Petroleum review JULY 2000

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kW = kilowatts (103)

MW = megawatts (10⁶)

GW = gigawatts (109)

sq km = square kilometres

kWh = kilowatt hour

km = kilometre

b/d = barrels/day

t/d = tonnes/day

ABBREVIATIONS

The following are used throughout Petroleum Review:

- $mn = million (10^6)$ bn = billion (10^9) tn = trillion (10^{12})
- cf = cubic feet
- cm = cubic metres
- boe = barrels of oil
- equivalent
- t/y = tonnes/year

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: Chris Moorhouse, Chief Executive, International Trading, BP Oil, hands over the IP Presidential badge of office to Charles Henderson, Chairman, Total Oil Holdings and Total Oil Marine at the AGM this month. Full report on page 19.









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ROUNFrom the Editor

Trying not to smile

Asked to name an industry which has never enjoyed lower finding and development costs for its main product, and one that is enjoying the most sophisticated technology ever as well as receiving the highest prices for its products in the last 120 years (apart from a brief five-year crisis period) – would you name the oil industry?

So traumatised has the industry become by the mega-mergers, the great price slide of 1998/99 and the stock market's continuing lack of enthusiasm for its shares that even good news is treated with the greatest suspicion. And high prices are good news.

The market has effortlessly absorbed the 2.2mn b/d increase in Opec production over January levels and driven prices above \$30/b again. The driving forces being low stocks, buoyant Asian demand and one or two special situations such as the introduction of the second phase of the reformulated gasoline programme in the US.

Opec's 21 June meeting has turned from being a review as to whether output needed changing to a meeting about how much extra should be produced. Key Opec states, still traumatised by the memories of the ill-fated Jakarta agreement of November 1997, remain as nervous and gloomy about prospects as the private oil companies. The nervousness and gloom seem misplaced – the market is fundamentally strong and for a number of good reasons.

There is now very litte 'spare' Opec capacity and that which there is is predominantly in Saudi Arabia. However, Saudi only has real power in Opec when it has unused capacity to threaten the market with or promise to western politicians. At least 1mn b/d of Saudi 'spare' capacity is probably the volume that must be kept off the market to retain their market leverage. In effect their useable 'spare' capacity is 0.7mn b/d rather than 1.7mn b/d.

No other Opec or non-Opec country now has any significant 'spare' capacity. New capacity will take time and effort to develop. It cannot be kept secret. So on the supply side the only question marks are Saudi policy and just how little capacity is left.

With the wisdom of hindsight we can now see that Jakarta was really about Opec countries trying to maintain their market shares in the face of Iraq's return to the market. The Asian crisis and the concomittant fall in Far East demand compounded and intensified the failure of Opec to accommodate Iraq's return. It was a special situation further complicated by all parties building stocks to record levels rather than cutting back production. As of now, global stocks are low and production surprisingly close to capacity. At less than 3%, global 'spare' capacity is virtually at an operational minimum and hardly a significant price threat.

The only other threat is from collapsing demand. However, here too the threat appears minimal. For the last six months, Brent has averaged over \$25/b (the dramatic price fall to \$22/b lasted all of 10 days). At such levels, prices have only been higher in the years 1979-1984 when Opec's power was at its height in the aftermath of the Iranian revolution.

Yet despite the high prices and the anguished cries of American politicians and motorists, all the evidence is of demand strengthening rather than weakening. The first quarter was relatively weak, at least in the west. The second quarter has been notably stronger with Indian and Asian demand increasing very strongly. With every day that passes the low stocks across the world become more price stimulative as the time to build winter stocks shrinks away.

So if there is no realistic possibility of major new production flows and if any weakening of demand does no more than facilitate stockbuilding for winter, why are the industry and its leaders so determined to be gloomy? Money is pouring into the industry's coffers in a flood, but is being invested with a caution that verges on parsimony.

At \$20/b the industry is profitable, at \$25/b it is very profitable. At \$30/b it is heading for record profits. Perhaps there is an explanation of the industry's perverse behaviour – dot.com envy. Is it that the industry's leaders sick of their stock options doing no more than adequately, and sick of hearing the plaints of stockbrokers analysts for more growth have decided to ensure that the industry is so profitable no one will ever be rude to them again?

Of course the explanation could be a little less dramatic. Having slashed E&P expenditures by 18% in 1999, the companies find themselves increasingly dependent on Opec for supplies at least for the next year or two. Rather lower prices would make negotiating this newfound identity of interest rather easier.

Chris Skrebowski



Tulsa-based Mercury International Technology has developed a software applications service provider technology and service - Interactive Internet Processing (iIP)™ – that aims to make high-end geophysical software applications more accessible and affordable to the E&P sector of the oil and gas industry. Customers will be charged approximately \$25/h, greatly reducing the capital formerly needed to purchase, maintain and upgrade expensive super-computers and software necessary for such highend applications. The service is provided on a 'pay as you use' basis, with user times calculated to the nearest minute. For more information visit www.goiip.com

More recently, six of the key energy companies in the US – American Electric Power, Aquila Energy, Duke Energy, El Paso Energy, Reliant Energy and Southern Co Energy Marketing – are reported to be planning to create a new Internet trading platform that will bring together buyers and sellers of electricity and natural gas. Together, the six companies are reported to trade some \$75bn in natural gas and electricity annually. Plans are to move as much of this trade as possible to the new site, which is, as yet, unnamed.

Surgutneftegaz and SAP are said to be planning to create an Internet oil exchange. However, the United Financial Group states that it doubts 'that the rest of the [Russian] industry will show much interest in creating such an exchange as it would lead to additional taxation.'

Chevron has become an initial subscriber to PriceWaterhouseCooper's PetroCore service at www.PetroCore.com – a website dedicated to joint interest accounting information exchange in the petroleum exploration and production industry. The site focuses on information sharing among companies that jointly own fields, as well as royalty owners, venture partners, service companies and others.

Transneft, Transnefteproduct, the Russian Railways Ministry, Sibneft and Transtelecom have joined forces to create an Internet exchange for trading oil and refined products, reports the United Financial Group's *Russia Morning Comment*. However, UFG comments that the lack of any oil producers among the founders of the project 'gives rise to suspicion that it may be no more than a PR stunt.'

Powershift, a UK programme that is helping to create a sustainable market for 'clean' fuels in the UK, has launched its new website at www.est-powershift.org.uk which

cont'd on p39

NEWUpstream

In Brief

Bright future ahead for North Sea

Speaking at the Scottish Offshore Achievement Awards in May (see *Petroleum Review*, June 2000), Euan Baird, Chairman and Chief Executive Officer of Schlumberger, indicated that the North Sea still had a bright future and that UK-based oil service companies had much to contribute to the global energy industry.

Pointing out that the 'Stone Age did not come to an end because we ran out of stones,' Baird stated that: 'Hydrocarbons have the potential to play a major role in the world's energy supply for the next 100 years if the industry invests in its future and repositions itself as a reliable supplier of environmentally acceptable, low-cost energy and a partner capable of leading the world into the next energy age – whatever that proves to be.'

Focusing on the environmental issues impacting the industry, he stated that as the use of hydrocarbons for energy is one of the main sources of man-made carbon dioxide (CO2) emissions, it was essential that the industry was 'proactive' in helping to develop a much better understanding of the mechanisms which determine the earth's climate and, in particular, establishing the relationship between increasing CO2 concentrations in the atmosphere and global warming. 'Should increasing levels of man-made CO2 prove to have a significant and detrimental effect on global climate, my conviction is that sequestration of CO_2 will be a more cost-effecitive solution than switching prematurely to other, less efficient sources of energy,' he said.

He indicated that studies conducted by the Department of Energy (DOE) into various methods of CO2 sequestration have set a goal of \$10/t of carbon. 'If this cost range can be achieved, it will be practical to offset all projected growth in greenhouse gas emissions beginning in 2015. This additional cost of sequestration would add about \$1 to the cost of a barrel of oil, not much when one considers the amount of tax that is levelled on this fuel today. Importantly, at current production rates, it would produce a business with annual revenues of around \$30bn. Scottish industry has developed an enviable reputation in offshore technology and I am convinced that this can be adapted to meet the needs of carbon sequestration in the oceans."

Baird went on to highlight the enormous efforts made in recent years to keep the North Sea oil and gas industry alive, citing that between 1990 and 1998 the province accounted for over 80% of the growth in non-Opec oil production and around 30% of the growth in worldwide production. 'To sustain production, innovative ways must be found to extract more of the oil in place in existing fields, cost-effectively map and develop satellite fields and open up new areas, such as the West of Shetlands, in a safe and environmentally acceptable manner.'

He said that companies should centre their attention on:

- Improved recovery using real-time reservoir management techniques which anticipate production problems in the reservoir before they affect the production of the well.
- Bringing to the surface only what is required. 'Today we talk about disposing of water and gas downhole, tomorrow it could be carbon.'
- Completion techniques to reduce costs, improve safety and facilitate remedial work.
- All aspects of storing carbon dioxide, including re-injection into depleted reservoirs, downhole separation of carbon from hydrogen, and sequestration of carbon in the ocean depths.

Baird stated that he was convinced that 'Scotland is a more entrepreneurial place than it was during the initial oil boom in the 1970s and that the opportunities in this mature phase are more numerous than in the exploration and development of the first large producing fields.' He emphasised that now was a period when 'small creative companies with minimum overheads will prosper as they make more aggressive use of new technology coming from the service industry and universities.' He stated that this would require:

- a new breed of young entrepreneurs who see opportunities not problems, and have the courage to go all the way and not sell out at the first opportunity;
- the universities to supply technology and well-trained people; and
- the cooperation of government to ensure that fiscal incentives are tuned to the opportunities.

Visit the IP website @ www.petroleum.co.uk An alliance of oilfield service companies BJ Services, DSND, Total Safety, Dolphin Well Services, Expro North Sea and Expro Group Integrated Services – together known as the Liverpool Bay Contractors'Alliance (LBCA) – has secured a contract to provide BHP Petroleum with a complete range of field services for its Liverpool Bay Asset for the next five years.

UK

OMV (UK) has finalised an Atlantic Margin farm-in deal with Shell UK under which it will acquire a 15% interest in blocks 204/27a and 204/28 and a 15% interest in block 204/29b.

Talisman and partner Summit North Sea Oil are understood to be planning to go ahead with the development of the North Sea Beauly oil field in which Talisman holds a 60% interest. Located in block 16/21c, the field has reserves put at just 3mn barrels of oil. Beauly is to be developed via a 4,000 ft horizontal extension to an existing well, which will be tied back to the Balmoral floating production system. First output is slated for 4Q2000 at an initial rate of 10,000 b/d.

Two new initiatives that are aimed at speeding up the development of marginal oil and gas fields have been unveiled by UK Minister for Energy, Helen Liddell. The Pilot Undeveloped Discoveries Workgroup is promoting a process to find new ways of bringing together the licence owners of adjacent discoveries to explore new ways to facilitate their development. Meanwhile, Amerada Hess, BP Amoco and Shell, working with the Undeveloped Discoveries Workgroup and Logic, are planning a complementary 'Satellite Accelerator' initative. The intent is to open a number of opportunities for industry collaboration, inviting innovative proposals from the industry at large.

The UK's Emergency Response and Rescue Vessel Association (ERRVA) has expressed concern over news that BP Amoco is considering substituting rescue vessels with helicopters, stating that the so-called 'Jigsaw' scheme was a 'cost reduction initiative ' and would lead to a 'very definite dilution in the offshore rescue capability' in the North Sea.

BG is reported to be seeking approval for the second phase of development of the Armada gas condensate field in

NEW_{upstream}

World growth boosts oil demand

Without an agreement to increase output further at the Opec meeting planned at the end of June, oil prices will drift higher still over the next few months, states the latest Royal Bank of Scotland Oil and Gas Index.

Buoyant world growth is boosting demand and has recently led to an inevitable increase in the price of oil to over \$30 – well above the upper end of Opec's target range – frustrating all attempts to stabilise prices.

In addition, the apparent arrangement to increase supplies to reduce prices again has not been implemented by Opec, although this may change when the group meets in June.

'There are too many variables which can frustrate attempts to fine tune the market and the Royal Bank's Oil and Gas Index has previously notes that prices could move strongly up or down given the range of unpredictable forces which would be brought to bear on the oil price after March,' comments Stephen Boyle, Head of Business Economics.

'However, the most likely result of the next Opec meeting is a further modest increase in output with the aim of bringing prices back within the target range of \$22 to \$28 per barrel.'

| Year Month | Oil production (av. b/d) | Gas production (av. mn cf/d) | Av. oil price (S/b) |
|---------------|-----------------------------|---------------------------------|------------------------|
| Apr 1999 | 2,717,767 | 9,863 | 15.66 |
| May | 2,507,093 | 7,349 | 15.18 |
| Jun | 2,400,277 | 6,785 | 15.91 |
| Jul | 2,602,363 | 6,852 | 18.90 |
| Aug | 2,645,493 | 6,604 | 19.93 |
| Sep | 2,588,488 | 7,379 | 22.83 |
| Oct | 2,666,146 | 9,380 | 22.03 |
| Nov | 2,698,681 | 11,641 | 24.64 |
| Dec | 2,634,050 | 13,054 | 25.64 |
| Jan 2000 | 2,645,841 | 12,900 | 25.63 |
| Feb | 2,567,535 | 12,645 | 27.97 |
| Mar | 2,606,250 | 12,306 | 27.27 |
| Apr | 2,480,945 | 12,024 | 23.15 |

Source: The Royal Bank of Scotland Oil and Gas Index

North Sea oil and gas production

New definitions for NWCS concession blocks

Several countries have recently changed, or are proposing to change, the definition and datum origin of concession blocks in the area of the NW European Continental Shelf and Atlantic Margin, reports Exploration Consultants Ltd (ECL) of the UK. The UK has re-defined its concession blocks with respect to ETRF89 Datum west of 6 Degrees West, whilst Ireland has proposed changes to the concession blocks and international boundaries has also recently been finalised.

These changes and new definitions have proved to be problematic for many

oil companies and their future exploration plans. In response to requests for accurate databases, ECL, has developed a dataset solution incorporating all necessary changes to co-ordinates. The dataset includes concession block definitions for the UK, Norway, Denmark, Germany, Netherlands, Ireland, Faeroes and their respective international boundaries. It has been designed to be accurate to the one-metre level, as opposed to many existing small-scale mapping systems, which are claimed to lose up to five metres on block boundary line definition alone and more on the international boundaries.

In Brief

North Sea block 22/5b. It is proposed to drill a further seven wells and a sidetrack of an existing well using the Santa Fe Galaxy III jack-up.

The UK's 19th offshore licensing round is reported to have been delayed by a further six months as the UK Government is understood to have failed to implement environmental regulations required under the European Commission's Habitats Directive.

A total of 30 companies have placed 57 applications for 141 blocks in the UK's ninth landward petroleum licensing round. Just under half the blocks applied for have a coal bed methane or vent gas focus. Ten of the applicants are understood to be newcomers to onshore petroleum licensing in the UK.



Ramco Oil & Gas (60%), in partnership with Island Petroleum Developments (32%) and Sunningdale Oils (Ireland) (8%), has been granted a licensing option for Galley Head, offshore Ireland. Galley Head encompasses parts of blocks 48/18, 48/19 and 48/24, all in the North Celtic Sea Basin, and is located just 25 km north of the Seven Heads oil and gas accumulation.

Umoe Olje og Gass of Norway is under stood to have won the main topsides fabrication contract for Statoil's Kvitebjorn North Sea field. Construction is due to start in August.

Aker Maritime and J Ray McDermott joint venture Spars International is understood to have secured a contract to build what is claimed to be the world's fourth spar-type production platform. The unit is destined for Kerr-McGee's Nansen field in the Gulf of Mexico. An order for a further unit is also thought to be under negotiation, for the company's Gulf of Mexico Boomvang field. Hull fabrication will be undertaken at the Aker Rauma yard, before shipment to the Gulf of Mexico for completion by McDermott.

Statoil is understood to be proposing to develop the North Sea Kristin field via a floating platform at a cost of over NKr12bn. The field is due onstream from 2005.

Kvaerner has secured a \$16mn contract to supply pumps and pumps systems to Norsk Hydro's North Sea Grane field

4



In Brief

Enron and Sasol to cooperate in Mozambique

Enron and Sasol have reached an agreement to cooperate concerning their respective gas and pipeline rights in Mozambique. The agreement – still to be formally approved by the government of Mozambique and subject to technical reviews – will combine and align the interests of the two companies and will lead to the construction of a single pipeline stretching from central Mozambique to Maputo and the Latin American markets.

Enron currently holds the rights to develop the Pande gas field and to own and operate a pipeline from the field to Maputo, where it is developing the Maputo Iron and Steel Project in conjunction with five international steel companies. Sasol has the rights to the Temane field and the Sofala and M-10 blocks, as well as pipeline rights to transport gas from the fields to South Africa.

The independent development of each of these projects would have resulted in two parallel pipelines from central Mozambique, running south. The companies recognise the considerable synergies in moving the gas via a single pipeline, which will achieve better efficiencies and improve the viability of both projects.

Proposals invited for European funding

Proposals have been invited under the third and final round of the EPSRC/DTI Oil and Gas Extraction programme, which will commit funding of around £2mn to new projects. The programme aims to:

- Take forward the recommendations of Foresight, the UK Government programme to clarify important pointers for industry and research.
- Focus on key research issues for the oil and gas industries.
- Allow the development of collaborative (larger) programmes of research.

 Encourage networking between academia and industry.

The third round includes an outline proposal step into the assessment process. Only those proposals shortlisted by the Programme Advisory Panel will be invited as full submissions.

The deadline for outline proposals, which will be accepted from those organisations eligible to receive LINK and EPSRC funding, is 31 July 2000. For more information contact: Dr David Holtum, EPSRC Engineering Programme, Tel: +44 (0)1793 444478; e: david.holtum@epsrc.ac.uk

Venture completes 'Trees' acquisition

Venture Production has completed its purchase of Lasmo's 46.9% operated interest in North Sea block 16/12a and 25% stakes in adjacent blocks 16/13b and c. Block 16/12a contains the producing Birch and Larch oil and gas fields, together with the undeveloped Pine and Elm accumulation, known as the 'Trees' fields. Birch and Larch are currently producing 7,000 b/d of oil through a subsea tie-back to the Brae complex. The bulk of this output, 4,700 b/d, comes from Birch, with Larch producing intermittently at present.

The acquisition marks an important milestone for the company, establishing it as a North Sea operator and positioning it for growth in the UKCS sector. Founded in 1997 and based in Aberdeen, Venture's strategy is to focus on the exploitation of discovered but undeveloped fields, known as 'stranded' reserves, which fail to meet investment or materiality thresholds of the current owner-operators. This is achieved using a combination of modern oilfield technology and operating practices and innovative commercial structures.

According to Andy Bostock, Venture's North Sea General Manger, the Trees fields have the potential to add 20,000 b/d to the company's portfolio. It is planned to soon drill a water injection well in the Larch field, in order to reinstate sustained production of 6,000 b/d in 2001, and to overhaul Birch in order to raise production. Plans also include bringing Elm and Pine onstream, probably as subsea satellites to Agip's Tiffany field complex. First oil may be produced as soon as 2001. Both Elm and Pine tested at 10,000 b/d during appraisal. Elm reserves are put at less than 5mn barrels. with slightly more predicted for Pine.

Venture also plans to continue its drilling and workover programme in Trinidad, where it has taken production from its five oil and gas fields from 300 boe/d to over 1,500 boe/d in just five months. Some \$20mn is to be invested in this region in 2000. Plans are to boost production to 4,000 b/d in 2000 and 8,000 b/d in 2001. North America

R&B Falcon has announced that six of its shallow-water jack-ups and three of its drill barges are to re-enter active service in the near future as demand for drilling services in the Gulf of Mexico continues to grow.



Hellenic Petroleum of Greece and Austrian oil company OMV are reported to be planning to jointly drill for oil on Hellenic Petroleum's proven 20,000 bld oil deposit in Iran and its 250mn barrel field in southwest Albania

State-owned Syrian Petroleum Company has initiated a major programme for developing the country's gas reserves, report Stella Zenkovich. The gas will be primarily used to supply Aleppo, the second largest city, and for export to Lebanon. Conoco is understood to be interested in participating and TotalFinaElf has submitted a proposal for exploiting six fields near Palmyra.



Lukoil – which holds a 10% stake in the Azerbaijan International Oil Consortium (AIOC) – has said that it may not use the proposed Baku–Ceyhan pipeline to send its oil to market, preferring instead to transport its volumes via Russia's northern pipeline to the Black Sea of Novorossiysk, reports the United Financial Group's Russia Morning Comment.

Russian oil production is forecast to rise by the International Energy Agency to 7.3mn b/d by 2010 compared with 6.4mn b/d today.

Wintershall of Germany has confirmed plans to develop the 1.8bn barrel Prirazlomnoye field with Gazprom, reports the United Financial Group's Russia Morning Comment. The company is also understood to be planning to invest up to \$1bn by 2003 if the project is approved.

Gazprom is reported to have said that it remains confident that the Blue Stream pipeline between Russia and Turkey will be completed on time and that deliveries will commence in 2001, according to the United Financial Group's Russia Morning Comment.

NEW_{upstream}

In Brief

Scottish oil and gas industry 'Oscars'

The Scottish Enterprise Energy Group reports that over 1,500 companies have requested copies of the group's Spends & Trends dynamic forecasting tool for upstream expenditure on the UK Continental Shelf (UKCS) since its launch last year. A further 100 companies have attended workshops throughout Scotland.

Developed in partnership with 40 offshore operators, contractors and SMEs, the tool aims to stimulate strategic planning within the Scottish oil and gas service and supply base by helping companies explore how forces in the external environment can impact upon their day-to-day business. According to SE Energy Group, use of the tool could save the Scottish service and supply base £1mn/y in planning costs.

Updated by Arthur Andersen following feedback from operating companies, the *Spends & Trends UKCS 2000* CD-ROM holds the tool software, as well as a 1999 online report, a 2000 online report and an online user guide. The 2000 version includes forecasts based on three new oil and gas price scenarios in addition to the three detailed in the original release.

The new Low Case scenario is based on a \$12-\$13/b oil price, while the Base Case scenario assumes a \$16/b nominal oil price with gas prices rising and remaining at 15p/therm in 1999 real terms. The High Case scenario examines the effects of oil prices ranging from \$20 to \$22/b. In addition to the numerical forecasts presented in the report, the software allows users to produce a variety of expenditure forecasts over a six-year period to 2005 via the manipulation of key variables such as oil price. This, in turn, can help the user develop contingency plans to weather out the peaks and troughs of the oil and gas industry.

Under all three new economic scenarios, expenditure on the UKCS over the next five years is forecast to fall in real 1999 terms from the levels seen in 1997/1998, with 50% of total spend focused on development drilling. Opex is expected to stay reasonably constant, with a trend towards higher expenditure on well servicing and operational costs, and lower spending on onshore support.

The most popular types of development will be in subsea, minimum facilities and FPSOs, reflecting the maturity of the market and the increasing number of marginal fields and small pockets of reserves which require lower cost solutions for financial viability.

'New technologies and new ways of working are going to be key in securing the future of the UKCS as an attractive location for investment as it becomes increasingly focused on the next generation of smaller developments,' commented Louise MacDonald, Manager at SE Energy Group. 'At the same time, companies must be prepared to exploit global opportunities and diversify into other sectors to cushion the impact of peaks and troughs of business in the UKCS.'

Dana outlines future company plans

Outlining future plans to journalists in Aberdeen on 19 May, Dana Petroleum's Managing Director Tom Cross explained that he was looking to boost company turnover by at least 35% this year. He stated that Dana had already achieved profitability in just four years, well ahead of the six years originally forecast when the independent company floated in 1996.

The company has a market capitalisation of around £140mn, is debt free, and has £25mn in the bank. It has also made £35mn from strategic transactions and holds a number of valuable discoveries, the most recent being its Ande Ande Lamut-1 discovery in Indonesia (see *Petroleum Review*, June 2000).

The company is understood to be currently negotiating a new North Sea asset acquisition that could boost total daily oil production from 7,000 b/d at present to 20,000 b/d in 2001. However, Cross would not be drawn on specific details, saying only that an announcement may be made in the next month.

The company has made six consecutive discoveries in less than two years, three in the North Sea, two in Indonesia and one in Ghana. According to Cross, Dana plans to focus on its core areas of the North Sea, West Africa, northwest Europe, southeast Asia and Russia in the future.

He also indicated that the company had great confidence in the future of the Faroes, whose first offshore licensing round closed last month with 17 companies lodging applications.

Dana is in a good position to participate in this region, holding a 20% stake in local oil company Foroya Kolvetni, which is expected to float on the London stock exchange later this year. Ratification of tax concessions by Russia and, most recently, Turkey, have removed one of the major uncertainties facing the project.

Kazakh state oil company – Kaztransgaz – is reported to have secured rights to develop the Amangeldin group of gas fields in the Zhambyl region in the south of the country. Total proven field reserves are put at 25bn cm of gas.

Chevron, operator of the Tengizchevroil joint venture – in which Lukoil holds a 5% interest shared with BP through Lukarco – has said that it plans to increase output by almost 25% to 260,000 b/d by the end of June, reports the United Financial Group's Russia Morning Comment.

Dragon Oil is reported to be planning to invest \$35mn on developing the Lam and Zhdanov fields in the Cheleken block offshore Turkmenistan this year. Field reserves are put at 80mn tonnes. Total project development is expected to cost \$2.2bn.

Lukoil and Socar are understood to be planning to invest \$250mn on rehabilitating and exploring further the 150mn barrel Azeri Zykh-Govsany field. The field is expected to produce between 30,000 and 40,000 bld (2–3% of Lukoil's total).

Lukoil's Severny field contains 60% oil and 40% gas, reports the United Financial Group's Russia Morning Comment.

Lukoil, Yukos and Gazprom plan to create an alliance to explore hydrocarbons in the Russian sector of the Caspian shelf. The three partners will hold equal stakes in the Capsian Oil Company which holds a licence for a 13,000 sq km exploration block surrounding Lukoil's recently discovered 2.1bn barrels Khvalynsky field.

The Russian Duma is reported to have approved the PSA development of the Tyanskoe oil field in Western Siberia.



AEC International and West Oil are reported to have discovered oil with their Puffin 5 well in the Timor Sea. Wireline logs are understood to have indicated a total of 9.4 metres of net oil pay in the well which is to be suspended as a potential producer.

NEW Spstream

Operators of a LNG project in northwest Australia are close to completing a major deal with Japan, reports Clare Blackburn in Whangarei, New Zealand. Japanese buyers are negotiating a \$3bn (£1.2bn) staged expansion of LNG production from the North-West Shelf project, according to operator Woodside Petroleum. Woodside, which has an equal stake along with Shell, Chevron, BHP and Japan Australia LNG, is confident that it will be delivering to Japan by 2004.

Premier Oil reports that the partners in the Kirthar exploration licence and the Government of Pakistan have agreed to the sale of gas from the 1tn cf Bhit field. In addition, the development plan for the field has been submitted to the Ministry of Petroleum and Natural Resources. Field development is slated to begin in 3Q2000, with first gas expected in 2H2002.

OMV of Austria is understood to be targeting a 2Q2002 start-up for its Sawan gas discovery in Pakistan. The \$210mn development plan for the 2tn cf gas field has yet to be approved by the authorities. A gas sales and pricing agreement has also yet to be negotiated.

The Government of Pakistan has granted OMV petroleum exploration licenses covering block 2668-4 (Gambat) in the district of Khairpur Sindh and block 2871-6 (Yazman) in the Bahawalpur district of Punjab. Over \$4.8mn is to be invested on exploration in the Gambat licence area, and \$5mn on Yazman, over a three-year period.

Shell and Cairn Energy are reported to have signed a production sharing contract with state-owned company Petrobangla covering oil and gas exploration blocks 5 and 10 in Bangladesh. Five wells are to be drilled in block 10 and one well in block 5 under the deal.

Agip of Italy is understood to have signed a production sharing contract with the China National Petroleum Corporation (CNPC) covering exploration for natural gas in northwest China's Qinghai province where possible reserves are put at 250bn cm.

US company Unocal is reported to be planning to invest a further \$200mn to \$300mn on gas exploration projects offshore Thailand's borders with Vietnam and Cambodia. Kalrez Energy is reported to have been granted a 20-year extension of its PSCs at the Bula and Seram oil fields in Indonesia. Bula has 85 wells currently producing and remaining recoverable reserves of 1.1mn barrels. Further exploration and development of Seram is planned next year, at a cost of \$157mn.

Unocal Thailand is reported to have indicated that it will bring onstream its Arthit field in the Gulf of Thailand in 2005. A total of six successful wells have been drilled to date in blocks 14A, 15A and 16A.

Indonesia Petroleum's Dinichthys-1 exploration well is reported to have made a gas and condensate discovery in WA-285-P in the Browse Basin offshore Western Australia. The well is understood to have tested at 22mn cf/d of gas and 1,300 b/d of condensate. Plans are to bring the prospect onstream as early as 2001.

Latin America

BHP Apiro-1 well in the block 2(c) production sharing contract area offshore Trinidad has tested at 21.6mn cf/d of gas.

An Enron Offshore Services and Horizon Offshore joint venture is reported to have secured a \$33.6mn contract from Mexican state oil company Pemex to install six pipelines in the Cantarell field in the Bay of Campeche.

Brazil's National Petroleum Agency (ANP) is reported to have approved 44 companies to compete for the second auction of 23 oil exploration licences due to be put out to tender in June 2000. The ANP is understood to have made contract terms more attractive in a bid to encourage foreign participation. It is also said to be offering manageable areas with varied terrain to encourage smaller independent companies to enter this arena.

Africa

Nigeria has called for \$35bn investment over the next five years to develop its oil sector, writes Stella Zenkovich. Presidential Advisor is understood to have offered to provide an 'enabling environment' to those companies moving into the area. The Nigerian Government is also understood to be preparing to embark on periodic licensing rounds. Triton Energy reports that the Ceiba-3 development well offshore Equatorial Guinea has confirmed the primary reservoir found in the Ceiba-1 and Ceiba-2 wells and encountered a deeper similar-quality oil reservoir.

The World Bank is reported to have approved a \$193mn finance package in support of a \$3.7bn oil development and pipeline project which is to link oil fields in southern Chad to the coast of Cameroon.

BP Amoco has announced a potentially 'significant' oil discovery – Galio – in block 18 offshore Angola, the company's third successive discovery in the region. The Galio 1 discovery well tested at 4,770 b/d of 34 degrees API oil. The two previous discoveries, Platina and Plutonio, tested at 6,500 b/d and 5,700 b/d in May and July respectively.

TotalFinaElf has announced a new oil discovery on the Mer Tres Profonde Sud (MTPS) permit offshore Congo Republic. The Andromede Marine-1 well – which set a record for the Republic of Congo by reaching a water depth of 1,893 metres – tested at 7,000 b/d of high-grade oil.

TotalFinaElf has signed an agreement with the Nigerial National Petroleum Corporation (NNPC) for the development of the Amenam/Kpono field which straddles blocks OML 99 and OML 70 offshore Nigeria. Some 500mn barrels of oil are expected to be produced from the field, which is to be developed via production platform tied to a floating storage and offloading vessel located on TotalFinaElf's Odudu field in OML 100. Start-up is slated for mid-2003 with production targeted at 125,000 b/d. Associated gas will be either re-injected or commercialised through the nearly NLNG plant in Bonny. Field life is put at 25 years.

International Egyptian Oil Company (IEOC), the local arm of Italian company Agip, has submitted a \$450mn investment plan to the Petroleum Ministry to sustain oil production at its Belayim fields in south Sinai and the Gulf of Suez, writes Stella Zenkovich. Having come onstream in 1986 and reaching peak production of 240,000 b/d in 1993, Balayim's production has since dropped to 186,000 b/d. The intention is to increase and sustain output at 200,000 b/d.

NE Upstream/Industry In Brief

Shell increases stake in Sakhalin II

Shell is to increase its stake the Sakhalin Il project offshore Sakhalin Island by acquiring Marathon's 37.5% stake in Sakhalin Energy Investment Company. Shell already holds a 25% interest in the company. In exchange, Marathon will acquire Shell UK's 28% interest in the BP Amoco-operated Foinaven field and associated infrastructure in the Atlantic Margin and a 3.5% overriding royalty on 100% of the production from eight blocks in the Gulf of Mexico, including the Ursa field. In addition, there will be a reimbursement of expenditures made by Marathon for the Sakhalin project for the year 2000.

The deal is subject to a number of contingencies, including an agreement with the remaining shareholders of Sakhalin Energy – Mitsui & Co and Mitsubishi Corporation – under which Shell will provide both upstream and LNG services to the company.

Sakhalin Energy has current reserves of 1bn barrels of oil and 14tn cf of natural gas. Output from the existing

Malampaya CGS first

The concrete gravity sub-structure for Shell's Malampaya field was installed offshore Palawan Island on 1 June, exactly three months ahead of its schedule. Installation of the CGS – claimed to be the first such unit to have been constructed in Asia – is the first stage in the completion of the Malampaya Deepwater to Power Project which will supply more than 20% of the electricity demand of the main island – Luzon – by 2002.

The contract for design, construction and installation of the CGS was awarded by Brown & Root Energy Services to the Malampaya CGS Alliance in late September 1998. The Alliance comprises ArupEnergy, Australian civil engineering contractor John Holland and Van Oord ACZ. The 385,000 barrel capacity unit was constructed in Subic Bay Freeport in the Philippines. Four shafts, each 57m metres high, will support the 13,000 tonnes operating weight of the integrated gas processing deck, which is due to be float-over installed in early 2001.

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Vityaz production complex is targeted to rise from 1mn barrels in 1999 to 13mn barrels in 2000. At present, the complex is producing for six months per year as it is blocked by ice for the other six months. The company is evaluating alternative schemes to supply associated natural gas for Russian utilisation.

Work is underway to finish appraisal of the Piltun lobe of the Piltun-Astokh field, with two appraisal wells planned in 2000, and the company is working on obtaining sales contracts for Lunskoye gas. Sakhalin Energy is also planning to move into the front-end engineering and design phase by the end of this year, with first production from Piltun and Lunskoye slated for 2005. Full field development will eventually include additional platforms on the Piltun feature and Lunskoye gas field, an onshore processing plant in the north of the island, oil and gas pipelines to ice-free harbours in the south of the island, an LNG plant and oil and LNG terminals in the south of the island. Total project investment is put at \$10bn.

Seismic JV unveiled

Schlumberger's surface seismic business Geco-Prakla is to be merged with Baker Hughes' Western Geophysical seismic unit to form a new venture called Western GECO. Schlumberger is to pay Baker Hughes \$500mn in cash and the new venture will be owned 70% by Schlumberger, 30% by Baker Hughes. The merger is expected to generate 'significant' cost savings which will 'support the development and innovation necessary to help seismic maintain its role as a key contributor to the oil industry's process of lowering the cost of finding and producing oil and gas.' The transaction is expected to complete before year-end.

Egyptian gas deal

BP Amoco has signed a Letter of Intent with the Egyptian General Petroleum Corporation (EGPC) covering a twodevelopment complex which will be located on the Mediterranean coast close to BP Amoco's gas fields. The developments will consist of a two-train LNG project and a two-train natural gas liquids (NGL) project.

The plan is to build a world-scale NGL plant to quickly supply the growing demand for LPG in Egypt. First production of NGLs with delivery of LPG to the local market is slated for early 2003. The twotrain LNG plant will process and ship LNG to Mediterranean and other markets, with the first shipment planned in 2004. TotalFinaElf has announced that up to 65 of its 630 UK staff may be made redundant as part of a restructuring of its UK operations following the merger of TotalFina and Elf Aquitaine.

UK



Eni of Italy is reported to be planning to cut annual costs by \$1.52bn by 2003, up 60% from its October 1999 announcement.

BP Amoco is to acquire Bayer's 50% stake in their petrochemicals joint venture Erdoelchemie for an undisclosed sum.

TotalFinaElf is planning to launch an exchange offer in France and North America for the 4.44% of Elf Aquitaine shares currently not held by the Group.

Statoil is reported to be planning to cut a further 700 jobs by the end of 2001 in a bid to cut costs by NKr1bn/y. Some 1,600 positions have already gone over the past year as part of the company's original plan to cut costs by NKr3bn/y.



Ken Arnold, President of Paragon Engineering Services, has acquired Halliburton's 40% stake in Paragon, bringing his ownership to 60%. Dresser-Rand owns the remaining 40% of the company which provides front-end engineering, detailed design, project management, procurement, construction management, inspection and training services to the oil, gas and pipeline industries.

Canadian Natural Resources (CNR) is reported to have beaten Petrobank Energy with a C\$650mn (\$442mn) takeover bid for Ranger Oil. Ranger holds a number of North Sea, Canadian, North American and West African assets. It is understood that CNR plans to sell the company's North American assets as they are not a strategic fit in its portfolio of operations.

Aspen Technology – a US-based provider of enterprise optimisation and extended supply chain solutions for the process industries – has acquired Petrolsoft, a leading supplier of web-enabled supply chain software for the downstream industry, for an undisclosed sum. The deal will allow

NEWindustry

In Brief

Scottish companies launch Norwegian initiative

Scottish Enterprise Energy Group, in partnership with Scottish Trade International and the British Embassy, has launched a new market development initiative to assist Scottish companies break into, or expand market share, in the Norwegian oil and gas market.

Oivind Martinsen has been appointed as the Group's Stavanger-based Offshore Commerical Advisor. He will work with the Energy Group to identify companies with appropriate products, services and capabilities for the Norwegian market.

According to Louise MacDonald of SE

Conoco acquires Saga UK

Conoco (UK) is to acquire Saga UK from Norsk Hydro for \$540mn. The sale includes Saga's interest in the North Sea Britannia gas field, bringing Conoco's stake to 51.42%. It will also boost Conoco's share in the Alba field to 23.43%, making it the largest equity holder. Other assets include Saga's 25% stake in the Gryphon field, its interests in the Thistle area – which includes Area 6 (18.28%), Don NE (19.71%), Don SW (41.67%), Deveron (18.28%) and Thistle (18.28%), and 27 exploration licences in the North Sea and Atlantic Margin.

The deal will add total estimated recoverable reserves of 113.1mn boe and increase Conoco's UK reserves by 14%. Daily natural gas and oil production from the company's UK operations are expected to rise by 10% and 30% respectively. The deal is subject to UK regulatory and government approvals.

Energy Group, Norway is 'an attractive oil and gas province for new exporters to cut their teeth on as it has many similarities to our domestic market and most of the major operators and contractors are active in both regions.'

Production of oil and natural gas liquids (NGLs) on Norway's Continental Shelf is predicted to continue to increase from 240mn cm of oil equivalent in 1997 to a plateau of 300mn cmoe in 2002. Official figures indicate an annual spend of NKr50-60bn (£4-5bn).

Birthday Honours

Shell Chairman Mark Mood-Stuart became a Knight Commander of the Order of St Michael and St George in the Queen's Birthday Honours List for 2000.

BP Amoco Deputy Chief Executive Rodney Chase was awarded a CBE, as were Anne Quinn, Group Vice President, BP Amoco; Keith Henry Taylor, Former Chairman of Esso UK; and Professor Ian Fells, Professor of Energy Conversion at the University of Newcastle.

OBEs were awarded to Professor Peter Calow, Chairman of the Advisory Committee on Hazardous Substances; Bryan Samuel Jackson, Senior Director of Toyota Motor Manufacturing; and Robert Arthur Patrick Mellor, Trustee, Royal Society for the Prevention of Accidents.

Shell solution to slug problem

Shell Global Solutions International and Houston-based Dril-Quip have announced a license agreement for an innovative slug suppression system that is claimed 'will help optimise multi-million dollar, offshore oil and gas production flows around the world.' Dril-Quip is to use its worldwide network to manufacture, market and service the new, intelligent slug detection and control system which was designed and developed by Shell Global Solutions. Shell is also to provide technical support, computer flow modelling and training. Slugs are liquid surges (which can be followed by gas surges) that disrupt steady production flows in mixed oil/gas subsea pipelines and offshore platform riser systems. Until now, a common remedy has been costly cutbacks in flow rates until the problem has passed. However, this new system is designed to stabilise the flow of oil and gas before it reaches processing equipment on offshore platforms. According to Shell, this 'replaces the need to throttle back production and means faster flow start-up and higher processing rates.'

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AspenTech to offer an integrated solution for optimisation and automation of the entire supply chain for oil companies, from crude selection, to refining, to deliver of products to the consumer.

BP Amoco has entered into a merger agreement with Vastar Resources under which BP Amoco will acquire Vastar's publicly-held minority stockholding at \$83 per share. BP Amoco already holds 81.9% of Vastar following its merger with Arco.

Alon Israel Oil Company is reported to be planning to acquire all the USbased downstream assets of TotalFinaElf, excluding chemicals, for an undisclosed sum. Assets to be acquired include the 55,000 b/d refinery at Big Springs, Texas.

The Canadian Government has removed the 25% restriction on foreign ownership and increased the limit on individual ownership from 10% to 20% in order to give companies competitive access to capital markets.



Russia's Deputy Prime Minister, Viktor Khristenko, has said that Russia does not need a state oil company and that a competitive market would be a more efficient solution to providing fuel to the nation's consumers, reports the United Financial Group's Russia Morning Comment.

Lukoil has released its 1999 pre-tax results. According to the United Financial Group's Russia Morning Comment, the company posted a 30% increase in net revenues to \$10,903mn and a 283% rise in gross profit to \$1,987mn.

A former CEO of Lukoil-Uraineftegaz has been elected the new CEO of Onaco, reports the United Financial Group's Russia Morning Comment.

The replacement of the Russian Fuel and Energy Minister Viktor Kalyuzhny will have an 'extremely beneficial effect on oil companies' earnings and the level of foreign investment,' reports the United Financial Group's Russia Morning Comment. According to UFG, the new Minister, Alexander Gavrin, is 'unlikely to continue to scare off direct foreign investment, as Kalyuzhny did in the cases of BP Amoco, Sidanco and the PSA projects.'

NEW Sownstream In Brief

China to joint World Trade Organisation

China has agreed to a partial liberalisation of its trading system for oil and petrol through a deal struck with the European Commission which should pave the way for the Chinese Government to join the World Trade Organisation later this year, reports *Keith Nuthall*.

At present, foreign oil importers have to sell crude and processed oil via a Chinese state import agency. However, Beijing has now agreed that upon WTO accession, these importers will be able to sell direct to customers until a certain level of imports has been reached in a given year. These ceilings are 7.2mn tonnes for crude oil and 4mn tonnes forprocessed oil. These levels are to rise by 15% each year.

Meanwhile, China has insisted that an overall import quota for processed oil should remain fixed at 16.58mn tonnes, rising by 15% per year until 2004, when it would be abolished. There would be no restrictive quota on crude imports, only a licencing system.

New look for Lukoil retail network



Minale Tattersfield & Partners recently completed a major image and forecourt design update project for Lukoil's Russian fuel retail network. Lukoil was looking for a new, modern image that could compete with western retailers such as BP Amoco.

There were strong practical considerations to take into account in the design. One of the primary concerns, for example, was that the canopy structure should be able to support the weight of up to 10 ft of snow for six months of the year, as would be the case in certain parts of Russia. The design also had to offer protection from the elements, not only snow and rain, but also icy temperatures of down to -40°C, often accompanied by chilling winds.

A dome-type structure was proposed, which sheltered the motorist from rain and snow and offered protection against biting winds whipping around the sides. It was also proposed to maximise the available retail space by building upwards – this would be particularly suited to urban areas where land is at a premium. A two-storey building concept was put forward which could accommodate the forecourt shop and a partner brand, such as MacDonalds. Another alternative would be a cyber café.

However, Lukoil felt 'more comfortable' with a conventional service station design where the principal means of differentiation from the competition lay in the branding of the site. The new design builds on the existing brand equities, using the distinctive colour red, the name and the distinctive angle of the 'K' of Lukoil which has been worked into the unusually shaped canopy edge. In addition, the unusual lozenge shape of the logo has been picked out in other branded elements such as signage and used in elements of the building.



Shell is reported to be planning to build two gas-fired power stations in the UK when the government lifts its moratorium in the autumn.



BP Amoco and ePower, a new Irish energy company, are to form a power and gas marketing joint venture in Ireland. The two companies will join as the major shareholders in the proposed 400-MW Powerstoon power project being developed by Ireland Power Energy near Dublin.

ExxonMobil is to sell its 25% stake in German gas transmission, distribution and storage company Thyssengas to RWE Energy, subject to approval by the European Commission, for an undisclosed sum.



Tulsa, Oklahoma-based Syntroleum has agreed a fuels testing deal with General Motors, covering the testing of synthetic fuels for advance power train systems.



Sasol of South Africa has raised its stake from 34% to 49% in the proposed gas-to-liquids venture of Qatar General Petroleum Corporation by taking over 15% equity from Phillips Petroleum, writes Stella Zenkovich.



Ukraine has secured a two-year supply deal with Itera which enables it to purchase gas but avoid the 30% gas excise tax, reports the United Financial Group's Russia Morning Comment. According to UFG, the scheme is possible since Itera purchases gas from Gazprom at domestic prices, which are 75–80% lower than the Ukrainian border price. As a result, Gazprom pays excise duty only at the \$1.5/mn cm rate instead of the \$13/mn cm rate.

Poland has rescinded its agreement to allow Gazprom to expand the capacity of the Yamal–Europe gas pipeline, the key alternative to the existing transit

10

NEW Sownstream In Brief

TotalFinaElf acquires Latin American gas assets

TotalFinaElf is to acquire interests in several natural gas transmission assets in Argentina, Chile and Brazil from Canadian company Transcanada Pipelines for \$440mn. The networks form an interconnected system for supplying the markets of the three countries from the Argentine gas-producing Neuquen and Northwest Basins.

According to the terms of the agreement, TotalFinaElf will acquire:

- A 27.2% stake in Gasinvest, the owner of a 70% interest in Transportadora de Gas del Norte (TGN), one of Argentinia's two major natural gas transmission systems. Covering the northern half of the country, the 5,500-km system has a daily transportation capacity of close to 50mn cm of gas.
- A 46.5% equity stake in both Gasoducto GasAndes (Argentina) and Gasoducto GasAndes. Both com-

route through Ukraine, reports the United Financial Group's Russia Morning Comment. If Poland maintains this politicised view, Gazprom may be forced to build the more costly Trans-Baltic pipeline in order to minimise its dependence on Ukraine, comments UFG.

Gazprom has signed an interim deal with Turkmenistan on increasing gas supplies to Russia from 20bn cm/y to 30bn cm/y in 2001.

Lukoil has signed a deal with Mazheikiu Nafta which is expected to secure it long-term access to the refining capacity and retail markets of the Baltic States. They are to import 6mn tonnes panies own the GasAndes pipeline which interconnects with TGN and supplies the Santiago de Chile region. TotalFinaElf already owns 10% of the 465-km pipeline which has a curent capacity of 9mn cm/d of gas. Plans are to increase this to 19mn cm/d in the future.

- A 21.8% interest in Transportadora de Gas del Mercosur (TGM) which owns a 437-km pipeline linking the TGN network to the Brazilian border. Up to 15mn cm/d of gas can be handled by the system, start of which is expected in June/July 2000.
- A 12% stake in Transportadora Sul Brasileira de Gas (TSB0 which will link the Argentine–Brazilian border from TGM to the city of Porto Alegre in Brazil, covering a distance of 615 km. TotalFinaElf already holds a 15% interest in the pipeline, which has a planned capacity of 12mn cm/d.

of curde and market refined products in the Baltic States and CIS through a series of joint ventures.

Rosneft is reported to have committed to exporting 3mn t/y of oil through a new Russia-China pipeline being constructed by Yukos, Transneft and China National Petroleum Corporation. The \$1.7bn pipeline will have the capacity to handle up to 20mn tonnes of oil and is due onstream in 2005. Yukos has already pledged to export between 10mn and 20mn t/y.

Gazprom is to form a joint venture with the Kazakh pipeline company to take over the assets of Tractabel, the Belgian company that is pulling out of Kazakhstan, reports the United Financial Group's Russia Morning Comment.



Military Head of State General Pervaiz Musharraf has issued an order for the construction of a 1,500-km long gas pipeline traversing the territory of Pakistan to supply Iranian gas to India, writes Stella Zenkovich. Pakistan expects to earn \$600mnly in transit fees.

Enron has signed a Letter of Intent to contribute \$21mn in equity capital to acquire a 13% equity interest in Syntroleum's 10,000 bld Sweetwater gas-to-liquids project in the Burrup Peninsula in northwest Australia.



Kenya Oil Company (Kenol) of Nairobi has acquired the Ugandan duo of Galana Oil – which trades under the 'Gulf' label and has 17 service stations – and Kobil Uganda as part of its drive to secure a 5% market share in the Ugandan fuel retail sector.

Shell and AgipPetroli have signed an agreement for Shell to purchase AgipPetroli's oil products operations in five key African markets: Kenya, Uganda, Ethiopia, Eritrea and Cote d'Ivoire. The principal assets and operations that are covered by the acquisition include 320 petrol stations, storage and distribution facilities (operating and non-operating), direct sales of fuels, lubricants, LPG and bitumen to commercial customers.

UK Deliveries into Consumption (tonnes)

| Products | †Apr 1999 | *Apr 2000 | †Jan-Apr 1999 | *Jan-Apr 2000 | % Change |
|---|------------------------|-------------------------------|------------------------------|------------------------------|----------|
| Naphtha/LDE | 249,602 | 202,850 | 1,124,906 | 901,642 | -20 |
| ATE - Kerosene | 734,982 | 755,113 | 2,781,089 | 2,981,205 | 7 |
| Petrol | 1,759,204 | 1,703,125 | 6,950,152 | 6,907,540 | -1 |
| of which unleaded | 1,500,929 | 1,566,775 | 5,813,211 | 6,313,188 | 9 |
| of which Super unleaded | 27,707 | 30,272 | 113,131 | 139,124 | 23 |
| of which Premium unleaded | 1.473.222 | 1,536,503 | 5,700,080 | 6,174,064 | 8 |
| Load Replacement Petrol (IRP) | 0 | 136,350 | 0 | 594,352 | - |
| Running Oil | 312.040 | 332,148 | 1,577,592 | 1,585,426 | 0 |
| Automotive Diesel | 1 164 928 | 1.237.876 | 4,964,899 | 5,070,189 | 2.1 |
| CorOil/Marino Diosol Oil | 602 046 | 554.058 | 2,431,131 | 2,473,675 | 2 |
| Gasolivianie Dieser On | 180 737 | 132 427 | 822,696 | 596,096 | -28 |
| Lubrication Oil | 67 322 | 65.834 | 256,954 | 266,296 | 4 |
| Lubricating Oil | 07,522 | 00000 | 2 006 036 | 2 761 558 | -5 |
| Other Products | 665,041 | 658,622 | 2,906,026 | 2,701,558 | 2 |
| Total above | 5,735,902 | 5,642,053 | 23,815,445 | 23,543,627 | -1,1 |
| Refinery Consumption | 513,275 | 450,987 | 2,150,840 | 1,762,312 | -18 |
| Total all products | 6,249,177 | 6,093,040 | 25,966,285 | 25,305,939 | -3 |
| + Revised with adjustments * Figures dated from Feb | 2000 onwards are the f | inal figures as supplied by r | eporting companies, they are | no longer provisional figure | s |

downstream

Taking the Virtual Oil Company concept to its full potential?

The new 'e' world greatly reduces the barriers to entry for new customerfocused intermediaries in all industries - oil and gas being no exception. Oil companies must become customer focused or face the risk of these new intermediaries capturing much of the added value, reducing existing players to little more than bulk commodity suppliers, writes Neil Thomas, a Manager at Arthur D Little's Energy Practice, London.

E-business

The downstream oil industry's traditional business model focuses on selling the output of refineries rather than on providing solutions to customer needs. Control over the early stages of the value chain has historically been the key to long-term success and profitability for the vertically-integrated major oil companies. However, the commodity nature of many refined petroleum products and the pressures of globalisation are forcing companies to rapidly shift their emphasis to controlling the final customer interface.

The enhanced customer relationship management (CRM) functionality of the latest 'e' technologies offers an exciting opportunity for companies to break the shackles of their traditional production focus and transform large parts of their organisation into customer focused businesses. The challenge is to do it before new entrants capture their most valuable customers.

Companies cannot afford to play a 'wait and see' game. Estimates of the value of e-business transactions over the next few years range into the trillions of dollars. This growth will be fuelled by technology advances that will dramatically increase the means and speed by which information can be accessed.

For many companies the risk is not that they fail to identify the threat, nor that they cannot implement the technology, but that the legacy of organisation structures, processes and cultures prevents them from reacting with sufficient agility to fundamentally change their businesses to meet the new challenges.

Current trends

Already we see evidence of the major players recognising that they need to revisit their main business processes and examine way in which new 'e' technologies can improve their internal efficiencies. For example, BP Amoco has started using the Internet to purchase basic catalogue items. These items represent only 15% of its total \$20bn annual procurement budget, but 50% of all transactions, and the company targeted \$200mn annual savings from these items alone. By the end of 2000, it aims to conduct 95% of all purchases online. Companies are also waking to the potential cost savings offered by transferring a typical sales transaction away from the traditional visit to the customer by a company sales representative to direct customer ordering over the Internet.

We are seeing the industry adopting e-business to enhance the customer management process through initiatives such as online sign-up, account status and e-billing for fuel and loyalty cardholders. Many companies, including Texaco, are now offering free online journey planners that identify the location of service stations along the route. Shell has launched free Internet access to motorists visiting any of its chain of service stations across Europe. It plans to use its existing fuel payment card as a broader financial services facility that will also serve as a business-to-business ecommerce platform. Mobil has gone one step further and become the first major oil company to offer a 'core' product directly to consumers via the Internet. In addition to providing product information, its 'Mobil E-Store' carries a range of lubricants and associated products for delivery direct to consumers' homes.

E-business is also impacting the main support processes in these companies. BP Amoco has signed a \$600mn outsourcing contract for its human resources administrative, transactional and information services to achieve what it calls 'e-enabled HR'.

Industry reaction

The impact of e-business will go beyond improving the efficiency of key business processes. It also has the potential to reshape the entire structure of the downstream industry. At Arthur D Little we envisage two possible scenarios developing, as highlighted in the February 2000 issue of *Petroleum Review*.

The cautious incrementalist approach taken by the oil companies in the first scenario – in which the primary focus is on reducing costs via the improved efficiencies offered by new e-technologies – leads to continuing commoditisation and points to the dangers of not grasping the transformative powers of e-business.

In the second scenario, companies use e-business as the catalyst to fundamentally change the industry structure and re-segment around four global segments – manufacturing, distribution, midstream marketing and retail merchandising – each of which is enabled by the new technology.

Clearly these two scenarios are deliberate extremes between which one can imagine a number of plausible outcomes. However, if anything, they are likely to understate the degree of transformation we will witness over the next 10 years.

Improving business processes

The sheer size of oil companies' capital and expenditure budgets means that the opportunities for cost savings through e-procurement are commensurately large. Many of the oil companies' major commercial customers are already demanding that their suppliers meet their online purchasing requirements. The efficiency of product distribution can be improved through online links from service stations and other end-use customers right back to the refinery via the various distribution depots.

Online ordering and intelligent replenishment sensors can increase supply chain optimisation by reducing working capital and allowing more flexible refinery production. The customer management process can also be transformed by e-business through streamlined transaction processing, sales management and more effectively targeted customer communication and loyalty programmes.

Re-examining the value chain

Redefining business processes is necessary but not sufficient. More fundamental changes are needed as oil companies apply the tools of e-business directly to their core product/service supply chain.

Companies must take advantage of e-business to improve the efficiency of their supply and trading activities. Opportunities exist to radically change both paper and physical trading. New e-markets will be established along the lines that we are already witnessing in related industries such as chemicals. The transition is likely to be fastest for crude oil trading and commoditised futures, swaps and options, although refined oil products will rapidly follow as new virtual oil markets and auction sites are established. Refining will benefit from the effects of e-procurement initiatives and the enhanced possibilities for supply chain optimisation offered by real-time information.

The potential for enhancing the role of service stations through e-business is considerable. Success in achieving this potential will be linked to oil companies enhancing the consistency of their offerings and levels of customer service, which they have so far failed to do. Perhaps the time has come to operate this part of the business quasi-autonomously.

Substantial disintermediation is likely in commercial sales. In reality, the phys-



ical nature of energy industry products means that there are roles for product movers. However, oil companies do not have to be structured around this physical supply chain. It is crucial that they control the commercial interaction and ongoing communication with customers. Rational decisions can then be taken on the most appropriate way to manage movement of the physical product. Companies can use e-business to take innovative approaches to satisfying current and future customers' requirements.

E-business innovation

Four levels of e-business innovation have been identified by Arthur D Little, ranging from the provision of enhanced customer information on simple web pages to revolutionary business models that utilise the transformative powers of e-business to significantly shift value creation. (See **Figure 1**.)

The leading companies are well underway in achieving the first level of e-business innovation, namely marketing innovation, through initiatives such as online provision of service station locations and product specs. Some are taking the first steps to Level 2, channel innovation, by beginning to sell products and process orders over the web. However, these are tentative steps, involving direct sales offered in parallel to the more traditional sales channels, and are already leading to concerns over channel conflict. While oil companies are right to have these internal debates, they risk becoming moribund.

New start-ups are not burdened by the debate on how to deal with a legacy of traditionally loyal channel partners. Their competitive advantage lies in their ability to adopt the third level of e-business innovation from the outset. This product/service innovation is likely to involve intermediaries aggregating petroleum and other energyrelated products from multiple suppliers, and 'bundling' them for sale to customers with enhanced service and lower costs enabled by e-business.

Can traditional oil companies respond to the threat posed by these potential new entrants with an even more innovative approach? Level 4 innovation, business model transformation, will require revolutionary thinking. Five years ago, Arthur D Little proposed the idea of a 'Virtual Oil Company'™ as a means of challenging industry strategic thinking and to push scenario visioning to the limit. The downstream virtual oil company is a knowledge-based enterprise, founded on sophisticated customer intelligence and delivering growth through building brand value. Virtual companies do not have to be part of either the production or the traditional distribution process. They can exist through their ability to control flows of information to the customer.

At the time, the virtual oil company was considered radical and in some cases technically infeasible. No longer. In today's world of e-business, the open, interactive infrastructure of the Internet provides the glue to hold the virtual oil company together. The domain name **E-Energy.com** has been registered, but who will have the vision to take the concept to its full potential.

For further information, contact +44 (0)20 7409 2277 or **thomas.neil@adlittle.com**





The last decade of the 20th century was one of unprecedented change with network rationalisation, the entry of supermarkets into the market place and the diversification of forecourts into areas other than fuel all making their mark. The next decade looks likely to be equally exciting, with low product margins, the arrival of the Internet and higher customer expectations all looking set to keep the industry lively. *Steve Boocock*, Retail Marketing Manager, Q8, reviews some of the major trends expected to develop over the next decade to 2010.

There will be dramatic advances in technology in all of the forecourt's main profit centres – refuelling, stores and the car wash – which will increase throughput of vehicles on sites and improve customer service, making it more pleasurable, comfortable and speedy to refuel.

Nowhere will change be more evident than in refuelling and pump payment technology. By 2010 over 25% of UK forecourts will offer automated pumps, more than double that in 1999. Four contenders are expected to take over or take off in the UK:

- Pay at the pump. Already making a reasonable showing, pay at the pump equipment will become commonplace and be the expected service standard on sites with large convenience stores where fuel-only customers will not want to queue in-store.
- Cash and cardless refuelling which sends messages via radio waves in the petrol pump to a receiver in the driver's key-ring. On recognition and validation of the driver's unique code, fuel is automatically dispensed. Currently in limited operation in the US, the technology is ideal for business users and company fleets.
- Payment by mobile phone. The arrival of WAP Internet access will open the door to payment from mobile phones, providing another avenue for pay at the pump technology – one that is bound to be popular with the estimated 60% of the population expected to own a mobile phone by 2001.
- Robotic pumps. Already on trial on a Q8 forecourt in Stockholm, the robotic pump allows customers to refuel without leaving their car,

increasing safety and making it perfect for forecourts in climates of extreme hot or cold. The driver simply inserts their choice of payment card into a terminal by their window and a robotic arm then removes the car's cap and fills the tank with the requested amount. The only modifications needed to vehicles are the installation of a sensor on the tank door and a spring tank cap.

The forecourt shop

As shops become ever-more important profit centres, forecourts will adopt the state-of-the-art EPOS (electronic point of sale) and EDI (electronic data interface) technology currently found in supermarkets. This will enable more sophisticated extrapolation of information on customer purchasing habits and automated ordering stock ordering, improving stock management and the freshness of products in store.

Q8 is at the forefront of this drive – EDI technology already allows daily deliveries to its managed and Xpress Budgens stores and the company is to invest in an up to the minute supermarket standard EPOS system for installation in 2000–2001.

Carwash technology

The decade 2000–2010 will see continual upgrading of carwash technology both in the quality of the wash and the reduction of washing time. Remote monitoring will come to the UK, automatically contacting the manufacturer at the first sign of operations difficulties. Enhancements such as foam brushes – shortly to be tested on Q8's UK network – will give a high finish and eliminate any risk of surface scratching.

The automated forecourt

As supermarkets try to maximise valuable trading space by opting for compact fully automated forecourts (which take up 25% of the space of conventional forecourts) and consumers' familiarity with the technology increases, the number of automated forecourts will experience substantial growth during the next decade.

The next ten years also open the possibility of automated forecourts extending beyond supermarkets to other high traffic areas such as leisure and retail parks, and to city centres where limited space and premium land prices make them an attractive replacement to lower volume traditional forecourts.

Another step in the evolution of automated forecourts will be a move to grow site profitability through product diversification using innovations such as automated convenience stores. Such stores, housed in giant vending machines, can stock 3,000 products – from refrigerated items such as milk and butter to distress purchases such as nappies – in 18 sq metres of space. Predominantly in use in shopping malls, train stations and hospitals on the Continent, their application is also perfectly matched to forecourts. Q8 is looking to start trials in Belgium in 2000–2001.

Forecourt as destination

Forecourts will continue to increase usage by non-fuel customers through the addition and enhancement of auxiliary services.

One of the first to link up with a supermarket brand in the UK, Q8 believes that to extend successfully operators will need to be focused – concentrating on the needs of their customer base and ensuring standards



remain high across all areas – and not be tempted to diversify too far away from the core product offering.

Top growth areas in the next decade will be:

- ATMs and banking facilities as banks reduce their rural networks.
- Partnerships with fast food brands.
- High quality convenience stores.

New profit centres will develop and are most likely to be low maintenance on behalf of forecourt staff and to be centred on providing additional convenience to customers. They will, for example:

- provide collection points for good purchased over the Internet;
- provide outdoor web kiosks allowing travellers on the road to access the Internet for related services such as weather, news and traffic updates, hotel bookings and checking their own e-mails.

Customer demand

Customer expectations of forecourt convenience stores will be higher than ever and many premium priced shops with limited ranges will be forced out of the market. Top demands from customers will be for a wider selection of goods and competitive pricing to enable them to look to forecourt stores as reliable outlets for serious mid-week top up shopping. In line with this, customers will expect to see quality fresh fruit, vegetables, bread and meat become staple products of the forecourt store, requiring in turn improved distribution and multi deliveries in a week from suppliers.

Advances in forecourt technology and the emphasis on the forecourt store will lead to a fresh approach to the recruitment of managers. Driver controlled deliveries and EDI ordering of fuels will mean that recruitment will no longer focus on those who are first and foremost fuel experts but will shift to look first for grocery experience, with the limited fuel skills required being trained in by the forecourt companies.

Fuel retailing

Competitive pricing and low margins will continue to rationalise the forecourt market, reducing the number of sites in the UK still further and increasing the traffic on the remaining forecourts.

While the number of vehicles on the road is predicted to grow on average by 2% per year over the next decade, fuel consumption will remain stable due to the development of more fuel efficient engines and engine oils and the high rate of duty on fuels in the UK.

Legislation will mean that lower emission fuels such as City Petrol are standard by 2005 and there will be further emission reducing refinements before the decade is out. Public concern for the environment will go someway to making these the preferred choice but legislation, lower rates of duty and other tax benefits will continue to be required for consumption volumes to really take off.



internet

The e-commerce challenge

The development of e-commerce is transforming many traditional businesses, including the European fuel retailing sector. OPAL (Oil Price Assessments Ltd) recently hosted a conference looking at some of the challenges faced by fuel retailers as they take new e-technologies onboard. *Kim Jackson* reports.

Forecourt

peakers at the 'European Motor Fuel Retailing & the e-Commerce Challenge' conference in London on 10 May 2000 emphasised the need for fuel retailers to adapt to the challenges posed by new and innovative applications and service providers in order to maintain and develop their market position. However, it was also noted that the development of e-commerce/e-business initiatives should not be taken at the expense of the 'traditional' day-to-day operations.

The future is now

Maarten Van Hasselt, Vice President of EFS & Partner Consultants kicked off the proceedings by outlining oil company ecommerce strategies at the forecourt. He suggested that while many companies had been quick to develop e-commerce initiatives in this sector, it was important for them to 'follow the rules of other businesses' by ensuring that such initiatives not only created profits for business, but also 'added value' to the customer.

Hasselt stressed the importance of 'conducting business in radically different ways' – ie. innovating – rather than just using innovations to conduct traditional business practice in a better way. He warned that unless companies adopted radically different business methods and moved away from the bureaucratic, slow decision-making, riskaverse 'corporate culture' there was a very real danger that newcomers to the market could rapidly gain market share.

He also suggested that while the supermarkets had already gained a considerable foothold in the fuel retail sector, oil companies now had an 'opportunity to change the rules of the game and to win business back' by utilising new e-technologies and business practices to offer 'different packages and different value'. The key was to 'differentiate offering and understand the needs of the customer' while 'continuously redefining markets, business activity and culture', he said.

Forecourt as destination

A number of the presentations predicted that the forecourt of the future would become a point of destination for the consumer. Fuel sales would be of secondary importance, with the actual forecourt acting as a focus for a wide range of consumer services, including a pick-up point for shopping deliveries, dry cleaning etc and Internet access, perhaps via an on-site cyber-café.

E-commerce vs e-business

Eduard Schaepman, CEO, euroShell Cards, pointed out that there was actually a difference between e-commerce and e-business, even though the media and some companies had a tendancy to use each without distinction:

- e-commerce involves the use of the Internet in commercial ways, while
- e-business involves the use of the Internet to make business webenabled.

He said that the Internet 'lowered the barriers of entry into the fuels market place' and was leading to an 'increased commoditisation of business'. He saw 'new value chains developing as the boundaries of the marketplace were blurred' with an increasing overlap between services offered by oil companies, fleet software suppliers, vehicle manufacturers, fleet management/contract hire companies, e-enabled service suppliers and card companies/banks.

Stating that customers wanted 'an integrated portfolio of services which are easy. fast, simple and transparent,' Schaepman went on to outline some of the recent einitiatives to be undertaken by Shell in this field, including the recent relaunch of euroShell, the group's pan-European fuel card business which provides fleet management services to the commercial road transport, fleet and haulage sectors, on a single platform. This has enabled the company to respond more quickly to customer demand and more easily introduce enhancements to existing products and services, and will allow Shell to expand into new product areas. Claimed to be a 'market leader', euroShell has 1.5mn customers and over 4mn cards currently in circulation, generating more than 150mn transactions annually.

Shell has also launched Geostar – a free journey planner and travel information service on the Internet. The interactive portal covers 16 European countries, in six languages: English, German, Dutch, Danish, Swedish and French. Longer-term plans include the incorporation of WAP (wireless application protocol) technology – providing Internet access via a mobile phone – which would allow Shell, for example, to send a message to a customer about problems on their travel route and suggest an alternative. [One of the *continued on p23...*



New Shell truck ports roll out a welcome for drivers

Fire safety at the forecourt

Changes to the law with respect to fire safety have had a profound effect on the responsibilities of petrol forecourt operators and the duties performed by personnel on their premises. In December 1999 amendments to the Fire Precautions (Workplace) Regulations 1997 came into force which passed the legal responsibility for the management and performance of fire safety risk assessments from the respective Fire Authority to the employer. For petrol forecourt owners – such as Murco Petroleum which operates 94 company stations in the UK and supplies nearly 300 branded dealers sites – the existence of a fire certificate issued by the local Fire Brigade is no longer accepted as proof of due diligence.

where the company's filling stations we recognised the significance of this change to the law,' says Brian Jeffrey, Murco's Company Stations Manager who is responsible for the safe operation of the company's filling stations. 'By simply incorporating fire risk into our existing assessment procedures we felt we would be failing in our duty of care to staff, contractors and the public. We therefore took the opportunity to carry out a wholesale review of all risk assessment documentation and procedures.'

Risk assessment

In December 1999 Jeffrey called in training organisation SGS United Kingdom to review and re-write Murco's petrol forecourt risk assessment manual. SGS' Health & Safety Training Manager, Bob Manning, spent six weeks on-site at several Murco filling stations analysing the procedures performed by staff in the course of their duties. For each task, he prepared a separate risk assessment based on the five-step assessment model advocated by the UK Health & Safety Executive, the relevant sections of HSG146 and with reference to the Fire Precautions Regulations.

'We identified over forty distinct duties performed by all persons at the filling station and associated engineering workshops,' says Manning. 'These ranged from the delivery, storage and dispensing of fuel to sales duties performed at the till, the valeting of cars and even changing of fuel prices on the forecourt signs.'

The Regulations state that the purpose of the risk assessment is 'to identify where fires may start in the workplace and who may be put at risk from that fire'. For each task Manning was able to identify the hazards involved, decide who might be harmed and how, evaluate the risks arising from the hazards and define control measures which should be followed to minimise the risk. Concerning the risk of fire, recognising the hazards involves the identification of sources of ignition and combustible materials.

'The presence of petroleum underground in storage tanks, above ground during dispensation and in the air in the form of vapour ensures combustible material is omni-present at filling stations,' he explains. 'Personnel therefore need to be vigilant.'

In the open, petrol vapour normally disperses easily but can collect in tanks, cavities, drains and other enclosed areas. Flammable atmospheres may be present in tanks and petrol cans and there is even a danger if petrol is spilled on clothing or rags.

The detection and disposal of spillages notwithstanding, the identification and management of sources of ignition is a priority when managing the risk of fire at petrol station forecourts. 'Appropriate warning signs drawing attention to the more obvious sources such as lighters, matches, car engines and cigarettes are a prerequisite,' he continues. 'However, fires can be initiated by less conspicuous origins such as clothing with man-made materials and even footwear which incorporates steel toe caps that can cause sparks when in contact with concrete surfaces.'

Training manual

Murco's new task-based risk assessment manual includes checklists and comments boxes to be completed by managers and supervisors during periodic assessments. 'A comprehensive risk assessment of all duties should be carried out at least once per year at petrol filling stations,' emphasises Manning. 'Particular tasks may need to be reviewed after any accidents or incicontinued overleaf...





Russia

...continued from previous page dents and should be read by any new recruits before they start work.'

Recognising that English is not always the first language of the personnel managing and maintaining Murco's forecourts, Jeffrey instructed SGS to illustrate the manual with diagrams and photographs. 'We are keen that all personnel working at our petrol stations are fully aware of their responsibilities regarding fire safety,' he explains. 'By replacing much of the text with pictorial information we have made the manual more readable and cut its length from over 200 pages to just 50.'

Team training

Finally, Manning was invited to Murco's headquarters in Finchley to deliver a day's training on the new risk assessment manual to the company's ten area managers. SGS combines its traditional class-based risk assessment seminars with a CD-ROM training package that has been designed specifically for forecourt operators. 'Recognising the working patterns of filling stations and the lack of time available for extra curricular activities such as off-site training, we have developed an interactive software application which introduces delegates to the relevant fire-related legislation and basic principles of risk assessment,' explains Manning. 'This interactive, self-paced tutorial is modular in design and enables delegates to work through its content at their own pace and their employer's convenience.'

The CD-ROM, which is priced £95, covers current and forthcoming legislation, identifies hazards and risks, risk versus cost, case law, assessment procedures, risk analysis and evaluation. Student assessment forms part of the course. Successful completion of the multiple-choice knowledge review allows a training certificate to be printed for student retention.

More detailed information about fire safety is contained in the booklet Dispensing Petrol: Assessing and Controlling the Risk of Fire and Explosion at Sites where Petrol is Stored and Dispensed, HS(G)146, ISBN 0 7176 1048 9, available from HSE Books. See also the Code of Practice for the Design, Construction and Operation of Petrol Filling Stations, published by the Institute of Petroleum and the Association for Petroleum and Explosives Administration. Currently, a pan-industry training review group, under the auspices of UKPIA, is in the final stages of developing a generic risk assessment for service stations. Guidance is at present available in a video produced by UKPIA called A Measure of Control. For more information about risk assessment training, contact SGS on +44 (0)1276 697681.

Lukoil moves West

Lukoil is well known as Russia's largest oil company. Less well known is the location of its production assets and the way the company's investment focus is moving westwards. *Petroleum Review* found out the details when it talked to *Pavel Bogomolov*, Londonbased correspondent for Lukoil's *Oil of Russia* magazine.

There is ample data about Lukoil and its management plans available to technical audiences. However, it is not always widely appreciated that the company is the first truly integrated Russian oil company covering all aspects of the business from production to branded retail sales in Russia and in neighbouring countries. Current plans are for profits of \$2.5bn this year.

The Russian constitution prohibits any individual oil company from producing more than 35% of the country's total crude production. Lukoil's current output accounts for 23% of total Russian production. Its aim is to gradually expand this towards the legal ceiling, which would involve an expansion in production of up to 100mn t/y (2mn b/d). As part of this strategy the company recently negotiated the formal extension of a \$150mn mediumterm loan from the EBRD (European Reconstruction Bank of and Development).

Westward bound

Lukoil is traditionally associated with Western Siberia and the company takes its name from three settlements in the area – Langepas ('L'), Urai ('U') and Kogalym ('K'). However, the fields in this area are becoming depleted and transport costs to the main markets are high. As a result Lukoil is increasingly focusing its E&P investments in European Russia (Timan-Pechora) to the west of the Urals.

The Timan-Pechora region, the arctic province bordered by the

Pechora Sea, offers shorter distances to western markets either by pipeline or ice-class tankers. More than half of the ten planned newbuild ice-breaker tankers, designed by Lukoil, have already been commissioned and are in operation. Trials over recent years have demonstrated the viability of tanker exports from Timan-Pechora. and a unique all-weather oil export terminal is currently under construction at Varandei. The refocusing of investment on resources 1,000 miles to the west will allow Lukoil to process its Siberian production for sale within Russia while using the locational advantage of its Timan-Pechora assets to export crude more profitably.

Diversification strategy

In the northern Caspian, the major find recently made by Lukoil in the Russian zone (see *Petroleum Review*, May 2000) will be a key investment producing incremental production for the company. It is perhaps for this reason that western commentators characterise the company's programme of investing outside Russia in the Caspian as political acts advancing only Russian interests in the region. The Lukoil view, however, is that far from being political acts they are simply part of a diversification strategy in a resource-rich region where there is corporate space for all.

In support of this view the company notes its active participation in the development of the economic zones belonging not to Russia, but to the neighbouring CIS countries such as Kazakhstan, which, according to Bogomolov, have a tendency to enhance and protect their own interests and sovereignty. Moreover, Lukoil has also maintained its 10% stake in the BP-led Azeri international consortium in the southern Caspian and has always been supportive of the consortium.

In addition to expanding production in Russia and the CIS, the company is also looking to expand output by implementing its projects in Iraq once UN sanctions are lifted.

On the downstream side, Lukoil has already completed refinery acquisitions in Ukraine, Romania and Bulgaria totalling \$200mn. At the moment the company is tendering to buy 70% of the Paramo refinery in the Czech Republic, confirming its commitment to become a westward looking, fully integrated oil company.

Institute of Petroleum AGM

Change of President at the IP's Annual General Meeting



The 87th IP Annual General Meeting took place on 6 June 2000 with the President *Chris Moorhouse* in the Chair.

Presenting the President's report, Chris Moorhouse said: 'It is with mixed emotions that I make this last appearance at the IP as President. On the one hand, I have enjoyed my two years – I've learned a lot, met some great people, and done some things that in prospect seem rather terrifying. On the other, I am very relieved that we have been able to find an excellent successor as President, Charles Henderson. I do hope that he finds as much enjoyment and satisfaction in the role as I have.

Before I hand over, though, a few reflections and observations seem appropriate. First, a reminder that the IP, its membership and its activities sit in the context of the oil and gas industry. In the last two years we have seen very large movements in the price of oil, we've seen industry restructuring and mergers on an unprecedented scale, and through the period, the forces of competition have resulted in an unrelenting pressure on costs. In my company, and I'm sure in every corporate and OILC member, each year there is a difficult debate about whether to continue to support the IP or not. That's the reality. And it's true for individual members too. The IP can't take anyone's support for granted.

That means the IP needs to change. Over the last two years – if I'm allowed to highlight just one success among the many achievements of the Institute and its dedicated team of permanent staff and volunteers – it would be the establishment of the Scientific and Technical Advisory Committee (STAC). By getting the key players from the OILC member companies to determine how to focus the industry funded research and representation budgets on key issues, STAC has significantly increased the credibility of the IP work for the industry. And in doing so it has made the IP more valuable to one important segment of its membership.

Looking forward, I see a continuing need for change – the IP has to stay in touch with the changing need of all its members: OILC, corporate and individual. As an information organisation, accessibility via the Internet will be a fundamental requirement for the majority of the membership as time goes by. The IP has a prize winning and popular website, but much more needs to be done to make sure that the IP remains an Institute providing the maximum value to its varied members.'

He concluded by expressing his thanks to Council, the Chairmen, members of the various committees and the IP staff for their 'support and for their excellent achievements in 1999 and 2000.'

Orders of the day

First order of the day was the election of Charles Henderson, Chairman of both Total Oil Holdings and Total Oil Marine, as IP President for the 2000–2001 session. Terry Moore and Peter Newman were re-elected Honorary Secretary and Honorary Treasurer for the 2000–2001 period.

There were three nominations for two vacancies for Ordinary Members of Council, which were filled, by ballot, by Neil Brenton and Simon Clare. Brian Hamilton, David Codd and Christian Cleret filled three of the four vacancies for Additional Members of Council – the fourth position is to be filled by the IP Council in due course.

It was also announced that Neil Brenton would be standing down as a Branches Member of Council, having served his three-year term, and that Eric Absolon from the East Anglia Branch was to fill the vacancy.

The Report of Council was then presented by Director General Jeff Pym (see box), and subsequently adopted. The accounts were outlined to the meeting by Honorary Treasurer Peter Newman, and adopted. Ernst & Young were re-appointed as auditors for the coming year.

Chris Moorhouse went on to present an Honorary Fellowship to lan Ward and Awards of Council to David Brown, Graham Thomas and George Wood (see box pieces). Unfortunately, both Bruce Mckenzie and Dr Chris Roythorne were unable to attend the AGM – Awards of Council will be presented to them at other suitable occasions later in the year.

The President then thanked the retiring Members of Council David Setchell and Ian Fotheringham.

- David Setchell joined Council in June 1999 and served as IP President from 1996– 1998, despite enormous upheavals in his own company, Gulf Oil UK.
- Ian Fotheringham joined Council in June 1988 when he became Honorary Secretary, a position he held until June 1994. Between 1992–1993 he also frequently acted as Honorary Treasurer when the need arose. Ian was Chairman of the Membership Committee from 1994–1998 and, after 11 years on Council, was awarded the IP's Eastlake Medal in June 1999.

Chris Moorhouse concluded his duties by handing over the official President's badge of office to the new IP President, Charles Henderson, who went on to give his Presidential address (see p20).

presidential address

Planning for the future



AGN

Having officially taken on the mantel of IP President, *Charles Henderson* took the podium to give his Presidential address.

adies and Gentleman, let me start by saying how much I appreciate the honour of being asked to take over the Presidency of this great Institute, and that I will do my best to live up to the traditions set by my many august predecessors who have served the Institute with such distinction.

The most recent predecessor is, of course, Chris Moorhouse, and I am sure that I speak for you all in thanking him for his commitment, hard work and good-humoured leadership over the last two years. Chris, of course, is a trader, and I see that in his inaugural address he claimed he was the first such person to be President. Mine is perhaps an even more unusual background and I am particularly touched that you feel able to welcome an ex-gamekeeper, albeit a benign one, into your midst.

Chris has presided over an inter-

esting two years to say the least. The roller-coaster of the oil price must have been particularly interesting to a professional trader, and no doubt in the gaps between his duties as President he found time to exploit all that market volatility to the advantage of his employer!

But the recent price experience has been much more than a test of the trader's nerves. It has been a salutary experience for the whole industry and for government too. Back in late 1998 we were all looking into the abyss. Cash flows were drying up, balance sheets savaged, and recent investment decisions looking distinctly questionable. The future of the industry, particularly in the high cost upstream sector of the UK, looked threatened. Some of the preoccupations that we in the IP have had over recent years were sharpened. How were we now perceived as an industry for a career (or less amibitously, for a first job)? Could we reduce costs still further? And all this at a time when the government was known to be contemplating increasing the tax burden on the industry - indeed, had pencilled in a substantial additional take as part of the budget arithmetic.

Well, mercifully, we didn't get the tax increase. But we have had a welter of policy initiatives in the oil sector, starting with the formation of the Oil and Gas Industry Task Force, now known as Pilot. This has spawned a number of government-sponsored initiatives in the fields of cost reduction, removal of bureaucracy, technology development, and training. We have had the stricter consents policy on gasfired power stations, the new electricity trading arrangements, the Kyoto follow up, including the climate change levy and the concept of voluntary emission caps and permit trading. Most recently we have seen the Utilities Bill, a further round of subsidies for coal, and the promise of the end of the stricter consents policy.

And in the industry, we have had a spate of mega-mergers.

The recovery of the oil prices has allowed us all to breathe again. But for how long? Have the fundamentals really changed? Can the current Opec aspiration of \$25 be justified by the fundamentals any more than the \$11 price was not so long ago? If \$25 was seen as durable then we would surely all be investing heavily in new projects. But we are not. Has the industry adopted a permanently more cautious view of its future opportunities? Naturally, if the industry is in turmoil then the industry's professional association, the IP, is not immune. Low oil prices meant that members looked hard at their subscription costs. Mergers mean that there are fewer companies and fewer people employed by those companies amongst whom we find our members.

In this rapidly changing and turbulent world it is all the more important that were are responsive to members' needs, and also all the more important that we continue to enhance the reputation of the industry as a place to work and as a corporate citizen.

Key strengths

The key strengths that the IP should be developing over the next few years if it is to achieve these objectives are in:

- Technical and scientific support for the industry.
- Development of our support for the aviation industry – establishing standards, practices and guidelines to help with industry self regulation.
- Reinforcement of our vital work on epidemiology.
- Continuation of our development of test methods.
- Production of industry guidelines in many areas, including health, safety and the environment.
- Education here we have a vital role to ensure the understanding by the public, by opinion formers, by officials, and particularly by the next generation – our children – of the key contribution to the global economy made by the petroleum industry.
- Training, again a key contribution both to individuals and their employers, to make sure that the much needed skills continue to be available and up to date.
- Communication this is really what the IP is all about. Be it conferences, events, Petroleum Review, training, our website, the IP's products are information and knowledge. We need the most effective means of communication to make this as widely available as we can.
- Library and Information Services I can say without hesitation that the IP's Library is one of the best specialist libraries available to the petroleum industry, and now that is has been upgraded, good has become even better.

AGM

award winners

Cooperation and networking opportunities - if I were to say IP, often the reply is 'IP Week'. This shows how associated the IP is with events whose main purpose is to create cooperation and networking opportunities. This too is a key function of the IP and it is a function that we will increase. This Autumn there are two networking events. The Autumn Lunch this year is to be enhanced by incorporating the new IP Awards ceremony of excellence in the industry. I am sure this will be a huge success for many years to come. The second event is our IP dinner in Aberdeen, which this year for the first time we are expanding to include a mini-conference built around topical North Sea themes.

But two development opportunities for the IP in the next few years stand out. First, cooperation with other similar bodies in the energy business, both nationally and in Europe. Indeed, we should capitalise on the huge prestige that the IP has worldwide. Cooperation offers new ways to enhance the scope of the Institute and improve the range of services that we can provide to our members.

Second, there is the Internet. Everyday we read of new initiatives by industry and commerce to exploit this medium – new ways to communicate, new ways to do business. There is much speculation where this will all end up but one thing is for sure, it is here to stay and the impact on communication will be profound. For organisations like the IP, whose product is information and knowledge, I believe it is vital to keep up with the developments.

Our Institute is in good shape. It already has a good website, but we cannot stand still and, in my view, the IP's continued technical development in this area is vital for its future.

Finally, the people. In the recent weeks since I have begun to get better acquainted with the people who run the IP and the issues that they are tackling. I am impressed. We are also fortunate to have such an enthusiastic and committed staff. We are fortunate that we can draw on the many and expert volunteers from amongst our members. The combination of the dedicated permanent staff and those volunteers, can, I am convinced, ensure that the IP, already strong, will flourish. During my Presidency I shall do what I can to further all the interests and activities of the IP. In this I am sure that I can count on the help of our Director General and his people, our Council, our loyal members and all my colleagues from the oil industry and associated industries.



Honorary Fellowship – Ian Ward (FInstPet)

During the past 20 years there have been nine recipients of an Honorary Fellowship – awarded to 'persons of eminence who may or may not be actively engaged in the petroleum industry' – including HRH The Prince of Wales and Dr Garrett FitzGerald.

It was the unanimous wish of Council that Ian Ward join the ranks of previous winners, in recognition of all he has done for the IP since becoming Director General in June 1991 – a post he held until August 1999 when he retired from the industry.

Ian came to the Institute direct from a long and varied career in BP. His last job there was Manager, Operations and Distribution for BP Oil Europe. Equipped with a BSc degree in Botany from the University of Hull, he first entered the oil industry in 1964 by joining Shell-Mex and BP in the retail market. After the break-up of Shell-Mex and BP, he joined BP in 1973, where he held several retailing, aviation and distribution posts, before becoming the Manager of the Personnel Division for BP Oil UK in 1986.

During his eight years as the Institute's Director General, Ian gave most generously of his time – in fact the staff could set their watches by the time he came in in the morning: 7.23am on the dot! He showed a tireless enthusiasm about the IP, with his boundless energy, always cheerful and ready to listen. He never minded where he went to recruit new members – in fact wherever he went, he always came back with at least one new member, even from the golf course! His knowledge of the industry is legendary: not only who does what but also where and why.

lan shaped the IP as it is today. He brought it up to date; encouraged modern business systems and methods; along with technical department, he instigated STAC; and he provided the right environment for the spectacular growth of individual membership and many operational innovations.

On receiving his award, lan said that he believed there were two categories of people that were given Honorary Fellowship of the IP – the 'great and the good' and the 'volunteers who have given major commitment'. He said that he didn't fit either category and that he felt 'a bit of a fraud' in receiving the award for doing something that had been so enjoyable for so many years... and getting paid for it! He gave his sincere thanks to Chris Moorhouse, Council, Committee Members, volunteers (technical, non-technical and in the Branches) and IP staff, without whom the IP would not have been so successful, and stressed that this award was 'really theirs' not his.

award winners



Graham Thomas

Standards and their development are core to the business of the IP. Graham Thomas of BP Amoco has been actively involved in the field of international standards, in a leadership role, since March 1990 when he became Chair of PSE/17. This committee, for which the IP provides the Secretariat, consists of the UK experts who shadow and contribute to the development of all standards under ISO TC67.

Graham has shown a single-minded focus on the importance of standards to the oil and natural gas industry. He has championed the case for their development and usage within BP Amoco, the IP, the UK, and at the international level through OGP and EuroPIA. His work within BP Amoco has been recognised by their active support for additional collective work across the industry and within STAC in particular.

Graham was a pioneer in the use of electronic communication and computer processes as an aid to committee work and as an alternative to formal meetings. This has enlarged his network of contacts across the world, so essential to the generation and acceptance of a truly international standard.



George Wood (MInstPet)

Dr George Wood joined the IP in 1989, having been involved with the IP since 1984 through his then-employers, now known as the Robert Gordon University, where he was a lecturer in Offshore Engineering. He was co-opted onto the Aberdeen Branch Committee in 1992 and took over as Branch Secretary in 1993.

In 1989, George left the world of academia and joined a drilling company. Throughout the 1990s he experienced a number of employment changes as a result of company take-overs and mergers. Even though these changes necessitated a number of work location changes, George always managed to arrange a suitable 'central' meeting place for monthly Branch Committee meetings.

George is a member of a number of other industry organisations and brings to the Aberdeen Branch a wealth of knowledge, information, contacts and gossip, that assists in ensuring that the Branch addresses all issues related to the offshore industry.

For the past seven years, he has combined the extremely-long hours required by his work with the demanding role of Branch Secretary. He has found time to conduct surveys, write countless letters and document literally scores of meetings. In typical selfless fashion, George has now indicated a need to step down as Branch Secretary – but is happy to continue until a suitable replacement can be found and then work alongside his successor until that person feels comfortable in the role.

On receiving his 'much appreciated' award, George said that all the effort he had put into the job was for one reason – for the people in the Institute and the people in Aberdeen Branch. He also stated that he had probably 'got far more back' than he had put in and thanked all for their support.

Graham said that his Award of Council was 'entirely unexpected' and thanked all involved. He said that the development of industry standards could not be done without the support of industry and volunteers and thanked in particular IP Technical Managers Sjoerd Schuyleman and Martin Hunnybun for their 'tremendous support' which he felt had been fundamental to the success of the IP's international standards.



David Brown (FInstPet)

David Brown joined the IP in May 1982 and was granted Fellowship in March 1993. In the late 1980s he was a member of the Engineering Committee which was subsequently disbanded and superseded by the Downstream Operations Committee (DOC) in 1991. David was the first Chairman of DOC.

On moving to a new environmental role in BP Oil Europe in 1993, he resigned from DOC but joined the Environment Committee and in 1994 became its Chairman. He relinquished this position in March 1999 when he advised he would be retiring from BP Amoco.

During his time as Chairman of both committees – through a period when volunteer support was diminishing – David gave considerable commitment and support to ensure the key objectives were achieved. In 1995, he was elected to Council and re-elected in 1998 for another three-year term.

David said it was a 'great privilege' to receive an Award of Council. He said that he had had 'enormous pleasure' in working with such 'professional, committed and interesting' people over the years and in the run up to the development of STAC.

report

A year of challenge



resenting the Director General's Report of Council, Jeff Pym stated that 1999 had been a 'roller coaster of a year', with oil prices recovering from the 'financial trough' at the beginning of the year, continued company mergers, stricter environmental and regulatory controls, continued rationalisation, simplification and outsourcing throughout the industry, and huge sums on money spent to 'avoid the Millennium Bug'. He said that together with 'ever more wide-spread globalisation and the emergence of ecommerce and e-business to lead us into the dot.com 21st century', these trends had 'led many to believe we were on the brink of revolutionary developments in trade and business activity. Indeed, a year of challenge."

He stated that the successes of the IP in 1999 - which 'were all the more notable' against this 'challenging environment' – had placed the IP 'firmly on the launch-pad to take advantage of the opportunities which are the counterpart of challenge'.

He went on to note these successes, including the meeting of the target for recruiting new corporate members; the 'transformation' of the IP Library and Information Services into 'an interactive information centre'; the launch of a new portfolio of training courses; the development of an integrated IT system; the publication of a record number of codes, guidelines and standards; and the continued maintaining of the IP's 'unique role in encouraging and facilitating debate within our industry on issues both difficult and contentious.

He also stated that the IP's role in providing independent advice on regulations and the acknowledgement of the Institute's expertise throughout Europe had grown 'ever stronger', and that it had become 'slicker' in developing technical activities following the establishment of STAC in 1998. He pointed to the continued high-standard of Petroleum Review, now in four-colour, and stressed that it was 'routinely covering issues right at the front of people's minds - such as ebusiness'. He also highlighted the continued success of the IP's programme of conferences, training courses, workshops and discussion groups, in particular, the 'enormously successful' IP Week and Autumn Lunch which were, once again, sold out events.

He also stressed that one of the IP's key charitable objects is education and stated that 1999 saw ever greater links with schools and colleges through our provision of curriculum resources and careers information. A number of student chapters have been established and the IP is working in close alliance with leading colleges and universities and national training organisations throughout the UK.

Expanding web capabilities

Jeff also took the opportunity to highlight the IP's activities in the dot.com world. He reported that the IP's award winning website (**www.petroleum.co.uk**) was receiving 15,000 hits per month and said that there were 'great plans this year to develop our web capabilities further'.

He stated that the IP was 'very healthy'. 'It has taken challenges in its stride and created from them real opportunities. We are now confidently looking forward and are working with the technologies afforded by the new economy.'

He concluded by thanking all those involved in the work of the IP – Chris Moorhouse, Ian Ward, Council and Management Committee, and the numerous volunteers. He also thanked his dedicated staff, and gave particular thanks to Sue Shrago, Assistant to the Director General, who had provided invaluable support in his past nine months and who will be leaving soon, and both Anne Poynter, Assistant to the Financial Director, and Technical Manager Andrew Sangster who, after many years of dedicated contribution, will be soon retiring.

... continued from p16

speakers, Nigel Lang of Catalist, later gave a practical demonstration of WAP technology at work. Taking a delegate's postcode, he was able to use the phone to call up specific information about the nearest service stations to that location, including details of fuel prices, whether the site had a shop or car wash facilities, and exact distance to the site.]

Specifically targeting the commercial trucking sector, Shell has also opened a pan-European network of Truck Port service stations. More than 300 are planned throughout Europe, including 17 in the UK. Featuring high-speed pumps (designed to dispense fuel at up to 130 litres per minute), the sites can accommodate the largest artic or drawbar rig. Refuelling is backed by the euroShell fuel payment card and euroShell Monitor, a new fuel cost control system which provides security and control checks. The sites also offer drivers a wide range of services and facilities, which include overnight and meal-break parking, restaurants, shop, on-site fax machines and showers.

The group is also planning to develop a number of e-commerce initiatives over the next few months, including web-based vehicle brokering, financial and investment services, e-procurement and travel services. Schaepman also made what he said was Shell's first public announcement of 'TruckersNET' – an Internet-based load brokerage service that will offer some 3,000 loads to customers across Europe. Payment will be via the euroShell card.

Fast-track development

Alan Goldman, Business Development Manager of OPAL and conference organiser, stepped in at the eleventh hour to give a presentation that covered, in part, the paper that was to be given by Arthur D Little consultancy's Neil Thomas – edited highlights of which are on p12.

Goldman explained that 'e-commerce is not about technology – it's about new, or existing, customer focused companies or intermediaries developing innovative capabilities'. He said that the 'challenge for oil companies' was to 'adapt and avoid becoming bulk commodity suppliers, allowing new infomediaries to provide the added value'.

He stressed that industry had to continue to innovate in order to stay ahead of the game. He concluded by saying that the development of e-commerce was 'much like driving a race car with your foot permanently on the accelerator and constantly looking in the rearview mirror. If you brake, or take your foot off the accelerator, even temporarily, you will be overtaken.'

Forecourts e-management

Globalisation in practice

Retail Resource provides management accounting services to the forecourt sector worldwide. It is a collaboration between UK accountancy firm Chantrey Vellacott DFK and British Airways through their trading divisions CV Retail (CVR) and Speedwing World Network Services (SWNS). This collaboration is an example of globalisation in practice with companies in lowcost economies such as India delivering services to service providers in the west who concentrate on adding value. In the decade ahead, the explosive growth of e-business means that this form of collaboration will become the norm, delivering a range of benefits to western companies, writes *John Roberts*, CVR Managing Director.

year ago we installed our forecourt accounting software packages in 50 sites in Ireland for an international oil company and produced monthly management accounts from London. Today we can install the packages on sites dotted around the world, process and validate the data in India, with added value services, help desk and client support functions carried out in the UK. The world is shrinking fast.

Retail Resource aims to deliver cost effective retail accounting solutions, covering services ranging from full back-office outsourcing for head office functions to the production of monthly accounts and weekly payroll for the site operator. These solutions are deliverable because the company has:

- an offshore and low-cost data processing and review facility;
- software specifically designed for the forecourt retailer; and
- people with sector experience.

Offshore facility

Our operations in Mumbai and Pune in India provide a quality low-cost outsourcing facility. The business performs to ISO 9002 European standards and employs a 1,200-strong graduate workforce. The company has been running for over four years and, when required, operates on a 24 hour-per-day basis. The business processes data received both electronically and in paper form. Turnaround times are rapid and information is secure.

Falling communications costs and the speed of electronic data transmission enable services to be delivered quickly and at low cost, using a trained workforce in a low-cost economy, to businesses in high cost western economies. All liaison with management and operators of UK companies are dealt with by staff based in the UK.

Software system

The software is a full general ledger system but with many features designed purely for the retailer, including:

- The design of the database makes the system compatible with other front and back office systems already in use.
- Data entry is geared around a daily reconciliation of takings and cash.
- A bank and polling agent reconciliation process with automatic matching of cleared lodgements and identification and ageing of uncleared lodgements.
- Trading accounts with margin and variance analysis by product category with drill down to original invoices and transactions.
- Motor fuel volume, as well as financial data, is handled.
- Site and regional comparisons, together with exception reports, are produced in number or graphical format on any balance sheet, trading or profit and loss account item.
- Flexible consolidated reporting to meet Group requirements.

Service benefits

The forecourt operator achieves savings in both time and cost by using the site software. Monthly inputting of data takes less than half the time traditionally spent on writing up manual records. Reports are available immediately to the site operator following data entry and problems can be identified quickly and dealt with via a bookkeeping helpline. Less time is spent on financial administration and more spent on productive forecourt management issues. Reviewed management reports are turned around in a matter of days following the month end. Control over forecourt staff is also enhanced with the availability of shift reports identifying losses and variances.

Head office and regional management also benefit from a reduction in management support and administration time and cost. If required, site information is available to management remotely throughout the month, giving a greater degree of control and an enhanced ability to deal with problem sites. Head Office reporting is extremely flexible allowing management to focus in on issues of choice and site and regional comparisons allow for best practice to be identified and lessons learnt.

The traditional benefits of outsourcing are also available:

- reduction in capital spend and manpower;
- replacing fixed with variable cost; and
- access to extra service of expertise and creativity.

The benefits of globalisation are available to all – those multinationals and SMEs managements that embrace the change will derive the benefits.

For further information on Retail Resource call John Roberts on +44 (0)20 7509 9100 or e: jroberts@cvdfk.com

Japan

Little profit despite rationalisation

During the past 18 months the Japanese oil industry has undergone a process of consolidation as oil companies try to cut costs and use mergers to reduce the number of competitors. The mergers and tie-ups have made front-page news in Japan but oil industry analysts believe that oil companies are still failing to address the main causes of the domestic oil industry malaise. David Hayes reports.

Refining

Imperial Palace, Moat Wall and Maranouchi Business District, Tokyo Photo: David Hayes



apan's oil industry faces three major problems. The most important is an excess of this refining capacity. Generous staffing levels and high salaries at refineries is another problem, along with the intractable problem of the large number of petrol stations across the country. Mergers are taking place without addressing these problems, analysts say, with the result that rather than providing a solution, mergers threaten to create even larger unprofitable oil companies.

Lacking in indigenous reserves, Japan is forced to import 99.7% of its oil requirements, of which some 80% is imported from the Middle East. Only about 14.6% of oil imports are from fields developed by Japanese oil companies that have minimal exposure to oil field development. Excess refining capacity still plagues the industry with only about 75% of refinery capacity being utilised in Japan compared with the OECD average of about 90%. Refining costs are high in Japan at roughly double the cost of refining in Singapore and South Korea with the result that Japanese refineries only supply the domestic market. Lack of network rationalisation means the large number of service stations in operation causes excessive price competition in the retail market.

'Japan has been through tough times largely of its own making,' commented Nicholas Smith, the Tokyo-based Senior Analyst and Global Chemical Coordinator for Jardine Fleming Securities (Asia), 'The oil industry was never a normal industry; the government has over interfered since the Refining

Japan

1920s. The oil refining industry has not set its own capacity, where to build refineries, the products or to build service stations - the government has controlled every facet. And has also controlled prices.'

Government policy

The major strength of Japan's oil industry is a result of government policy that continues to regard oil as a national security issue. The Ministry of International Trade and Industry (MITI) insists on Japan doing its own refining and so the oil industry can always expect some degree of government support. In addition, any would-be new competitor wanting to enter the market is required to hold 70 days worth of inventory that can tie up a substantial amount of working capital.

Japan's oil stocks are high compared with other countries. Corporate and national oil holdings average 160 days supplies, of which the government holds about half. Smith noted that Anglo-Saxon oil companies would consider oil holdings of about half this size as ample.

'There is not a feeling among Japanese oil company executives that they generate profits for investors. They are sitting on far too much capital,' Smith said. 'Some 75% of refinery capacity is utilised compared with the OECD 90% average. Oil consumption is stable in Japan so there is a problem of overcapacity. Japan's refineries are not an export industry as their cost structure is too high.'

In most markets refining costs are around \$3/b. However, in Japan they are \$6.12/b. For their nearest rivals costs are \$3.12/b in Singapore and \$2.40/b in South Korea. The figures are estimates as no official figures have been released by the oil industry.

'There are difficulties in Japan. Normally manufacturing is efficient in Japan but management and distribution is inefficient. But in oil refining the manufacturing is inefficient as well,' Smith commented. 'You cannot reduce the number of oil refinery workers; the oil cost also is difficult to change. Maintenance would be criminal to cut. You cut depreciation by cutting profits through increasing tax and reducing payouts to shareholders. Consequently it is difficult to cut costs in refining operations, but easier to cut headquarters staff.'

Refining consolidation

As part of wider efforts to cut costs Japan's oil industry has undergone a period of consolidation over the past 18

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months. Caltex pulled out of Nippon Petroleum, selling its stake at profit to Nippon Oil. Shortly afterwards Nippon Oil merged with Mitsubishi Oil in April 1999 to form Nippon Mitsubishi, Japan's largest petroleum group. Japan Energy and Showa Sekiyu also have formed a broad alliance on distribution, while Nippon Mitsui Oil has announced a tie up with Cosmo Oil under which the two companies treat their joint refining facilities as a single entity. Nippon Oil and Cosmo Oil combined have 27% of Japan's refining capacity.

Meanwhile, Tonen and General Sekiyu are in merger negotiations following a plan revealed in January 2000 by ExxonMobil to cut costs by Yen 12bn (US\$110mn) by integrating its Japanese affiliates. The merger would create Japan's second largest petroleum group with 16% of retail sales and 12% of the nation's oil refining capacity.

ExxonMobil owns 48.6% of General Sekiyu, a wholesaler of oil products, and a 50% share of Tonen, Japan's leading oil refiner. Although refiners and oil product wholesalers traditionally have been separate companies in Japan, the move is expected to encourage further restructuring of the oil industry.

There has been intense price competition on oil imports since deregulation started in 1996 with the end of the Provisional Measures Law introduced 10 years earlier which set oil inventory requirements and required oil importers to have refining capacity in Japan. However, resistance from dealers and high costs involved in shutting refineries has hindered rationalisation. The success of the Tonen-General Sekiyu merger would depend on the size of the cost cuts achieved.

General Sekiyu has seen profits deteriorate as a result of excess capacity in refineries and service stations, and bad cost management. However, in January the company revealed better than expected net losses of Yen 14.3bn compared with forecasted losses of Yen 23bn on sales of Yen 488bn for the year ending December 31, 1999.

Meanwhile, Japan's oil refining industry consists of 38 refineries with a total 5.06mn b/d refining capacity compared with South Korea where six refineries have a total 2.54mn b/d refining capacity and Singapore where four refineries provide 1.17mn b/d refining capacity.

Regional contrast

The contrast between Japan and South Korea is striking. The 817,000 b/d SK oil refinery at Ulsan is almost as large as Japan's three largest refineries combined, while South Korea's three largest refineries have the combined capacity equivalent to 40% of Japan's total refining industry. Some 48% of Japan's refining capacity consists of refineries below 150,000 b/d in capacity while 14% of the nation's refining capacity is units less than 100,000 b/d capacity.

'The difference between Japan and South Korea is that South Korea has built large oil refineries and petrochemicals plants with top of the range capability, while Japanese refineries are generally medium to small in size.' Smith said. 'This is because they were built after the Second World War when Japan was short of cash and had to rely on foreign help. Almost nothing has been built during the past 30 years. It's the same situation with petrochemicals. Japan suffers from the handicap of small size and age.'

'Japan has closed down plants of minimal capacity. Plants of 50,000 b/d have been closed down with a fanfare, but they shouldn't have been there. Japan could take out 14% of capacity, equivalent to 708,000 b/d, by taking out anything below 100,000 b/d. That would take utilisation to the high 80% range. If they did that it would affect a number of companies.'

The government has allocated a budget of Yen 2bn for refinery closures in fiscal year 2000. Smith noted that although refineries are getting various financial incentives from the government to close down, it is not clear what the incentives are.

'There is a possibility of more refinery closures this year,' Smith said, 'Although the market liberalised in 1996 Japanese oil companies spent 1995 to 1997 squabbling with the government over continuing the Provisional Measures Law which had closed the market. So Japan did not prepare for imports.'

The result has been the import of South Korean refined products on a spot basis although these have not gained a significant market share. However, this may change if other groups copy the agricultural cooperative Zen Noh which has imported South Korean gasoline for its own service stations.

Excessive competition

Meanwhile, excessive competition at the distribution end of the oil business is another structural weakness in Japan's oil industry. Oil companies own only an estimated 20% of the 56,444 service stations across Japan which are run by an estimated 28,427 companies. The average operator owns two petrol stations. In fact, most of them are 'mom and pop' enterprises.

Japanese oil companies have not built up large chains of service stations because of the high land costs. Consequently, with 80% of service stations controlled by independent companies, a merger of oil companies does not necessarily mean that any petrol stations will close. MITI is known to consider the excessive number of service stations a worse problem than Japan's excess refining capacity.

Most petrol stations are run as a franchise in Japan and supplied exclusively. Recently service stations have been putting on pressure for cheaper petrol prices and have started switching brand allegiance if they cannot get it.

While service stations are keen to source cheaper petrol, new laws which came into effect on 1 January 2000, governing the benzene content of imported products seem likely to shut the door again on any imminent rise in refined imports.

'The government opened the market in 1996. Now it is closing the market again with the enactment of the new benzene laws,' Smith commented. 'This year new laws will take the benzene content of gasoline down from 5% to 1%. In global terms, that's strict. This will make it difficult for South Korean and Singaporean refineries to meet Japanese market specifications, which presumably is the government's intention. The reduction of benzene is for environmental reasons."

Japanese refineries already have finished investing in plant modifications to comply with the new regulations while South Korean and Singaporean refiners generally are not equipped to meet these new tighter regulations. Although this represents a new import barrier it only affects gasoline. Since liberalisation in 1996 gasoline no longer generates the majority of profits for Japanese refiners. In fiscal year 1998 gasoline accounted for 23% of production by the oil industry compared with 41% for the middle distillates - diesel, kerosene and A-heavy.

'The Japanese oil industry is not there to make money. It should not be on the stock exchange as it just uses shareholders capital with a very low return,' Smith said. 'Only once in the last 25 years has the oil industry's recurring profit margin reached the manufacturing industry margin. People invest in oil as part of an overall spread of investments. The stock market still believes oil shares outperform at a time when the yen strengthens. You buy oil in US dollars and pay in dollars; so if the yen strengthened in the interim you then pay less. But that opportunity is now hedged out.'

While the government still sees the oil industry as necessary for reasons of national security, MITI is aware of that Japan continues to suffer from high-energy costs with high oil prices remaining a cause for concern. With the oil industry already regarded as a burden on the economy, Smith argues that Japan cannot afford to let refined product prices rise enough to make oil companies profitable.

So although the Japanese government is unlikely to allow oil companies to fail, the structural difference between Japan's oil industry compared with South Korea and Singapore makes it unlikely that Japanese refiners can ever match their regional competitors on cost. This leaves expanding imports as one long-term solution for cutting gasoline costs.

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PETROLEUM REVIEW JULY 2000

opec

Changing contractual agreements for upstream investors

Population pressure, financial dependency on hydrocarbon exports and the impact of the calamitously low oil prices in 1997-99 have led a number of producers to review their relationship with the oil companies in terms of access and contractual agreements, writes *Mojgan Djamarani*.

Recent attempts by Opec producers to open up their upstream oil production to foreign oil companies and project finance stem from:

- The rapid growth of population in countries where most of the government budget is spent on salaries and subsidies, leaving little to be spent on the development of their energy industries. In Iran, for example, massive government subsidies on fuel prices have tripled domestic demand over a 20-year period. Meeting this increase in domestic energy needs means less oil is available for exports and this in turn means tighter budgetary constraints.
- A second factor is the set-back suffered by Opec producers as a result of the low oil prices of 1997-99. In 1998 when oil prices fell as low as \$9/b, Opec revenues sank to their lowest levels since 1972 at \$80bn compared to the all-time high of \$439bn in 1980 (in constant 1990 dollars).

Opec producers still remain highly dependent on oil exports for half or more of their budget incomes. The rising oil prices of the 1970s and 1980s brought a boom in revenues and undermined efforts at diversification. The collapse in prices came as a rude awakening and has impressed upon them the need for economic restructuring and reducing government subsidies. It has also convinced many of the need for foreign investment. However, foreign investment is a highly politically charged issue, particularly for the Gulf Opec countries, and it is generally felt that they must tread cautiously given their fragile political stability.

The efforts of Opec countries to open up, apart from lack of much needed investment resources, is also spurred on by a desire to increase their market share. They also wish to divert the much sought after investment capital and advanced exploration and development technology of the international oil companies away from the newly emergent non-Opec producers as well as from each other. There is little love lost among Opec members. The way in which allocation of Opec production quotas are tied to the size of the production capacity of the member-states is also a consideration in inviting foreign oil companies to expand production capacity.

Oil production

According to EIA's International Energy Outlook 2000, although oil's percentage share of world energy consumption is expected to decline slightly, absolute world oil demand will grow from 73mn b/d in 1997 to 113mn b/d in 2020. Opec producers are expected to be the major beneficiaries of this growth.

During the last two decades Opec's share of the world oil market has dropped from 52% to 41%. Advances in exploration and development technologies, large capital investment by the oil majors, as well as favourable fiscal and legal regimes of some non-Opec host governments, have all contributed to increases in non-Opec oil production.

Non-Opec oil production, increased from almost 27mn b/d in 1976 to 44.5mn b/d in 1998 while Opec production has remained at around 30mn b/d. The non-Opec producers are expected to produce an additional 7mn b/d by 2010 taking their total to 51.5mn b/d and thereafter a further 5mn b/d by 2020.

More than two-thirds of the expected growth in oil supply is to come from Opec. Capital investment required to increase production capacity by 1 b/d in Gulf Opec countries is less than \$5,000. According to the EIA, even at low oil prices over the period to 2020, capex as a percentage of gross oil revenues would be less than 18%. And although the cost of expanding capacity for other Opec members is at least double that for Gulf Opec, they can still expect margins in excess of 32% on investment.

Iran, Kuwait, Venezuela and Nigeria are among the countries that are vigorously pursuing strategies to woo foreign oil companies into their upstream oil operations. Saudi Arabia, Algeria and Libya (although the latter two have an active presence of foreign oil companies) are also reviewing their petroleum legislation.

Until a decade ago all these countries were closed to investment by the international oil companies. But now that they are opening up, a clear division is emerging between Opec Gulf countries that are offering various takes on service contracts and the non-Gulf countries that were faster off the mark in offering investment opportunities but are pursuing more traditional contractual arrangements.

Iran

Iran was the first Gulf Opec country to seek foreign investment in its upstream oil operations. Although in the petrochemical sector foreign equity stakes of up to 49% are permitted, the upstream oil sector is regarded as more strategic. What Iran is offering on buy-back terms (*Petroleum Review*, April 2000) to the international oil companies is essentially risk service contracts under which the

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foreign contractor provides all the investment capital as in a traditional PSA. In turn the contractor is reimbursed from the sales of oil once the field enters commercial development when the operatorship of the field reverts to NIOC. The remuneration on buy-back is based on a fixed rate of return and is paid by NIOC by allocating the foreign contractor a share of production equal in value to the amount due.

So far buy-back arrangements which were hoped to bring in \$12bn in investment have raised only about \$5bn in five offshore projects. The biggest investment so far has been in the upstream gas sector - Phases 2 and 3 of the South Pars field - and even that was signed before 1998 when buy-backs were first offered.

There are several shortcomings to the buy-backs. The short duration of the contracts means that there will be a limited flow of revenue for the contractor. The fixed rate of return, reportedly around 15%, means that even if the project is successful, there is little above the typical rate of return for a contractor. Moreover, any increases in projected investment costs are borne by the contractor and not recoverable.

According to Edward Jankowski of Lasmo, a key feature of buy-backs is their price insensitivity for the big projects as they are production based. However because there is a cap on cost recovery, the smaller projects will be price sensitive as total revenue from field development could be limited. Therefore the smaller projects become more attractive to foreign oil companies in times of high oil prices.

More than 20 years after the Islamic revolution Iran has not yet managed to raise oil production to pre-revolution levels. Today it accounts for 10% of Opec revenues compared to 17-18% before. It has ambitious plans to double current production by 2010 requiring some \$30bn in investment. It may need to reconsider its buy-back arrangements to make them more attractive to the oil companies.

Iran has also successfully sought alternative external financing of its oil projects. International Petroleum Finance reported in 1997 that Iran had raised the first project finance deal in the Middle East in the upstream oil sector. Project finance involves the banks and bondholders assuming much of the risk from the main sponsor of the project and has traditionally been used in the LNG and petrochemical projects. A \$160mn syndication was put together by the German Westdeutsche Landes Bank for the offshore Soroush field. Iran has assigned crude oil that does not necessarily have to come from Soroush to pay back the loan. The arrangement is seen by many as verging on equity ownership.

Kuwait

Even though Kuwait's constitution forbids foreign ownership of mineral resources, the government is moving towards allowing foreign investment in oil production in the guise of Operating Service Contracts (OSC). That would still leave the government in full ownership of the reserves, OSCs provide for per barrel fees to the foreign oil companies along with allowances for capital recovery, incentives for increasing reserves, saving costs and introducing advanced technologies.

The OSCs, which run for a 25-year period, have two advantages over Iran's buy-back arrangements. One is their long-term duration, which lets the oil companies to have a longer-term revenue stream. The other is that the OSCs, not being price related, give a fixed fee to the oil companies per barrel of oil produced which can be most advantageous at low oil prices.

The fields, which the Kuwaiti government intends to open to OSCs, are all operating fields in the northern and western parts of the country but exclude its biggest field, Burgan.

Venezuela

Of the non-Gulf Opec producing countries, Venezuela is expected to make the biggest contribution to the increase in oil demand by aiming to double its current capacity to 6mn b/d by 2020. The opening up of Venezuela took place in 1995 by a congressional agreement. According to the agreement every joint venture (JV) agreement must be ratified by the congress. Under the terms of the Agreement, the foreign investor bears all risks in the exploration phase. The government becomes involved in the production and development phase through a designated affiliate, PdVSA, to safeguard its control at all stages of the JV. This is done through the establishment of a management committee as well as a mixed private-state company. The government maintains control over the committee by a double vote and over the mixed company through a veto power.

When oil is discovered the management committee and the mixed company will approve a development plan. PdVSA and the investor will then form a consortium to implement the plan. Applicable income tax is set at 67.7%, although a 34% tax rate applies to projects related to the development of heavy and extra heavy oil. The tax is levied on each separate member of the consortium after the PdVSA subsidiary has deducted its 'PEG' share of the profits. The PEG represents the net profits to the consortium before taxation that the consortium accords to the PdVSA subsidiary at the bidding stage in respect to that field or project.

The PEG accorded to the PdVSA subsidiary is biddable up to a 50% maximum and stays at the bid level for the first \$1bn of gross revenue, and then will vary on a formula involving the rate of return on assets. There is no ring fencing of income tax. There is a 16.66%/b royalty which may be lowered in special circumstances. For heavy oil development a rate between 1% and 16.7% applies in the early years of a heavy oil project linked to profitability, in other words, royalty is set on a sliding scale. Investment tax credit is set between 2% and 6%. In addition to all the above, there might also be significant municipal taxes to be negotiated by the foreign investors.

Marginal fields are developed under Operating Service Agreements that run for 20 years. An operator is appointed for every project who must at all times have an interest in the contract equal to at least 30% of the total interest held by the private companies. Direct state participation for a service contract is an option that that the state has the right to exercise. So far three rounds have been held which are expected to produce 750,000 b/d by 2006 with cumulative investments of about \$10bn.

Strategic associations or JV operations have largely been confined to the Orinoco Belt in eastern Venezuela which holds reserves of heavy crude estimated at 1.2tn barrels. There are four JVs that have been approved by the congress and in which PdVSA has a minority stake (Sincor, Zuata, Hamaca, and Cerro Negro). All aim to convert the heavy crude of around 9° API to at least 20-23° API. Production rate for the projects range from 80,000-200,000 b/d with total investments of \$11-14bn over a 35-year period.

Two of the JVs, Sincor (Total/Fina/ Statoil/PdVSA) and Hamaca (Phillips/ Texaco/PdVSA), have been stalled due to budget constraints by PdVSA as a result of low oil prices and the economic and natural catastrophes that the country has suffered in recent years. In 1999, PdVSA had its lowest budget in 10 years. The other two JVs - Cerro Negro with Exxon/Mobil and Veba Oil, and Zuata with Conoco - are producing concerns that went online in 1997 and 1998 respectively.

PdVSA's expansion programme until recently sought to increase production from the notional current capacity of 3.7mn b/d to 6mn b/d by 2007. 1.2mn b/d of this increase was to come from the JVs or the strategic associations; 600,000b/d Oil

opec

from operating agreements; and the rest from PdVSA's own efforts. However, PdVSA has had to scale down its expansion plans to 5.8mn b/d by 2007.

PdVSA, which until guite recently enjoyed a great degree of autonomy and independence from the government in its operational decisionmaking, has been using project finance raised from both domestic and foreign investors extensively in its upstream operations. This helps to spread risk and to give it more working capital. Venture capital funds can take up to 10% of the shares in development projects under operating agreements and issue bonds based on their holdings. The return on the bonds is tied to the return on the production unit. In the Orinoco Belt projects, the funds could hold up to 5-35% of stocks in the Zuata and Sincor projects which have combined investments of \$5.2bn.

Nigeria

The Nigerian oil industry could compete with the Gulf Opec countries not just on cost and quality of crude but also the degree of its openness to foreign investment had it not been for the corruption and economic mismanagement of the recently ousted military government.

Nigerian onshore and shallow water oil operations are undertaken by JVs in which the NNPC holds equity stakes of 60%, except in the case of Shell where it holds 55% stake. Deep water and frontier exploration all use production sharing contracts in which the foreign operator covers all exploration and development costs. Once oil is discovered, the operator will start paying tax and royalties to the government.

Because of lack of resources to fund exploration and development projects in the deepwater areas, in 1993 NNCP opted for production sharing contracts on 13 blocks with eight foreign oil companies. Despite the high cost of work on deepwater reservoirs, non-reliance on NNCP funding has allowed for high level of activity in the blocks awarded.

The PSCs, with a 30-year duration, offer favourable fiscal and legal regimes. The foreign oil companies are offered a higher profit share for the more marginal high risk projects. They have royalty rates ranging from 16.7% to 0% depending on the depth of the water. In addition, petroleum profit tax is reduced from 85% to 50% and investment tax credit (an allowable deductible) is set at 10% for water depth of up to 100 metres and 20% for over 200 metres of the development capital cost although in some cases as in the Esso PSC a 50% flat rate has been set. Tax on PSCs is set at 50%. Ring

fencing was dropped from deep water contracts so that companies could spread their costs over all new blocks.

Deepwater reservoirs are estimated at 8-20bn barrels and already several discoveries have been made:

- Bongo and Ngolo fields (Shell 55%/Exxon 20%/Elf 12.5%/Agip 12%). Bongo was discovered in 1996 with estimated reserves of 600,000-1bn barrels and production capability of 350,000 b/d and Ngolo has estimated reserves of 100mn barrels;
- Abo field (Agip 40%/ Amoco 35%/Exxon 25%) is expected to go onstream in 2001;
- the Abagami field on Texaco's block OPL 216 with several hundred million barrels of recoverable oil reserves.

All of Nigerian oil production currently comes from JV operations. In 1995 Nigeria improved its fiscal regime in JV operations whereby petroleum profit tax was reduced from 85% to 65.75% until all pre-production capitalised expenditure has been fully amortised. Royalty is set at 20% and investment tax credit at 5% but it is allowable deductible. However, a major problem of Nigeria's upstream oil operations has been the government's failure since 1993 to fund NNPC's share of JV operations. This has wreaked havoc on the Nigerian oil industry as the foreign operators have cut back on their exploration and development activities as arrears to them by NNPC have been building up. NNPC owes around \$2bn in JV arrears.

Because of its past debt problems, Nigeria has been blackballed by international financial institutions. Recent agreements reached with the IMF could open the doors to loans from the IFC and World Bank. In the meantime, the first alternative finance approach to address its JV obligations is being applied to the Shell/Elf/Eni \$900mn EA development. The western operators have agreed to meet NNPC's 55% share of the field development expenditures against repayments from future production. In effect the JV is being converted into a PSC which will be ring fenced from main JV operations once commercial oil flows.

Most foreign operators, however, prefer to convert existing NNPC debts into equity rather than have to come up with more cash themselves. Elf is hoping that project finance will cover a large share of its \$1.2bn development costs of Amenan-Kapono field due to the strong economics of the field with total capex of \$5/b. Economic recovery in the emergent markets and improvements in Nigeria's international standing with the election of President Obasanjo and return to civilian rule could revive Elf's earlier attempts to raise some of the financing through bonds. Elf is also looking to bank borrowings with Elf guaranteeing NNPC's share.

Exxon/Mobil on the other hand, has been keen for NNPC to divest or at least transfer some of its equity to Exxon/Mobil, raising its share to 60%. But there is stiff opposition in Nigeria and within the NNPC to sell-offs. NNPC is looking to project finance to raise cash. According to Presidential Oil Adviser, Rilwanu Lukman, Nigeria hopes to raise \$35bn over the next five years to fund its oil projects. Current plans aim to raise reserves to 30bn barrels from the current 25bn barrels and production capacity to 3mn b/d by 2003.

Other Opec countries

Saudi Arabia, Algeria and Libya are other Opec members who are considering opening up their upstream oil operations. Libya is reconsidering its petroleum legislation to introduce new legal clauses to encourage oil and gas exploration activities in the country. Currently only 25% of the country's area is granted to various foreign oil companies under different kinds of agreements. In Algeria, Sonatrach which signed a number of PSAs in the late 1980s and early 1990s is reconsidering its tough fiscal terms.

Soon after Iran's opening up, Saudi Arabia's Prince Abdullah began a round of discussions with US oil companies in September 1998 regarding possible upstream investment in Saudi oil and gas sectors. Although there is little resistance to foreign investment in the upstream gas, the oil ministry and some members of the royal family have come out against the opening up of the upstream oil operations. It is argued that with 3mn b/d in surplus capacity there is little need for near term investment in oil production. On the basis of EIA projections, in order to maintain market share the Saudis will have to expand production capacity from the current level of 11.4mn b/d to 14mn b/d by 2010 and 22mn b/d by 2020.

Earlier this year the Saudis announced that a Supreme Council on Petroleum and Mineral Affairs was to be set up. Although its functions have not yet been spelt out, it is widely believed to be directed toward restructuring of the economy and accelerating private sector investment in the oil sector.

Currently the only JV operations in the Saudi oil sector are in the 6,200 sq mile Neutral Zone which is equally partitioned between Saudi Arabia and Kuwait. The operator, the Arab Oil Company of Japan, which has a majority stake of up to 40% (with Saudi Arabia and Kuwait each 30%) is producing around 280,000 b/d from the offshore Khafji and Hout fields which are connected to Saudi Safaniyah field. The JV runs out in 2003 and, although Kuwait has extended it for another 30 years, Saudi Arabia is dragging its feet on the AOC concession on Khafji field which lies within its sector.

Conclusions

The key features of each country's investment regime are summarised in Table 1. The countries that have been discussed are all mature oil producing regions. In contrast to the other emerging regions - Yemen, China, the Caspian, etc. - they have huge proven reserves; small capex values; shorter lead times; existing infrastructure such as pipelines and terminals, lower environmental risk, with the possible exception of Nigeria, and much greater access to their eventual markets. Combined with a more favourable investment regime foreign investors are being offered a serious prospect of enhanced access to world's largest reserves of cheap oil.

Seen in a historical context, a cycle may have emerged during which in the initial exploitation of oil reserves exploitation at terms that were perhaps too favourable to the international oil companies - provoked a nationalist backlash which in turn led to domestic control of oil and gas resources. Combined with the formation, and growing influence, of Opec, many oil producing countries have seen considerable revenues flow into the hands of their governments. However, these oil producing countries have not been able to produce companies or institutions that can rival the major international oil companies in terms of technology or access to the billions of dollars required to sustain the exploration and development required, hence the opening up of their upstream sectors.

Stakes are high

For the oil producing countries the stakes are high. There is a very delicate balance between allowing foreign oil companies to once more have a direct influence on their economies whist still keeping political credibility with their populations.

In Venezuela, for example, President Hugo Chavez - elected in 1998 and who before that attempted a coup with the help of the armed forces - believes that PdVSA has grown too independent and given away too much to foreign oil companies. Government control over

| Country | Investment Regime | Key Features |
|-----------|---------------------------------|---|
| Iran | Buy-back | Presently enacted No equity stake Short-term contracts with limited revenue stream Guaranteed rates of return All but small projects price insensitive |
| Kuwait | Operating Service Contract | Expected to be enacted soon No equity stake Long-term contracts with fees per barrel basis All projects price insensitive Incentives for enhancing recoverable reserves and cost-effective production |
| Venezuela | Operating Agreements | Presently enacted Restricted to marginal fields Equity stake available 20-year contracts |
| | Strategic Associations | Presently enacted but each JV must be approved by Congress 35-year contracts 67.7% Petroleum Profit Tax, reduced to 34% for heavier crude 16.66% per barrel royalty that can be reduced in special circumstances Government maintains control over any JV |
| Nigeria | V | Currently enacted Onshore and shallow water fields NNPC holds 55% to 60% Petroleum Profit Tax 65.75%. Royalty 20%. Investment tax credit 5%. |
| | Production Sharing Agreement | Currently enacted Deepwater fields Petroleum Profit Tax 50.00% Royalty 0 to 16.7% depending on water depth Investment tax credit 10 to 20% depending on water depth but can be as high as 50%. |

PdVSA is tightening and it has been placed back under the jurisdiction of the Ministry of Energy and Mines. The emphasis in the country's energy policy is being shifted away from oil to petrochemicals and gas. In fact, all government sector investments in the upstream oil sector have been suspended. This does not bode well for the country's oil industry where, according to Dr Fadhil Chalabi of the Centre for Global Energy Studies, there are a growing number of ageing fields with declining rates of production, in some cases reaching as high as 12%/y. Dr Chalabi further reiterates that: 'Unless huge investments are made to maintain the capacity, it is generally thought that a significant part of Venezuela's preChavez oil capacity, will have been lost'. The re-emergence of oil nationalism, he says, will be discouraging to foreign oil companies.

Although the government has not yet overturned any legislation governing the activities of the foreign oil companies that would immediately threaten their investments, measures such as the shortening of the working week for oil workers will make it more costly for the foreign investors to operate in Venezuela.

If the international oil companies wish to avoid a repetition of the historical cycle, they will have to be as alert to the political implications of their negotiations with the producing states as the economic.

Lots of potential – but lots of problems

Nigeria, Africa's most populous country, is fortunate to be rich in oil resources and even richer in natural gas. *Fred Thackeray* reports on current prospects for hydrocarbon developments in the country.

ne year after the accession of Olusegun Obasanjo's newly elected civilian government, Nigeria is still struggling to overcome a deeply ingrained legacy of past mismanagement and corruption. But the investments already made by oil and gas companies and their plans for the future imply that they at least believe it can be done.

Nigeria

A heavily attended conference* in London at end-April provided an opportunity to assess progress to date and to hear a wide variety of opinions on prospects. To the outside observer the most impressive feature was the undisputed and publicly expressed recognition amongst the many Nigerian speakers – governmental and independent alike – that corruption remains a problem that must be rooted out.

Key aspects of Nigeria's present state are extensive extreme poverty, an unmanageable accumulated external debt of \$31.5bn and hopelessly inadequate energy infrastructure – electricity supply and petroleum refining in particular. Together, these conditions interact to render extremely difficult the potential political and economic renaissance.

Some key statistics cited at the Executive Meeting of the Conference by Charles McPherson, the World Bank's Manager of Oil and Gas, illustrate how much the country's circumstances have been deteriorating. Whereas ten years ago, he said, 38% of the population had access to electricity, today a mere 10% has usable power. Even more striking, he added, the percentage of the population 'living in extreme poverty' has increased from one-third to two-thirds over the same period.

The effects of localised poverty in the main oil and gas-producing region of the Niger Delta have been dramatically signalled by sabotage and rioting conducted by populations seeing the creation of wealth in which they do not share. These events have caused frequent interruptions of production and exports for more than two years and are still continuing intermittently. However, the oil companies and the government are now addressing the problems. Shell, for example, lists a range of welfare investments in the region and the government is set to invest 13% of oil and gas revenues in local developments.

Ambitious targets

Against the present distressing background for the Nigerian economy, both the government and the oil companies are setting ambitious targets for upstream investments as the key to economic and social development. The government's hopes were expressed in an address presented by Funsho Kupolokun on behalf of Rilwanu Lukman, Obasanjo's Special Assistant on Petroleum. By 2003, the targets are to increase proved oil reserves to 30bn barrels from today's 25bn barrels and to increase oil production capacity to 3mn b/d from today's 2.2mn b/d.

Beyond this, the government is hoping to raise capacity further by 2010 to between 4mn b/d and 5mn b/d. The principal contribution to this growth is expected to come from deepwater offshore fields.

Kupolokun said that as soon as 2003/04 the new deepwater fields are expected to achieve a capacity of 'not less than 750,000 b/d.' If this raises total production by the same volume to 2.95mn b/d the increase would be equivalent to an average annual growth of about 7.5%.

A government target for even faster growth to 3.5mn b/d by 2003 was also mentioned at the Conference by Heinz Rothermund, Shell's MD of Exploration & Production for Sub-Saharan Africa. Shell alone, together with its long-time partners in Nigerian JV operations – Elf (now part of the TotalFina group) and Agip – is planning continuing major investments and a doubling of its production from about 800,000 b/d to around 1.6mn b/d in the next three to four years. Rothermund declared that he had no doubt that the government's aim to double Nigeria's oil reserves ultimately to 50bn barrels is achievable.

Already, in the seven years since the first deepwater licenses were issued in 1993, discoveries total an estimated 2.8bn barrels of oil and 6tn cf of natural gas (**Table 1**). Just four giant fields are estimated to contain 78% of the total deepwater oil reserves or about 2.2bn barrels (**Table 2**). Aiming to further stimulate expansion, in March the government issued invitations to tender in a new licensing round, with a closing date of end-June. Eleven of the blocks offered, or half the total of 22, are in deep or ultra-deep water, seven are shelf blocks and four onshore.

Opec proviso

An important proviso, however, will be whether Nigeria's objectives are compatible with Opec quota constraints. As the World Bank's McPherson pointed out, on a per capita basis, Nigeria's present oil export quota of about 2.2mn b/d is tiny as compared with other Opec members.

ExxonMobil's Vice President for Africa, Jim Massey, cited a forecast that world oil demand will increase at an average 2% annually up to 2010. The forecast indicated that Opec countries would be meeting the whole of the increase; but, he said, it is likely that Nigeria's potential growth will exceed this and to achieve it would require an increase in its share of Opec production. It is therefore 'imperative' he added, that the Nigerian government and the oil industry should work together to minimise pre-investment. The oil industry 'must propose a fair and transparent production allocation system and this may include special consideration for higher cost deepwater production.'

Joint ventures

The readiness of the government so far to resolve the issues which will promote oil and gas investments has been reflected in its approach to the funding of investments in the onshore joint ventures. It holds an average 58% equity in these JVs but has been chronically unable to meet the 'cash calls' required for development expenditures.

Obasanjo has publicly asserted that the government will not sell out its holdings, however, and alternative funding is in course of being agreed which will leave its equity shares intact. The new agreements are designated hybrid or quasi-PSC (production sharing contract). The concept is that the oil companies make the necessary investments and are reimbursed for NNPC's share from future cash flows. During the period of NNPC's carried interest the companies will be able to claim full capital allowances on the investments.

Reducing gas flaring

A key issue now being confronted by all the companies operating in Nigeria is the urgency to reduce flaring of associated gas, currently running at some 2bn cf/d. The government has declared a target to completely eliminate flaring by 2010. All the companies have declared their policies to achieve this target. The two largest – Shell and ExxonMobil – have set targets to eliminate flaring from their operations by 2008.

ExxonMobil, according to Jim Massey, the company's Vice President for Africa, is currently flaring 31% of its gas production, and reinjecting 56%. The remaining 13% is used as fuel or lost in 'shrinkage'. The Group's principal active project at present is Mobil's offshore Oso gas condensate field development. A study now under way to increase utilisation is looking at a wide range of options which include both LNG and GTL (gas-to-liquids), also gas supply to domestic markets.

Shell has already moved a long way towards its goal of eliminating flaring with the massive NLNG project. Investment totalled \$3.7bn for the first two trains and their related facilities that are now fully operational. A further investment of \$1.7bn is anticipated for expansion by adding a third train and facilities, bringing the total LNG capacity to 8.7mn t/y. Overall progress on this expansion is now 20% complete, aiming at its first exports in 4Q2002.

Natural gas feed for the first two trains is 900mn cf/d and will increase to 1,500mn cf/d with the addition of the third train – equivalent to 75% of the national total currently being flared. The third train will be able to process 100% associated gas feedstock and the plant's production capacity will then also include 1.2mn t/y of LPG.

Investment for the first two-trains project was wholly equity financed by the participants in the joint venture company, NLNG – NNPC 49%, Shell 25.6%, Elf 15% and Agip 10.4%. First returns on the project are not anticipated until 2007. For the third train expansion the equity partners are providing a further \$600mn and have agreed that any residual funds from the two-trains project and revenues from its operations will be re-invested in the expansion. To

| | Oil (bn | barrels) | Natural | gas (tn cf) |
|-----------------|---------|----------|---------|-------------|
| Deepwater PSC's | 2.8 | (11%) | 6 | (5%) |
| Shell JV | 12.0 | (48%) | 69.6 | (58%) |
| Exxon Mobil JV | 4.5 | (18%) | * | |
| Chevron IV | 3.0 | (12%) | 3.6 | (3%) |
| FIFIV | 1.5 | (6%) | 2.4 | (2%) |
| Agin IV | 0.7 | (3%) | 3.6 | (3%) |
| Texaco IV | 0.2 | (1%) | * | |
| Others | 0.5 | (2%) | 34.8 | (29%) |
| Total | 25.2 | (100%) | 120 | (100%)** |

* Included in Others

** An estimate by Shell puts the total reserves at 3,570bn cm or 126tn cf, approximately 50% each associated and non-associated gas.

Source: Totals and percentages from Wood Mackenzie paper at Conference.

| and the second se | (approx. bn barrels) |
|---|----------------------|
| Anbami (Texaco) | 0.9 (39%) |
| Bonga (Shell) | 0.6 (27%) |
| Erba (ExxonMobil) | 0.4 (18%) |
| Nowa/Sebki (Statoil) | 0.3 (16%) |
| Total | 2.2 (100%) |

Source: Percentages and total barrels from Wood Mackenzie

1. Nigoria's present proved oil & gas reserves

Table 2: Present deepwater oil reserves in four fields

service the third train, however, two new LNG carriers have been ordered which are to be partly funded through a syndicated loan of \$160mn. Currently a further expansion is under study, which would add another two trains.

Looking ahead

A recurring theme in the political aspects both of speakers' presentations and of networking discussions in conference breaks was that not too much progress should be expected soon. The hope of many is that the present regime will survive its term, leading to the re-election of Obasanjo in 2004 to continue the huge task of social and economic renovation that is needed. Two external factors will play key roles in bringing this about. One factor should be international recognition of Nigeria's efforts and accordingly early assistance with debt relief, notwithstanding that the country is a major recipient of oil and gas revenues. The other key factor, even more important, will be the continuing commitments of the international oil and gas industry to find and develop the reserves, which are likely to prove far greater than assumed hitherto – especially reserves of natural gas.

*A two-day conference organised by CWC Associates on Oil and Gas Investments in Nigeria, preceded by half-day Executive Briefing.

Environment Agency enforces PCBs regulations

The UK's Environment Agency is to start enforcing new regulations designed to keep harmful polychlorinated biphenyls (PCBs) out of the environment. It has set up a specialist registration team that is to ensure that all PCBs still in use, above limits, are registered with it by 31 July 2000.

Under the regulations, all PCBs must be removed from use and properly disposed of by 31 December 2000. Some holders of PCBs, however, will be able to defer the removal and disposal, such as laboratories using PCBs for analytical or research work.

It will cost £155 to register as a

holder of PCBs. People will need to register if they:

- hold any residual stocks of PCBs which are at a concentration in excess of parts per millions;
- hold equipment containing in excess of 5 litres of contaminated materials as well as having a PBC concentration of over 50 ppm.

Those entitled to hold PCBs beyond the 31 December deadline will pay an annual renewal fee (yet to be set) until the PCBs are disposed of. For more information, view the Agency website at www.environment-agency.gov.uk

High hopes but limited action

One year after the end of the Kosovo conflict, international companies and governments in south Eastern Europe are examining a host of ambitious energy infrastructure proposals. They face a major challenge to reconcile their aspirations with regional realities, writes *Maria Kielmas*.

Balkans

he Balkan region is viewed as an obvious transit route to bring Russian and Central Asian oil and gas to Western European and eventually North American markets. Not only does it bypass the environmental risk posed by increasing traffic through the Bosphorus Straits, it would provide a politically important physical link between the West and countries who hope to become members of the European Union (EU) and Nato. This was the thinking behind a longstanding Romanian plan, announced just before the Kosovo conflict erupted, to carry up to 34mn t/y of Caspian crude over 4,000 km from the port of Constanza, through Serbia, Croatia, Hungary and Slovenia to the Mediterranean. Similarly, Romania wants to link its gas network to Croatia's and onwards to Western Europe.

So long as UN sanctions against Serbia remain in place, these schemes are not viable. But a US company, New York-based Albanian, Macedonian and Bulgarian Oil Corporation (AMBO), hopes to build a crude pipeline which bypasses Serbia. With costs estimated at \$1.1bn, this ambitious project would carry 750,000 b/d of Caspian crude due west from the Bulgarian port of Burgas across the southern Balkans via Macedonia to the Albanian port of Vlore. AMBO President Ted Ferguson told news conferences in late May that the pipeline's throughput will represent 40% of new oil production passing through the Black Sea in the next five years and 30% over about the next 10 years. He claimed that a number of oil companies including Chevron, BP Amoco and Texaco have expressed interest in the scheme, while the governments of Bulgaria, Macedonia and Albania could be shareholders in the pipeline company.

Serbia could be connected to the pipeline route whenever UN sanctions against the country are lifted. Other pipeline proposals include:

- A \$600mn, 280-km, oil pipeline to transport Russian crude southwest from Burgas in Bulgaria to Alexandroupolis in Greece. Bulgaria also hopes to be the natural gas transit hub for the Balkan region and eventually hopes to expand supplies to Macedonia, Serbia and Albania.
- A 220-km oil pipeline running from Thessaloniki in Greece northeast to Skopje in Macedonia to supply the OKTA refinery. The Elpet consortium, led by Greece's Hellenic Petroleum, bought a 54% stake in the refinery last year. It plans to spend US\$182mn in refinery upgrading and pipeline construction. The hope is to supply Serbia's fuel needs once sanctions are lifted. Nato bombing destroyed the Pancevo and Novi Sad refineries causing an estimated \$1bn billion in damage. But Serbian President Slobodan Milosevic said in late May that refining capacity will be brought back to pre-war levels by the end of the year.

Croatia's state oil company, Ina Naftaplin, and Hungary's Mol have signed a memorandum of understanding to link the Croatian gas grid with Hungary's. Croatia currently imports Russian gas through Slovakia, Austria and Slovenia.

Linking the Croatian oil and gas pipeline systems with Western Europe.

Balkan governments and international sponsors such as the EU, European Bank for Reconstruction and Development (EBRD) and World Bank have stressed the need to repair and upgrade the Balkan region's energy and transport infrastructure and integrate these with those of the EU.

Upstream optimism

Upstream oil industry developments provide some reason for optimism. The whole of the Montenegrin offshore has been licensed out and an onshore exploration round is being planned. Exploration activity in Albania is picking up after it was halted by the Kosovo crisis, and companies hope that the newly elected government of Croatia will introduce oil sector reform. Ramco has begun seismic work on Juzni Jadran Block 1, offshore Montenegro, using Murmanskbased Sevrneftegeofizika as contractors. Ramco signed the contract with state oil company Jugopetrol Kotor in June 1998 through its now wholly owned division, Medusa Oil. Negotiations of the contract straddled the period in March 1998 when

the UN enacted an arms embargo against the Federal Republic of Yugoslavia in an effort to foster peace in Kosovo. The US issued an executive order in June 1998 banning new US investments in the Federal Republic of Yugoslavia, but not Montenegro.

Despite the Montenegrin government's distancing of itself from Belgrade's actions in Kosovo, its remains a member of the Yugoslav Federation and so contracts with foreign investors still must be approved by Belgrade, particularly as the government of President Milo Djukanovic remains equivocal on independence given the internal divisions among Montenegrins.

London-based Star Petroleum have acquired the offshore Juzni Jadran Blocks 2 and 3 in February this year. All three blocks consist of water depths between 20 and 1,000 metres but the companies are concentrating in areas of less than 300 metres. The prospects here, and offshore Albania, are essentially structural plays in Eocene and Cretaceous carbonates. The Tertiary prospects are believed to be more gasprone. Previous drilling in the area by Chevron in the 1970s as well as by state oil companies from former Yugoslavia registered oil and gas shows but no commercial discoveries.

The coastal region, some of which is held by Star and Ramco, has also been drilled extensively. Croatia's Ina Naftaplin, Jugopetrol Kotor and Serbia's Nafta Novi Sad had a joint venture to drill a 4,500 metre well onshore near Ulcinj, which terminated when the Serbo-Croat war broke out in 1991.

Exploration interest in the Balkans in recent times has focussed on Greece and the Black Sea. Romania is deemed prospective but the terms on offer are difficult while officialdom is perceived as corrupt. Interest is growing in the Adriatic region, which has been studied extensively by most of the majors in the 1980s and early 1990s. Occidental is planning to drill on its Albanian block 3 in the fourth quarter. Amoco held some of the Croatian offshore and held options on much of the coastal onshore acreage before war broke out.

Today the main foreign player is Agip through its joint venture with Ina, to develop offshore gas in the northern Adriatic's Ivana area. Reserves here, basically one field surrounded by several satellite fields, are 275bn cf.

Onshore production in Croatia, and Serbia's Vojvodina, comes from the southern rim of the Panonnian basin. Before the wars each country was producing 1-1.4mn tonnes of oil (15,000 b/d to 23,000 b/d) from old, shallow fields. Individual fields produced between 100 b/d and 3,000 b/d. But foreign investment has been deterred by the poor terms on offer. Croatian terms stipulate a 50% back-in for the state company which, by the government's own admission, is in serious financial difficulties. The region has to import most of its oil needs. State budgets have been hit by rising oil prices, the fall in the value of the euro – to which most of the region's currencies are pegged via the deutschmark – relative to the US dollar, and regulated low domestic prices for fuel.

Downstream politics

Restructuring of the sector, privatisation and cross-border mergers are stalled by political and public opposition to domestic fuel prices rising to free market levels. But the Balkans are not alone in this. None of the former communist states in Central and Eastern Europe has been able to free up fuel and utility prices entirely. In early June, Hungary's Mol was embroiled in a public slanging match with the government over its attempts to raise prices while protest groups were urging a consumer boycott of the company. In Serbia the customs office cut the dinar rate to 19 to the deutschmark, from an official six and a street value of 22-23, in an effort to boost revenues and causing prices for fuel, the main import, to soar. Fuel prices had already risen 8% earlier in May while the government has upped electricity prices by 9.5% twice this year. But Serbia's \$200mn debt to Russia's Gazprom for gas supplies remains unpaid so in early June Gazprom cut off deliveries.

The Russian action confused pundits who believe it is still trying to remain an ally of Belgrade. Bulgaria is also facing similar treatment from Gazprom, which has refused to consider Bulgaria's request for lower gas prices. Bulgaria said it needed lower prices to boost its flagging industrial sector but Gazprom retorted that it needed the funds because of difficulties in developing new gas fields.

There is little chance of any crossborder energy company consolidation until the fuel price issue is resolved. Mol and Ina have held on-off talks about a possible merger since 1996. Last year Deutsche Bank valued Ina at \$750mn and in August the two companies agreed to exclusive negotiations. But the election of Stipe Mesic as President of Croatia in February this year and the removal of members of the late Franjo Tudjman's Croatian Democratic Union (HDZ) party from all positions of influence effectively halted the deal. Mol later acquired 36.2% of Slovak refining company Slovnaft for \$262mn. But in late May Croatian Prime Minister Ivica Racan, speaking during a visit to Budapest, invited Mol to re-open talks with Ina.

Before its acquisition of Slovnaft, Mol was believed to have a war chest of \$200mn to \$300mn. The company wants to concentrate its efforts on Central and Eastern Europe and the former Soviet Union and hopes to farm out all other assets and exploration acreage. Its exploration blocks in Algeria, Tunisia, Yemen and Pakistan are now up for grabs. But should Mol's talks with Ina come to fruition, Ina may farm out its non-regional exploration holdings, such as Oman. The renewal of Ina - Mol talks have not impressed analysts who think that Mol is overstretched and unable to absorb Ina's debts. They think Austria's OMV or one of Slovenia's three oil companies would make a better partner. Ina and Slovenia' Petrol recently reached an agreement for the supply of 120,000 t/y of gas condensate to the Lendava refinery, which is 50% owned by Ina, from fields in northern Croatia, and the export of LPG to Bosnia and Herzegovina.

Other Balkan countries are joining the privatisation drive. Montenegro wants to sell off state enterprises including Jugopetrol Kotor, and is also mulling new hydrocarbons legislation. Before the Kosovo conflict Serbia planned to privatise Nafta Industrije Srbije (NIS) Jugopetrol. Albania is restructuring Albpetrol while Romania plans to re-offer the Petromidia refinery. In an example of the legal problems facing investors in the region a Romanian court cancelled a \$725mn deal for the refinery with a Turkish company, Akmaya. Akmaya claimed it had been denied privatisation incentives available to other foreign investors in Romania while the Romanian government's privatisation agency, State Ownership Fund, alleged breach of contract on Akmaya's part when it missed a payment deadline. The court ruled in favour of the government.

Future investment needed

Although there is a general agreement among international lenders and foreign investors on the need for infrastructure improvements, especially energy infrastructure development in the Balkans. By themselves, these investment are not enough. They can only pay off if there is economic activity that is generated by other investments. The EastWest Institute stresses the need to develop institutions of public and private governance. The region is characterised by the subordination of the rule of law to vested interests, a black market economy and corruption. Integration of the region with the EU is of paramount importance.

West Africa E&P

Exploration hot spot

For the past five years West Africa, in particular offshore Angola, has been an exploration hot spot, making the emerging hydrocarbon province an attractive place to be. This is reflected in high signature bonuses but is also symptomatic of dollar oil prices coasting along slightly south of \$30/b, writes *Priscilla Ross*.

ver 50 companies hold equity interests in one or more deepwater West African oil and gas licences. However, just four companies -ExxonMobil, Elf, Shell and BP Amoco hold more than 50% of the key licences, according to global consultants Wood Mackenzie. Elf is premium rated in terms of reserves whereas ExxonMobil has the lion's share of acreage staked out. Following ExxonMobil and merged TotalFinaElf a clutch of companies comprising Shell, BP Amoco, Texaco and Statoil are important in acreage and/or reserves. The third tier of companies which hold significant Angolan deepwater assets are Agip, Chevron, and Norsk Hydro (see Table 1).

Almost all of the deepwater licences in the main hydrocarbon basins in offshore West Africa are under licence to foreign companies. There are currently around 52 deepwater licences in the region, but the main exploration thrust is in the deepwater blocks where typically the licence size is in excess of 5,000 sq km.

The outstanding question is why there are so few operators of production? One of the answers according to Dr Andy Latham, Wood Mackenzie's Principal Consultant, African Energy, speaking at a recent Angolan oil conference, is that exploration blocks are very large – typically 5,000 sq km. He added: 'Blocks are often re-awarded to the same companies. The established shallow-water operators secured the pick of the deepwater blocks. Operated production has never been traded and industry mergers have combined companies that were present separately.'

Angola a key player

Four countries – Nigeria, Angola, Gabon and Congo - hold 82% of these licences (see Table 2). According to Alistair McFadzean, Deputy Director, West Africa, UK Department of Trade and Industry, Angola has 12.5% of global deepwater reserves and production is due to double in five years. UK companies with North Sea experience are seeking opportunities in a market worth £500mn/y to the UK. There are particular opportunities those with experience of developing oil reserves via floating production systems and the future is bright with the gearing up for finds in the super ultra deepwater areas.

Angola currently has a small 35,000 b/d refinery and the government has authorised the construction of a new 200,000 b/d facility. Jose Mangueira, National Director of Petroleum in the Angolan Ministry of Petroleum says production will significantly expand from mid-2000 to about 1.3mn b/d. He predicts: 'Within five to eight years, Angola will probably become the second largest producer in the African continent. In fact, seismic data indicate that the deep and ultra-deep offshore areas include huge reservoirs, therefore the discovery of large reserves in the next few years is regarded as a certainty."

According to BP Amoco statistics, oil production in 1998 in Nigeria, Libya, Algeria and Egypt was ahead of

| Operator | Block |
|---------------|--|
| Agip | 1/80, 25 |
| CABGOC | 0, 14 (Chevron's subsidiary Cabinda Gulf Oil Company |
| Elf* | 3, 17, 32 |
| ExxonMobil | 15, 24, 33 |
| BP Amoco | 18, 31 |
| Shell | 1/92, 16 |
| Texaco | 2/80, 9, 22 |
| Total* | 2/92 |
| BHP | 21 |
| Petrofina* | 19 |
| Energy Africa | 7 |
| Ranger Oil | 4 |
| SNL P&P | 4,5 |
| Occidental | Cabinda Norte |
| Ocean/Seagul | Cabinda Centro |
| +11 | |

*Now TotalFinaElf

Table 1: Operators offshore Angola, 1999

Angola in output. However, Angolan oil enthusiasm will be fuelled further by US investment dollars - as the Sonangol figures outlined in Tables 3 and 4 show, operations and development are crowding out exploration expenditure.

Exploration activity has, since 1980, concentrated on offshore areas chiefly on the Lower Congo Basin blocks. In 1993, exploration began in deepwater blocks resulting in the discovery of 12 very big reservoirs, will reserves are estimated at 7bn bar Between 1995 and 1998 Ang reserves trebled and now stand at barrels. Deepwater blocks will tribute about 50% to total produc as from 2002.

According to Mangueira: 'Our pre tions are that reserves will grow about 4bn barrels in the next t years.' While another industry an agreed that discoveries are consta being made and that this is a pro play, he was more conservative put his reserve count at around 7bn barrels.

JVs and PSAs

The Angolan State company, Sonangol, is the exclusive concessionaire of the exploration and production rights on liquid and gaseous hydrocarbons and can enter into agreements with foreign companies. There are two types of agreements: joint-venture (JV) agreements and production sharing agreements (PSAs). The agreements currently being negotiated currently between Sonangol and the petroleum companies are PSAs.

Angola's 1978 Petroleum Activities Law is currently being reviewed and will include many of the provisions of the PSAs in order to simplify and make all agreements uniform. Some 50% of production is earmarked for cost recovery in a PSA and 50% is profit oil to be shared between the contractor group and Sonangol. For shallow-water blocks profit is shared according to a fixed ratio negotiated for each block on the basis of cumulative production. For deep and ultra-deepwater blocks, the sharing of profit is also made according to a fixed ratio, but based on the internal rate of return.

BP E&P

BP Amoco announced the Galio oil discovery offshore Angola in May 2000. Galio is the third exploration well the company has drilled in block 18 and the third successive discovery. The Galio 1 well - drilled in 1,238 metres of water and some 185 km off the coast - tested at 4,770 b/d of 34 API oil. Although further work will be needed to evaluate the full extent of Galio, the preliminary results indicate the possibility of a sig-

| Benin | 1 | 2 |
|---|---|---|
| Table 2: Deepwater licences offsh | nore West Africa | |
| nificant oil accumulation. The pany's two earlier discoveries block, Platina and Plutonie drilled in 1999. Platina was of 1,400 metres water depth and at 6,500 b/d in May. Plutonio w in 1,362 metres water depth ar at 5,700 b/d in July. Anthony Shutes, the Cor Director, Angola Business Ur | he com- i on the lt has a 20% b, were BHP is the op rilled in signed, with i planned. In l as drilled operator, and interest. The includes 500 i one well. A P: | was signed in stake in block perator. A PSA 3D seismic and block 5 Sonan I BP Amoco ha work program sq km of 3D s SA has been ini |

No. deepwater licences

17

14

9

6

3

3

2

1

Amoco says deepwater oil reserves that are currently under development amount to 1.3bn barrels, while some 4-5bn barrels have been discovered and there are 10-15bn barrels yet to find. The company also has interests in two other offshore blocks currently under development:

Country

Nigeria

Angola

Gabon

Congo

Ivory Coast

Namibia

Ghana

Equatorial Guinea

- Block 15 in which BHP has a 26.67% interest and ExxonMobil acts as operator. Covering an area of 4,200 sq km, it includes the Hungo, Kissanje, Marimba, Dikanza and Chocalho discoveries. First oil is expected in 2003.
- Block 17 where BP Amoco holds a 16.67% interest and Elf is operator. Covering an area of 5,000 sg km, it includes the Girassol project and Dalia, Rosa, Lirio and Tulipa discoveries. First oil is expected in 2001.

BP Amoco also holds a 26.67% interest in block 31 and is the operator. The block covers an area of 5,349 sq km and the water depth is 1,500 to 2,800

May 1999. 21, where has been four wells gol is the as a 27.5% mme here eismic and tialled.

Percentage (%)

30

25

16

11

5

5

4

2

Untapped potential

Gas is the untapped Angolan opportunity - and challenge - for operators. Commercial solutions are needed to convert the world class gas resource to economic success. According to Shutes there are local market constraints and competing export options as well as an infrastructure requirement. For him, the dilemma is the cost of gas utilisation and the lead time to first gas.

Cost reductions are challenging in a deepwater environment and industry cooperation is needed. Stability of fiscal terms will underpin gas commercialisation and maximise the benefits to Angola. According to Mangueira the development of 19 reservoirs and the expected large discoveries will contribute to a significant increase in production of associated gas. He put associated gas reserves at about 10tn cf and added that, while calculation of non-associated gas reserves is underway, reliable data is not yet available.

| | Oil production (b/d) | Investment (Smn |
|------|----------------------|-----------------|
| 1993 | 504,461 | 1,208 |
| 1994 | 550,488 | 1,197 |
| 1995 | 616,664 | 1,331 |
| 1996 | 679,212 | 1,590 |
| 1997 | 713,583 | 1,925 |
| 1998 | 738,600 | 2,243 |
| 1999 | 800,000 | 3,360 |
| 2000 | 810,000 | 4,131 |
| 2001 | 900,000 | 4,868 |
| 2002 | 1,050,000 | 4,858 |
| 2003 | 1,400,000 | 4,825 |

Source: Sonangol

Table 3: Investment in Angolan oil production

West Africa E&P

| Year | Exploration | Development | Operations |
|------|-------------|-------------|------------|
| 1993 | 159 | 746 | 303 |
| 1994 | 131 | 781 | 285 |
| 1995 | 119 | 872 | 340 |
| 1996 | 260 | 791 | 539 |
| 1997 | 499 | 815 | 611 |
| 1998 | 521 | 1,087 | 635 |
| 1999 | 487 | 2,140 | 733 |
| 2000 | 497 | 2,953 | 681 |
| 2001 | 170 | 3,745 | 953 |
| 2002 | 142 | 3,580 | 1,136 |
| 2003 | 142 | 3,441 | 1,242 |

Of the Angolan gas production in 1998 some 85%, which represents about 290bn cf/y, of the produced gas was flared and about 15% re-injected to aid in crude production. Angola is responsible for about 30% of the total gas being flared in Africa and is next only to Nigeria in terms of total gas flared. In Nigeria permanent changes have been made in tax laws to encourage a reduction in gas flaring.

There are two planned Angolan gas utilisation projects – the Cabinda project and the South of the Zaire River mouth/southern area of the Lower Congo Basin project. The project for utilisation of Cabinda associated gas has started and is expected to end flaring within three to four years. Gas will be used for injection, gas lift and the production of LPG, LNG and NGL.

The project for utilisation of gas from blocks in the areas south of the Lower Congo Basin started in 1998. According to forecasts, production of associated gas from this area will grow gradually from 1999 and is expected to reach its peak in 2001–2007 at 700mn cf/d. The estimated lost opportunity value due to flaring is over \$1bn based on LNG costs.

A gas utilisation study was completed in April 1998 and a joint planning agreement was signed between Sonangol and Texaco in July 1999. Reserves certification performed by Gaffney Cline and Associates rates reserves on the low end at 4tn cf, most likely 9.5tn cf, and at the high end of the spectrum at 25tn cf – with the caveat that much of the deepwater area is still to be explored.

Gas quality is very good with a low carbon dioxide (CO2) level (0-2%) and low nitrogen level (0 -1.4%). The gas liquids quantity is high, being rich in condensate and LPGs. Texaco and Sonangol believe gas currently being flared would be low cost to gather. If dedicated gas fields for the project were developed from previous discoveries it could be achieved in shallow water depths of typically 30–75 metres.

The development plan envisioned by Sonangol and Texaco is for a shallow water platform off the coast the Angolan town of Soyo and a trunkline linking the platform to an LNG plant close to the Angolan capital, Luanda. The LNG plant would be a single train with 3mn t/y capacity, expandable to 6mn t/y. There is an existing industrial site in Luanda near the present refinery and the existing port, providing the possibility of some shared infrastructure.

The sponsors of the project envisage three 135,000 cm vessels with a oneway transit time of eight to 10 days. It is cost comparable with expansion projects around the world. The location is close to both Latin America and Europe. LNG delivery is slated for the end of 2004 or early 2005. An earlier date is possible with early commitment by financiers and gas off-takers.

Cornering the market

Since the 1980s the hydrocarbon industry in Angola has grown at a rate of 25% a year. During the last three years huge reservoirs have been discovered in the deep offshore. Angola has cornered the market in West Africa in deepwater exploration with 28 exploration and 11 appraisal wells. This is more than all other countries combined. A high level of drilling in the future is likely to continue in Angola, as well as Equatorial Guinea and Nigeria in the next five years and presumably further out.

Deepwater depths offshore West Africa are typically 400 metres to 3,000 metres. According to analysts there is a typically low success percentage of 10% to 15% for deepwater plays – but in Angolan deepwater exploration wells are some of the best in the world and the exploration success rate is over 50%. Also, if a find is made the chance of high reserves are enhanced. There are few cost estimates and wide variations for field sizes and costs but development costs are penciled in on the back of an envelope at \$3/b and operating costs at \$2-\$4/b.



Over recent years Petroleum Review has always included a comprehensive European bulk storage survey in the August issue.

Consolidation in the storage industry means the format is no longer appropriate.

This year's feature will comprise an overview article and one or two technical articles.

The 1999 survey will shortly be transferred to the Institute of Petroleum's website www.petroleum.co.uk and will be maintained as an always-accessible source of data on European bulk storage facilities.





... continued from p2

includes details of how government funding is to be spent.

Amec has announced the formation of Operations Analysis, a new businessto-business e-commerce company serving customers in the process and service industries. Operations Analysis will offer an Internet Work Center, including a portal through which customers may obtain leading edge business analysis, process optimisation and technology enhancement services and counsel. Access to information will be made available through the website at www.OperationsAnalysis.com with subsequent industry-specific work centre sites to follow.

MarineManage.com has launched an interactive marketplace for vessel sharing. Operators and service companies in the oil and gas industry will be able to buy and sell vessel deck space and time through this new Internetbased trading environment. The service will enable customers to fully utilise spare vessel capacity and sell-on available vessel time potentially reducing their logistics costs and offering clients the opportunity to move cargo easily and cost effectively. The initial phase of the service will be free until September 2000.

Edinburgh-based consultant Wood Mackenzie has launched 'energyvision' a new Internet service designed to provide energy clients access to Wood Mackenzie's research any time, anywhere in the world. The service allows subscribers to access and search over 20,000 pages of detailed analysis covering the energy industry is over 60 countries. For further information, contact ukhelpdesk@woodmac.com or visit via www.woodmac.com/energy Houston-based energy company Enron has created a fifth division called Enron Net Works which will house its trading platform, electronic www.EnronOnline.com, where it conducts some \$1.5bn of transactions daily. The new unit is also to examine opportunities for global B2B Internet sites to service other industries, ranging from pulp and paper to chemicals and computer data storage.

Belgian IT company Bluegate is planning to launch an Internet marketplace for the transportation of products for the chemicals industry in Europe. The site will act as a meeting place for chemical companies and accredited hauliers and will contribute toward planning, optimising and streamlining the European goods transport market for the chemicals sector. It will also offer a wide range of services with high added value, including the computerised management of distribution related documents. A pilot portal is due to come online in summer 2000.

UK car dealer Pendragon has launched a new online car retail service at www.tins.co.uk Customers can order from a wide range of UK manufacturers and models on the Internet, supported by what is claimed to be one of the largest of supply partners in the country, including Pendragon's 200-strong dealer network. Pendragon also plans to use its dealership expertise in areas such as valuing part exchanges, finance packages and vehicle delivery.



- Aviation Jet Fuel Specifications, Manufacture, Product Quality, Properties, Distribution and Availability 18 - 20 October 2000 Code: RF7
- The International Aviation Fuels Market Demand, Supply and Pricing Code: IM1

23 - 25 October 2000

industry is responding by producing reformulated gasolines, city diesel and other clean or 'green' fuels

- Automotive Diesel Fuels Fuel Manufacture, Product Quality, Engine Design and the Potential for Additives
 - 13 14 November 2000
- ✓ Gasoline Technology Specifications, Quality, Blending **Components, Additives and Market Developments** 15 - 17 November 2000 Code: RF5

The CPS Postgraduate Diploma in the Management of the International Refining and Fuels Industry

The college recognises the importance of providing flexible methods of training, which can meet the needs of both the company and the individual, to develop the necessary combination of management, technology, and economic competencies. The RF5, RF6 and RF7 courses listed here can be taken as part of *The CPS Postgraduate Diploma in the* Management of the International Refining and Fuels Industry and are designed to benefit managers, economists, marketers and technical and commercial staff involved in the downstream petroleum industry including specialised areas

The IM1 course is a module within The CPS Postgraduate Diploma in the Management of Petroleum Logistics and Marketing

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Technical report toxicology

DNA adducts produced by oils, oil fractions and polycyclic aromatic hydrocarbons in relation to repair processes and skin carcinogenesis*

By Andrew J. Ingram,¹ John C. Phillips² and Scott Davies²

en polycyclic aromatic hydrocarbons (PAHs) mainly with three or four aromatic rings were tested for their ability to induce DNA adduct formation in mouse skin. Four of these were selected to investigate adduct formation and loss over a period of eight days. Three mineral oils were also examined for their adduct forming ability and one was selected for adduct formation and loss over a period of eight days. In addition, fractions derived from the same oil containing 2-3- and 4-6ring aromatic compounds were applied to mouse skin in a non-carcinogenic oil vehicle and adduct levels were observed over an eight-day period.

It was found that PAHs that had no mutagenic, initiating or carcinogenic activity and those that had mutagenic activity in bacteria but no initiating activity in mouse skin failed to produce DNA adducts in mouse skin. Two of the three PAHs with initiating activity and both complete carcinogens produced clear evidence of adduct formation, the adduct levels produced by complete carcinogens being 100 to 1,000 times greater than those produced by initiators. Examination of adduct formation and loss with the carcinogenic PAHs benzo[a]pyrene and 5-methylchrysene over an eight-day period showed a peak at 24 hours and an apparent twophase process of adduct loss. It is suggested that the first steep loss was due to DNA repair and that the more gradual subsequent loss was probably due to epidermal hyperplasia and desquamation. With the initiator 1, 4dimethylphenanthrene (three rings) a peak of adduct formation was seen at two days and adduct levels were not reduced much by eight days. This suggested that, with initiators, adduct formation and repair may be spread over a longer period than with complete carcinogens.

With the whole oils, clear evidence of adduct formation was seen with both a carcinogenic non-solvent-refined oil and with a non-carcinogenic residual oil. The level of adduct formation with the residual oil, however, was much lower than with the carcinogenic oil. When adduct formation by the carcinogenic oil was examined over eight days, the pattern of adduct formation and loss was similar to that of a tumour initiator rather than a complete carcinogen. Peak adduct levels on the diagonal of the thin-layer chromatography (TLC) plates seemed to occur at one and four days after treatment, with no clear reduction after eight days. From examination of adducts formed by the 2-3-ring and 4-6-ring aromatic fractions, it appeared that the main adduct spots produced by the carcinogenic oil were due to the 2-3-ring aromatic components of the oil. Adduct spots near the vertical axis of the TLC plates were also seen with the 2-3-ring and 4-6-ring fractions. The relevance of these spots is uncertain, but if they truly represent adducts, the findings suggest that they are due mainly to 4-ring PAHs.

The studies suggest that the activity of carcinogenic oils is largely due to substituted 3- and 4-ring polycyclic aromatic compounds and that more attention should be paid to substituted 3-ring compounds in predicting the carcinogenic potential of oils from analytical data.

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Fuels and Hydraulic Fluids Filtration

Friday 24th November 2000

A one day technical meeting to be held at Cheshire Innovation Park, UK

Fuel cleanliness requirements in both automotive and aviation applications are rapidly approaching those for hydraulic fluids. Many industry fuel specifications now require particulate limits as low as 1mm with negligible free water.

This one day meeting will present a number of topics in the field of fuel and hydraulic fluid filtration. Using both rig demonstrations and presentations reviewing current equipment and technologies, the meeting will explore industry practice and future challenges both in liquid separation and liquid quality monitoring.

The meeting is aimed not only at suppliers and users of fuels and hydraulic liquids but also suppliers and manufacturers of relevant filtration materials, equipment and systems.

For further details contact Vic Hughes Tel: +44 (0)151 373 5545 Fax: +44 (0)151 373 5102 e: Vic.B.Hughes@sav.simis.com

Publications and Data Services

The Oil Industry of the Former Soviet Union

N A Krylov, A A Bokserman and E R Stavrovsky (Available from Marton Book Services, PO Box 269, Abingdon, Oxon OX14 4YN, UK). ISBN 90 5699 062 4. Price: £72 (\$110).

This book describes the current Russian situation and prospects for the future development of its oil industry. It provides information on technologies used, including their technical and economic characteristics, and current research. Part 1 discusses oil reserves and the current resource base, prospects for their development, potential oil reserves, and those already explored. Part 2 discusses conditions under which oil is produced and describes features particular to Russian oll production, associated problems and technologies. Part 3 highlights the background, current state and operational problems of the oil transportation system of Russia and other countries of the Former Soviet Union. Also reviewed are the technical state and operational reliability of the main pipeline network, including a general description of the pipeline system, design and construction of oil pipelines, repair and maintenance, and economic and control problems.

Multinational Energy and Mining Companies 2000

(Commercial Intelligence Service, Business Monitor International, 179 Queen Victoria Street, London EC4V 4DU, UK). Price: Directory – £290 (\$465); CD-ROM – £495 (\$820)

This directory, available in print or on CD-ROM, provides details on 7,700 top energy and mining professionals at over 3,500 multi-national companies, subsidiaries, joint ventures and company representatives across Asia, Latin America, the Middle East, Africa and emerging Europe. Key information listed includes company name, full postal address, telephone, fax, e-mail and website, senior executive personnel, industry classification, business activity, nationality, size of company, \$ sales volume, and contact details for the parent head office. The CD-ROM version allows the user to export data to disk or labels in order to create targeted mailing lists, support telesales and build a customised database. CD purchasers also receive a free printed copy of the directory.

Environmental Exposure to Benzene*

(Available, free of charge, from CONCAWE, Madouplein 1, 1210. Brussels, Belgium), 34 pages.

This report (no. 2/99) provides a review of the health risks from environmental exposure to benzene. Sources and levels of benzene exposure of the general public have been identified from literature and model calculations are presented of the daily absorbed dose of benzene for different activity patterns. The possible influence of changing benzene levels due to legislative measures on the daily absorbed dose is also estimated.

* Held in IP Library

Electronic Energy Trading

(Can be ordered online from Global Change Associates' website at www.global-change.com at a cost of \$995.)

Now in its second edition, this management report from international energy consultants Global Change Associates, analyses the state of the electronic energy trading market. Since its first publication in December 1999, over 30 new platforms have been launched – such as Redmeteor.com, PEPEX, the Intercontinental Exchange – and are included in this latest report. The new edition also features an updated assessment of North American and European market developments and a forward view of the likely European trading structure. A comprehensive functionality table is also included.



Information for Energy Group (IFEG)

For their summer social, the Information for Energy Group is having a trip on the London Eye at 7.30 pm on 13 July. For further information please contact Catherine Cosgrove.

New Editions to Library Stock

- The Final Disposal of Disused Pipelines and Cables: Summary of the Findings of a Norwegian Assessment Programme). Ministry of Petroleum and Energy (MPE), Oslo, Norway, December 1999.
- Offshore Oil and Gas Directory 2000/2001. 28th Edition. Miller Freeman, Tonbridge, Kent, 2000.
- BS EN ISO 13628-4: 1999. Petroleum and Natural Gas Industries: Design and Operation of Subsea Production Systems: Part 4: Subsea Wellhead and Tree Equipment. British Standards Institution (BSI), London, UK, 1999.
- ISO 13706: 2000(E). Petroleum and Natural Gas Industries: Air-Cooled Heat Exchangers. 1st Edition. International Standards Organisation (ISO), Geneva, Switzerland, ISO, April 2000.

Library & Information Service Hours

Open 9.30 am to 5 pm Monday to Friday (except Bank Holidays). Non members are welcome on payment of an entrance fee of £19 for half a day visit, or £27 for a full day. Student non-members may use the library for £1.50 per day if they bring a letter of introduction from their tutor and their student ID card.

A sample of what you get if you visit:

- help with your research from experienced library staff;
- access to the extensive collection of the library;
- CD-ROMs such as the University of Tulsa's Petroleum Abstracts and Society of Automotive Engineers' (SAE) collection of papers;
- photocopying facilities; and,
- for members, free access to the Internet.

Contact Details

- Information Queries to: Chris Baker, Senior Information Officer +44 (0)20 7467 7114 Information Officer, +44 (0)20 7467 7115
- Library holdings and loans queries to:
- Liliana El-Minyawi, LIS Assistant, +44 (0)20 7467 7113
- Careers and educational literature queries to: Information Assistant, +44 (0)20 7467 7116
- WebSite gueries to:
- Perry Hackshaw, Webmaster, +44 (0)20 7467 7112
- LIS management queries to:
- Catherine Cosgrove, Head of LIS, +44 (0)20 7467 7111

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

NEWTechnology

Multi-component gas analysis for hydrocarbon processing

Limas 11-UV, the new 200-500 mn photometer from ABB Analytical offers precision gas analysis for use in hydrocarbon processing, measuring up to five components in a gas sample simultaneously. This latest addition to the Advance Optima product portfolio of analysers uses the principle of ultraviolet absorption by gases such as nitrous oxide (NO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), hydrogen sulfide (H₂S), carbon sulfide (CS₂), carbonyl sulfide (COS), chlorine (CL₂) and ammonia (NH₃).

According to the manufacturer, the analyser is capable of measuring down to 22 ppm. Accuracy is claimed to be enhanced by a quadruple beam procedure with double-quotient evaluation. This is also said to give the unit 'strong immunity from drifts in the radiation source and detectors'. High selectivity is ensured by optimum selection of measured wavelength and reference wavelength, use of gas filters and electronic balancing of cross-sensitivity.

In addition to precision analysis, the Limas 11-UV offers calibration without the need for test gas bottles. Its integrated gas-filled calibration cells sim-



plify operation and maintenance, delivering savings in costs, time and storage space. An electrodeless discharge lamp with very long service life is used as the UV radiation source.

Available with either aluminium or stainless steel cells, the unit is said to be safe for use with both toxic and flammable gases. It is offered as a standalone analyser, but also integrates fully with other members of the Advance Optima family for incorporation with multi-analyser systems.

Tel: +44 (0)1952 670477 Fax: 44 (0)1952 670455

Emissions monitoring shield

A new and highly sensitive emission monitoring system developed by Shell Global Solutions is claimed to effectively put a warning system shield over any kind of installation. Soon to be in service at one of Japan's oil refineries, the continuous monitoring system is also said to save oil refineries, as well as chemical and gas plants, millions of dollars as it eliminates the need for costly checks for leaks from every valve and flange within the process area.

The system provides operators with an advanced early warning system that gives them time to fix leaks before concentrations of escaped gas rise to dangerous levels or are detected outside the perimeter fence. The monitor has a wide range of applications across industry and can support compliance with new legislation such as the Ozone Directive, states Shell.

The air quality monitoring system links concentration and meteorological measurements with emission modelling algorithms via a complex statistical technique. Air quality is assessed 24-hours-a-day by examining light absorption over fixed distances. The absorption measurements can be 'tuned' to reveal the concentration of almost any gas, claims Shell. It can also be tailored to monitor aromatic compounds, general alkanes, and specific compounds such as hydrogen fluoride and methane.

Tel: +44 (0)151 373 5870 Fax: 44 (0)151 373 5845

Tank monitoring alliance

Enraf of the Netherlands and Texasbased Scientific Instruments have formed a worldwide alliance to jointly market a liquid natural gas (LNG) tank management system. The system will incorporate a multi-sensor probe and control unit, highly accurate servo-operated tank gauges, temperature devices and 'LNG Pro', a Windows NT-based software program. The agreement provides for Enraf's coordination of technical support, including system configuration, start-up, customer training and after-sales service, utilising the partner's worldwide distribution and service networks.

Enraf Tel: +1 281 443 4291 www.enraf.com

Pushing back the boundaries of deepwater engineering

Hyperlast has produced a new range of products pipeline insulation and protection designed to perform in the harsh conditions of deepwater engineering from 500 metres to more than 3,000 metres depth. Its Syntactic DW-512 polyurethanes are said to offer a long-term solution for the insulation and protection of subsea systems, from wellhead to platform servicing depths of up to 600, 1,500 and 3,000 metres. 'Simulated service testing shows that coating thickness remains constant over time under hydrostatic conditions,' states the company. 'These materials retain the properties of the original 512 material, in particular its elasticity, which enables DW-512 to be reeled.'

The new materials are stand-alone, single-layer coatings that are said to combine physical protection against abrasion and corrosion, with exceptional adhesion and resistance to mechanical and thermal stress. There is no restriction in the coating thickness and it can be applied either by moulding or rotational casting.

In addition to its use for thermal insulation of subsea flowlines, the DW-512 range can also be used in manifolds, riserrs, spool pieces and field joints, maintaining flowline temperature.

Tel: +44 (0)1663 746518 Fax: +44 (0)1663 746605

NEWTechnology

Millennium lifesaver



The UK Design Council has granted Millennium Product status to potentially life-saving products made with Gore-Tex® Nomex® fabric and developed by specialist clothing and accessories manufacturer, the Shark Group.

The Air Pocket and Air Pocket Plus products enable wearers to safely rebreath their own exhaled air during a cold water immersion emergency when a helicopter ditches in open seas. Cold shock is a primary physiological hazard for immersion victims, and can cut breath hold time to about 50% of that required to make a successful underwater escape.

The light, compact, rebreather system is protected by flame retardent Gore-Tex Nomex fabric and is worn between the lifejacket lobes. The system is particularly suitable for oil industry workers travelling to and from rigs by helicopter. The rebreathers are said to be simple to use and maintain. The Air Pocket Plus system automatically adds an additional breath of air to the counterlung on immersion, further supporting the passenger during the critical escape phase.

Tel: +44 (0)1506 412525 Fax: +44 (0)1506 420004

Innovative subsea pig launcher wins award

Brown & Root Energy Services (BRES), a division of Halliburton, and GD Engineering were recently presented the 2000 Award for the Most Significant Contribution to Subsea Pipeline Technology by the Pipeline Industries Guild. The award was given for their work in developing the first subsea pig launcher to be used for regular maintenance on a multiphase oil pipeline without interrupting production.

Developed specifically for use in the BP Amoco Machar subsea oil field, part of the Eastern Trough Area Project, the pig launcher is also said to offer opportunities for 'significant cost savings' on other long tie-back subsea developments.

The unit has been successfully used on several occassions for wax removal from the 16-inch diameter, 245 bar design pressure, 36-km long production pipeline from BP Amoco's Machar subsea field to the Marnock platform in the northern sector of the North Sea, without the need to stop oil production.

The pig launcher is vertically deployed and remotely operable. It is said to be flexible enough to accommodate intelligent pigs, and is environmentally friendly and intrinsically safe. It has been designed to withstand repeated use with minimal intermediate maintenance and is deployed from a diving support vessel using heave compensated guide wires. Three pigs are launched in sequence using flow diverted from the subsea manifold. Connection to the subsea system is through two standard subsea hydraulic connectors. All of the subsea operations are carried out by remotely operated vehicle (ROV) with zero hydrocarbon leakage.

A significant problem associated with many long distance subsea tie-backs is the control of petroleum wax deposited on the inside of the pipeline wall as the process stream cools down. In the case of the Machar field pipeline, the wax build-up can be up to 3.5mm per month along the pipe wall and will impact the throughput of the pipeline if not removed.

The new subsea pig launcher is claimed to offer greater capex and opex savings than round trip pigging as there is no need for a second pipeline and no production downtime.

Tel: +44 (0)20 8544 5000 Fax: +44 (0)20 8544 6904

Underground corrosion monitoring

BAC Corrosion has developed a new range of impressed current mixed metal oxide tubular anodes whose cost is said to be close to that of equivalent siliconiron and cheaper magnetite multiple anode strings. The anodes are designed to protect buried metallic structures from corrosion. Their light weight and ease of installation is claimed to eliminate the handling and installation problems associated with heavy and brittle alternatives currently available on the market.

The device comprises a titanium tube with a mixed metal oxide coating that activates the titanium electrically enabling it to function as an anode. With the cable connection in the middle of the tube, at a crimped section, even current distribution along the anode's length is said to be assured. Full internal moisture production is provided by a



filling of epoxy resin, end caps and cable seals. The BAC range comprises three pipe diameters and two pipe lengths with a variety of cable types to suit particular applications.

Tel: +44 (0)1952 290321 Fax: +44 (001952 290325

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

Membership News

NEW MEMBERS

Mr J A Adebanjo, Grays Mr M M Al-Matrook, Kuwait Mr D Atkins, Cleethorpes Mr B W Casey, Longbay Petroleum Associates Limited Ms S Coleman, Edgware Mr B Connell, Bayerische Landesbank Mr S Z Currie, Norton Rose Mr M D Elkins, Bournemouth Mr E J Erlendson, Canadian Petroleum Limited Hon E Eta, Skyward Resources Limited Mr R C Exton, Harrow Mr G Fielden, Halifax Mr W L Gyde, Sinclair Knight Merz Mr M Harper, Angle Technology Limited Mr N G Hayes, Wellesbourne Dr I M Ismail, API Petroleum Refining & Marketing Corporation Ltd Mr M A James, Slovakia Mr S Lomako, Mayer, Brown & Platt Mr J MacGregor Watson, Andersen Consulting Mr H E Makki, UAE Mr S Miyauchi, Nissho Iwai Europe Plc Mr P B Monahan, Countrywide Fuel Mrs M Ozmegova, London Mr T Reddick, Innovative Instrumentation Mr E T E Rozario, Norway Mr J Sattar, Petroleum Economics Limited Mr J Scott, ABN Amro Bank Captain M S Shakespeare, Lowestoft College Mr M Simpson, Smallfield Mr P J Slater, Rolls Royce plc Ms M A S Zughaid, Jowfe Oil Technology

STUDENT

Ms C M Majewski, London Ms C Nakhle, University of Surrey Mr O B Olorunyomi, Nigeria Mr S B Smith, Hamble Mr G Zabel, London

STUDENT PRIZEWINNERS

Mr M Jarymec, Venezuela Mr M Rogerson, London

NEW FELLOWS

Mr N F Green FinstPet

Norman Green is a Chartered Chemist with almost thirty years experience in analytical chemistry in the petrochemical industry. He is employed by SGS Redwood Services as a Specialist in their Quality and Technical Support Group. His main areas of responsibility lie in the development, validation and control of test methods that utilise instrumental techniques, chiefly GC, HPLC/IC, ICP-OES, AAS, GFAAS, FTIR and UV/Visible spectroscopy. He also manages the technical and quality aspects of the company's accredited laboratories. Before joining SGS he worked for both Shell and Burmah Castrol in the UK.

Dr H A Pearce FinstPet

Dr Pearce is Managing Director of Great Marsh Limited, which is based in Southampton. Dr Pearce is a Chemist who graduated from the University of East Anglia with a PhD in Infrared Studies of Adsorption and Catalysis in 1974. Before joining Great Marsh Limited, he was Commercial Director of

NEW FELLOWS CONTINUED

Bitmac and before that worked for Esso Petroleum Company Limited. Great Marsh Limited is a chemicals and oil services company which stores, blends and manufactures a wide range of products for the major chemical and oil companies. Dr Pearce is currently Deputy Chairman of the Independent Tank Storage Association and is an active member of the IP Southern branch.

Dr B J Botter FinstPet

Barend J Botter joined the petroleum industry in 1978 after obtaining a PhD in Physics from Leiden University in The Netherlands. He has worked in Shell's upstream sector in specialist and managerial capacities in Research and Petroleum Engineering. He is currently working as a Senior EP Project Leader. His career took him from Holland via Denmark to the UK and lately back to Holland. He held various external positions in the industry, a.o. Member Technical Advisory Board of the Petroleum Engineering Department at Heriot Watt University (Edinburgh) and Technical Programme Committee Member 1998 SPE European Petroleum Conference.

NEW CORPORATES

Simmons & Company, 33 Queens Road, Aberdeen AB15 4ZN, UK

Tel: +44 (0)1224 202300 Fax: +44 (0)1224 202303 Representative: Mr C I Welsh, Managing Director Investment banking activity – corporate finance, research.

Datamonitor, 9 Swiss Terrace, Swiss Cottage, London NW1, UK

Tel: +44 (0)20 7675 7830 e: sloth@datamonitor.com Representative: S Loth, European Oil Analyst

Datamonitor are market analysis experts specialising in downstream oil & gas markets. The company researches fuel retailing markets across Western, Central and Eastern Europe. They also specialises in providing quality data to gas production and distribution companies around the globe.

Schutter (Far East) SDN.BHD. No 4203 (3rd Floor) Jalan Susur, Persiaran Raja Muda Musa, 42000 Port Klang, Selangor Darul Ehsan, Malaysia Tel: +603 3662672 Fax: +603 3662676

e: bzschutter@pd.jaring.my

Representative: Captain J B Chiang, CEO

Schutter (Far East) Sdn.Bhd. is a one stop logistics service company specialising in cargo care, especially the petroleum sectors offering marine surveying, quality assurance services, storage, handling, documentation and customs clearance. Schutter (Far East) Sdn.Bhd. also offers a full Outtern Guarantee (FOG) scheme to sellers and buyers alike for all liquid and bulk cargo shipments. This is a joint venture company between The Schutter Group of Rotterdam and local Malaysian.

Microclean Environmental Ltd, Townspark, Castletown Road, Dundalk, Co. Louth, Republic of Ireland Tel: +353 42 9339332 Fax: +353 42 9339339 e: microclean@eircom.net

Representative: Mr Gerard McDonnell, Managing Director Since 1993 Microclean Environmental has designed, supplied and implemented specialist bioremediation programmes for oil/petroleum based contamination of land and water. Its services now include comprehensive site investigations, scientific and engineering monitoring programmes, construction works, together with bioremediation of oil spillages. All works are supervised by suitably qualified scientific and engineering personnel.

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IP Discussion Groups & Events

Energy, Economics, Environment

'Towards the Total Energy Company'

Thursday 6 July, 17.00 for 17.30

Kirby Owen, Director, Energy Consulting, Wood Mackenzie

IP contact: Jenny Sandrock

Energy, Economics, Environment

As part of a series on

'Late Life of the North Sea'

14 Sept – an overview by Tom Windle, Ariadne Business Consultants

9 Oct – presentation on Shearwater by John Stubbs, Project Director, Shell Expro (*to be held at Imperial College*)

24 Oct – tax issues by Christine Wheeler OBE, CW Energy Tax Consultants

IP contact: Jenny Sandrock

Energy, Economics, Environment Discussion Groups

Please notify the contacts if you plan to attend any of the advertised events All events will take place at the IP unless stated otherwise Institute of Petroleum , 61 New Cavendish Street , London W1M 8AR, UK Tel: +44 (0)20 7467 7100 Fax: +44 (0)20 7255 1472 e: jsandrock@petroleum.co.uk

Addendum to PMP7

Petroleum Measurement Manual: A Guide to Recommended Measurement Practice for Compliance with the Requirements of HMC&E Notice 179 Petroleum Measurement Paper No 7 Addendum 2

Petroleum Measurement Paper No 7 (PMP7) was published by the IP in March 1995. An addendum was published in February 1999. This addendum allowed the use of Coriolis mass meters for the volumetric measurement of petroleum products during transfer into and out of bonded installations.

Whilst PMP7 does not exclude the use of any particular type of volumetric flowmeter, it does nevertheleass concentrate on positive displacement and turbine metering systems as these were the most popular types at the time of publication. Since then the other types of flowmeter such as ultrasonic meters have been developed to the point where they can meet the performance standards specified in HMC&E Notice 179. Such meters may be considered by HMC&E for revenue accounting by volume provided that:

1. Regular proving is undertaken in accordance with the procedures and requirements of chapter 8 of PMP7. 2. The performance of meters fully complies with the criteria of chapter 7 of PMP7.

3. All other relevant requirements of PMP7 are met.

THE INSTITUTE OF PETROLEUM

Note 1: Acceptance by HMC&E would be conditional upon the satisfactory conclusion of a comprehensive trial demonstrating that the meters satisfy HMC&E mandatory requirements at all times.

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

IP Conferences and Exhibitions

International Conference on

Oil and Gas Accounting London: 6-7 November 2000

The following topics will be discussed:

- New OIAC SORP what has changed?
- Accounting and Reporting for joint ventures and consortia
- Decommissioning, dismantlement, removal and restoration – a revolution in accounting, resulting from FRS 12
 Business combinations
- Cost ceilings and impaired issues
- Oil and gas reserve definitions, measurement and valuation - the SPE and IP recommendations and disclosure
- Problems arising from the use of commodity-based and financial-based derivatives
- Accounting for risk sharing and financial arrangement
 Accounting for and reporting commodity-based
- derivatives
- Accounting for and reporting financial derivatives
 International accounting developments affecting the
- petroleum industry

Please see below for contact details

International Conference and Exhibition

INTERSPILL 2000 Brighton, UK 28-30 November 2000

A major conference and exhibition featuring the activities of the European spill response industry, both at sea and on land, under the direction of the **British Oil Spill Control Association** and organised by the **Institute of Petroleum**. It is planned that **INTERSPILL 2000** will be the first in a regular series of such events.



Speakers

Keynote address delivered by: William O'Neil, Secretary-General, IMO

Confirmed speakers:

- Dr Alessandro Barisich, DG XI-EU
- Archie Bishop, Hollman Fenwick & Willan
- Ulf Burstoff, Waterways and Shipping North
- Kevin Colcomb, Maritime and Coastguard Agency
- G H Davis, Environment Agency Wales
- John Dawes, British Oil Spill Control Association
- Lord Donaldson of Lymington
- Norwegian Pollution Control Authority
- Sjon Huisman, Ministry of Transport, Public Works and Waste Management
- Mans Jacobsson, International Oil Pollution Compensation Funds 1971 and 1992
- Alasdair MacDonald, Dovre Safetec Ltd
- Robin Middleton, SOSREP, Maritime and Coastguard Agency
- Joe Nichols, International Oil Pollution Compensation Funds, 1971 and 1992
- Edward Owens, Polaris Applied Science Inc.
- Maurice Storey, Maritime Coastguard Agency
- George Sutherland, Shetland Islands Council
- Gustav Törling, National Rescue Services Board
- Carla de Vries-Hess, Legal Affairs, Commission of the European Communities, Directorate General of the Environment
- Hans Wallenkamp, International Salvage Union
- Dr Ian White, International Tanker Owners Pollution Federation
- Peter Wood, Postgraduate Research Institute for Sedimentology, University of Reading

Technical Programme

There will be five sessions at the conference:

- 1. Salvage and cargo/bunker transfer
- 2. Spillage response at sea and in inshore waters
- 3. Shoreline response, waste disposal and recycling
- 4. Inland spills response and remediation procedures
- 5. Future developments and innovations

These sessions will cover oil and chemicals, environmental impacts, requirements and responses, liabilities and compensation, as well as regulations and training.

The first four sessions will present and discuss changes recently introduced, about to be introduced or otherwise not widely known; the fifth session is intended to introduce new possibilities for the future which may become operationally significant.

Who should attend?

INTERSPILL 2000 will be of interest to all who are concerned about the environment and those involved in its protection, including:

- national and international environmental agencies
- oil, chemical, and transport industries
- port and harbour authorities
- offshore oil field operators
- central and local authorities
- emergency services

Brochure with full conference programme is now available

For further information on either of the above conferences please contact:

Pauline Ashby, Conference Department, Institute of Petroleum,

61 New Cavendish Street, London W1M 8AR, UK Tel: +44 (0)20 7467 7100 Fax: +44 (0)20 7255 1472

e: pashby@petroleum.co.uk

or view the IP Web Page: www.petroleum.co.uk

EN Forthcoming

JULY 2000

London

Alarm Systems Management Details: 4-sight Consulting and EEMUA, UK Tel: +44 (0)1582 462324 Fax: +44 (0)1582 623470 e: Training@4-sightConsulting.co.uk

6-7

Paris The Economics, Geopolitics and Terms of Investments in the Middle East Details: Jonathan Neale, CWC Associates, UK Tel: +44 (0) 7704 6161 jneale@cwconferences.co.uk

10-11

London **Oil Prices and Investment** Details: Lisa Williams, CWC Associates, UK Tel: +44 (0)20 7704 6161 Fax: +44 (0)20 7704 8440 e: lwilliams@cwconferences.co.uk

10-12

London Resolving International Border Disputes Details: Global Business Network Ltd, UK Tel: +44 (0)20 7291 1030 Fax: +44 (0)20 7291 1001 e: gbn.conferences@talk21.com

11-12

e-fulfilment 2000 **Details: Access Conferences** International Ltd, UK Tel: +44 (0)20 7840 2700 Fax: +44 (0)20 7840 2701 www.access-conf.com

11-12

London Practicalities of Implementing **Utilities Internet Billing** Details: IIR Ltd, UK Tel: +44 (0)20 7915 5055 Fax: +44 (0)20 7915 5056 e: registration@iir-conferences.com

12-14

London Iranian Oil, Gas and Petrochemicals Forum Details: IBC Global Conferences Ltd,

UK Tel: +44 (0)20 7453 5491 Fax: +44 (0)20 7636 6858 e: cust.serv@ibcuk.co.uk

AUGUST 2000

6-11

Calgary SEG 2000 International Exposition & 70th Annual Meeting Details: Society of Exploration Geophysicists, US Tel: +1 918 497 5500 Fax: +1 918 497 5557

22-25

London

Stavanger Offshore Northern Seas Details: Offshore Northern Seas International Conference and Exhibition, Norway Tel: +47 51 59 81 00 Fax: +47 51 55 10 15 e: ons@ons.no www.ons.no

23-24

Brazil 4th Annual Latin Upstream 2000 Details: Global Pacific & Partners Tel: +1 281 597 9578 Fax: +1 281 597 9589 e: global.pacific@pixie.co.za www.glopac.com

SEPTEMBER 2000

Oxford LPG - Supply, Economics, Markets and International Trading

19-22

Oxford International LPG Trading and Pricing - Supply, Shipping, Contract and Risk Management

27 LPG Direct Marketing, Operations and Safety

Details: The College of Petroleum and Energy Studies, UK Tel: +44 (0) 1865 260211 Fax: +44 (0) 1865 791474

New publication

THE INSTITUTE **OF PETROLEUM**

Pocket Guide to Safety for Personnel Working on Oil Installations

The Institute of Petroleum is committed to the promotion of safety in all matters relating to the oil industry. It is important that safety is not sacrificed through ignorance or for operational expediency. To promote this aim we have produced the Pocket Guide to Safety for Personnel Working on Oil Installations. It has been prepared to give simple first line instruction to maintenance and operations personnel working on oil installations, large and small, that process, handle or store petroleum products. It can be used by both company employees and contractors.

The Pocket Guide provides generic guidance to assist in identifying key health, environment and safety issues covering all aspects of the operation. It is intended to supplement but not supplant the use of detailed risk assessments, operational manuals and safety manuals.

ISBN 0 85293 292 8 Discounts available for bulk orders

Available for sale from Portland Press Ltd at a cost of £7.00 inc. postage in Europe (outside Europe add £5.00). Contact Portland Press Ltd, Commerce Way, Whitehall Industrial Estate, Colchester CO2 8HP, UK.

Tel: +44 (0)1206 796 351. Fax: +44 (0)1206 799 331. e-mail: sales@portlandpress.com

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

Oxford



Venezuelan state-owned oil and gas company PDVSA has appointed **Daniel Garcia** as the new Executive Director of Commercialisation for Manufacturing and Marketing. **William Mauco**, Garcia's predecessor, has been moved to an Executive Director's role at SOFIP. **Javier Hernandez**, current head of the company's Curacao refinery becomes the new Executive Director, Refining. His successor at the refinery is **Julio Hasselmeyer**, Manager of Planning and New Business for PDVSA Manufacturing and Marketing. **Carlos Arteaga** will take over from Hasselmeyer.

Petresearch Ltd, now a member of the KCG Group, is to be chaired by **Keith Doherty**, formerly CEO of Global Engineering Consultants and founder of MAI Consultants. **Sue Whitbread**, formerly Managing Director of Petroconsultants-MAI, takes over the role of Managing Director and **Bill Farquhar**, formerly of Shell Exploration and Production International becomes Technical Director. **Iain Patrick**, formerly Commercial Director of Monument Oil, and **Bill Guest**, Technical and Business Development Director of Monument Oil have joined Petresearch as Associates to provide advisory support.

Christopher Adams, Executive Director of Palmer & Harvey McLane Ltd, has announced the appointment of Graham McPherson as Group Managing Director. Stan Murton becomes Managing Director of the new P&H Buying Group Ltd and Graham Brain, currently P&H Operations Director is appointed Development Director of P&H Direct Ltd with specific responsibility to identify and deliver new opportunities for direct business.

Chevron Corporation has announced the retirement of Vice Chairman James N Sullivan after nearly 40 years with the company. Sullivan graduated with a chemical engineering degree from the University of Notre Dame in 1959 and joined Chevron Research Company in 1961 as a process engineer. He was elected Vice President in 1983 and became a Corporate Director in 1988. Sullivan is also a director of Weyerhaeuser Co, the American Petroleum Institute and the United Way of the Bay Area. The company has also announced that Chief Financial Officer Marty Klitten and Chevron Chemical Co President Darry Callahan have been appointed to new positions as Executive Vice Presidents. John Watson, Vice President of Strategic Planning will replace Klitten as CFO and Patricia Yarrington, president of Chevron Canada Ltd will succeed Watson.

Caxios has recently appointed **Bernard Cunningham** as its new Business Development Director. Cunningham, formerly Sales and Marketing Director at Costain Oil, Gas and Process Ltd will be responsible for maintaining and growing existing business as well as developing new business areas.

Dr John Schubert has been appointed to the board of the Broken Hill Proprietary Company Ltd (BHP), with effect from 1 June 2000. Schubert was formerly Chairman and Managing Director of Esso Australia Ltd from 1988 to 1993 and Managing Director and Chief Executive of Pioneer International Ltd from 1993 to May this year.

Petro-Canada has announced the decision of **Jim Stanford** to step down as Chairman of the Board of Directors. Brian MacNeill as been appointed as the new Chairman. MacNeill has been a member of the Board since 1995 and is President and CEO of Enbridge Inc.

PetroCosm Corporation has announced the appointment of its senior management team. It comprises: Ash Bakshi, Managing Director, International Sales; Eric J Brown, Vice President, Technology; Malachy W Finnen, Vice President, General Counsel; Michael S Giglio, Vice President, Sales; Rodney L Gray, Vice President, Chief Financial Officer; Donna Harrigan, Vice President, Human Resources; Edward A Lowe, Vice President, Business Development; Alexandra D Pruner, Vice President, Marketing; and Linda Sarandrea, Vice President, Customer Relations.

William M Cobb, President of William M Cobb & Associates Inc has announced that F J Marek, M Fred Duewall, Randal M Brush and Donald L Balley have been elected to the Board of Directors as Senior Vice Presidents and have joined him as owners of the firm.

Following the merger of TotalFina and Elf Aquitaine, **Michel Contie** has been named as the Managing Director of the new upstream organisation formed from the merger of Total Oil Marine and Elf Exploration UK. Contie was formerly Director of the TotalFina exploration and production activities in South America.

Apache Corporation has announced the election of retired BP Amoco executive **Charles J Pitman** to the company's Board of Directors. Pitman succeeds former Wyoming Governor **Stanley K Hathaway** who is retiring from the Board after 23 years.

Robert Eden has been appointed Sales Manager – Filtration Technology for Bollfilter UK. Eden has over 15 years experience working with filters together with qualifications in mechanical engineering.



Mohamed Tawila has been appointed Chairman of the Egyptian General Petroleum Corporation replacing Abdel-Khalek Ayyad.

SGS United Kingdom has announced the appointment of **Rob Brown** as Business Manager, Chemical Services for SGS Redwood Services. Brown joined the company from Nalco Europe where he was District Sales Manager.

lain Light has been appointed head of UK & Ireland operations for Det Norske Veritas (DNV). Light was previously head of the company's global chemical process and refining business in Oslo.

TGS NOPEC Geophysical Company has appointed **John Adamick** to the role of Vice President, Business Development. Adamick will focus on developing growth opportunities and building investor relations for the company. **Karen El-Tawil** has been named Vice President, Gulf of Mexico. El-Tawil assumes responsibility for all multi-client business activities. She joined the company in 1997 and most recently served as Vice President, Marketing Sales.

Inmarsat Ltd has appointed **Michael Butler** as its Managing Director. Butler was previously UK Managing Director at MCI WorldCom.

The New York Mercantile Exchange has hired **David Keller** as Chief Information Officer. Keller was formerly Chief Information and Technology Officer at Sempra Energy Trading Group.

New publication

Guidelines for the Management, Design Installation and Maintenance of Small Bore Tubing Systems

Small bore tubing systems are commonly used in the process industries, both in onshore plants and offshore installations. They are used for instrumentation and control purposes on many kinds of fluid service, including hydrocarbon, chemical, water and pneumatic/hydraulic power. Their ease of installation makes them economically attractive, and when correctly designed and constructed, they can provide high integrity over the installation lifecycle.

These guidelines provide a reference framework of management and technical controls and procedures necessary to ensure the continuing integrity of small bore tubing systems.

Although prepared primarily for use by the petroleum, process and petrochemical industries in the United Kingdom, the principles and practices are likely to be of value to other industries worldwide. It is envisaged that application of these guidelines will assist in managing the responsibilities which operators have placed upon them by the Health and Safety at Work Act and its supporting statutory instruments, or by equivalent legislative requirements elsewhere in the world. It is intended that these guidelines will be of use to design engineers, operators, contractors and consultants and all other parties concerned with the safety and environmental issues associated with operating onshore and offshore facilities.

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