Petroleum review

FEBRUARY 1998

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Capturing 23% of UK market with 6% of sites

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Exciting future for pivotal region

Catalytic cracking
Latest developments to meet new fuel standards

Covering the international oil and gas industry from field to forecourt – exploration, production, refining and marketing

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ABBREVIATIONS

The following are used throughout *Petroleum Review*:

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

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

Front Cover: Castellon refinery, Spain.

Photo: Courtesy of British Petroleum Photographic Library

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From the Editor

Opportunities amid the crises

The international oil and gas industry is currently assaulted by three interlocking crises – Asia, Iraq and Opec. At the same time it is confronted by two remarkable opportunities – to improve downstream margins and to gain access to assets in countries and companies previously closed to it.

The Asian financial crisis clearly has some way to run but with bankruptcies and layoffs increasing it is becoming ever clearer that oil and gas demand growth in the region will be hit hard this year. However, most commentators are starting to believe that a financial meltdown can be averted and limited regional energy demand growth is seen as more likely than a decline.

Spot oil markets have already passed their verdict on Asian recovery hopes and Opec's desire for higher output. It is quite unprecedented for spot Brent prices to be languishing at around $15/barrel in mid January. Analysts' hopes of a rapid price recovery look ever more forelorn as the northern hemisphere winter remains warm, Opec is unable or unwilling to cut production and Asian economic activity slows.

The misfortunes of some often produce opportunities for others and the Asian crisis is unlikely to prove an exception. For the international companies the crisis offers the possibility, even the likelihood, that some countries will have to reduce their very high tax rates on upstream development to sustain interest – Indonesia being an obvious candidate. Meanwhile countries that have unofficial production ceilings such as Malaysia are likely to have to relax such ceilings in their search for dollar earnings.

Social and financial pressures mean that the whole area is likely to be rather more open to collaboration, joint ventures and inward investment. There will obviously be great reluctance to sell key assets, but such moves can no longer be ruled out, particularly as the industry has had two highly profitable years and is currently cash rich.

Paradoxically the Asian crisis and slowdown has given the industry a breathing space. The immediate pressure to secure more production capacity has abated, giving the industry the opportunity to carefully consider where it can most effectively spend its money. Even a limited development slowdown could take the pressure off the system, halting or reversing the recent escalation in costs. Day-rates for deepwater exploration rigs being the most obvious example.

It is hardly a secret that the international banks are going to be very cautious about lending money in the so-called emerging markets over the next few months or even years. Low oil prices if sustained (as is likely) will put great pressure on the producers offering great opportunities to financially strong international oil and gas companies.

Mergers and acquisitions are widely predicted to be a key feature of 1998 in a number of sectors including banking and oil and gas.

Recently the intriguing possibility has been raised that takeovers will come to an abrupt halt around mid-year as, after that date, the aquiring company will not have time to integrate the acquired company into their computer systems and ensure millennium compatibility before 2000.

Some of the problems being addressed to make offshore production systems millennium compatible are addressed in an article (p12) which gives some idea of the cost and sheer complexity of the problem.

Iraq has been a crisis for so long that there has been a tendency to discount its potential for major disruption. At the time of writing one UK aircraft carrier and four US ones are steaming to the Gulf but the market reaction was only to raise spot Brent prices by 50 cents.

The next few weeks will determine whether the world really has the stomach to confront the Iraqi regime or has become bored with an embargo which is increasingly seen as blocking business opportunities.

Some analysts are predicting that all Iraqi exports could be halted without the world being short of oil supplies. This is Opec's immediate problem. Collectively the members have committed themselves to producing far more oil than can be sold at anything other than distressed prices.

Do they now produce more and try to maintain income or do they attempt to curtail production to firm prices hoping the others won't cheat? Professor Odell (p22) suggests that the global oil industry may become regionalized with the Middle East reduced to marginal suppliers.

The rapid fall in oil prices has significantly improved downstream margins yet oil demand in the major developed nations remains strong. While some of the improved margin will erode there is a good chance that most will be held onto.

There is now a healthy realization that buying marginal sales is very costly. The supermarket owners have been allowed to capture 23% and 50% of the gasoline markets in the UK (p28) and France – markets they have captured without the costs and inconvenience of owning or operating a single refinery.

Web World

The great strength of the Internet is the almost unbelievable volume of information now available – its great weakness is the time it can take to find what you want. We are working to ensure that for oil and gas information the best starting point for any search is the Institute of Petroleum's own site on **www.petroleum.co.uk**

This month we have added hotlinks to some less well-known industry sites such as PTT, the Petroleum Authority of Thailand, at **www.ptt.or/th** which invites you to send your best wishes to his Majesty the King; Agip Petroli on **www.vol.it/AGIPP/** which is in both English and Italian; and the Kuwait National Petroleum Company (KNPC) at **www.knpc.com.kw**

To find out about the latest and most sophisticated simulation programmes run on Cray computers the Cray Research site on **www.cray.com/PUBLIC/APPS/DAS/** will bring you up to date on what can be done, complete with some truly stunning 3D reservoir simulations. Service and Supply companies are increasingly using the Internet to promote their services and products. Some make great use of hot-linking to expand the usefulness of their sites: a notable example is Sperry-Sun Drilling Services on **www.sperry-sun.com/** which features well over 20 hot-links.

As well as providing information the Internet can also provide links to like-minded individuals and help with career development. Canada appears well served with the Canadian Society of Exploration Geophysicists on **www.canpic.ca/tscseg.html** and the Canadian Oil Scouts Association on **www.canpic.ca/COSA** plus the Canadian Well Logging Society on **www.canpic.ca/tscwls.html**

Government agencies are also well represented, a good example being the wide range of comparative economic data on the world's 25 richest countries making up the Organisation of Economic Co-operation and Development (OECD) to be found on its site at **www.oecd.org** However, there can be little doubt that the US government with its commitment to making accessible to the taxpayer the work funded by the taxpayer remains the source of some of the best industry data on the Web. The main Department of Energy site at **www.doe.gov** contains a wealth of information but is complex and sometimes difficult to find your way around.

Whatever your interest the place to start your search is the Institute of Petroleum's site on **www.petroleum.co.uk**

NEWS Upstream

Occidental targets Qatar development

Occidental Petroleum has signed a production sharing agreement with state-owned Qatar General Petroleum Corporation to develop the Idd El Shargi South Dome (ISSD) oil field offshore Qatar. The field lies about 15 miles from the Idd El Shargi North Dome (ISND) oil field, operated by Occidental since 1994 and currently producing in excess of 100,000 b/d.

The ISSD field is estimated to hold 1.1bn barrels of oil in place with ultimate gross recoverable reserves put at 200mn to 300mn barrels. Occidental holds a 44% interest in the project.

The company plans to invest up to $450mn in capital over the life of the project, with about $400mn to be spent in the first five years.

The ISSD field will be operated as a satellite of the ISND in order to keep overall per unit operating costs down. Its development plan calls for the drilling of 36 wells from three platforms, including 21 producers, 13 injectors and two water-disposal wells. Occidental will also build two pipelines, one for oil and one for gas, linking the ISSD field to the processing facilities on the main ISND production platform.

Tatarstan releases oil field licences

The Republic of Tatarstan is formally transferring two oil field licences to recently formed joint stock company Ideloil. Aminex holds a 35% stake in Ideloil and is to provide finance for field development together with technical advice and support.

A new development well to test a Devonian target in the Dachnoye field is planned early 1998. At present there are 10 producing wells on the field. The provisional development plan calls for around 80 further wells to be drilled.

Work on the adjacent Ivinskoye field will commence in summer 1998. Both fields will be linked to common gathering facilities. Ivinskoye and Dachnoye are the first of 13 fields being made available to Ideloil by the Tatarstan Government. Remaining oil in place for the 13 fields is estimated at 3bn barrels.

Aminex's partners are: Tatneft 10%, Tatnefteprom 40%, Tatneftekhim Invest Holdings 10% and Zarubezhneft 5%.

UK Government gives green light for Waveney

The UK Department of Trade and Industry (DTI) has given Arco British approval for the development of the Waveney gas field located in block 48/17c of the southern North Sea.

Reserves are estimated at 84bn cf of gas. The field, which will be developed by a minimal facilities platform tied back to Mobil's Lancelot pipeline system, is due onstream in October this year. Gas will be exported to Phillips' Bacton terminal for processing.

SLP Engineering in Lowestoft has secured the contract for construction of the Waveney platform. Stolt Comex Seaway will undertake pipeline installation and Seaway Heavy Lift the platform installation.

Arco British holds an 85.71% interest in Waveney and will act as operator. PanCanadian North Sea holds the remaining 14.29%.

Drop in number of offshore accidents

The latest Accident Data Report from the International Oil Industry Exploration and Production Forum shows the number of lost time injuries worldwide in the oil industry has continued to fall significantly.

The lost time injury frequency (LTIF) for 1996 was 2.7 injuries per million man hours, a fall of 19% on the 1995 figures of 3.3 and of 50% over the last 10 years. As in 1995, the major part of this improvement is attributed to improved contractor performance, the LTIF decreasing from 3.9 in 1995 to 3.1 in 1996.

Company LTIF also fell significantly from 2.6 in 1995 to 2 in 1996.

However, there were 74 fatalities recorded worldwide in 1996 (three fewer than in 1995), the main cause being vehicle accidents and workers being struck by moving objects or equipment. Five deaths were caused by shootings/terrorist activity.

The report surveyed 36 member companies and their contractors operating in 60 countries, providing a database of over 900mn manhours worked by nearly half a million upstream employees – about three-quarters of the world exploration and production industry workforce.

In Brief

United Kingdom

BP has confirmed that it plans to *award Bond a five-year contract, worth in excess of £35mn, to utilize two new generation Eurocopter AS332L Mk 2 Super Puma helicopters. The helicopters will be operated from Bond's Aberdeen base in support of the oil company's northern North Sea operations, primarily on the longer flights to its west of Shetland and Bruce fields. The new aircraft, scheduled to enter service in September 1998 are faster and feature a larger cabin area than the Mk 1 models. They also have a greater payload.*

Reda Production Services of Inverurie, *Scotland reports that what is claimed to be the world's first completed subsea 'step-out' electrical submersible pump (ESP) installation has commenced production on Shell Expro's Gannet E field. The downhole pumping system, deployed in a production well at a 14-km step-out distance from the main platform, is required as the marginal field's crude is relatively viscous and heavy.*

BP reports that its latest extended-reach well at Wytch Farm has beaten *the previous world record for this type of well by over 2km. Measuring 10km in length, the well taps the offshore extremities of the Sherwood oil reservoir in Poole Bay. Initial production from the well is around 20,000 b/d and it is expected to recover some 6mn barrels of oil reserves.*

Arco British has acquired a 50% *working interest in part of production licence P105, block 49/29a, adjacent to the southeastern end of the Gawain field area in the North Sea, from Superior Oil (UK). In exchange, Superior has acquired a 50% working interest in part of production licence P001, block 49/42 which lies adjacent to the north-western end of the Gawain area.*

Arco British has made a hydrocarbon *discovery on the recently drilled 14/26a-6 well in the Central North Sea. The well tested at over 40mn cf/d of gas. An appraisal well is to be drilled as soon as practical in 1998.*

UK subsea flexible pipe manufacturer *Wellstream has signed three new research-based technological cooperation agreements (TCAs) with Petrobras that will help the Brazilian company to recover oil from new finds in ultra-deep waters (over 500 metres).*

NEWS Upstream

Durward/Dauntless reserves lowered

Amerada Hess reports that possible reserves in the North Sea Durward and Dauntless fields may be toward the bottom end of the range originally anticipated. Preliminary evaluation of early production data indicates that recoverable reserves could be as low as 11mn to 20mn barrels of oil.

The fields, located in blocks 21/11 and 21/16 respectively, came onstream in August 1997, just 16 months after the field development plans were approved. Production is currently running in excess of 30,000 b/d.

Further work is being undertaken in a bid to find a more definitive reserves estimate. Water injection, which started later than expected in the middle of October 1997, was not fully reflected in production levels when the initial evaluation was carried out. In addition, a gas lift facility is due to be installed in mid-1998 which will further increase production levels. A well is also planned in the northern part of the Durward field in the 1Q1998 which is targeted to access reserves not currently being drained by existing wells. Several other prospects in the Durward/Dauntless area may also prove to be potential tie-backs for the existing production facility.

Despite the potential for improved production levels and reserves estimates, the co-venturers believe that it is 'prudent' to make plans to cater for the possibility that more definitive reserves do not improve from the current initial evaluation range.

Participants in Durward/Dauntless are: Amerada Hess 28%, Saga Petroleum 23.5%, DSM Energy 20%, British-Borneo Petroleum Syndicate 18.5% and Seafield Resources 10%.

Australia looks at new exploration acreage

A number of new exploration areas offshore Australia have been flagged for release in 1998. More than 50 new areas are under consideration, the majority of which are located in the Carnarvon, Canning, Browse and Perth Basins offshore Western Australia and the Bonaparte and Arafura Basins offshore the Northern Territory. Other areas being considered are in the Otway Basin offshore South Australia and Victoria, the Gippsland Basin offshore Victoria, the Sorell Basin offshore Tasmania and the Carpentaria Basin offshore Queensland.

Most of the areas have received some exploration in the past but many are only lightly drilled. The majority of the areas under consideration fall within the under-explored category.

The final line-up of areas to be released for exploration are expected to be announced in March 1998 at the Australian Petroleum Production and Exploration Association (APPEA) annual conference in Canberra, Australia on 8 to 11 March 1998.

Bidding for the 1997 licensing round is due to close on 26 March 1998.

Smit seals 1998 deals

Smit Transport and Heavy Lift have recently secured a number of contracts from Norway's fabrication yards. The 1998 work programme includes a sequence of 37 lifts for the Åsgard A FPSO monohull in early February, which is to be deployed in the Åsgard Consortium's Smørbukk, Smørbukk Sør and Midgard fields, and two visits during the first half of the year to Kvaerner Rosenberg's Stavanger yard for lifts associated with the conversion of a jack-up to the Siri field mobile production system destined for service on the Danish Shelf. Several lifts are also planned at Heerema Tonsberg's yard for the Jotun wellhead protection platform and at Umoe's Haugesund yard for work associated with the Troll C deck.

Smit Transport has been awarded a two-voyage contract by Saibos covering the transport of various modules for Elf's Zafiro field offshore Equatorial Guinea.

Joint North Sea development

Bow Valley Petroleum is to purchase a number of working interests in the UK sector of the North Sea from BP Exploration. The deal covers the following: 15% in block 16/13a, 14.28% in block 20/2a, 4.17% in block 20/3a, 12.40% in block 20/7a and 15.24% in block 30/3a (excluding pre-tertiary strata).

Petrobras and Morrison Middlefield Resources Ltd (MMRL) are also to acquire interests in these blocks which contain the Blane, Enoch and Ettrick oil fields and the 16/13a J1 gas condensate field.

The three companies plan to minimize project costs by developing their interests via shared production facilities. The joint 'Dolphin' project will be managed by Croft Offshore, a Bow Valley-MRRL joint venture.

In Brief

***Phillips Petroleum's appraisal well on** block 15/27 in the UK sector of the North Sea has flowed at average rates of 8,050 b/d of oil and 5.2mn cf/d of gas through a 40/64-inch choke in its second interval test. It is proposed to develop the field via subsea facilities tied back to Amerada Hess's Ivanhoe/Rob Roy floating production facility the* AH-001. *Production may begin in 4Q1998.*

***Liverpool-based Bibby Line has placed an** order for a series of four self-propelled, self-elevating, multi-purpose service jack-up rigs. The units, designed by US company Searex, will be fabricated by Arab Heavy Industries in Ajman in the United Arab Emirates under the management of the Keppel Group of Singapore. The first vessel will be delivered early in 1999.*

***Wood Group Engineering Services** (WGES) has been awarded a £2mn, five-year contract by Britannia Operator Ltd for management of all the topsides valve inventory on the Britannia gas platform. The contract covers the management of all repairs, inspections and overhaul requirements for the platform's 10,000-plus valves.*

Europe

***An Occidental Petroleum-led consortium** has signed production sharing contracts for blocks A2 and A3 located in eastern Albania. The blocks lie within a fold and thrust belt where more than 500mn barrels of oil and 1tn cf of gas have been discovered to date.*

***A European consortium led by OMV** Onshore Exploration (40%) and partners Enterprise Oil Exploration (30%), Clyde Expro (15%) and Mol Albania Oil & Gas (15%) has signed two production sharing contracts for onshore blocks 1, 4 and 5 in Albania.*

***Smit Marine Contractors has secured** the moorings installation, tow-out and hook-up main contract for Bluewater Engineering's* Bleo Holm *FPSO destined for Talisman Energy's Ross/Parry field located in blocks 13/28A and 13/29A in the North Sea. First production is scheduled for September 1998.*

***UK independent Premier Oil is reported** to be planning to invest $250mn in the development of Patos Merinze, Albania's largest onshore oil field. Plans are to increase current production from 6,000 b/d to between 25,000 to 50,000 b/d over the next four years.*

NEWS Upstream

West Sak oil field enters production

Field operator Arco Alaska has announced that the West Sak oil field on Alaska's North Slope came onstream on 26 December 1997. The field is currently producing 200 b/d of oil and is slowly increasing towards the project's production target of 300 barrels per well per day. Fifty wells, both production and injection, are scheduled to be completed by early 1999. Nine wells have been drilled and cased to date. A successful Phase 1 project will result in the drilling of an additional 500 wells in the West Sak core area as part of Phase 2 development of the project, reports Arco.

West Sak is a large, relatively shallow viscous oil accumulation that overlies much of the Arco-operated Kuparuk field. Oil in place is estimated at more than 15mn barrels.

Participants in West Sak are: Arco Alaska 55%, BP Exploration Alaska 39% and Unocal 5%. Mobil and Chevron hold the remaining 1%.

UKOOA announces 1998 President

Steve Suellentrop, Managing Director of Arco British, has been appointed President of the UK Offshore Operators Association (UKOOA).

Speaking after his election, Suellentrop commented on some of the key issues facing the UK oil and gas industry in 1998. He stated that it was vital that the UK Government, which is currently undertaking a fiscal review of the industry, maintains the stability and attractiveness of the current fiscal regime which contributes about 20% of the total annual investment in UK industry. He also emphasized that safety and the environment must hold 'pride of place' in all the industry's activities and endorsed the industry's efforts to look outwards and foster more dialogue with external audiences.

UKOOA's other Executive Officers for 1998 are: Vice President – Francis Gugen, Managing Director, Amerada Hess; Vice President – Bob Connon, Managing Director, Chevron UK; Honorary Secretary – Mark Hope, Technical Director, Enterprise Oil; and Honorary Treasurer – Alan Jones, Director and General Manager, BP Exploration Operating Company.

Steve Suellentrop

Release of offshore hydrocarbon data

The UK Health & Safety Executive (HSE) Offshore Safety Division has published a new report containing statistics on hydrocarbon releases from offshore installations. The report, which covers the period 1 October 1992 to 31 March 1997, is the third compiled from HSE.

As with previous editions, the report provides the offshore oil and gas industry with data for use in preparing installation safety cases, particularly in quantified risk assessment as recommended in the report on the Piper Alpha disaster inquiry.

Hydrocarbons release data is broken down by hydrocarbon type (liquid, gas or two-phase), installation type, location on the UKCS and year of occurrence. System and equipment types associated with each release are also indicated. Unlike its predecessors, the new report also includes a provisional severity rating – 'major', 'significant' or 'minor' – to all releases. It also gives failure rates for equipment types as well as the rates for system types reported previously.

Of the 1,097 releases reported during the four and a half-year period covered by the report, 14% were classified major, 53% significant and the remaining 33% minor. Overall, there has been a 25% drop in the number of major releases reported in 1996/97 compared to 1995/96. The number of significant releases also dropped by 5% but minor releases increased by 20%.

In Brief

Kvaerner Maritime has secured a $6mn *contract by The Office of Naval Research, part of the US Department of Defense, for the feasibility study of a mobile offshore base. Measuring 1,600 metres by 140 metres, SeaBase will comprise three large-scale semi-submersible platforms linked by two semi-buoyant flexible bridges and will be the largest structure of its type in the world. Facilities include a runway capable of landing up to C-17 transport aircraft and accommodation for up to 10,000 military personnel.*

Exxon's French affiliate Esso SAF is *reported to have discovered oil at the Tamaris exploration well 50km southwest of Bordeaux.*

ABB Lummus Global and Odebrecht-SLP *Engineering have announced a cooperation agreement for upstream oil and gas EPC projects in the UKCS, Brazil and elsewhere in the world.*

Amoco has announced that it is to act *as operator of a group of exploration companies – comprising Deminex UK Oil and Gas, Fina Petroleum Development and Maersk Olie og Gas – which will jointly evaluate the hydrocarbon potential of UK and Faeroese acreage in the Atlantic Margin.*

Saga Petroleum has announced plans *to invest Nkr11bn in the development of its Snorre 2 oil field in the Norwegian sector of the North Sea. The field, which is expected to produce up to 110,000 b/d, is to be developed by a floating production unit and associated subsea system.*

Shell has established a new company, *Shell International Deepwater Services, at Rijswijk, The Netherlands, which will support the Group's growing global portfolio of deepwater opportunities.*

The Norwegian Petroleum Directorate *reports that the first phase of exploration drilling in the Vemadome area in the Norwegian sector of the North Sea has failed to find any trace of hydrocarbons.*

North America

The Troika oil and gas field in the Gulf *of Mexico is reported to have come onstream. Production is expected to peak at around 80,000 b/d of oil and 140mn cf/d of gas in 1998. Partners in the project are BP, Marathon and Shell.*

NEWS Upstream

US company Energen's subsidiary Taurus Exploration is reported to have signed an agreement covering the acquisition of Chateau Oil and Gas's natural gas reserves on West Cameron blocks 426 and 427 in the shallow waters of the Gulf of Mexico for $17mn. Reserves are estimated at 12.5bn cf of gas.

Middle East

Total has announced the start-up of production from the Kharir field on the East Shabwa permit in Yemen's Hadramaout region. Production was expected to reach a plateau of 20,000 b/d of oil last month.

Russia & Central Asia

Turkmenistan is reported to have begun the first phase of commercial exploitation of the Byashgyzyl gas field in southeast Kara-Kum. Reserve estimates are put at 100bn cm.

Lukoil is reported to have increased its Russian oil reserves by a massive 50% following the acquisition of major reserves in the Caspian Sea and the far north of Russia. Assets acquired include a 52% stake in oil exploration company Arkhangelskgeoldobycha and a 100% working interest in the Severny field in the north Caspian.

Asia Pacific

A Kvaerner Oil & Gas Australia-led consortium has received a letter of conditional award from West Australian Petroleum for the Gorgon upstream LNG development project.

Premier Oil has announced that its Pelikan-1 well in the Natuna Sea block A offshore Indonesia has tested at a combined rate of 43mn cf/d of gas. It has been suspended as a future producer.

Canadian Occidental Petroleum is reported to have acquired a 50% stake in block WA-260-P offshore northwest Australia from BHP.

Statoil reports that the Lufeng oil field in the South China Sea entered production at the end of 1997. Two of five planned production wells are flowing at a combined rate of 46,000 b/d.

Australia is conducting an environmental assessment of plans to expand its North West Shelf natural gas project which includes the construction of two additional processing trains on the Burrup Peninsula to boost production to around 15mn t/y, effectively doubling the country's LNG exports to A$3bn/y.

China National Offshore Oil Corporation (CNOOC) has contracted PGS to conduct a 2,150 sq km 3D seismic survey in the Qiong Dong Nan Basin offshore Hainan Island, China, beginning in April 1998. It is believed to be the biggest such survey to be undertaken in China to date.

It is reported that US company Triton's development plan for the Cakerawala field in the Gulf of Thailand has been approved by the Malaysia–Thailand Joint Authority. Some 2tn cf of gas will be produced from the field which is due onstream in 2000.

Esso Production Malaysia Inc (EPMI) is reported to have signed a farm-in agreement with Diamond Gas Exploration for the SK A, B, C and D deepwater blocks offshore Sarawak, Malaysia.

BHP and Esso plan to develop the deepwater Blackback oil field in the Bass Straits, Australia. The field will be developed in three phases – the first comprising three subsea wells tied back to the existing Mackerel platform located 18km to the northwest. Reserves are estimated at 13.5mn boe. First production is scheduled for 1H1998. Production is expected to peak at 18,000 b/d.

Arco has announced that the Ubadari #1 well, located in Berau Bay, flowed at a combined rate of 45mn cf/d. Arco has confirmed discovery of at least 13tn cf of proved and probable reserves in support of the Tangguh LNG project.

UK oil and gas company Cairn Energy's Semutang-5 exploration well onshore block 15 in Bangladesh has tested at 23mn cf/d of gas.

Repsol reports that the B-KX-1X exploration well off the southwest coast of Vietnam has tested at 52.9mn cf/d of gas.

Tullow Oil reports that its Suri-1 well located in Pakistan's onshore East Badin extension block B has tested gas at commercial rates from three zones and has been suspended as a future gas production well.

Latin America

It has been reported that Petrobras's Roncador field in the Campos Basin may hold around 3bn barrels of oil and gas. This figure is more than double the 1.4bn forecast in 1996.

BG plc, through its subsidiary BG Exploration and Production, and its 50:50 co-venturer Texaco Trinidad, have signed a production sharing contract with Trinidad for 408 sq km of exploration acreage in the offshore Columbus Basin of Trinidad and Tobago.

Africa

Elf Petroleum Nigeria reports that the Ofon field on block OML 102 offshore southeast Nigeria came onstream on 24 December 1997. Production is expected to plateau at 60,000 b/d of oil.

Elf Aquitaine's Oombo oil field located on block 3/91 offshore Angola has come onstream at a rate of 9,500 b/d.

Ranger Oil has announced the award of two production sharing contracts covering blocks CI-101 and CI-103 offshore Cote d'Ivoire in West Africa.

Nigeria is reported to have announced a 50% cut in income tax rates for gas projects to 35%, the usual income tax rate, in a bid to encourage the development of such projects. Oil developments will continue to pay the higher rate. The government also announced a 20-fold increase in the penalty for oil companies flaring gas to N10 (naira) per thousand cubic feet (equivalent to $0.13).

Total reports that the D14-6X well located on block 14 offshore Cabinda, Angola, has successfully tested at 7,300 b/d of oil. The new discovery is named Landana.

Italian oil and gas company Agip has swapped a 25% stake in its North Jenein block in south Tunisia in exchange for a 30% interest in US company Anadarko's Zula block in the Red Sea.

Morocco and Enterprise Oil have signed a $2mn oil exploration contract for a block offshore Cape Draa, Morocco.

Phillips unveils 1998 capital budget

Phillips Petroleum has approved $1.789bn for capital projects in 1998. This compares with estimated 1997 spending of $2.098bn, which includes $354mn for various upstream acquisitions. A total of 61% of the 1998 budget will be directed toward upstream projects and 35% on downstream with the remaining 4% set aside for corporate and other expenditures.

Exploration and production's 1998 capital budget is $1bn, the bulk of which will fund international projects supporting Phillips' growth strategy. Around $626mn has been budgeted for international production activities, compared with an estimated $815mn in 1997. Spending will focus on development projects in the UK North Sea, including Jade, Janice and Renee/Rubie fields; the Siri field in Denmark; the Eldfisk waterflood and Ekofisk II projects in the Norwegian North Sea; the Zama Virgo field in Canada; and, in Venezuela, reactivation projects in Lake Maracaibo and the development of extra-heavy oil reserves from the Hamaca region of the Orinoco oil belt. In the US, $249mn has been earmarked for development drilling and production projects compared with an estimated $298mn in 1997.

A total of $126mn will fund exploration activities – 42% of which will be US-based, including exploratory drilling in the deep-water blocks in the Gulf of Mexico. Overseas, exploratory wells are expected to be drilled in China, Australia, the UK, Peru, Algeria, Venezuela, Nigeria and Norway.

Phillips' refining, marketing and transportation (RM&T) 1998 budget will be $343mn, up 32% over 1997 spending. This includes investment in two major pipeline projects – the conversion and expansion of a pipeline from the Texas Gulf Coast to Wichita, Kansas, and the expansion of a pipeline system into the El Paso area. There are also plans to increase the company-owned network of service station outlets from 328 sites to 450 within the next five years.

Energy clubs – the way forward?

Many gas and electricity companies will soon be turning themselves into 'energy clubs' and their customers into members, according to William Garton-Jones, a utility industry specialist at consulting and IT services company Cap Gemini. Speaking at the Adam Smith Institute in London on 10 December 1997, he explained that such clubs, modelled on the successful US experience of retail clubs, could provide a better deal for consumers while improving cash flow and customer retention for utilities.

It is envisaged that the clubs would work by charging a fixed annual fee to members who would then pay for energy consumed at cost. Total annual payments by consumers would be lower, while utilities would benefit from a substantial inflow of cash at the start of each year and the assurance that customers, having paid their up-front membership fees, would be unlikely to desert to a competitor.

New Year's Honours

A number of oil and gas industry personnel have been awarded New Year Honours. Graham Hearne, CBE, Enterprise Chairman, was knighted while CBEs were awarded to John Brooks, Director and Head, Exploration and Licensing at the Oil and Gas Directorate; Arthur Dove, Chairman of the Council for Registered Gas Installers; Richard Hardman, Amerada Hess's Director of Exploration; Eileen Marshall, Director, Regulation and Business Affairs at Ofgas, and Vivian Thomas at BSI.

Professor Brian Bayne was awarded an OBE for his services to the prevention of marine pollution, and David Lindley, Managing Director of Lindley Associates for services to renewable energy and to the wind turbine industry. OBEs were also given to Michael Molvneux, Sen Group Occupational Hygienist, Shell International and Ian White, Managing Director, International Tanker Owners' Pollution Federation.

Chevron developments

Chevron's Board has approved a new programme to repurchase up to $2bn of common stock and a $6.3bn capital and exploratory spending programme for 1998, the largest in the company's history. It is also reported that operational earnings for 1997 (yet to be announced) are expected to set a new record, exceeding the previous high of $2.65bn set in 1996.

The company also announced the discovery of a second giant oil field in Angola's offshore block 14 and first production from its offshore Kitina field in the Republic of Congo. The field is expected to reach peak production of 50,000 b/d by the end of 1998.

In addition, Chevron has signed an agreement to extend a services contract with Kuwait to assist in development of the Burgan field while production from the Chevron-operated Boscan field in Venezuela has been boosted to 90,000 b/d, some 10% more than the set target.

In Brief

United Kingdom

***Gulf Canada Resources reports that, as** part of the company's strategy to expand its presence in the North Sea, the office for its UK operations is to be moved to London's West End. The office will continue to be responsible for current Middle Eastern and African projects and other regional opportunities for Gulf.*

***Wood Group subsidiaries Wood Group** Offshore and its fuel distribution company Woodacon Oils have merged with logistics company ASCo Group to form what is claimed to be the UK's largest logistics provider to the oil and gas industry.*

***Shell and accountants Ernst & Young** are to create 400 jobs in Glasgow in a new joint venture. The new company, Tasco Europe, will initially provide support solely for Shell's European operations. Ultimately, however, it plans to offer specialist accountancy services to other companies as well.*

***The UK Court of Appeal has judged in** favour of Total Gas Marketing in its case against the Trent field owners (Arco British 61.25%, Atlantic Richfield Oil & Gas (St James) 18.75% and Talisman North Sea 20%) by declaring that Total is not bound by the Trent gas sales contracts it had entered into with each of the Trent field owners in February 1996 because first deliveries did not comment on 31 October 1996 as agreed, but six days later. The Trent owners have been granted leave to appeal against the decision to the House of Lords.*

Europe

***BP Chemicals has acquired Veba subsidiary** Styrenix Kunststoffe for $200mn to become one of the largest producers of styrene plastics in Europe.*

***Total and Gaz de France have signed an** an agreement that outlines their future alliance in the natural gas industry. The agreement, which involves joint developments and reciprocal asset transfers, is intended to improve Gaz de France's access to natural gas production and to enhance Total's presence in downstream gas businesses. Joint development projects will focus on Asia and Latin America, where Total already has a strong presence. Asset transfers include the sale from Total to Gaz de France of a 24.9% share in Gaz de Strasbourg.*

NEWS Industry News

The UK Government ratified the Energy Charter Treaty in Lisbon, Portugal on 16 December 1997. The Treaty creates a legal framework to promote long-term cooperation in the energy field between the Russian Federation, the Commonwealth of Independent States, the Baltic States and Central and Eastern Europe, and a large majority of OECD countries. It includes provisions on investment, trade, transit, sovereignty over resources, environment, competition, taxation and access to capital and technology. The European Community, 12 EU Member States, Azerbaijan, Armenia, Albania and Cyprus have ratified the Treaty which is scheduled to enter into force by 31 March 1998.

Heerema Offshore Construction Group (HOCG) has concluded an agreement with its US partner J Ray McDermott under which their joint venture operations will be transferred to HOCG in exchange for cash in excess of $300mn and several crane vessels. The companies report that their strategic goals have changed since the Heeremac joint venture was established in 1989 in a bid to cope with unfavourable market conditions.

The European Fund for Regional Development has granted Spanish company Repsol 62.9mn Ecus (Pta10.2bn) for the construction of the new Cartagena-Puertollano pipeline. The 350km-long pipeline, scheduled to enter service at the end of 1999, is expected to triple the amount of oil unloaded at the Cartagena terminal and will suply the Cartagena refinery and the Puertollano industrial complex. The current pipeline, with an outlet at Malaga, will go out of service as soon as the new line goes onstream.

Total has acquired an additional 4.54% of nuclear fuels processor Cogema from CEA-Industrie. The deal raises Total's total interest in the company to 15%.

Bechtel Enterprises and Shell International Gas have finalized an agreement for Shell to acquire a 50% interest in InterGen, a major international developer of private power projects and related fuel assets.

It is understood that Finnish oil and petrochemicals group Neste plans to merge with state-owned power utility Imatran Voima (IVO). It is hoped that the alliance will improve the position of Finland's energy industry in a rapidly deregulating European power market – particularly its potential role as a hub for Russian gas supplies. Neste is to sell part of its holding in natural gas joint venture Gasum to the Finnish state and to new independent investors prior to the merger. European competition rules require that the sale take place so that the new Neste-IVO group does not have a monopoly over the European natural gas chain. Neste will retain a minority holding in Gasum.

North America

Enron Corporation is reported to have sold 7% of its retail electricity business to two large North American pension fund investors for $130mn.

International information database publishing company Information Handling Services (IHS) Group has acquired Houston-based Petroleum Information/Dwights LLC. The deal follows IHS's acquisition of Petroconsultants in 1997.

It is reported that US companies Ocean Energy and United Meridian are to merge their operations to create one of the largest independent oil and gas companies in the world with a market capitalization of $3.1bn and assets of $1.2bn.

Chevron's Gulf of Mexico Deep Water Business Unit has announced that it is forming an alliance with a number of companies – including Aker Maritime, Brown & Root Energy Services, Han-Padron Associates and Saipem – to develop its deepwater offshore leases in the Gulf of Mexico. The alliance will provide a full range of project services including conceptual studies, engineering, fabrication and heavy lift capability.

Middle East

Liverpool-based Bibby Line has opened two new offices in Doha, Qatar, and in Dubai, United Arab Emirates.

Russia & Central Asia

Socar and Conoco are reported to have signed a memorandum of understanding covering the joint exploration of Azerbaijan's natural gas resources. Under the terms of the MOU, the companies will also assess the possibility of increasing output from the Garadagskovo gas refinery and production of Azeri compressed gas.

Russian oil companies Yukos and Sibneft are merging their operations to create what will be one of the world's largest oil producing companies. The new Yuksi venture will account for around 22% of Russia's crude oil production.

Oil production and service company Aminex has increased its interest in the capital of AmKomi, its joint venture in the Komi Republic, Russia, from 50% to 55%. At the same time, the state property fund of Komi has acquired 35% of the interest of state firm Komineft. In addition, Aminex has created a wholly owned Russian operating subsidiary, Ami-Tek, which will take over management of certain Aminex projects in Russia, including the Kirtayel field which is currently under development.

Asia Pacific

Shell Philippines Exploration, Occidental Philippines, First Gas Power, National Power, Manila Electric and KEPCO have signed key commercial agreements for the $4.5bn Malampaya gas-to-power project offshore the Philippines. The investments will cover the development of the offshore subsea production wells and the construction of a 510-km offshore pipeline and shore teminal as well as several power generating plants capable of initally generating 2,700MW.

Santos has announced that it plans to spend up to A$200mn on exploration in 1998. The company spent A$194mn in 1997 on drilling and seismic activity.

Spanish oil and gas company Repsol has raised its stake in its Argentinian affiliate Astra from 47.5% to 56.7%. Astra is to play a key role developing Repsol's presence in Mercosur, investing around $2bn over the next five years.

It has been reported that the Brazilian government is planning to sell R6bn-worth (six billion Real) of its remaining shares in Petrobras.

NEWS Downstream

UK gas prices soar but remain good value

The UK no longer has the lowest natural gas prices for large business users, according to the latest survey by UK consultants National Utility Services. Of the 13 countries surveyed, Canada had the lowest domestic gas prices, averaging 0.66p/kWh, during the year ending September 1997.

UK industrial and commercial gas prices rose by more than 23% to 0.74p/kWh. National Utility attributes the sharp upturn to a combination of factors that have led to UK gas suppliers adopting tougher pricing policies, including market consolidation, the implementation of penalty charges by Transco and an increase in spot prices. Despite recording the highest percentage price increase of the countries surveyed, the UK still has the lowest price for industrial and commercial gas in Europe.

Country	Av. gas price (p/kWh)	Incr/decr (%age)
Australia	1.01	+2
Belgium	1.09	+13.5
Canada	0.66	+4.8
Finland	0.77	unchanged
France	1.19	+5.3
Germany	1.30	+20.4
Italy	2.04	+6.3
Netherlands	1.25	+7.8
South Africa	1.26	+9.6
Spain	1.21	–4
Sweden	2.25	+23
UK	0.74	+23.3
US	0.91	+7.1

Source: *International Gas Price Survey*, National Utility Services

Lottery first for Q8

Kuwait Petroleum (Q8) has become the first petroleum retailer in the UK to become an official partner with the National Lottery. The first stage of the partnership will begin in January 1998 and will take the form of a national promotion, called Q8 Rewards, across the company's 400-plus-strong network of service stations.

Under the scheme, Q8 customers receive one coupon for every 12 litres of fuel purchased. Coupons can be redeemed against a National Lottery Lucky Dip voucher or a wide range of other gifts including free BT Talk Time, Kodak cameras, ABC cinema tickets, KFC Kids Club meals and £5 gift vouchers for use at major retailers such as Comet, B&Q and Woolworths.

UK review of power station energy sources

Details of the UK Government's review of energy sources for power generation were published in December 1997. Medium and longer term scenarios for the development of generating capacity and sources of fuel supply for generation will be assessed by the review, which will also consider the implications of high levels of dependence on any particular fuel, source of supply, transport route, or technology.

The review will take as its starting point trends in energy sources for power generation, especially the growing dependence on gas, taking into account the energy policy objective of secure, diverse and sustainable supplies of energy at competitive prices and, in particular, the role of coal. It will also consider technical factors relating to the growing use of gas in generation, including the provision of system stability and flexibility; the possibilities for and likelihood of interruption of gas supplies; and possible measures, such as the holding of fuel stocks, to mitigate the risks and consequences of interruption.

Amoco goes Dutch with gas storage

Amoco inaugurated its first gas storage facility in Europe at the end of 1997 as part of a drive to expand its involvement in the international gas market.

The $150mn facility at Alkmaar in the Netherlands will help Dutch natural gas company Gasunie meet peak demands, beginning in the winter of 1997/98, as production from the Groningen field in northern Netherlands, traditionally used as a 'swing' producer, has continued to decline.

Up to 3.6bn cm of gas will be stored in the largely depleted Alkmaar reservoir, operated by Amoco for the past 25 years. Developed and operated by Amoco Netherlands, in association with Dutch companies Dyas, Energie Beheer Nederland and Veba Oil Nederland, the gas storage facility will deliver up to 24mn cm/d of gas by the year 2000.

In Brief

United Kingdom

Logica has secured a £7.1mn contract *to become applications partner to British Gas Services for the next three years. The company will act as the primary applications support, development and systems integration partner across a range of infrastructure needs for British Gas Services, the central heating and home services subsidiary of Centrica.*

The UK Health and Safety Executive *(HSE) has published new guidance on the design, construction, operation and maintenance of installations used for the storage of flammable liquids in fixed tanks.*

A new licence condition which will *enable UK gas industry watchdog Ofgas to take action against companies that use misleading or improper sales practices in the competitive gas market was scheduled to take effect late January.*

Around 30% of domestic gas customers *in Wales are reported to have signed contracts with independent supplier Swalec Gas in advance of the local market opening to competition in April 1998.*

Shell UK has merged its North Sea gas *marketing companies Quadrant and Gas-Direct to form a single company, Shell Gas Direct Ltd, responsible for selling all Shell UK's new North Sea gas. The new company will focus on the industrial and commercial gas sector.*

Europe

Gaz de France and Air Liquide are *reported to be planning a joint venture which will supply liquefied natural gas (LNG) to local authorities and firms operating heavy vehicle fleets in France.*

Shell Portuguesa is reported to have *signed an agreement with Auchan of France for the acquisition of its 18 'Extra' forecourt stores in the Greater Lisbon area.*

Eni of Italy is reported to have signed *a $4.8bn agreement with Croatian state owned oil company Ina for the supply of a minimum of 2.2bn cm/y of natural gas for a 24-year period beginning in 2001. A new 5bn cm capacity pipeline linking Italy and Croatia will service the agreement.*

UK gas competition timetable set out

UK gas industry watchdog Ofgas has set a firm date for the start up of the next step (Tranche 2) of domestic gas competition and has proposed a timetable for the roll-out of competition throughout the rest of the UK for mains gas users.

In Tranche 2, domestic gas competition will move to the counties of Cumbria, Greater Manchester, Merseyside, Kingston-upon-Hull, Lancashire, the East Riding of Yorkshire, North Yorkshire and York on 27 February 1998. The area includes about 2.8mn customers on mains gas.

A decision on the starting date for Tranche 3, which covers the counties of Cheshire, Derbyshire, North Lincolnshire, North East Lincolnshire, Nottinghamshire, Shropshire, Staffordshire, South Yorkshire and West Yorkshire, and comprises about 2.9mn customers, will be made during January 1998 when further information is available. The suggested date for this tranche is 27 March 1998.

Ofgas also proposes that the UK domestic gas market be fully opened to competition by 23 May 1998, some four weeks ahead of the 19 June 1998 target date originally put forward. According to the regulator, the bringing forward of the final date has been made easier following proposals from the gas pipeline company Transco for simplification of the Network Code, the set of business rules which allow all licensed gas shippers to share the UK gas pipeline system.

To date, around 20 companies in addition to British Gas have been licensed by Ofgas to supply gas to domestic gas customers. According to the regulator, more than 780,000 people have chosen to change their gas supplier from British Gas since Phase 1 of deregulation was introduced in Cornwall, Devon and Somerset in April 1996.

Centrica completes take-or-pay deals

Centrica has renegotiated the last of its take-or-pay contracts with North Gas producers. Under the terms of this latest agreement, its contract with Chevron UK, involving nearly half a billion therms, will terminate on 1 October 1998. Centrica will pay a consideration said to amount to less than 1% of its net assets to Chevron.

The take-or-pay contracts, a legacy of the British Gas monopoly, had placed an increasing financial burden on Centrica as it was effectively forced to pay above-market prices for gas which it did not always want while trying to remain competitive in a market where an ever growing number of independent gas suppliers were offering low-cost supplies (see *Petroleum Review*, p432, September 1997).

In aggregate, Centrica has now renegotiated price and volume commitments on about 46.5bn therms (see table). Analysts estimate that the deals have cost Centrica in the region of £750mn. The company states that, on average, it is now paying about one penny above the average market price of 14 p/therm for its gas.

Company	Volume (therms)	Reduction (vol/price)
BP	2.8bn	volume
British Gas	12.3bn	price
Mobil	~10bn	volume & price
BG plc	~8bn	volume
Amerada/ Enterprise Oil/ OMV (IUK)	~5bn	volume
Mobil/Arco/ Eastern	~1bn	volume
Conoco/Elf/ Total	~6bn	price
Chevron	<0.5bn	volume
TOTAL	**46.5bn**	

Snapshot of UK fuel prices

For those readers looking for our regular look at UK fuel prices, supplied courtesy of *PHH Allstar's Fuel Report*, please see page 30.

Whopper deal for Shell service stations

Addendum: David McLean Contractors, a division of the North Wales-based David McLean Group, will be responsible for construction work undertaken as part of the recently announced Shell (UK)/Burger King deal reported in the December 1997 issue.

Shell/Tejas merger

Tejas Gas Corporation shareholders have approved the merger agreement for Shell's $1.45bn acquisition of the US gas pipeline owner and operator. According to Shell, the new merged company – which will operate under the Tejas name as an affiliate of Shell Oil Company – will be one of the largest natural gas transportation, processing and storage ventures in the US.

The two companies merged their natural gas marketing businesses to form Coral Energy in 1995.

In Brief

***Statoil is reported to have secured a** contract to supply 400,000 tonnes of gasoline, diesel and jet fuel to Iceland in 1998. This represents two-thirds of Iceland's oil products demand.*

***Wingas of Germany is to supply natural** gas to Degussa's Kalscheuren and Wesseling sites, located south of Cologne, from October 1999. A 30-km feeder pipeline is to be built from the WEDAL pipeline network to service the contract.*

North America

***Occidental Energy Ventures** Corporation and Conoco Global Power Inc have completed financing for a jointly developed 440MW natural gas-fired cogeneration power plant near Ingleside, Texas. Construction will begin in early 1998 with commercial operation expected in January 2000.*

***PetroCanada and Ultramar Diamond** Shamrock are reported to be planning a refining and marketing joint venture of their Canadian and US operations. Under the terms of the deal, PetroCanada will control 51% of the new venture which has assets including five refineries and 3,500 service stations in Canada and the northeast US.*

***Occidental Petroleum has signed a** definitive agreement to sell its MidCon natural gas transmission and marketing subsidiary to KN Energy for $3.49bn in cash. KN Energy will also assume approximately $500mn in liabilities, putting the total value of the transaction at around $4bn. KN Energy will also pay Occidental an average $30mn/y for the next 29 years for a lease of the MidCon Texas Pipeline.*

***BP's Alaskan division is understood to** have signed state leases for the construction of pipelines linking its new Badami oil field to the existing pipeline infrastructure on Alaska's North Slope. Badami is estimated to hold 115mn barrels of recoverable reserves. It is expected to produce 30,000 b/d, beginning in late 1998.*

Middle East

***The United Nations has approved 18** out of 29 Iraqi crude oil sales contracts submitted by Baghdad. The contracts cover the sale of just over 89mn barrels of crude.*

NEWS Downstream

Environment Agency cracks down on emissions

The UK Environment Agency proposes to revise the deadline for an 84% cut in sulfur dioxide (SO_2) emissions from power stations in England and Wales from 2005 to 2001.

By 2001, changes in the electricity industry, particularly the increasing use of gas, are expected to have reduced SO_2 emissions from 2.34mn t/yr in 1991 to 500,000 tonnes.

The Agency is seeking a further reduction to 365,000 tonnes in a bid to further improve air quality and help control acid rain.

According to the Agency, its proposals for pollution reductions beyond those caused by the shift to gas could be achieved by power generators by using existing technologies such as flue gas desulfurization which chemically removes and neutralizes SO_2, by burning low sulfur coal, by injecting neutralizing limestone into boiler furnaces or by decreasing the use of older stations.

Other proposals include substantial cuts in emissions of nitrogen oxides (NOx) and particulates at coal and oil fired power stations. Plants not meeting the new limits are expected to close.

Repsol service station sale in the offing

Spanish oil company Repsol is reported to be considering the sale of its UK network of service stations as part of a drive to focus on its core Iberian business and its expansion programme in Latin America.

The company operates around 60 sites under the Repsol brand and a further 300 under the Anglo name.

Repsol recently sold its 90-strong French network to Shell.

BG sales agreement

BG Exploration and Production is to supply approximately 275bn cf of gas to Enfield Energy Centre Ltd (EECL) for a 15-year period. EECL is a 50/50 joint venture between international independent power project developer and operator Indeck and US gas/electricity utility Northern States Power. The company is currently developing a 396MW combined cycle gas turbine power station at Brimsdown, north London, which is due to become operational in 4Q1999.

Long-term Philippine gas supply agreement

BG plc joint venture First Gas Holdings has signed a 22-year agreement for the purchase of natural gas for a 1,000MW power project on Luzon Island in the Philippines. The gas will be supplied by Shell and Occidental from their offshore Camago-Malampaya field. First delivery is scheduled for January 2002.

The first stage of the project is a 1,000MW power station at Santa Rita, Batangas, with a planned second stage taking total capacity to 1,500MW. The plant will begin producing electricity for the local distributor to supply customers in Metro Manila from 1999. First Gas Holdings – in which BG plc has a 40% interest – has in place an agreement with Enron for a supply of condensate fuel from 1999 to 2002, when the natural gas will become available.

Further price cuts for BGT customers

UK gas industry watchdog and British Gas Trading (BGT) have announced lower tariffs for gas customers with pre-payment meters.

Based on an average consumption of 650 therms/y the price cut will reduce the average annual bill by around 4%, or £13, for the majority of customers who have electronic Quantum meters, states Ofgas. The lower tariffs take effect this month. The reduction is to be introduced for those customers with coin and token meters as soon as possible thereafter.

There are 1.24mn pre-payment meters in use in the UK, of which 1.12mn are electronic Quantum meters.

Wide-ranging price cuts for BGT's DirectPay, OptionPay and standard tariff customers were announced in September 1997 and scheduled for introduction on 12 January this year.

DirectPay customers (those paying by monthly direct debit) received a 9% reduction, equivalent to £27.60 off the annual average bill while OptionPay customers (paying quarterly bills within 10 days) got an 8% reduction equivalent to £25 off the average annual bill. Standard tariffs with quarterly bills paid after 10 days were reduced by 1%, representing a reduction of £3 off the average annual bill.

In Brief

***Iraq has agreed to supply Jordan** with 4.8mn tonnes of crude oil and by-products in 1998. It is proposed that the deal be serviced via a new 1,000-km pipeline linking the two countries. Jordan is also reported to be considering the construction of a new oil refinery at the port of Aqaba.*

Russia & Central Asia

***Construction of a $190mn gas** pipeline linking Turkmenistan to northern Iran was reported to have completed in December. The 200-km line will carry gas from the Turkmen Korpedzhe gas field to Kord-Kuy in Iran. The new route means that Turkmen gas no longer has to be exported via Russia.*

***It is reported that the Ukraine's State** Property Fund plans to sell 20%, 25% and 20% stakes in three energy distribution companies Ternopiloblenergo, Kyivoblenergo and Zakarpattyaoblenergo, respectively.*

Asia Pacific

***Enron Corporation is reported to have** acquired 74% of the equity in the 513MW Kannur Power Project in India's southern state of Kerala.*

***It is reported that Pertamina plans to** build 52 service stations in Indonesia by the end of 1999. Specific site locations have not been disclosed.*

Latin America

***Total is to acquire Argentinian LPG** marketing company Argon for an undisclosed sum. Argon markets 220,000 tonnes of LPG per year in 21 provinces, supplying one-quarter of Argentina's LPG needs.*

***Australian Light Gas Company is** reported to have agreed the purchase of a 30% holding in Chilean natural gas distribution company GasValpo.*

Africa

***A JGC/Kellogg joint venture has** secured a contract for the conceptual engineering for the BP/Sonatrach In Salah gas development project in southern Algeria.*

UK operators take Year 2000 problem to task

The Year 2000 problem must rank as one of the most widely discussed issues of the day. All the technical journals feature regular news items on it, the tabloids and the broadsheets write about it with varying degrees of accuracy and someone has estimated that there are 10,000 pages devoted to the Year 2000 on the Internet. Yet polls show that a considerable number of businesses are either unaware of the impact of Year 2000, or have not yet started to examine its potential effects on their business. *Peter Richardson*, IT Manager, Marathon International Petroleum, describes some of the efforts which the North Sea oil and gas industry has taken, and is taking, to raise awareness among its hundreds of suppliers.

In very brief and simple terms, the problem has arisen because, for good reasons at the time, most computer programs were written with just a two-digit date, ie '97' instead of '1997'. The result now is that some programs assume that the year 2000 is 1900 instead of 2000 and accordingly return absurd answers to calculations involving dates.

The problem affects two distinct categories of systems. First there are the systems which are used by companies and organizations to run administrative functions such as banking, payroll, stock control, purchasing, invoicing, data records, etc. These systems run on computers that work from programs which have been written – coded – by programmers. Fixing those programs is a matter of examining the code and making the necessary changes – no small undertaking but there are tools available and many of the larger organizations have been working on this for several years.

The second category of systems is that which encompasses devices and machinery and indeed the computers which run the programs in the first category. Virtually every device and machine today has some form or other of electronic control in it – watches, clocks, cameras, TVs, videos, ovens, motors, lifts, etc. Moving further up the scale, cars, aeroplanes, ships, locomotives, factories, refineries, hospitals, power stations and, of course, offshore oil platforms are comprised of a multitude of devices and machines.

In some cases the control system will be an integral part of the device, in others the control will be exercised through a programmable logic controller (PLC) which will probably feed data to, and take instructions from, a massive distributed control system (DCS). The integral electronic control, and to some extent that of the PLC, is provided by what are termed 'embedded chips'. These can be considered as tiny, self-contained computers running on code which has been written for specific purposes.

Just as with the code for administrative functions, so some of the embedded-chip code will have date functions which may or may not be affected by the Year 2000. An inexpensive chip can run a control system which notes when a piece of equipment was last maintained, checks the current date, calculates how long it has been running, looks up its program to find out how long the equipment can run between maintenance periods and issues a warning notice – or conceivably shuts down the equipment if the equipment appears to have been running for a non-sensical number of years. Most of the chips will not affect operations.

The task is to discover which pieces of equipment are 'smart' and need fixing. This is much easier said than done. The vendor of a given piece of equipment will be several stages up the supply chain from the original chip manufacturer. This is an area where the offshore oil and gas industry is currently focusing a great deal of attention.

Industry collaboration

Some months ago the UK Offshore Operators Association formed a UKOOA Year 2000 Task Force with the following terms of reference:

- raise awareness of the problem in the industry;
- promote collaboration in the industry;
- enable leverage of suppliers;
- protect industry reputation;
- promote links to other Year 2000 bodies;
- develop and promote consistent Year 2000 message to industry and the world; and
- involve all oil industry business disciplines.

The Task Force set about its work with a will. There was no shortage of volunteers from the operators, most of whom already had Year 2000 programmes in place. There was an immediate willingness to collaborate and share information from which it soon became apparent that allowing for differences in terminology and style, all the operators were following substantially similar courses.

All saw their priorities as safety, revenue and reputation. All recognized that in the North Sea today everyone's fortune is bound up in everyone else's. One offshore operator ships oil to shore through another who may well be buying gas from the first operator and selling that on to an onshore customer through a pipeline operated by another. Injection water, communications and even electric power are supplied by one platform to another. Each, therefore, has a vested interest in the other's con-

Offshore production facilities are often highly interlinked and interconnected. Gas, oil, power and even injection water are transformed between platforms which may be operated by different companies. Full 2000 compatability requires that all control and operating computer systems and embedded chips are millennium compatible.

tinued operation. And all recognized that ensuring safe and continuing operation beyond 31 December 1999 is a task which requires thorough planning and the widest cooperation.

Plan of action

It was very quickly determined that there are a number of courses of action which offshore operators can take:

- Do nothing and fix the problems when they occur.
- Change the date now and see what happens.
- Identify every 'smart' item and replace it.
- Identify every 'smart' item which is critical and which needs fixing, and fix it.

The common consensus is to follow the last course. No customer would support the first course, the second is only viable on small, isolated stand-alone systems and there is not time to take the third.

A number of 'raising awareness' initiatives have been completed. In September 1997, the Task Force hosted the 'Priority Year 2000' conference to coincide with 'Offshore Europe' in Aberdeen. In October that same year, several members of the UKOOA Task Force were speakers at 'Project 2000 in Oil and Gas', an event run in Aberdeen by the International Quality and Productivity Centre (IQPC). Discussions were held with Grampian Enterprise to see if there are ways in which the Task Force can help to raise awareness among small and medium sized enterprises (SMEs). The Task Force has prepared a standard 'awareness workshop' which its members are willing to run for any interested party. Articles such as this have also been written for the Aberdeen Chamber of Commerce's Business Bulletin.

The 'Priority Year 2000' conference was aimed at board level and senior management in key oil industry companies. Some 65 people attended, representing 35 companies. The three keynote speakers were: Robin Guenier, the then Executive Director of Taskforce 2000; Malcolm Brinded, Oil and Technical Services Director, Shell Expro; and Dan Stover, Managing Director, Brown & Root AOC. The conference had an interactive structure with workshops on the themes of methodology, organization, collaboration and business dependencies. The purpose of the workshops was to discover and share 'best practices' which could be used by anyone.

The conclusions drawn by the Methodology Workgroup were that:

- There must be acceptance that the Year 2000 problem is real.
- A properly structured team must be set up to solve the problem.
- The team must have support from, and a clear chain of command to, the Board,
- Because of the time-scales, the solutions must concentrate on the critical systems.
- The solutions must be tested to a level which instils confidence and leaves no doubts.
- The solutions must be implemented in good time.
- All work must leave an audit trail.
- A contingency plan is essential.

The Organization Workgroup emphasized that:

- Board level support is essential.
- A single 'coordinator' is needed to handle all issues.
- The team must be able to communicate with all disciplines at all levels.

The Collaboration Workgroup encouraged the widest possible collaboration because:

article continued on p15

Striking strategic partnerships upstream

Perhaps more than any other industry, the upstream oil and gas sector is well accustomed to the concept of outsourcing and partnering. No other market sees projects on quite the same scale of collaborative working as the design, fabrication, commissioning, management and final decommission of an installation in the North Sea. But while outsourcing of business processes and resources is nothing new to the oil industry, there are opportunities to gain even more financial and organizational benefits from working with specialist partners, particularly in information technology (IT). *John Sasserath*, Associate Director of CMG's oil division explains...

One of the most compelling arguments is that by outsourcing IT, global organizations in particular benefit from not having expensive assets on their books. Such assets can appear to lose and gain value considerably over a year when the effects of currency changes are taken into account – introducing an unwelcome measure of unpredictability.

The alternative is to look carefully at IT and to choose which services should be retained in-house and which could be run more effectively with a partner. The aim then is to remove assets from the balance sheet where appropriate, and to record instead the more stable costs of services within the profit and loss account.

Yet this is only one advantage of working with specialist IT partners. As well as helping with global accounting, outsourcing has always provided benefits such as cost effectiveness. First introduced in the 1960s as an alternative to investing in expensive and complex computer systems in-house, bureau operations and then facilities management companies delivered better value for money services in particular areas.

In the late 1980s and early 1990s, when organizations began to downsize both their IT departments and overall operations, outsourcing grew in popularity. The concept of being able to 'turn up the wick' of IT development, as well as IT services, appealed to many large organizations facing skills shortages and high IT costs.

By the mid-1990s, the idea that strategic partnering could help organizations build IT systems to support moves into new market areas had taken a firm grip on business. Today, organizations can choose from a broader than ever range of services, from payroll bureau services at one end of the scale to the delivery of strategic outsourcing at the other, with system development, system support and managed services somewhere in the middle.

Partnering advantages

So what are the benefits of partnering to upstream oil companies? The first point is that the oil industry is still going through a period of downsizing and refocusing on its core business of getting oil out of the ground efficiently and effectively rather than in investing in building up large IT departments and expensive assets.

The way in which the oil industry works is also well-suited to partnering. Its work is consortia and project based and it sees the very real cost benefits of outsourcing services such as building platforms, distribution and hiring in plant such as cranes.

It also means that oil companies do not necessarily want to spend time developing the careers of IT specialists in particular areas. They need to bring people in to work on those projects, but may not need the same set of skills on another project six months down the line.

A further issue is the extensive use of legacy systems within the oil industry. Oil companies would quite rightly rather invest their IT budgets in skills which are core to the business – exploration and analysis of seismic data, for example – rather than older development languages. The benefit of working with an IT partner is that it can afford to maintain a broader range of skills which can then be shared across different projects.

Cost comparisons

So, the real benefit of partnering to the oil industry is that it helps to run the business more cost-effectively. But it is vital to compare the real costs of running and developing IT systems in-house against the costs proposed by a third party. The mistake that companies often make is to look at costs in isolation, rather than in comparison with the budgets that they would have to grow in-house over the same period.

Third parties can provide a more cost-effective service because of their use of resources, but also because IT is their core business. Their success depends on their ability to understand the changing capabilities of IT and their ability to match those capabilities to the requirements of the global and competitive oil industry.

According to reports, around 45% of IT projects are never completed, while a further 40% are completed but do not fulfil their original purpose. Another finding is that 70% of the cost of any IT system comes from maintenance – keeping systems up and running and ensuring that they continue to support the business.

By outsourcing IT to a specialist, oil companies can buy time to focus on what really matters to them. With the right partner they can reduce both the effort of maintaining IT and of researching its value and capabilities.

Assessing the risks

But just outsourcing IT in an unplanned and unfocused manner is not going to gain benefits in itself. To get the most out of a partnership, oil companies

need to look carefully at services and applications to decide which ones would benefit most from being handed over to a third party.

The first step to take is to weigh up the risks of outsourcing as well as the benefits. One point that is often overlooked is that once IT services are outsourced, it is difficult to bring them back in-house again if the partnership fails for some reason. Organizations which have not kept pace with IT over the years will find it financially difficult to make investment from scratch in new IT infrastructures. They will also have lost their IT staff and know-how along the way.

Another issue is that organizations which strike three- or five-year deals with partners often believe that it will be a simple matter to switch suppliers when the deal comes to an end. The truth is that this is more difficult than it appears to be because successful strategic partnerships now depend on a company's ability to understand the business and its drivers – not just its IT systems. Over time, company and vendor become inextricably linked. When they replace one supplier with another, organizations are faced with the prospect of starting that whole learning process again.

The third issue is that IT is now all-pervasive within the oil industry. If a single element of IT fails to operate – such as a safety system – then the company can grind to a halt.

Get it right from the start

The best way to avoid such problems is to choose the right vendor in the first place and to negotiate contracts very carefully. The key is to improve the performance of services by keeping up the pressure on an existing partner rather than constantly switching to alternative vendors.

This can only happen in a culture of equal partnerships with equal risk and reward. This involves more than just the provision of basic service levels and agreement on the parameters of those levels. Increasingly the market is changing so that third parties are involved at a much higher level in the business – helping to implement IT which delivers a tangible return on investment.

In this way, IT becomes more of an enabler and a supporter of continuous improvement and change. The IT partner must therefore be a company that understands how the business works, what the industry's challenges are and where the next developments are likely to be. Only then can they truly advise their customers about how to implement IT in the most cost-effective way.

Organizations should also look at how well an IT partner can handle particular niche technologies. If it does not have know-how of, say, radio networks in-house, does it have a partnership with a reliable company which knows that technology inside out? The diversity, and the increased importance, of IT to the upstream oil business means that it needs to be able to trust a partner to act as an informed broker of relevant niche IT services.

In this way, the IT partnering in upstream oil will become more and more like the construction industry. A prime contractor will take full responsibility for developing and managing an overall project, including responsibility for sourcing and managing smaller, niche partners.

The benefit to upstream oil companies is that they can entrust not just development and delivery of IT to an experienced partner with its own tried and trusted expert sub-contractors, but that they can also expect to see the introduction of IT that enables improved business process design and performance.

As the oil industry continues to contract and concentrate on doing core business better than ever there has never been a better time to take another look at the strategic, not just tactical, outsourcing of IT services. ●

UK operators take Year 2000 problem to task *continued from p13*

- There is little enough time.
- Many of the systems and suppliers are common across the North Sea.
- Suppliers would not be able to cope with each company conducting its own tests.
- There are only so many ways to determine whether an item is, or is not, compliant.

The Business Dependencies Workshop concluded that:

- Supplier and sub-supplier, supplier and operator, and operator and operator are too dependent upon each other for one to say 'It's not my problem, it's yours.'
- No company can, nor should it try to, solve the problem on its own.

Early advice on protecting one's organization against Year 2000 problems recommended issuing detailed questionnaires to all of a company's suppliers. Suppliers then found themselves inundated with questionnaires from their customers, all wanting reassurance but asking for it in different ways. Trail blazers among the Task Force members shared their realization that a simple questionnaire produced faster results than did a complex one.

Also, it is not only suppliers of goods and materials from whom businesses need reassurance, but also suppliers of services. It is important that the company which maintains the equipment, or transports the maintenance materials, will be able to provide its services on and beyond 1 January 2000. Those suppliers must be able to demonstrate that they in their turn have contingency plans. The customer at the end of a six-link supply chain needs to be aware that if each component is 90% certain of being Year 2000 compliant, then the probability of the entire chain being compliant is only just over 50%. It is not difficult to think of supply chains with six links when manufacturer, vendor, maintainer, onshore transporter, warehouse and offshore transporter are considered.

Nationally, if all affected businesses send out detailed questionnaires to each other, UK plc will be spending an enormous amount of time completing and collating questionnaires rather than ensuring compliance. To date, however, only a few oil industry suppliers have proactively issued bulletins to their customers describing which of their equipments are compliant and under what circumstances. Those few initiatives have been warmly welcomed. Manufacturers' sites on the Internet are a valuable source of compliance information, but that still leaves the onus on the customer to seek out the information.

UKOOA's Year 2000 Task Force meets every month. Members share experiences and information and direct each other to other Year 2000 bodies. Membership of the group has been expanded to encompass the HSE and the Offshore Contractors Association (OCA). The OCA, of course, represents a valuable conduit into the chain of suppliers. It is not just the company which sells and installs a piece of equipment which is of interest, but potentially every company in the chain back to the supplier of the embedded chip.

Where applicable, UK operators maintain close ties with their US counterparts because much of the oil patch equipment is common across the globe, and therefore so are the problems. E-mail, the Internet and the Web are heavily used to garner and to disseminate information – so much so that members have to ensure that they do not drown in data while thirsting for facts. Web pages are being created on UKOOA's website where the results of tests will be made available.

There is still much work to do, and less and less time in which to do it. The operators, through the UKOOA Year 2000 Task Force and any other effective means, are ready to do all they can to assist everyone in the oil industry to secure our business against the Year 2000 problem. ●

Changing the catalytic cracking complex

Catalytic cracking is the major upgrading process in the majority of European refineries. But, although the process has been ideally suited to meeting the fuels demand patterns of the past it will need considerable development if it is to rise to the challenge of future requirements. *Jane Wiltshire* reports on the latest developments in the field of catalytic cracking which aim to increase the production of environmentally acceptable fuels.

The fluid catalytic cracker (FCC) is the workhorse of the European refiner. In a market historically dominated by gasoline in the summer and by heating oil in the winter, the cracker provided a valuable means of upgrading heavy components to lighter components with sufficient 'swing' flexibility to meet seasonal demand changes.

However, the face of European refining is now subject to considerable change. More restrictive product specifications for gasoline and diesel, due to be introduced by 2000, will reduce the added-value of the traditional cat cracking unit. Refiners will need to produce gasoline with a lower olefin, aromatic, benzene and sulfur content and diesel which is lighter, lower in aromatics and higher in cetane.

Table 1 illustrates the proposed specifications for the year 2000. These specifications have yet to be finalized but represent the 'common position' for the EU Council of Ministers. They are less stringent than those recommended by the European Parliament in Strasbourg during spring 1997 and pressure is being put on member countries to tighten specifications yet further.

Even if there were no recommendations to tighten the 2000 specifications over those agreed in the common position statement, refiners would find it difficult to meet the new specifications without investment. In any event, it is certain that even tougher specifications will be introduced by 2005. At the extreme, these specifications could limit gasoline sulfur to 30 ppm maximum, aromatics to 30% and olefins to 10%. Diesel sulfur could be limited to 50 ppm maximum, polycyclic aromatics to 6% and cetane raised to 58%. In addition, as **Figure 1** shows, demand for diesel in Europe now exceeds that for gasoline, whereas the refining industry is geared to gasoline production.

These new restrictions and market developments require a re-think of traditional cat cracking operation and processes to further upgrade or treat cat cracker products. Using catalytic crackers to maximize gasoline production may not be a sensible option in an environment where the growth rate of diesel now exceeds that of gasoline, and highly aromatic and olefinic material is undesirable. Cost-effective treatment of cracker products and conversion of these to more environmentally friendly components seems to be the way ahead.

In a mature industry such as oil refining, technology changes are more likely to be evolutionary rather than revolutionary. In recent years, since the advent of riser cracking, cat cracking technology development has centred around catalyst development, improving catalyst/oil mixing, cyclones and air distributor design and other such evolutionary changes. However, radical changes often produce radical solutions and this appears to have happened in the case of the cracking technology providers' response to the needs of the changing transport fuels market.

Novel design concept

At the second European Refining Technology Conference held in London in late November 1997, Neste revealed a completely new design for the catalytic cracking unit. Based on continuous circulating fluidized bed technology, the design incorporates a concentric configuration for the reactor and the regenerator and intershell riser spaces. Gas and solids are separated via a multiport cyclone located directly above the annular reaction riser space. This novel design avoids the use of unmanageably large reactor and regenerator vessels and therefore facilitates a much shorter reaction time which can be exactly controlled, an increased temperature and a high catalyst to oil ratio. It is thus possible to dramatically increase conversion to light olefins while simultaneously increasing gasoline octane number. The light olefins may then be used to increase production of methyl tertiary butyl ether (MTBE) and alkylate, thus providing useful high octane products which are free of olefins and aromatics.

Anticipating a future surplus of heavy distillate, Neste decided to investigate increasing the amount of light olefins produced by the cat cracker. The heavy distillate fraction from the cat cracker will be unsuitable for inclusion in diesel in the

Gasoline			Diesel		
Benzene % volume	(max)	1.0	Cetane number	(min)	51
Aromatics % volume	(max)	42	Density kg/m²	(max)	845
Olefins % volume	(max)	18	Polyaromatic Hydrocarbon % weight	(max)	11
Sulfur ppm	(max)	150	Sulfur % weight	(max)	350
Oxygen % weight	(max)	2.2	T95 Deg C	(max)	360
E100C % volume	(min)	46			
E150C % volume	(min)	75			
RVP kPa (summer)	(max)	60			

Table 1: European Union transport fuels specifications – proposals for 2000

future because of its high sulfur, high density and high aromatics content, and its inclusion in heating gas oil will be limited because of the declining market for this fuel and the high viscosity of the heavy gas oil cut. In addition, cat cracker gasoline is high in olefins and aromatics and relatively low in octane number. Increasing the production of lighter olefins would provide much needed additional feedstock for the downstream alkylation and MTBE units, thus providing increased quantities of valuable alkylate and MTBE which can be used to lower the overall content of olefins and aromatics in finished gasoline.

Increased quantities of light olefins can be obtained from the cracking unit by increasing cracking temperature, reducing contact time and increasing the catalyst to oil ratio. However, the mechanical restrictions of conventional cat crackers prevent the optimization of the process for maximum light olefin production. Neste was therefore led to develop new cracking technology in which risers with closed-coupled cyclones are applied in both the reactor and regenerator sides which both operate as continuous circulating fluidized beds. By this means, large reactor and regenerator vessels are avoided and regenerator time can be accurately controlled. However, the cyclone design becomes critical because the catalyst mass flow is more than tripled compared with conventional cat cracking units. This means that in order to achieve stable catalyst circulation, the reactors would need to be extremely high.

To overcome this difficulty Neste has designed a totally new reactor concept in which the reactor and regenerator are configured concentrically (**Figure 2**). The inner one acts as the cracking reactor and the outer one acts as the regenerator. Gas/solid separation takes place in a multiport cyclone located directly above the axially annular reactor space.

The design of the multi-port cyclone plays an important part in the success of the new configuration. It incorporates a number of louvred vanes arranged in a circular fashion around the perimeter of the cyclone and enables faster and more efficient separation of the catalyst and hydrocarbon gases which, in turn, allows residence time to be shortened. It also allows the use of lower inlet velocities and reduces erosion problems. Because the catalyst inventory is located inside the cyclone diplegs it is much smaller than that required for conventional catalytic cracking units. Hence, catalyst replacement is much faster. This could be an advantage in situations where rapid response to market conditions is required.

Other advantages of the process are its compact construction, leading to fewer thermal expansion problems, and the reduced requirement for refractory surfaces which are required only inside the pressure shell. As might be expected there are still some problems to be solved. These include pre-fluidization, maintenance, catalyst attrition due to the high catalyst to oil ratio and the design of the catalyst valve. Neste suggests that maintenance problems may be solved using parallel reactor/regenerators and reports that development of attrition resistant materials is underway.

A demonstration unit using the new technology was started during summer 1997 and Neste hopes to have the design of a pre-commercial unit (40 to 50 t/h) ready in 1998 with the aim of building a full-scale unit by 2002.

Maximizing yield

Evolutionary development has generally focused on obtaining higher yields of gasoline and higher throughputs, and providing more robust catalysts. At the European Refining Technology conference, however, technology providers shifted this emphasis away from gasoline production and showed how this process of evolutionary change could enable refiners to increase the proportion of middle distillate production or reduce environmental emissions.

Reducing FCC reaction temperature has the effect of increasing the yield of light cycle oil (LCO) for use in heating oil or diesel but also increases the production of slurry, reduces LPG olefinicity, decreases gasoline octane number and reduces overall conversion. Increasing combined feed temperature reduces air requirements and allows an increase of LCO at constant catalyst activity but most units do not have the flexibility to vary the feed temperature over the wide range required.

The third method of increasing LCO yield is to reduce catalyst activity by reducing catalyst addition rate. However, build up of metals will be higher and catalysts therefore need to be more resistant. Akzo, in conjunction with Elf Antar and Cepsa, showed how it was possible to overcome this by developing catalysts which are more resistant to metals contamination but which can achieve much lower slurry yields at lower conversion. These catalysts, when combined with Intercat ZSM-5 additives, allow the refiner to reduce the severity of his operation without increasing slurry production and to increase both LCO and LPG yield at the expense of gasoline.

Akzo cited the experience of a major Asia-Pacific refiner who processes residue through its catalytic cracking unit. The operation cycles between gasoline and middle distillate mode. Using conventional catalysts, the refiner was limited in his ability to maximize middle distillate

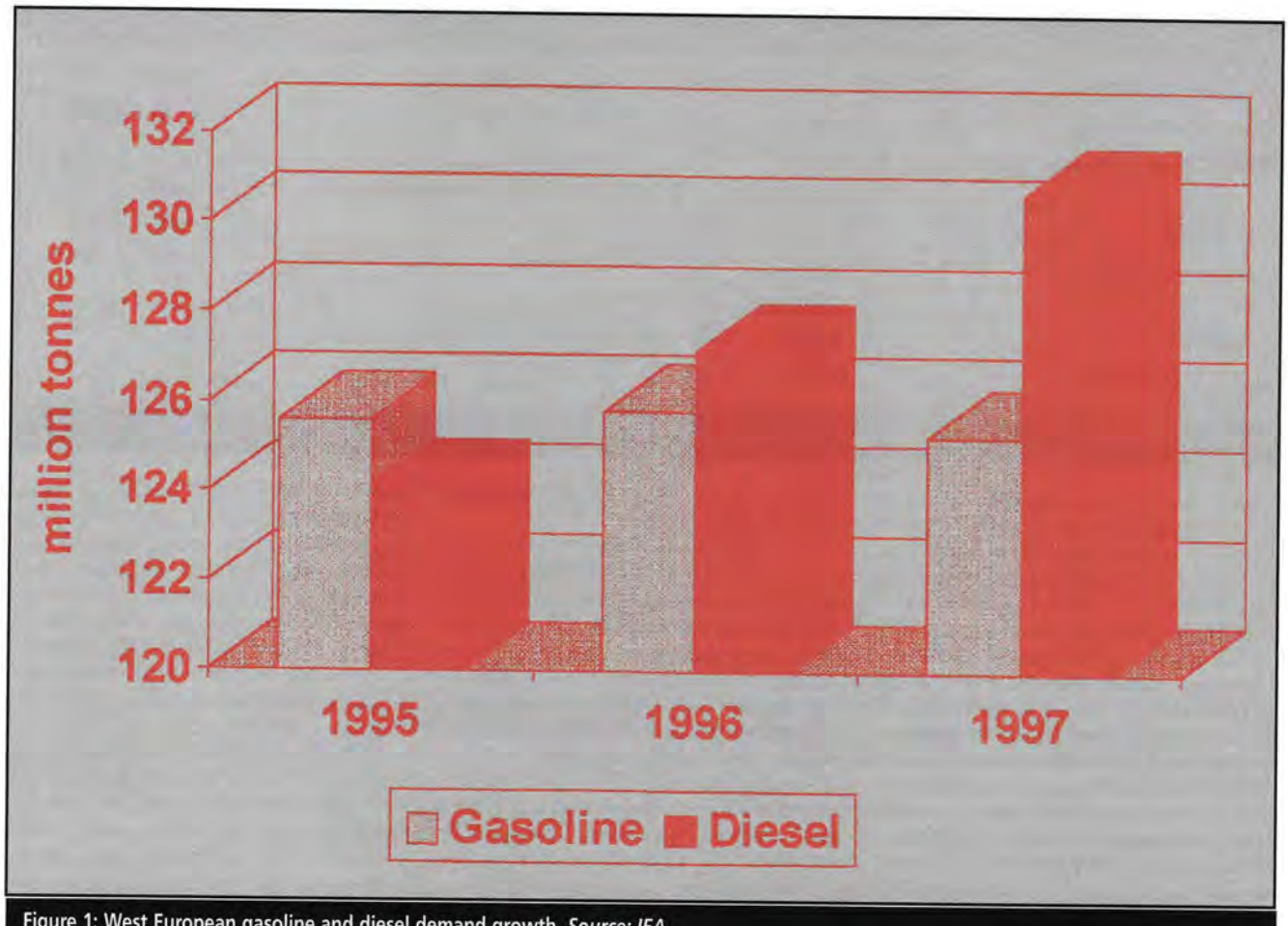


Figure 1: West European gasoline and diesel demand growth. *Source: IEA.*

by slurry run-down constraints. After switching catalysts to Akzo's active alumina technology catalyst, the refiner was able to reduce catalyst addition rate from 9 t/d to 4 t/d and increase light cycle oil yield by 5% volume. Despite conversion being reduced to 54% from 58%, slurry yield was reduced by 1%. The catalyst was able to withstand the 40% increase in vanadium – a consequence of the lower catalyst addition rate – because of its greater resistance to metals.

As a result of this commercial experience, Elf and Cepsa combined with Akzo to study LCO maximization more closely in the laboratory. E-cat (equilibrium catalyst) from a Cepsa refinery was compared with E-cat supplied by Akzo and tested in Cepsa's circulating pilot plant using a conventional feedstock under conventional operating conditions. Results showed that for the same yield of slurry it was possible to obtain 2.5 wt% more LCO and increase gasoline yield by 0.7%. However, LPG yield was much reduced and there was a loss in olefinicity and gasoline octane.

Because of the future value of olefinic LPG as feedstocks to alkylation and MTBE units, Akzo has been driven to explore ways in which the need for maximum middle distillate can be matched with the need for olefinic LPG. Use of Intercat's ZSM-5 additives with Akzo Nobel's host catalysts has been investigated using simulation models. Results showed that with 4% additive and a catalyst tuned for LCO maximization it was possible to increase LCO by 2.5%, reduce gasoline by 1.7% while maintaining LPG yield without any increase in slurry yield when compared to the Cepsa refinery base case. Moreover, gasoline octane was 0.2 to 0.3 numbers higher than in the base case. There was, however, still some loss of LPG olefinicity. Akzo plans to continue to study these catalyst/additive combinations to enable refiners to have the full flexibility they require for the future.

Cost-effective gasoline desulfurization

New European Union gasoline specifications will mean hydrotreating FCC feed or desulfurizing FCC gasoline. The former route is a very expensive, capital intensive one and the latter results in loss of FCC gasoline yield or octane. CDTech showed in its presentation to the conference how its two-stage catalytic desulfurization process could be used to achieve 95% desulfurization with high yield and minimum loss of octane and at substantially lower operating pressure than that required in conventional hydrodesulfurizers. The hydrodesulfurization is carried out in the distillation tower itself.

Gasoline sulfur levels

The typical sulfur level of European gasoline is around 300 ppm. Almost 95% of the sulfur can come from the FCC gasoline, which itself can exhibit sulfur levels as high as 2,000 ppm. Hydrotreating the FCC feed would considerably reduce the sulfur in the FCC gasoline but this option is normally very capital intensive. An alternative option would be to fractionate off the heaviest 10% of the gasoline which contains roughly one-third of the total FCC sulfur. However, in order to blend off this heavy gasoline,

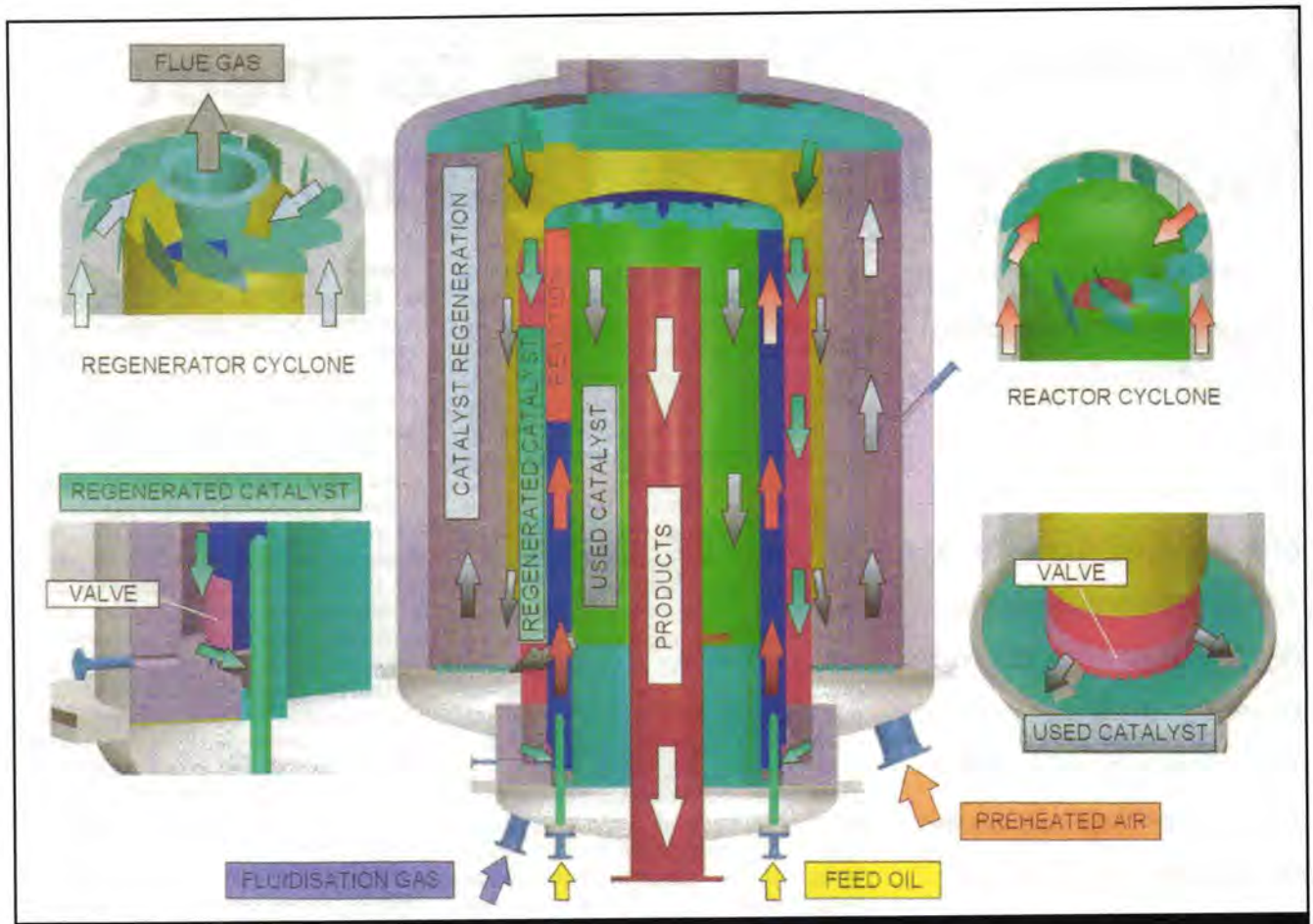


Figure 2: Neste's new reactor concept. *Source: Neste.*

hydrotreatment would be necessary, even if it were to be utilized in gas oil. Hydrotreatment of the full range of gasoline suffers from considerable loss of octane. A further option would be to remove the C5 olefins prior to hydrotreatment. These can then be fed to a TAME (tertiary amyl methyl ether) unit and octane loss and hydrogen utilization would be reduced.

The CDTech solution to gasoline desulfurization is a scheme which uses two stages of catalytic distillation to achieve 95% desulfurization of the FCC gasoline with high yield and minimal loss of octane. In the first stage, a dehexanizer takes off the C5/C6 cut which contains virtually no mercaptans and can be blended as a low sulfur, high octane component. In the second stage, desulfurization and distillation of the remaining gasoline stream are carried out in a structurally packed distillation tower. The desulfurization catalyst is contained in the packing. No additional reactor system is required and hydrogen is added directly to the column. The system is designed to achieve 70% to 95% desulfurization at substantially lower operating pressures than those required for conventional desulfurization processes.

Octane loss is avoided in this system since the light ends are distilled to the low temperature zone where olefin saturation is lower. The heavy ends are subjected to the higher temperatures at the bottom of the tower which are needed to desulfurize the more refractory sulfur compounds in the heavy fraction. Two other advantages of the process are the lower hydrogen consumption as a result of the reduced olefin saturation and reduced capital costs because of the lower pressure operation.

Other problems

Overcoming the problems with diolefin fouling of the etherification catalyst, associated with obtaining TAME from FCC C5s, was also addressed in the CDTech presentation to the conference. Selective hydrogenation is the normal method of converting the diolefins to olefins. However, the sensitivity of the palladium catalyst is such that mercaptan removal upstream of the selective hydrogenation unit is normally required.

The problem with this is that the treatment can leave traces of oxygen in the C5 cut which can cause deterioration of the etherification catalyst. CDTech's CDHydro application avoids this by combining selective hydrogenation and distillation. In the design, the selective hydrogenation catalyst is placed at the top of the depentanizer column and hydrogen is introduced below the catalyst. The system operates at pressures which are significantly below those required for conventional selective hydrogenation and hydrogen compression is therefore not normally required.

At the bottom of the catalyst zone, mercaptans react with diolefins to form thermally stable olefinic sulfides and are fractionated off with the bottom product. In the upper section of the catalyst zone, hydrogen reacts with C5 diolefins to selectively produce olefins. The resulting stream is low in diolefins and mercaptans and is therefore a better feedstock to the TAME unit. Additionally, the octane of the C5 cut is increased and the RVP (Reid vapour pressure) is reduced due to double bond isomerization and selective hydrogenation.

Ultimate database to meet industry information needs?

Oil and the other energy markets have never been more volatile or global than they are today. This is a complex environment where the efficient use of market information is a key strategic element in achieving the improvement in corporate productivity and control that companies are looking for in their supply and trading operations. In a bid to help energy companies handle their data more efficiently, Saladin has developed a new database which provides a central store of price and market information that can be used throughout an organization for a range of applications writes *Mark Powell*, Energy Server Product Manager, Saladin.

Energy industry data is varied, inconsistent, complicated and diverse. Different types of data are supplied by different vendors, in different formats, using different units of measurement and different descriptions of the same commodities or product. Furthermore, large organizations frequently source exactly the same data more than once – a problem that occurs because the information is required in a number of departments, divisions or geographical locations that have no common infrastructure. Often the various departments are completely unaware that the effort they are putting into maintaining a database of prices is being duplicated, triplicated or worse, within their own organization.

For example, the strategic planning department may be assessing the risk of new equity reserves based on calculations of the historic volatility of crude prices. At the same time the crude trading desk is also calculating the historic volatility of crude prices using a duplicate set of data and a separate historical volatility calculation.

The problem is compounded by the large volume of data to be processed. Platt's, a major source of oil market information in the UK, publishes many thousands of data points each day. This information covers many different markets and regions. Literally dozens of other vendors publish regional prices. For example, the Saladin Information Service distributes data from 29 vendors and, in the US, OPIS (Oil Price Information Service) publishes 50,000 to 100,000 wholesale product prices every day.

Data can be sourced in a number of ways – electronically via dial-up services, the Internet or bulletin boards; by diskette; fax or post. In many organizations data is manually entered into trading systems from faxes or even from other 'closed' systems. This introduces the very real risk of user error.

Different departments will want to use the data in different ways. It is unlikely that the raw data will be used directly. More commonly the information is aggregated using some kind of formula, averaged or adjusted in some way.

End-user products have given people front end tools – ways of looking at data – but these systems are closed and the information is not available to other applications. However, any number of users may also want access to the actual numbers in their own departments. An open system would allow users to use the same information in a number of applications across the enterprise and therefore reduce overall duplication, errors, costs and risks.

The complexity of energy market data often leads to a lack of understanding regarding the storage and use of data. This can result in information being lost or decisions being carried out on a number of incorrect assumptions.

The wide distribution of data within a company leads to a diversification of responsibility and management of that data. This usually results in a reduction in the quality of the data often in the form of incomplete or incorrect information. This will obviously have a corresponding effect on the value of the data and on any analysis produced as a result of using it.

The distribution of data across a number of databases, departments or physical locations leads to increased effort in maintaining the information. Many data vendors regularly publish corrections to data points and it is essential that these corrections are applied to every database that contains that data. In addition, new quotations are constantly being added by data vendors. Without a proactive approach to maintenance, any database of market prices will quickly become out of date. The human costs of duplicating this maintenance effort across a number of databases can be significant. The business costs of failing to accurately perform this maintenance can be even more significant.

Opening the door to data

Energy information specialist Saladin recognized the growing need of energy companies for a coherent, central store of price and market information that would be available for use throughout an organization to feed a variety of applications ranging from market analysis and long-term forecasting to risk management, transaction processing, deal pricing and invoicing.

The company worked with BP to develop a product to meet the specific needs of handling energy market price information. Called EnergyServer, the new database was launched mid-1995. Since its launch, it has been acquired by

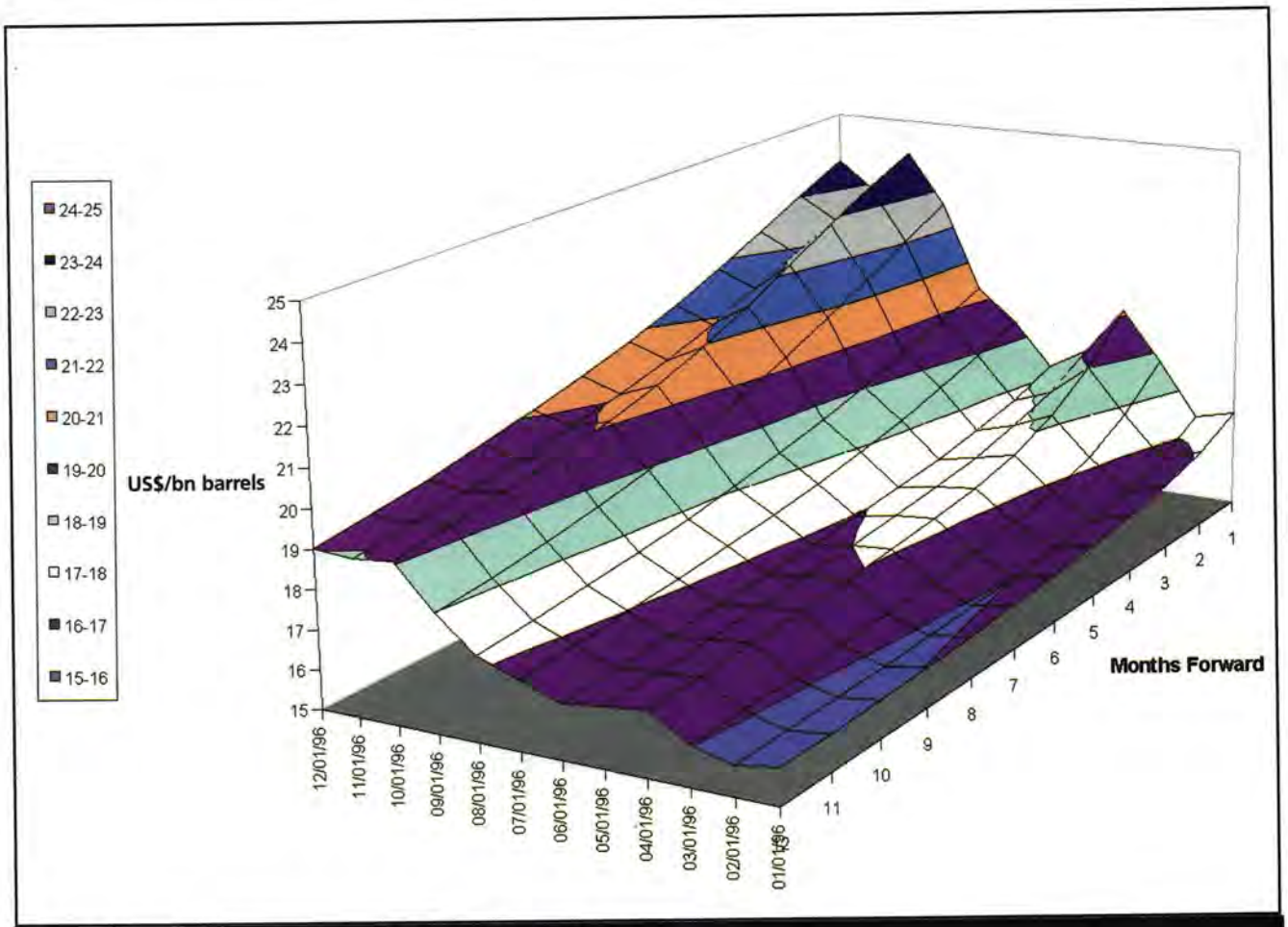


Figure 1: Energy Server screenshot showing IPE Brent Forward Curves

oil majors looking to increase efficiency and reduce risks, such as BP, Conoco and Chevron, as well as gas and power companies Enron, Cinergy, SEI and Coral. Diversified companies such as Koch Industries have also purchased the database, as have financial traders and players in the US downstream wholesale sector.

EnergyServer performs three primary functions – the collection of energy data, its storage and access to the data. Acting as a 'knowledge warehouse' specifically developed for energy market information, it is designed to handle all the types of market data commonly used in the industry, including exchange data, market price assessments, supply/demand statistics, transportation data, proprietary prices and other data that changes over time.

The database integrates multiple sources of real-time and historical data, and incorporates the most efficient technology for handling these types of data so that the information can be made globally available – to refining and marketing, strategic planning, finance and all trading departments for example.

This availability of information from one central store provides consistency and accuracy across the organization.

EnergyServer has automated the way in which relevant information is obtained, enabling traders to get directly to the information they need without having to go through a range of accessing methods or performing the processing needed to make the data useful. It also removes the duplication of such effort within an organization, as well as ironing out the inconsistencies in data representation.

Saladin has incorporated an understanding of the structure of energy data in EnergyServer, including the frequency and timing of the different quotations as well as the different nomenclature and classifications that the various data providers use for the same products. The database also features a comprehensive set of data conversions, calculations, manipulations and combinations that are used daily across the industry.

In addition to these programmatic interfaces, an Excel interface can be provided which allows a user to extract data directly from the database into an Excel spreadsheet. This provides immediate access to the full range of data and manipulations and is useful for ad-hoc analysis, building models and developing custom applications which are tailored to the individual user.

EnergyServer also centralizes many of the standard manipulations associated with the data. This means that individual trading, analytical, risk management and invoicing systems do not need to reproduce the same functionality. Other data analysis functions available include automatic data filing and a full range of averaging techniques used in formula pricing. Unit and currency conversions can be automatically carried out using daily exchange rates and conversion factors for weight, volume or energy content. Requests for data can also include moving averages, lags, leads and momentum modifiers and users can retrieve data for dates in a set calendar, for example, to calculate averages around contract dates.

Built for integration with an open architecture, the database is designed to link to both new and legacy systems anywhere within a corporation. This linkage is achieved by a number of interfaces which allow access via specially developed application programming interfaces or via industry standard technologies such as ODBC, TIBCO's TIB and Dow Jones Markets' TRS.

Changing the face of the international oil market

Dr Peter R Odell, Professor Emeritus of International Energy Studies, Erasmus University, Rotterdam, **presents the controversial view that the current pattern of supply and demand in the global energy market needs to change radically in order to stabilize future oil prices. He puts forward a scenario in which the world market is divided into three major geographical trading regions – North America and the Caribbean; Europe and North Africa; and East Asia and Australasia. Furthermore, he envisages that the Middle East would no longer be a dominant player in the international arena, but would act instead as the residual supplier to those oil importing countries such as China and India lying outside of the newly regionalized market.**

During the past 18 years, world oil demand has been severely constrained as a result of competition from alternative energy sources and a near-global emphasis on the more efficient use of oil resources. Global demand peaked in 1979 and then fell for five of the following six years. By 1985 oil use was under 90% of its 1979 level – a level to which it finally recovered only as recently as 1994.

Supply side developments over the same period have been more dynamic. Most notably, production from the Former Soviet Union (FSU)/eastern Europe has fallen by over 40%, from 610mn tonnes to 360mn tonnes, while the Middle East's output is still only 90% of its peak 1979 level. Despite these supply constraints, the international oil price remains weak at under 50% of its level in 1980/81 in current dollars and at less than 35% in real terms.

Middle East producers were fortunate in that they shared the 'misery' with the FSU producers, particularly Russia. Had the net availability of oil for export from the former communist, including China, to the non-communist world not fallen from about 170mn tonnes to under 80mn tonnes since the mid-1980s, Middle East output would have been almost 200mn tonnes less than 1979, rather than only 100mn tonnes. Under these circumstances, the price of oil would possibly not have recovered from its collapsed level of 1986. At worst, it would have continued to fall post-1986 to the long run supply price of the commodity of no more than $10 to $12 per barrel in 1997 dollar terms.

Thus, the objective of oil price maintenance has been saved by events in the Former Soviet Union, aided in more recent years by the constraints of UN/US embargoes on oil supplies from Iran and Iraq. It is, as usual, politics rather than economics which have continued to generate an oil price that is both well above its competitive level and more or less high enough to satisfy the exporters.

Short-term prospects

The UN/US embargoes remain critical for stable oil price prospects in the short term. However, two further conditions also need to be satisfied. First, even the non-embargoed exporters may still need to restrain their levels of production below those achieved in 1997 rather than increasing them as decided at Opec's December 1997 meeting. Second, the now re-emerging excess of Russian supply over internal demand will need to remain limited to no more than China's modestly rising net imports so that they cancel each other out.

Elsewhere, the non-Opec, non-Russian and non-Chinese supply/demand relationships will in the aggregate remain 'as is' for the rest of the 1990s as total production from the countries involved keeps pace with the group's increasing demand for oil. Under such circumstances the prospect for a significant increase in the demand for Middle East oil – and the maintenance of the oil price at current levels – is no better than 50/50. That is unless the US determines that its further positive intervention in the market is required to keep international supply/demand in balance in order to serve its national interest in oil price stability.

It is highly ironic that it is only the revitalized US interest in exercising its hegemony over international oil that can now secure some degree of order in world oil markets through to the turn of the century.

Looking longer term

The short-term prospect for increased supplies from the Middle East and the prolongation of close-to-present price levels over this period thus depends on the exercise of US hegemonic power in favour of such an outcome. Even so, the acceptability to most Middle East countries, for more than another few years, of a system which effectively limits their revenues and their contributions to the total required supply, seems unlikely.

The Middle East's share of world proven reserves, at 65%, is almost 2.2 times its share of world oil production at 29.7%. This is perceived to be inequitable and the region's producers may seek instead to re-establish their earlier domination of international trade. As shown in **Table 1**, this was 61% in 1975 compared with only 45% in 1996. The Middle East's theoretical ability to achieve this objective over a five- to 10-year period is not in doubt given the much lower production and development costs compared with

most alternatives for expanded oil supply. In a resurgent competitive market in which the Middle East producers/exporters secure the necessary and profitable reinvolvement of the major international oil corporations in the expansion of their output and exports, a return to the pre-1975 situation of the oil importing countries' heavy dependence on cheap oil from the Middle East for their oil needs cannot be excluded.

Apart from the purely political concern in many importing countries over the possibility of an international oil market dominated by Middle East supplies and the major international oil corporations, there would also seem likely to be consternation about the future of indigenous energy production in many countries. Actions to safeguard the future of such nationally oriented energy industries could be expected. Equally important, the non-Middle East oil exporters, finding the viability of their own oil industries in jeopardy from much expanded Middle East production, could decide to seek alternative alliances and relationships which reflect their concerns. If this happened, there would then be a powerful motivation for a potential regionalization of the hitherto global oil industry, based on a perception of mutual economic and political interests between contiguous or proximate oil exporters and importers.

Regionalized oil industry

The essential elements in such a regionalization process seem likely to emerge from the adherence of the non-Middle East major oil exporting countries – both former Opec members and those exporters, such as Mexico, Egypt and Malaysia which never became members of the organization – to three oil trading blocs built around the main geographical groupings of the OECD countries of North America, Western Europe and Japan/Australasia (see **Figure 1**).

Intra-regional trade in the western hemisphere has, indeed, already built up significantly since 1980 from 168mn tonnes to 298mn tonnes in 1996 (see **Table 1**). Over the same period, the region's exports to the rest of the world declined. In 1996 it was no more than 51mn tonnes while imports from the rest of the world stood at 205mn tonnes. The latter figure, however, represented only 17% of the region's oil use showing that its degree of integration into the global oil system, compared to integration within the hemispheric system, is already at a very modest level. The continued process of hemispheric integration would offer importers increased security.

	1955	1975	1995	(1996)
1. Global Oil Production	786	2,734	3,266	(3,362)
of which, Middle East	21%	36%	30%	(29%)
2. Oil Traded Internationally	291	1,508	1,815	(1,911)
of which, Middle East Exports	50%	61%	46%	(45%)
3. Intra-Regional Trade	106	402	643	(707)
as % of Middle East Exports	73%	44%	79%	(83%)
4. Trade:				
a) within Americas	87	177	267	(298)
b) within Europe and NW Africa	11	175	296	(306)
c) within Far East	8	50	80	(103)

Source: P R Odell, The Global Oil Industry: the Location of Production – Middle East Domination or Regionalisation? Regional Studies, *Vol 31, No 3, 1997, pp.311–322 (Data for 1996 from BP* Statistical Review of World Energy, *London 1997).*

Table 1: Global, Middle Eastern and Regional Oil Production and Trade (in mn tonnes)

Venezuela's massive oil expansion prospects – with increasing contributions from Canada, Mexico, Colombia and Argentina – make this a highly feasible option. For the producers, in particular Venezuela, the security of markets would be equally important.

The region based on OECD Europe can, in the light of recent political changes, now be defined as comprising all of Europe including major oil producing areas in Russia and in the Caucasus together with the oil exporting countries of North Africa and West Africa. While the size of the region may seem overwhelming, as can be seen from **Figure 1** its geographical extent is rather less than that of the other two regions.

There is already a close balance within the region between oil supply and demand at just over 1,000mn tonnes per year. The small net import of less than 50mn tonnes could be eliminated only through further modest development of the region's considerable oil resources, particularly in Russia and North Africa, as well as the known and prospective oil rich areas of Norway and Britain (already the world's sixth and ninth largest oil producers).

The physical integration of supplying and consuming areas within the region is also already well established through existing infrastructure. However, this is set to intensify in the near future as a result of the European Energy Charter and the Mediterranean Basin political initiative. Such developments will encourage additional intra-regional trade. Given the mature nature of most of this region in terms of energy use (with the exception of North Africa) and the political commitment to controlling energy use for environmental reasons any growth in oil demand will be slow. This will allow indigenous production to sustain the region's oil needs well into the future.

Finally, with respect to East Asia and Australasia, there are already a number of regional organizations such as ASEAN which are responsible for generating intensified economic relations within the region. These initiatives incorporate concern for energy issues, not least because of the relatively high rate of growth (around 6% per annum) in the region's demand for oil. Since 1986 oil use has increased from 320mn tonnes to over 615mn tonnes. Net dependence on imported oil has thus risen – by 1996 it was 450mn tonnes putting the region's self-sufficiency in oil at only about 27%.

The medium-term aim of this region cannot be oil independence. Indeed, given the continuity of relatively high demand growth rates in spite of recent economic and financial difficulties, there seems more likely to be an increasing requirement for imported oil. Regional cooperation must thus aim to curb the increase in oil demand, partly by demand-size measures but also through efforts to enhance the production, transport and use of alternative regional energy sources. Such alternative sources include coal and natural gas for which regional supply prospects are more favourable than those for oil and for which massive infrastructure developments linking producers to markets within the region are being given a high priority. In these ways, a significantly higher degree of energy self-sufficiency becomes an achievable medium-term objective. This leaves the encouragement of more regional oil production, through enhanced indigenous involvement in upstream activities, as an objective achievable only in the longer term.

The potential regionalization of the

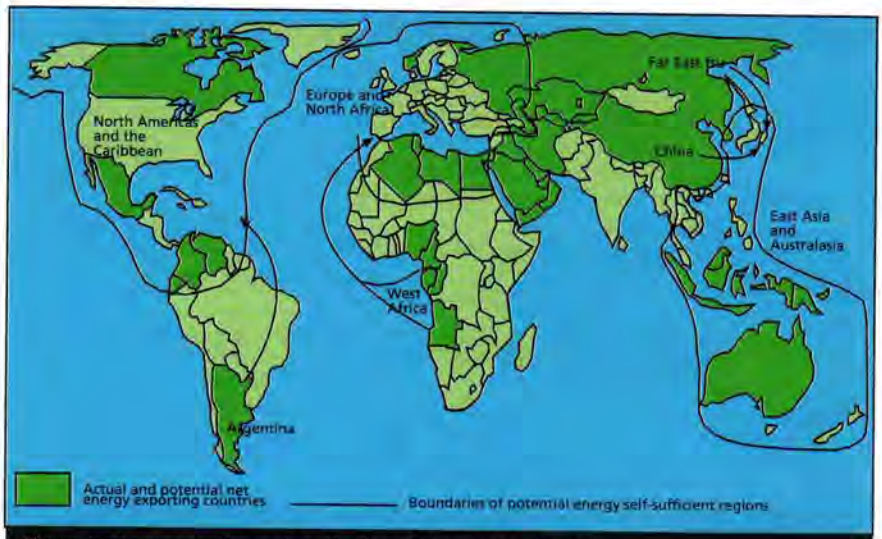


Figure 1: The prospective regionalization of the global oil system

international oil system, as outlined above, is not comprehensive. Some areas, including much of Africa and the Indian subcontinent, are neither rich enough as potential producers nor important enough as users to include them in the regional markets defined. These areas will thus remain dependent on Middle East producers. However, as these suppliers will be anxious to secure 'captive' customers because of the regionalization of much of the rest of the international market, the oil importing countries should be able to buy their import requirements at highly competitive prices.

Such an opportunity could also apply to China, for which association with the East Asian/Australian market may be impossible in the short term for political reasons, including the ongoing dispute over rights to the potentially oil rich South China Sea.

Limited opportunities

Such expanding market opportunities for Middle East oil suppliers are likely to be modest relative to the area's supply potential. The suppliers will, in essence, have the choice of 'hanging together' or 'hanging separately' in respect of their relations with the oil importing world outside the regionalized markets. A failure by the Middle East suppliers to cooperate would likely lead to a price war for the limited markets and thus to temporary success in expanding their international market share. This would, however, be followed quickly by the inevitable international political and strategic concern over dependence on the Middle East and the consequent strengthening of the regional arrangements described.

To avoid this, the Middle East producers' cooperation could be developed specifically in respect of the growing Asian markets. This would most likely involve the establishment of long-term supply agreements based on pricing formulae of a kind which fit in well with the statist approaches of most of the Asian countries with respect to the economic sector and rapid economic growth.

Future prospects

The Middle East exporters' future thus depends on their ability and willingness to generate the necessary collective political clout to constrain output in order to secure the maintenance of real prices. It is likely that the US will covertly support any such attempts as it exercises its hegemonic power in favour of the status quo. Oil trading would continue under such a scenario, although it would be constrained by tight limits as trading ranges became defined by the overriding political wish for stability in the international oil system. Thus, it is conceivable that 1996 could well have been the final year in the period since 1971 during which uncertainty over the supply and price of oil was the hallmark of the international market.

Should the Middle East oil exporters not reach an accord, in spite of support from the US, an alternative structure for the international oil markets will need to be developed. This too would be likely to be based on the precept of ordered markets as in the halycon days of the international companies, control over the system. A free-for-all oil system with prices emerging from the largely unfettered play of markets is barely conceivable except as a short-term phenomenon. It would not suit the longer-term energy objectives of any of the significant players – be they country or company – in international economic affairs.

Thus, as indicated, the non-Middle East members of Opec (Venezuela, Nigeria, Algeria, Libya and Indonesia) would divest themselves of their commitments to Opec as it becomes an organization which is unable to deliver the requirements for oil volumes and values which satisfy their economic needs. Their more effective links will lie in their commitments to the regional markets whereby they can be guaranteed some degree of protection against low-cost, marginally priced oil from the Gulf.

Consequently, the Middle East oil exporting countries will need to reorientate their economic and political interests to the markets that remain outside those which are regionally organized, such as the Indian subcontinent. In particular, they will need to use active diplomacy to secure a rapprochement with the expanding economies of the region, including that of China.

Thus out of a structured Gulf States/South Asia/West Pacific Rim nations' dialogue, a new international energy organization could emerge to replace Opec. It is likely that such a new body would not confine its concerns with oil supply and transportation issues but also more generally to influencing the evolution of the energy markets of the world east of Suez.

The West was never willing to make such a commitment to the oil exporters but the time now seems to have come for a 'producer/consumer dialogue' within the increasingly important region of the world lying beyond the Americas and Europe. The aim of such a dialogue would be to create an international organizational structure capable of minimizing energy supply and market uncertainties.

The actors involved would comprise, on the one hand, those Middle East countries with limitless supplies of oil but with economies with little else going for them and, on the other, countries with near limitless energy market opportunities.

Any organization developed to ensure the delivery of both supply and demand among the countries concerned will require a structure in which international diplomacy and intergovernmental regulation are the basic elements. Nevertheless, in a system of the size and complexity outlined in this article, fulfilling the markets' requirements down to the last barrel of oil or the final cubic metre of natural gas would seem likely to need some measure at least of traded markets' operations to ensure equilibrium in supply and demand at all times. This, however, is a far cry from the West's present treatment of oil as merely just another commodity.

Caspian booms but concerns remain

Caspian energy development is now at a crossroads, facing a variety of conflicting pressures. Last year witnessed both a cluster of major new oil and gas development contracts in Azerbaijan and Kazakhstan and an economic crisis in the Far East that could severely affect export prospects from the region. It also saw considerable progress on a variety of export pipeline routes – and the start of fresh squabbling over formal ownership of some Caspian resources, reports *John Roberts.*

This year has opened with the international energy industry paying fresh attention to the potential role of Iran as a transit country for Caspian energy exports, in addition to revived interest in its own oil and gas resources. It also opened with fresh falls in international oil prices, a development which could well have significant consequences for the level of intensity with which international oil companies pursue opportunities in the Caspian region.

Despite vicissitudes, which include disputes over the ownership of key fields and concerns about the reliability of agreements in Turkmenistan or the prospects for gas deals in Uzbekistan, the Caspian retains its allure. For its riches, while yet to be properly quantified, are now taken for granted and so, in general, is its availability for international companies to develop on a commercial basis.

The potential is considerable. Although proven reserves remain low at around 8bn barrels (**Table 1**), reflecting a lack of exploration wells, Wood Mackenzie considers that there are at least 27.8bn barrels of oil and 243bn cm of gas in four of the main Caspian region countries: Azerbaijan, Kazakhstan, Turkmenistan and the adjacent, but landlocked, Uzbekistan. To this should be added the prospect of additional reserves off the Caspian coastlines of Russia and Iran.

This falls well short of the hyperbole of some US reports, such as the State Department's 1997 assessment, which mentions the possibility that the Caspian may contain as much as 200bn barrels of oil, and which, if added to the current proven world total, would ensure that the region possessed roughly one-sixth of the world's reserves.

Reserves potential

Over the next two or three years, reserve estimates should become much more accurate. Suffice it to say at this stage that the oil industry generally likes what it has found, and that it is working on the basis that the Caspian region contains at least as much oil as the North Sea; that it may well contain double the North Sea's resources, and that it might even contain three times as much.

Very roughly, as and when the region's resources are proven, it will probably be found to contain between 4 and 10 per cent of the world's oil reserves. This is nothing like the quantities found in the Gulf, which accounts for some 65% of proven world reserves, but the bottom line is simple: at present, most of the Caspian's likely oil and gas reserves are available for exploitation by western companies on a production sharing basis, whereas the vast majority of Gulf oil remains off limits, a reservoir essentially accessible only to the respective national oil companies.

Finalized agreements

Last year witnessed a number of key developments. The number of consortia with signed production-sharing agreements for offshore Azerbaijan concessions soared from three to ten. Almost every significant oil company now seems to have a stake in one consortium or another, while those who took the initial risk in negotiating the initial unitized Chirag-Azeri-Guneshli fields — companies such as BP/Statoil, Amoco and Pennzoil – have gone on to head their own specific development projects.

In Kazakhstan, two major agreements were finalized in November 1997. Agip, British Gas and Texaco formally secured a production sharing agreement for the giant Karachaganak gas and condensate field on Kazakhstan's northwestern border with Russia. Offshore, British Gas and Agip were among six companies, the others being BP/Statoil, Mobil, Shell and Total, which secured a combined oil production and supply agreement (OPSA) covering 6,000 sq km of the northern Caspian, and which constituted the 12 choicest blocs from a mammoth survey of 103,000 sq km carried out by the six companies as part of the now disbanded KazakhCaspyShelf consortium.

Kazakhstan also moved to secure the rehabilitation and revival of its second biggest field, Uzen. In September 1997, it concluded a $4.3bn agreement with the China National Petroleum Corporation (CNPC) under which the latter would take over the Aktyubinsk Oil Company, with a major refinery as well as the associated oilfields. The agreement also provides for CNPC to invest $3.5bn in a new pipeline to carry Kazakh oil eastwards to China, and provides for further Chinese assistance in developing a pipeline south to Iran.

Both the Azerbaijani and Kazakh deals provide fascinating examples of the interplay between politics and com-

merce. In August 1997, during a visit to the US, Azerbaijani President Gaidar Aliev signed three new contracts with US firms — a move which would ensure the commercial development of a cluster of offshore fields but which also had a clear political motive. Aliev was using the contracts as an inducement to the US Congress to lift Section 907 of the Freedom Support Act, under which Azerbaijan is forbidden to receive anything except humanitarian aid, while Armenia, its antagonist in the currently frozen Nagorno-Karabagh dispute, is not disbarred from receiving US development aid.

Kazakhstan's China deal was likewise largely political — and reflects the Kazakh government's need to secure powerful external allies if it is to overcome the problem confronting all those who seek to develop the region's hydrocarbon resources: how to ensure they are brought swiftly and effectively to external hard currency markets.

The pipeline aspect of the CNPC agreement provides a clue. It is widely believed that the Kazakhs have secured Chinese agreement that the first line to be built with Chinese support will be the southward line to Iran. Unless the US can come up with both financing and a practical implementation programme for alternative lines to the west, Kazakhstan President Nursultan Nazarbayev said during a US visit in October 1997, he would continue to pursue talks with Iran on a pipeline to be financed, at least in part, by the Iranians.

In the pipeline

The Iranians have already indicated their ability to help the Caspian states export their hydrocarbon reserves. On 29 December 1997, the presidents of Iran and Turkmenistan held a joint ceremony to mark the formal opening of a new 200-km gas pipeline from Korpedzhe on Turkmenistan's Caspian coast to Kurt-Kui, a junction with Iran's main east-west gasline.

This line, initially by swaps and subsequently by direct connection, will carry Turkmen gas to Turkey. With an initial capacity of 1.5 to 2.0bn cm/y, but due to rise to 12bn cm/y, it is one of four export pipeline systems either completed or under physical construction at the start of 1998. It will connect with a line currently being built to connect the northwestern Iranian city of Tabriz with the northeastern Turkish city of Erzerum. The next few months are likely to see the Turkish government award fresh contracts to carry the Turkmen gas further westwards, from Erzerum to the capital of Ankara, where the line will link up with existing gas piped down from Russia via Bulgaria and northwestern Turkey.

	end 95*	end 96*	Jan 97*	Jan 98*
Azerbaijan	1.2	7.0	1.2	1.2
Kazakhstan	5.3	8.0	5.4	5.4
Turkmenistan	n/a	n/a	0.5	0.5
Uzbekistan	0.3	0.6	0.6	0.6
Total	6.8**	15.6**	7.7	7.7

** BP Statistical Review 1996 and 1997. + Oil and Gas Journal ** excludes Turkmenistan*

Table 1: Current proved reserves for Caspian region (bn barrels)

The third of the four systems is the oil pipeline from Sangachali, just south of the Azerbaijani capital of Baku, to the Russian Black Sea port of Novorossiysk. This 100,000 b/d capacity line, a reversal of a former line which brought Russian oil south for refining at Baku, came into service at the end of October 1997 and is being used to export the 'early oil' currently being produced by the Azerbaijan International Operating Company (AIOC), the consortium which secured rights to Chirag-Azeri-Guneshli in September 1994.

The fourth of the systems is a second line to carry AIOC's 'early oil', but this will run westwards from Sangachali up the Kura Valley to Georgia and thence to Supsa on the Black Sea. It has a two-fold significance: it will be modern Azerbaijan's first non-Russian oil export pipeline and it is actually being developed as a project by AIOC itself. This alone makes it a favourite for further development as at least one element of the 'Main Export Pipeline', a project under which the bulk of Azerbaijan's projected oil exports over the next several years will be brought to market by a new line intended to serve European and/or Mediterranean markets. The line under construction is due to open by October this year with a 120,000 b/d capacity. In fact, it looks likely to open a little earlier. In addition, extra pumping stations are being installed so that capacity can be steadily increased to 200,000 b/d.

These are all positive developments; they show that the region's resources can be brought to market by a variety of means and they put pressure on obstructionist countries to re-think their policies. It is now more than four years since an agreement was first concluded for a new pipeline system to bring oil from Kazakhstan's biggest field, Tengiz, westwards to Novorossiysk or another nearby terminal. Following extensive restructuring of the original pipeline consortium in 1996 and 1997, and a gradual erosion of various Russian hardline positions which persistently stalled the project, it now looks reasonably likely that early 1998 will see a firm start on this project, which could yet enable it to be the first essentially new export system capable of carrying large quantities of Caspian hydrocarbons to market.

US negotiations

Likewise, US opposition to Iran may be changing. In July, the State Department signalled that it would not invoke sanctions against companies seeking to build a full-scale gasline across Iran from Turkmenistan to Turkey. Shell, whose Director of E&P International Ventures, Alan Parsley held talks with Turkmenistan President Sapurmurat Niyazov in December 1997, is expected to present the Turkmen authorities with a study on proposals for constructing such a line in the next few months. The project's goal is completion of a line capable of eventually carrying some 28 bcm/y of gas westwards to Turkey from Turkmenistan's major southeastern gasfields such as Dauletabad.

However, while this is one project on which the sun may be beginning to shine, it is far from clear that the Turkmen authorities have got their act together with regard to negotiating and awarding mainstream production sharing agreements. The country's record to date has been poor, which is one reason why Turkmenistan remains in recession despite its leader's claims that it constitutes a new Kuwait. This month, however, the bidders for its first general offshore tender round should be announced, and they may provide a pointer concerning the terms under which the Turkmens are willing to see their oil developed by foreign companies. Meanwhile one directly negotiated contract by the UK's Monument Oil, with Mobil brought in subsequently, is pressing ahead with its rehabilitation of onshore Caspian oilfields at Nebit Dag.

Offshore dispute

The offshore tender, however, illustrates another of the problems confronting development of the Caspian's offshore resources: border disputes. In

The Chirag 1 production platform in the Caspian being inspected prior to refurbishment. The platform, 120km offshore Azerbaijan, is now the production centre for the Chirag-Azeri-Guneshli project operated by BP on behalf of the AIOC consortium.

essence, the five littoral countries – Azerbaijan, Iran, Turkmenistan, Kazakhstan and Russia – all seem to be coming to a de facto acceptance that the sea's hydrocarbon resources will be partitioned, and not – as Russia and Turkmenistan initially favoured – developed jointly. But already there are problems concerning the establishment of the new maritime boundaries.

Some of the problems stem from what might be termed historic accidents. The Azerbaijani government awarded AIOC a unitized concession for three fields – Chirag, Guneshli and Azeri – because of past Soviet efforts to develop this sector. But Azeri lies roughly halfway between the coastlines of Azerbaijan and Turkmenistan, and in recent years the Turkmens have laid claim to the field. Their government's current position is that they do not want to stop AIOC developing the field, but they do feel they are entitled to a share of the proceeds.

More seriously, they are disputing a field called Kapaz by Azerbaijan and Serdar by Turkmenistan. In July, Azerbaijan thought it had pulled off an astute political coup by awarding a production sharing agreement for this field to a Russian grouping headed by Lukoil and Rosneft. Within a week, protests from Turkmenistan had helped prompt both companies, and the Russian government, to declare the deal null and void. The next step is likely to be a further round of US sponsored diplomacy to try to break the deadlock – and so further push Washington's view that Turkmenistan and Azerbaijan should cooperate on oil and gas export routes so that Turkmen hydrocarbons can also be exported westwards across Azerbaijan and Georgia to markets in Europe and the Mediterranean. In the North, too, Kazakhstan and Russia are at odds over whether a prospective Russian block, also awarded to Lukoil, extends into Kazakh waters.

These issues will all retard the smooth development of Caspian hydrocarbons. So will problems concerning alternative export routes, such as the planned gas line across Afghanistan, on which a financial plan is supposed to be ready by the end of 1998, and Turkish proposals for a gas line under the Caspian from Turkmenistan via Azerbaijan to Turkey.

There are other reasons, too, why the development of Caspian energy may be slower than first anticipated. At Tengiz, Chevron faced technical as well as political challenges that have helped retard the field's development. Off Azerbaijan, dependence on a single drilling rig makes the drilling of a dry hole an agonizing burden on whatever unlucky consortium suffers such a misfortune, since it can take it a year to get its next turn with the rig.

Development delays

In addition, the intermingling of politics and commercial requirements can be expected to cause further delays for many of the existing projects, and will no doubt also slow down the likely pace of future investment. At a time when oil prices are falling, oil companies are bound to be cautious about the speed with which they disburse their capital outlays. Moreover, the Asian crisis has highlighted a particular peculiarity of Caspian energy, which is that while its long-term role would naturally be to serve markets in East Asia and South Asia, the first sets of pipelines are actually likely to take both its oil and gas westwards to essentially European markets.

But none of these delays will bring the process of bringing Caspian oil and gas to market to a halt. For the bottom line is that the Caspian is now becoming, if it has not already become, a mainstream oil play. International energy companies are already committed, under full formal agreements with national governments, to spending more than $50bn on development of resources in the Caspian and in neighbouring onshore areas in Azerbaijan, Kazakhstan, Uzbekistan and Turkmenistan. At Tengiz, Chevron and Mobil are committed to spending some $10bn over 20 years; in Azerbaijan, AIOC has $8.5bn investment commitment; at Karachaganak, Agip, BG and Texaco have a $2bn commitment over the next two years with a further $5bn to follow.

In October, in a major address on US strategy in the Caspian, 'A solution to the Caspian Puzzle,' The US Ombudsman for Energy and Commercial Relations with the newly independent states of the Former Soviet Union delivered a keynote address to a conference on Caspian pipelines. The Ombudsman, Jan Kalicki, stated boldly: 'We can now look forward – optimistically, but I think not unrealistically – to a time some 10 years from now when the Caspian becomes the third largest energy-producing region in the world.'

He, probably, was being unrealistic. Today, there are at least five regions which produce more than 3mn b/d of oil and also produce more than 100bn cm/y of gas. They are the Gulf, Russia, the US, the North Sea, and Southeast Asia. It will take around 10 years for the Caspian to enter that elite club, and it should manage to overtake Southeast Asia in the process. But it cannot hope to surpass any of the current 'Big Four' in the immediate future. The potential is here, but it will be for another generation of oil and gas executives, and probably for another generation of national leaders as well, to determine just how fast the full potential of the region's still unknown reserves can, and should, be exploited.

Strenghtening hold on UK fuel sales

Supermarkets are now a major force in the fuel retailing sector of the UK. They currently handle around 23% of total retail gasoline sales and almost 17% of retail DERV sales in the country – impressive figures considering that this sector owns around 6% of the UK's branded outlets. *Kim Jackson* looks at the development of this sector and its future prospects.

The UK has experienced a rapid growth in large, out-of-town supermarkets/hypermarkets with car parking and associated service stations since the 1980s. Encouraged by the liberal planning regulations prevailing at the time, the supermarkets have faced few barriers to entering the UK fuel retailing sector. Securing product, for example, was not a problem as the UK was, and still is, a major gasoline exporter. This contrasted with the position in France which was actually a net importer of gasoline during the 1980s, and where the supermarkets were able to take advantage of imbalances in regional gasoline and diesel supply/demand in order to secure low-cost supplies. France, with its major refining centres located in the north and south, had significant regional product imbalances which allowed the supermarkets to 'play' the refiners off against one another.

The 'convenient' location of the supermarket service stations adjacent to supermarket stores, together with their low fuel-pricing policy, has meant that the supermarkets have been very successful at gaining market share. The latest figures from the UK Department of Trade and Industry indicate that this sector now holds 23% of the retail gasoline market and almost 17% of the retail DERV market. According to UK consultants Catalist, the supermarket groups hold about 20% of the total UK retail fuels market, even though they only operate around 5% of the country's total network of branded service stations (a figure slightly lower than the 6% calculated from *Petroleum Review's 1997 Retail Marketing Survey*). This gives the supermarket sector a 'market effectiveness' – market share divided by outlet share – of nearly 4, compared to Esso, Shell and BP/Mobil's market effectiveness of between 1.3 and 1.4, states Catalist Managing Director Nigel Lang.

The profit margins of the oil company players and independents have suffered as a result, all the more so since Esso implemented its 'Price Watch' campaign almost two years ago and the UK petrol pump war began in earnest. The supermarkets, however, claim that they have felt little impact from the price war being waged between the oil companies as they were already operating a low-cost pricing policy. Sainsbury's and Tesco report that the introduction of their respective 'Reward' and 'Clubcard' loyalty cards has played a significant part in maintaining sales during this period. According to Sainsbury's, its loyalty card has helped restore volumes to pre-Price Watch levels. Tesco and Sainsbury's are the two largest players in the super-

	Tesco	Sainsbury's/ Savacentre	Safeway	Asda	Morrisons
No. of branded outlets*	287 (285)	205	156	129	64 (62)
Regional breakdown:					
England	251 (249)	186	114	121	64 (62)
Wales	22	7	10	10	0
Scotland	14	9	29	18	0
Northern Ireland	0	3	1	0	0
Isle of Wight	1	0	2	0	0
Vapour recovery equip: **					
–Stage 1B	287	205	150	126	40
–Stage II	2	58	1	0	0
No. of outlets with shop***	271	130	156	14	56

* All figures are for gasoline. DERV figures, if different, are in brackets.
** No. outlets fitted with equipment in operation.
*** A shop is defined as having a selling area of over 10 sq metres and selling at least five product lines other than cigarettes, sweets, lubricants and car accessories.
Source: Petroleum Review

Table 1: Number of supermarket service stations in the UK – the five major players

	Gasoline		DERV	
	% del	% outlets	% del	% outlets
3Q1993	14.9	2.52	6.5	2.01
3Q1994	18.4	3.6	10.6	3.63
3Q1995	21.5	4.18	15.1	4.37
3Q1996	21.8	5.45	15.5	5.62
3Q1997*	23.0	5.96	16.9	6.1

** estimated*
Source: Based on Energy Trends, *November 1997 issue, UK Department of Trade and Industry (DTI) and* Petroleum Review Retail Marketing Survey *1993–97*

Table 2: Supermarket share of total UK fuel retail deliveries and number of outlets

market fuel retail sector, claiming to hold 9% and 6%, respectively, of the total UK fuel retail market at present.

In a bid to protect both market margins and volumes some oil companies have been looking towards cooperative ventures with the supermarket chains in recent months. Examples include pilot schemes between Kuwait Petroleum/Budgens, Texaco/Spar and BP/Safeway. There have been periodic rumours that Shell and Sainsbury's were considering some form of cooperative venture, but nothing has materialized as yet. However, Shell is pursuing cooperative ventures in both the Dutch and Belgian markets with the Ahold and GB retail groups respectively.

Future prospects

Both the supermarkets and the analysts contacted by *Petroleum Review* believe that the recent rapid growth in the supermarket/hypermarkets' marketshare is now over and that future growth will be at a slower rate. The main reasoning behind this is that the planning regulatory regime in the UK is no longer so liberal and there are now fewer sites suitable for new large, out-of-town supermarket sites. It is also important to note that the opportunity to 'retrofit' existing supermarket sites with forecourts is limited – most have already been done, while space at the remaining sites is at a premium and there is no room to retrofit petrol pumps.

That said, the five main players in the UK supermarket sector – Tesco, Sainsbury's, Safeway, Asda and Morrisons – all report that they still expect to expand their network of outlets as the opportunity arises. Morrisons – the smallest of the five main players, claiming to hold just 1% of UK marketshare – is particularly keen to expand and hopes to build, on average, up to 14 sites per year. The company reports that four new filling stations are currently scheduled to be built in 1998, one of which will be opened in Kent in September. Morrisons' store network is presently focused in the north of England and this new site represents the company's 'first foray' into the south of the country.

The company is unique among the main supermarket players in that although it currently buys its product from Texaco (one of the largest suppliers to the UK supermarket groups), its fuel is sold 'semi-branded' under Texaco's Clean System3 name and warranty. However, while the fuel is supplied by Texaco, Morrisons is keen to stress that it is independent from the oil company – it determines what price the product is sold at and does not get involved in any Texaco promotions. The supply contract is put out to tender every two to three years; the next is scheduled in 1999. The company has also purchased fuel from both BP and Shell in the past.

Tesco superstore site, Hatfield, North London

Ceiling to growth

Mathieu Zajdela, Managing Director of French analysts Enerfinance, predicts that the supermarket sector will plateau at around 30% of total UK fuel retail marketshare in 2005. Wood Mackenzie, too, agrees on a maximum ceiling of 30%, although Stephen Brooks, Principal Consultant–Downstream Oil says that this is dependent on the number of new petrol stations that the supermarkets build. He suggests that the major retail groups are now focusing on developing alternative retail formats other than their large, out-of-town sites which have dominated the scene to date.

Zajdela points out that the question of whether it reaches 25% or 30% is important because two completely different market balances will prevail at these two extremes. Supermarket pricing strategy and consumer reaction, rather than oil company strategy and legislation, will determine which level is reached, he says. He also believes that, despite the significant reduction in the number of service stations in the UK during 1996 and 1997, the UK market has not yet reached equilibrium and he anticipates further site closures.

Taking the initiative

The supermarkets have already taken steps to diversify their petrol retailing activities. Tesco was one of the first to head in a slightly different direction – tentatively establishing its own smaller, stand-alone service stations equipped with a small 'Tesco Express' convenience store retailing supermarket, branded goods at supermarket prices. To date, it is the only supermarket to have embarked on such an initiative and currently operates around 15 sites of this type in the UK. Such a move has not been without its problems. For example, a different distribution structure has had to be developed as deliveries to these smaller Tesco Express sites is a completely different concept to the large-scale requirements of its supermarkets/hypermarkets.

Other retailers have been looking at establishing cooperative ventures with the oil companies. These ventures are very much in their early stages. The BP/Safeway venture, for example, is currently assessing the success of its five pilot sites before embarking on a nationwide rollout of 100 sites as planned over the next few years.

The supermarkets are also aiming to increase their overall revenues by looking at retailing goods and services outside their current ranges. For example, Sainsbury's has developed its own brand of DIY stores, known as Homebase.

Thus, it seems inevitable that whatever happens the supermarket sector will remain a strong player in the UK fuel retail market for the foreseeable future as it continues to develop and take advantage of new opportunities. ●

***Petroleum Review* will be looking at the role of supermarkets in Europe's fuel retailing sector in its March issue.**

UK petrol prices – the ups and downs of 1997

Fuel prices in the UK varied markedly over the course of 1997, according to the recently published summary of the monthly PHH AllStar fuel reports from PHH Vehicle Management Services, the Swindon-based fleet and fuel management company.

The summary report indicates that the petrol pump price war, waged on the UK forecourts over the past few years, continued during 1997 with prices continuing to drop until the end of April when they bottomed out. Prices began to rise, albeit slowly, following the General Election on 1 May 1997 as the country watched and waited for the new Government's mini-Budget which was unveiled on 2 July.

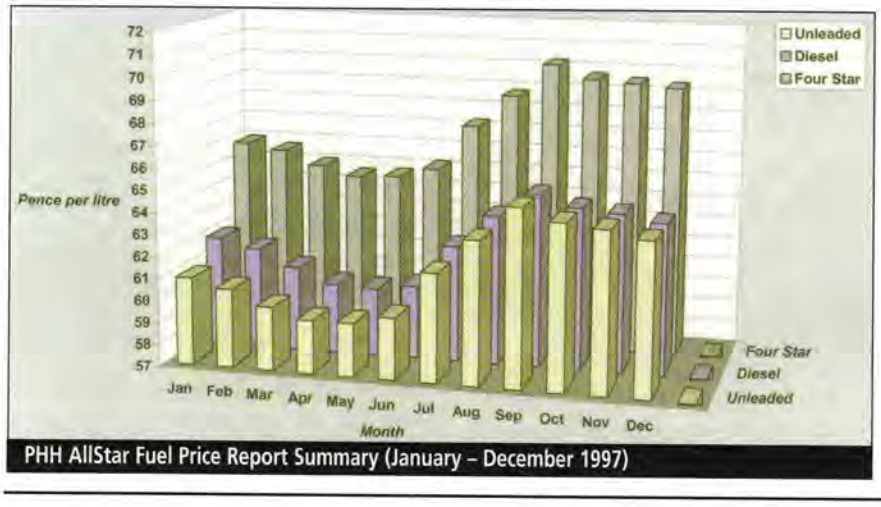
The Chancellor of the Exchequer Gordon Brown added nearly four pence duty onto a litre of fuel in the mini-Budget, which, after a short lull, led to a steep price rise in excess of the additional Budget tax as fuel companies strove to improve margins which had eroded during the fuel price war. The new duty rates for leaded petrol rose to 45.01 p/litre, for unleaded petrol to 40.28 p/litre, super unleaded petrol to 43.60 p/litre and diesel (both conventional and ultra-low sulfur) to 40.28 p/litre. Duty on road fuel gases was held at the pre-budget rate of 21.13 p/kg, however, in a bid to promote the use of such cleaner burning fuels and help motorists offset the costs of vehicle conversion (see *Petroleum Review*, August 1997, P351)

The report also states that prices have varied little since September 1997, fluctuating only slightly according to the strength of the pound sterling against the US dollar, the currency in which oil is internationally purchased. 'For 1998, the pound is expected to be much more stable against the dollar at its present level than at its giddy recent heights and we would imagine that prices will gradually creep back up as oil companies attempt to claw back some of the margin that they have lost over the past couple of years, which sadly has sent some of the smaller independents to the wall,' commented Keith Greenhead, PHH Divisional Manager, Fuel. 'On the positive side, however, the remaining oil companies realize that they must be competitive with the supermarkets and are having to increasingly acknowledge the power of the customer whom we have been advising to buy the cheapest fuel available locally since 1994.'

However, Greenhead pointed out that in rural areas cheaper fuel was, once again, a denied luxury in 1997 which proved to be another year when rural pricing was consistently higher than in urban areas – by as much as 9 p/litre (40 p/gallon). 'We would welcome a Government initiative to reduce the duty on fuel in such areas to redress the balance somewhat,' he said. 'Rebating duty would appear to be a fair way of lowering fuel prices in rural areas which are the very areas where people rely on personal transport. It could also provide tourism with a boost, as a drive in the country can be quite a costly undertaking if an out-of-town fill-up is required, if indeed a garage still open can be found.'

Over the course of 1997, unleaded fuel prices jumped by 2.95 p/litre (13.4 p/gallon) on average, with diesel showing the largest average rise at 1.88 p/litre (8.55 p/gallon) and four-star up the most at 3.44 pence per litre (15.6 p/gallon).

Figures for the PHH AllStar monthly fuel reports, regularly highlighted on *Petroleum Review*'s downstream news pages, are based on transactions made by the 650,000 drivers in the UK who use AllStar- and PHH-operated fuelcards. PHH estimates that it purchases over £20 million worth of petrol and diesel every week on behalf of these clients.



PHH AllStar Fuel Price Report Summary (January – December 1997)

Snapshot of UK November fuel prices

	Pence per litre
Diesel	
Lowest: Coventry	62.52
Highest: Aberystwyth	66.05
National average	64.20
Unleaded petrol	
Lowest: Bradford	62.62
Highest: Aberystwyth	67.41
National average	64.28
Four-star petrol	
Lowest: Swansea	67.56
Highest: Northampton	71.80
National average	69.48

Source: *PHH AllStar Fuel Report*

IP WEEK 98

IP Week 1998: 16–19 February

IP Week in February is the focal point each year when leading figures in the international oil and gas industry travel to London for an intensive round of conferences, industry events and social functions. The Institute's own programme of events forms the core of these activities and attracts a truly international and prestigious audience.

Monday 16 February 1998
International Conference on Oil and Gas after 2000 – Realignment and Restructuring for the New Millennium

This will focus on moves to realign and restructure the industry's operations in response to recent pressures, through mergers, joint ventures, alliancing, asset swaps and closures, together with the new processes and practices for the management of the business, both within individual companies and among the participants in partnerships and consortia.

Speakers include: **Richard Giordano** (Chairman, BG plc), **Peter Sutherland** (Chairman, The British Petroleum Company plc and Goldman Sachs International Ltd), **Wenent P Pan** (President, Chinese Petroleum Corporation, Taiwan), **Richard Schenz** (Chief Executive Officer and Chairman of the Executive Board, OMV AG, Austria) and **Thierry Desmarest** (Chairman and Chief Executive Officer, TOTAL SA).

Peter Sutherland, Chairman of BP and Goldman Sachs International

Tuesday 17 February 1998
IP Annual Luncheon at The Dorchester Hotel, Park Lane,

More than 400 guests are expected to attend one of the highlights of IP Week 1998, the IP Annual Luncheon. This year, Dr Mark Moody-Stuart (Managing Director, Royal Dutch/Shell Group) will be the Guest of Honour and Speaker.

Places are limited and tickets will be allocated on strict receipt of the application form.

Right: Dr Mark Moody-Stuart, Managing Director, Royal Dutch/Shell Group

Wednesday 18 February 1998
Price Risk Management: The 11th Oil Price Seminar and Exhibition

Supported by New York Mercantile Exchange

This important Seminar provides risk managers, traders, marketers, analysts, information providers and forecasters with the opportunity to hear the latest expert opinion on how to handle risk, both on and off exchange, and the management control systems which ensure sound financial management of hedging programmes.

Thursday 19 February 1998
International Conference on Innovations in Offshore Field Developments

Designed to provide a *tour d'horizon* of the most recent major innovative offshore developments of deep water fields with a particular focus on technological innovation and on new contractual and organizational structures.

Chairman and speakers include: **Rex Gaisford** (Director of International Development, Amerada Hess International), **Luiz Eduardo Guimarães Carneiro** (E&P Executive Superintendent, Petrobras, Brazil) **Harvey Smith** (President, Hibernia Management and Development Company, Canada), **Alan Gaynor** (Chief Executive, British-Borneo Petroleum Syndicate), **Halfdan Millang** (Executive Vice President, Aker Maritime, Norway), **Don Vardeman** (Manager, Marine Facilities and Engineering, Oryx Energy Company, US), **Andy Tillbrook** (New Technology Co-ordinator, Amerada Hess International), **Dominique Michel** (Chairman and Chief Executive Officer, Doris Engineering, France) and **Thor A Tangen** (Senior Vice President, Norsk Hydro ASA, Norway).

Top right: Don Vardeman, Manager, Marine Facilities and Engineering, Oryx Energy Company, US; below right: Thor A Tangen, Senior Vice President, Norsk Hydro, Norway

IP WEEK 98

For a copy of the IP Week 1998 Programme and registration form, please contact:
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http://www.petroleum.co.uk

Future surplus capacities in debate

The theme of the recent Oil and Money Conference, hosted by Energy Intelligence Group and the *International Herald Tribune* in London in December 1997, was 'Towards the Year 2000: The End of Surplus Capacities?' Although the speakers from industry, finance and international politics presented a host of often conflicting views, the general consensus was that emerging geopolitical issues can radically change the working environment for the companies. This was only too clearly seen when Saudi Arabia, and other OPEC members, announced plans to increase output shortly after the conference and the resulting slump in oil prices. Tentative negotiations between the US and Iran, and the decline in the Far East economies also look set to influence the balance of future global supplies. *Mike Wells* summarizes some of the points addressed at the conference...

While there was much positive feeling that the international oil and gas industry will be able to meet the forecast 30% rise in world demand over the next decade, some words of caution were voiced:

- Today's quest for value creation and long-term growth had to be profitable value growth. In other words, the oil and gas sector would have to generate better returns which, currently, remain low compared with other industries.
- Companies needed to concentrate on applying skills not possessed by competitors.
- Companies needed to be aware of the interests of all their stakeholders.

The question was, however, how to do this while competing in an increasingly expensive acquisitions market and against a backdrop of too many competitors for too few ventures. Furthermore, how many companies would be able to survive the pressures into the new millennium?

Surplus supply responsibilities

Sheikh Zaki Yamani, Chairman of the Centre for Global Energy Studies (CGES), made a call for all oil producing nations to share the burden of maintaining spare oil production capacity for contingencies. The existence of such spare capacity, Yamani pointed out, helped to prevent temporary supply disruptions from permanently damaging the industry through very high prices. But the oil industry should not expect just Saudi Arabia (with 67% of the world's excess capacity), together with Kuwait and the United Arab Emirates (UAE), to be alone in maintaining spare capacity. Not only was it too great a burden for the country, but relying on a single country to cover most of the world's supply shortfall 'means that the entire oil industry depends on political and economic circumstances in [that] one country' which was 'imprudent to say the least'.

He stated that, at the time of the conference, prices were 'strong' with global demand rising by 2mn b/d a year. 'Saudi Arabia seems content to sit on its spare capacity and slowly lose market share because it is benefiting from the higher prices', he said. Yet the pressure to open the taps was reported to be building up. The CGES has calculated that Saudi Arabia's shut-in 2mn b/d costs it around $100mn per year simply to keep these facilities in a state of constant readiness. Furthermore, it has lost about 4% of its share of OPEC production since 1993.

Yamani recognized that this sharing by all oil producers would require the cooperation of many governments, most oil companies and some international organizations. Oil companies would never volunteer to keep some of their production capacity idle but was it too much to require the operator of a 100,000 b/d field to hold 5,000 b/d in reserve, to be produced when prices climb too high?

He pointed out that IEA countries are legally compelled to hold compulsory oil stocks by agreement of all member countries and that general compliance had been good over the years. 'What is wrong, in principle, with obliging all oil producing countries to hold, say, 5% of their oil production capacity idle? If oil prices were suddenly to rise steeply, then the idle capacity could be swiftly activated to take the heat off oil prices.' However, only a few weeks after the conference, the oil price slumped as Saudi Arabia announced plans to raise output by 10% from January with other OPEC members likely to follow suit.

Boosting production capacity

Volumetric growth is now central to the industry's consensus strategic thinking. Estimates of growth targets of a cross section of large oil companies, both private and national/recently privatized, analysed and presented at the conference by Richard Gordon, Vice-President of John S Herold Inc, showed that the typical company plans to produce 33% more in 2001 than produced in 1996. Venezuela was also reported to be aiming to double production capacity by 2000 while most national oil firms also have ambitious plans in overseas investments.

But Gordon asked, how can most companies expect to grow at such rates in an overall market that is growing more slowly? Is industry-wide growth attainable given the current resources available – rigs, labour, fabrication facilities, etc? Herold's database shows that 17 of the largest private oil companies, based on their recent performance in adding new oil and gas reserves, cannot reasonably expect to generate and sustain their targeted compound growth rates in oil and gas output averaging 5.8% based on internally generated grass-roots ventures. Most of the companies are depleting faster than they can add new reserves or, at best, are in a stationary state despite most of them having 'downsized and high-graded output in recent years'. The degree of certainty associated with the regional diversity of recent production deals varies enormously. Gordon believes that the markets for new ventures are overheating – bids are high, amounts of money left on the table are sometimes staggering and there are probably too many competitors for too few ventures.

'The challenge for companies today as they proceed with production deals that have already been won, is to find a way to build from the initial deal to a true core asset', he said. Some would not succeed, but far more dangerously is the production deal that sees volumes rise significantly, peak and then decline with no additional investment opportunities generated.

The international oil and gas industry debates continually what will be the effect on global supplies and prices of the re-entry of Iraqi crude. Recent political crises and the continued stance of the US make it unlikely to be a major factor this century. But probably more important is the recent Government attitudes in Iran. Tentative political feelers are now being put out between Iran and the US. The views of influential commentators in Washington are that the US embargo has had negligible impact on Iran's policies while harming US business as well as constraining growth and diversification of the economies of Central Asian states. In this context the conference statement of Iran's Deputy Minister of Petroleum, Mohammad Nejadhosseinian, was particularly noteworthy for its promise of more liberal service contracts. Oil companies, he said, would have greater participation in contracts for Iranian projects, reducing investors' risks and determining and guaranteeing a precise rate of return on capital, with greater clarification of contract terms. New onshore and offshore projects under revised contractual arrangements would soon be announced, and 'we are prepared to talk on onshore licence blocks in about six months'.

Recent rig crisis

But a sombre warning on the effect of the crisis shortage of offshore rigs on the recent increase of exploration opportunities was provided by Matthew Simmons of Simmons Co. International, of Houston. He stated that up to 450 units would be required over the next decade, costing up to $100bn, to meet anticipated global oil demand. Today's rig fleet was almost entirely contracted, and many countries were awaiting availability in order to drill on leases awarded as much as two years ago. About two-thirds of offshore rigs were now working on mature basins, and then mainly on development/workover rather than exploration The current scale of rig building was nowhere near enough, and its alleviation could take a decade to rectify, he concluded.

Whose oil is it anyway? International boundaries and hydrocarbon production

***Martin Pratt*, Research Officer at the International Boundaries Research Unit (IBRU) at the University of Durham, describes the way that boundary disputes are addressed and the implications for the international oil and gas industry.**

IBRU was founded in 1989 by Professor Gerald Blake, geographer at the University of Durham with a long-standing interest in boundaries and international geopolitical issues. The unit remains the only centre in the world which focuses specifically on international boundaries and it has become established as a leading source of information and expertise on boundary and territorial issues worldwide.

Many boundary disputes (especially at sea) arise precisely because of the prospect of hydrocarbon deposits in a given area, which means that the oil and gas industry needs to be aware of the issues involved, particularly if more than one country may be attempting to award concessions for the same area.

Boundaries and resources

International boundaries are human constructions which rarely take into account the physical geography of the earth's surface or its underlying geology. As a result they often divide natural ecological regions and resources between states in an arbitrary fashion. Problems arise between states over the ownership and exploitation of natural resources for two main reasons: either because the boundary separating the states in question has not been agreed; or because the resource is subject to flow or migration.

In general, hydrocarbons are affected mainly by issues relating to sovereignty, jurisdiction and boundary alignment, although the transportation of oil and gas from source to market can also create difficulties, as anyone involved in the Caspian Sea region will be all too aware.

Land boundaries

On land, there are around 310 international boundaries. The figures cannot be more precise because there are disagreements over the status of some boundaries (eg Korea, Cyprus). The total also fluctuates as new states are born and old ones disappear.

Since historically most boundaries were superimposed on a background of human and physical geography without much consideration of the consequences, few boundaries remain wholly acceptable and routinely open for peaceful interaction.

On the other hand, relatively few – perhaps 10% – are subject to serious territorial disputes sufficient to threaten armed conflict.

A further 20% or so probably give rise to stress between neighbours over questions of management – for example, illegal migration, smuggling, terrorist incursions or environmental pollution.

It is striking, however, that on land hydrocarbon resources are rarely the principal cause of either territorial dispute or arguments about the function of a boundary. There are only about 43 international boundaries which have major oilfields sufficiently close to be of interest to a neighbouring state. Much the same could be said of gasfields; of these, two dozen or so fields appear to be straddling boundaries.

Nevertheless, there are some land boundary disputes in which hydrocarbons are a significant factor:

- Saudi Arabia-Yemen: most of this long border has never been defined and in 1992 Yemen was forced to suspend exploration activities following Saudi protests.
- Cameroon-Nigeria: a territorial dispute in the Bakassi peninsula has impeded oil exploration in the region.

It should also be noted that territorial and boundary disputes can have a profound effect on the ability of petroleum producers to market their product. Pipelines are highly vulnerable and routes chosen have to be across secure territories.

Some of the largest onshore unexplored basins are located far from coasts, often in landlocked states. While the producing fields may themselves be peaceful, investment in expensive transportation infrastructure, including pipelines, also has to assume wider regional security. In parts of Africa and the former Soviet Union this may be a risky assumption to make.

Maritime boundaries

The number of maritime boundaries is subject to even more uncertainty than on land.

Delimitation of maritime boundaries is a relatively recent phenomenon, only starting in earnest post-World War Two and largely stimulated by the desire to exploit offshore oil resources (the majority of early delimitations were in the Arabian Gulf and the North Sea).

Currently there are around 140 agreed boundaries and between 410 and 440 potential maritime boundaries.

In attempting to define a total there are two major areas of uncertainty:

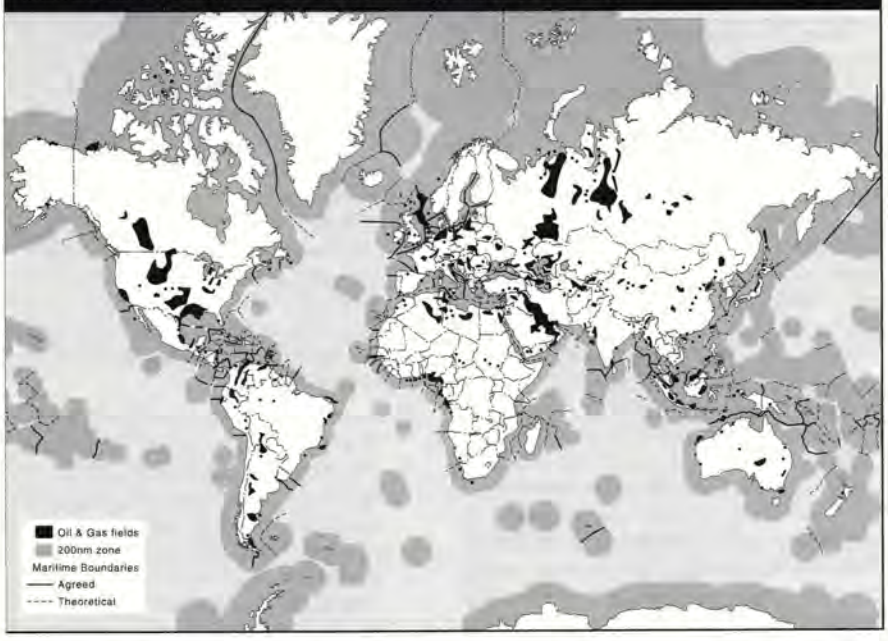
1. Not all coastal states have defined their maritime claims, so it is difficult to predict whether certain states are likely to have to define boundaries with their neighbours.
2. In areas where there are multiple overlapping claims, eg the South China Sea, the number of potential boundaries varies according to the way you choose to carve up the area.

Maritime jurisdiction

Under the 1982 United Nations Law of the Sea Convention (UNCLOS) which finally came into force in 1994, coastal states are entitled to a 12 nautical mile (nm) territorial sea (over which full sovereignty is exercised), a 200 nm exclusive economic zone (EEZ) and at least 200 nm of continental shelf. States which can prove that the 'natural prolongation of their land territory' extends beyond 200 nm are entitled to up to 350 nm of continental shelf – and occasionally even more (the alternative limit is 100 nm beyond the 2,500 metre isobath). Once the process of partition is complete, some 36% of the world's seabed will fall under state jurisdiction. Almost all the important fisheries and oil and gasfields fall within the global EEZ.

In theory, states claiming continental shelf beyond 200 nm must define the outer limits of their claims by November 2004, although this deadline is likely to be extended since the guidelines on the technical information that would be required by the Commission on the Limits of the Continental Shelf has only

International boundaries and the main oil and gas fields of the world © International Boundaries Research Unit, 1997



started appearing in the last few months. In certain parts of the world continental shelves beyond 200 nm will have to be divided between states. A notable example is to the northwest of the British Isles where Denmark (through the Faroe Islands), Iceland, Ireland and the UK all have an interest.

The fact that only around a third of the world's potential maritime boundaries have been agreed does not mean that two-thirds of them are disputed. Boundary delimitation is a costly business, especially when new surveys are required, and for many states it is simply not a priority at the moment.

The distinction between a boundary which has not been agreed and one which is actually disputed is sometimes a fine one.

A few of the key offshore boundary disputes in which hydrocarbon resources (known or potential) are a factor include:

SE Asia
South China Sea (Spratlys, Paracels, Indonesia-Vietnam)
Gulf of Thailand
Gulf of Tonkin
East Asia
Senkaku/Diaoyutai Islands
Caspian
Persian Gulf
Several longstanding island sovereignty disputes: Kuwait-Saudi Arabia, Bahrain-Qatar, Iran-UAE.
Red Sea
Hanish islands
Gulf of Guinea
Golfo de Venezuela
The Atlantic Frontier region

There are two main reasons why there are so many disputes:

1. Valuable resources (both living and non-living) are at stake and most states are keen to secure as many of those resources as possible.
2. The law of the sea lacks clarity on many boundary-related issues. It provides few clear rules, opting instead for guidelines which are open to interpretation and which allow states to defend aggressive claims.

Except for the territorial sea (where the default boundary is the median line) UNCLOS simply calls for states to negotiate on the basis of international law to produce an equitable result. However this begs the question as to what is equitable and lawyers have already written thousands of pages discussing the question without reaching a satisfactory conclusion.

The use of straight baselines also frequently causes disputes between neighbours. UNCLOS allows states to draw straight baselines where the coastline is 'deeply indented or cut into' or there is a 'fringe of islands in the immediate vicinity' but many states interpret these terms very liberally and claim straight baselines in inappropriate circumstances. This often has the effect of extending the area under the state's jurisdiction at the expense of neighbouring states.

Islands

The basic principle has long been that islands generate maritime zones in exactly the same way as mainland areas. But UNCLOS introduced a clause stating that rocks which cannot sustain human habitation or economic life are only entitled to a territorial sea.

This can make a big difference. A tiny island in the middle of the ocean with no other land within 400nm (eg Ascension Island) can generate 125,600 sq nm of EEZ – roughly 1.75 times the land area of the UK. This helps to explain why there are so many disputes concerning sovereignty over tiny, uninhabited islands which in themselves are of almost no value. A rock in a similar situation gets only 450 sq nm of maritime space.

However, UNCLOS failed to define what is meant by 'capable of sustaining human habitation or economic life', an omission which has resulted in considerable confusion and disagreement.

As the depth from which hydrocarbons can be extracted continues to increase, the value of offshore real estate is bound to rise and states will be tempted to make more and more aggressive claims, which will almost inevitably give rise to further boundary disputes.

Atlantic Frontier

This area contains all the elements touched on so far: hydrocarbons, fishing continental shelf beyond 200 nm, baseline problems and until recently, a classic island/rock debate.

To the north of Scotland, the UK and Denmark have yet to define their fisheries and continental shelf boundaries.

For fisheries, both sides agree on principle a median line boundary, but they disagree over where that median line should be drawn.

For continental shelf, nobody knows exactly what each side is claiming (understandably, they are keeping their cards very close to their chests) although both are certain to be attempting to maximize their seabed rights.

It is generally agreed that single multi-purpose boundaries are easier to manage than different lines for different zones, but there is no obligation to do so.

Until recently, both sides' continental shelf designations stopped short of the median line claimed by the other side. However, *Petroleum Review* last month announced that the UK has awarded an 'out of round' licence to explore two blocks (204/14 and 204/15). The NW corner of 204/14 just crosses the Faroese median line and the Danish government issued a note reserving its position regarding a possible claim. Negotiations are continuing. According to our sources, nothing has yet been ruled out. Joint development is apparently considered by the UK to be preferable to litigation.

To the west of the British Isles the basic problem is that there is extensive continental shelf and all four countries want as much of it as possible.

Ireland and the UK agreed a boundary in 1988 following nearly 30 years of on-off negotiations. The

boundary ignored the claims of Denmark and Iceland, both of whom defined their claims to continental shelf in 1985.

Denmark's claim is based on the argument that the Faroes are part of the Faroes/Rockall microcontinent. Iceland has effectively claimed all the continental shelf up to the median line with the Faroes and 200nm from the UK and Ireland.

Rockall is an element in the equation, but is not as problematic as many people think, especially since the UK ratified UNCLOS last summer.

Rockall was annexed by the UK in 1955, apparently to prevent the USSR from using it as a listening post. Neither Denmark nor Iceland has formally acknowledged British sovereignty, but nor have they challenged it. It is not clear whether Ireland claims it or not; certainly the Irish government does not pursue its claim very vigorously.

But all three have vigorously and consistently challenged the UK's right to use Rockall as a basepoint for extended maritime claims on the grounds that it cannot sustain human habitation.

When the UK acceded to UNCLOS in 1997, it acknowledged that Rockall was a rock and pulled back the outer limit of its fishery zone to 200nm from the island of St Kilda. The UK is now totally reliant on its natural prolongation argument to justify its continental shelf claim.

Greenpeace's seizure of Rockall in 1997 had little to do with sovereignty. It was more a publicity stunt to draw attention to its campaign against the development of the Atlantic Frontier. However, British government officials enjoyed pointing out that by sending people to 'live' on Rockall, Greenpeace was actually demonstrating that it is habitable, and thereby strengthening the British government's position *vis a vis* oil production.

Dispute resolution

Negotiation is often painfully slow but usually achieves win-win results. Even sovereignty disputes can be resolved through negotiations although this is rare.

In contrast litigation/arbitration is relatively fast but costly and risky as often the winner takes all.

Interim arrangements are actually a requirement for states which are party to UNCLOS (Articles 74 and 83): 'Pending agreement (on the boundary of the EEZ/continental shelf) the States concerned, in a spirit of understanding and cooperation, shall make every effort to enter into provisional arrangements of a practical nature and, during this transitional period, not to jeopardise or hamper the reaching of final agreement. Such arrangements shall be without prejudice to the final agreement.'

Several states have negotiated joint development arrangements of one kind or another with their neighbours when hydrocarbon deposits straddle the international boundary or lie in disputed territory. Most of these are offshore, but a small number of significant agreements have been made concerning onshore deposits. Several joint development zone (JDZ) arrangements date back to the 1960s and 1970s. However, states still appear to prefer permanent international boundaries and absolute sovereignty to shared arrangements.

There are some 16 JDZs already in operation. Arrangements vary considerably in detail. Some are applied – a bit like sticking plasters – to disputed areas where it has not been possible to agree a boundary (eg Japan-Republic of Korea, Saudi Arabia-Sudan, Australia-Indonesia). In such cases the assumption is that, one day, boundary negotiations may resume.

Other JDZs have been agreed as a method of exploiting a shared resource even though the boundary line is agreed (eg Iceland-Norway, Bahrain-Saudi Arabia, Qatar-United Arab Emirates).

The detailed arrangements for joint development areas also display great variety. This is one of their most significant characteristics because it suggests that some kind of regime could be devised to suit both parties in most circumstances.

It is possible to identify four main types of trans-boundary cooperative arrangement between states for the management of hydrocarbon deposits. They are:

a) Geological cooperation: This is based on agreed rates of production by both parties working their own sectors of the deposit. The apportionment of production quotas is based on a knowledge of reserves, determined by a joint commission. One example is the 1960 agreement between Czechoslovakia and Austria over natural gas in the Vysoka-Zwendorf frontier region.

b) Joint operations: This kind of agreement allows equal sharing of production irrespective of the side of the border on which it occurs. Close cooperation between producers on both sides is clearly essential. The Federal Republic of Germany and the Netherlands concluded such a treaty in 1962 for the Groningen gasfield.

c) Unitized exploitation: The development of a common deposit by a single operator acting on behalf of the parties is clearly the most efficient form of cooperation. Detailed arrangements vary considerably but a number of offshore joint developments are essentially of this kind (eg Japan-South Korea and Malaysia-Thailand). The 1976 Norway-UK agreement for the Frigg gas deposit in the North Sea is particularly interesting. The field is exploited as a single unit but Norway is entitled to 60% and the UK to 40% of revenues, based on assessments of reserves on their respective sides of the boundary. Remarkably, these proportions were fixed for all time. The process of calculating reserves for this purpose is fraught with technical problems.

d) Joint powers: The classic example is the 1974 Saudi Arabia-Sudan agreement over the resources of the Red Sea. A common zone was established beyond a water depth of 1,000 metres in which both parties enjoy equal sovereign rights. There are several other examples. The 1969 Qatar-Abu Dhabi (United Arab Emirates) agreement provided for joint sovereignty and equal shares of the Al-Bunduq oilfield. In 1965, following partitioning of their former Neutral Zone, Kuwait and Saudi Arabia agreed to retain equal rights to the land and maritime resources of the divided region.

The joint Declaration between Argentina and the UK of September 1995 deserves mention because it sets out 'to promote the exploration and exploitation of hydrocarbons in maritime areas of the South West Atlantic subject to controversy on sovereignty and jurisdiction'. A joint commission has been established to coordinate exploration activities in a specially designated area west of the Falklands/Malvinas Islands. Among other objectives, the commission will encourage joint ventures and consortia from the two sides.

The UK and Argentina are also able to offer other areas for licensing which are not joint zones. The agreement does not change the position of the governments of Argentina or the UK in respect of their sovereignty claims but, rather remarkably, it opens up the considerable hydrocarbon potential off the Falklands/Malvinas Islands for exploration before the major political question has been settled.

If the desire for the revenue that oil and gas production brings is sufficiently strong, governments usually find a way of overcoming or circumventing sovereignty/jurisdictional disputes to make resource exploitation possible.

However, if the short-term demand for revenue is less pressing and states can afford to pursue a long-term strategy to maximize their territorial claims, the delays are likely to be considerable.

'Everyone Needs ...Standards'

Your country needs you...

The production of international standards is a massive task and the UK input to ISO/TC 67 working groups falls on the shoulders of a small number of stretched experts (who also have jobs and homes to go to!). Ways of trying to increase the UK input (and influence) were extensively explored in 1997. As reported in last month's issue, the Crine Network will be administering £250,000 of funding throughout 1998. This will be used to subsidize companies who are prepared to provide their technical experts to help in drafting and editing work. The funding will be aimed at specific standards that PSE/17 have identified as being in need of UK support. Examples include: subsurface safety valve equipment (three separate standards), subsea drilling and production equipment (six standards) and downhole equipment (five). A full list of the 25 earmarked standards can be found on the IP website. If you have expertise in any of these areas Crine Network may be able to fund your contribution. Please contact Sjoerd Schuyleman +44 (0) 171 467 7132 or Martin Hunnybun +44 (0)171 467 7133 for details or to offer your services.

Share your technical expertise

When international standards are in their draft stages they are issued to national standardization bodies for comment. A BSI committee has the responsibility of submitting the UK comments. To solicit as wide an industry input into the development of the standards as possible, PSE/17 and its subcommittees send copies to any interested technical experts. The experts are asked to review the document and provide suggested wording changes, highlight errors, suggest improvements etc. Your comments can make a real difference to the final content and quality of the published standard! Experts to form 'Review Networks' are being sought for each of the 120 standards being produced by TC 67. The advantage of this process is that you do not have to join any committees or travel to any meetings to ensure your comments are reviewed.

If you think you can help, and would like to get involved, please contact Sjoerd Schuyleman or Martin Hunnybun at the IP. They can provide you with a list of all the standards and any other information that you need.

British Beef

The recent minutes of a well known international organization with a standards subcommittee included reference to the BSE 17 committee! It should of course have been PSE/17, which is the BSI committee shadowing the activities of ISO/TC 67 developing international standards for the petroleum and natural gas industry. The inevitable discussion on mad cow disease did provide a few moments of humour in the otherwise serious day's meeting.

Mooring standard published in the nick of time...

An international standard ISO TR 13637 'Mooring of mobile offshore drilling units – design and analysis' was published only days before the end of 1997. This technical report is derived from API RP 2SK and was developed by ISO/TC 67/SC7 'Offshore Structures' and also fulfils obligations to ISO/TC 8 'Ships and Marine Technology', the International Maritime Organisation (IMO) and ship operators. This was the first (and only) standard to be published by TC 67 last year and was therefore something of an achievement. Congratulations to Richard Snell and his team. Copies of the standard can be bought through the BSI publications department.

ST B-3 Water and Sediment Panel

The IP's Water and Sediment Panel ST B-3 is seeking additional members. The Panel's current work programme includes:

- Development of a precision statement for the Potetiometric Karl Fischer Water Test for Fuel Oils.
- Development of a precision statement for the Sediment in Crude Oil – Membrane Filtration Method.
- Preparing the UK's input for the revision of the ISO standards Water in Crude Oil by Distillation and Water in Petroleum Products by Distillation.

For further details contact John Phipps at the IP on +44 (0)171 467 7130 or fax +44 (0)171 255 1472

Calling all Laboratories Conducting Mechanical Tests on Lubricants and Greases

Laboratories in the UK or overseas currently running Institute of Petroleum (IP) Mechanical Tests on lubricants and greases are invited to take part in IP round robin testing. These test programmes are organized and monitored by the ST C-1 General Mechanical Test Panel. The results of these programmes provide a suitable means for referencing many standard test rigs against the 'industry mean'. In addition the ability to compare test severity, laboratory repeatability and inter-laboratory reproducibility are paramount in many situations especially when certain quality standards are to be maintained.

If your laboratory is interested in taking part in IP round robin tests, wherever you are in the world, please contact the IP. Your participation will be greatly appreciated by other members of the panel as an increase in data will lead to a better statistical analysis.

Please note that it is not necessary to attend IP meetings to take part in round robin tests so overseas laboratories are just as welcome as UK based laboratories.

For further details contact John Phipps at the IP on +44 (0)171 467 7130 or fax +44 (0)171 255 1472

Test Methods Standardization – the Bottom Line

The Test Methods Standardization Committee (ST) has produced a booklet *The Bottom Line*. This outlines the benefits that companies can obtain by being active in the process of test method standardization and the value of having an up to date portfolio of standard test methods published annually by the IP.

It also confirms the IP's proactive policy towards the development and revision of European and International Standards. This includes the involvement of the ST Panel experts in the preparation of the UK's input, via BSI, to the CEN and ISO Committees and Working Groups.

Test Methods Book

The 1998 edition ofthe IP's Standard Methods for Analysis and Testing of Petroleum and Related Products and British Standard 2000 Parts will be published in February. This contains 234 Full Methods, 16 Proposed Methods and 9 Appendices with technical information. This edition contains 8 new Full Methods 12 new International Standards and 2 new European Norms. A number of methods have significant technical changes.

Our website can be found at:
http://www.petroleum.co.uk

Auto-corrected density readings

A new density and specific gravity meter designed to eliminate problems related to temperature and density error when taking readings has been unveiled by Paar Scientific of Raynes Park, London.

Developed for all applications in the oil industry, the DMA 5000 digital density meter employs the well established oscillating U-tube technique for determination of density. However, the new unit also incorporates a reference oscillator – which determines the natural resonant frequency of the U-tube and the effect of damping the oscillation as a consequence of the sample viscosity – to provide an automatic correction of viscosity error to all readings.

The instrument can automatically correct density measurements across a viscosity range of 0 to 700 mPa s (centipoise, cP), states the manufacturer, eliminating the need for correction formulas.

A platinum temperature probe is said to optimize the accuracy of sample temperature measurements, while thermal stability is claimed to have been improved so that only three measurements are required to extrapolate density readings across a temperature range.

Tel: +44 (0)181 540 8553
Fax: +44 (0)181 543 8727

Qwik-fit forecourt lights

Parkersell Forecourt Service's new Canolux CS402 canopy luminaire features a Qwikfit installation system which is claimed to halve installation time and eliminate the use of expensive support frames.

The Qwikfit system comprises two main components: a recessing frame clamped to the canopy underlining and a sealed beam unit located into the recessing frame. A separate control gear housing can be simply detached from the recessing frame and fixed directly to the canopy structure to accommodate the heavier wound control gear.

The lighting system is designed to accept both 250 Watt and 400 Watt metal halide lamps.

Tel: +44 (0)1489 788822
Fax: +44 (0)1489 788773

New certification for electromagnetic testers

TWI Certification has launched a central, independent certification scheme for operators of electromagnetic testing equipment. The new qualifications apply to two proprietary brands of equipment: Lizard EMA and ACFM. For each of these, two levels of certification are available, depending on the skill/knowledge required for the job.

Individuals who have already undergone training on this equipment are advised to immediately apply to TWI Certification as they may be entitled to take advantage of a special dispensation with regard to eligibility for examination.

Tel: +44 (0)1223 891162
Fax: +44 (0)1223 894219

Fighting oil with oil

A project to clear oil pollution from beaches with the aid of vegetable oil won the second Enterprise Oil and Heriot-Watt University Environmental Award in December 1997.

The winning submission, from a team led by Dr Stephen Mudge at the School of Ocean Sciences at the University of Wales, Bangor, is based on research which shows that a solvent based on vegetable oils is more effective and less toxic than current clean-up methods, thus minimizing the environmental damage caused by oil spills.

The solvent is created by chemically modifying the fatty acids in the vegetable oils to form methyl esters so that the solution becomes a biodiesel (a solvent of organic origin).

'The problem with mineral oils such as crude oil is that a large proportion of the spilt oil vaporizes before ever reaching the coastline,' says Dr Mudge. 'As a result, what reaches the shore is a sticky, tarry substance, and it is those sticky properties which make the pollutant so difficult to clean, especially when weathering occurs or it becomes stratified within the beach.'

He continues: 'The beauty of biodiesel is that it returns the sticky tar to a liquid, and once in solution it can be washed or drained off. Not only can it then be collected relatively easily, but once back in the laboratory both the tar and the biodiesel can be separated and re-used.'

The £25,000 award prize money will be used to fund further development work on the project.

Dr Stephen Mudge

Tel: +44 (0)1248 382879
Fax: +44 (0)1248 716367

New fire safety valve package

A new fire safety valve package providing rapid, automatic shutdown of electrically-actuated, quarter-turn valves in the event of fire has been developed by Neles-Jamesbury in cooperation with Pyroalliance. The package is claimed to meet storage tank fire safety standards currently in effect in France and under consideration for other countries in the European Economic Community. It is also said to be suitable for emergency fire safety shutdown of critical valves on pipelines.

The fire safety valve package consists of a fire-activated emergency actuator mounted between a double-flanged butterfly valve and an electrical actuator. If the temperature around the valve reaches 140°C, the actuator's fuse melts and releases a spindle that breaks the weld on a small tank of pressurized nitrogen gas. The nitrogen pressure generates motion to disengage the electrical actuator which causes the emergency actuator to secure the valve in the closed position.

For safety purposes, the valve can only be reopened using a manual jackscrew after the fire has been extinguished. An optional feature allows for remote testing of the device.

Tel: +33 3 89 506 400
Fax: +33 3 89 506 440

Faster access to freight rates

The Worldscale Associates of London and New York, whose members include the world's leading tanker brokers, has introduced an electronic version of Worldscale, its annual volume of tanker freight rates and other data.

Developed with energy information specialists Saladin, the Windows-based Worldscale*plus* version includes all the 73,000 rates in the printed version and enables the user to view this, together with key data (such as fixed and variable rate differentials) found elsewhere in the book's 500-odd pages, immediately with a single keyboard request.

The electronic version also allows the user to key in their own text notes to ports, countries, routes or complete voyages, offers a 'wildcard' facility to view groups of voyages on the same display and incorporates an at-a-glance cross-referencing system.

According to Alan Burgess, Chairman of Worldscale Association (London) and also Chairman of shipbroker Galbraith's, the main user of Worldscale, in particular operations staff in charterers', owners' and brokers' offices, should gain 'immeasurable benefit in terms of speed of access and time saved securing information' with the electronic version.

At £1,100 (plus VAT), Worldscale*plus* costs the same as the 1998 version of the Worldscale book and is available only to subscribers. The figure includes access fee and single user licence and electronic updates every four months. The multi-user licence is based on a cost of £125 (plus VAT) for each additional user.

Tel: +44 (0)171 456 6600
Fax: +44 (0)171 456 6601

Heavy duty protection with 'surgical glove' comfort

Adequate hand protection for people working in industrial or engineering applications has usually meant specifying a thicker glove that is more heavy-duty and robust. While the greater glove thickness provides suitable protection, it reduces the sense of touch and tactility and prevents the user from performing more delicate or intricate work.

The new N-Dex Plus glove from Sentinel Laboratories is claimed to overcome this problem by providing comfort and tactility combined with glove strength and durability. Manufactured from nitrile film only 0.22mm thick, the synthetic rubber glove is also claimed to provide excellent resistance to a wide range of solvents and chemicals as well as puncture, cut, snag and abrasion.

The special low modulus of the nitrile formulation means that the glove readily stretches to the hand size resulting in a close fit similar to a surgeon's glove, states the manufacturer.

Tel: +44 (0)1444 484044
Fax: +44 (0)1444 484045

Constant pressure relief without process interruption

The Safety Selector Valve (SSV) from Anderson Greenwood is a dual pressure relief system designed to enable operators to switch smoothly from one valve to the other in order to safely undertake routine servicing and emergency maintenance of either pressure relief device without process interruption.

The SSV guarantees less than 3% pressure drop in the valve inlet which eliminates destructive chatter and thus maximizes process efficiency, states the manufacturer. The bleed valve incorporated on each branch enables entrapped process fluids to be vented and the isolated branch to be depressurized.

For added versatility, the safety selector system can be integrated with any of the manufacturer's pilot or spring operated pressure relief valves or rupture discs and can accommodate temperatures from cryogenic to 425°C. The SSV requires only one minor pipe/vessel penetration and is supplied fully assembled.

Tel: +44 (0)161 494 5363
Fax: +44 (0)161 494 5672

Personal single gas monitor

The new compact ISC T80 Single Gas Monitor from Quantitech uses easily interchangeable, pre-calibrated 'smart' sensor modules to detect and display the concentrations of a particular gas in the atmosphere. Modules are currently available for oxygen, carbon monoxide, hydrogen sulfide, sulfur dioxide, chlorine and nitrogen dioxide. The device features one-button operation and an ultra-bright visual alarm, audible alarm rated 90dB at three feet, and an optional built-in vibrating alarm to give warning of dangerous gas levels.

Tel: +44 (0)1908 227722
Fax: +44 (0)1908 227733

New pig signallers launched on the market

Pipeline Engineering & Supply has launched a new range of Unisig pig signallers claimed to combine the best features of all pig signallers currently available on the market together with a number of new features.

According to the manufacturer, all internals in the new range can be removed, serviced and replaced under full line pressure without the presence of a costly integral ball valve.

A new orientation locking system, means that the boss does not need to be oriented during installation and all cap and internals can be fitted to an existing T D Williamson signaller boss.

It is also claimed that the range can be fitted to live pipelines using existing hot tapping systems.

Furthermore, the manufacturer states that one single design covers all sizes of pipes and all permutations, be they mechanical, electrical and/or flanged.

Tel: +44 (0)1748 818341
Fax: +44 (0)1748 818039

Kind clean up for skin – Addendum: Would those readers wishing to obtain a free sample of Derma Shield, the skin protectant featured in the December 1997 issue, please note that they now need to contact the manufacturers, Benchmark Technologies, directly.

The company can be reached by telephone on +44 (0)1633 877569 or by fax on +44 (0)1633 865282.

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

NEW Publications

Natural Gas in Central Asia: Industries, Markets and Export Options of Kazakstan, Turkmenistan and Uzbekistan

Akira Miyamoto (The Royal Institute of International Affairs, Chatham House, 10 St James's Square, London SW1Y 4LE, UK). ISBN 1 86203 012 X. 98 pages. Price: £14.95.

Central Asia contains some of the world's largest gas resources but their development has been impeded by the political uncertainties following the break-up of the Soviet Union and the complexities of getting the gas out – whether west through Russia, southwest through Iran to Turkey or south and east to the expanding Asian economies. This report examines the resources, industries and recent developments in the three major gas resource countries of Kazakstan, Turkmenistan and Uzbekistan. It also assesses the strategies likely to be taken by the Central Asian gas industries and governments, especially with regard to export possibilities, including pipeline routing and construction issues.

The Kuwait Petroleum Corporation and the Economics of the New World Order

Mary Ann Tétreault (Published by Quorum Books. Available from The Eurospan Group, 3 Henrietta Street, Covent Garden, London WC2E 8LU, UK). ISBN 0 89930 510 5. 248 pages. Price: £43.95.

Kuwait has used its main resource, oil, to integrate itself into the world economy as an autonomous actor rather than as a dependent commodity exporter. This book analyses the development of state-owned Kuwait Petroleum Corporation in the context of domestic, regional and world politics. The author sets out to show that multinational, vertical integration under state ownership can be an optimal strategy for oil-exporting, developing countries, particularly those whose resource endowments are otherwise highly limited.

Energy Exporters and Climate Change

Peter Kassler and Matthew Paterson (The Royal Institute of International Affairs, Chatham House, 10 St James's Square, London SW1Y 4LE, UK). ISBN 1 86203 071 5. 126 pages. Price: £10.95.

Policies to tackle climate change agreed at Kyoto and beyond will influence global energy choices away from carbon-rich fossil fuels and, eventually, towards renewable energy sources. This book suggests that the change process will take many years. In the short term, climate policies will favour fuel shifts along a chain from coal to oil to natural gas. In the longer term they should encourage investment in low-emission industries. The study also outlines some new patterns of international cooperation, including emissions trading and the transfer of 'green' technologies.

Pipelines, Ports and Politics: An Analysis of Russia's Oil Export Options and Expansion Plans

(Centre for Global Energy Studies, 17 Knightsbridge, London SW1X 7LY, UK). ISBN 1 901628 16 0. 124 pages. Price: £875.

This publication examines how the profile of Russia's oil exports has changed since the late 1980s. It describes, evaluates and compares the various projects that have been put forward for extending the country's export pipelines and for the construction of new ports on the Black, Baltic and Barents Seas as well as on Russia's east coast. The report also examines the issues of shipping additional volumes of oil through the Turkish Straits and assesses the impact on the Danish Straits of increased exports through the Baltic Sea.

Introduction to Oil & Gas Joint Ventures

(Oilfield Publications Ltd, 15 The Homend, Ledbury, Herefordshire HR8 1BN, UK). ISBN 1 870945 96 4. 290 pages. Price: £95.

The choice of the right partners, the establishment of clear objectives and the creation of the right management structure are of crucial importance in the setting up of joint ventures in the oil and gas industry. Designed to act as a reference source for those wishing to embark on such a path, the book begins with a general background to the purpose, thought processes and approaches involved in establishing a joint venture together with an outline of the style of venture structure. It goes on to outline the practical and preliminary considerations that should be taken into account when putting together a bidding agreement and provides information on the application, licence fees, grant of licence, rights, joint operating agreements, unitization agreements and unitization across borders. The guide also looks at joint venture management for operations and associated services and provides detailed analysis of financing economics, tax, safety and insurance issues. It concludes with a non-operators viewpoint on monitoring, auditing, benchmarking and achieving operatorship.

The Benefits of Information Sharing in Petroleum Exploration

Fernando Barrera-Rey (The Oxford Institute for Energy Studies, 57 Woodstock Road, Oxford OX2 6FA, UK). ISBN 0 948061 99 5. 35 pages. Price: £20.

This publication argues that the sharing of petroleum exploration information, and the subsequent coordination of exploration operations, can lead to benefits for all. Focusing on the specific case of the UK Continental Shelf (UKCS), the study sets out to calculate by how much the chances of success can be increased by following such an approach. Included in the analysis is an outline of the drawbacks of previous attempts to model exploration, the incentives to share information from exploration and the role that government can play in information sharing.

Worldwide Gasoline and Diesel Fuel Survey 1996

(Associated Octel, Suite 2, 4th Floor, Berkeley Square House, London W1X 6DT, UK). ISSN 1361 6080. 32 pages.

This survey details the quality and consumption of gasoline and diesel fuel marketed worldwide during 1996. Statistics are provided on a regional basis. A brief summary outlining the latest trends and developments in this sector over the review period is also provided.

Tax or Technology?: The Revival of UK North Sea Oil Production

Steve Martin (The Oxford Institute for Energy Studies, 57 Woodstock Road, Oxford OX2 6FA, UK). ISBN 0 948061 99 5. 130 pages. Price: £50.

After peaking at around 2.5mn b/d in 1985, UK North Sea oil production slumped to just 1.8mn b/d by 1991. Recent years, however, have witnessed a strong recovery in oil supplies which are now expected to reach a new peak of 3mn b/d by the turn of the century. This publication analyses the factors underpinning this recovery, including the influence of developing technology and improved oil recovery techniques and the impact of successive relaxations in the fiscal regime.

Membership News

NEW MEMBERS

Mr J Bannister, John Bannister & Associates
Mr M Berensteyn, New United Credit Corporation Ltd
Eur Ing T D Blakemore, Offshore Design Engineering Ltd
Ms M A Boszko, MB Traducciones
Mr S Brooks, Wood Mackenzie Consultants Ltd
Ms C B Brown, Galbraith's Ltd
Mr T Bruce, Aberdeen
Mr E Businge, London
Mr I Campbell, Aberdeen
Mr R J Clark, Denholm Shipping Services Ltd
Mr I D Cole, Amerada Hess Ltd
Mr J Crompton, Engen Petroleum Ltd
Mr E H Crowther, Caltex India Ltd
Mr A Dentskevich, Woking
Mr F Doll, H Clarkson & Company Ltd
Mr C Ensor, Thurleigh
Mr E Fenton, Limerick
Mr R Fezzani, BP Oil International Ltd
Mr D Fraser, Oracle
Mr L French, TDG Pinnacle
Mr J I Gasca, Aberdeen
Mr V H Gokani, Leicester
Dr M M Grant, WS Atkins
Mr A Grigsby, Ove Arup & Partners
Mr T Gudmundsen, Statoil
Mr B C Hales, Lucas Diesel Systems Engineering
Ms C Hampson, HSBC Investment Bank
Mr N Harasyn, Luton
Mr D Harbinson, West Brabourne
Mr J Ioannidis, Springfield Shipping Company
Mr E Jenkinson, Safeway Stores plc
Mr C A Jones, Dorking
Mr E K Karanja, Alfa Beta Products Ltd
Ms P Knudsen, Interfocus
Mr A J Lansdale, Galbraith's Ltd
Mr T-M N Lee, Hong Kong Marine Department
Mr T T Lovell, Immingham
Mr M MacRitchie, Inverness
Mr J R Meakin, Macclesfield
Mr G P Molhant, J Henry Schroder & Company Ltd
Mr B Nielsen, Hanseatic Shipping Company
Mr A S Norton, Karlaplan Ltd
Mr D O'Dea, Durapipe Glynwed Plastics Ltd
Mr R R Owens, Arro Instrumentation Ltd
Mr D M Paterson, Genting Oil & Gas Ltd
Mr F Peacock, Enfield
Ms J G H Penfold, Control Flow Inc
Mr A S S Ponandrum, Malaysia
Ms Y Reardon, Warwick
Mr J Rigby, Banque Paribas
Mr D J Roberts, Newcastle upon Tyne
Ms F Robertson, Birmingham
Mr D W Ross, Headlevel (UK) Ltd
Mr E M Sahyoun, London
Mr R Sansom, Mobil Gas Marketing
Mr G Scicluna, Enemalta Corporation
Mr A A Shah, Frost & Sullivan
Captain C R Smylie, Fairdeal International Ltd
Mr D Strathdee, Ellon
Ms V Street, Canterbury
Mr J Thorogood, Corringham
Mr G Vidya Dharan, Emirates National Oil Company
Mr Y Wako, The Oil Information Service Center
Dr C R Weddell, Esso Petroleum Company Ltd
Mr A Welch, Aberdeen
Ms J Welch, Crewe
Mr J R Whelan, HSBC Investment Bank
Mr R White, High Wycombe
Mr Y Wong, Hong Kong Marine Department

NEW STUDENTS

Mr O O Alokolaro, London
Mr J O Ediale, Dundee
Mr P I Ohanweh, London
Mr J O Sampson, Dundee
Mr A Sijuwade, London

STUDENT PRIZEWINNERS

Mr A H Akram, London
Mr R A B Duncan, London

NEW FELLOW

Dr Graham Watt FInstPet
Dr Watt graduated from the University of Edinburgh with a BSc (HONS) in Chemical Engineering, followed by a PhD in the same subject. In 1971, he joined Shell UK at Stanlow Refinery, where he held a variety of technical and operations posts, and also served on the IP Stanlow Branch Committee. In 1984 he transferred to the Supply Division of Shell UK Oil in London, and then in 1988 to Shell Eastern Petroleum as Operations Manager of Shell's Singapore refinery. He returned to Shell UK in 1992 and is currently Refinery Manager of its Shell Haven Refinery in Essex. Dr Watt is a member of the Essex Branch, and chaired the 1996 IP Residue Conversion Conference.

NEW CORPORATE

Tagus International Ltd, The Technology Centre, Epinal Way, Loughborough, Leicestershire, LE11 0QE Tel: +44 (0)1509 611123 Fax: +44 (0)1509 234295 e-mail: caroline@tagus.co.uk

Representative: Caroline Gerrie, Director
Tagus International Ltd has a successful track record helping companies within the oil, gas and chemical industry to implement new business initiatives by designing and developing bespoke programmes which support and improve peoples' performance.
'Once we have determined the business objectives, we develop an implementation and solution strategy and then design, develop and produce the appropriate training, tools and information which will enable people to produce real business results'.

Around the Branches

A full listing of Branch Events is available on the IP web site:

http://www.petroleum.co.uk

or, if you require further information please contact your individual Branch Secretary.

Membership News

Dear Member

Do you know that the Institute of Petroleum has a Benevolent Fund?

According to the recent Membership Survey less than half of the Members were aware of the fund. Read on and then you will know why it is there and how it can be used.

Why is there a Benevolent Fund?

The Institute of Petroleum's Benevolent Fund is a registered charity under English Law with its own Trust Deed. It exists to provide financial and other help to past and present Members and their families and dependent relatives who are in need. Each case is considered by the Trustees and there is no set scale of grants or benefits.

What types of award are given?

Awards have included one-off financial grants, help with reoccurring bills, assistance towards carer breaks and convalescence costs.

Who runs the Benevolent Fund?

There are two General Trustees who are long-standing Members of the Institute of Petroleum with experience in its operations and its membership. The President, the Honorary Treasurer, the Honorary Secretary and the Director General of the IP are the Management Trustees of the Fund. Applications for support are dealt with as and when received. When considered appropriate, a visit is made to the person making the application.

What should I do if I require assistance?

Enquiries and requests for assistance on behalf of Members or former members, their families or dependent relatives should be made in writing to the Secretary to the Trustees.

What do I do if I know that a former Member or their family requires assistance?

Sometimes those most in need have lost contact with the IP and are not aware of its Benevolent Fund. If you are aware that someone else requires help, please do write to the Benevolent Fund Trustees.

All enquiries are handled in the strictest confidence and should be addressed to:

Secretary to the Trustees
IP's Benevolent Fund
61 New Cavendish Street
London
W1M 8AR, UK

EVENTS Forthcoming

February

5–6 **London**
Climate After Kyoto: Implications for Energy
Details: The Royal Institute of International Affairs, UK
Tel: +44 (0)171 957 5700
Fax: +44 (0)171 321 2045

10–13 **Cairo**
Oil & Gas '98
Details: IIR Exhibitions, UAE
Tel: +971 4 365161
Fax: +971 4 360137

11–13 **Cardiff, UK**
The Sea Empress Oil Spill Conference
Details: The Chartered Institution of Water and Environmental Management, UK
Tel: +44 (0)1787 831 3119
Fax: +44 (0)171 405 4967

13–16 **Berkshire, UK**
Understanding Oil Supply Logistics
Details: Petroleum Economist, UK
Tel: +44 (0)171 831 5588
Fax: +44 (0)171 831 4567/5313

16 February
London: *Oil and Gas after 2000 – Realignment and Restructuring for the New Millennium*
Details: Pauline Ashby, The Institute of Petroleum

16–17 **London**
Power Project Finance: 7th Annual Conference
Details: Rebecca Luing, IBC UK Conferences
Tel: +44 (0)171 453 2703
Fax: +44 (0)171 323 4298

16–17 **London**
Electricity & Gas: Managing Stakeholder Expectations in a Competitive Market
Details: Nick Tribe, The Economist Conferences, UK
Tel: +44 (0)171 830 1154

17 February
London: *IP Week Annual Luncheon*
Speaker: Dr Mark Moody-Stuart
Details: Pauline Ashby, The Institute of Petroleum

17 February
London: *The Auto-Oil Programme – Will Reason Prevail?*
Details: Mr J M Wood, The Institute of Petroleum

17–18 **London**
Worldwide Deepwater Technologies
Details: Jennie Hung, IBC UK Conferences
Tel: +44 (0)171 637 4383
Fax: +44 (0)171 453 2058

17–19 **New Delhi**
The India Oil and Gas Conference and Exhibition
Details: Dan Lipsher, Society of Petroleum Engineers, US
Tel: +1 972 952 9306
e-mail: dlipsher@spelink.spe.org

18 February
London: *Price Risk Management: The 11th Oil Price Seminar*
Details: Pauline Ashby, The Institute of Petroleum

18 February
London: *IP Week Annual Dinner*
Details: Pauline Ashby, The Institute of Petroleum

18 **London**
Decommissioning – Valuation Issues
Details: Langham Oil Conferences, UK
Tel: +44 (0)1509 881022
Fax: +44 (0)1509 881576

18–19 **London**
Customer Management in Gas & Electricity
Details: AIC Conferences, UK
Tel: +44 (0)171 242 2324
Fax: +44 (0)171 242 1508

19 February
London: *Innovations in Offshore Field Developments*
Details: Pauline Ashby, The Institute of Petroleum

18–19 **London**
CHP 2000 – Cogeneration for the 21st Century
Details: Uloma Otuonye, IMechE, UK
Tel: +44 (0)171 973 1304
Fax: +44 (0)171 222 9881

19 **London**
One Day Forum on ROV Technologies & Applications
Details: IBC UK Conferences
Tel: +44 (0)171 637 4383
Fax: +44 (0)171 453 2058

19–20 **London**
Safe & Reliable Control Room Operations
Details: Christiana Sztadhaus, IBC UK Conferences
Tel: +44 (0)171 453 2751
Fax: +44 (0)171 636 6858
e-mail: cust.serv@ibcuk.co.uk

21–22 **Abu Dhabi**
International Seminar on Risk Analysis and Integrity Management of Pipelines and Process Plant
Details: Energy Logistics International, UK
Tel: +44 (0)1628 525492
Fax: +44 (0)1628 521928

22–27 **Wiltshire, UK**
The Gas Chain: From Reservoir to Burner Tip
Details: The Alphatania Partnership, UK
Tel: +44 (0)171 613 0087
Fax: +44 (0)171 613 0094

23–24 **Oslo**
21st Annual Conference: Offshore Pipeline Technology
Details: Christiana Sztadhaus, IBC UK Conferences
Tel: +44 (0)171 453 5491
Fax: +44 (0)171 636 6858

23–25 **Amsterdam**
Introduction to Petroleum Refinery Processing
Details: The Center for Professional Advancement, Amsterdam
Tel: +31 20 638 28 06
Fax: +31 20 620 21 36

23–25 **Houston**
1998 Worldwide Technology Forum
Details: Landmark Graphics Corporation, US
Tel: +1 847 384 7730
e-mail: forum@lgc.com

24–25 **London**
The CRINE Network Conference 1988
Details: CRINE Network, UK
Tel: +44 (0)1527 518777
Fax: +44 (0)1527 518718

24–26 **Yangon (Rangoon)**
Myanmar (Burma) Oil & Gas Expo '98
Details: CP Exhibition, Hong Kong
Tel: +852 2511 7427
Fax: +852 2511 9692
e-mail: cpexhbit@hk.super.net

EVENTS Forthcoming

March

3–4 **Vienna**
The Development of Oil and Gas Resources in the Caspian & the Central Asian Republics
Details: Ailsa Matkevich or Elizabeth Akwa, The Adam Smith Institute, UK
Tel: +44 (0)171 490 3774
Fax: +44 (0)171 505 0090

3–6 **Dallas**
SPE/International Association of Drilling Contractors Drilling Conference
Details: Dan Lipsher, Society of Petroleum Engineers, US
Tel: +1 972 952 9306
e-mail: dlipsher@spelink.spe.org

4–6 **Miami**
Second Latin American Energy Conference: Gas, Power and Regulation in Latin America
Details: Centre for Global Energy Studies, UK
Tel: +44 (0)171 704 6161
Fax: +44 (0)171 704 8440

5–6 **Vienna**
Oil and Gas Pipelines in Russia and the CIS Republics
Details: Adam Smith Institute, UK
Tel: +44 (0)171 490 3774
Fax: +44 (0)171 505 0090

9–10 **Rome**
The Future of Natural Gas in the Mediterranean
Details: Rebecca Luing, IBC UK Conferences
Tel: +44 (0)171 453 2703
Fax: +44 171 323 4298

9–11 **Brussels**
IBM Year 2000 Technical Conference
Details: IBM International Conferences, Belgium
Tel: +32 2 655 5528
Fax: +32 2 655 5739
e-mail: conferences@be.ibm.com

9–11 **Norway**
The Integrated Geophysical Techniques in Seismic Interpretation
Details: Norwegian Petroleum Society, Norway
Tel: +47 22 12 90 08
Fax: +47 22 55 46 30
e-mail: karin.haugness@npf.no

9–12 **Surrey, UK**
The Fundamentals of the Natural Gas Industry
Details: Petroleum Economist, UK
Tel: +44 (0)171 831 5588
Fax: +44 (0)171 831 4567

10–11 March
London: *Oil Spill Response – The National Contingency Plan*
Details: Pauline Ashby, The Institute of Petroleum

10–13 **Brighton, UK**
Oceanology International 98
Details: Spearhead Exhibitions, UK
Tel: +44 (0)181 949 9222
Fax: +44 (0)181 949 8186
e-mail: oi98@spearhead.co.uk

11–12 **Prague**
Syndicated Lending in Central and Eastern Europe and the CIS
Details: IBC UK Conferences
Tel: +44 (0)171 453 2756
Fax: +44 (0)171 453 2766

11–13 **Turkmenistan**
3rd Turkmenistan International Oil & Gas Exhibition
Details: Birmingham Chamber of Commerce and Industry, UK
Tel: +44 (0)121 455 9600
Fax: +44 (0)121 456 1785

10–13 **Brighton, UK**
Oceanology International 98
Details: Spearhead Exhibitions, UK
Tel: +44 (0)181 949 9222
Fax: +44 (0)181 949 8186

12–15 **Bangkok**
Oil & Gas Thailand '98
Details: Overseas Exhibition Services, UK
Tel: +44 (0)171 486 1951
Fax: +44 (0)171 413 8212
e-mail: oilexhibit@aol.com.uk

14–19 **Dubai**
Middle East Petroleum & Gas Conference
Details: The Conference Connection Inc, Singapore
Tel: +65 356 0960/1
Fax: +65 356 0962
e-mail: cconnect@pacific.net.sg

20–23 **Bletchworth, UK**
Understanding the Commercial, Economic and Trading Aspects of Oil Refining
Details: Petroleum Economist, UK
Tel: +44 (0)171 831 5588
Fax: +44 (0)171 831 4567

22–27 **San Diego**
Corrosion '98
Details: NACE International, US
Tel: +1 281 228 6223
website: www.nace.org

23–24 **London**
Seatrade Tanker Industry Convention
Details: Sue Cleary, Seatrade Organisation, UK
Tel: +44 (0)1206 545121
Fax: +44 (0)1206 545190

23–27 **Singapore**
Terminal Operation and Bulk Liquid Measurement
Details: Abacus International, UK
Tel: +44 (0)1245 328340
Fax: +44 (0)1245 323429

25–26 **Norway**
Underwater Technology Conference '98
Details: Norwegian Petroleum Society, Norway
Tel: +47 55 12 58 40

25–26 **Watford, UK**
European Conference – Product Data Technology Days
Details: Dan Lipsher, Society of Petroleum Engineers, US
Tel: +1 972 952 9306
e-mail: dlipsher@spelink.spe.org

26–27 **Amsterdam**
IPPs & Merchant Power Plants in Europe
Details: Rebecca Luing, IBC Financial Focus, UK
Tel: +44 (0)171 453 2703
Fax: +44 (0)171 323 4298

26–27 **London**
Trade and Investment Opportunities in the Russian Oil Industry
Details: The Royal Institute of International Affairs, UK
Tel: +44 (0)171 957 5700
Fax: +44 (0)171 321 2045

26–27 **London**
The Future of Multiphase Metering
Details: IBC UK Conferences
Tel: +44 (0)171 453 5491
Fax: +44 (0)171 636 6858
e-mail: cust.serv@ibcuk.co.uk

29–3 April **Wiltshire, UK**
The Commercial and Political Challenges of Natural Gas
Details: The Alphatania Partnership, UK
Tel: +44 (0)171 613 0087
Fax: +44 (0)171 613 0094

30–2 April **Amsterdam**
Contracts Management and Administration in the Oil and Gas Industry
Details: The Center for Professional Advancement, Amsterdam
Tel: +31 20 638 28 06
Fax: +31 20 620 21 36

IP Conferences and Exhibitions

IP Week 1998

London: 16–19 February 1998

An influential programme of Conferences appealing to an international audience has been planned, which together with the Annual Luncheon and Dinner, means that IP Week 1998 represents an excellent opportunity for delegates to meet and discuss the latest developments with senior executives in the industry today. Please see page 31 for detailed information on the Programme of Events.

Conference and Exhibition

Oil Spill Response – The National Contingency Plan

Gatwick: 10–11 March 1998

organized with the support of UKPIA, the British Oil Spill Control Association (BOSCA) and the Nautical Institute.

In recent years, the UK has suffered two large oil spills. One of these involved the largest shore-line clean-up in the UK since the *Torrey Canyon* incident over 30 years ago. In light of these incidents, the National Contingency Plan has been reviewed and revised.

This Conference will address all the important issues:

Day 1 – Policy and the National Plan; Role of Local Government, the Environment Agency, Ports and the Spill Response Industry; Funding and Finance

Day 2 – Media Coverage, Waste Disposal, Health and Safety Issues, Setting-up Shore Line Response Centres and New Clean-up and Monitoring Techniques

Speakers include: **Glenda Jackson CBE, MP** (Parliamentary Under-Secretary of State, Department of the Environment, Transport and the Regions), **David Bedborough** (Chief Scientist, MPCU), **Dr Mike Frend** (Director General, UK Petroleum Industry), **Robin Gainsford** (Director, MPCU), **Chris Harris** (Chief Executive, The Coastguard Agency), **Gordon Johnston** (Executive Director, UKMPG Ltd), **Rear Admiral Michael L Stacey** (Chairman, British Oil Spill Control Association) and **Dr I C White** (Managing Director, International Tanker Owners' Pollution Federation).

Who should attend?
Attendance at this event will be essential for Ports and Harbours Authorities, Shoreline Local Authorities, those responsible for the formulation of contingency plans and those involved in oil spill response and shoreline remediation.

Exhibition
An Exhibition of oil spill response equipment and remediation techniques will be held in association with the Conference. Further information regarding exhibition space is available from the Conference Department.

The Programme and registration form is now available from the IP Conference Department.

International Conference and Exhibition

Metalworking Fluids

Birmingham: 3–4 June 1998

The Programme and registration form will be available in February 1998.

Annual Introduction Courses

Introduction to Oil Industry Operations

London: Wednesday 17–Friday 19 June 1998 and

Introduction to Petroleum Economics

London: Monday 22–Wednesday 24 June 1998

International Conference

Aviation 2000 – Safety and Operations

London: 1–2 October 1998

There is increasing emphasis on Ramp Safety within the aviation industry, both in terms of fuelling questions and other ramp users. This topic, together with the new issue of the IP Aviation Model Safety Code will be fully reviewed. The new developments in filtration and related test procedures will also be discussed and linked with the broader issue of fuel quality impacts on jet engine performance. This important Conference will be of interest to all involved in aviation fuelling together with those with a broader interest in Ramp Safety. An Exhibition of equipment linked with aviation fuelling will be held in association with the Conference. The Programme and Registration form will be available in April 1998.

International Conference

European Acidification Strategy, the Goals of Public Policy and its Cost to Industry

London: 12 May 1998

The Programme and registration form will be available in February 1998.

For a copy of the Programme and registration form for the Oil Spill Response Conference or to add your details on to the mailing lists for forthcoming events, please write or fax:

Pauline Ashby, Conference Administrator, Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR, UK
Tel: +44 (0)171 467 7100 Fax: +44 (0)171 255 1472
All forthcoming events can be viewed on the IP web page: http://www.petroleum.co.uk

Diary Dates

London Branch

IP WEEK 98

'The Auto-Oil Programme – Will Reason Prevail?'

Tuesday 17 February 1998, 17.30

Michel Flohic, Deputy Secretary General, EUROPIA

Auto-Oil, the joint Commission, motor and oil industries technical programme to identify the best vehicle and fuel measures to achieve high quality air standards, is moving to a new phase. High stakes are being played for right now in the European Parliament between those who argue the environment is worth protecting at any price, no matter how marginal the improvement, and those who say we should seek value for money in all things, including delivering on the environment. This will be the theme of Michel Flohic, Deputy Secretary General of EUROPIA, who will present an update of the latest technical and political developments in the Auto-Oil programme.

Tea and biscuits will be served at 17.00. Light refreshments will be available afterwards.

IP Contact: Mr J M Wood on +44 (0)171 467 7128

IP Standardization Committee

'Petroanalysis 98: Fuels 2000 and Beyond – the Analytical Challenge'

Wednesday 25 March 1998, Shell Research and Technology Centre, Thornton (near Chester)
Registration 9.00

This joint meeting with the Royal Society of Chemistry Analytical Division will focus on analytical approaches required to ensure new compliance with forthcoming tighter automotive fuel specifications across Europe.

Contact: Mr R W Hooks, Shell Research & Technology Centre for further details.
Tel/Fax: +44 (0)151 373 5439/5654
e-mail: r.w.hooks@msmail.trctho.simis.com

Energy Economics Group

Wednesday 25 March 1998, noon – 14.15

Sir Malcolm Rifkind, Director of BHP Petroleum Ltd

will make a presentation on the political issues associated with the exploitation of oil opportunities in Central Asia. *Prior registration essential.*

IP Contact: Jenny Sandrock

Exploration & Production Discussion Group

'1998: Outlook and Challenges for the Oil Industry'

Thursday 12 March 1998
17.00 for 17.30 until 19.00

Andrea Felsted, Energy Correspondent, Lloyd's List International

IP Contact: Jenny Sandrock

'Security & Supply: Gulf & Caspian Oil & Gas'

17 February 1998, 17.30 at BIEE, Caledonian Club

Pierre Shammas, President APS Group, Beirut and Nicosia

BIEE c/o Mary Scanlan, Tel: +44 (0)181 997 3707
Fax: +44 (0) 181 566 7674 e-mail mailbox@biee.demon.co.uk
All IP members and Energy Economics Group welcome

MOVES People

British Energy plc has announced the appointment of **Peter Hollins** as its new Chief Executive. He succeeds **Dr Robert Hawley** CBE who left the company in June 1997. Hollins has had a successful career at senior level with ICI plc, where from 1989 until 1992 he was General Manager of ICI Resins BV. Since then he has been the Board Director responsible for the Polymers Division of European Vinyls Corporation (EVC International NV), a joint venture between ICI and Enichem.

Rayco Technology Group, Canada, President *Normand Hinse* has announced the appointment of three senior personnel to manage the international business centres of the Group. They are *Bill Cakebread*, Wylie Systems, Hastings, UK; *Alain Dusablon*, St Nicolas, Canada; and *Frank Beardsley*, Tulsa, US. All four (pictured) have extensive experience in the field of construction equipment safety.

Exxon Corporation has elected **Rene Dahan** to its Board of Directors. Dahan is continuing to serve as Senior Vice-President of the corporation, but has been succeeded as President of Exxon Company, International (ECI) by **Stuart R Mcgill**, Executive Vice-President of ECI and a member of its management committee.

Balmoral Group has announced the appointment of **Bob McAlpine** as its ne Operations Director. Previously Managing Director of Balmoral Webco, McAlpine began his career with the company as Operations Manager of the pipecoating division of the Group in 1990.

Finn Kulås, Managing Director of Statoil (UK) ltd, has been appointed Senior Vice-President of the Statoil Group, responsible for the methanol business area. He has returned to Norway to take up his new position. **Geir Jøssang** has been appointed Managing Director of Statoil (UK) Ltd. He was previously Vice-President of Products, Trading and Supply in the Statoil global trading and supply organization in Stavanger.

John J (Jack) Miller has joined Occidental Oil and Gas Corporation as Senior Vice-President–Worldwide Exploration with responsibility for directing the company's global exploration programme. A former employee of Texaco for the past 17 years, Miller's most recent position was Vice-President and Director of Exploration–Europe, based in London.

Mike Borrell has been appointed Strategic Planning Manager of the business development and exploration division of Total Oil Marine, the UK exploration and production subsidiary of the Total Group. He was previously Head of Market Analysis and Strategy in the gas division of Total's Paris head office. The company has also appointed **Jeff D Morgan** as Terminal Manager at St Fergus North Sea Gas Terminal near Peterhead. Morgan's previous role was General Manager, Operations for British Gas Hydrocarbon Resources Ltd.

Edwin J Hess, Senior Vice-President of Exxon Corporation, has retired after more than 40 years with the company. Hess was responsible for Exxon's Canadian affiliate, Imperial Oil, and for a number of corporate headquarter departments.

Lasmo has announced the appointment of **Paul Murray** to the Board as Corporate Development Director. Murray joined Lasmo plc on the acquisition of Thomson North Sea Holdings in 1989. He was appointed to the position of General Manager, Corporate Development in March 1996.

Phil de Boos-Smith, Total Oil Great Britain's Managing Director and Chief Executive, will retire on 1 April this year, after 39 years with the Total Group. He will be succeeded by **Gary Jones,** previously Chief Executive Officer of Total Petroleum North America.

***Tom King* has been appointed as a Non-Executive Board Member of Metoc. King, who retired from his position as Director, New Business, for Lasmo in April 1997, has fulfilled a distinguished career within the international oil and gas industry. He remains on the Lasmo Board as a Non-Executive Director and a member of its Health, Safety and Environment committee.,**

Isotopic Analytical Services has appointed *Professor Graeme Simpson* as Non-Executive Director. He will advise on strategic planning and development, and on marketing the company's services worldwide. Simpson worked for Esso for 21 years, initially as a geologist, before completing his MBA degree in 1988 and moving into business management.

Mike Bahorich has been promoted to Vice-President, Exploration Technology of Apache Corporation, heading the company's advanced 3D seismic programmes in its worldwide exploration effort. Prior to joining Apache as Chief Geophysicist in 1996, he held various positions at Amoco Corporation. **Daniel J Parish** has been named an Assistant General Counsel. Parish joined Apache in 1994 and is responsible for operational matters, asset acquisitions and divestitures, marketing, and environmental issues, as well as legal matters arising out of the company's Canadian operations.

Dr Tony Denton, Chairman of the Noble Denton Group, independent marine, engineering and meteorological consultants, has retired. He is being retained as a Special Advisor to Noble Denton International, which will include undertaking specific assignments requiring his expertise.

US-based Texaco Inc has appointed **John O'Connor** as President of Global Exploration and Production, and Senior Vice-President of the company. O'Connor was formerly CEO of Australia's BHP Petroleum. He will also be a member of Texaco's Executive Council.

The Institut Français du Pétrole (IFP) has made the following appointments. **Daniel Morel** has been appointed CEO. **Édouard Freund** is now Executive Vice-President in charge of Research and Development, and is replaced as Director of the Refining-Petrochemicals Division by **Germain Martino**. **Jean-Claude Barbier** is now Executive Vice-President in charge of Industrial Actrivities. **André Vidal** replaces him as Industrial Director. Barbier has also become Chairman of the American subsidiary IFP North America. **Daniel Decroocq** has become Executive Director, in charge of Scientific Management and Documentation.

The First International Conference & Exhibition on Evacuation, Escape and Rescue Offshore

March 31st & April 1st 1998, Aberdeen

Day 1

Chairman, John King	- HSE
Roger Spiller	- MSF
David Fitzpatrick	- Hibernia Management & Development Co.
Andrew Kingswood	- ARK Associates
Dave Menarry	- HSE
Tom Brighton	- OPITO
Doug Robertson	- Independent Consultant
Surgeon Rear Admiral Frank Golden (ret'd)	
Fergus Mack	- Marathon Oil UK

Day 2

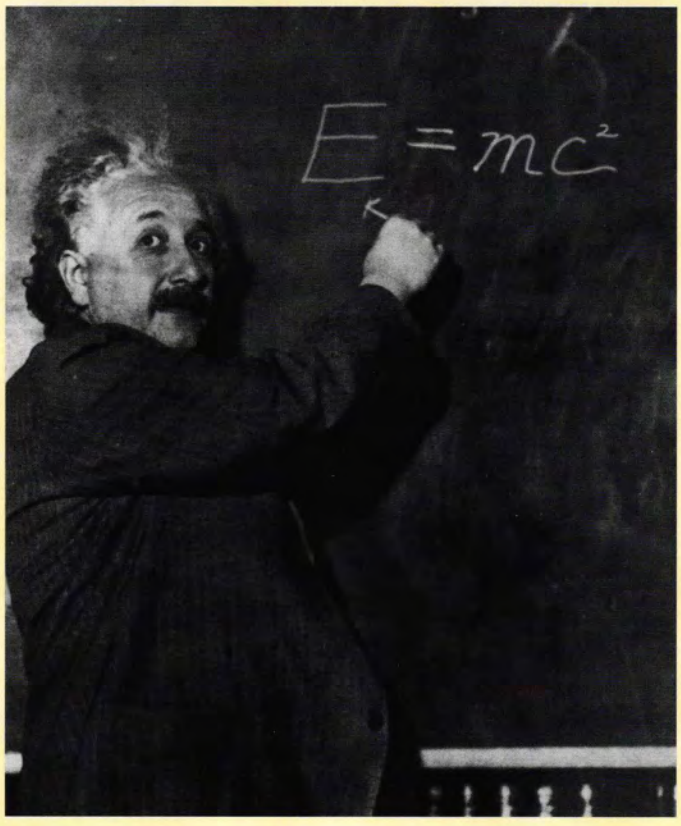
Chairman, John Wils	- UKOOA
Russell Watt	- Conoco UK
David Foster	- HM Coastguard Agency
Capt. Jim Middleton	- Marathon Oil UK
Ovin Carlsson	- Ese Holding A/S
Jeremy Daniel	- SSOA
Dave Cheadle	- Safe Marine
Paul Galagher	- WS Atkins
Ian Lovell	- Shell UK Expro

SUPPORTED BY EVACUATION, ESCAPE AND RESCUE TECHNICAL ADVISORY GROUP (EERTAG)
whose members include:-
HM COASTGUARD, HSE-OSD, SSOA, TRADE UNIONS, UKOOA & MOBILE DRILLING UNIT OPERATORS' ORGANISATIONS

Organised by the Energy Logistics / PennWell Partnership

Further details from Sarah Moore

Tel: +44(0)1628 525492 Fax: +44(0)1628 521928



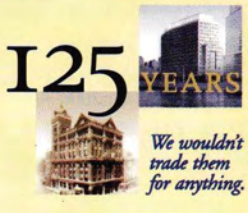
The One Guy Who Knew More About Energy Than Us.

It's not like we think we're geniuses or anything. It's just that more than 80% of the exchange-based energy transactions that take place on the planet, take place at our place, the New York Mercantile Exchange.

We didn't write a scathingly brilliant theory on relativity, but in 1978 we did write the world's first successful energy futures contract. Since then, our market has become the global benchmark for energy prices. And we've grown to become the world's largest physical commodities exchange.

Maybe it's because of our stringent safeguards. Maybe it's because people know we've been around for 125 years and we'll be around for quite a few more.

At our age, some people might be tempted to slow down and take it easy. Not us, we're too full of energy.



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