Petroleum review

JULY 1998

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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
t/y = tonnes/year	b/d = barrels/day
	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: David Setchell hands over the IP Presidential seal to new President Chris Moorhouse at the AGM in June

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From the Editor

Biting the refining bullet

The news that Shell has finally decided to close the Shell Haven refinery (though not until the end of 1999) will come as a disappointment rather than a surprise (see p10). The disappointment stems from the fact that Shell Haven is a very sophisticated refining unit with considerable upgrading capacity. In fact it is the source of Shell's 0.05% sulfur City Diesel, a grade which Stanlow in its present configuration would have difficulty in making.

Shell has concluded that there is no realistic prospect of adequate refining returns in the immediate future and has decided that Shell Haven must close. The latest UK consumption statistics, just released by the IP, show UK oil consumption in 1997 falling by 3.9% over 1996 levels, the fourth consecutive annual fall. BP's latest statistical review (see p8) shows total European oil consumption growth of just 1.1% in 1997.

Few would seriously question that Europe still has massive excess refining capacity or that there is little prospect of sustained economic returns from refining in Europe. To date, however, companies have been notably reluctant to accept the closure and environmental remediation costs involved when a refinery is finally closed.

This may be about to change. Low oil prices are now putting real pressure on companies. The improvement in refining margins from low crude prices will erode as continuing low oil prices become accepted as a fact rather than a temporary phenomena.

The economic implosion in the Far East and particularly the move by Japan into recession (GNP contracted by 5.8% in the 1Q1998) means that oil demand growth in the region in 1998 will be minimal if any at all. Massive stock-builds, spurred by a continuing price contango, have continued throughout the first and second quarters and global storage capacity is rapidly filling up. To date, Opec has been announcing cuts that are too little and too late – in effect they have been doing little more than confirming the volume of buying that has not occurred, the ships that have not turned up to load. It remains to be seen if Opec's end-June meeting will prove more effective.

Economics is very brutal – if you want to achieve a higher price, you have to deny willing buyers which means reducing output/capacity. This applies as much to refined products as crude oil and is the reason the Shell Haven decision is likely to be the first of a number of hard decisions to be taken in 1998 – both upstream projects and refineries look vulnerable.

It is becoming increasingly clear that for long-term viability Europe's refineries need to be large (to secure full economies of scale), flexible in terms of the crudes that they can run and the products they can make, and almost certainly closely integrated with petrochemicals operations (which have yielded much higher returns than refining over recent years). Two major refinery units are currently missing from Europe's refining centres – cokers and gas-to-liquids plants.

Fuel oil demand in Europe has fallen steadily since 1992. The latest statistics for UK demand in 1997 (just published by the IP) show a truly spectacular 42.6% fall in fuel oil consumption. Across Europe fuel oil demand is moving below the point where deep cracking, in all its various forms, can cope. Someone, somewhere will have to invest in a coker or cokers.

Joint ownership seems the most likely scenario but 1998 doesn't look particularly propitious for sanctioning such an investment. However, Conoco, which built the UK's only coker at South Killingholme many years ago, is generally believed to be operating the country's most profitable refinery.

The other major refining pressure is the move to ever tighter sulfur standards, particularly for vehicle fuels. In 2000 gasoline specifications will require 150 ppm while diesel will be no higher than 350 ppm and may be as low as 200 ppm. By 2005 the limits are likely to be 50 ppm or lower for both fuels.

Gas-to-liquids and particularly middle distillate synthesis plants offer refiners products and blendstocks with truly amazing properties. Because the input gas has to be desulfurised the products contain no sulfur. They are predominantly straight chain paraffins with no aromatics and few olefins. The gasoil has a cetane rating of up to 75. With blendstocks such as these the refiners' problems in meeting the new specifications reduce dramatically or disappear. So far the economics are not quite right. All are racing for this prize. It seems increasingly likely that the most profitable use of gas-to-liquids will be in meeting demanding product specifications in developed markets.

So who will be the first company to build a middle distillate synthesis plant in a major European refinery?

Chris Skrebowski

Web Word

One of the many benefits of the Internet is that it can provide an easily accessible resource for industry news, often free of charge. Furthermore, many sites offer search facilities that provide sophisticated tools for researching a particular area. Although there are numerous sites dedicated to oil and gas, some of the more general home pages can also offer an interesting perspective.

The Times (**www.the-times.co.uk**) and The Telegraph (**www.telegraph.co.uk**) websites offer excellent archives complete with retrieval systems.

Newsalert categorises stories by industry, and is continually updated (**www.newsalert.com/free/industry**).

The 'Tomorrow's World' page (**www.bbc.co.uk/tw**), hosted by the hugely successful BBC website, often carries relevant stories and provides a good overview of scientific advances.

New Scientist (**www.newscientist.com**) and *The Economist* (**www.economist.co.uk**) are also useful for background issues, and *The Economist* will also give you a free screensaver when you register!

Nature (**www.nature.com**) includes an extremely useful section on the Kyoto Climate Conference, including briefings, commentary, and links to other relevant sites.

If you are looking for specific petroleum-related material, IP members can have a full year of unlimited access to *Oil and Gas Journal* Online for just $36 (**ogjonline.com/ipmembers.html**). OGJ Online includes the current issue, archive search, special reports, editorials, analyses, forums and much more.

Alexander's Oil and Gas Connection (**www.gasandoil.com/goc**) includes a wealth of information on news and trends, contracts awarded, discoveries, plus regular reports and features.

Many sites are now starting to use databases, thus enabling users to interrogate the information held on the site. One example of this is Deepwater (**www.deepwater.co.uk**), available via subscription, which offers up-to-date data on over 250 onshore fields, searchable by a wide range of criteria.

Of course there is also the IP's own News in Brief Service which is provided completely free of charge! Updated daily, it carries the latest stories from around the world. You will find this and many other useful pages on the Institute's website, including the full Publications Catalogue, a calendar of forthcoming events, and over a hundred links to other sites (**www.petroleum.co.uk**).

If you have any comments or suggestions regarding the IP website, please e-mail the Webmaster Catherine Pope at **cpope@petroleum.co.uk**

NEWS Upstream

UK launches 18th seaward licensing round

New exploration technologies will target oil and gas prospects in mature offshore areas of the UKCS, stated UK Energy Minister John Battle announcing the 18th seaward licensing round. The round offers licences for a number of blocks in the northern, central and southern North Sea and in the northern half of the Irish Sea, Liverpool Bay and Morecambe Bay. Some of the blocks were last available for licensing 25 years ago and have been given up by previous licensees as a result of the fallow blocks initiative.

Advances in exploration and production technology are expected to drive forward new approaches to the whole acreage on offer. Projects under licences awarded in this round will be subject to the requirements of regulations to implement the Environmental Impact Assessment (EIA) Directive which entered into force on 30 April 1998. Under the regulations, the public will be able to access the EIAs on which they can comment to Government.

The closing dates for applications are the 10 and 11 September 1998.

Larch field to produce through Brae

Marathon Oil UK, on behalf of the Brae Group, has completed arrangements to process and transport oil production from the Larch field via the Brae A platform in the central North Sea.

Crude oil and natural gas liquids from the Larch subsea development will be exported to shore via the Brae-Forties pipeline to Cruden Bay. First oil is scheduled in 2H1998, with peak rates up to 17,000 b/d. Up to 12mn cf/d of gas is also expected to be produced in 1998.

Larch is the fourteenth third-party field contracted to Brae and the fourth to include platform processing. Overall Brae and third-party oil throughput approached 400,000 b/d in 1997, equivalent to 15% of UK output and making the Brae pipeline system the third largest transporter of Britain's oil production.

Green light for Flora field development plans

The UK Department of Trade and Industry has given Amerada Hess (operator, 85%) and Premier Oil (15%) the green light for the fast-track development of the Flora field in North Sea blocks 31/26a and 31/26c.

Flora will be developed as a subsea tieback to the Fife field located 8.5 km to the south using the *Uisge Gorm* floating production, storage and offloading vessel which currently produces both Fife and the Fergus field (also developed by Amerada Hess and Premier Oil). Development comprises three wells – two horizontal producers and one vertical water injector.

Flora has estimated recoverable reserves of about 17mn barrels of oil. First oil is scheduled in October 1998, just 15 months after the discovery well 31/26a-12 was drilled. Initial production is expected to reach 20,000 b/d.

According to Francis Gugen, Managing Director, Amerada Hess, the fast-track development of Flora will 'not only increase our production but will extend the plateau production of the Fife and Fergus fields'. He also pointed out that fast-track developments of smaller fields are 'becoming increasingly important, especially at a time of low oil price, and when the Government's review of the North Sea fiscal regime has introduced serious questions about the economic viability of some new developments in the North Sea'.

Amoco expands Egyptian portfolio

A new discovery and rapid development of a discovery first brought onstream in October 1997 have enabled Amoco Egypt Oil Company to increase Gulf of Suez production to 332,000 b/d of oil through the Gulf of Suez Production Company, the joint venture between Amoco and the Egyptian General Petroleum Corporation.

The South Gharib SG310-4 well in the Gulf of Suez has produced 18,800 b/d of oil from the first of two pay zones in the Miocene upper Rudeis formation. An additional three wells, one of which is currently being drilled, are planned to develop the new field. According to Amoco, the field is estimated to hold reserves of 25mn barrels, making it the largest company find in the region to date.

The company also reports that it has achieved initial production of 32,000 b/d of oil and 5.1mn cf/d of gas from its East Tanka Asl oil discovery in the Gulf of Suez. Coming onstream in October 1997, the 12mn- to 16mn-barrel Miocene discovery is located close to the large October field. It has been developed by a low-cost tripod platform design claimed to be the first of its kind to be used in Egypt. Five successful wells have been drilled in the extensively faulted area.

In Brief

United Kingdom

***Norwegian offshore services company** Petroleum Geo-Services has secured a contract from Ranger Oil to produce oil from its North Sea Kyle field. The field, due onstream in 1999, holds between 15mn and 20mn barrels of oil.*

***The first development well in the** Ranger-operated Columba E field in the North Sea has entered production at a rate of over 9,000 b/d.*

***It is reported that Powergen plans to** raise over £300mn from the sale of its North Sea and Liverpool Bay assets.*

Europe

***Enterprise Oil and Eni report that the** Volturino 1 well in the Volturino concession, which has tested at 6,793 b/d, confirms the extension of the Monte Enoc field into the concession acreage.*

***Ramco Energy subsidiary Medusa Oil** and Gas has signed an agreement with Jugopetrol Kotor, the Montenegrin state oil company, to explore a block covering the southern half of offshore Montenegro. Some 90% of the acreage lies offshore.*

North America

***BP Exploration Alaska plans to boost** oil output from its North Slope fields by 100,000 b/d over the next few years – more than a 20% increase. The increase will be fuelled by four new fields – Badami, Northstar, Liberty and Tarn – due onstream by 2001, and enhanced oil recovery in existing fields.*

***Mariner Energy is understood to have** acquired from Chevron an additional 30% equity in the Pluto deep-water project in the Gulf of Mexico, bringing its total interest to 97%.*

***Texaco's Barite South gas project in** East Cameron block 381 in the Gulf of Mexico is reported to have come onstream, producing in excess of 50mn cf/d of gas from its first well. Production is expected to peak at 140mn cf/d by end-1998.*

***BP Exploration Alaska has acquired a** 50% stake in the Alaskan Sandpiper field and is to become operator. Murphy retains a 28% interest and PetroFina Delaware 22%.*

North Sea drill cuttings initiative unveiled

The UK Offshore Operators Association (UKOOA) has launched a new twin-track initiative in a bid to find the best way to deal with drill cuttings on the seabed of the North Sea – a legacy from the industry's earlier operations in this region.

The cuttings are produced as a well is drilled. Drilling mud, used to lubricate and cool the drill bit, carries the cuttings to the surface, where they are separated from the mud, cleaned and discharged to the seabed.

The problem of drilling cutting accumulations is largely confined to the central and northern North Sea regions. Here, seabed currents are weaker and not able to rapidly disperse the cuttings to allow any remaining traces of drilling mud to biodegrade as is the case in the shallower waters of the southern basin.

Building on the body of work to date, the initiative will implement a technical and scientific programme of research, together with a broadly based stakeholder dialogue, with the aim of identifying acceptable and practical solutions for the removal of old drill cuttings.

According to Eric Faulds, Shell Expro's Decommissioning Manager and leader of the UKOOA Task Force, although the industry has developed a number of ideas there is currently no proven technology for the removal of old drill cuttings. Options include removing the cuttings completely, by pumping, dredging and using speciall y designed underwater vehicles, or treating them in place on the seabed by capping with impermeable material or using bioremediation processes which introduce 'bugs' to accelerate the natural breakdown of hydrocarbons.

'Without developing new environmentally acceptable removal techniques, trying to move the drill cuttings could cause more environmental harm than leaving them in place,' stated Faulds. 'Cleaning or treating cuttings in place, at great depths on the seabed, is also surrounded by unknowns.'

Marine scientists, environmental groups, specialist contractors, regulators and other North Sea interest groups such as fishermen have been invited to join in discussions, with the first seminar planned in October 1998. The initiative is also backed by the Oil Industry International Exploration and Production Forum (E&P Forum). According to James May, Director-General of UKOOA, the Norwegian oil industry organisation OLF is also keen to participate.

It is hoped that the initiative will yield helpful inputs for the next international discussions on drill cuttings, to be held in February 1999 by the Sea Bed Activities group of OSPAR (the Oslo and Paris Conventions governing all aspects of marine pollution in the North East Atlantic region).

As part of the initiative, Shell Expro has published a report on a £1mn survey of drill cuttings at its own installations in the North Sea. The company has drilled over 400 of the 1,600 wells in the North Sea in the last 30 years. The number, size and location of drill cuttings accumulations at 35 Shell/Esso sites in water depths up to 167 metres were established. Accumulations were confined to an area immediately below each installation, typically lying over an area about the same size as the base of the platform. Most were found to be up to two metres at their thickest, with a minority around 10 metres.

The total weight of Shell Expro cuttings is estimated to be between 200,000 to 240,000 tonnes. By comparison, the onshore UK mining industry produces 400 times this amount of residue every year while UK households produce 135 times this tonnage in household waste annually, states the company.

In the mid-1990s, oil-based muds were replaced with light synthetic muds in a bid to limit the environmental risks. The lubricators in synthetic muds are 'synthesised' from products such as ethylene and basically contain carbon, hydrogen and oxygen atoms in different configurations, selected for their low toxicity and ability to biodegrade.

However, research has shown that synthetic muds are not breaking down naturally in seawater as quickly as expected and in a further move to minimise impacts, operators in the UK are phasing out discharging cuttings contaminated with synthetic muds by the end of the year 2000. These cuttings will be reinjected into wells or taken ashore for treatment.

South China Sea developments

Arco and the China National Offshore Oil Corporation have expanded a cooperation agreement for development of the Ledong natural gas fields in the South China Sea to include structures in the nearby Wenchang area.

The supplementary agreement increases the likelihood that a commercially viable project can be developed by combining the Ledong/Wenchang prospects with the nearby Arco-operated Yacheng 13-1 gas field which has been supplying gas to Hong Kong since 1996.

In Brief

Middle East

***Occidental Petroleum has signed an** exploration and production sharing agreement for Block 27 in Oman.*

Russia & Central Asia

***Mobil is reported to have won the** rights to develop the Serdar block in Turkmenistan's first offshore oil and gas tender. The block is a political hotspot with both Azerbaijan and Turkmenistan laying claim to it, the former having named it Kyapaz.*

***Elf Aquitaine is understood to have** signed an agreement with Azeri state oil company Socar, Mobil and Agip for the construction of a drilling platform for exploration in the Caspian Sea.*

***Eni of Italy is reported to have signed** a production sharing agreement with Azeri state oil company Socar for exploration of the offshore Araz-Kurdashi-Shirvan Deniz region in the Caspian Sea.*

***Rosneft and BP are reported to have** formed a strategic alliance to explore part of the Sakhalin shelf on Sakhalin Island.*

***Azeri state oil company Socar is** seeking interest from foreign companies wishing to evaluate and ultimately rehabilitate and expand the NGDU Narimanov, Bulla Deniz, Palchyg Tapesi, Neft Dashlary and Bakhar producing offshore fields. Combined recoverable reserves are put at 450mn barrels of oil and 3.4tn cf of gas.*

Asia-Pacific

***Premier Oil and Shell Exploration have** agreed to combine their onshore exploration, development and production interests in Pakistan into a joint venture company valued at $390mn.*

***The China National Offshore Oil** Corporation and Santa Fe Energy are reported to have discovered a new oil field – Panyu 4-2 – in the Zhujiang River Mouth in the South China Sea.*

***Lasmo has signed a production sharing** contract for the Malagot onshore exploration licence in western Irian Jaya, Indonesia.*

***BHP Petroleum is understood to have** sold its interests in the Jabiru, Challis and Skua oil licences in the Timor Sea to Gulf Canada Resources for an undisclosed sum.*

Lining technology in the pipeline

A new joint industry project has been launched in a bid to develop lining systems for multiphase flowlines. A total of 14 companies – Amoco, BG, BP, Eni Agip, EMC, Mobil, Safetyliner, Shell, Shell Chemicals, Statoil, Subterra, Texaco and Wellstream – are participating in the first phase of the project. The venture is being managed by Offshore Technology Management (OTM) with BG Technology acting as the technical contractor in the first phase.

Polymer linings have been used as corrosion resistant barriers for new-lay subsea water injection pipelines for a number of years in the North Sea and have also been used extensively for hydrocarbon service in offshore lines in North America. Such linings enable the use of ordinary carbon steel pipe, and a reduction in pipe wall corrosion allowances, instead of much more expensive corrosion resistant alloys or clad pipe.

However, over time, gas permeates through the lining into the annulus between it and the steel host pipe, reaching a pressure close to that in the bore of the pipe. When the pressure within the pipe is reduced either during depressurisation or normal operational functions, the expansion of the gas within the annulus may cause partial or total collapse of the lining. This, in turn, can result in pipeline blockages, rucking or damage to the lining. The joint venture aims to develop a practical system of subsea venting or a lining system which does not need venting in order to eliminate these problems.

Decommissioning plan for Fulmar SALM

Shell Expro has submitted an updated decommissioning programme to the UK Department of Trade and Industry based on a proposal from Heerema Marine Contractors for disposal of the Fulmar single anchor leg mooring (SALM) buoy.

The 5,150-tonne buoy, formerly part of the crude oil offloading system serving Fulmar and three other fields in the central North Sea, is currently moored in a fjord near Hjelmeland, northeast of Stavanger, Norway. Heerema proposes to bring the SALM in its vertical position alongside the nearby yard operated by Ardal Mekaniske Verkstad (AMV), less than 500 metres from its present mooring, and lift it on to the quay using a heavy lift crane vessel. This is essentially a reversal of the buoy's original installation procedure, also carried out by Heerema in 1981.

AMV would be subcontracted to carry out the onshore scrapping and recycling of the buoy. More than 2,500 tonnes of recovered steel, about half of the buoy's total weight, would be sent to a smelting plant in Norway for recycling. Other metals are also planned to be recovered while the SALM's 1,650 tonnes of haematite ballast would be sent for recycling. Around 800 tonnes of treated water ballast will also be removed and dealt with by a specialist waste disposal contractor.

UK tax review threatens industry future

A major new study has confirmed that the UK oil industry will have to compete harder in the world marketplace to attract future exploration investment, according to the UK Offshore Operators Association (UKOOA). The report shows that in many respects, the UK already lags behind other mature provinces such as Norway, the US, Angola, Indonesia and Australia, let alone the frontier provinces.

The report, incorporating a study by Petroconsultants for UKOOA, shows that the economics of investing in UK offshore exploration, particularly in view of the current oil price of $14/b, are a fine calculation, even with the existing UK tax regime. Maintaining the success rate in discovering commercial fields is ever more challenging in a maturing province, says UKOOA. The hostile environment of the North Sea, coupled with diminishing field sizes, raises costs to some of the highest levels in the world. According to the latest UK Department of Trade and Industry figures, the average cost of new fields is in excess of $10/b – more than twice that of certain other regions in the world. The study shows that a low tax burden is essential if the UK is to maintain its competitiveness in an open market. However, the threat of increased taxation levels jeopardising future development has been hanging over the UK oil industry since July 1997, when the UK Treasury announced a review of UK offshore oil and gas taxation.

'At least 380,000 jobs depend on oil and gas production,' explains James May, UKOOA Director General. 'It contributes over £14bn to GDP and represents 16% of UK industrial investment. We are a real success story and we want to build on that success. Much will be put at risk by an increase in taxation.'

In Brief

Premier Oil has announced that the *Zamzama-1 well in the Dadu exploration licence in Pakistan has tested at rates of 24.6mn cfld and 22mn cfld of gas.*

Apache's Stag platform offshore *northwest Australia has come onstream. Output from five horizontal wells is expected to reach 25,000 b/d of oil by mid-June 1998.*

Latin America

A consortium led by energy service *company John Wood Group has signed a 16-year contract worth $800mn with PdVSA to operate, maintain and expand a water injection project on Lake Maracaibo, Venezuela.*

Triton Energy is reported to be putting *its 12% interest in the Cusiana and Cupiagua oil field in Columbia up for sale, together with a 50% stake in the offshore joint development area between Thailand and Malaysia.*

Amerada Hess has plugged and abandoned well 14/09-1 *in tranche A of the North Falklands Basin. Appraisal of the well, which had encountered traces of hydrocarbons, showed that deposits were not present in commercial quantities.*

Africa

Marathon and Santa Fe Energy have *reported that the first appraisal well on the East Orovinyare prospect offshore Gabon has tested at 2,460 b/d of oil.*

BG Exploration & Production and *Edison International have announced two gas discoveries in the West Delta Deep Marine concession in Egypt. Claimed to be in some of the deepest waters yet drilled in the Nile Delta, the two 600 metres-plus depth wells both tested in excess of 30mn cfld of gas.*

Lasmo reports that its F3-NC174 well in *Libya, the second appraisal well on the Elephant oil field, has tested at 8,400 b/d. Field reserves are estimated to be in excess of 500mn barrels.*

Gabon is reported to be extending the *closing date of its ultra-deep offshore licensing round from June until October in order to give interested parties more time to analyse recently acquired 2D seismic data. A total of 13 blocks are being offered in water depths over 3,000 metres.*

New field output boosts UK oil production

April saw UK sector oil production at its lowest level this year although levels were marginally above year-earlier levels and prices were slightly firmer than in March. Gas production followed the normal seasonal decline pattern but output levels were notably higher than a year ago.

According to the Royal Bank of Scotland's *Oil and Gas Index* the main oil output reductions on the month were the falls of 18% in Brent production (–25,000 b/d), 37.5% from Captain (–18,132 b/d), 36.2% from Miller (–13,300 b/d) and 12.9% from Harding (–11,900 b/d). These falls were partly offset by gains of 33.5% from Foinaven (+16,000 b/d), 44.1% from Liverpool Bay (+15,300 b/d), 33.3% from Curlew (+8,000 b/d) and 5.9% from Nelson (+7,449 b/d).

In the gas sector the main production declines were from the Hewell, Jupiter, Brent and Bruce fields while notable production gains were seen from the Indefatigable, Leman, Armada and Johnston fields.

The Royal Bank analysis shows that April 1998 oil production was 43,000 b/d above year-earlier levels. The gain in output was only possible because the 10 fields that have come onstream since April 1997 contributed 275,000 b/d of output in April 1998 while production of all earlier fields was 187,000 b/d (7.4%) lower than a year previously.

In the gas sector a similar pattern was seen. The three new gas fields brought onstream in the last year – J-block, Armada and Boulton – contributed 8% of April 1998 production. In contrast, output of the earlier fields, operational before April 1997, was marginally lower – down by 58mn cf//d or 0.7%.

According to the Royal Bank of Scotland the conclusion is that without the new fields, UK production of oil and gas would be in decline. A continuous stream of new developments is now needed if output levels, company incomes and government tax revenues from the UKCS are to be maintained. The same also applies if the service and supply industry is to be maintained at its present capacity.

(Petroleum Review plans to provide a regular commentary and table of UK North Sea oil and gas production.)

Year Month	Oil production (av. b/d)	Gas production (av. mn cf/d)	Av. oil price ($/b)
Apr 1997	2,513,285	8,479	17.71
May 1997	2,285,537	7,093	19.25
Jun 1997	2,156,115	6,515	17.7
Jul 1997	2,458,846	6,018	18.41
Aug 1997	2,428,302	5,883	18.38
Sep 1997	2,526,529	6,376	18.49
Oct 1997	2,619,632	8,249	19.89
Nov 1997	2,553,987	10,076	19.07
Dec 1997	2,704,516	10,950	17.38
Jan 1998	2,590,822	11,037	15.20
Feb 1998	2,576,522	10,346	14.07
Mar 1998	2,583,422	9,798	13.17
Apr 1998	2,556,644	9,155	13.53

Source: The Royal Bank of Scotland Oil and Gas Index

North Sea oil and gas production

Repsol and Amoco sign Trinidad deal

Repsol is planning to acquire an interest in Amoco's gas assets in Trinidad and Tobago. An initial 10% stake in Amoco Energy Company of Trinidad and Tobago has been agreed in principle, with an option to increase this to 30% at a later date.

Essential to the deal is the future signature of a contract for the acquisition by the Repsol-Gas Natural Group of Trinidad LNG of 6bn cm/y of gas, 4.5bn cm of which will be supplied under a take-or-pay regime. Such an agreement will permit the construction of two trains of LNG in addition to the train that Atlantic LNG – a company in which Amoco and Repsol are major shareholders with 34% and 20% interests respectively – is building in the Caribbean country and which is due onstream in 1999.

Amoco and Repsol also plan to jointly pursue gas-fired power generation projects in Spain, together with natural gas opportunities in Latin America (in particular Brazil) and the Caribbean.

In Brief

United Kingdom

***Santos is reported to have sold its UK** oil and gas assets to Brazilian state-owned company Petrobras for $135mn.*

***Saga Petroleum has opened a new** office in central London and reports that it plans to invest £70mn in the UK in 1998.*

***Montrose Fire and Emergency Training** Centre and Scottish Offshore Training Association are to merge their operations to form a new single-source training venture – Montrose Scota Training International.*

***Hardy Oil & Gas has announced plans** to raise £79.1mn, net of expenses, by way of a two-for-seven rights issue of new ordinary shares. The move will finance a five-fold output increase by 2003.*

***Construction has begun on the UK's** first offshore wind farm located 1km from Blyth on the coast of Northumberland. It is due to begin operating in summer 1999.*

***UK logistics company ASCo Group and** waste management services firm Stoneyhill Waste Management have formed what is claimed to be the UK's first waste management company to offer a complete supply chain service in the handling of all types of offshore waste.*

Europe

***The Italian Basilicata Region has** granted Eni and Enterprise Oil all necessary consents for the development of the Val d'Agri light oil reserves. The agreement will boost oil production from 8,000 b/d to 45,500 b/d in 2H2000 and to over 100,000 b/d thereafter.*

***Announcing its quarterly figures for** the first time, Italian oil and gas group ENI is reported to have recorded a 3% rise in operating profit in 1Q1998 to L3,901bn ($2.2bn), despite a 33.8% drop in oil prices and lower sales of L16,316bn during the period. The Italian Treasury is due to sell off a 12% stake in ENI in a fourth tranche of share sales later this year. This latest sell off will leave the government with a less than 50% stake in the company.*

***Elf Aquitaine has sold its Italian oil and** gas subsidiary Elf Idrocarburi Italiana to Edison Gas. Elf has retained its petroleum products distribution operations in Italy.*

NEWS Industry/Training

Russian oil company results hit by low oil prices

The continued drop in world crude oil price has had a significant impact on Russian oil company financial results this year (see Table). All the companies concerned are involved in the business of oil production and have no downstream operations to help offset declining revenues as the price of their main product falls. The price of crude oil has fallen by a third over the past year.

Company	1Q97 ($mn)	1Q98 ($mn)	%change
Nizhnevartovskneftegaz	3.3	–8.8	–166
Tyumenneftegaz	28.9	2.5	–91
Tatneft	88.3	–168.4	–91
Megionneftegaz	25.4	8.2	–68
Surgutneftegaz	154.0	80.7	–48

Source: Russia Morning Comment, *United Financial Group (UFG), Moscow*

Russian oil companies' first quarter results in 1998 compared with those in 1997

DuPont safety training

DuPont SEMs (Safety and Environmental Management Services) is to hold a seminar in London on 30 November to 1 December on work safety and accident prevention for industrial managers. The two-day course will give upper and middle management in manufacturing industries an overview of the DuPont way of reducing accidents. The company claims to have the lowest accident rate in the chemical industry worldwide – 0.25 per 1,000 employees per year.
Tel: +44 (0)117 931 3120
Fax: +44 (0)117 931 3132

1998 Birthday Honours

John Browne, British Petroleum CEO, was awarded a Knighthood in the Queen's 1998 Birthday Honours for his services to the oil and gas industry.

Others honoured for their service to the industry were: Thomas Hollobone, Secretary of the International Marine Contractors Association and Association of Diving Contractors, awarded an OBE for service to the Health and Safety in the diving industry; and John Brown, lately Area Manager of Esso UK, who was awarded an MBE for his service to the petroleum industry and disabled people.

Inspectorate acquired in BSI expansion plan

Independent inspection company Inspectorate was acquired by the British Standards Institution (BSI) at the end of April 1998. The sale followed Privy Council approval for a change in BSI's self-funding status which now allows it to invest in and embark on an international expansion programme.

Inspectorate offers a 'cradle to the grave' service – tailored to fit customer requirements – supervising shipments of crude oil and carrying out various analyses on cargoes for the purpose of commercial settlement.

Its Metals and Minerals Division offers a Spent Reforming Catalyst Recovery Programme for the refining industry. This service includes management of the total precious metal recovery programme from receipt of information that a parcel is available for refining, through to completion for commercial settlement purposes.

According to Inspectorate the evaluation procedure provided as part of this service is crucial to obtaining an accurate representative and homogeneous sample of the precious metals that are recovered from the reforming catalysts, because settlement for the intrinsic precious metal content is based upon the sample analysis, rather than an actual or total recovery from a particular lot of material.

Demystifying the assessment centre process

A growing number of engineers are required to attend 'assessment centres' as part of the selection process for new jobs.

London-based ABMD Management Development Consultants is to launch a new three-hour evening workshop in July which, it claims, will unveil the 'mysteries' of psychometric tests, group discussions, role plays and other searching assessment activities utilised at such centres.

The workshop will highlight what can be expected at an assessment centre, what assessors look for, and how candidates can prepare themselves to perform at their best. The course will run on a regular basis. Further details available from ABMD on +44 (0)1753 892494.

In Brief

Paris-based consultant Enerfinance is *to change its name to Petro Finance.*

The Hellenic Republic is offering a *23% stake in Hellenic Petroleum through a public offering of the Greek company's shares.*

North America

Stolt Comex Seaway plans to acquire *all of the outstanding common stock of Ceanic Corporation for $222mn.*

Russian oil company Lukoil has opened *its first US office at New Madison Avenue, New York.*

It is understood that Renaissance *Energy of Alberta, Canada, has acquired Pinnacle Resources for C$1.06bn.*

Arco is to reduce its 82.2% ownership *of Arco Chemical stock to 50% as part of a drive to focus on its core oil and gas businesses. The stock is estimated to be worth $1.3bn.*

Pogo Producing Company is reported *to be planning to acquire Arch Petroleum for $115mn.*

Middle East

Saudi Basic Industries Corporation *(Sabic) has achieved a 12% increase in production this year compared with the first five months of 1997. Saudi Arabia's domestic market accounts for 31% of Sabic's sales.*

Russia & Central Asia

Following an earlier announcement *that it will retender its 75% holding in Rosneft in July at $1.64bn, the Russian Government has unveiled plans to sell its remaining 25% interest, less one share, by the end of 1998.*

The European Bank for Reconstruction *and Development, Overseas Private Investment Corporation of the US and the Export-Import Bank of Japan are reported to have agreed a $177mn loan to help finance the Sakhalin II project in Sakhalin Island.*

Russian gas company Gazprom is *reported to be urging the Government to sell a further 2% to 3% stake in the company to a strategic western investor. The interest is said to be worth $1bn.*

NEWS Industry/Training

Energy demand growth slows in 1997

The steady rise in world energy consumption slowed during 1997 with demand outside the Former Soviet Union (FSU) increasing by only 1.6%, half the rate of growth of the previous three years.

Rapid growth in the emerging market economies, excluding the FSU, contrasted strongly with very slow growth in the OECD and a fall in Europe, according to the latest *1998 BP Statistical Review of World Energy*.

World demand grew by 1% with hydro and oil being the fastest growing fuels while gas and nuclear use decreased. The largest rise in consumption was Ireland, up by 9.8%, but rapid growth was also recorded in Brazil, Iceland, Indonesia, Spain and Taiwan. India increased its consumption by 6.1% to become the world's sixth largest energy market.

World oil consumption grew by 2.1% in 1997 to 71.7mn b/d, slightly slower than in 1996. Asia, excluding Japan, saw the fastest growth, up by 5.1%, followed by South and Central America which grew by 4.1%. Consumption in the US and Europe rose by only 1%, while consumption in Japan fell by 1.3%. Much of this was attributable to a milder than normal winter in the northern hemisphere.

World oil production grew by 3.1%, the fastest rate of growth since 1988. Opec production rose by 5.4%, with Iraq up 94.3% as exports resumed. Opec's share of total world production rose to 41.5%, its highest level in more than a decade.

Growth in non-Opec production, excluding the FSU, slowed to 1.4%. The UK saw a 1.6% decline in production. US output fell by 0.9% but this was offset by an increase of 4.4% in Mexican production. Output from the Russian Federation grew by 1.6%, reversing the unbroken falls in production of the last decade. Increasing production in Kazakhstan and Uzbekistan contributed to a rise in total FSU production of 2.2%.

World gas consumption fell by 0.2%, the first annual decline since 1975, with consumption in the OECD area generally weak as a result of an unusually mild winter.

World gas production fell by 0.2% with declines of 5.4% in Russia and 11.5% in the Netherlands.

In Brief

***Russian oil companies Yukos and** Sibneft are reported to be planning to put on hold the proposed merger of their operations. It is understood that Elf, which had negotiated the purchase of a 5% stake in the merged Yuksi operation, will now acquire a 12% interest in Sibneft for the same price.*

Asia-Pacific

***Kunio Komatsu, Chairman of Japan** National Oil Corporation (JNOC) is reported to have resigned amid allegations that the company has amassed some $6bn of bad debts.*

Latin America

***A $6bn offering in Brazilian oil company** Petrobras is reported to be on the cards. The sale would reduce the state's share in the company to 51%.*

The *BP Statistical Review* (see left) can be viewed at **www.bp.com/bpstats**

Phillips licences new refining technology

Phillips Petroleum has begun licensing a new proprietary technology which it commercialised at its Woods Cross, Utah, refinery. The reduced volatility alkylation process (ReVAP) is claimed to cut airborne hydrogen fluoride (HF) emissions in the event of an accidental release by 60% to 90% compared with other refining processes currently available on the marketplace.

Phillips jointly developed the ReVAP process with Mobil Oil and installed it in late 1996 at both the Woods Cross facility and Mobil's Torrance refinery in California.

'ReVAP has three principal advantages,' explains John Mihm, Senior Vice President of Corporate Technology at Phillips. 'First, it can be used in existing HF alkylation units. Second, it is environmentally friendly. And third, it is relatively low cost, allowing refiners who use the HF process to greatly reduce their risk while remaining competitive.'

HF alkylation is a refining process used in more than a hundred refineries worldwide to produce a high-octane blendstock for unleaded gasoline.

ReVAP unit at Woods Cross refinery, Utah. *Courtesy Phillips Petroleum.*

Energy trading: more risk, more pay, more women?

A recent report commissioned by energy information specialist Saladin has highlighted that the most successful energy trading rooms are those that are more entrepreneurial, more risk taking, more reward focused and less male-dominated than others. The market survey, conducted by independent consultants Douglas-Westwood Associates, had two objectives: to uncover the prime factors behind trading room success, and to investigate the impact of liberalising energy markets worldwide.

Of the 37 companies cited by the survey as being the most successful in this sector, the top three trading rooms were Enron, Vitol and Morgan Stanley, followed by J Aron, with two companies sharing fifth place: BP and Koch.

Information was found to be the paramount factor in trading room success, topping both risk management and cultural factors. Traders reported that around half of every day was devoted to accessing and using information. The impact of the more volatile and immediate natural gas and power markets was evident in that real time prices and news were deemed of greatest importance with fundamentals data, in particular weather information, a growing necessity.

Three-quarters of traders surveyed reported that levels of Internet usage has increased over the past year. Over 20% of trading rooms implemented new risk management systems during this period, and nearly a third noted advances in sophistication; in implementation of value at risk; and in systems, controls and procedures. Further systems developments are expected over the next year.

A number of managerial aspects were also identified as being important for success: getting the right mix of people, providing the capability to share information, giving individuals high rewards and effecting an appropriate risk management policy.

Liberalisation of energy markets, particularly in gas and electricity, was found to have had an impact on trading – but, so far, has been less dramatic and more gradual than has often been stated. Around half the survey group had little visibility, or understanding, of the differences between the various sectors. However, about 45% reported some effect on their own recruitment and resources while 30% noted changes in their approach to trading, the commodities being traded and trading room performance.

The greatest impact on energy markets overall was widely held to be an increase in cross-commodity trading. Over the next two years traders predict further growth and opportunities, continued development of mixed and derivatives trading, and – on the downside – increased competition, market instability, restructuring and fallout.

In Brief

United Kingdom

UK supplier of environmental fuels, *Greenergy, claims to have developed the UK's first 'Citypetrol' – a cleaner-burning form of gasoline fuel that is said to offer greater environmental benefits than those achieved with Citydiesel.*

Conoco has signed a five-year contract *to supply Yorkshire Electricity with 1bn therms of gas from the beginning of October 1998.*

Over 200 truck drivers took to the *roads in London and Birmingham on 8 June 1998 in protest against the high price of diesel fuel in the UK which is said to be some 30% more expensive than on the continent.*

Tesco is to add a further 32 sites to its *50-strong network of service stations currently selling City Diesel. It is also to relaunch its low benzene unleaded fuel under the name 'City Petrol'.*

Texaco has signed a supply agreement *with independent fuels retailer MPK. The 21 Midlands-based dealer sites have been rebranded with Texaco livery and will be supplied by the oil company's Kingsbury terminal in Staffordshire.*

The Retail Motor Industry Federation *(RMI) has called on the UK Government to offer tax concessions to operators of service stations in Northern Ireland in a bid to prevent the illegal trade in cheap, black market petrol imports from south of the border.*

Europe

Mol has sold its 43% minority stake in *LPG retailer PB Gaz Szerviz, which currently holds 20% of the Hungarian LPG market, to majority shareholder TOTAL.*

EuroGas has entered into an agree- *ment with National Power to form a joint venture company in Poland to develop a gas-fired combined heating plant in Zielona Gora, western Poland.*

The Norwegian Gas Negotiating *Committee (GFU) and UK gas marketing company Alliance Gas have signed a 15-year agreement for the supply of 0.55mn cmly of Norwegian gas to the UK market. Deliveries to St Fergus, Scotland, are due to begin in summer 2001.*

NEWS Downstream

Shell Haven refinery closure planned

Shell UK has announced plans to close its Shell Haven refinery in Essex in 1999. The closure is said to be necessary as continued overcapacity, flat demand and intense competition have led to depressed margins and poor returns on investment over the past few years.

There are 10 refineries in the UK, producing 12mn tonnes more gasoline and diesel than UK customers require each year, according to a report published by independent consultant Roland Berger & Partner of Germany in December 1997. Surplus products are shipped to European and North American markets, where there is intense competition with local refineries. The EU currently has a surplus refining capacity of between 70 and 100mn tonnes of crude oil throughput per annum, the equivalent of between 9 and 13 refineries. According to Shell, the overcapacity and related highly competitive European markets for refined products have in recent years led to an overall average return on capital in European refining of just 4%.

Shell UK expects these conditions to persist, driven by the increasing use of gas rather than oil in power generation and heating, new opportunities for eastern European and Former Soviet Union refineries to export to western Europe, and the continuous trend towards more efficient vehicle engines. In addition, more stringent EU specifications for gasoline and diesel, aimed at further reducing environmental impacts, will demand further substantial refinery investments.

The company plans to focus its refining operations at its larger refinery at the Stanlow Manufacturing Complex at Ellesmere Port in Cheshire which processes 12.3mn tonnes of crude oil and feedstock per year. Shell Haven refinery employs 290 staff and processes 5.1mn tonnes annually. Representing under 5% of the UK's crude distillation capacity, it is likely that the closure of Shell Haven will have little impact on the UK refining industry.

Competitive UK gas

The UK Government has announced a number of industry action plans aimed at improving the competitiveness of the UK gas industry. The plans have emerged from a five-month study that considered how recent market changes have affected the competitive position of the industry.

Actions include the creation of a customer oriented industry forum, a more integrated approach to the development of the Public Gas Transportation market, continued promotion of the opening of European gas markets, and the establishment of a working group – chaired by DTI and Ofgas – to look at gas related research and development issues.

May UK fuel prices

	Pence per litre
Diesel	
Lowest: Stoke-on-Trent	64.07
Highest: Inverness	69.31
National average	66.76
Unleaded petrol	
Lowest: Stoke-on-Trent	63.74
Highest: Cambridge	68.39
National average	65.93
Four-star petrol	
Lowest: Halifax	69.68
Highest: Aberystwyth	75.16
National average	71.99

Source: *PHH Allstar Fuel Report*

In Brief

North America

Chevron is reported to have signed an *agreement to acquire Amoco's North American lubricants marketing business.*

Shell, Texaco and Saudi Aramco are *reported to have been given the go-ahead to merge their eastern US refining and marketing assets. The new Houston-based venture will trade under the name Motiva Enterprises LLC.*

Russia & Central Asia

Chevron has opened what is claimed to *be the first western service station in the new Kazakh capital of Astana. The site is the second brand service station to be opened by Chevron in Kazakhstan.*

It is reported that Iran plans to issue a *tender for a $400mn oil pipeline linking Iran's Caspian Sea port of Neka to Tehran. It is envisaged that the 392-km line will form part of a larger pipeline carrying Caspian oil from Neka to the Kharg terminal on the Persian Gulf.*

Latin America

Van Ommeren has formed a new 30:70 *joint bulk storage venture with Peruvian logistics company Serlipsa. The new venture, Serlipsa Van Ommeren Terminals, will operate two terminals with a total capacity of 176,000 cm.*

Africa

Shell is reported to have formed a new *company – Shell Nigeria Gas – to market natural gas in Nigeria.*

UK Deliveries into Consumption (tonnes)

Products	†Apr 1997	*Apr 1998	†Jan–Apr 1997	*Jan–Apr 1998	% Change
Naphtha/LDF	173,132	214,034	599,704	989,452	65
ATF – Kerosene	651,754	685,814	2,466,356	2,621,718	6
Petrol	1,902,913	1,688,648	7,215,085	7,050,317	–2
of which unleaded	1,348,511	1,308,788	5,063,136	5,375,941	6
of which Super unleaded	44,157	30,014	176,751	139,181	–21
Premium unleaded	1,304,354	1,278,774	4,886,385	5,236,760	7
Burning Oil	278,671	332,975	1,391,020	1,416,502	2
Automotive Diesel	1,278,303	1,134,019	4,853,338	4,973,383	2
Gas/Diesel Oil	629,036	600,337	2,681,356	2,164,211	–19
Fuel Oil	276,402	229,592	1,772,299	1,074,230	–39
Lubricating Oil	78,727	76,398	291,546	290,527	0
Other Products	721,624	670,259	2,838,713	2,728,709	–4
Total above	5,990,562	5,632,076	24,109,417	23,679,794	–2
Refinery Consumption	518,409	494,326	2,168,934	2,064,995	–5
Total all products	6,508,971	6,126,402	26,278,351	25,744,789	–2

† Revised with adjustments *preliminary

Institute of Petroleum's Annual General Meeting

The 85th IP Annual General Meeting took place on 9 June 1998 with the President David Setchell in the chair.

Chris Moorhouse and David Setchell with the IP Presidential seal

Presenting the President's Report, David Setchell reflected on what he had said at his inaugural address to the AGM two year's ago. 'I put great emphasis on the IP's role in sustaining, enhancing and promoting the reputation of the oil industry and the reputation of its members, asserting that without knowledge of the industry there can be no reputation, and that knowledge must be supported by the integrity of our behaviour.

'Although we have not completed the task, the IP has made very positive progress in all directions: information dissemination has increased and improved on all fronts – the Library, the Internet, publications generally, *Petroleum Review* in particular, conferences, while technical work on operating standards and codes of practice help to maintain behaviour affecting safety, efficiency and environmental sensitivity at a high level. The IP's Lifetime Learning programme, now established and operating, promotes both information dissemination and individual professional development, although by its very nature the effect on the industry's reputation will be cumulative and progressive rather than instantaneous.

'At the same time, the IP retains, and is seen to retain, a very independent position in the oil industry's firmament. This also works to the advantage of the industry, not least in being able to offer open forums for the exposure of and debate of major issues – whether they be technical, commercial or political.'

He went on to thank IP Director General Ian Ward and all IP staff for their hard work over the year, and paid tribute to the many volunteers who 'give freely and abundantly of their time' to Institute committees, working groups and forums. He also urged corporate members to encourage their employees to join the IP and its various activities stating that: 'It is in their best interests that the IP's output – particularly in the technical area – should be sustained.'

Council members, also volunteers, were also warmly thanked for 'their guidance and participation' over David Setchell's two-year term as IP President. He paid particular tribute to Honorary Treasurer David Sharp and Honorary Secretary Terry Moore, before moving to his official duties in the Council election process.

Orders of the day

First order of the day, was the election of Chris Moorhouse, Chief Executive Officer, International Trading, BP, as IP President for the 1998–99 session.

Terry Moore was re-elected as Honorary Secretary while Peter Newman took over as Honorary Treasurer for the 1998–99 period, replacing David Sharp, who steps down after five years' service. Peter Newman is Managing Partner, Oil & Gas Industry Services–Europe, Middle East, India and Africa of Arthur Anderson's London office. He is also a member of the Oil Industry Accounting Committee.

There were four vacancies for Ordinary Members of Council, two of which were filled by the re-election of Dr Graham Bell, Chief Medical Advisor, Esso UK, and David Brown, Deputy Head HSE, British Petroleum. The remaining two vacancies will be filled on a 'casual' basis over the next few months. Clive Fowler, Managing Director, Amoco (UK) Exploration, was appointed as a Nominated Member of Council.

IP Director General Ian Ward reported that Bob Hooks of Shell Research was standing down as Branches Member of Council having served his three-year term and that Alan Higgins, Chairman of the Aberdeen Branch, was to fill the vacancy. He then went on to present the Report of Council which was subsequently adopted.

The accounts were outlined to the meeting by the 1997–98 Honorary Treasurer David Sharp, and adopted. Auditors Ernst & Young were re-appointed as auditors for the coming year.

David Setchell went on to present Awards of Council for many years of meritorious service to the Institute to Ted Hill, Bob Hooks, David Sharp and Simon Shimmin (see photos). He also thanked the retiring members of Council: David Sharp, after serving as Honorary Treasurer for five years; Anthony Levy, after six years; Frans Said who resigned from Council a few months ago after serving for almost six years; Bob Hooks who leaves after three years as a Branches representative on Council; and John Orange who leaves after six years, during three of which he also served as Vice President and Member of the IP Management Committee.

David Setchell concluded his duties by handing over the official President's badge of office to the new IP President, Chris Moorhouse, who went on to give his Presidential address.

'A thriving, financially sound organisation'

Having officially taken on the mantel of IP President to see the Institute into the millennium, Chris Moorhouse took the podium to give his Presidential address.

Ladies and Gentlemen, it really is still a surprise to me that I am standing here tonight on the occasion of taking over the Presidency of the Institute of Petroleum. David Setchell has set such a high standard during his two years as President and he will be a hard act to follow. I would like to commence my Presidential address by thanking David for all the hard work, support and dedication that he has given to the IP over the last two years, made all the more difficult because of the momentous events occurring within Gulf UK in which he has played a major role. We will remember him particularly for his support and enthusiasm for the implementation of the Lifetime Learning initiative, and also for his style, his approachability and his excellent wit, always seeming to have just the right amusing anecdote for every occasion. I am counting on his continued coaching and support in his role as Past President.

I have actually been a member of the IP for nearly 28 years, although until quite recently I really only thought about the IP in terms of the magazine *Petroleum Review* which arrived faithfully every month, no matter which country I was working in at the time, and the IP dinner, where as a trader in the 1980s I used to be a frequent attendee of many of the fringe events and parties.

I think this reflects a theme which continues – the constant ongoing need for communication of all that the IP is doing to support the needs of its individual and corporate members. Since I became CEO of BP Oil UK in October 1996 I have been more involved with the affairs of the IP and now have a much better understanding of what is going on. Fortunately my new job as CEO of International Trading for BP still leaves me with an appropriate base and I believe next February will be the first time that the President's speech at the IP Dinner will have been given by a trader, somewhat appropriate given the multitude of traders gathered for the various fringe events. Who knows, some of them may actually turn up at the real IP Dinner!

IP support

Individual membership has reached a record level of 8,355. We have seen continual growth of self-employed specialists and smaller service providers. On the other hand, we do note a decreasing number of corporate memberships which also reflects an increasing number of company mergers and reorganisations.

We will look to maintain diversity of membership and expand our international reputation, particularly in Europe. This will be the key to influencing the debate around the big issues affecting the industry from the IP's position of neutrality and independence.

Centre of excellence

Considerable emphasis has been placed in further developing our relationships with other industry bodies and I am pleased to see that one of my first duties as the incoming President is to host a meeting which David Setchell has arranged with the Presidents of UKPIA and UKOOA to discuss the whole issue of industry reputation which was raised so clearly by Mark Moody-Stuart in his speech at this year's IP Luncheon.

Further work is being pursued to identify those key areas where the technical and scientific experience of the IP should be deployed. With strong pressure on the oil industry through lower oil prices and major restructuring already in place, technical cooperation and recognition of common codes and standards will play a big role in achieving the challenges the industry is facing at the turn of the millennium. This is an area which I believe is under-exploited by the oil companies in their quest for cost efficiency and which I will be taking steps to promote further.

Financial challenge

The challenge remains to increase attendance at both the major flagship events which supplement the programme through the year and meet the special needs of people in the industry.

The IP needs to develop further the range of services which have perceived value for the industry and further increase its financial independence.

Environment

Industry environmental performance, track record and public image will continue to be a major concern with increasing and justified public awareness. I believe the role of the IP is to promote a clear understanding of the issues and facts, and to also provide opportunities for discussion and debate.

The final word

In summary then, the IP continues to be a thriving, financially sound organisation with an increasing role to play in industry efficiency, Lifetime Learning as well as other educational initiatives, and in the environmental debate.

I would like to take this opportunity to again extend my thanks to Council, the committee members and the IP staff for their efforts and achievements and look forward to meeting the challenges of the next two years.

Bob Hooks (FInstPet) joined the IP Test Method Standardization Committee and Analysis Subcommittee ST-G in 1985. At the same time he was appointed Chairman of the Liquid Petroleum Gases Panel, ST-G-1, a position he held until 1988 when the panel was disbanded.

He served as the Secretary of ST-G from 1989 until 1992 when he was appointed Chairman, a position he still holds. He also chairs the IP Volatility Panel ST-B-9.

Bob is an internationally recognised expert on analytical test methods. He regularly represents the UK at ISO/TC 28 and CEN/TC 19 meetings and is the Convenor of CEN/TC 19/WG 15, the working group responsible for the development of European vapour pressure test methods. Bob also advises UKPIA on analytical test methods and forms part of its Test Methods Working Group. He represents the IP at ASTM where he is the spokesperson for volatility and analytical test methods.

In addition to his work in standardization, Bob is an enthusiastic Chairman of Stanlow Branch and he has also just completed a three-year term of office as one of the Branch Representatives on Council.

David Sharp (FInstPet) became Honorary Treasurer of the Institute in 1993, after his predecessor suddenly vacated the position on health grounds.

Over the past five years David has been most generous in providing his time and expertise in helping the IP through a significant period of transition, not only as Honorary Treasurer, but also as Chairman of the Finance Committee, Pension Fund Trustees Committee and Benevolent Fund, as well as being an effective member of Management Committee and Council.

During his term of office he has provided invaluable assistance in guiding the IP through potentially difficult times, particularly during the installation of its new accounting system and in integrating the major changes that are required in accounting procedures and reporting in order to meet the requirements of both Companies House and the Charity Commission. Also during the last few years there have been major changes to pensions legislation which has had a significant impact on the IP; again, with help and guidance from David, the IP has been able to fulfil its obligations.

Simon Shimmin (MInstPet) resigned from the Aviation Committee at the end of 1997 after nine years of acting as a most enthusiastic and dedicated Chairman. Under his leadership, a major research and development programme on aviation fuel filtration has been carried out, a close working relationship with API established, four codes of practice developed or updated, a performance specification drawn up for leak detection systems and action taken in response to fuel-handling incidents. Simon has also played a major role in running three highly successful, and profitable, conferences involving major customers and equipment manufacturers.

All of these activities have been influenced by the sound guidance provided by Simon and they have made a significant contribution to the enhancement of the Aviation Committee's international standing.

Ted Hill (FInstPet) has been associated with the IP for many years. He gave a paper at the IP's Microbiology Conference in 1967 where, in his opening address, the President N A Leslie stated that the IP should 'interest itself more closely in microbiology'. Since then, Ted has been heavily involved with the work of the IP's Microbiology Committee.

Ted studied Bacteriology and Chemistry at University College Cardiff and subsequently became a full-time research student, lecturer and then senior lecturer.

He jointed the IP's Microbiology Committee in the 1970s and became Chairman in February 1985 – a post he held for five years. After serving as 'just a member' for two years, he once more took on the responsibility of chairing the Committee in February 1992 and has held the position since.

Ted has been involved in the problems of microbes in fuels, microbial fouling and corrosion since the 1960s. He has been the author or co-author of over 250 technical papers related to the oil and shipping industries and is an internationally accepted expert in the field of microbiology.

Delays push back North Sea start-ups

Great hopes were being nursed at the start of 1998 that overall North Sea production levels would pass the 6.5mn b/d mark. However, a number of project delays and reserves downgrades mean that the province will now struggle to get past 6.3mn b/d – not allowing for the recently agreed voluntary output cuts by Norway as part of the Venezuela/Saudi Arabia/Mexico-led drive to bolster world crude prices – writes *Jeremy Cresswell*.

Floating production, storage and offloading (FPSO) system-based projects appear to have been particularly prone to delays and cost overruns – but it is hard to work out exactly why. Various reasons have been suggested, ranging from downright optimistic schedules which are heavily reliant on parallel engineering, to oil companies trying to reinvent the proverbial wheel (ie ship), to shipyard/fabrication yard quality control difficulties.

However, platform-based projects such as Britannia and Eastern Trough Area Project (ETAP), appear to be coming together with relative ease, coupled with considerable cost savings along the way.

In the UK sector, the latest *Royal Bank of Scotland Oil Index* shows that the UK has been hard pushed to produce even 2.6mn b/d over the past few months. This compares with the long hoped for 2.7mn b/d late-1990s peak which has remained so elusive. It seems there is little hope of achieving the 1998 average of a record 2.84mn b/d as forecast by Wood Mackenzie Consultants in January.

Meanwhile, Norway has just scraped past its 1997 average to achieve 3.29mn b/d of oil and liquids – some 300,000 b/d down on the 3.6mn b/d that had been predicted by some. As for Denmark, the picture there has been one of relative production stability, with output chugging along at around 235,000 b/d to 240,000 b/d.

UK projects

Of the UK developments expected onstream this year, BP Exploration's FPSO-based Schiehallion/Loyal development west of Shetland is receiving perhaps the most scrutiny. Barring untoward hitches – and none have been admitted to publicly – the £750mn-plus project was due onstream as *Petroleum Review* went to press.

Compared with the Foinaven field, which started commercial output 18 months or so later than planned, Schiehallion has been plain sailing. There have been few, if any, appreciable delays with any part of this development except for a spell of bad weather bottling up the Schiehallion production ship in Sullom Voe for a few weeks.

The $1.6bn BP/Shell ETAP development in the Central North Sea should also come onstream before autumn sets in. Hook-up and commissioning work are currently well underway. Wood Mackenzie notes that some of the seven ETAP fields – with collective

recoverable reserves put at 1.2tn cf of gas and 513mn barrels of liquids – are expected onstream 'late 1998 and early 1999' with others, such as Skua, following at a later date when pipeline capacity becomes available.

Another UKCS development that looks like making first production in line with expectation and with huge cost savings is the Conoco/Chevron Britannia project. The prize is more than 3tn cf of gas and 145mn barrels of liquids – making it the largest ever gas development to be commissioned in the Central North Sea to date.

However, other North Sea project timetables, such as those for Banff and Ross, have been slipping. Banff was due onstream late summer, but a start-up date towards the tail end of 1998 now seems more likely. Some industry pundits had predicted as early as the beginning of February 1998 that the project was running late but Conoco denied this, even though first oil had already been pushed back from the 2Q1998 to 3Q1998. Now it is to be the 4Q1998, largely as the result of a late decision to upgrade process facilities aboard the PGS-owned Ramform Banff production ship at a cost of £10mn.

On the other hand, Conoco can look forward to extracting more oil and gas from Banff than originally declared. Recoverable reserve estimates have risen from 62mn boe to 94mn boe.

Talisman's Outer Moray Firth Ross project has fallen behind schedule because completion of the production ship *Bleo Holm* at UiE's yard on the Clyde is taking longer than anticipated. It looks increasingly likely that the original autumn start-up will slip into winter 1998, although Jim Buckee, Talisman's President and Chief Executive Officer, told *Petroleum Review* that he expected the delay to be measured in weeks rather than months.

It will be interesting to see just what does happen given that discussions have been held between the Canadian company and *Bleo Holm*'s owner Bluewater with regard to enhancing the ship's process systems capability from 40,000 b/d to 60,000 b/d by debottlenecking. Will further upgrade work be carried out before the vessel leaves the Clyde?

The reason behind such speculation is that Buckee is hopeful of a reserves upgrade for Ross – plus the nearby Cromarty satellite may harbour more gas/condensate than hitherto supposed. With that in mind, a further delineation well was spudded on 3 May by the semi-submersible *Petrolia*.

Among smaller developments to come onstream more or less on schedule are the Texaco-operated Galley field and Ranger Oil's Columba E project. Capital expenditure (capex) for Galley, based on the upgraded semi-submersible *Northern Producer*, has been estimated at £110mn, while Ninian satellite Columba E is thought to have cost Ranger around £40mn.

While Ranger's Ninian satellite gas project has gone to plan, the company has pushed the start-up of Banff satellite Kyle (estimated to hold 5.4mn barrels of oil) back to 1999, albeit only a month or so at this stage.

In January, the Oil, Gas and Petrochemicals Supplies Office listed 27 UK Continental Shelf fields scheduled to come onstream this year. Wood Mackenzie was more conservative, listing 22 candidates collectively reckoned to be capable of contributing 160,000 b/d to UK production before the year is out.

Both forecasts have proved over-optimistic and it remains to be seen how many on either list actually make it.

Norwegian ups and downs

Switching to the Norwegian sector, the start-up date for Esso Norge's Balder project, which was originally expected onstream at the end of 1996/early 1997, has been pushed back to 1999. Balder alone is a major story, but suffice it to say that the project has become a litigious mess which has contributed to Smedvig abandoning the idea of developing an FPSO fleet in favour of sticking to what it knows best, namely drilling.

On the other hand, Esso Norge's Jotun FPSO appears to be making steady progress, supposedly with none of the complications that conspired to turn Balder into a nightmare. Start-up is set for late 1999.

Another severely delayed project is Åsgard. Operator Statoil waved goodbye to 1Q1998 first oil following FPSO construction problems at the Hitachi Zosen shipyard in Japan. Aker Stord, which is equipping the vessel with its topsides system, unexpectedly found itself with a stack of extra remedial work to do on the vessel's marine systems. Some 1,800 people are working to get the ship ready for tow-out late November 1998 and the latest start date set for the offshore mid-Norway project is now February 1999.

According to Åsgard Production Vice President Kyrre Nese, the heavy delay will hit profitability, but the project remains robust nonetheless. Break-even price is put at $12/b. Capex has climbed from NKr30bn to around NKr36bn, in part because of Åsgard's increasing size and complexity.

Saga Petroleum is another Norwegian sector operator suffering floater troubles – in this case the Varg FPSO. Now running some seven months behind plan, the company does not expect Varg to come onstream until the 4Q1998. So long as Saga escapes further delays, the ship was expected to set sail for Europe late June, 96.8% complete.

Despite problems at Singapore's Far East Levingston shipyard, Varg Manager Lasse Holen says that the FPSO is up to scratch, which is more than can be said for Varg field reserves. Saga has made no secret that Varg is commercially marginal and that reserves look like coming in at the lower end of estimates, namely 35mn barrels – although it is expected that supplementary reserves will be found in the area.

An indication that Saga has been on a steep learning curve with this project – its first ever production ship – is the fact that the Varg experience, now 20% over budget at NKr3.5bn, is to be used as a case study.

Other projects suffering technical and related postponements include Tordis East, while H-Sentral is one that has been pushed back as a result of the Norwegian Government's decision to deliberately delay a number of projects.

Danish developments

In the Danish sector, Phase 1 of Lulita came onstream at the end of May 1998 with production expected to reach some 10,000 b/d. Lulita, which makes Statoil's Efterforskning & Produktion subsidiary an oil producer for the first time, is being opened up as a tie-back to the Harald field by Danish Underground Consortium (DUC) and the Statoil group which also includes Dopas, Denerco Oil and LD Energi.

Dutch focus on gas

Looking last, but not least, to the Dutch sector where backbone production is based on natural gas. Offshore output from this region is expected to peak in 2001 at around 187,000 boe/d. Contributing this year to that target are NAM's L/9 and K/7 (FC and FD) developments, plus Elf's K/4-A and K/6-GT projects.

In the case of L/9, the NAM platform will carry significant additional process capacity for future satellite tie-ins. Opinions vary as to whether first gas will flow in December 1998 or very early 1999. The original forecast was for mid-1998.

The K/7 discoveries are being developed using extended reach drilling (FC) and a satellite platform (FD).

As for Elf's projects, K/4-A was discovered and delineated by wells drilled over the period 1990 to 1996. Production is expected to peak in 2005. K/6-GT comprises two accumulations, namely G and T, and they are to be exploited via a satellite platform.

IBM links with Agip Petroli to promote integrated refinery computer systems

The latest developments in the computerisation of refinery operations have been introduced at three refineries in Italy. The jointly owned Agip Petroli/Kuwait Petroleum refinery at Milazzo, Sicily, is the latest candidate. *Chris Skrebowski* reports following a recent visit to Milazzo.

Starting in 1993 Agip Petroli has been working to integrate the various layers of computing involved in refinery operations. The company selected IBM as its partner in its step-by-step approach to the work. The two companies have now completed the applications of the new integrated systems to the Agip Petroli Sannazzaro, Livorno and Taranto refineries; a significant part of the system is already operational in Raffineria di Milano SpA, the jointly owned Agip Petroli/Kuwait Petroleum refining company.

In the light of their successful cooperation the two companies have just signed a partnership agreement to develop and implement advanced information technologies for the management and optimisation of the refining process. The agreement extends the existing partnership between the two companies that enabled the joint design and development of Agip Petroli Production Information System (SIPROD). The new agreement aims to maintain the competitive position reached by creating SIPROD and to apply it to all Agip Petroli refineries and subsidiaries. Later it will be applied to other ENI subsidiaries and possibly to third-party organisations.

It also involves the exchange between Agip Petroli and IBM of refining process know-how and IT solutions and architectures respectively.

SIPROD is a modular information system specifically designed to support refinery operations via a common platform. The system is designed in such a way that it can be added to or have parts removed as the overall system is refined and evolved. The system is integrated with IBM's CIPROS (Computer Integrated Process and Refinery Operations) platform, the latest software specifically designed by IBM for use in refineries and petrochemical plants and featuring the latest developments in system architecture.

CIPROS merges all relevant data into coherent management reports and is claimed to improve planning scheduling, monitoring, analysis and decision making in the refineries and petrochemical plants to which it is applied.

Traditionally, refining operations within oil companies have been efficiently linked horizontally but have not usually been able to communicate effectively between the various layers or levels of computerisation.

In the case of refinery operations there would normally be various information systems monitoring market prices and translating these into refinery output plans. These operations can loosely be referred to as business management systems. The primary driver in this area is the maximisation of margins.

The next layer is operations management, planning and controlling arrivals and despatch of crude and products. Here the primary driver is operational efficiency. The final layer is the process control and monitoring of the individual refinery units and the overall refinery processing operation. These are typically real-time operations and the primary driver is the stability of the process or operation.

By developing a common platform that allows the various layers of computer operation to be integrated, systems such as CIPROS offer a number of potential economies. The use of consistent data at all levels minimises errors while effective integration of management control systems with operational systems allows the overall system to become more responsive and profit driven.

IBM has secured a number of contracts featuring CIPROS. In addition to the work with Agip Petroli, these include a contract with Star Enterprise, the Saudi Aramco/Texaco joint venture, for its 230,000-b/d Convent, Louisiana refinery located 50 miles west of New Orleans. Work on this project began in early 1998 and is scheduled for completion by year-end.

IBM is also installing the solution as a pilot for SINOPEC at its Jinan refinery on the Yellow River, 300 miles southeast of Beijing. SINOPEC chose the solution following visits to Agip Petroli's refinery in Sannazzaro and and Raffineria di Roma SpA (the jointly owned Petrofina/Shell/ERG refinery at Rome), both of which feature an IBM solution.

According to Bill Miller, IBM's General Manager, Europe, Middle East & Africa, process and petroleum industry group, the company is putting a greater emphasis on consulting, as witnessed by its recent acquisition of Chem Systems Inc, the management consulting firm based in Tarrytown, New York and London.

Miller explained that major companies still tended to look for systems rather than solutions but there was clear evidence that concepts such as CIPROS were attracting industry interest. He pointed out that with 700 refineries worldwide there was very considerable potential, but did note that the system was only readily applicable to refineries with modern digital monitoring systems. Approximately 150 to 200 of the world's refineries have the sort of monitoring systems that would allow sophisticated computer systems to be readily applied.

According to IBM, a recent study has shown that a 1% saving in operating expenditures can produce a 6% profit increase while a 1% improvement in product yield can result in a 57% profit increase.

Additional information on CIPROS and other IBM refining solutions can be found on the company's website **www.refining.ihost.com**

Colombian prospects improved

Fuelled by fears that Colombia will no longer be self-sufficient in hydrocarbons by 2004, its government has revised its oil and gas exploration and production fiscal and legal framework to include incentives aimed at encouraging exploration for new reserves, writes *Kim Jackson*.

Colombia is a major exporter of oil, consuming just 12.6mn t/y of its 32.4mn t/y production. Its domestic industry is founded on two oil fields holding in excess of 1bn barrels of recoverable reserves – the BP-operated Cusiana/Cupiagua field and the Occidental-operated Cano Limon field. The remainder of Colombia's oil deposits are small, with fields typically holding less than 20mn barrels. Current reserves stand at 2.8bn barrels of oil and 0.23tn cm of gas.

Approximately 65% of the country's 32.4mn t/y of production is exported (some 75% to the US) while all produced gas is consumed by the domestic market. However, domestic demand for oil is rising at the rate of 4%/y while long-term gas demand is expected to reach 14%/y. Unless substantial new reserves, in the region of 4bn barrels, are discovered the country is expected to become a net importer of hydrocarbons by 2004.

New regulatory regime

Colombia's standard association contract terms – with 20% royalties, state oil company Ecopetrol's option to back into 50% of commercial production, and a sliding-scale government take rising with increased production – has meant that the country has remained relatively unattractive to foreign investors in the past. In addition, the country has had a turbulent political history which has led many western oil companies to remain cautious about investing in the region while others have been forced to withdraw operations and sell assets.

However, in a bid to encourage future exploration and foreign investment – especially in relatively unexplored basins such as the Cesar-Rancheria and Amazonas basins to the northeast and southeast respectively and the Choco basin on the Pacific coast – the Colombian Government has restructured its association contracts, reducing Ecopetrol's statutory participation and extending the exploration and production periods. Typical exploration periods were between three and six years, while a standard production sharing agreement covered a 22-year period. Royalty levels and the tax rate, which currently stand at nearly 90%, remain unchanged. Colombia hopes to attract around $4bn of upstream investment over the next five years.

Under the new regime, private sector oil companies are able to turn in existing contracts and receive back up to 25% under more favourable R-factor conditions instead of the previous sliding-scale terms. The R-factor is the ratio between accumulated income and accumulated investment plus accumulated costs. The negotiated terms will reflect the size and geological data available for the area, according to the Colombian Ministry of Mines and Energy.

Existing fields with proven liquid or gas hydrocarbon reserves will continue to operate under the terms and conditions of the original contract entered into. Any remaining acreage in the associate area may be handed back to Ecopetrol as outlined above. Those areas reverting back to the state oil company before the end of the agreed exploration period, together with areas regarded as commercial – including the 5-km protection zones – will not be re-offered. The remaining 75% of returned acreage will be put out to public tender and re-allocated with a view to boosting exploratory activity. The bidding process is expected to begin in 3Q1998.

The Government has also established new terms for gas production, which had previously been governed by non-specific oil contracts agreed with Ecopetrol. Terms for smaller and marginal fields, the development of which was particularly unattractive under the old regulatory regime, have also been revised.

A number of oil companies are reported to have taken up the opportunity to review their Colombian contracts. Occidental Petroleum recently announced plans to renounce its exploration and production contract for the Samore oil block in northeast Colombia in return for new rights to a smaller percentage of the area. It is also understood that BP may hand back rights to 85% of the Piedemonte block in eastern Colombia – acreage which it has yet to explore. It too, would be eligible to take back up to 25% of this area.

A number of new contracts have been recently awarded under the new regime, including the granting of six-year offshore oil exploration contracts to Amoco and Arco in May 1998, Shell and Texaco signing similar deals the previous month. Ecopetrol is also reported to have opened bidding for 18 new oil exploration projects in the upper and lower Magdalena River basin, the southern Putumayo province and the eastern plains in May 1998.

Geological data bank

Keen to optimise the efficiency and effectiveness of future exploration, the Colombian Government has set up an 'Integration Management' project to compile all available geological data from both Colombian sources and elsewhere in the world. It has also founded the Colombian Petroleum Institute (ICP) National Lithological Museum which holds around 70% of rock samples extracted to date from the subsoil and surface of Colombia. Ecopetrol will provide funding to further expand Colombia's data bank of geological information.

The Government has also agreed to grant preferential allocation of three to five projects to national companies in a bid to encourage investment of private national capital. These companies will also be able to bid in conjunction with foreign firms for any of the projects put out to tender in the 3Q1998.

Activity downstream

Colombia is also attempting to encourage a higher level of foreign participation in its downstream sector. This will help underpin funding in excess of $3bn over the next 15 years on new gas transmission and distribution facilities in a bid to meet burgeoning growth in domestic gas demand and the construction of 1.7 GW of gas-fired generating capacity.

Ecopetrol's monopoly over the transportation sector has been removed with a new independent company, Ecogas, taking over control. Meanwhile, the distribution sector is being broken up and sold to the private sector. For example, Bogota's gas distribution company Gas Natural was bought by a Spanish company, also called Gas Natural, last year.

The country is also keen to encourage foreign interest in the refining and petrochemicals sectors.

Maintaining production in the new millennium

Maintenance of production is the most important function in a refinery or petrochemical plant whose profits are predominantly based on product volume, writes *Neil Ritson* of the Newcastle Business School at the University of Northumbria, Newcastle.

Nearly all the management functions in this sector are concerned with maintenance – only jetty operations, intermediate storage and tanker-filling can be truly deemed non-maintenance activities. The term 'process industry' by definition means that even production operators are affecting 'conditional maintenance'; this goes for engineering, stores and senior management too. There is no marketing or product development in a process plant – maintenance of production is the overriding consideration.

Overcapacity in the UK and European oil refining sector in 1994 was estimated to be running at approximately 20%. Since that date only marginal improvements in capacity utilisation have been seen. This inevitably puts substantial pressure on refining margins and companies have to take action in order to remain in the marketplace. In the UK, for example, we have recently seen the demise of Gulf Oil's Milford Haven refinery after Shell UK acquired the company's downstream and retail operations. Following the earlier BP/Mobil merger, BP took over the management of the former Mobil refinery at Coryton while Mobil is due to close the former BP refinery at Llandarcy. There is also the additional threat to oil company retail profits arising from the growth of the UK supermarkets which now hold around 20% of the fuels retailing market.

As far as immediate action is concerned, capital investment is not an option as it takes years to design and build plant and and even longer before payback is achieved. Cost-neutral or cost-saving measures remain the only viable options open to refiners. While these may include the closure of plant, efficiency calculations suggest that running close to capacity is mandatory – hence the choice of non-added-value activities as prime targets for management action. But which ones?

Benchmark measuring

It is almost an axiom of management that you can only manage what you can measure. Out of house, the Solomon's Refinery Efficiency Survey provides a guide for refiners to match their performance against others on a number of criteria. However, as quartile bands of performance are used, the overall industry pattern is somewhat disguised. Furthermore, refinery survey data is not audited. As a result, some managers are suspicious of possible 'sandbagging' by competitors.

Far better comparisons are available in-house to major companies and these reveal that maintenance in the UK is far more expensive than in other parts of the world. There are many reasons for this, a longstanding one being demarcations within the maintenance sector – not only between the craftsmen and production operators, but also between both in-house groups and external contractors.

These skill constraints, extenuated by the craft apprentice system, affect the way maintenance work can be organised, controlled and implemented and so greatly affect its expense. In addition, during production unit shutdowns, the inherent delays resulting from a demarcated, inflexible workforce affect the duration of the turnaround. The additional costs of intermediate storage, and ultimately lost revenue, can run into millions of pounds per day. Refiners have always been aware of the duration of shutdowns varying between countries but this is now becoming highlighted as a measure of management's capability or incapability.

Alternative options

All but two of the plants in Solomon's research sample of 24 oil and chemical manufacturers had operated a large craft maintenance workforce since they were built. The remaining two were built in the same area during the late 1950s/early 1960s and always relied on contractors for maintenance while retaining a two- or three-man strong shift maintenance crew, trained to technician level, for emergency cover.

All the other plants had drastically reduced internal maintenance workforces, most by around 50%, since the mid-1980s and many had taken the opportunity to renegotiate internal and site agreements to better integrate inter-craft and contractor work. The skills lost were replaced by external sourcing and generally included the support trades such as scaffolding, lagging, etc. Plant managements retained high-value skills such as instrument technicians and rotating equipment fitters. Some had a formal rationale for such a selection process, while for others it was more informal, even involving maintenance craft employees in the process of defining areas for savings, such as more efficient routines. For other companies instant and difficult top-down decisions had to be made.

The sample of plants all had different methods of solving the problem, albeit with a fairly common core – the transfer of the retained skilled maintenance employees on to staff status in all but three locations. This not only reduced inter-union wrangling and artificial demarcations, but allowed for a more involved progressive culture more allied to the concept of 'human resource management' than that of 'industrial or employee relations'.

The subsequent ability of management to introduce changes became easier, though what to change, when to change it and who needed to be involved were still open to question. There were no benchmarks to aid the process – every plant management was learning from square one about the new arena of involvement of contractors on a large scale.

Such a process was felt to be necessary on both efficiency and cost-saving grounds. John Cross (IT Manager, BP Exploration) had outlined BP Exploration's decision to outsource its IT function in the *Harvard Business Review* in 1995. This decision was taken from a business viewpoint, rather than cost-saving, on the basis that outsourcing left managers time for a higher level of operating their business, relegating IT to a support function and leaving managers to reconsider new systems without internal constraints such as sunk costs or even inter-departmental politics and conflicts.

BP Exploration's solution was a consortium of suppliers, whereas much

Plant No	Year	In-house employees	Contractors Number of contractor firms	Number of contractor employees	Split by turnarounds*	Split by term contracts**
1	1995	212	14	1,500		
	1996	185	7	500		
2	1985	400	140		40 firms	100 firms
	1996	160	48/49			8 or 9 firms
3	1993	70		50		
	1994	50				
4	1994	120	2	50 (term)	1 firm, varying numbers of employees	1 firm, 50 employees
	1996	75				
5	1991	128	5	28	Varies	5 firms, 28 employees
	1997	50				
6	1991–8		6 (1994) 5	(1980) 1	5 firms do both * and **	
7	1980	300		120	Varies	1980, 200 firms
	1996	95		60–80		1996, 6 firms 1998, 1 firm
8	1991–8		6			1980, 5 firms 1997, 1 firm
9	1970	550		1,500	Varies	All Term/Specials
	1995	230	70	600/700		
	1996	180	40	420		
	1997	120				
10	1990		100			Varies
	1994		1			
11	1990		100			
	1994		5			
12	1985	250			1 firm, 150 employees	10 main firms 100 listed
	1993	<100				
13	1993	300			Varies, one per unit/complex	1993, 35 firms 1997, 10 firms
	1994	140				
14	1993	100			1 firm	6 firms, 150 employees
15	1993	80	5			
	1994	40				

*Notes: *Turnaround – major planned maintenance*
*** Term – long-term maintenance contracts*

Japanese and total quality management (TQM) theory suggested 'single-source-vendors' were the most viable option. At the opposite extreme was the new possibility of using the market itself as a supermarket of suppliers playing one off against the other for best process practices and, if possible, joint funding possibilities such as John Cross had outlined.

However, Michael Cross's 1989/90 survey (undertaken while Visiting Fellow at City University) concluded that despite the rush to outsource activities there was no coherent way of managing contractors. It is interesting to note that a large part of his sample comprised the oil majors who had increased their UK subcontracting during the period 1981–1988 by 40%.

The structural or formal arrangements for contractors depend on the number of players involved. A wide variety of solutions is found, ranging from single-source vendors, through 'key' contractors numbering usually about five, to a preferred list grouping of around 10 or a more market-led approach of using from 25 to 90 contractors.

Some plants used a trade-based contractor set (even where an asset-based organisation existed) while others divided their plant up into areas appointing a contractor for each, including specific contractors for major units. One plant in the research sample used only one contractor for all of its turnarounds.

Such developments are linked to internal company style, location, contractor competence and technology. Today, turnarounds are set at longer intervals due to the ability of new materials to withstand production rigours for longer periods of time. However, some sensitive units require more frequent inspection. Unplanned shutdowns have been largely eliminated due to increased reliability, as has ongoing 'remedial' maintenance. There is also increasingly a move to pre-plan in greater detail and prefabricate work off site – this also helps to shorten turnarounds and enables more turnaround work to be done outside of the unit shutdown period. Remote locations tend to use the market more to avoid dependency. This process has been very much allied to company style – only two refineries in the sample have used partnering by joint venture, and only one alliancing. The other plants remain largely in a small-market contracting mode with between five to nine key contractors who can be switched if they fail to perform.

Results of rationalisation

More than one plant manager has said that the rationalisation process in the refining sector, be it efficient or not, had unblocked the mindset and by subsequently thinking afresh (often doing less in absolute terms) millions of pounds had been shaved off annual maintenance budgets.

The impact of contractor company reputation in a smaller slack market and, according to some plants, incentivised contracts, have combined to halt the opportunistic behaviour which was the scourge of the engineering contracting industry in the post-war years. However, even today, there have been several major strikes by contractor workforces despite the presence of new union agreements. These agreements – a cornerstone of new working arrangements for the integration of contractors and internal maintenance staffs – comprise external, contractor-based; internal, client-company-based; and single-union site agreements. National Agreements for the Engineering Construction Industry (NAECI) are often modified for local conditions. As a result, with one or two major exceptions, the 1996/97 round of cracker and other major shutdowns have been of world-class performance levels in terms of duration. Again this represents considerable overheads and lost revenue savings for the hard-pressed refiners, and in the process is re-establishing managerial pride.

This article is based on a research survey funded by the University of Northumbria and the Economic and Social Research Council (Grant number R-000-22-1670). The author welcomes enquiries from practitioners about a further application through the Engineering and Physical Science Research Council, which has funded large (million-pound) joint 'action research' projects between universities, consultancies and major companies such as Nissan.

Voluntary eco-management schemes – the modern approach

Organisations today are under mounting pressure to manage and improve their environmental performance – to comply with ever more stringent legislation while meeting the increasing demands of stakeholders in the business. The petroleum sector is a high risk industry and has developed many standards and codes which are internationally recognised as providing valuable guidance to companies, large and small, to help with managing environmental risk. *Ruth Hillary and *Ron Skinner*** look at the modern approach to voluntary regulation using recently developed environmental management system (EMS) standards.**

In recent years the concept of self regulation has grown in importance as a mechanism to deliver environmental performance improvements. It is supported by business as a cost-effective solution to control environmental impacts and runs in parallel to demands for deregulation. It is supported by governments because as the costs of implementing and controlling regulation have steadily risen, they have sought new mechanisms to achieve environmental policy.

EMS standards

European Union (EU) environmental policy is defined in its action programmes. Since its first action programme on the environment in 1979, the EU's environmental policy has evolved to embrace self-regulatory approaches and incorporate a broader range of instruments to deliver its policy. This range of tools includes market based instruments such as the eco-management and audit scheme (EMAS).[1] EMAS is a voluntary regulation which sets out the requirements of environmental policies, programmes and systems which industrial sites follow and are verified to in order to become registered to the scheme. Once registered, sites may use the EMAS statement of participation to advertise their inclusion in the scheme. At the end of 1997 there were 1,211 sites registered to EMAS across Europe, 74% of which are located in Germany.

ISO 14001:1996[2] is an international environmental management systems (EMS) standard and is likely to be widely adopted as an acceptable framework for the management of environmental issues in a systematic manner. With the adoption of ISO 14001 by the European standards body CEN, the standard can be used as the basis for achieving much of EMAS. However EMAS requires a public environmental statement,[3] a feature not found in ISO 14001. There is a greater number of organisations certified to ISO 14001 than registered to EMAS. At the end of 1997, there were 3,235 organisations certified to the standard worldwide with 525 located in the UK, 618 in Japan and 104 in the US.

Many companies will take the position that compliance with the laws and regulations is all that is required. While it is essential to know the law and to comply with it, the legal landscape is constantly changing, driven by societal concerns. A breach of the law may result in a successful prosecution, but it is often media exposure and stakeholder concerns that can have a more lasting impact on the reputation of the company.

Throughout the world, initiatives are being taken by advocate groups and non-governmental organisations (NGOs) to question what are acceptable environmental risks. A proactive approach, anticipating the changing demands on the organisation from these groups and other stakeholders such as customers, banks, insurers, shareholders and employees will result in a more robust and flexible means of managing these issues.

Companies that have successfully implemented an EMS have recognised the need to tailor it to suit the style of the organisation and build on the quality management systems which are to a greater or lesser extent already in place in the organisation. The system should be able to identify the key aspects of the business which can have significant impacts on the environment. This can only be done by the organisation itself and requires an understanding that design, production, manufacture, marketing, finance, accounting, planning and many other business activities all have some potential to impact the environment and have to be addressed within the EMS. The realisation that the organisation can have an influence on the environmental aspects of many other activities within the supply chain can lead to overall improvements in resource usage, energy conservation, waste reduction, etc with consequent cost savings.

Voluntary standards

By adopting good environmental policies and providing critical knowledge skills and implementation tools and techniques, companies will soon raise the consciousness of the organisation. The application of voluntary standards is a better means of systematically harnessing this knowledge and implementing policies than simply complying

with laws and regulations.

Companies certified to ISO 14001 consider the process to be highly cost-effective and can point to actual cost savings and short payback periods.

Need for guidance

Many large companies have developed an EMS which suits their own needs. But, how do the smaller companies with limited resources ensure that their efforts to establish an EMS are going to be effective? In almost everywhere throughout the world, small enterprises constitute the vast majority of business. With limited understanding of the organisation's environmental impacts, many smaller companies will adopt 'best practice' using standards adopted under various business and industry sector programmes.

In some cases this may be adequate, but there is always the possibility of stakeholder pressure being ignored or improperly understood. Changes in attitude and greater demands from society and the legislators may not be obvious to some companies. Assessment procedures may be lacking and the review process poorly managed.

Establishing policy

Modern management system standards – quality, occupational health and safety, environment – all have common features. They require a systematic approach which enables the organisation to establish a policy, identify the critical factors affecting the particular aspects of the business and develop a plan to bring about some improvements in line with the policy. Many companies have developed policies for environmental management, in some cases with less than adequate commitment to ensure successful implementation. Some are unsure what are the key issues to be addressed in the policy. Yet again, loosely worded policies reflect the belief that the environmental issues will become an economic burden on the organisation with no real understanding of the potential economic benefits.

Structuring procedures

A well-structured EMS should provide an appropriate framework which enables the organisation's policy to address those aspects of the business which present the greatest risks to the environment and consequently the exposure of the company to prosecution or stakeholder censure. The key to this is to develop a procedure for identifying these aspects and prioritising them according to their significance (ie. degree of risk). Most organisations agree that this is the area which causes the greatest amount of difficulty. This is fundamental to effective environmental management and is a prerequisite for bringing about improvement in the organisation's environmental performance.

A recent publication by the Institute of Petroleum[4] provides a suggested methodology for assessment of significant environmental aspects and impacts, in addition to providing guidance on all the elements of the ISO 14001 standard. This has been written primarily with small to medium-sized companies in mind. It will also be useful guidance for larger organisations that are seeking registration under EMAS.

Benefits to business

Businesses implementing formalised EMS such as ISO 14001 and EMAS have found benefits. In a recent survey of EMAS registered sites cost savings was the most frequently cited benefit.

Other benefits include:

- Better image
- Improved employee morale
- Improved environmental performance
- Better organisation, programme and targets
- Assured regulatory compliance
- Competitive advantages
- Improved documentation and EMS
- Better training and awareness of employees
- More customers and greater customer satisfaction.

Implementing and maintaining an EMS costs, but the benefits to companies that take the EMS route outweigh these costs.

Relevance to SMEs

All businesses need to effectively manage the environmental impacts of their activities; however small and medium sized enterprises (SMEs) – firms employing less than 250 people – often find the task difficult. For example, in a recent national survey of SMEs' attitudes to environmental issues, it was found that 84% were unaware of the Duty of Care Regulation for waste, regulations that apply to even the smallest business. Also, 24% could list no benefits from pursing positive environmental actions. The lack of awareness of environmental legislation and the benefits of addressing environmental issues indicates the importance that SMEs consider their environmental impacts. Formalised EMSs assist in this process. However, SMEs do not readily participate in such systems often because they see them as bureaucratic. For example, the majority of sites registered to EMAS belong to large enterprises. Nevertheless, the benefits of SMEs' involvement in EMS are real. Over 500 SMEs from across Europe were involved in a recent European Commission pilot project to implement EMSs and EMAS. These SMEs worked with consultants and many found tackling their environmental issues in a systematic and structured way a positive benefit and integrated well with existing management systems.

The final word

The externally certified initiatives like EMAS and ISO 14001 allow companies to demonstrate environmental responsibility and to obtain cost benefits – being proactive in managing all significant environmental aspects of their business rather than reacting to regulatory requirements. Adopting a formalised EMS is a positive mechanism to show both internal and external stakeholders of a business the concrete steps being taken to manage environmental impacts. EMSs are applicable to all sizes of organisations. They represent a self-regulatory opportunity for companies to strategically manage, control and plan environmental issues for the challenges of the 21st century.

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*** Ron Skinner is an independent consultant.*

Industry preoccupations

Antonio Cosulich, Chairman of the International Bunker Industry Association (IBIA), looks at the key issues facing today's marine fuels industry.

Three challenges facing the bunker industry regularly make the headlines: bunker procedures, bunker contracts and education. Each is symptomatic of an industry that has become increasingly complex. Today's bunker market is highly fragmented and specialised with many middlemen and players standing between the fuel producer and the ship. Although the vast majority of deliveries pass off satisfactorily, the disparate nature of the market leaves room for misunderstanding and – in the very worst cases – fraud.

Industry's call for standardized bunker procedures is linked largely to the problem of off-spec fuel deliveries. To ensure that the fuel delivered on board meets the required specifications, samples are taken and analysed. However, problems have arisen in the industry over how and where fuel samples should be taken. An ISO working group on bunker sampling has been looking at this issue and has been driven towards the lowest common denominator – taking a sample from the tanks of the bunker barges that deliver the fuel. However, a quick dip in the tanks does not give a complete picture. Oil's constituent components layer themselves in tanks according to weight and what is measured at the top may not tally with what lies deeper down.

What the industry really needs is a strong agreement on the need for a standard sampling procedure that will siphon off a representative portion of the fuel as it is transferred from the barge to the buyer's ship. Only this way can both parties be sure that the sample represents what was delivered. Until such an arrangement is in place, and ships and physical suppliers have the right equipment, disputes over bunker quality will continue to dog the market.

Some regional initiatives have been running alongside the ISO effort. The Dutch suppliers' union, NOVE, has developed a standard protocol which was launched last year while the Singapore Standard Bunkering procedure is now a few years old and is seen by many in the industry as a sound platform on which to build.

The question of a standard contract for bunker sale and purchase has been championed by Baltic and International Maritime Council (BIMCO). Although it has developed a standard contract, FUELCON, it has hardly been adopted by the bunker buying community and the selling side of the business appears, with one exception so far, to have rejected it.

The third issue facing the industry – education – is one that IBIA has been pushing hard. In many ways it lies at the root of the other problems. Too many owners appear to be reluctant to invest in training for those staff who order bunkers. The result is that too many buyers of bunkers have too little knowledge of the business. Owners should know that an investment in training bunker purchasing staff will lead to fewer problems and less time lost. IBIA organises seminars, training courses and conferences around the world, and publishes a quarterly journal, as part of a drive to promote bunker awareness.

NEW Publications

Fair Payment from Road-Users

David M Newbery (The Automobile Association, Norfolk House, Priestley Road, Basingstoke, Hampshire RG24 9NY, UK). 27 pages. Price: £5.00 (Free to AA members).

In 1997, the UK's Automobile Association (AA) asked Professor David Newbery, Director, Department of Applied Economics, University of Cambridge, to review what UK vehicle users pay in taxation and to compare this with infrastructure, social and environmental costs. The main conclusions drawn in his report are: (a) current transport taxes cover the full social and environmental costs of transport, as well as the cost of providing the transport infrastructure; (b) because social and environment costs are falling (for example, the car fleet has become 25% cleaner since 1992), motoring taxes based on them should be going down, not up, and there is no justification for the UK Chancellor's policy of increasing motor fuel duty by 6% annually; (c) it does not make sense to introduce taxation based on social and environmental costs in the roads sector of the economy alone; and (d) the whole system of charging road users and financing transport requires fundamental reappraisal.

Babylon to Baku

Dr Zayn Bilkadi (Stanhope-Seta, Park Close, Englefield Green, Egham, Surrey TW20 0XD, UK). ISBN 0952 881608. 230 pages. Price: £35 (special price for Petroleum Review *readers).*

While much has been written about the history of oil and its influence upon the modern world, this publication concentrates on the history of bitumen. Beginning in the distant times of Babylon and finishing in 1879, just when Daniel Yergin begins his award-winning history of the modern oil industry in his book *The Prize*, it sets the early practical and artistic use of naturally occurring bitumen in the context of related civilisations in Babylon, China and elsewhere. The book contains a number of colour pictures of ancient relics, some of which were reproduced in the October 1996 issue of *Petroleum Review*.

Seawater Circuits: Treatments and Materials

Editor: Yves Lefebvre (Éditions Technip, 27 rue Ginoux, 75737 Paris Cedex, France). ISBN 2 7108 0707 6. 384 pages. Price: FFr620.

This book aims to help in the selection of materials and protection techniques for equipment and pipings transporting seawater or other salt waters. It provides a description of the main seawater circuits, such as fire fighting, waterflooding of oil reservoirs, cooling of effluents and desalination plants, and includes a summary of the main seawater characteristics, living organisms, deposits, fouling and scaling. It also outlines techniques for preventing biological activity, fouling, deposits and scaling, and provides descriptions of cleaning techniques. A study of corrosion types is also presented.

Climate Change Briefing Papers

(The Royal Institute of International Affairs, Chatham House, St James's Square, London SW1Y 4LE, UK). Price per pack: £15.00 (plus £2.00 p&p). Individual papers can also be purchased (prices vary according to number, minimum order of five briefing papers of any selection).

This series of 10 briefing papers by the Energy and Environmental Programme of the Royal Institute of International Affairs provides an outline of the scientific background to, and a description of, the international negotiations on the UN Framework Convention on Climate Change and offers an analysis of the key analytic and policy issues involved.

Performance of Cross-Country Oil Pipelines in Western Europe: Statistical Summary of Reported Spillages – 1996

(CONCAWE, Madouplein 1, 1210 Brussels, Belgium). 16 pages.

This report (No. 7/97) analyses the reported spillage incidents for western Europe's 31,050-km oil pipeline network. There were six reportable spillage incidents in 1996, resulting in gross spillage of 1,414m^3. After clean-up, these resulted in a net loss of oil into the environment of 732m^3 – equivalent to 0.00011% of the total volume transported. Over the 26-year period from 1971 to 1996, third party activity has been the most frequent cause of spillage (4.4 per year) and is easily the largest cause of oil loss into the environment (48%) from the western European oil pipeline network. Corrosion comes second in terms of the number of spillages (4 per year) while mechanical failure is second in terms of net volume spilled (30%).

Positive Measures for Technology Transfer

Editor: Dr Tim Forsyth (The Royal Institute of International Affairs, Chatham House, St James's Square, London SW1Y 4LE, UK). ISBN 1 86203 047 2. 128 pages. Price: £9.95.

Disputes over technology transfer have been a long-enduring theme in international negotiating over environment and resource issues. The Kyoto Conference on Climate Change held in Japan in December 1997 proposed a 'Clean Development Mechanism' as a way to integrate environmental protection and economic development and reiterated the need for furthering cooperation in the transfer of, or access to, environmentally sound technologies, know-how, practices and processes. Despite this, international divisions persist about appropriate mechanisms for technology transfer, and debates remain polarised between developing countries which demand technology transfer on preferential terms, and developed countries which believe technology is controlled by the private sector and has to be linked to investment. This book presents proceedings from an international workshop on technology transfer and is a timely addition to future debates on this issue.

Metocean moves on the frontier

The fifth annual BP/Shell/Statoil Atlantic Margin Metocean Workshop was hosted in Dublin on 20–21 April 1998 by Ireland's Marine Institute, the Department of the Marine and Natural Resources, Petroleum Affairs Division and Irish offshore engineering company, MCS International. The two-day workshop's theme of 'Harsh Operating Environments' focused on the need for greater understanding of the waves and currents found north and west of Ireland. *Chris Shay* summarises the main conclusions drawn.

Bogi Hansen from the Faroes Fisheries Laboratory set the scene with an overview of the dynamic water masses in the Wyeville Thomson Ridge to Faroes area, stressing the need to for both large- and small- scale models to identify current processes and to test current modelling against observations.

Colin Grant from BP Research and Development, outlined the present five Joint Industry Programmes (JIPs) in the North-East Atlantic: the North-Western Approaches Group (NWAG), the North European Storms Study (NESS), the Faroes Metocean Group (GEM, 1997), the Norwegian Deepwater Program (NDP, 1996) and the evolving Irish Metocean Group (RSG, 1998).

Common to all JIPs is the need to understand how remote sensing and current modelling can help oil companies to understand the wave and current environment so production engineers can design safe production systems. One key issue which emerged was the need for oil companies to specifically identify their remote sensing (RS) requirements and for RS providers to meet them.

Ian Legget, Shell UK Exploration and Production, said in new frontier areas it was cheaper for oil companies to work together. The Rockall Studies Group, (comprising 16 oil companies, budget £4.8mn) has prepared a metocean strategy. However, the wider picture needs to be looked at, not just the Rockall area, as metocean does not lend itself to a fragmented approach. He said there is a need for an Irish Metocean JIP which could include the Porcupine Basin. Additional current measurements were needed and the RSG budget could be revised to £6mn – if the government is supportive.

Alan Blumberg of Hydroqual Inc presented a paper on current modelling and a 3D hydrodynamic model animation showing an 18-day current dispersal scenario if an oil spill occurred west of Scotland. The surface current would move the oil spill southwest, to the northwest coast of Ireland, west of Donegal and Mayo. The bottom current would to a lesser extent disperse to the northeast, west of Scotland. Trevor Guymer of Southampton Oceanographic Centre outlined currently available remote sensing capabilities and stated that the oil companies and the remote sensing scientists should be working closer together.

At a parallel remote sensing workshop on day two of the conference, Dr Graham Jackson of the UK Defence Establishment Research Agency (DERA) said a combination of sensors is critical. As military funding was dwindling DERA was interested in pooling resources. Colin Grant of BP noted that the oil industry was interested in going into deeper water while the military was more interested in going into shallow seas. That said, both need real-time data on wave spectra, swell and currents, the oil industry needing a twice daily service. Meanwhile, the requirement west of Ireland was to get wave spectra from synthetic aperture radar (SAR). Peter Dexter of the World Meteorological Organisation in Geneva said there was also a need for satellite operators to coordinate more with satellite users – a sentiment echoed by Grant who stated that there was a need to get better value from sensors and to pass on specifications to satellite providers of what satellite products the oil industry actually requires.

Martin Holt of the UK Meteorological Office presented a paper on a new wave numerical model which has only come into use in the past year following meetings with British Petroleum. This spectral wave model describes sea state, and shows swell and wave height. Holt said there was a need to measure more precisely long period swells because of the heave problems for rigs and vessels generated by waves of 18-second plus periods. Waves of long period are of concern because all great circle routes converge on the northwest approaches, and North Atlantic storm generated waves and swell inevitably arrive in two to three days focused at the Iceland-Faroes gap in the frontier production area. Colin Grant of BP said that on Schiehallion's production system they were monitoring motions on the vessel to compare against model forecasts.

Complementing this presentation, Lars Petter outlined the Norwegian Meteorological Office's numerical model, called the Estuarine and Coastal Ocean Model (ECOM), used to provide oil drilling companies on the Norwegian Continental Shelf with forecasts of ocean currents and hydrography which might influence drilling operations. Petter said the lack of real time ocean data for validation is a major obstacle for determining the skill and accuracy of the forecast.

The workshop concluded that further integration of current modelling and remote sensing is required, there is a need for current data in the Irish offshore area, and that wave and current modelling require validation and improvement.

Clair field put on ice

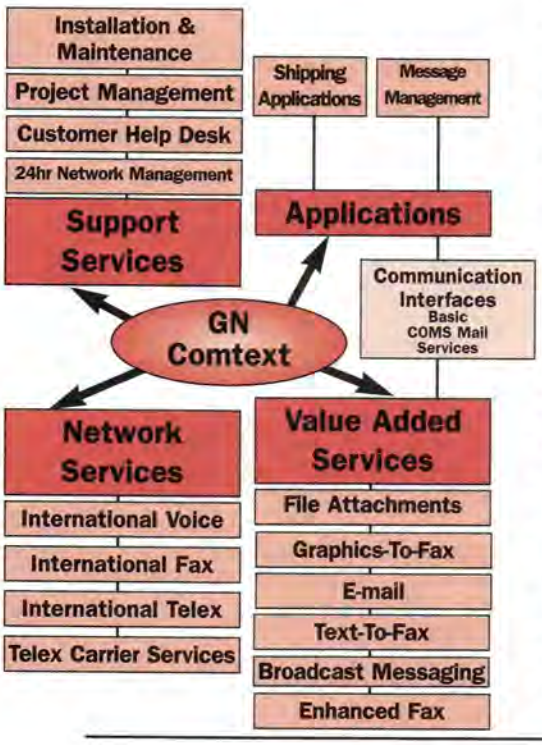
According to Dick Olver, a Managing Director of BP Exploration, the partners in the Clair field have agreed to suspend all external expenditures on the project in light of reservoir difficulties, low oil prices and uncertainties over the UK tax regime.

Development plans were to have been submitted this year in order to meet the project sanction deadline. However, this will now be delayed until BP (25.32%, operator) and its partners Conoco (20.73%), Chevron (19.42%), Enterprise (15.41%), Elf (9.83%) and Amerada Hess (9.29%) can agree a way forward.

Discovered in 1977, Clair has estimated field reserves of 5bn barrels. However, due to the complex geology and heavy nature of the oil, only 260mn barrels are considered recoverable with today's technology.

Spreading the word on data communications

The requirement for cost-effective global data communications solutions is greater than ever with problems in terms of lack of global reach and the security issues surrounding new solutions driving petroleum companies to look for alternatives, writes *Simon Young*, of GN Comtext's Marketing Department.



Communications needs are changing geographically while technological advances have led to increases in the speed and security of data transmission being demanded by industry. The need to communicate with suppliers, vessels and customers globally extends beyond the capability of many service providers and, as a result, most major oil companies now have their own communications infrastructure utilising dedicated lines to deliver all forms of communication media.

Customised solutions

Such organisations are increasingly having to address the problems associated with messaging traffic 'breaking out' of established networks, particularly telex and fax systems. Sending messages and documents securely to distant or remote locations outside the company's own network is often subject to large premiums. Furthermore, expansion of a network in order to cater for all messaging needs is often unrealistic – yet outsourcing the data-communications requirement is also often an uneconomic option. In a bid to eliminate these problems, GN Comtext has developed a cost-effective range of customised solutions and industry interfaces designed to complement an organisation's existing messaging infrastructure.

Clients can access the service from many systems including telex, fax, message switches, PCs and mainframes. There is an emphasis on 'global communications with local support'. A central network management facility provides 24-hour network support while over 60 offices worldwide offer local technical support to over 5,500 customers in 80 countries.

Originally developed for the shipping community, the company recognised synergies between this market sector and the petroleum industry, and has extended its service accordingly. Clients operate within a closed user group which offers the user a fast and secure service with delivery confirmations and full message reconciliation. This is a major advantage over using the Internet which, because it is hampered by a lack of consistency with delivery times and message status reporting, is not always a suitable medium for confidential or legal documents.

As a result, the company's e-mail is fast becoming the *de facto* standard for the shipping industry with an increasingly high proportion of the company's maritime clients using the service. Users can send or receive messages with other users over a secure private network. The potential benefits for companies in the petroleum industry lie predominantly in 'upstream' traffic sectors, utilising reduced Inmarsat, telex and fax charges. Increased economies of scale will further reduce charges as the closed user group service is taken onboard by a larger clientbase.

For many communications managers expanding or updating existing communications systems requires a large investment. A reluctance to change systems that users are familiar with also acts as a deterrent. Recognising this, the company has developed a network capable of recognising the majority of messaging formats. Connection to the network requires minimal set-up costs. In addition, the network can interface with most proprietary communications software.

Keeping costs down

Inmarsat, telex and fax communications costs, which can represent a high proportion of the company's running cost, are kept to a minimum by using a specialist provider capable of commanding favourable rates through volume. According to Andrew Ogilvie, UK Account Manager: 'The overriding factors which bring these companies to us remains the cost savings and network security we provide, offering a significant saving over PTT services of around 25% or more'.

There are plans to continue to expand the coverage of its global data transmission network. Local nodes providing easy access are currently available in most major cities and in 1997, around £2mn was invested in new networking technology in a bid to speedily develop service enhancements to meet customers' ever changing needs.

**GN Comtext Limited is a wholly owned subsidiary of GN Great Nordic, a multinational company based in Copenhagen, Denmark. GN Great Nordic has over 125 years' experience of the international telecommunications business with group turnover exceeding US$400mn per annum.*

High-tech solution to polypropylene problem

The marine fuels industry has been dogged by a stubborn problem – polypropylene contamination – over the past year. Pockets of contaminated fuel have been cropping up around the globe, causing ships' engines to shut down at sea in the worst cases. Undetectable using traditional analytical methods, and inseparable from fuel oil by standard onboard separation methods, polypropylene looks set to cause the bunker industry a serious headache. The latest analytical technology does offer a solution, but so far few companies in the marine fuels industry have access to it.

Polypropylene is an oil-based polymer used in the manufacture of plastic wrappings. Due to its physical properties, it is very difficult to isolate once it has been pumped into a ship's fuel tanks. 'Polypropylene particles are lighter than fuel oil particles, which means that the ship's purifiers are not able to separate them out and they end up collecting on the filter system screens', explains John Dixon (right), a Fellow of the Institute of Petroleum and Managing Director of the Lintec Group, the fuel analysis specialist that first alerted the maritime industry to the polypropylene problem.

'Due to the nature of the particles and the temperatures found in booster systems, the polypropylene fragments will not, in all likelihood, be effectively removed from most types of self-cleaning or back-flushing filters', says Dixon. 'The particles will also be free-moving and randomly distributed within the fuel oil. This allows the polypropylene particles to float high in the fuel – you can even end up with contamination concentrated in the last tank filled. It is a very unpredictable material.'

The size of the polypropylene particles varies greatly, from 30 microns to 750 microns. They also vary from sand-like compositions and pea-sized pellets to strands up to 5 mm in length. According to Dixon: 'The larger particles will choke a 50-micron screen fairly quickly, but the variety of the particle shapes means that there is a big chance that even smaller particles will cumulatively block the filter too.'

Polypropylene is extremely chemically stable, which makes it an ideal wrapping material because it does not react with the products that it protects. However, because it does not react with anything, it is virtually impossible to separate out of fuel oil using chemical reactions. 'If the industry could have chosen which contaminant would cause it the most headaches in terms of detection, separation and blockages, polypropylene would have been at the top of the list,' comments Dixon.

Although there is no evidence so far that polypropylene contamination causes permanent damage to ship engines, it can starve them of fuel and has been known to shut them down completely. The problem is amplified if the same fuel is used to run the ship's generators. At present, the only course

of action open to the crew of a ship that has taken on contaminated fuel is to debunker the vessel and filter the oil on land – a procedure which can cost up to $300,000. Understandably, marine insurers have taken a keen interest in the problem and Dixon has been involved in a busy round of meetings with representatives of most of the leading Protection and Indemnity (P&I) clubs which insure shipowners against the consequences of bunker problems.

Tackling the problem

Pre- and post-delivery tests are one solution to the problem but standard fuel analysis does not necessarily pick up on polypropylene contamination. Bunker analysis is big business, although the method and technology used today only fulfils the most basic analytical requirements – viscosity, metal content, density and so on. Definitive particle analysis is not a standard part of bunker testing, even though testing services will be able to tell very quickly whether there are alien particles present. Discovering particles in a client's bunker sample isn't hard – running the sample through a fine filter will reveal any fibres and fragments. The trick is being able to provide the client with an accurate report of what those fibres and fragments are and how they are likely to behave when they pass through a ship's fuel purification system.

Such advanced analysis is costly and few in the marine fuels testing industry

are able to provide clients with such a service. To produce a detailed chemical analysis of a bunker sample means investing in the latest technology. 'Once we identified the problem last year, we took the gamble that it would be a persistent one and invested £30,000 in the most recent Fourier Transform Infra-Red (FTIR) technology, says Dixon.

The gamble paid off. The polypropylene problem appeared to have gone away by October 1997 and Lintec looked to have invested in an expensive 'toy for the boys' in the company's Rotterdam laboratory. However, the problem raised its head again in February 1998 with a vengeance and the FTIR unit has been busy ever since.

Manufactured by US-based analytical equipment manufacturer Perkin Elmer, a basic FTIR unit retails at £25,000. It can be tailored to suit individual laboratories' requirements through the use of additional separate, validated software packages and accessories, and is more commonly used for high-grade pharmaceutical or criminal forensic analyses.

The physics involved in FTIR analysis are complex. Put simply, an FTIR unit identifies a compound by its infra-red spectrum. Each compound has a unique spectrum, much like a fingerprint, which can be matched with reference spectra allowing the lab technician to accurately determine the identity of any compound.

'We've built up our own library of software to help identify polypropylene particles,' says Dixon. 'At present, we are not aware of any other marine fuels testing firm equipped with an FTIR unit or the software capability to detect polypropylene. Everyone offering fuel analysis will have a pardensometer to measure density and an atomic absorption unit to measure metal content, but the price of an FTIR is a hurdle most are unwilling to negotiate. We're offering the maritime industry a level of analytical precision previously unavailable to it.'

FTIR units not only offer a high level of precision, they are also very quick. Using the unit in its Rotterdam laboratory, Lintec is able to fax a detailed report to a client within three hours of receiving a pre- or post-delivery bunker sample. A preliminary phone call can be made one hour after receipt. With reliable courier services able to deliver samples from anywhere in the world within 24 hours, shipowners and managers can have their results in under a day in many cases – much quicker if their vessel is in the Amsterdam-Rotterdam-Antwerp area. Although bad test results will come as little comfort to ships that have already loaded contaminated fuel, the fast turnaround means that they will probably not have started using the oil.

Global problem

The source of the current polypropylene contamination is not known exactly, but the most likely location is the Baltic region according to Dixon. 'It is not quite clear how the polypropylene has got into the oil, or exactly where this happened, but there are at least two batches that we are aware of that are causing problems in the bunker industry,' he says.

Although the polypropylene pollution stems from a single location, it has found its way into bunker oil being offered at ports around the globe due to the natural commercial blending and distribution of fuel oil. The spread of the problem has been swift, to the extent that no port can be considered free from the trouble. No one is able to estimate the size of the most recent batch of contaminated oil, or how long it will affect the marine fuels market. Nor can anyone be certain that the problem will disappear once it has been burned up.

'All we know is that it is here now, and that a solution is needed now,' says Dixon. So far though, few companies have stepped in to offer one.

If you lost your job tomorrow, how employable are you?

Tony Blair won an election landslide with the mantra 'Education, education, education'. To misquote him, what individuals need today is 'Employability, employability, employability'!

To remain employable, individuals must not only respond to short-term job challenges but also anticipate the future. Each needs to take responsibility for his or her own learning and acquire the know-how to manage continual change. **'No one will ever show more interest in your professional development than you.'**

Lifetime Learning refers to the ongoing process by which an individual acquires a unique portfolio of skills, knowledge and understanding during a working career, that contributes to his or her employability. **'Professional development is a unique and personal journey – this is all too rarely recognised.'**

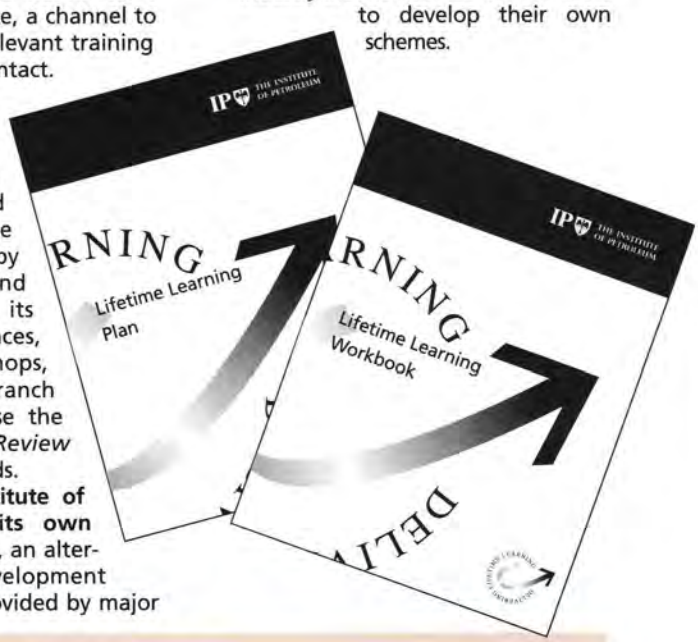
The world of work is changing fast. Employers in the oil and gas industry now require flexible organisations to sustain competitive advantage and people who major on knowledge acquisition, innovation and fast response times – in short, people aware of the skills they need both today and for the future.

The IP supports individuals in progressing their Lifetime Learning. Many IP members follow Continuous Professional Development (CPD) schemes of other institutes in order to obtain chartered status or a generic professional qualification. However as careers progress, a broader skills base and deeper knowledge of the issues facing the global industry can differentiate individuals. The IP is well placed to provide this wider perspective. Unlike many professional institute, which focus on generic skills applicable across a range of industries, the IP's strength resides in its sector-based role in oil and gas.

'Real everyday life, work in particular, provides a constant stream of developmental opportunities' but individuals sometimes need access to a wider information source, a channel to share best practice, a relevant training course, or a personal contact. Particularly when time is of the essence, a one-stop-shop, where up-to-date information can be quickly obtained is invaluable. The range of services provided by the IP, the Library and Information Service, its Publications, Conferences, Seminars, Workshops, Discussion and Branch Meetings and of course the journal, *Petroleum Review* help to meet these needs.

In February, the Institute of Petroleum launched its own 'Lifetime Learning Plan', an alternative personal development framework to those provided by major companies and other professional bodies. This presents

- another option for those individuals who have alternatives
- a unique facility for those working in the industry who do not have any such guidelines – a bigger proportion of people than might be expected
- the growing number of self-employed
- those working in the many small companies that now provide services to the industry that do not have the resources to develop their own schemes.



The IP Lifetime Learning Plan

The IP Lifetime Learning Plan is a continuing process to help you with:

- Self assessment
- Checking the validity of this assessment
- Identifying aims and objectives
- Developing an action plan to achieve those aims and objectives
- Implementing the action plan
- Monitoring and recording your performance against your plan

and providing you with a template for its management. It focuses on outputs, ie achievements that contribute to your development, rather than inputs or attendance.

Many companies in the oil and gas sector and other professional institutes provide similar templates. This is an alternative which you may wish to use if it fits your circumstances.

The Lifetime Learning Plan and accompanying Workbook is available free of charge to Individual Members of the Institute who should contact our Membership Department for a copy. Corporate Members should also enquire if they have an interest in using it among their staff.

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Processing Equipment and Systems

The Institute hosted the annual meeting of ISO/TC 67/SC6 on 11 and 12 June in London, which was attended by 24 delegates from eight countries including representatives from the American Petroleum Institute (API), the European Petroleum Industry Association (EUROPIA) and the European Standards Committee (CEN/TC 12). The welcoming address was given by Dr Brian Abbott, the recently appointed Technical Director at the IP who stressed the importance of developing international standards that the industry needs now and in particular those on the Focus List, where progress is expected during 1998. The Secretariat for this subcommittee is provided by AFNOR (France) and, with the assistance of an interpreter, the Chairman (Loic Lescop) and Secretary (Valerie Capella) patiently worked through the extensive agenda covering both days.

Subcommittee Six (SC6) is responsible for developing 31 diverse international standards including a range of packaged and rotating equipment used offshore and in refinery applications. Many of these standards are based on tried and trusted API documents where the challenge is to convert them for international use. Mr Marty Lesh, from the API Committee for Refinery Equipment (CRE) and Chairman of its International Standards Coordination Group, addressed the meeting and reaffirmed the committee's active support. He said: 'Where possible this work should be done in joint working groups including the US experts currently involved in the API Task Groups. The intention is to initially produce co-branded ISO/API standards, but once the equivalent international version is available, the API document will be withdrawn and all future revision work will be done in ISO'. He noted that there have been some transitional problems due in particular to the differing time scales for developing API and ISO standards and the fact that the API format does not comply with the ISO rules. 'However, problems are most often perceived and it is encouraging to report that there is usually little difference of opinion on the technical content once the experts sit down together and develop a good working relationship.' Mr Prentiss Searles, the API Standards Associate from the Washington headquarters, also attended the meeting making a valuable and energetic contribution based on his detailed knowledge of working with the industry to develop technical specifications and recommended practices.

An evening cocktail party at the Institute provided a brief social interlude to the at times tedious process of standardization – but needless to say, most of the conversations on the Thursday evening still centred on this process. Such is the commitment of those people actively involved on behalf of the industry. ●

Drilling Fluid Standard published

The ISO Central Secretariat has published *ISO 13500 Drilling fluid materials – Specifications and tests* which was approved unanimously by parallel ballots carried internationally and in Europe. The identical text will also be published by CEN and will then be adopted by the British Standards Institution as BS EN ISO 13500. Professor John Bensted, Chairman of the BSI Subcommittee which has had input to the technical content of the standard, has contributed to the national foreword. This is the first of the ISO/TC 67 'Focus List' standards to be issued for the petroleum industry in 1998. Copies can be purchased through BSI. ●

Marty Lesh, API (left) talking with Graham Thomas, BP, Chairman of BS Committee PSE/17

Delegates who attended the recent SC6 meeting at the IP

Canadian production set to boom

Diversity is said to be the spice that keeps a love affair going, but it is also the key to creating a healthy petroleum industry in Canada that now embraces new frontiers and a rejuvenated, competitive gas distribution grid, writes *Gavin Will*.

On both the east coast and western Canada the next five years promise significant changes which could catapult the nation into the ranks of the world's larger exporters of oil and gas. One of the most promising areas is offshore Newfoundland and Nova Scotia, where full-cycle development has finally arrived following years of false starts and hiccups.

On the producing side Hibernia appears to be a success, although it didn't seem so earlier this year when production plunged from 60,000 b/d to 15,000 b/d. It turned out that reservoir managers underestimated the degree to which flow rates would decline without water or gas injection; but doubts about field performance largely disappeared in June when a water injection programme for two production wells proved successful and quickly boosted oil flow to 60,000 b/d.

As new production wells are brought onstream this year, flow rates at Hibernia are expected to reach an average of 100,000 b/d and peak at over 150,000 b/d in 1999. The volume of recoverable crude has recently been increased to 750mn barrels from 600mn barrels, but it is widely believed the two reservoirs within the field will eventually yield 1bn barrels of recoverable reserves.

Next field

Following Hibernia is the nearby Terra Nova field that is scheduled to begin producing first oil in late 2000. Fabrication of an 850,000-barrel FPSO will start this year in South Korea, where Daewoo Heavy Industries is building the hull, the turret and several topsides components. The remaining four deck modules are being built at Newfoundland's Bull Arm fabrication yard and at the Barmac facility in Scotland.

Terra Nova contains an estimated 400mn barrels, although if this estimate is like the original figures for Hibernia the amount of recoverable crude may be considerably higher.

Once Terra Nova begins producing oil, operators are hoping to reduce the time lag between start-ups in the Jeanne d'Arc Basin to a period of one to two years. Among the most likely successors is the Whiterose field, which contains an estimated 250mn barrels of oil. Husky Oil will conduct a delineation programme this year that could lead to a production test well in 1999. Husky is looking to begin full-scale production in 2002–2004.

One of the most exciting prospects is the Hebron field, which operators now believe could hold up to 600–750mn barrels. A seismic programme conducted last year by the ownership group – which includes Mobil, Petro-Canada, Chevron and Norsk Hydro – has vaulted Hebron to the front of the class. If delineation drilling this summer proves a success then this field could be producing oil before 2005.

These high hopes for Hebron have sparked a renewed interest in determining just how much oil and gas is out there to be found. As a consequence, the largest drilling programme in over 10 years will commence late this summer. The major operators, led by Mobil, have a contract with Glomar to conduct a multi-well drilling programme, and at least two more rigs will arrive to delineate Whiterose and drill the Terra Nova production wells.

In addition, a Schlumberger vessel, the *Geco Orion*, is conducting a large 3D seismic programme this summer. Its key target is an area adjacent to Hebron covering 1,000 sq km. Among the points of interest is the Riverhead block and several nearby blocks situated between Hibernia and Terra Nova.

The *Orion* and a Veritas 2D vessel are also surveying of new acreage included within the 1998 offshore Newfoundland land sale which closes in September. There are 13 blocks available, and for the first time the majority are outside the narrow limits of the Jeanne d'Arc Basin. Two of the blocks are in the deepwaters of the Flemish Pass outside the Grand Banks continental shelf, while five others are located in the Outer Ridge Complex and the North Grand Banks Basin.

New areas

In fact there is substantial interest in new areas of offshore Canada, since to date there has been practically no exploration outside the Jeanne d'Arc Basin and the Sable Island area off Nova Scotia. That changed this year when Gulf Canada announced its plans to explore a massive 2.17mn hectare block it has owned for more than 25 years in the Gulf of St Lawrence.

A moratorium on exploring this area around the French islands of St Pierre and Miquelon ended five years ago with the settlement of a boundary dispute between Canada and France. Gulf was awarded exclusive rights to a French marine corridor this year in return for a commitment to drill at least one well in 2000. Gulf contracted Veritas to conduct 6,000 km of 2D seismic in its block this summer, as well as a

further 6,000 km in a huge area covering the Atlantic seaboard from offshore Newfoundland to the marine boundary with the US on the Georges Bank.

Meanwhile, development of the C$2.5bn Sable Island gas project is proceeding on schedule for production in late 2000. The 3tn-cf project, which is led by Mobil and Shell, will supply markets in the northeast US through a consortium of Canadian and US distributors. A new pipeline is being built which will transport the gas through Nova Scotia and neighbouring New Brunswick, and then into Maine and the New England states.

The Sable project is the first of several gas fields slated for development offshore Nova Scotia and the reason Mobil hired the *Geco Topaz* to conduct a 3D seismic programme in the Sable region this year.

The 1998 Nova Scotia offshore land sale proved interest remains high, as Chevron committed C$66.6mn for one of seven parcels sold in May. Bids were not submitted on three blocks bordering Gulf's acreage in the Gulf of St Lawrence, chiefly because a marine boundary dispute between Newfoundland and Nova Scotia remains unresolved.

Pipeline victory

Meanwhile, in western Canada, a David – in the form of the Alliance Pipeline group – has slain the Goliath of TransCanada PipeLine, a victory that may change the face of gas distribution throughout North America. Provided the National Energy Board gives final approval, the C$3.6bn project will transmit gas from Fort St John in northwestern British Columbia to Chicago – a distance of 3,000 km.

Proposed start-up for the Alliance pipeline is mid-2000, with initial delivery capacity of 1.3bn cf/d. The project could also be expanded, by additional compression, to 2bn cf/d. Fort Chicago Energy Partners is the largest single shareholder in the project with a 26.6% holding in Alliance Pipeline Limited Partnership. Other shareholders include IPL Energy, Coastal Corporation, Westcoast Energy, Duke Energy, Unocal and Williams Company.

The fact that Alliance won the lucrative pipeline deal took observers by surprise, since TransCanada PipeLine had been widely expected to walk away with the project without much competition. But TCPL failed to come up with a proposal that caught the imagination of investors as Alliance did, and perhaps in the end it could not compete with the vision and determination of the younger rival.

For TCPL the loss resulted in moves aimed at preserving its competitive position in western Canada, and earlier this year the company reached an agreement to merge with Nova Corporation. The merger will create the fourth largest energy services company in North America, with approximately C$16bn in revenues and C$21bn in assets. It will also put the new entity in a better position to deal with consortia such as Alliance, while also creating a consolidated energy and chemical company with the clout to compete throughout North America.

Oil sands expansion

Aside from natural gas the big news in western Canada is the long awaited decision to invest significant capital into oil sands projects in northern Alberta. The largest of the expansion plans is Project Millenium, a C$2.2bn proposal by Suncor Energy to boost oil sands production.

The expansion is designed to more than double Suncor's oil sands production to 210,000 b/d by 2002, while bringing costs down to $10 to 11/b. To achieve these goals Suncor plans to expand its Steepbank Mine, invest in additional mining equipment, twin the extraction plant and upgrader, and expand facilities that provide the operation with water, steam and electricity.

Related to this expansion is the C$475mn Wild Rose pipeline, which is being built by IPL Energy. Its 30-year agreement with Suncor will permit the transport of heavy crude oil from the Athabasca and Cold Lake regions of Alberta. The pipeline is scheduled to begin service in the 1Q1999, and will connect with other carriers, including Interprovincial Pipe Line, another wholly-owned subsidiary of IPL Energy.

Canada's largest producer of heavy oil, Syncrude, is also pledging big dollars in a bid to boost production at its Fort McMurray operations in Alberta. Syncrude is investing $2.1bn in an expansion of its heavy oil upgrader, which will allow it to increase production of light, sweet crude oil from 300,000 b/d to roughly 480,000 b/d by 2007.

The upgrader project is part of a wider expansion at Syncrude known as the Syncrude 21 project, with total commitments to the programme now reaching C$4.2bn.

The world's largest producer of oil from oil sands, Syncrude Canada is a joint venture comprising Alberta Energy Company, Canadian Occidental Petroleum, Gulf Canada, Imperial Oil, Murphy Oil and Petro-Canada. The Syncrude output is moved to a hub in Edmonton on the Alberta Oil Sands Pipeline under a long-term agreement with AEC Pipelines L.P.

In order to handle the higher volume AEC Pipelines plans to expand pipeline capacity to 300,000 b/d by 1999 from the current 238,000 b/d at a cost of C$144mn. By 2007 the aim is to boost capacity to 950,000 b/d.

New pipeline

Another important project for heavy oil development in Alberta is a new C$250 pipeline between Cold Lake and Hardisty. The 250-km ThickSilver Pipeline will ship blended bitumen from Imperial Oil's Cold Lake production facilities and other bitumen-production projects to the Hardisty pipeline terminal for transportation to markets via the Interprovincial and Express pipelines.

Pipeline construction is scheduled to begin in 1999, with operation commencing in 2000. As one of Canada's largest sources of crude oil production, Cold Lake currently produces about 115,000 b/d of bitumen. Planned expansion projects could increase Imperial's daily production to about 150,000 b/d.

US onshore oil and gas assets being overlooked

The assumption that US onshore hydrocarbon reserves are near depletion, with the domestic industry dependent on overseas projects and discoveries in the deepwaters of the Gulf of Mexico for survival, stems partly from the knowledge that imports now meet more than half of US oil demand, writes *Judith Gurney*.

The spate of mergers, joint ventures, acquisitions and sales in the last few years – the recent announcement by DuPont that it will divest Conoco indicates that this process continues – is interpreted as an across-the-board attempt to rationalise and shut down onshore activities. The fact that US, and even some foreign companies, are still keen about exploring, developing and producing onshore oil and gas fields is overlooked.

One reason for a lack of attention to onshore oil and gas activities is the US governmental structure. States, rather than the federal government, own and manage the vast proportion of continental land mineral rights, and reports on economic activities within individual states rarely find their way into the international or even the national media. The federal government – the source for most news about the oil industry – owns only a very limited amount of onshore acreage, located mostly in the west and in Alaska. Moreover, fearing environmental damage, it refuses to allow leasing on many of its holdings, such as the Arctic National Wildlife Refuge Coastal Plain (ANWR) in Alaska and some lands in the Rocky Mountains region. A recent report notes that only about 17% of total federal mineral acreage is under lease in 1998, compared to 72% in 1983.

Oil reserves and production

Of the 22,017mn barrels of US proved oil reserves at the end of 1996, some 26% were located in Texas, mainly onshore but also in state-controlled offshore waters. Another 24% were located in Alaska and 16% in California. A second tier of four states – New Mexico (which shares the Permian basin with Texas), Louisiana, Oklahoma, and Wyoming accounted for 12%. More than 7% of reserves were in Kansas, North Dakota, Utah, Colorado, Montana and Mississippi. By comparison, the federally–administered offshore Gulf of Mexico waters were then estimated to contain 12% of total reserves, while the waters off California, held 2%.

Estimates of undiscovered, technically recoverable, onshore reserves vary. Alaska is believed to hold the most promise while the US Geological Service recently upgraded its estimates in the Alaskan ANWR to between 11.6bn and 131.5bn barrels of oil in place and 4.3bn to 11.8bn barrels technically recoverable.

Onshore oil production comes from a curious mix of young and old fields. Close to half of the top 100 currently active oil fields were discovered prior to 1946; the oldest, Coalinga in California, was discovered in 1887. Of the six fields with the highest annual production in 1996, three were young Alaskan fields – Prudhoe Bay and Kuparak River, discovered in the late 1960s, and Point McIntyre, discovered in 1988. The other three were old California fields located in the San Joaquin Valley – Midway-Sunset, discovered in 1901 with more than 10,000 currently producing wells; Kern River, discovered in 1899 with a 40-foot deep, hand-dug well; and BelRidge South, discovered in 1911, with more than 4,200 producing wells. Two fields from Texas, one from Alaska, and Elk Hills (the former Naval Petroleum Reserve in California which was recently purchased by Occidental), make up the rest of the top ten.

Texas has the most large fields, with 97 considered to have ultimate oil recovery exceeding 100mn barrels. California has 51 oil fields, Louisiana 34, Oklahoma 18; other states have less than 10 apiece. Many of these top 100 oil fields are produced by only one or two companies.

The onshore oil industry tends to be dominated by a few large companies, whereas there are many more smaller, often independent, companies involved in gas production. The 20 largest companies hold approximately 70% of proved reserves of crude oil but only about 56% of proved reserves of natural gas.

Increasing production

Maintaining a viable onshore industry requires a lot of effort. Proved US oil reserves began to decline in 1977 – although the discovery of oil in Alaska partially counteracted this trend for almost a decade – and production has been falling since 1985, except for a modest increase in 1991 related to the Persian Gulf War. These declines would be even greater if exploration, aided by advanced seismic and other technologies and encouraged by high oil prices

Field name	Location	Discovery Year	1996 Production mn barrels
Prudhoe Bay	Alaska	1967	286.5
Kuparuk River	Alaska	1969	98.8
Midway-Sunset	California	1901	59.1
Point McIntyre	Alaska	1988	57.5
Kern River	California	1899	48.3
Belridge South	California	1911	40.7
Endicott	Alaska	1978	26.6
Wasson	Texas	1937	25.2
Giddings	Texas	1960	24.0
Garden Banks 426	Gulf of Mexico	1987	21.7
Elk Hills	California	1919	21.6
Yates	Texas	1926	19.9
East Texas	Texas	1930	19.7
Pescado	California offshore	1970	18.5
Spraberry Trend	Texas	1950	17.3
Hondo	California offshore	1969	16.4
Slaughter	Texas	1937	15.5
Milne Point	Alaska	1982	14.1
Viosca Knoll 990	Gulf of Mexico	1981	13.5
Seminole	Texas	1936	12.6

Source: *US Energy Information Agency*

Table 1: Top US fields ranked by oil production – 31 December 1996

like those in most of 1997, did not find new reservoirs, even in mature areas.

On the production side, horizontal drilling, integrated reservoir studies and modern completion techniques such as hydraulic fracture stimulations, have enhanced well productivity and lowered completion costs. Enhanced oil recovery (EOR), particularly CO_2 injection and steamflooding, has improved recoverability of oil in old fields.

The centre of the CO_2 industry is the Permian basin in West Texas and New Mexico where Shell and other companies produce giant CO_2 fields and deliver their product through an intricate pipeline system. Current plans under discussion include a 500-mile pipeline to California and new CO_2 projects for areas in Kansas, Oklahoma and the Texas Panhandle. Steam injection has proved especially valuable in some California fields with high viscosity oil.

Refining

The substantial capital expenditures required by adherence to environmental regulations, low margins and increased competition have wrought dramatic changes in the US refining industry in the last few years. Some 30 refineries have been shut down, with domestic refining capacity reduced by 15%. Here too, there have been a lot of mergers, joint ventures, sales and acquisitions, with some changes, such as the recent sale by Amerada Hess of a half-stake in its St Croix refinery to PdVSA, involving non-US companies. The leaner, modernised refineries which have survived are now operating at close to capacity rates, with an average capacity utilisation rate in 1997 of 94.4%. Refinery margins have gradually improved and the current low oil prices which are reducing upstream profits have improved the bottom line of companies' downstream interests.

One of the major challenges for refiners has been the requirement that all gasoline sold in areas out of compliance with federal and state air quality standards must be reformulated. Reformulated gasoline (RFG) is currently estimated to account for 25% of the US gasoline market. Stricter automobile emissions levels, probably including a reduction in the amount of sulfur in gasoline, are due at the turn of the century, and meeting these will involve more adjustments and capital expenditures for the refining sector.

Gas reserves

US proved gas reserves at the end of 1996, excluding those in the Alaskan North Slope which the government considers as unmarketable, were listed as 166,474bn cf. Texas, including offshore state-administered waters, contains 23% of these reserves, New Mexico 10%, Oklahoma 8% and Wyoming 7%. Other states with holdings in the vicinity of 5% include Alaska outside of the North Slope, Colorado, Kansas, and Louisiana. A number of others with some reserves include Pennsylvania, Ohio, Virginia and West Virginia in the Appalachian region. Some 6% of proved reserves are coalbed methane deposits, located principally in New Mexico, Colorado, Alabama, and Virginia. Federal offshore areas, including the Gulf of Mexico and California, contain 18% of total proved reserves.

A 1996 report by the US Geological Survey suggested that a lot of gas reserves exist in deep sedimentary basins, at or below 15,000 feet. It estimated that 114tn cf of technically recoverable gas reserves remain to be discovered, with about half in the Rocky Mountain area. This deep gas will be difficult and expensive to produce and a number of technical issues need to be addressed to overcome the costs and risks involved.

The main gas onshore producing regions are the Anadarko/Panhandle region, the Permian basin, the San Juan basin and the Rocky Mountain basin. Unlike oil, gas production has remained fairly constant since 1985. Texas, Oklahoma, New Mexico and Louisiana are the leading onshore producers and another 19 states have some output.

Energy policy

Although the federal government, in its recent Comprehensive National Energy Strategy, emphasised a desire to see onshore oil production increase, environmental and financial concerns largely dominate its energy policies. Two recent federal initiatives arose from budgetary concerns – the sale of the Elk Hills field to Occidental for $3.65bn and the aborted attempt to sell off some SPR reserves. Relations with the oil industry are strained over a dispute regarding the basing of royalty payments on posted prices which the government feels has led to underpayment. Oil companies oppose a proposed new crude oil valuation based on Nymex or spot prices which they feel would not accurately reflect values, especially for production in the Rocky Mountain area. The impending resignation of Energy Secretary Federic Pena is not expected to result in major changes in the government's policies.

The collapse of oil prices and economic turmoil in a number of Asian countries is far more likely to bring about changes in the US oil industry. If oil prices remain low, the requirements for expenditure of deep-water Gulf projects may force companies to cut back on onshore exploration and production.

Key upstream transactions

In 1997, Petroconsultants logged over 400 upstream transactions in its worldwide upstream transaction database. The total number of transcations logged in the database since 1990 now totals more than 2,800.

The 400-plus new entries covered 55 countries in the categories of company takeovers, developed reserves, undeveloped reserves and exploration acreage. The key 1997 deals in each of these transaction categories are detailed below.

Takeovers

In 1997, the average price paid for reserves derived from company takeovers worldwide was $4.84/boe. This compared with an average of $5.13/boe in 1996 and an average since 1990 of $4.78/boe.

The countries which showed the most activity in 1997 were Canada, the UK and the US. Together, these countries accounted for a total $10.5bn worth of transactions for a cumulative 2bn boe at an average purchase price of $5.17/boe.

The largest takeovers in 1997 were Canadian Occidental's $1.4bn takeover of Wascana Energy ($6.11/boe) and the $1.2bn acquisition of Chauvco Resources in the merger with Pioneer Natural Resources ($7.84/boe).

Of special note during 1997, was the aggressiveness of Gulf Canada Resources. In February 1997, the company took over Clyde Petroleum of the UK in a bid which valued the company at $904mn ($5.5/boe). In July 1997, Gulf Canada Resources took over Stampeder Oil in a transaction which valued the company at $490mn ($5/boe).

Developed reserves

In 1997, the average price paid for developed reserves worldwide was $3.75/boe. This compared with an average $3.68/boe in 1996 and an average since 1990 of $3.63/boe.

Date	Buyer	Seller	Price (US$/boe)
March 1997	Santos	WMC	3.83
October 1997	Apache	Mobil	5.24
December 1997	Hardy	Apache	6.58

Table 1: East Spar Gas Field Evaluation

Transaction	Buyer	Seller	Price (US$/boe)
Venezuela round	Various companies	Government	0.01 to 3.30
Yetagun field	Texaco	Premier	1.74
Bangladesh gas	Shell	Cairn	1.73
Millom field	British Gas	Burlington	1.35

Table 2: Undeveloped Reserves Prices

Transaction	Buyer	Seller	Price (US$/sq km)
Mauritania	Fusion	Hardman	20
Poland	Apache	FX Energy	617
Indonesia	Various	Government	40 & 4,206
Myanmar	Various	Government	452 to 890
Trinidad	Conoco	Government	9,840

Table 3: Exploration Acreage Prices

The countries which showed the most activity in 1997 were Australia, Canada, the UK and the US. Together, these countries accounted for a total $13.6bn worth of transactions for a cumulative 3.4bn boe at an average purchase price of $4/boe.

Of special note during 1997 was the interest shown in reserves on Australia's offshore Northwest Shelf, particularly the East Spar gas field. During the year three transactions valued the field at between $3.83/boe and $6.58/boe as detailed in **Table 1**. As the table shows, the value of the East Spar reserves showed a significant increase over time.

The East Spar field currently has proven and probable reserves estimated to be approximately 500bn cf of gas. The field is currently producing 50mn cf/d of gas and is operated by Apache.

Undeveloped reserves

In 1997, the average price paid for undeveloped reserves worldwide was $0.52/boe. This compared with an average $0.42/boe in 1996 and an average since 1990 of $0.21/boe.

The countries which showed the most activity in 1997 were Argentina, Australia, Kazakhstan, Russia, the US and Venezuela. Together, these countries accounted for a total $1.64bn worth of transactions for a cumulative 5.1bn boe at an average purchase price of $0.32/boe. Kazakhstan traded by far the largest volume of this total, estimated to be at least 3.7bn boe at an average purchase price of $0.24boe.

Significant events involving undeveloped reserves during 1997 were the interest shown in Venezuela's marginal field bid round, the sale of Texaco's interest in the Yetagun gas field offshore Myanmar, Shell taking an interest in Bangladesh gas (Sangu field) through a farm-in with Cairn Energy and the sale of Burlington Resources' Millom gas discovery in Ireland's Irish Sea. Summary details of these transactions are shown in **Table 2**.

Cumulative winning bids in the third marginal field round in Venezuela totalled $2.17bn for a total of 21 blocks. Lasmo was the most prominent bidder, paying $453mn for the Dacion block.

In the Yetagun gas field transaction offshore Myanmar, Texaco offloading its 42.9% stake in the field to Premier for £260mn. Premier immediately on-sold a 36.4% interest to Malaysian state oil company Petronas.

In the Shell/Cairn transaction in Bangladesh, Cairn agreed to transfer a half interest in its whole asset base in the country to Shell in return for Shell paying Cairn a cash equivalent of $230mn. Reserves in the Sangu field were estimated to be 800bn cf of gas.

In 1997 the average price paid for pure exploration acreage worldwide was $1,134 per sq km. This was similar to the average price paid in 1996 and an average since 1990 of $1,085 per sq km.

The countries which showed the most activity in 1997 were Australia, Indonesia, Russia and Myanmar. Together, these countries accounted for a total $141mn worth of transactions for a cumulative 210,445 sq km at an average purchase price of $670 per sq km.

Of special note during the year was the renewed interest in offshore Mauritania by Hardman Resources, acitivity in Poland by Apache and the payment of a number of signature bonuses to acquire tracts of land in Indonesia, Myanmar and Trinidad. Details of these transactions are shown in **Table 3**.

Hardman was awarded its two Mauritanian blocks in late 1997, attracted one farminee but was unsuccessful in enticing the second, Shell, to remain a farminee in the deep water section of the blocks after a four-month option to acquire a 70% interest was not exercised.

The highest Indonesia signature bonus paid was for the Sabo block which lies adjacent to Australia's 150mn barrel Laminaria oil field in the deep water sector of the Timor Sea.

No collusion in UK fuels retailing concludes OFT report

The UK Office of Fair Trading (OFT) published a 140-page report of its year-long review of the UK fuels retailing market in May 1998. No evidence of predatory or collusive behaviour by the supermarkets or oil majors in a bid to remove independent rivals was found. As a result, the industry will not be referred to the Monopolies and Mergers Commission (MMC) for what would have been the fourth time. The last MMC investigation, in 1990, also concluded that the industry was competitive and operating in the public interest.

Announcing publication of the report – entitled *Competition in the Supply of Petrol in the UK* – John Bridgeman, Director General of Fair Trading stated that in the past eight years, pump prices have fallen by about a third in real terms (without duty and VAT) largely because of keen competition between the oil companies and the supermarkets.

The report did acknowledge that competition between the supermarkets and major oil companies had squeezed a number of independents out of the market. 'Competition promotes market efficiency, keen prices and consumer choice but it inevitably results in winners and losers. Supermarket volumes have grown at the expense of the traditional roadside sites. The prices charged by independent petrol retailers show that they are, on average, more expensive than their rivals. The consumer, not surprisingly, has chosen lower prices.'

Since the last MMC referral in 1990, the supermarkets' share of the market has grown from 5% to around 23%. There were 274 supermarket sites 10years ago and 12,156 independents. In 1996 there were over 700 supermarket fuel outlets and less than 10,000 independents.

Marginal recovery

Bridgeman stated that he did not believe that lower prices indicated predatory behaviour. 'There is evidence that petrol was being retailed at a loss but margins have now recovered to profitable levels. However, margins are still at a historically low level. If successful predation had occurred, we would have seen much higher margins being earned now.'

He went on to point out that between January 1991 and February 1998 real gross margins in the market fell by about a third, from around 6 p/l to 4 p/l on unleaded and leaded gasoline. Crude oil prices dropped by about 40% (in £ terms) in the 18 months to March 1998. However, the cost of crude oil alone only has a small effect on the final pump price given that tax currently accounts for about 80% of the final price and distribution costs a substantial proportion of the remaining 20%.

Supermarket sales

'The supermarkets' pricing behaviour has been the result of a low cost base and long term desire to compete with other supermarket rivals rather than predation,' he continued. 'Sales at the average supermarket site in 1996 were 8.6mn litres, around four times the average roadside site. That allowed the considerable fixed costs of a petrol forecourt operation to be spread thinly, permitting supermarkets to operate on small margins and offer consumers competitive prices. Since overall demand for petrol has been largely static in recent years, virtually all the growth in supermarket volumes has come from traditional roadside sites.'

'Similarly, keen pricing by the oil companies cannot be regarded as predation because it is unlikely to drive supermarkets out of the market.'

PRA response

However, according to the UK Petrol Retailers Association (PRA), the report was two years overdue and quoted 1996 prices. As a result it was said to be 'unrepresentative of today's fuel market and will do nothing to protect the consumer today or tomorrow'.

Christopher Macgowan, Chief Executive of the Retail Motor Industry Federation, of which the PRA is a division, said that: 'No mention has been made of the fact that since 1996, 2,500 sites have closed, a figure increasing by the day. Consumers in rural areas are certainly not getting a fair deal with high prices and extensive closures. Far from acknowledging that the supermarkets and the oil companies are creating significant problems for the consumers – with the daily closure of forecourts – they have missed a big opportunity to help consumers get a better deal. In areas such as motorway service stations, petrol prices are consistently high as there is no competition, but this does not warrant comment in the report.'

He added: 'There is existing evidence that the oil companies will not offer the lowest prices when not pressed to do so by the existence of competition. There are no hypermarkets on the UK's motorway network: has anyone noticed how many pence per litre more fuel costs at these sites? A distress purchase it most certainly is!'

'Owned site operators enjoy no protection against unfair practice; even the right to informal conciliation does not exist in the new form of operating agreements.'

The PRA has called for a Government initiative to replace OFT as the responsible body for regulation of the downstream fuels industry. 'This should immediately be the subject of a wider and more detailed inquiry by a Select Committee,' said Macgowan.

The Scottish Office was scheduled to report on its own inquiry into rural petrol prices in June 1998.

Prospects after the Riyadh agreement

Three factors influence the oil market and the price of oil: fundamentals, perceptions and geopolitics. *Manouchehr Takin from the Centre for Global Energy Studies looks at how these factors have influenced the global oil market in recent months.**

The slower than anticipated growth of non-Opec oil production, together with the delayed re-entry of Iraqi oil into the world market, kept oil prices high in 1996/97. The oil industry had also been decreasing the average level of its oil stocks since 1991 and less oil was available at this time to meet unexpected shortfalls in the world market. However, there has been a weakening of the market since late 1997 as levels of oil stocks have begun to rise following an increase in oil supply and reduced oil demand. (see **Figure 1**.)

On the supply side, a number of delayed oil field development projects have finally begun to come onstream. In addition, the perennial over-production by Opec above its own self-imposed ceiling became more pronounced in the 2H1997. Despite this, Opec decided to raise its production ceiling by 2.5mn b/d in its Jakarta meeting of November 1997. The actual production increase was not as high as this figure since the organisation had been producing above its previous quota. Nevertheless, the decision had a significant bearish impact on the market.

In addition, the imminent military attack on Iraq and the possible cessation of that country's oil exports did not occur. On the contrary, there is now a greater likelihood that Iraq will be allowed to export significantly larger quantities of oil. Since the level of Iraqi oil exports is based on the revenue it generates, the lower the price of oil the greater will be the volume of Iraqi exports.

On the demand side, the 1997/98 winter in the northern hemisphere was unusually mild and the Asia/Far East economic crisis has led to less lifting of oil by these countries, resulting in a growth of unsold inventories. Furthermore, with the low price for physical deliveries and the higher price in the forward and futures markets, part of the purchased oil has been going into inventories, counter to the normal seasonal stock behaviour. An inventory overhang has now accumulated on the market, accentuating the bearish sentiment at a time when the world is going into a seasonally low oil-demand period.

Such a supply/demand situation resulted in the price of oil falling by more than 40% between October 1997 and mid-March 1998. Clearly something had to be done and, as usual, all eyes were on Opec. However, Opec members were not unanimous on the choice of action, nor on the size of any production cuts. Venezuela's production cut was expected to be the greatest since it had been the largest and most consistent over-producer for a few years. On the other hand, Saudi Arabia was also expected to cut the most since the Kingdom had taken the largest share in replacing the Iraqi oil removed from the world market in the 2H1990. However, Venezuela, denying that it was over-producing, proposed the participation of the producers outside Opec. Other countries did not see this as a practical proposition.

A turning point

It was against this backdrop that an unexpected event took place in the form of the Riyadh Pact on 22 March 1998, followed by the Opec meeting on 30 March. The former was most dramatic since Mexico (not an Opec member), together with Venezuela and Saudi Arabia, announced that they would reduce their oil production by 600tn b/d. In the latter event in Vienna, other Opec countries joined in and agreed to lower their production. Further production cuts have since been announced by other non-Opec producers such as Norway, Russia, Oman and others. The total promised volume of production curtailment amounts to betweem 1.6mn b/d to 1.7bn b/d relative to the actual February production.

The Riyadh Pact is very significant since it resolved the apparent impasse between Saudi Arabia and Venezuela and, more importantly, it involved the active participation of Mexico, a non-Opec country. The Pact could become a turning point for Opec and Opec/non-Opec relationships and for future developments in the oil market.

Oil prices recovered by almost $3/b following the announcement of the Riyadh Pact. However, contrary to most expectations, the price recovery was partly lost following the Opec decision and a weak oil price regime prevails to date.

Market perceptions

The actual workings of the oil market, however, do not always follow the exact supply/demand fundamentals. Perceptions play an important role. As noted above, the expectation in 1996/97 was that Iraq would soon commence oil exports and the market had already discounted for its re-entry. However, procrastination in the Iraq/UN negotiations led to delays in the start of Iraqi oil exports and its later cessation which lasted many months. These unforeseen delays were a major factor causing the tight oil market at the time. Since late 1997, and before the Jakarta meeting, the market perception has been for a further deterioration of Opec discipline, rising oil production and even the organisation's collapse! This perception still prevails today, the expectation that the promised production cuts will not be fully implemented, contributing to the bearish market sentiments.

These views reflect the poor historical record of Opec quota discipline and of Opec/non-Opec cooperation dating back to 1987. More particularly, most Opec member countries have been over-producing since the 1993 decision on

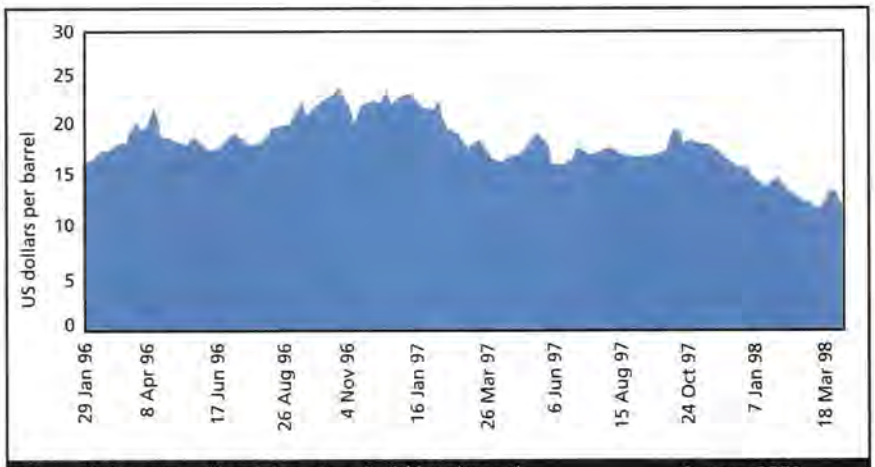


Figure 1: Recent profile of the price of oil (dated Brent) Source: *CGES*

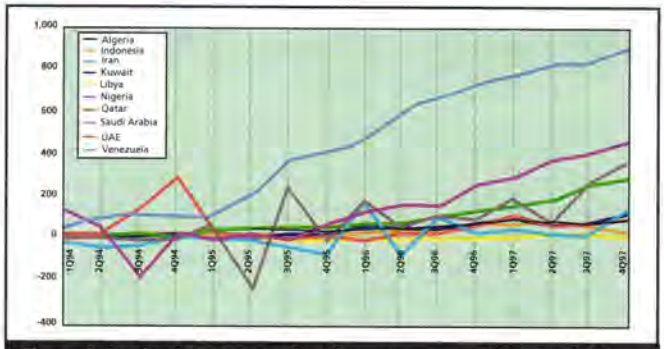


Figure 2: Production compared with quota Source: *CGES*

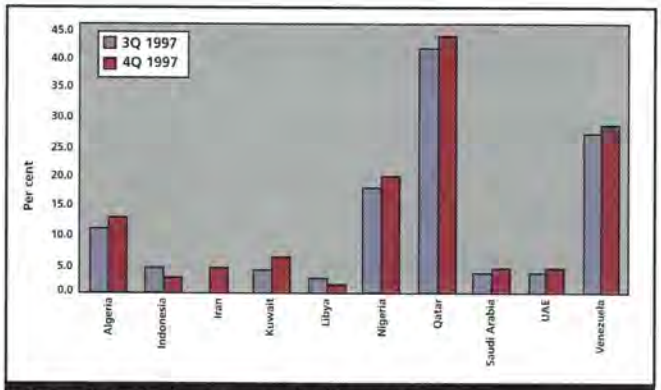


Figure 3: Production compared with quota
(Over-production as per cent of production) Source: *CGES*

production ceiling and quotas – total Opec over-production was about 2.5mn b/d in late 1997. The behaviour of individual countries has differed. The largest volumes of over-production have been in Venezuela, Nigeria and Qatar (see **Figure 2**). Venezuela stands out more distinctly since its over-production has been consistently rising since early 1995, reaching 930tn b/d in the last quarter of 1997. Using the percentage of over-production as an indicator (see **Figure 3**), Qatar is seen to be the largest over-producer, followed by Venezuela, Nigeria and to some extent Algeria. Other countries have been more or less observing discipline.

The quota-observing countries were complaining about the lack of production discipline among other Opec members and had warned that over-production should not continue. Of greater significance was the production behaviour of Saudi Arabia which possessed about 2mn b/d of unused production capacity. It stated that it could no longer act as a swing producer and increased its over-production in the 2H1997 (see **Figure 2**).

Saudi Arabia was also the initiator for the agreement on increasing the Opec production ceiling in Jakarta in November 1997. Two interpretations have been given for this Saudi initiative. One is that Saudi Arabia was impressing upon the over-producing members that their over-production and the loss of Saudi market share could not continue. The other is that Saudi Arabia actually believed the market would remain bullish and could absorb the extra supply. The Kingdom had been consistently forecasting higher call on Opec in the previous two years and the Jakarta initiative could have been a reflection of another bullish market outlook by Saudi experts.

Whatever the reasons, the result of the Jakarta agreement was to weaken the market and in spite of the Riyadh and Vienna meetings, the weakness has persisted. Market perception is that the production discipline will not be observed, or at least not completely so. Some analysts also believe that the agreed production cut is not sufficient and they also criticise Opec for not having acted earlier.

It is regrettable that the negative perceptions have been aggravated by some statements from Opec authorities. For example, while over-production was widely reported in the international statistics (by secondary sources), some countries were consistently denying it and on occasions there were even conflicting statements by the different authorities within the same country.[1]

However, it has to be stated that in spite of all the weaknesses of Opec and all its shortcomings, the organisation will, nevertheless, survive and influence the oil market in some form or another. Indeed, if Opec did not exist it would have to be created. Those interested in the market and the oil price outlook should continue observing Opec decision-making process and its relationship with non-Opec producers.

Oil price outlook

The most important factor for the rest of 1998 will be the behaviour of Opec and non-Opec producers – about which the market has a sceptical view. However, although such a view is to some extent justified, the bearish outlook should not be exaggerated.

Looking first at the Opec/non-Opec agreement – this is very different from the past experiences which had been limited to technical discussions and consultation meetings between the two groups. This time, both producer groups have suffered from the extremely low oil prices and from the drastic reduction of their revenues. They have both made commitments under the weak market conditions, rather than first expecting Opec to 'put its house in order' before non-Opec cooperation.

Had Opec acted first by reducing its production and improving the price of oil, then there would have been less incentive for non-Opec countries to cut their production and exports. Furthermore, oil prices have to go up much higher before causing a temptation for over-production by Opec and non-Opec countries.

A criticism of Opec is that the ceiling should not have been raised in November and that the present cuts are too little, too late. With an earlier production cut, oil stocks would not have been replenished and the market would have remained strong. However, had Opec cut production when prices were still firm, it is doubtful if Mexico, Norway, Russia and others would have participated in the initiative.

Another indicator for market optimism should be the statements by Opec that it would continue to monitor the market conditions and, if necessary, would take further decisions. In spite of Opec's poor performance record, such a scenario should not be disregarded. On the contrary, history has shown that when Opec finds itself in a serious crisis, it will act.

Furthermore, although Iraq's exports are set to rise again, there are doubts on the speed of further increases. In spite of the prompt evaluation and reporting by the UN technical experts, the repairs of Iraqi oil facilities and the increasing of export capacity might be much slower. There are also signs of possible re-escalation of tensions between Iraq and the UN. In addition, the availability of accurate data on stocks and inventory behaviour always has a time lag of several months. The existence of the large stock overhang and its size still has to be evaluated. Thus, the influence of Iraqi exports and the stock overhang might not be as bearish as it may appear at present.

Nevertheless, it is difficult to give an exact price forecast since the greatest unknown still remains the production behaviour of Opec and non-Opec countries in the coming months.

Speculating on geopolitics

We need not be reminded that oil is not like any other commodity but has an important strategic significance. The history of the oil industry has numerous examples of processes other than pure free market forces. The excesses by the old oil concessionaires, the role of the

Seven Sisters and their governments, various successful and unsuccessful attempts at oil nationalisation and international political and business intrigues are well known historical facts. In our own time, Opec, the International Energy Agency (IEA) and the oil or energy ministries in many producing and consuming countries remind us of the global strategic importance of oil.

It is interesting to compare the recent developments in the oil market with those in 1986. In that year, the price of oil collapsed from between $27/b to $28/b to less than $10/b – though the recent price decline has been less steep. The 1986 collapse occurred because Opec decided to stop defending the price of oil through production management – the policy which had been followed for several years. Opec decided to end acting as a swing producer for the global oil market while Saudi Arabia decided to stop acting as a swing producer within the organisation. Opec chose to maximise production in order to reverse the shrinking of its market share which had been taken up by non-Opec producers.

The Opec policy reversal led to the collapse of the price of oil and was described by some as a 'price war'. The consequence was the crisis atmosphere in the oil industry, particularly in high-cost production areas where the price of oil had become comparable with its cost of production. Oil industry restructuring, downsizing, staff reduction, return to core business and other drastic measures were common in the industry. However, a crisis had also developed in the Opec countries themselves. Although their cost of oil production was low and oil operations were still profitable, the loss of foreign exchange earnings was drastic. The financial situation became desperate when the oil price fell to less than $10/b and Opec could not continue the 'price war'.

Opec was under pressure from two sides to end the situation. On one side were the Opec countries themselves where the treasuries, finance ministers and heads of states put pressure on the oil ministers. The consuming countries were of course benefiting. However, those industrialised countries with significant oil production (eg, the US, which is both a producer and importer, the UK and Norway) together with the international oil companies hoped for oil price recovery and were also exerting pressure on Opec. The visit of Vice President Bush to Saudi Arabia at that time was not unrelated to the price of oil.

Finally, Opec decided to end the 'price war' and to apply production management once again. However, the production ceiling was chosen so as to defend a price of $18/b, instead of the $27/b to 28/b which Opec had been defending till then. The $18/b was a 'magic price level' which was considered a compromise for Opec, the global oil industry and oil consumers.

In comparing the recent oil price decline with 1986, Opec is again under pressure from two sides. Can one extend the comparison and expect another 'magic price level'? The industry has since learnt to explore and produce at lower oil prices. So will that compromise price be, say, $14/b to 15/b? Or is the idea too speculative – will the oil markets be influenced by only market fundamentals and perceptions this time?

(1) As already noted, Venezuela was the largest over-producer and the Chief Executive of national oil company PdVSA was vehemently criticising the whole concept of production restraint. At the same time, the country's Minister used to deny Venezuela's over-production. Yet, as reported in the *Financial Times* 2 and 3 April 1998, he referred to Opec ministers saying: 'All of us were Pinocchios, including Venezuela, lying to each other!'.

* This article is based on a presentation to the IBC Gulf Conference 'Oil, Gas & Petrochemicals in Qatar' held in Doha, Qatar, on 19 to 21 April 1998. The views expressed here are those of the author and not the official position of the CGES.

Opec's future rests on Asian tigers' return to growth

A number of supply factors have created the current oil price weakness. Wavering Opec policies, uncertain prospects for Iraqi exports and the movements of stock levels have all played their part. More fundamentally, the success of the companies in finding and developing non-Opec supply at competitive costs has continued. On the demand side has been the setback to oil and gas demand growth in Asia. How soon growth resumes is crucial to the Opec producers in the Middle East. *Fred Thackeray* assesses whether the views of the experts at a recent conference provided any answers.

Once the current financial crises in Asia have been surmounted, it is expected that the region will return to rapid economic growth and fast rising energy demand. This means the region will become increasingly dependent on Middle East oil. Against dependence of about 60% for its oil requirements today, by 2010 it will be 80% dependent. Dependence will be mutual – of the increase in Middle East oil exports between 1996 and 2010, around 42% is forecast to go to the Far East.

Forecasts such as these – resumption of rapid growth; increasing reliance on Middle East oil – formed the consensus opinions of a star-studded assembly of oil and gas wisdom at the Centre for Global Energy Studies (CGES) annual conference in London at the end of April 1998. Although the conference was entitled 'Oil and Gas Investments in Asia under Conditions of Oil Price Uncertainties and Financial Crisis', it was noteworthy that not one of the speakers directly answered the implied question: should one now invest in oil and gas in Asia? The answer was simply glossed over in the expectation that economic growth and rising energy demand will soon be resumed.

Experience of the vagaries of forecasting in the international oil industry over the past 25 to 30 years should give this sector cause to be wary of such a strong, almost unstated, consensus. However, the persistent growth of populations in Asia is bound to give a strong and sustained boost to energy consumption. A recent UN study reported slowing growth rates of world population, with the prospect that it may reach a plateau by 2100. Nevertheless, the study estimated that by 2010 the combined populations of China, India and Indonesia would increase by 400mn. To meet the energy needs of these greatly increased numbers in just 12 years' time it is certain that a major expansion of oil and gas supplies, as well as coal, will be required.

An estimate of the increase for the principal countries of the region – China (including Hong Kong), India, Indonesia, Thailand, Taiwan, Philippines, South Korea, Malaysia and Singapore – was presented at the London conference by Leo Drollas, CGES Deputy Executive Director. Oil consumption in these countries taken together, he estimated, will increase more than 50% by 2010 from about 12mn b/d in 1998 to over 18mn b/d.

Looking further ahead, Mark Moody-Stuart, a Managing Director of the Royal Dutch/Shell Group, cited the Group's 'sustained growth' scenario of world economic and energy developments up to 2020. By then, the scenario indicates that Asia could account for more than half the world economy against one-third today and that in the Asia-Pacific region total energy demand will be higher than today by 60mn boe/d. Oil consumption in the Asia-Pacific region, according to Shell's scenario could more than double by 2020 while gas consumption could increase nearly four-fold.

According to speaker Dr Fereidun Fesheraki, Director of the East-West Centre, total Asian oil demand was already 18.7mn b/d in 1997. In a base-case forecast, he assumed that the Asian financial crisis would continue until 2000. On this basis, he estimated that oil demand in the region would rise to 19.2mn b/d in 1998, 20.6mn b/d in 2000, 24.3mn b/d in 2005 and 28.4mn b/d in 2010. Of the total in 2010, he anticipated 6.6mn b/d, or almost one-quarter of demand, will come from China.

Particularly significant for investment decisions at the present time were Dr Fesheraki's estimates of refinery capacity. In contrast to the region's net oil import dependence overall, in respect of refining it is close to statistical self-sufficiency, with a total crude distillation capacity of 18.7mn b/d. In a separate comment, Shell's Moody-Stuart said there is now more spare refining capacity in the Asia-Pacific region than in western markets, resulting in net product flows from east to west rather than the historic pattern in the other direction.

LNG – The main victim

Several speakers emphasised the current problems of the LNG business, due principally to the Asian financial and economic setbacks but also to other factors including the weakness of crude oil prices to which gas prices are contractually linked.

Jim Jensen, President of Jensen Associates, summed up the issue with the comment that: 'The concentration of Asian economic problems on South Korea, Malaysia and Indonesia hits at the heart of the Asian LNG trade and Japan's poor economic performance compounds the

problem'. Estimates of the future growth of LNG demand made only a few months ago, he said, 'now look overly optimistic'. Accordingly, the Institute of Gas Technology, for example, published in January 1998 a forecast of Korean imports 20% below earlier official estimates.

Focusing on recent developments, Paul Griggs, Vice-President of Strategic Planning for BHP, remarked that short-term contracts for deliveries to South Korea have been cancelled; Indonesia's Natuna project 'has been put on hold indefinitely' and Malaysia's third Bintulu project (MLNG Tiga) is 'rumoured to have been shelved'. More generally, he said, there will be 'an oversupply of LNG especially in the medium term'. Expansion of existing plants alone, he pointed out, could meet a growth of 4%/y in requirements and these may be favoured because they are cheaper. Grassroots projects which have not yet secured buyers, he added, include those in Yemen and Papua-New Guinea, the Gorgon project in Australia and the Tangguh project in Indonesia. (Since the conference British Gas has announced that it has signed a Memorandum of Understanding with the Yemen LNG Company for a potential export project to supply BG's proposed import terminal at Pipavav in India.)

'Asia is destined to play a crucial role in propping up the oil industry'

– Sheikh Yamani

The prospects for further LNG supplies to Asian markets from the Middle East are likewise unpromising. Dr Ibrahim B Ibrahim, Economic Advisor, Emiri Diwan of Qatar, made an assessment that 'new entries by LNG suppliers from the Arabian Gulf are going to be more difficult' in future 'especially in the light of the present economic crisis in Asia-Pacific'. Both he and Jensen drew attention to the changing character of the Asian markets for LNG. Future growth of demand will increasingly be to fuel combined cycle gas turbine (CCGT) plants built by IPPs (independent power producers) as privatisation of the region's electricity industries proceeds. This will mean smaller requirements, perhaps as low as 400,000 tonnes, for an individual project. Also, said Ibrahim, the principal new markets – in China, India, Thailand and the Philippines – have 'specific institutional, financial, and economic characteristics that make the execution of LNG projects extremely difficult'. There is, he added, 'an absence of large, reliable and financially solid offtakers'.

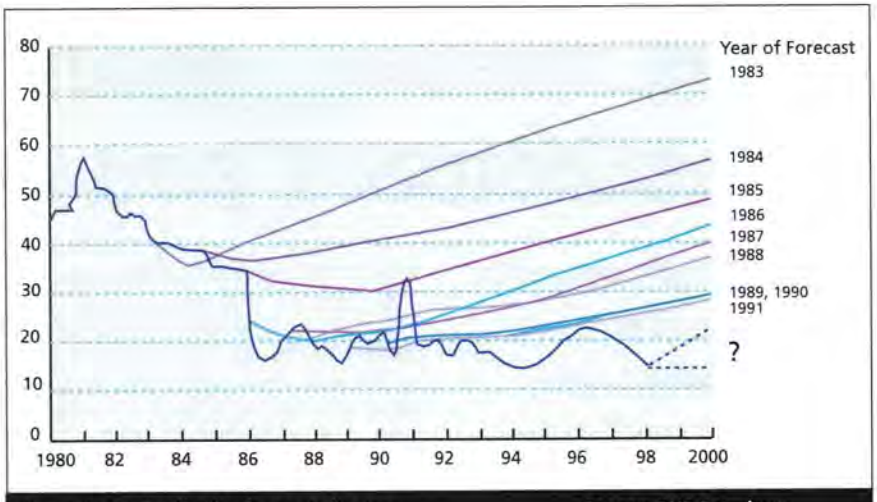


Figure 1: Crude oil price forecasts by year Source: *BHP Petroleum*

Alternatives

Striking across the consensus of the conference, the opportunities for non-Middle East sources of oil and gas supply to Asia's emerging markets were outlined by Marcello Colitti. As Honorary Chairman of Enichem, Colitti's unorthodox approach fitted well with the growing assertiveness of the ENI group on the world stage.

The great oil and gas pipelines originating in Siberia, he remarked, now go south-westwards to European markets, but, if these were rotated to a south-easterly direction, then 'they would carry Siberian oil and gas to the heart of China'. It seems likely, he surmised, that 'the Central Asian reserves will find their natural outlet in the emerging markets of the Far East'. Colitti pointed out that as the crow flies it is the same distance from the Kazakh fields to Peking as from Urengoy to Milan.

He added that the natural gas resources of the Asian region itself are underdeveloped. Currently, he estimated, the reserves/production ratio in the principal countries averages 98 years and the lack of basic gas infrastructure is making the economic growth of these countries more uncertain and vulnerable.

Unanswered questions

When and how should one invest in energy projects in the Asian Tiger region? While speakers at the conference did not specifically answer these questions, they did, however, provide a wealth of material for delegates to form their own opinions. To this, perhaps, should be added the comment – considering the virtually certain prospect that Asia's rapid growth will soon resume – now is surely the best time for financially strong investors to seize the opportunities presented by low exchange rates and low-priced assets.

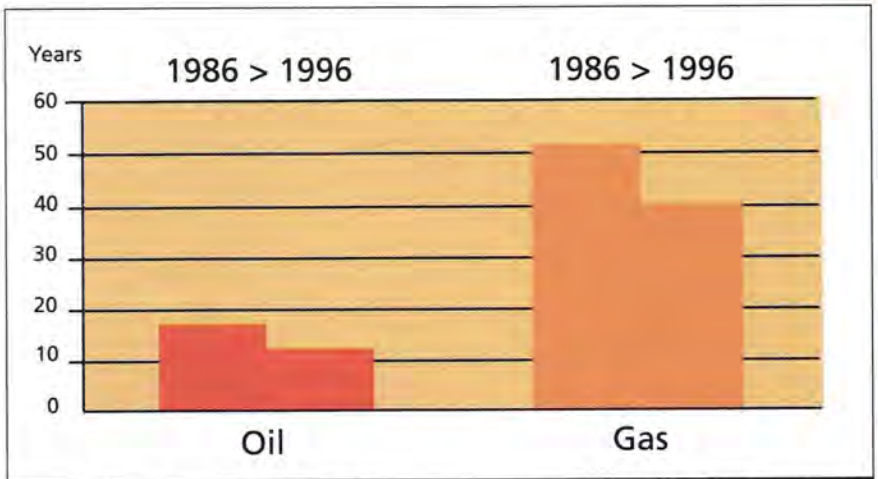


Table 2: Oil and gas reserves in SE Asia Source: *BHP Petroleum*

Fuels testing, quality measurement and control

The high profile and wide publicity given to developments in automotive fuel specifications, particularly where these are related to environmental compositional matters – sometimes obscures an equally dramatic change in the way that all petroleum products are now being tested and the associated quality control of that testing, writes *Stanhope Seta*.

The challenge of satisfying the conservative instincts of most of the user industries in terms of the properties to be specified and measured, and at the same time, to provide laboratories with modern, accurate, precise and cost-effective measurement tools, is one that is being met by the test method writers in close cooperation with the instrument manufacturers.

The development of new test techniques to measure traditional product properties, perhaps by alternative or simulated approaches, has brought the whole area of test method and apparatus calibration and verification into sharper focus. This has created a new market for secondary reference materials, in addition to the great expansion of the existing market for certified reference materials (CRM). This in turn is generating new general guides for the use of these materials and associated statistical techniques, as well as specific guidance now given in a large number of recently issued or revised test methods.

This article looks at a few recent developments where new techniques have been accepted into hitherto conservative specifications, first as options to existing techniques, but now in one instance as the preferred technique.

The Setavap analyser carries out automatic vapour pressure tests of gasoline in conformance with ASTM D 1591 (prEN 13016-1) and elevated temperatures (prEN 13016-2), as well as performing vapour liquid ratio tests to ASTM D 1588

Low temperature operability

Across the range of middle distillate and residual fuels the use of the traditional tests of cloud point, pour point and freezing point reigned for over 50 years, and thus a huge database was built up on experience of the relation of these properties to performance in storage, handling and application. In the 1970s, the introduction of cold filter plugging point (CFPP) to define low temperature operability of middle distillate fuels by a new measure (filterability) was accompanied by vast quantities of field and dynamometer data which has been added to and modified continuously ever since.

Despite the success of this tool, and the various similar offshoots (LTFT, SFPP etc), it has been an addition to, rather than a substitution for, existing tests. Over the past few years, the emphasis has shifted from the development of new properties to measure, to better ways of obtaining the values of existing properties. This has spawned a succession of automated and automatic methods to improve one or more aspects of the traditional manual techniques.

With time, the number of these alternatives gets reduced, by amalgamation, poor experience or lack of cost-competitiveness, and the few remaining compete for acceptance into specifications and as alternatives to the reference manual methods. This stage has now been reached for low temperature operability tests, with alternatives to all three traditional measurement tools currently being introduced into specifications.

For freezing point, this is a particular triumph as the ultra-conservative nature of the aviation industry has resisted changes to test methodology – it took well over 10 years to get digital density accepted. Three alternatives, one automated (ASTM D 5901/IP 434) and two automatic (ASTM D 5972/IP 435 and ASTM D 4305/IP 422), to the traditional manual freezing point (ISO 3013/ASTM D 2386/IP 16) have now been accepted into international aviation turbine fuel standards as alternatives, albeit the last of these with a viscosity limitation. This allows instrumental techniques, such as those pro-

The UK Ministry of Defence, IATA and ASTM have now approved ASTM D 4305 (IP 422) Setapoint detector for automatic testing of the freeze point of aviation turbine fuels

vided by Stanhope-Seta, Phase Technology and Herzog, to be used fully in accordance with specifications such as ASTM D 1655, DEF STAN 91-91 and IATA. It is expected that the next issue of the international 'check list' specification will reflect this change.

For cloud point, again three alternatives (D 5771, D5772 and D5773) have recently been accepted into ASTM diesel, burner and non-aviation gas turbine fuel specifications. These ASTM test methods have completed IP review and will be in the 1999 IP Book. Undoubtedly, these techniques will soon be considered for inclusion in the European diesel fuel specification, EN 590, and other national and international specifications, including the new European heating fuel specification currently under development.

For pour point, ASTM has accepted five alternatives into the same fuel specifications as above. There is generally less interest in Europe for pour point of distillate fuels, and these methods have not yet been proposed for IP adoption; although there could well be interest for the marine market and inland residual fuel testing.

Vapour pressure

With the widespread introduction of oxygenated compounds (alcohols and ethers) into motor gasolines in the early 1980s, it was clear that the traditional Reid vapour pressure (RVP) – which measures water-saturated vapour pressure – was no longer indicating the true pressure exerted by such gasolines under working conditions. There was rapid development of alternative air-saturated techniques, particularly by Stanhope-Seta and Grabner, and it was anticipated that these would replace Reid vapour pressure in a very short time span. This did not occur for a variety of reasons, the main one of which was the desire of both the motor and oil industries to maintain their vast volatility/driveability databases based on RVP.

A second delay has been the uncertainty over measurement temperature, as it is now thought that a range of temperatures more related to normal underbonnet temperatures may be more appropriate for measurement. The situation is at last becoming clearer, and the new edition of the European motor gasoline specification, EN 228, will include the replacement of RVP by air saturated vapour pressure (ASVP). However, this replacement will only replace the method, not the reported value, as in this first stage, the result will be 'converted' to an equivalent RVP value by means of a dry vapour pressure equivalent (DVPE) equation which estimates the RVP under 'dry' conditions. Instruments (from Stanhope-Seta and Grabner) and test methods have been developed for the measurement of vapour pressure at a range of temperatures from 40°C to 100°C and it is expected that one or more of these will be included in the next revision of EN 228.

Calibration/verification fluids

There are now a great variety of so-called 'calibration' fluids on the market and users need to be aware of their potential, and in particular, their limitations. The top tier of these are the certified reference materials (CRM), directly traceable to a national standard and normally marketed by national metrology laboratories such as LGC in the UK and NIST in the US. Such materials are expensive but only need to be used either in very small quantities or at infrequent intervals. An increasing number of suppliers are becoming qualified to supply CRM's.

The second tier are test method specific commercial reference materials made or supplied by manufacturers or organisations certified to ISO Guide 25 and supplied with a certified value. These are not new and, in fact, the reference heptane, toluene, 2,2,4-trimethylpentane, hexadecane and heptamethylnonane used in the engine testing of fuels fall into this category, while fluids for the testing (verification) of viscometers have been around for several years. What is new here is the availability of a multi-test reference fluid where the fluid (normally a fuel or lubricant) has been the subject of a largescale correlation or cross-check programme. These fluids, which can be used for staff training or equipment monitoring/verification, have certified values for a range of tests with the assigned 'true' value coming from the large test population. The number of these large-scale programmes is of course limited, and thus the availability of surplus fluids even more so (Stanhope-Seta supplies such fluids). Furthermore, not all materials tested in such programmes will be satisfactory for inclusion in terms of excessive volatility, homogeneity or stability. These fluids are seen, however, as a welcome addition to the range currently on offer.

The third tier of reference fluids is the secondary working standards (SWS), normally produced by the laboratories themselves, with a recorded history of performance in the specific instruments.

Great care should be taken in the choice of the most appropriate reference material for the task to be performed. Test methods are increasingly giving guidance on the requirements in terms of fluids and the frequency of verification and/or calibration. There is also still great confusion over the difference between calibration and verification (not helped by some method writers). Briefly, calibration produces a bias or conversion, or series of biases or conversions, which are then applied to the measurement to obtain a test result. Verification ensures that an apparatus, instrument, procedure, or a combination of all of these, lays within defined tolerances, and no adjustment is then made to observed values to obtain a test result.

New valve packaging cuts costs and emissions

According to Salisbury-based James Walker, its recently developed Supagraf Premier valve packaging reduces product loss and allows the refining, petrochemical and chemicals industries to conform to environmental legislation on volatile organic compounds and hazardous air pollutants. It is also said to save time and money for valve manufacturers and refurbishers.

The valve packaging comes in length form for on-site convenience and is said to require no specialised fitting techniques in order to reduce hydrocarbon emission levels to below 500ppm. Also available in preformed split rings and sets, it is suitable for use with all standard valves.

Unlike special moulded ring sets supplied for fugitive emission control, Supergraf Premier is fitted in the conventional way – by cutting and inserting five rings into the valve gland and simply compressing by 30% for optimum sealing efficiency. Manufactured from reinforced exfoliated graphite ribbon, the length form packing is said to be tough and flexible with excellent resistance to extrusion at fluid pressures up to 210 bar. Also claimed to be chemically inert within a pH 1–14 range, it is capable of handling temperatures ranging from –200°C to 450°C in oxidising conditions or to 650°C in steam and non-oxidising environments.

The incorporation of an advanced lubricant system is said to eliminate graphite pick-up on the valve stem, keeping friction levels low and ensuring valve action is smooth and reliable with minimal break-out torque.

The use of one type of packing for both rising stem and quarter-turn rotary valves also offers savings on stock-holding costs for maintenance engineers and valve manufacturers who previously fitted special moulded ring sets best suited to individual valve types, states the company.

Tel: +44 (0)1483 757575
Fax: +44 (0)1483 755711

Weighty developments unveiled

A new range of high accuracy scales and mobile platforms for production plants where the presence of gases, volatile materials or combustible dusts poses risks of fire and explosion has been unveiled by Avery Berkel. The RDREx range offers 12 intrinsically safe models in capacities from 6 kg to 600 kg. Out-of-the-box and straight into operation, each unit is a fully self-contained hazardous area weighing station, complete with its own power supply. The units can control valves, feeders and other devices via fibre optic communication.

The company has also launched a new range of gravimetric filling systems, Neumo filling machines and liquid transfer systems to complement its Loadstar Ex intelligent instrumentation which controls weighing platforms, load cell and vessel weighers, and handles filling, checkweighing, counting, packing runs and product listing.

Tel: +44 (0)121 627 6666
Fax: +44 (0)121 555 6062

RDREx floor scales

Portable hygrometry

Michell Instruments has developed an intrinsically safe portable hygrometer for the quick and easy determination of moisture content in hazardous environments. Called CERMAX IS, the device is said to be accurate to ±1°C dewpoint between –60°C and 20°C and ±2°C dewpoint in the range –100°C to –60°C, with a resolution of 0.1°C dewpoint across the entire range.

Both simple dewpoint measurements and more complex functions such as pressure compensation, unit selection, temperature measurement and input scaling are selected via a user-friendly interface which consists of drop down menus.

Weighing just 3 kg and equipped with its own integral data logging facility and rechargeable battery pack, the unit is fully portable. Up to 10,000 measurement points can be stored before being downloaded to a PC. The device is suitable for a range of hydrogen, natural gas and propane applications.

Tel: +44 (0)1223 424427
Fax: +44 (0)1223 426557

NACE takes the strain

NACE International has developed a new slow strain rate (SSR) test method for materials selection and failure prevention in oilfield production environments. The test involves commonly used materials such as corrosion-resistant alloys, primary stainless steels and nickel-base alloys, which may experience stress corrosion cracking when exposed to hydrogen sulfide, carbon dioxide and brine.

SSR is reported to be a quick, simple method to evaluate metals and alloys for resistance to a variety of environmental cracking phenomena, including stress corrosion cracking, hydrogen embrittlement and liquid metal cracking.

The SSR test incorporates a slow, dynamic strain applied at a constant extension rate. The principal effect of the constant extension rate, in combination with environmental or corrosive attack, is to accelerate the initiation of cracking in susceptible materials. Failure is obtained within a few days for commonly used extension rates.

The SSR test method is detailed in NACE's standard *TM0198-98: Slow Strain Rate Test Method for Screening Corrosion-Resistant Alloys (CRAs) for Stress Corrosion Cracking in Sour Oilfield Services.*

Tel: +1 281 228 6223
Fax: +1 281 228 6300
e-mail: **msd@mail.nace.org**

Self-contained sampler improves aviation fuelling safety

As Jet A1 aviation fuel is widely distributed from refineries to airports by pipeline, contamination by water, solids and additive traces is inevitable. Modern aircraft fuel systems demand a fuel free from water, dirt and foreign contaminants and to achieve this, multi-stage filtration systems are employed at terminals, airports and fuelling vehicles.

Filtration performance is routinely monitored and field tests such as ASTM D2276 are regularly performed at various stages in the distribution system. Traditionally a sample is taken via a trailing tube and drained through a monitor case containing a filter into a bucket. The filter is then analysed for contaminant either by weight or colour change. This type of hose end sampling exposes the operator to the hazards of contact with jet fuel particularly during a fuelling operation.

In a bid to provide a self-contained and safer alternative, Stanhope-Seta, together with a major oil company, has upgraded its SSAFCON Sampler. The sampler is specifically designed for portable line sampling to determine particulate contamination and colour ratings of aviation turbine fuel while minimising exposure to fuel in the airport service area.

A permanently installed sampling point (the mounting tray) is usually plumbed in-line downstream of the filtration system at either a designated static test site, hydrant dispenser or airport fuelling vehicle. The sample is plugged into the mounting tray using self sealing, quick release connectors to provide a leak free flow of sample.

The monitor case and filter are housed in a special cell and a bypass valve used to direct fuel through the filter. An integral volume meter and pressure valve are used to control flow rate and monitor the volume of fuel passed through the filter. After each test the sampler is quickly and easily removed by disengaging the connectors, and the filter taken for further analysis – either gravimetric or colorimetric depending on the test procedures adopted by the operator.

Tel: +44 (0)1932 564391
Fax: +44 (0)1932 568363

SSAFCON Sampler installed on an aviation fuelling vehicle

Automatic kinematic viscometer unveiled

Poulton Selfe & Lee's new AKV 8000 automated kinematic viscometer automates each manual step of Standard Methods of tests ISO 3104, ISO 3105 and ASTM D445–IP71, to provide the user with a complete audit trail.

A standard glass capillary Ubbelohde type viscometer is used to measure all types of petroleum products including transparent, opaque and black oils. Unique sample filling stations allow the viscometer tubes to be easily changed. The instrument is automatically controlled via a Windows based software program.

Determinations are carried out in accordance with the required level of precision and kinematic results are calculated. An in-situ cleaning system automatically removes samples and cleans each viscometer tube.

The system can carry out up to eight simultaneous viscosity determinations in one or more temperature controlled baths and is suitable for the measurement of both new and used oils.

Tel: +44 (0)1268 733324
Fax: +44 (0)1268 560049

Remote environmental monitoring in real time

Meteor Communications has developed a 'go anywhere telemetry system' that is said to provide a low cost answer to the real time environmental monitoring of remote sites. The Meteor Burst system comprises an integrated network of battery powered remote terminals connected to environmental sensors, monitors and analysers which transmit environmental data back to one or more data collection points in real time. No mains power or telephone lines are required as data is transmitted in security coded packets by advance radio wave technology.

Data, such as stack emissions, ambient air quality, weather information and water effluent condition, can be transmitted over distances of 1,000 miles or more. Mountains, valleys and long stretches of ocean are no obstacle to the system, states the manufacturer. The system is two way and can be used for automatic alarm and plant shut down routines.

Tel: +44 (0)1727 828200
Fax: +44 (0)1727 828100

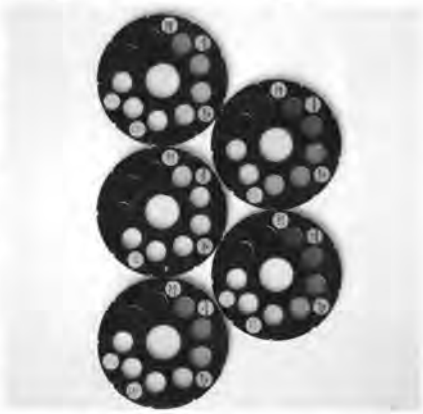
Colorimetric analysis using coloured glass

Colorimetric testing is a widely used method of quantitative analysis which depends on measuring the intensity of colour produced by chemical reactions to determine the concentration of a particular chemical present in a sample. Various techniques exist for measuring the depth of colour including the comparison with coloured liquid or glass standards or photometric measurement.

Salisbury-based Tintometer has simplified this process by offering standard test methods and a corresponding series of ready-made Lovibond® coloured glass filters which are calibrated to allow direct measurement of concentration levels. These include tests used to determine trace concentrations of lead in gasoline fuels and distillates, the percentage marker present in diesel fuels, the percentage of anti-icing additive in aviation fuels and the content of insolubles in diesel lubricating oils.

The company also produces a customised series of glass filters which correspond to colour standards specified in other test methods. Most recently, Tintometer made a test disc for the sulfuric acid test on refined naphthalene which is used to determine the levels of impurities present and which specifies the use of four liquid standard colour standards. However, according to the company, the use of glass filters instead saves the operator much laboratory time and effort.

Tintometer is also currently developing a special disc for hydrocarbon in water which can be used as a visual back-up for an infrared spectrophotometer to ensure that water discharged to the sea does not exceed the required hydrocarbon limit. The oil is extracted from the water sample using Freon to form a separate pale yellow layer, the colour of which can be used to determine the concentration of hydrocarbon in the sample. To date, this method has been used for determining the concentration of crude oil in sea water over the 10–100 ppm range. Although the method has not been applied more widely, Tintometer states that, in theory, it should be applicable to other hydrocarbons – however the company would need to verify the application of correction factors for different oil types.



Tel: +44 (0)1722 327242
Fax: +44 (0)1722 412322

Sensing small fires without false alarms

The new Det-Tronics X3300 unitised multi-spectrum infrared optical flame detector from Detector Electronics has been developed to more reliably sense smaller fires in offshore and oil refinery installations as well as many process and factory applications.

Claimed to be virtually immune to traditional false alarm sources, the unit is said to be sensitive enough to detect a 0.1m² gasoline fire, for example, at distances over 60 metres.

Tel: +44 (0)1753 683059
Fax: +44 (0)1753 684540

New subsea venture

Hardy Oil & Gas has entered into agreements with two Halliburton business units – Halliburton Energy Development and Brown & Root Energy Services – to deploy AlphaPRIME technology to pursue subsea oil and gas development and production opportunities worldwide.

The partners believe that, combined with Halliburton's proven subsea expertise, the new technology has the potential to make a material difference to the economic value and development potential of offshore discoveries in established hydrocarbon provinces. Potential areas of deployment include the North Sea, the Gulf of Mexico, Brazil, West Africa and the Asia-Pacific.

Developed by Alpha Thames Engineering, the AlphaPRIME system enables the operators of proven offshore discoveries to process a field's own oil and gas output on the seabed rather than at the surface as happens with conventional fixed platform or floating production systems. Use of a new choke and valve technology makes it possible to operate AlphaPRIME with electric controls, eliminating the need for heavy duty hydraulic systems.

The system also incorporates a patented multiple pipe connector which enables the entire processing and separation module to be disconnected and removed for maintenance or upgrading without the need to shut down production. According to Hardy Oil & Gas – which acquired an exclusive licence to the AlphaPRIME technology at the end of March 1998 and will act as operator of the new venture – no other subsea processing technology incorporates such a feature.

The system can also be reconfigured to cope with changing processing requirements over the life of the field. Potential applications include: replacing floating production systems in deep-water environments, achieving tie-backs to host facilities over longer distances than are currently feasible, and extending the life of existing infrastructures on mature fields.

Hardy Oil & Gas
Tel: + 44 (0)171 470 2200
Fax: +44 (0)171 470 2302
Halliburton Brown & Root
Tel: +44 (0)181 544 6678
Fax: +44 (0)181 544 6804

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

Membership News

NEW MEMBERS

Mr I A Al Bayaa, London
Mr R B Aucott, Lichfield
Mr J W Barber, Laing Technology Group
Mr A Bell, Kingswell Developments
Mr P Bendall, Gea Spiro-Gills Limited
Mr C Claypoole, Frere Cholmeley
Mr I Clowes, Chester
Mr P Collier, Nippon Oil E & P (UK) Limited
Mr P D Coxhead, Cheltenham
Mr P A Dacombe, ENTEC
Miss R E Dikhanova, Fina plc
Mr B A Eichler, Caltex New Zealand Limited
Mr M S Evans, Bayerische Landesbank
Mr E Faillenet, Perenco plc
Ms S Fennell, Dresdner Kleinwort Benson Limited
Mr P D Foreman, East Lothian
Mr A Gleaves, Aylesbury
Mr C Golvala, Ashurst Morris Crisp
Mr R A Hayman, Prime Safe Limited
Mr M J Hetherington, Econofreight-Olivest Engineering
Mr W D Hodgson, Henley
Mr T Holmefjord, Keystone Consulting
Mr D W Hunter, The Faraday Centre Limited
Mr N S Irvine, Oakwood Environmental Limited
Mr M Jobber, CACI Limited
Mr T Kikkawa, Japan
Mr A Konnaris, Plymouth
Mr L Lallier, Total Oil Marine plc
Mr P R Maslin, BP Oil UK Limited
Mr N L Monnickendam, ERAS Limited
Mr A Moore, Moore Control & Engineering plc
Mr F M O'Flynn, Cameron McKenna
Mrs O Sakhno, Latvia
Mr D Scott, NationsBank NA
Mr A H Scott-Priestley, Chalfont St Giles
Mr M U H Siddiqui, Adnoc Fod
Mr E Simpson, Dragon Resources (Holdings) plc
Mr M Smith, Wirral
Mr P M Spaven, Phillips Petroleum Company UK Limited
Mr C Tayton, GEC Alsthom T&D
Mr B Thomas, The Faraday Centre Limited
Mr M J Van Hoebost, GOVI SA
Mr T W Varley, Cromer
Mr H vou Wels, Siemens Nixdorf
Mr D Wellum, Hornett Bros & Company Limited
Mr I D Will, Teknica (UK) Limited
Captain Y W Wong, Singapore
Ms P Zanotti, ES-KO International Inc

NEW STUDENTS

Mr M Colijn , London
Mr F Elhajjami, London
Mr B G Lloyd, Liverpool
Mr B B Rabiu, London
Mr G Ramachandran, Aberdeen
Mr R Shafi, University of Liverpool
Mr E A Spence, London
Mr A P Viaudo-Bouiti, Middlesex

Around the Branches

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

www.petroleum.co.uk

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

NEW FELLOW

Mr Paul Pisani FInstPet
Mr Pisani is the Business Development Manager for Alpha Oil Services & Trading Limited (AOST) which he joined in early 1990. AOST is involved in marine oil spill detection, contingency planning and response (equipment sales and services); shipboard safety, remote sensing, training and consultancy. Mr Pisani is also a consultant to various companies operating in the Mediterranean. He is the current Chairman of the IP Branch in Malta and has served on the Branch Committee for five years.

NEW CORPORATES

AT Kearney Ltd, Lansdowne House, Berkeley Square London W1X 5DH, UK
Tel: +44 (0)171 468 8000 Fax:+44 (0)171 468 8001
Representative: Ms E Clarke, Information Specialist
AT Kearney Ltd is a strategic management consulting firm with a full spectrum of capabilities, skills, resources and services in strategy organisation, operations and information technology. As a worldwide management consultancy it focuses on mobilising knowledge and resources to achieve major improvements in clients' products, services, relationships and economies.

Geoservices, BP20, 7 rue Isaac Newton, Le Blanc-Mesnil, France
Tel: +33 1 48 14 83 83 Fax: +33 1 48 65 63 83
E-mail:mail@geoservices.com
Representative: Mr K Ross, Communications Manager
Geoservices is an international multi-service company serving the oil and gas industry in more than 60 countries from a network of over 50 bases. Its operations are grouped into the following main categories; mud logging (borehole data management while drilling), directional drilling (MWD/LWD, horizontal, underbalanced drilling), integrated services for well construction, testing and well services, early production facilities and integrated field management.

GLOBAL MSI plc, Carr Hill, Balby, Doncaster, South Yorkshire DN4 8DH, UK
Tel: +44 (0)1302 361558 Fax: +44 (0)1302 730198
Representative: Ms Andrea Dunn, Sales Admin
GLOBAL MSI plc is a leading manufacturer of petrol forecourt canopies, shop stell, car washes and associated forecourt products such as pump island surrounds, manhole covers, chamber liners, cradles, pumps, separators and silt traps.

Petrol Express Ltd, 2nd Floor, Old Town Court, 10–14 High Street, Old Town, Swindon, Wilts SM1 3EP, UK
Tel: +44 (0)1793 422742 Fax: +44 (0)1793 694666
Representative: Mr P A Kershaw, Supply & Pricing
Petrol Express Ltd is involved in the direct management of retail petrol stations with high potential on fuel and shop sales and other ancillary services.

Fisher-Rosemount Petroleum, 4910 Wright Road, Suite 100, Texas 77477, US
Tel: +1 281 274 9856 Fax: +1 281 274 9888
E-mail:hasit.patel@frco.com
Representative: Mr H Patel, Marketing Specialist
Fisher-Rosemount Petroleum is involved in precison flow measurement and control of petroleum products turnkey solutions, systems for automation of oil, refined products PD, turbine and coriolis meters for volume/mass and density control valves for safe and reliable operation of transportation, compact provers for precision field verification of flow meters.

EVENTS Forthcoming

JULY

5–10 **Maryland, US**
12th International Zeolite Conference
Details: David Olsen, University of Pennsylvania, US
website: www.che.udel.edu/12-IZC

6–8 **Italy**
Geographical Information Systems in the Next Millennium
Details: Wessex Institute of Technology, UK
Tel: +44 (0)1703 293223
Fax: +44 (0)1703 292853
e-mail: liz@wessex.ac.uk

6–8 **Brussels**
Customer Management
Details: IBC UK Conferences
Tel: +44 (0)171 453 5491
Fax: +44 (0)171 636 6858
e-mail: cust.serv@ibcuk.co.uk

6–9 **Cranfield, UK**
Pumps in Service
Details: Cranfield University, UK
Tel: +44 (0)1234 754766
Fax: +44 (0)1234 751875
e-mail: dfei@cranfield.ac.uk

7–9 **Aberdeen**
4D Seismic – 98
Details: Rebecca Smith, Energy Logistics International, UK
Tel: +44 (0)1628 671717
Fax: +44 (0)1628 671720

8–10 **Brussels**
Metering, Data Collection & Billing Systems
Details: IBC UK Conferences
Tel: +44 (0)171 453 5491
Fax: +44 (0)171 636 6858
e-mail: cust.serv@ibcuk.co.uk

9 **London**
European Acidification Strategy: The Goals of Public Policy and its Implications and Costs to Industry
Details: Pauline Ashby, The Institute of Petroleum

13–14 **Durham, UK**
Land Boundary Demarcation and Management
Details: International Boundaries Research Unit, University of Durham, UK
Tel: +44 (0)191 374 7701
Fax: +44 (0)191 374 7702
e-mail: j.c.oliver@durham.ac.uk

15–17 **Durham, UK**
Borderlands Under Stress
Details: International Boundaries Research Unit, UK
Tel: +44 (0)191 374 7705
Fax: +44 (0)191 374 7702

16–17 **London**
The International LPG Industry: New Developments in Operations & Safety
Details: Liz Hide, IBC UK Conferences
Tel: +44 (0)171 637 4383
Fax: +44 (0)171 453 5476

20–24 **Oxford**
The Futura Project (Part 1); Gas Project Planning, Development and Financing
Details: The College of Petroleum and Energy Studies
Tel: +44 (0)1865 250521
Fax: +44 (0)1865 791474
e-mail: registrar@colpet.ac.uk

28–29 **London**
Implementing Effective Risk Management
Details: Learning in Business, UK
Tel: +44 (0)181 944 9030
Fax: +44 (0)181 944 0434
e-mail: book@learning-in-business.com

29–31 **Southampton, UK**
Oil Spill '98
Details: Wessex Institute of Technology, UK
Tel: +44 (0)1703 293223
Fax: +44 (0)1703 292853

27–31 **Oxford**
The Futura Project (Part 2); Gas Sales Contract Negotiation and Implementation
Details: The College of Petroleum and Energy Studies
Tel: +44 (0)1865 250521
Fax: +44 (0)1865 791474
e-mail: registrar@colpet.ac.uk

AUGUST

18–20 **Cairns, Australia**
Spillcon '98
Details: Julie Morrison, The Meeting Planners, Australia
Tel: +613 9819 3700

SEPTEMBER

8–9 **London**
World Oil Prices
Details: Jenni Wilson, Centre for Global Energy Studies, UK.
Tel: +44 (0) 171 235 4334
Fax: +44 (0) 171 235 4338
e-mail: jenni.wilson@cges.co.uk

9–10 **Berlin**
Energy Markets, What's New?
Details: Prof Dr Georg Erdmann
Fax: +49 30 3142 69 08

13–18 **Houston**
17th Congress of the World Energy Council
Details: Barry Haest, WEC Congress Exhibition Director Management PennWell Conference & Exhibitions
Tel: +1 713 963 6238
Fax: +1 713 963 6284

13–18 **Houston**
Energy and Technology: Sustaining World Development into the Next Millennium
Call for Papers: Mr Richard H Williamson, Houston World Energy Congress Inc, US
Tel: +1 202 331 0415
Fax: +1 202 331 0418

14–18 **Oxford**
LPG Supply, Economics, Markets and International Trading
Details: The College of Petroleum and Energy Studies, UK
Tel: +44 (0)1865 250521
Fax: +44 (0)1865 791474

18–21 **Surrey, UK**
Understanding the Commercial, Economic and Trading Aspects of Oil Refining
Details: Petroleum Economist, UK
Tel: +44 (171) 831 5588
Fax: +44 (171) 831 4567/5313

19–20 **Muscat, Oman**
Petroleum Trading and Cargo Shortages
Details: Mike England, Abacus International, UK
Tel: +44 (0) 1245 328340
Fax: +44 (0) 1245 323429

20–25 **Oxford**
The Commercial and Political Challenges
Details: The Alphatania Partnership, UK
Tel: +44 (0)171 613 0087
Fax: +44 (0)171 613 0094

21–24 **Oxford**
Commercial Issues in LPG Trading – Contracts, Shipping, Prices and Risk Management
Details: The College of Petroleum and Energy Studies, UK
Tel: +44 (0)1865 250521
Fax: +44 (0)1865 791474

EVENTS Forthcoming

23–24 Dresden, Germany
Gasification – The Gateway to a Cleaner Future
Details: Tracy Lepkowska, IChemE, UK
Tel: +44 (0)1788 578214
Fax: +44 (0)1788 577182

23–25 Liguria, Italy
Ports 98, Maritime Engineering and Ports
Details: Sally Radford, Wessex Insititute of Technology
Tel: +44 (0)1703 293223
Fax: +44 (0)1703 292853
e-mail: sradford@wessex.ac.uk

24-25 Singapore
Petroleum Trading and Cargo Shortages
Details: Mike England, Abacus International, UK
Tel: +44 (0) 1245 328340
Fax: +44 (0) 1245 323429

27–30 New Orleans
SPE Annual Technical Conference and Exhibition
Details: Dan Lipsher, Society of Petroleum Engineers, US
Tel: +1 972 952 9306

28-1 Oct Oxford
LPG Direct Marketing, Operations and Safety
Details: The College of Petroleum and Energy Studies
Tel: +44 (0)1865 250521
Fax: +44 (0)1865 791474

29 London
Effective Visual Communication for Geoscientists
Details: The Administrative Secretary, JAPEC
Tel: +44 (0) 171 434 9944
Fax: +44 (0) 171 439 8975

The Annual Inter-Branch Golf Tournament

Thursday 6 August 1998
Crieff Golf Club

The tournament is for teams of six on a Stableford basis against full recognised Club Handicaps. All Branches and Individual Members are invited to participate.

For further information and entries contact:
W H Beaton, 63 Carlton Place, Glasgow
Tel: +44 (0)141 418 0401

1997 survey of the average lead and sulfur contents of petroleum products delivered into the UK market

Year	Lead content in g/litre			Sulfur content in % mass										
	Motor Spirit			Motor Spirit			Kerosene					Fuel Oil		
	4 Star Leaded	Premium Unleaded	Super Unleaded	4 Star Leaded	Premium Unleaded	Super Unleaded	Premium Kerosene	Regular Kerosene	Aviation Kerosene	Auto Diesel	Gas Oil	Light Fuel Oil	Medium Fuel Oil	Heavy Fuel Oil
	Lead g\L	Lead g\L	Lead g\L	S %wt	S %wt	S %wt	S %wt	S %wt	S %wt	S %wt	S %wt	S %wt	S %wt	S %wt
1989	0.143	0.002	-	0.05	0.03	-	-	0.04	0.03	0.19	0.21	1.8	2.2	2.2
1990	0.143	0.002	-	0.05	0.04	-	-	0.04	0.03	0.19	0.21	1.7	2.0	2.2
1991	0.145	0.001	-	0.04	0.03	-	-	0.03	0.04	0.19	0.21	1.4	1.8	2.1
1992	0.143	0.001	-	0.05	0.03	-	0.01	0.04	0.05	0.19	0.20	1.8	2.2	2.4
1993	0.143	0.001	0.001	0.04	0.02	0.02	0.01	0.04	0.04	0.19	0.20	2.3	2.5	2.8
1994	0.140	0.001	0.002	0.06	0.03	0.02	0.01	0.03	0.05	0.17	0.18	2.0	2.2	2.4
1995	0.137	0.001	0.001	0.05	0.03	0.01	0.01	0.02	0.04	0.13	0.14	1.9	2.0	2.2
1996	0.132	0.001	0.001	0.04	0.02	0.01	-	0.03	0.04	0.09	0.14	1.6	1.9	2.2
1997	0.133	0.001	0.001	0.05	0.03	0.01	-	0.03	0.05	0.04	0.14	1.8	1.8	2.2

Based on weighted average figures provided by the UK Petroleum Industry Association
Fuel oil figures exclude deliveries for export, bunkers and electricity generation *Source: UK Petroleum Industry Association*

IP Conferences and Exhibitions

International Conference on

European Acidification Strategy, the Goals of Public Policy and its Implications and Costs for Industry

London: 9 July 1998

Organised in conjunction with the UK Petroleum Industry Association (UKPIA) and the National Society for Clean Air and Environmental Protection

This Conference will debate the European acidification strategy, the goals of public policy and its implications and costs for industry.

The Conference will be of particular interest to those employed in the fossil fuel industry (oil, coal and gas) and heavy industry, national and international regulatory bodies and to environmental consultants and academics.

Chairmen and speakers include: **The Rt Hon Michael Meacher MP** (Minister for the Environment, Transport and the Regions), **Dr Bill Kyte** (Head, Corporate Environment Unit, PowerGen plc), **Richard Mills** (Secretary General, National Society for Clean Air and Environmental Protection) **Dr Alan Cocks** (Head of Environmental & Chemical Processes, National Power plc) and **Dr Suzie Baverstock** (Technical Co-ordinator, CONCAWE).

Registration fee: £150 plus VAT.
The programme and registration form are now available.

International Conference on

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.

Speakers include: **James E Swartz** (Delta Air Lines), **Franz Frank** (Airbus Industrie), **Edward Matulevicius** (Exxon Research & Eng Co), **Stuart Bullock** (Rolls Royce Aerospace Group) and **Vic Hughes** (Shell Research & Technology Centre).

An Exhibition of equipment linked with aviation fuelling will be held in association with the Conference.

The Programme and registration form will be available at the end of July.

Conference on

Microbially Enhanced Oil Recovery

London: 4 November 1998

The use of microbes to enhance oil recovery is a controversial subject that has been with us for many decades and is generating renewed, but cautious, interest within the oil industry. Proponents offer an inexpensive means to increase oil production and more recently an alternative to the use of biocides as a means of controlling H_2S generation.

This Conference will present the various issues associated with this technology. Speakers will present data on specific products – both whole cells and enzymes, means of testing their performance, and the view of the oil industry. The aim will be to assess the current and likely future role of MEOR in North Sea oil production.

The Programme will be of interest to:

- Production Technologists and Chemists
- Reservoir Engineers
- Microbiologists
- Chemical Suppliers
- Environmental Managers

The Programme and registration form will be available in July.

Autumn Luncheon

London: 30 November 1998

The IP is launching an Autumn Luncheon this November which, it is hoped, will become an established date in the oil and gas calendar of events. This year's Guest of Honour and Principal Speaker will be Sheikh Ahmed Zaki Yamani, Minister for Petroleum and Mineral Resources of Saudi Arabia over the period 1962–1986 and Chairman of the Centre for Global Energy Studies.

Please contact Pauline Ashby for an application form which will be available at the end of July.

For a copy of the programme and registration form for any of the above or to add your details 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
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Join our expanding Sales and Marketing Team

Account Manager Lubricant Additives

Ciba Specialty Chemicals is a global leader in the discovery, manufacture and marketing of innovative specialty chemicals. The Additives Division develops, manufactures and supplies high performance chemicals which optimise the durability, strength and appearance of everything from cars to compact discs. Our additives protect products against ageing, corrosion and wear in even the most extreme conditions.

The Lubricant Additives business supplies components and additive packages to international and national oil companies. If you are qualified to degree level in a technical discipline, have knowledge of and/or experience in the lubricant, process or polymer industries and most importantly, have the desire and drive to contribute to a dedicated, highly skilled and fast-moving Sales and Marketing organisation, then we wish to hear from you. The dimensions of this key role include:-

- growing sales through technical problem-solving and commercial negotiation
- marshalling the comprehensive technical and commercial resources of the worldwide Ciba Specialty Chemicals organisation in support of major UK customers
- co-ordinating sales and account activities in multi-national teams operating across national and regional boundaries
- providing market analysis and survey data to guide research and development teams.

We can offer the right individual a stimulating and challenging environment, a salary fully reflecting the importance of this key appointment, the opportunity to develop your career within a truly global organisation and the benefits you would expect from a major chemical company including car, private health care and pension scheme.

If you have the qualities we seek and believe that Ciba Specialty Chemicals can provide you with the next stepping stone in a career in the sales and marketing of high performance chemicals, then please send your CV to:
Mrs G Nadin, Personnel Officer.

Ciba Specialty Chemicals PLC
Charter Way
Macclesfield
Cheshire SK10 2NX.

Ciba
Value beyond chemistry

Ghent, Belgium

Fuel Additive Development Chemist

Texaco is a major international oil company supplying high technology petroleum products throughout the world. Recently the lubricants, coolants and fuels additives segments have been amalgamated into a global business unit. Research and development activities to support the growing European operation are centred at our modern laboratory in the attractive city of Ghent, Belgium where we are looking to appoint an experienced Fuel Additive Development Chemist.

As part of a small team reporting to the Fuel Additive Development Manager, the primary job duties will include designing and formulating gasoline and diesel fuel additive packages to meet European and Asian customer requirements and implementing test programs to evaluate product performance. While the main function is to develop technical data within the laboratory environment, the assignment will involve a significant degree of direct marketing support and customer liaison.
The working language will be in English.

Applicants should be able to demonstrate at least 3 years relevant experience, preferably including direct experience and technical knowledge of fuel additive development within the European petroleum industry.

Almost certainly a graduate chemist or chemical engineer, the successful candidate will be an excellent communicator, computer literate and possess sound interpersonal skills. Knowledge of European languages will be an advantage.

In return we offer a highly competitive Belgian Franc based salary and a wide range of benefits including a generous vacation allowance, a contributory pension scheme, bonus plan and luncheon vouchers. Relocation assistance will be provided where appropriate.

TEXACO

Please apply in writing with full CV including current salary details to: Marc Piens, Texaco Technology Ghent, Technologiepark - Zwijnaarde 2, B-9052 Ghent, Belgium. Telephone: (32) 9 240 71 11.
The closing date for applications is 15th July 1998.

Tender for the supply of Heating Oil and Motor Spirit

Tenders are invited for supply of Heating Oil & Motor Spirit for an initial one year period commencing on 1 October 1998.

Tenders should be requested by 13 July 1998 and tender forms are returnable to the undersigned by 12 noon on 21 July 1998. Tender documents are obtainable from Mrs Sue Virik, telephone 01243 752346, Central Contract Services, Directorate of Property & Trading Standards, The Tannery, Westgate, Chichester, West Sussex PO19 3RJ.

MP Kendall
County Secretary

MOVES People

Harold B Tyber has been appointed President of Arco's new venture, Arco Integrated Power Inc. **William Garrett**, former President of Tenneco Power, has accepted the position of Senior Vice-President, Business Development. **John Handlin**, former Business Manager for Arco Western Energy, joins the new division as Vice-President, Finance, Planning and Control.

Tom Botts has been appointed Natural Gas Director of Shell UK Exploration and Production, succeeding **Gary Vassie** with effect from 1 July this year. Vassie, Gas Director since 1994, is to take up a senior position in Shell Canada.

President and Chief Executive of the Canadian Gas Association, **Gerald Doucet**, has been appointed Secretary General of the World Energy Council succeeding the late **Ian Lindsay**.

Norson Services has appointed *Ian Jerrit* as Manager of the Hydraulics Division. Jerrit was previously with McTaggart Scott and Brisco Engineering and will head up the division which includes the Hydraulics Distribution, Workshop Services and Technical Support Team.

David Varney, Chief Executive of BG plc and former President of the Institute of Petroleum has been appointed Chairman of London's 'New Deal' employer coalition, set up by the UK Government to help the long-term unemployed.

Former Managing Director of the Global Energy Group, **Dr Silvia Pariente-David**, has joined Hagler Bailly as Director, Law and Economics, Europe.

Robert Norbury has been appointed non-Executive Director of Hardy Oil & Gas. Former roles include Chairman, Investment Banking, NatWest Markets until his retirement in April 1998. He joined Wood Mackenzie as Senior Corporate Finance Partner in 1969, and was made Deputy Chairman in 1984, helping establish the firm as advisers to the oil and gas industry. Following the acquisition of the company by the Hill Samuel Group he became Managing Director of all Corporate Broking.

British Energy has announced the appointment of **Dr Robin Jeffrey** as Executive Director, North America. He will report to Chief Executive **Peter Hollins** and has relinquished his position as Chairman and Chief Executive of Scottish Nuclear.

***John Emmett* has been appointed Operations Director at Tronic Ltd. He was previously at Phillips Communication Systems in Cambridge where he held senior management positions in Business Development, Product Management, Logistics, Manufacturing and, most recently, as Operations Manager.**

Peter Clayton has been appointed Vice-President of Centrilift, a Baker Hughes company, with special responsibility for new products and market development. He is based at the company's Claremore, Oklahoma, world headquarters.

The Board of Shell Transport and Trading Company plc has announced that **Dr Eileen Buttle** has been appointed non-Executive Director of the company with effect from 8 July. Dr Buttle is a Member of the Scientific Committee advising the European Environment Agency; carries out research evaluation for the Biotechnology & Biological Sciences Research Council; the European Commission and the Ministry of Agriculture, Fisheries and Food. She also chairs a review of long-term environmental monitoring for the Natural Environment Research Council. Previous appointments include: Member of the NATO Environment Panel and Chairman of the British National Space Centre Earth Observation Programme Board.

The Institut Français du Pétrole has appointed **Raymond Szymanski** as Director of the Physics and Analysis Research Division. He replaces **Raymond Boulet** who is retiring.

Industrial Services – part of plant hire company Vibroplant Ltd – has appointed **Ken Wilkinson** as National Sales Manager responsible for its powered access, compressed air, power generation and welding technology sectors.

***Christian B Cleret*, Managing Director of Elf Oil UK Ltd has succeeded *Ian Upson* of Esso as President of the UK Petroleum Industry Association (UKPIA), the trade association representing the UK oil refining and marketing industry.**

John Ryan has resigned from his position of President and Chief Operating Officer with Global Marine Inc. He will be replaced by **Robert Rose** but will remain a Director. In addition, **Jon Marshall** has been promoted to Executive Vice-President and Chief Operating Officer. **Marion Woolie** will become President of Global Marine Drilling Company and **Gary Kott** will become President of Global Marine's international drilling subsidiary.

***Peter Scarth* has been appointed to the position of Regional Export Sales Manager of Valtek. He will be responsible for sales to north and eastern Europe.**

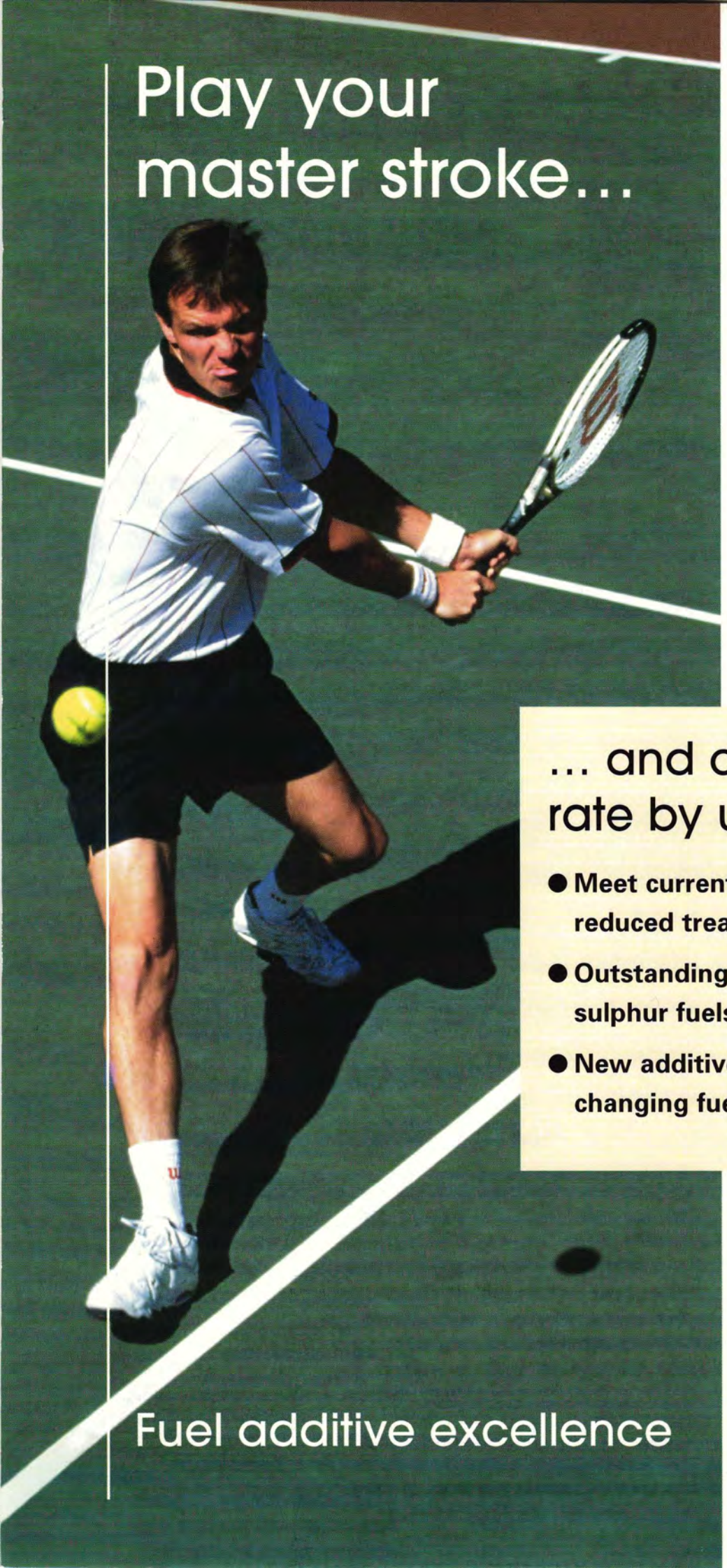
Tony Larkin has resigned from Broken Hill Pty to become Executive Director of Finance for the chemical group Orica.

Nigel Penney has been appointed Finance Director Designate for Ramco Oil & Gas.

Arnold Langbo, Chairman and Chief Executive of Kellogg Company, has been elected to the Arco Board of Directors.

John Morgan has been elected Executive Vice-President–Operations of Occidental Petroleum Corporation. He is currently Vice-President–Operations.

Bardex Corporation of Goleta, California, has appointed *Dave Molsberry* to head up its newly formed Customer Service Group.



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This cost effective technology allows you to offer your customers, reduced component wear, faster filling, reduced emissions and less odour – whilst keeping your costs down.

... and cut your treat rate by up to 50%

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- **Outstanding performance in low sulphur fuels**
- **New additive solutions to match changing fuel requirements**

Contact your local Paramins™ representative to find out more about Paradyne™ Performance Diesel Additive Packages.

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Paramins Business Centre
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Oxfordshire OX13 6TT
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