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COVER PHOTO
Bird's eye view of the Millennium site in Greenwich (bottom right)

News in Brief

15 May
Total has signed two new production sharing agreements with Pertamina. The contracts cover the Saliki and Sebawang I blocks offshore East Kalimantan. Total will act as operator of both areas.

19 May
Brown & Root Energy Services has secured a contract from Conoco (UK) Ltd for the engineering, procurement, fabrication, installation and commissioning of two wellhead platforms plus the fabrication and installation of an 800-tonne reception module for the Viking Phoenix development in the southern sector of the UK North Sea.

21 May
Trading as MJVI, Aberdeen-based APG Salamis JV Ltd, in partnership with Far East company Haji Malai Mashhor General Contractors, have secured two three-year contracts from Brunei Shell Petroleum Company – one to provide offshore pipeline repair services for 212 installations in the waters off Brunei, the other to provide personnel and equipment for offshore well tie-in and maintenance. The company has also been awarded an 18-month contract in Malaysia to support Petronas Gas on a major maintenance shut down programme for its gas processing plant.

Chevron Chemical Company is to conduct a joint feasibility study for the development of an integrated aromatics project at the Cardon Industrial Park on the Paraguana Peninsula, state of Falcon, Venezuela. The project, which will be undertaken with Maraven, is expected to be completed by March 1998.

Aminex has signed an agreement with the government of the Russian Republic of Tatarstan for the development of a number of oilfields. The oilfields will be owned by a new company – Ydelloil Co Ltd – comprising Aminex (35 percent); Zarubezhneft, an agency of the Federal Government of the Russian Federation, (5 percent); Tatneft, one of Russia's largest oil producing and exporting companies (10 percent); regional oil producing company Tatnefteprom (40 percent); and Tatneftekhiminvestholding, the investment arm of the Tatarstan government (10 percent).

22 May
Repsol has announced a new oil discovery following the drilling of the Komombo-1 well, near the Aswan Dam in southern Egypt.

Financière Valorgest, an indirect subsidiary of Elf Aquitaine, is to acquire a block of Elf Aquitaine shares representing 0.9 percent of the company's capital as a long-term investment from the Groupe Renault, which decided to dispose of its entire interest in the French oil company that it acquired at the time of Elf's privatisation in 1994.

A contract for the turnkey construction and delivery of a catenary anchor leg mooring (CALM) system for the Georgian Pipeline Company's Black Sea loading terminal at Supsa, Georgia, has been awarded by Kvaerner John Brown to Bluewater in the Netherlands. The buoy will act as the offloading point for oil from the Guneshli field.

23 May
Energy Africa Gabon Ltd and the government of Gabon have signed a production sharing agreement covering the onshore Ofoubou block some 40 km west of the Rabi-Kounga field.

27 May
UK independent gas group Quantum has purchased Vector Gas Ltd, a joint venture between Scottish Hydro Electric and Marathon Oil of the United States. Quantum also reports that it is preparing for a stock market flotation later this year that will raise money for further acquisitions and for entry into the UK gas market.

Gazprom has signed a financing agreement for the first stage of the 650km Polish section of the natural gas pipeline from the Jamal peninsula to western Europe, reports the *Financial Times*. The Russian oil company will arrange some $1 billion under the agreement, while Poland's Oil and Gas Company will be responsible for the borrowing of a further $350 million.

Blackburn-based Kay Group has become the first petrol and convenience store retailer in East Lancashire, and the third in the United Kingdom, to achieve an Investor in People award in recognition of its commitment to training and developing staff in line with business goals and objectives.

Elf Congo has been awarded the Mer Très Profonde (Very Deep Sea South) exploration licence by the Republic of Congo.

28 May
Kvaerner Oil & Gas Limited has been awarded an innovative 'General Operating Contract' by Elf Exploration UK plc under which the two companies will work as a team to maximise the performance of Elf's Piper B, Saltire A and Claymore platforms. The contract also includes operations engineering for the Elgin/Franklin development.

30 May
Repsol, through its subsidiary Astra, is to acquire Grupo Comercial del Plata's (GCP) interests in several Argentinian refining and marketing companies: Refinería San Lorenzo (42.5 percent); Destilerías Argentina de Petróleo (50 percent); Parafinas del Plata (50 percent); and EG3 (32.5 percent). A similar agreement has been reached with JME Inversiones, to acquire 27.5 percent of its stake in EG3. The deals are estimated to be worth $345 million.

Shell UK Ltd has purchased Esso UK's 50 percent share in Quadrant Gas Ltd, the gas marketing company which was previously jointly owned by both companies.

Norsk Hydro has signed a Letter of Intent with ABB Offshore Technology for the delivery of a subsea unit for the separation and injection of the water in the well stream from subsea wells in the Troll oil gas province. The deal is worth in the region of NOK170 million.

Metoc has been appointed by the Japan Vietnam Petroleum Company to provide health, safety and environmental advice for the company's operations in Vietnam.

2 June
John Browne, Group Chief Executive of British Petroleum, is to be honoured as the first recipient of the Award for Petroleum Executive of the Year on 18 November at a special dinner to be held during the annual Oil & Money Conference in London, sponsored by the *International Herald Tribune*, *The Oil Daily* and *Petroleum Intelligence Weekly*.

Greek shipowner and founder of the Hellenic Marine Environment Protection Association (Helmepa) George P Livanos has died just days before Helmepa's 15th anniversary, reports *Lloyd's List*.

Elf Exploration Inc's first well on the Virgo Prospect in the Gulf of Mexico has tested at daily flow rates of 22.7 mncuft of gas and 1,816 barrels of oil.

3 June
Kvaerner has signed a Letter of Intent with Emtunga for an accommodation module with a helicopter pad for the Asgard B platform. The agreement is worth some $24 million.

Arco has acquired all of Enron Oil & Gas Company's interest in the South Hedong and San Jiao coalbed methane prospects in Shanxi Province of the People's Republic of China for an undisclosed sum.

4 June
Repsol, through its sub-sidiary company Astra, has

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acquired a 99.3 percent stake in Algas and a 98.4 percent interest in its subsidiary Poligas Lujan, both of which are involved in the distribution and storage of liquefied petroleum gas in Argentina.

OMV is to acquire a 27.5 percent interest in International Petroleum Corporation's Block 5A project in Sudan for an undisclosed sum. The deal is subject to final government approval.

The United Nations has approved a six-month renewal of its oil-for-food deal with Iraq. The original arrangement, under which the country was allowed to sell $2 billion worth of oil in exchange for food, medicine and essential supplies, entered into force in December last year and was due to expire at the end of this week.

5 June

Peter Sutherland has agreed to take on the post of Chairman of British Petroleum permanently in a non-executive capacity. Deputy Chairman since July 1995, he has been acting as interim Chairman since Lord Simon of Highbury announced his resignation last month in order to take up a government post.

China National Petroleum Company is to pay $4.3 billion for a 60 percent stake in Kazakhstan's Aktyubinsk oil company, reports the *Financial Times*. It is hoped that the deal will allow the company to secure long-term supplies to balance a growing shortfall.

Shell UK Exploration and Production reports that it will announce full details of the nine bids it has received for the disposal of the Brent Spar in about three months time. Two proposals were dropped from the 11 proposals shortlisted last year.

Frost Group has changed its name to Save, the brand under which its UK service station network trades.

Phillips Petroleum Exploration Ireland has been awarded an interest in licences covering a total of 21 full and three part blocks in the Irish Rockall Trough.

9 June

Ramco Energy plc has signed a production sharing contract with Saknavtobi, the Georgian State Oil Department and the Ministry of Fuel and Energy of Georgia. The contract covers a block situated in the Kaheti district of northeast Georgia.

Centrica has put its gas meter business up for sale, reports the *Independent*. The company, known as Quantum, runs some one million prepayment gas meters in the United Kingdom

Texaco has been awarded operatorship of deep water Block 22 offshore Angola.

A new company, Venture Production, has been launched in Aberdeen to exploit marginal North Sea fields.

Chevron Overseas Petroleum Ltd has signed a production sharing contract with China National Petroleum Corp to explore for crude oil in the Shengli Field Complex in China's Shandong Province. It is Chevron's first onshore exploration contract in China.

10 June

Elf has secured interests in a total of 12 blocks in the Rockall Trough. It will act as operator in eight of the blocks.

Soco International plc has announced that the Sotamo 19-3 well in Mongolia has tested oil at a stabilised rate equivalent to 687 b/d with 47,000 cuft/d of associated gas and no water. Construction of a 300-km pipeline from these production facilities to the Mongolia/China border is scheduled to begin in 1999. In the interim, oil will be trucked to China where it will be sold under an existing crude sales contract with China National United Oil Corporation.

Four Mobil aromatics technologies are to be exclusively licensed through IFP for use in grassroots aromatics complexes. Mobil will continue to offer its technologies for licence in revamps and Mobil joint venture applications.

11 June

Fortune Oil's 56 percent owned subsidiary in China, Maoming King Ming Petroleum Company Ltd (MKM), is to invest $5 million in a new buoy for its single point mooring facility in Maoming to upgrade the crude discharge facility and to maximise its availability and reliability.

12 June

OMV has sold its stake in the TAKT exploration joint venture in the Republic of Sakha (Yakutia) in the Far East of the Russian Federation for a consideration of $6 million.

Shell Bulgaria and Amoco Oil Holding Company have agreed terms for the sale of Amoco Bulgaria Petroleum Products EOOD to Shell Bulgaria. The commercial terms of the deal have not been disclosed.

14 June

Nigeria has terminated four production sharing contracts signed with Ashland Oil (Nigeria) Company, according to the *Financial Times*. The Nigerian Ministry of Petroleum Resources is reported to have stated that the termination was deemed necessary following Ashland selling its rights and interests without seeking the written consent of the government.

17 June

Australian energy group Boral is to float off its natural gas distribution assets via a new company called Envestra, reports the *Financial Times*. Proceeds from the sale will be used to cut company debt.

BHP has formally assigned its 43.75 percent equity interest in the Vietnamese Dai Hung oilfield to Petronas.

Gulf Canada Resources and MCN Energy Group's investment arm are to form a joint venture, Gulf-CoEnergy Services, to market natural gas for Gulf and other North American producers, according to the *Financial Times*.

Chevron Chemical Co has entered into a 60:40 joint venture agreement with the Petroleum Authority of Thailand to proceed with engineering for a world-scale aromatics facility in Map Ta Phut, Thailand. Total investment for the facility, due onstream in 2000, is estimated at $1 billion.

Amec Process and Energy has been awarded the contract to provide engineering and procurement support for the upgrading of the *Spirit of Columbus* semi-submersible floating production facility. The vessel is destined for the Roncador field in the Campos basin off Brazil.

18 June

Vietnam has approved the BP-Statoil Alliance's $1.5 billion gas project in the Nam Con Son basin, reports *Lloyd's List*. The project includes the development of two gas fields, a gas land terminal and a power plant.

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UK Energy Minister pushes for gas competition in Europe

'Completing the Single European Energy Market is the new government's top priority,' said John Battle, UK Energy Minister, before attending his first Energy Council meeting in Brussels in May.

He also stated that the new government was in full support of the liberalisation of gas markets. 'Competition brings real benefits for industry and society, and when customers are put first should not be feared. Lower energy costs in Europe will also improve competitiveness in Europe's industries which must operate in tough world markets.

'I will be making this case in Europe in arguing for a positive commitment to gas liberalisation. It is important that there is a real move forward – through an effective third party access regime as well as market opening – so that the EU can hold out the prospect of putting competition at the service of us all.'

Negotiations on a directive seeking common rules for the internal market in gas (the Gas Liberalisation Directive) in fact recommenced under the Irish Presidency of the EU in the second half of 1996, the subsequent Dutch Presidency carrying the negotiations forward.

The Directive would provide a first step in opening up the European gas market to competition. As proposed, it would require Member States to allow a minimum number of larger customers, mainly electricity generators and industrial users, to be able to arrange their gas supplies independently. It would also facilitate entry of new gas suppliers into EU markets by allowing third party access to existing gas transportation networks.

Another important item on the agenda at the Council was the European Commission's Green Paper on renewables. Commenting on this issue, Mr Battle said: 'The agenda is starting to move forward. Renewables must move out of the margins and have a greater role as part of a diverse and sustainable long-term energy supply. By backing renewables we can address the issue of climate change and secure new markets for European industry. So we must make a start to exploring with our European partners how to open up markets for renewables. Renewable energy industries will provide the environmentally friendly companies and jobs of the next century.'

North Australian gas venture

Woodside Petroleum Ltd and Shell Development (Australia) Proprietary Ltd have signed a Letter of Intent covering a joint feasibility study of a large liquefied natural gas (LNG) project located near Darwin in Australia's Northern Territory.

Darwin offers proximity to potentially large gas resources offshore Australia and to Asian markets which hold considerable potential for growth in LNG demand.

The initial concept for onshore facilities includes two LNG processing trains with a combined capacity of around 7.5 million tonnes per year designed to supply export contracts for 20 years and a plant to supply the Northern Territory domestic gas market and adjacent states.

First LNG deliveries are targeted for 2005, dependent on customer requirements.

1997 Birthday Honours

President of the Institute of Petroleum between 1990 and 1992, Basil Butler, FinstPet (pictured above) was awarded a CBE in this year's honours list for his services to the oil industry and the Royal Academy of Engineering, of which he is Senior Vice President.

He is currently Chairman, Brown & Root Ltd; Chairman, European Council of Applied Science and Engineering; Director, BP Solar; and Director, Murphy Oil Corporation.

He also acted as Chairman, Devonport Management Ltd, which operates the Royal Dockyard, between 1991 and 1994 and was Managing Director, British Petroleum from 1986 to 1991.

Others honoured for their services to the oil and gas industry were:

Sir John Jennings, CBE, Chairman, Shell Transport and Trading plc

Dr Terry Adams, CMG, President, Azerbaijan International Operating Company

Professor Jane Plant, CBE, Assistant Director and Head, Minerals, Environment and Geochemical Surveys Division, British Geological Survey

Robert Hawley, CBE, Chief Executive, British Energy

Brian Withington, MBE, Regulations Manager, BG plc

Two Interconnector firsts for Mobil

Mobil Europe Gas Inc (MEGAS) became the first company to agree the sale of UK-sourced gas direct to an end user, as opposed to a wholesaler, in mainland Europe in May.

From late 1998 Mobil will supply Norsk Hydro Agri's Sluiskil plant in the south of the Netherlands with up to 2.2 million cubic metres (mncum) of gas per day over a 15-year period.

MEGAS has also become the first non-equity holder to secure capacity in the Interconnector pipeline. The company has negotiated agreements under which Mobil will have access to some 800 mncum/yr of Interconnector pipeline capacity over the life of the Norsk Hydro Agri supply contract.

Ofgas allows BGT price cuts – for now

Ofgas has announced that British Gas Trading (BGT) is to be allowed to continue offering lower 'ValuePlus' prices – a discount of around 5 percent – to direct debit customers in the southwest of England, but the matter will be kept under review in the light of the development of competition in the UK domestic gas market.

The watchdog has also called for a licence modification so that, in future, BGT must give Ofgas advance notice of any price changes. It suggests three months' notice and that this licence condition should remain in force until at least the year 2000 in order to ensure that predatory or pre-emptive price-cutting does not occur.

Ofgas says that it is concerned that action by BGT may 'impede the development of effective competition' and states that it will look 'particularly closely at any additional proposals to apply selective price cuts during the period up to, and sometime after, the introduction of full domestic competition'.

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Venezuelan licensing round

A number of blocks have been awarded by Petroleos de Venezuela (PDVSA) in the latest round of field reactivation bidding covering some 20 areas in western and eastern Venezuela. They include:

- A consortium comprising Arco and two Venezuelan companies, Inelectra and Polar Uno, was awarded the Khaki and Maulpa blocks in eastern Venezuela. Plans are to reactivate the two fields in 1998.
- A consortium comprising Chevron (30 percent) – which will act as operator – Statoil (30 percent), Philips Petroleum (20 percent) and Atlantic Richfield (20 percent) was awarded the LL-652 oilfield following its $251.3-million bid. The field is estimated to contain in the region of 2.5 billion barrels of oil in place with recoverable reserves of more than 500 million barrels. It has the potential to produce some 100,000 barrels per day (b/d).
- Repsol secured the licence for the Mene Grande area, on the east coast of Lake Maracaibo, with a bid of $330 million.
- Lasmo was the successful bidder for the Dacion area located onshore north-eastern Venezuela. The area contains three producing fields which together have produced in excess of 300 million barrels of oil since the 1940s – less than 14 percent of the original 2.2 billion barrels of oil in place.
- Union Texas Petroleum Holdings (66.67 percent) and Preussag Energie (33.33 percent) paid $175 million to secure the 15,000-acre Boqueron Area which currently produces some 10,000 b/d from nine wells. Union Texas plans to implement an enhanced recovery programme that will boost production to between 50,000 and 60,000 b/d within three to five years.

This is the third in a series of licensing rounds seeking to incorporate Venezuela's mature oilfields into mainstream production and attract foreign capital and investment to boost the national economy. The rounds also allow Venezuela's oil industry to benefit from the advanced technology that foreign partners employ to boost internal production capacity.

Additional reserves are estimated between two and three thousand million barrels. Investments in the mature fields have so far been calculated to be between $4 billon and $6 billion, with an estimated total production reaching 300-400,000 b/d.

Same face – new title

Sir David Simon CBE (right), former Chairman of British Petroleum, has taken the title Lord Simon of Highbury following his appointment as a UK government minister.

Prime Minister Tony Blair (left) has appointed Lord Simon as UK Minister for Trade and Competitiveness.

Energy sector meets the challenge

A total of 20 teams took part in the 'Energy Challenge' in May in which participants had to scale three peaks in the United Kingdom – Ben More, Lochnagar and Blencathra – in 24 hours. A total of £90,000 was raised from the energy sector for Children's Aid Direct, thanks to all the costs being covered by BG plc, the Challenge's major sponsor.

BG's Energy Challenge team is pictured above.

MMC report accepted by Ofgas and BG

Both Ofgas and BG plc have agreed to accept the Monopolies and Mergers Commission (MMC) report into the price control for the Transco pipeline business.

The report recommends an initial cut in Transco's charges of 21 percent which would amount to a saving of £29 on the average domestic gas bill in the coming year. It also recommends that prices are further reduced by RPI –2 percent for the subsequent years of the proposed April 1997 to March 2000 control period.

MMC has also endorsed Ofgas' position on key financial issues including Transco's cost of capital (7 percent) and the treatment of depreciation so that customers' charges are based on the repayment of the actual amount shareholders invested, some £11.6 billion, rather than the £17 billion value of assets in Transco's books.

The report follows Transco's rejection in October 1996 of Ofgas' final proposals for price control (see *Petroleum Review*, October 1996).

Ofgas is now considering the licence modifications for Transco proposed by MMC. It is intended that new licence conditions be in place no later than 1 October 1997.

New Teesside gas processing plant

A new gas processing plant at Seal Sands in Billingham, Teesside, and linking directly to the Central Area Transmission System (CATS) came onstream in May some four months ahead of schedule and under budget, according to Amoco (UK) Exploration Company.

Completion of the plant makes Teesside the only industrial area in the United Kingdom to receive associated natural gas liquids (NGLs) directly by pipeline. Gas will be delivered to the UK gas market via the National Transmission System. The plant will also supply feedstocks to local chemical industries.

A second gas processing plant is also under construction at the terminal. Due to start-up in mid-1998, it will bring the total gas processing capacity at the CATS terminal to 1.2 billion cubic feet (bncuft) of gas per day.

Each plant has a design capacity of 600 mncuft of gas per day and is expected to produce some 1,000 tonnes of NGLs per day.

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Enron settles J-block disputes

Enron recently brought an end to the long-running legal dispute concerning gas sales from the North Sea J-block by paying the partners – Agip, Phillips Petroleum and BG Exploration and Production – a $440-million cash settlement.

Modifications have also been made to the original take-or-pay gas sales contract to make it a firm, long-term supply contract with the fixed price for gas reduced to reflect current market conditions. The total contract gas quantity remains essentially the same.

It is anticipated that starting this month, and for the remainder of 1997, J-block gross production will average approximately 260 mncuft of gas per day and 95,000 b/d of liquids.

Meanwhile, the owners of the Central Area Gas Transmission System (CATS) have won their court case against an Enron subsidiary for its failure to pay monies owing under the 15-year Capacity Reservation and Transportation Agreement (CRTA) governing the transportation of natural gas to Teesside. Enron subsidiary Teesside Gas Transportation Ltd (TGTL) had claimed that the CATS owners had failed to comply with the CRTA and, as a consequence, no payments were due and the CRTA had thus terminated. Such termination, Enron said, would in turn lead to the termination of the gas sales agreement between Enron Europe Ltd and the owners of the J-block fields.

However, the UK High Court held that the CATS owners had made gas transportation services available to TGTL and had, at all times, been capable of accepting, transporting and delivering 300 mncuft of gas per day in full compliance with the CRTA. It ordered TGTL to pay all monies it had withheld since March 1995 and stated that the company was not entitled to reclaim earlier payments. The sum involved is in excess of £150 million.

Roundtable on cleaner autofuels

A National Society for Clean Air (NSCA) roundtable initiative on cleaner automotive fuels convened last month to discuss and examine the contribution that cleaner fuels can make to reducing air pollution. It brought together representatives from business, industry, government, academia, consumer and environmental organisations.

'There is currently considerable confusion over the potential benefits of different fuels,' commented Dr Malcolm Eames of the NSCA. 'By bringing together all of the stakeholders in this Roundtable, the NSCA aims to ensure that cleaner fuels make an effective contribution to reducing the environmental impact of road traffic.'

Tesco Director John Gildersleeve also participated in the discussions and said: '... encouraging the better use of fuels is one area where we can have an immediate and positive impact'.

UK government policy is to meet national air quality objectives by the year 2005. Most vehicles currently run on petrol or diesel so the Roundtable will concentrate on the environmental benefits from reformulating these fuels. It will aim to provide information to fuel retailers, local authorities and consumers – all of whom need to be better informed on the environmental impacts of different fuels.

The Roundtable Report will be published later this year.

Changes at *Petroleum Review*

Mrs Carol Reader (above), Editor of *Petroleum Review*, left the Institute of Petroleum last month. She was appointed Deputy Editor in 1988 and became Editor in the following year.

Her successor is Mr Chris Skrebowski, who until recently was Editor of *Petroleum Economist*. He took up his new appointment on 30 June.

No merger between Elf and Gulf

The merger between Elf and Gulf in the United Kingdom will not go ahead.

Announced last November, the merger would have combined their refining and marketing businesses. However, at a very late stage six months later, it proved impossible to finalise a mutually satisfactory agreement and the negotiations were called off.

It is understood that the talks collapsed because the two companies no longer believed that they would achieve the benefits and cost savings originally forecast.

Christian Cleret, Managing Director, Elf Oil UK, said: 'Elf remains committed to build on recent success in restructuring its refining and marketing operations and we will continue to explore opportunities to increase our profitability in the challenging UK market.'

For its part, Gulf Oil (Great Britain) was disappointed by the breakdown of the talks. Managing Director David Setchell, who is also IP President, said: 'We regret that it has not been possible to conclude the merger negotiations successfully on mutually satisfactory terms. As we evaluate other options, we will seek to provide the best possible opportunities for our employees and optimum continuity in terms of service to our customers.'

At the same time parent company Chevron Corp announced that it plans to review other alternatives immediately to maximise the value of its Gulf refining and marketing operations in the United Kingdom, including the possible sale of these assets.

Powell Duffryn sells terminal

Powell Duffyrn sold off the last of its eight chemical terminals in June as part of the company's drive to focus on its core ports and engineering businesses.

The Lemont terminal in Chicago was sold to IMTT, a joint venture between Van Ommeren and International Tanker Terminals of New Orleans, for £5 million in cash.

Under the terms of the agreement, IMTT assumes total responsibility for the environmental condition of the Lemont site and any contamination of adjacent sites which occurred during Powell Duffryn's period of ownership.

The facility had a book value of £8.8 million at 31 March 1997 and in the year ending March 1997 generated an operating profit of £800,000.

Finding the right person for the job

Preng & Associates specialises in recruiting executives for the oil and gas industry. Much of the consultancy's business in recent years has focused on eastern Europe and the fast emerging Former Soviet Union (FSU) countries. The company has recruited over 250 individuals for 35 companies, including Exxon, FMC, Mobil, Pennzoil, Total, BHP and Enron, in the FSU countries alone.

In the beginning...

The company was founded by David Preng in Houston in 1980 and now has additional offices in London, Moscow and Vienna. Some 90 percent of business is energy related with revenue from retainer contracts totalling a record-breaking $5.5 million in 1996.

'Two things separate our company from the competition – industry specialisation and global reach,' states Mr Preng. 'This is our business, we understand the way it works, the technology and the language and are fully aware of our clients' operational and strategic objectives.'

His point is illustrated by a recent project in which the company undertook a two-month long global search to find a manager to run an oil-from-waste recovery project for Total in Baku. Skills specifically identified by the client included the ability to speak Russian and 'western-style problem-solving skills'. A chemical engineer with a PhD from Baku State University working in the United Kingdom at the UK Atomic Energy Commission was found who fitted the bill and subsequently joined the Total operation.

The company also recently conducted an in-depth and comprehensive search throughout the senior levels of all energy companies operating in the FSU in order to find a Director Designate for Exxon's FSU operation. This led to the appointment of an English-speaking Russian who had worked extensively in Houston, Calgary and Aberdeen for a US oil services company and had, therefore, acquired the technological and commercial skills necessary to help Exxon capitalise on its significant investment in the region.

Head hunter and head hunted

'It is essential for the recruitment firm to be an accurate and effective extension of its client,' says James Tilley, the man head hunted by Preng to fill the position as Pennzoil's President in Azerbaijan, and now President of Caspian International Petroleum Company (CIPCO). 'By virtue of its unique experience in the FSU, Preng understands the nuances and cultural differences which are important to the candidate. Added to its knowledge of the industry, it is able to give the candidate a much better feel for the company and the environment he or she will be stepping into.'

When Mr Tilley was named President of CIPCO, a consortium in which Pennzoil is very actively involved, Preng found itself asked to search for a new President for Pennzoil's Caspian Sea activities.

Specialisation is the key

'Only individual searches by specialists in our industry can locate the key players our clients require,' comments Preng & Associates' Managing Director Europe Scott Eversman, who is a fluent Russian speaker/writer and has studied Russian politics, economics and strategic issues for the past 12 years.

The setting up of offices in key areas of the world is also essential to the company's success, according to Mr Preng. 'Our clients get *our* people in offices *we* own, not an overseas company that has a contract with a US recruiter. There is no doubt at all that by using our extensive in-country, industry specific network, we are able to help clients resolve their critical senior leadership and management issues. One of the frequent briefs from our clients searching for key players to work in the FSU is to find individuals who can build and train teams of locally recruited specialists, including their own successor.'

Business philosophy and future expansion

The Preng business philosophy also includes being aware of the sensitivities of countries in which its clients are operating or in which it is conducting a search.

Mr Eversman explains: 'In the FSU, for example, we are dealing with highly intelligent and technologically aware individuals whose diverse cultural backgrounds must be understood and respected. In the Caspian region, it is important to remember that we are dealing with ancient merchant peoples whose proud trading history goes back 3,000 years and who have found themselves presented, in the post-Soviet era, with unique opportunities to develop the immense hydrocarbon resource base.

'We believe the FSU will continue to provide us with many new and exciting challenges as the region continues to develop and offer opportunities for even greater western energy investment.'

As a result, the company plans to expand its activities over the next five years. Calgary, Buenos Aires, Singapore and Venezuela or Colombia have been targeted as the most likely places to set up shop. 'New hydrocarbon reserves and explosive industrial growth are fuelling the energy business in these areas,' says Mr Preng. 'It is essential that we are firmly ensconced in areas of growth, keeping ahead of demands by our clients. We can't afford to follow their lead.'

Publications

Instability and Conflict in the Middle East – People, Petroleum and Security Threats

Naji Abi-Aad and Michel Grenon (Macmillan Press Ltd, Houndmills, Basingstoke, Hampshire RG21 6XS). 224 pages. ISBN 0 333 68936 4. Price: £45.

Many believe that final peace between the Arabs and Israel will bring an end to all problems in the Middle East – perhaps because the Arab-Israeli conflict has dominated media coverage of the region over the past 50 years. As a result, insufficient attention has been devoted to other important elements of instability and conflict faced by Middle Eastern countries. This books seeks to provide an understanding of those elements – including the autocratic nature of the regimes and the struggle for power, interstate ideological divides, military antagonism and race, sectarian minorities and religious rivalry, disparity in economic development, divergence in petroleum policies and troubles caused by foreign labour migration, internal flight and flows of refugees – which, in the authors' opinion, remain the greatest threats to the security of petroleum supplies from the Middle East.

Mechanics of Hydraulic Fracturing

Ching H Yew (Gulf Publishing Company, Book Division, PO Box 2608, Houston, Texas 77252-2608, USA). 183 pages. ISBN 0 88415 474 2. Price: $95 (£70).

Intended as a reference book for research engineers and advanced graduate students in petroleum or mechanical engineering, this publication tackles the underlying mechanics of hydraulic fracturing in three sections. The first part concerns the development of fracture simulators for vertical wellbores, while part two covers the initiation of propagation of a hydraulic fracture from deviated or horizontal wellbores, development of directional perforation, link-up of mini-fractures from perforated holes and turning of hydraulic fractures. The third part of the book reviews the results from experiments conducted in laboratories and in the field.

Natural Gas in the Middle East and North Africa

Peter Enav (FT Energy Publishing, Maple House, 149 Tottenham Court Road, London W1P 9LL). ISBN 1 85334 730 2. 140 pages. Price: £395 (paperback).

This report provides a country by country assessment of gas production capacity, consumption and the markets for LNG and pipeline projects in the Middle East and North Africa. Examining where the rewards and risks lie, it assesses the political stability and major limitations to gas development in the region.

Performance of Cross-Country Oil Pipelines in Western Europe

(CONCAWE, Madouplein 1, 1210 Brussels, Belgium). 20 pages. Price: No charge (paperback).

Prepared by the CONCAWE Oil Pipelines Management Group's Special Task Force on Oil Pipeline Spillages (OP/STF-1), this statistical summary (report no 4/96) of reported oil spillages in 1995 covers an oil pipeline network of 30,600 km. Reported spillage incidents are analysed by cause and the effectiveness of clean-up is recorded. The number of spillages in 1995 averaged 0.33 spills per 1,000km, continuing the long-term trend of improving performance. Third-party activity was found to be the most frequent cause of spillage (4.5 per year) and easily the largest cause of oil loss to the environment (49 percent) from European oil pipelines. Corrosion came second in terms of the number of spillages (4.2 per year), while mechanical failure was second in terms of net volume spilled (30 percent).

Natural Gas – Production, Processing, Transport

Alexandre Rojey et al (Éditions Technip, 27, rue Ginoux, 75737 Paris Cedex 15, France). 420 pages. ISBN 2 7108 0693 2. Price: FFr 520.

Natural gas is proving to be an increasingly attractive energy source for the 21st century because of its abundance in reserves, environmental friendliness and flexibility. However, an increasing proportion of reserves is located offshore in poorly accessible areas often far away from the major sites of consumption and industry, and therefore faces huge technical and economical challenges. This book gathers the various economic, scientific and technical aspects to be considered to ensure the success of a gas project. It reviews all the stages in the gas production and processing sequence from the reservoir to the reception terminal and provides a comprehensive review of available knowhow and an analysis of the outlook for the future.

Air Pollution from Motor Vehicles – Standards and Technologies for Controlling Emissions

Asif Faiz, Christopher S Weaver and Michael P Walsh (Microinfo Ltd, PO Box 3, Omega Park, Alton, Hampshire GU34 2PG). 248 pages. ISBN 0 8213 3444 1. Price: £46.85 plus £4.50 UK postage and packaging (paperback).

This handbook presents a state-of-the-art review of vehicle emission standards and testing procedures and looks at vehicle emission control technologies and their applications in both industrialised and developing countries. It is one in a series of publications on vehicle-related pollution and control measures prepared by World Bank in collaboration with the United Nations Environment Programme to underpin the bank's overall objective of promoting transport development that is environmentally sustainable and least damaging to human health and welfare.

Offshore Recovery & Rescue

(Douglas-Westwood Ltd, Whitebeams, Pett Bottom, Canterbury CT4 6EH). 100 pages. Price: £720.

On an average day, some 30,000 people are employed offshore in the North West European Continental Shelf area and are therefore potentially at risk. Their safety is considerably enhanced by the presence of a fleet of about 180 specially equipped standby vessels patrolling the waters around the drilling rigs and platforms. This publication provides a summary of the present state of knowledge about offshore recovery and rescue, including legislative requirements in the United Kingdom, Irish Republic, Norway, Denmark and the Netherlands and various strategies for rescue and recovery. It also outlines the root causes of incidents, the location of survivors and their condition at both rescue and subsequent recovery. The economic factors driving the market are also assessed. The appendices include a listing of standby vessel owners and operators.

Collection and Disposal of Used Lubricating Oil

(CONCAWE, Madouplein 1, 1210 Brussels, Belgium). 108 pages. Price: No charge (paperback).

Prepared for the CONCAWE Water Quality Management Group by Special Task Force WQ/STF-26, this report (no 5/96) covers all aspects of used oil generation and disposal in western Europe for 1993. From the amounts of lubricating oil sold, the amount that is theoretically recoverable and the records of the quantity of used oil collected, it concludes that the fate of some 1.1 million tonnes of used oil is unknown. This represents some 20 percent of the total virgin lubricating oils market. The report also considers the various ways of disposing of used oil and compares their environmental impacts and economic cost.

Refinery oil loss accounting in practice

By Peter Downs, Senior Consultant, KBC Process Technology Ltd

In October 1995, the Institute of Petroleum published as Part XVII of the Petroleum Measurement Manual the Guide to Hydrocarbon Loss Accounting and Control in Petroleum Refinery Operations. This established a standard for expressing refinery loss and gave the reader some very useful information to help understanding of the subject. KBC has adopted this standard and used it in its loss survey investigations worldwide.

The IP standard report can use either mass or weight as the unit of measure. It is important to note that the two systems should not be mixed. For the purposes of this paper, loss is expressed in mass units and loss percent as a percentage of processed inputs.

To make any meaningful comparison of oil loss performance it is necessary for the calculation of the loss to be on a consistent basis. The example balance given in the Guide is reproduced as **Table 1**.

The first task in any loss survey is to establish the current situation. Restatement of the oil (yield) accounting data into what we have called IP Format has produced many surprises. Imagine four refinery managers reviewing loss performance for their respective refineries. The results are tabulated in **Table 2**. This compares the annual loss performance as reported by the refinery and that expressed in IP Format for four sites within the same company which were making comparisons of their loss performance.

The refinery manager from plant D, having recovered from the shock, recognised that he now had an opportunity to improve the profitability of his plant if he could reduce the loss. The manager from plant A was less enthusiastic and his inclination appeared to be more in line with wishing to 'shoot the messenger'.

In establishing the material balance it is important to understand the fundamental principles involved and then to apply these fundamentals to the specific cases.

The first fundamental to consider is that the input side of the balance accounts for all hydrocarbons or streams that can end up on the output side as either products, fuel or inventory.

A second fundamental is that the accounting must minimise the effect of refinery configuration and feedstock choice on the resultant loss calculation. Inefficient operation of equipment should not be disguised. This then

Processed inputs			Outputs + fuel		
Crude receipts	7.040		Measured despatches	7.740	
Process feedstocks	1.310		Feed to chemicals	0.344	
Blending feedstocks	0.311		Zero-valued output	0.027	
Blending additives	0.002		Sub-total, outputs		8.111
Imported slops and fuel	0.003		Fuel oil	0.157	
Imported gas	0.017		Fuel gas	0.279	
Sub-total, receipts		8.683	FCC coke	0.089	
			Sub-total, fuel	0.525	
Feedstock inventory			Product inventory		
Opening stocks	0.465		Opening stocks	0.517	
Closing stocks	0.437		Closing stocks	0.546	
Inventory change		0.028	Inventory change		0.029
			Total outputs + fuel		8.665
			loss		0.046
			% loss	0.53	
Total processed inputs		8.711	Total output + fuel + loss		8.711

Table 1: Material balance

Table 2: Loss performance

Refinery	% Loss	
	Plant	IP Format
A	0.94	1.20
B	0.71	0.59
C	2.03	1.79
D	0.39	1.15

allows meaningful comparisons of different refineries to be made.

Examples

It is now worth considering some examples of the application of these principles. The first example is the steam reforming of natural gas in a hydrogen generation unit. The chemical equation of the process is:

$$CH_4 + 2H_2O \rightarrow CO_2 + 4H_2$$

Applying the first fundamental means that the hydrogen content of the steam should be considered as an input. Applying the second means that the carbon content of the carbon dioxide should be considered as an output. In most cases the carbon dioxide is vented to the atmosphere and could be considered lost. However, if this was included in loss then meaningful comparison between refineries with and without hydrogen manufacture would be impossible. In some refineries, the carbon dioxide is returned to a process heater for environmental reasons. In such a case the carbon content of the quantity consumed should be included in the material balance as fuel, albeit that its calorific value is zero. It is not possible to measure the hydrogen input directly from the steam flow as there is normally an excess of steam used. It is necessary to calculate a component balance based on the known flows of hydrocarbon and hydrogen product.

On the subject of chemistry, there are two other items that are worth considering. In hydrotreatment and hydrocracking processes organic nitrogen is converted into ammonia.

With the lighter straight run feedstock such as naphtha and kerosene, the units tend to operate 'dry'. This means there is no continuous water wash. The ammonia produced may leave the unit in the fuel gas. This means it is either burnt, or if the fuel gas is treated, it may be removed in a water wash. For heavier feedstocks there is often a continuous water wash, which means the ammonia is dissolved and is in the sour water. Sour water is normally routed to a Sour Water Stripper (SWS) where the stripped ammonia (and hydrogen sulfide) is sent to the Sulphur Recovery Plant (SRU). In one high conversion refinery which we visited, the loss due to ammonia was equivalent to 0.3 percent of refinery throughput. This is a large distortion of the loss and one which the refinery could not economically change.

This ammonia used to be considered as a loss but there is a strong argument that it should be considered as another output.

The nitrogen removed is largely dependent on the process line up of the refinery and its choice of crude oil rather than the performance of the refinery. The quantity can be calculated by a knowledge of the nitrogen content of the unit feedstocks and products. If analytical data are not available, crude assay data and a known percentage denitrofication rate can be used.

The final chemistry example considered is around the SRU. The simplified overall equation for the Claus process is:

$$2H_2S + O_2 \rightarrow 2S + 2H_2O$$

As with the ammonia example, the quantity of hydrogen sulfide produced is largely defined by the plant configuration and crude choice. The hydrogen in the hydrogen sulfide is converted to steam and is of no value. It is believed this hydrogen content of the steam should also be counted as another output.

The efficiency of the SRU plant is made up of two elements:

- The configuration, ie how many stages are there, is there tail gas clean-up, etc
- The standard of operation.

There is an element of refinery per-

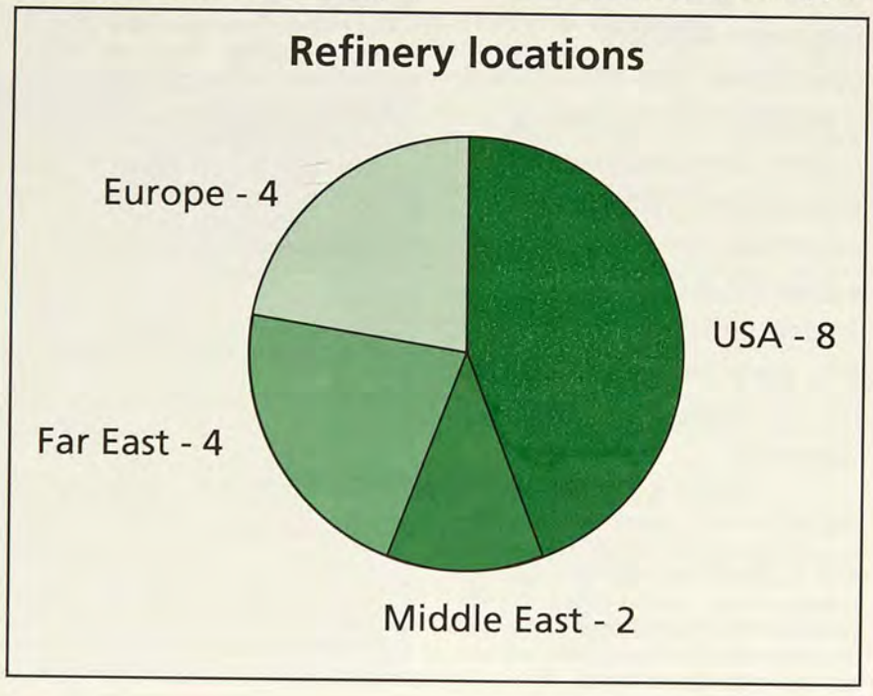

Figure 1

formance in this case. Any remaining unrecovered sulfur that is incinerated and vented to atmosphere should be considered as a loss and not included in the material balance.

Fuel consumption

The accuracy of loss quantification is limited by the accuracy of the measurement of the fuel consumed within the refinery. A number of common errors that have been observed measuring fuel consumption will now be described.

The majority of refineries have a fluid catalytic cracker (FCC). Analysis from many refineries shows that the FCC fuel gas contains on average about 10 percent volume of nitrogen. This nitrogen comes from the FCC regenerator where it entered the unit via the regenerator air. This remaining nitrogen has not desorbed from the catalyst and is carried over with the catalyst into the reactor. It is released with the off gas and enters the fuel gas system. The nitrogen in the fuel gas from the FCC has not been included in the input to the refinery material balance. The fuel gas consumption should therefore be corrected for this quantity. As a result of this change, the refinery loss will increase. The impact of this correction on the loss figure will vary from refinery to refinery but levels in the range of 0.1-0.2 percent have been observed.

It is important to measure the fuel consumed and not that imported and/or produced. In some refineries, especially in the United States, consumption is derived rather than measured using the following equation:

Consumption = Import + Production

This has the fundamental flaw that it assumes no loss. In many refineries, flaring can be a significant contributor to the loss and can often come from the fuel gas system. An over-statement of the fuel consumed will understate the loss.

Where own fuel gas and imported gas are a significant portion of the fuel consumed, an accurate knowledge of the density of the gas is vitally important in calculating the mass flow. The best solution, which is becoming more common, is to install an online analyser on the fuel gas mix drum outlet. This will give much better results than spot samples analysed in the laboratory. Care should be made that there is not a significant drop-out of heavy material before the flow measurement point or the density will not be accurate.

Refinery fuel gas compositions do change significantly. In one refinery where only irregular spot samples were taken, the loss lay somewhere in the range of a 1.62 percent loss to a 0.68 percent gain, using either the minimum or maximum gas density values recorded during the period.

An important source of refinery fuel in many refineries is FCC coke. This quantity can typically range between 4 and 8 percent of FCC intake, dependent on feedstock and unit operating conditions. As the coke is consumed in the regenerator it is necessary to calculate the quantity of coke. Most refineries perform this calculation by undertaking a balance around the regenerator using online analysis of the regenerator flue gas and the regenerator air flow. However, some refineries still assume a constant coke percentage on feed which can cause errors.

Loss results

From January 1996 to the present, KBC has calculated the loss performance in IP Format in 18 refineries worldwide. The geographical spread is shown in **Figure 1.**

Although in any region the sample is not statistically significant, there are some interesting observations that can be made. For example, **Figure 2** shows the loss results by region.

The poorest results have generally been seen in the United States. This is not totally surprising as US refineries have historically reported and thought in volumetric terms. One of the major management tools is volume gain and refinery loss is submerged in this figure. It is only when mass balances are produced that the loss is accurately identified. The thinking is starting to change in the United States and the American Petroleum Institute (API) is now formally reviewing the IP loss guide. A joint IP/API addendum to the guide is likely to be published.

The average loss performance based on the 18 refinery samples is

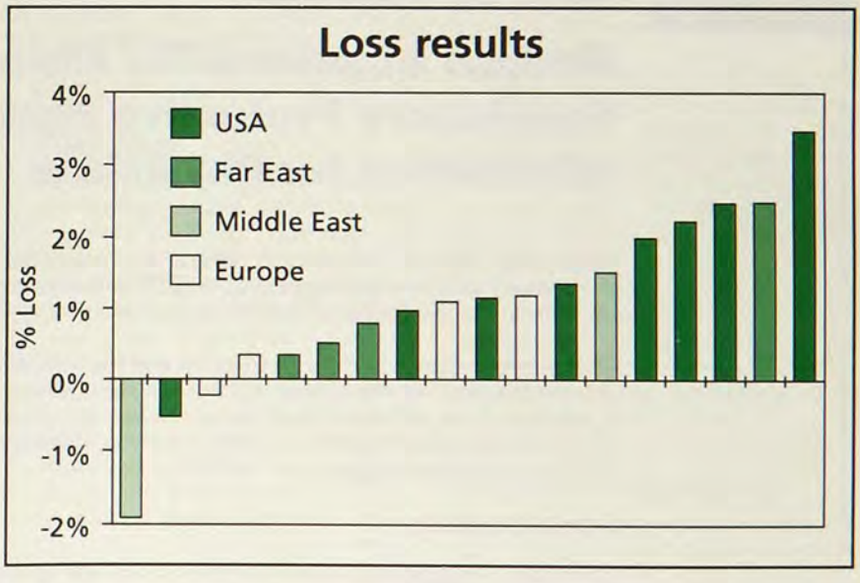

Figure 2

1.05 percent. With the refineries that had gains or very large losses, some known data problems were highlighted. Based on refineries visited and the use of IP Format, it is believed that a refinery using best practices should be able to obtain a loss performance around 0.3 percent. Reported performance significantly below this level should be treated with some caution even if IP Format is being used since it approaches the limits of measurement accuracy. It is difficult to quantify the benefits of loss reduction as the error in fuel consumption can be a variable. However, it is believed that the incentive of improving from an average performer to best practices could be of the order of 15 cents/barrel.

In addition to preparing the material balance, KBC prepared Accounted Loss Tables. In such a table, a list is made of known loss sources and estimates made of the mass lost. On average, 50 percent could be accounted for which means 50 percent could not. If there is a high percentage of unaccounted loss[1], then the loss situation is not under control. Techniques now exist to help identify the unaccounted loss.[1] A high accounted loss does mean the refiner knows where the problems are and can make a conscious decision whether to make changes.

The most common and largest contributor to the Accounted Loss is typically flaring. In general, it can be said that the management attitude to flaring is driven by the environmental legislation in the region and not by the financial lost opportunity. In the United States the concentration is on the prevention of smoke in the flare. This can mean that it is difficult to even see the flare, especially if there is a high hydrogen content. In some other regions it is illegal to flare, other than for safety reasons. This is reflected in the management attitude and hence the performance of the flare. Similar examples exist such as the fitting of double seals to floating roof tanks or the requirements to have inspection and maintenance programmes for fugitive emissions.

Conclusions

The adoption of a standard method of calculating refinery loss has allowed refinery performance to be compared on a realistic basis. Redefinition of some items as 'other outputs' will improve the methodology further since this practice would decrease dependency on configuration and feedstock. Loss performance worldwide varies considerably and some elements are driven by environmental legislation.

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Lubricity trends in low sulfur diesel fuels

By Brian Davies, Paramins Fuels Technical Service Manager, Abingdon

Lubricity additives have been widely adopted across Europe following the introduction of legislation aimed at improving air quality by reducing emissions. Lower sulfur levels in fuels, while improving the air quality, result in wear problems in some fuel pump systems. Lubricity additives overcome this problem.

Sweden became one of the first European countries to introduce very low sulfur diesel fuels (0.005%) in 1990. Unexpected side effects soon became apparent in the form of severe wear in diesel injection systems and deterioration of pump performance. This resulted in poor driveability, increased emissions and in some cases pump failure. In the worst cases, pumps failed after just 30 hours operation using the new fuel.

The failures were found in the rotary distribution pumps of cars and light diesel vans where the fuel is the sole means of lubrication. Failures did not occur in trucks as their pumps have separate oil lubrication of the critical components. However, significant wear may occur in these in-line pumps over a longer time period.

Drawing on its experience gained in solving lubricity problems in Arctic fuels, Paramins, the additives business of Exxon Chemical, developed a series of additives which improved lubricity and quickly eliminated the associated pump wear problems.

Driving force

Improvement in air quality was the major driving force behind the decision to introduce low sulfur diesel fuels. In October 1996 EEC legislation specifying a maximum limit of 0.05 percent sulfur for auto diesel entered into force across Europe (see *Petroleum Review*, December 1996).

Although the sulfur levels were not as low as those which had resulted in pump failures in Scandinavia, extensive testing using a variety of field and predictive tests, most notably the HFRR (High Frequency Reciprocating Rig), showed that lubricity problems would be likely to occur unless lubricity additives were used.

Lubricity additives had already been used extensively across Europe and can be added to the fuel in a number of different ways:

- at the terminal as a stand-alone treatment
- at the terminal as part of a premium diesel performance additive package
- at the refinery.

However, an added complication for fuel producers at this stage was the lack of an agreed lubricity standard.

Agreed lubricity standard

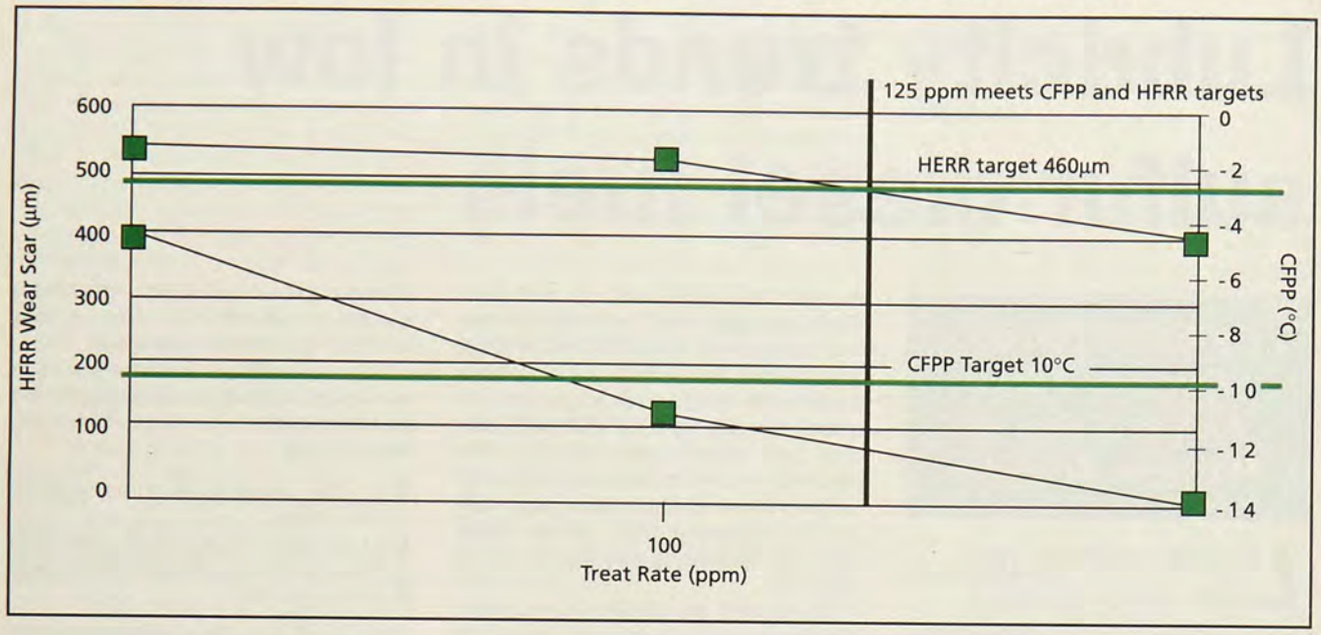
In February 1997 a limit value of 460 microns for wear scar diameter as determined by the HFRR method (CEC F-06-A-96) was agreed. Its introduction will mean that in future, fuels leaving the refinery will have to meet both lubricity and cold flow specifications.

In the UK, lubricity additives are generally already being added at the refinery. However, in many countries the new legislation brings with it a requirement for refineries to add lubricity additives to their fuels for the first time. This in turn brings a logistics problem which manifests itself in the form of investment in and location of new storage and injection facilities. Introducing a new tank and injection system solely for lubricity could cost a refinery in excess of $100,000.

Multifunctional solution

In a bid to enable refiners to respond quickly to this new standard and to

Figure 1: An example of how a multifunctional additive meets the cold flow and lubricity specifications simultaneously



reduce its impact on refinery economics, Paramins developed a single additive with both lubricity and cold flow performance (see **Figure 1**). The new additive is unique in its multifunctionality – it is not a simple mixture of the respective components.

Each additive in the PARAFLOW 7700 Series can be tailored to the refineries' specific operating conditions.

Using a single additive for cold flow and lubricity has several associated advantages:

- Fast response to new standards
- Lower overall treat cost potential
- No investment in new injection and storage facilities
- Improved refinery economics
- Improved cold flow operability including the possibility for additional cloud point elevation

Work continues on developing distillate additives yet further (see **Figure 2**) in order to keep pace with proposed 2000 legislation which calls for even lower sulfur contents and tighter distillation limits. Such legislation will result in even more challenges for the fuel producer and provide further opportunities for improved innovative products.

The final word

This new multifunctional approach to meeting lubricity and CFPP (cold filter plugging point) targets can bring associated cost saving benefits to the refinery. Any refineries not currently adding lubricity additives – be they in existing European markets or those emerging in Asia Pacific and the Americas – will benefit from not needing to invest in additional storage and injection facilities while refineries currently adding lubricity and cold flow additives separately may be able to benefit from fuels with improved cold flow operability and lubricity performance offered by a one-tank multifunctional solution.

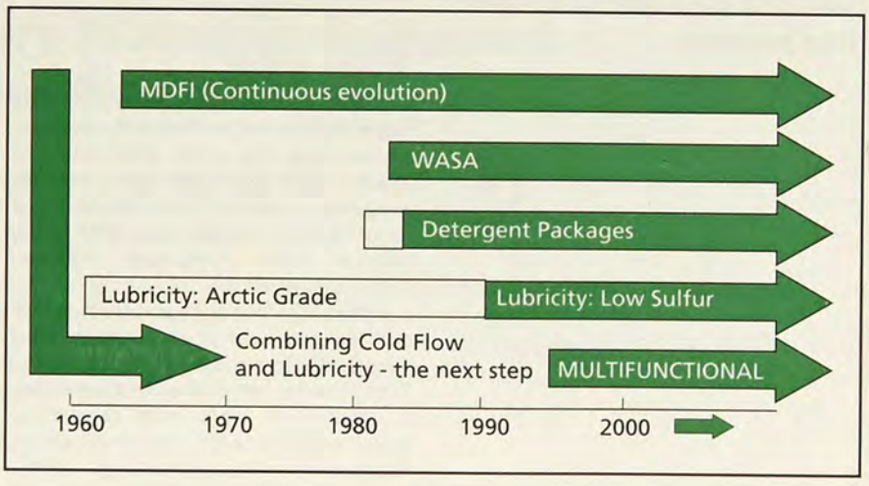


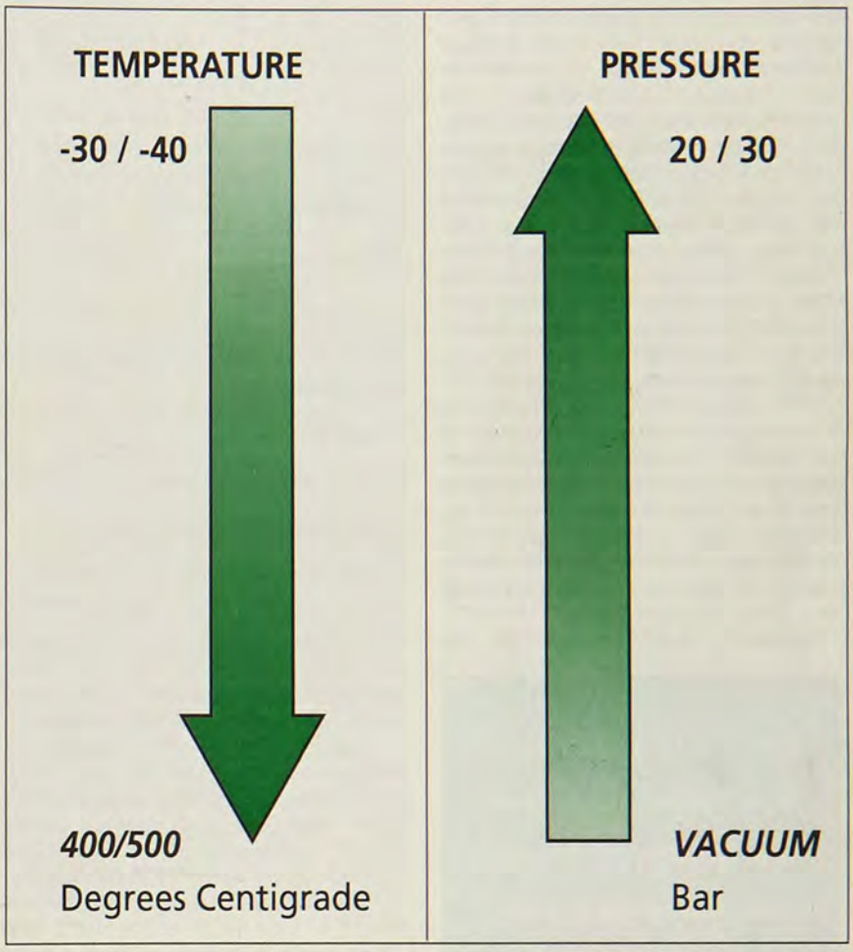
Figure 2: Continuous development of distillate additives

Refinery seals

By T N Cleaver, Senior Product Support Engineer, Flexibox International

The function of a mechanical seal is to prevent leakage of process fluid to atmosphere. Mechanical seals are used extensively in refineries where they have almost completely replaced packed glands because of their superior performance and lower 'real life' cost.

Figure 1: Operating range



Since the 1950s and 1960s refinery processing has evolved dramatically. From the early days of very little conversion being carried out, more and more units have been added, mainly with the object of 'bottom of the barrel' processing and producing finished products to meet stricter (and ever-changing) environmental requirements.

This evolution has led to changing, and usually more severe, operating conditions for seals and in turn has led to a range of modern solutions by the seal maker. **Figure 1** shows approximately the typical range of duties that mechanical seals experience. In general the higher pressures are associated with lower temperatures and the very high temperature duties are at low pressures. There are exceptions to this simplification, some reboiler duties for instance combine high vapour pressures (and hence high pump suction pressures) with high temperatures.

Safety has always been important but stricter requirements are now being enforced. Many flammable liquids are pumped at temperatures above their flash point as well as above their atmospheric boiling point – any leakage will flash to some extent, creating a hazardous vapour cloud which can drift until it meets an ignition source (or in the case of a toxic cloud, a human being). Roughly speaking, the higher the vapour pressure the higher the 'flash' and the greater the vapour cloud. As an example, a C3 splitter reflux pump may be operating at around 20 bar and 50°C. Seal conditions will be such that there is very little

temperature margin (bubble point at prevailing pressure – local product temperature); if a major liquid seal leakage occurs approximately 50 percent of the liquid will flash immediately to gas, the remaining liquid propylene at its atmospheric boiling point of –54°C will rapidly vaporise, the total volume change from liquid to gas being some 260-fold. LPGs, with high vapour pressures at process temperatures, have high auto-ignition temperatures when compared with heavier liquids whose processing temperatures can be above the auto-ignition temperature (see **Figure 2**).

The emission of photochemically reactive compounds to atmosphere is the subject of increasing legislation. Mechanical seals were once considered one of the major sources of such fugitive emissions – valves are now known to be very much larger, and usually there are many more valves than pump seals on a refinery.

Reliability and maintenance are becoming more and more important, as shown by the introduction of API 682 'Shaft Sealing Systems for Centrifugal and Rotary Pumps' with its stated design 'to default to the equipment types most commonly supplied that have a high probability of meeting the objective of at least three years of uninterrupted service while complying with emission regulations'.

Emission concerns have led the mechanical seal industry to develop new and revised seal ranges with high levels of intrinsic safety while meeting emission legislation and achieving high levels of reliability

The mechanical seal industry has responded to these concerns with new and revised seal ranges which have high levels of intrinsic safety, meet emission legislation and achieve high levels of reliability. All of this has been achieved at the low levels of cost required by users who themselves face ever increasing commercial pressures.

Certain seal problems have always existed, for instance the sealing of high vapour pressure LPGs (see **Figure 3**). In the past these were troublesome duties but better materials technology and better seal designs have contributed to more effective sealing. Distillation produces liquid streams at or near to their bubble points at the prevailing pressure – just as a pump has a required net positive suction head (NPSH), so does a seal. This has led to the development of low NPSH seals capable of operating without any auxilliary services.

Vacuum distillation, catalytic cracking and hydrocracking involve handling hot hydrocarbon streams, often above their auto-ignition temperature, and the seal maker has had to develop seal configurations to meet both application and more stringent safety requirements. Many hot streams contain abrasive particles, necessitating special seal arrangements.

Increasing concern over hazard has led to the development of inexpensive dry backup seals besides the more traditional liquid tandem and double seal arrangements. Combined with ease of testing, the dry backup seal is a relatively inexpensive way of providing additional safety (it should not be necessary to say that a safety system that is never tested, except 'in anger', is no safety system). These backup seals were originally developed for high vapour pressure LPG duties but have found increasing use on toxic applications – such as sour streams on ethanolamine units and sour water streams.

Emission concerns to some extent have the same solutions as hazard concerns, in that the aim is to reduce leakage to atmosphere to a legally defined limit as opposed to a hazard limit of some kind.

API 682 has had a major impact on the seal manufacturer with its demand for seal type qualification testing. The standard also contains a seal selection for various fluid types although more than a

Figure 2: Hazardous properties

	FLASH POINT °C	AUTO-IGNITION TEMP. °C
Butane	–70	430
Gasoline	–46	257
Kerosine	38/72	254
Gas Oil	65	338

FLAMMABILITY	TOXICITY
Flash point	Hydrogen sulfide
Auto-ignition temperature	HF (HF Alkylation)
Vapour pressure/bubble point	
Degree of flashing	

Figure 3

The Problems

LOW TEMPERATURE MARGINS	-	Most streams from distillation/fractionation columns. Often problem helped by boiling range, but LPGs tend to have narrow boiling range.
HIGH TEMPERATURES	-	Bottom/near bottom streams from CDU and VDU streams round (hydro) crackers, visbreakers, etc. Temperatures can be above auto-ignition temperature.
HIGH VAPOUR PRESSURE	-	LPGs leakage has potential to form large vapour cloud, flammability hazard.
LOW PRESSURE	-	VDU streams where abrasives dictate hard faces.
ABRASIVES	-	Catalyst fines on FCC bottoms. Coke particles – bottoms pumps.
CRYSTALLISING	-	Merox (caustic treating), hot carbonate gas scrubbing systems.
LACQUERING	-	Furfural extraction.

few refinery duties fall outside its scope.

Many of these problems can exist on a single unit. Consider, for example, the somewhat simplified flowchart for an FCC unit and its associated gas separation plant (see **Figure 4**). The main fractionator operates at temperatures varying from around 180°C at the top to around 360°C or even higher, at the bottom. Certain of the bottoms streams (the slurry oil streams) contain catalyst fines. Temperatures dictate bellows seals and the usual solution is to use a high temperature metal bellows seal with hard faces. Because of the presence of abrasive particles, a relatively clean flow (usually heavy cycle oil) at moderate temperatures is injected into the seal. A close clearance carbon bush restricts the flow of cycle oil into the pump – it also has the effect of increasing the box pressure slightly creating a more favourable condition for the seal. If a seal failure occurs, the leakage is of the relatively safe plan 32 liquid–hard faces give an emergency capability if the plan 32 fails. On the gas separation plant, where high vapour pressure and low temperature margins exist, low NPSH seal designs with backup seals are used. The standby seal provides added safety as well as sensibly eliminating emission of volatile organic compounds to atmosphere.

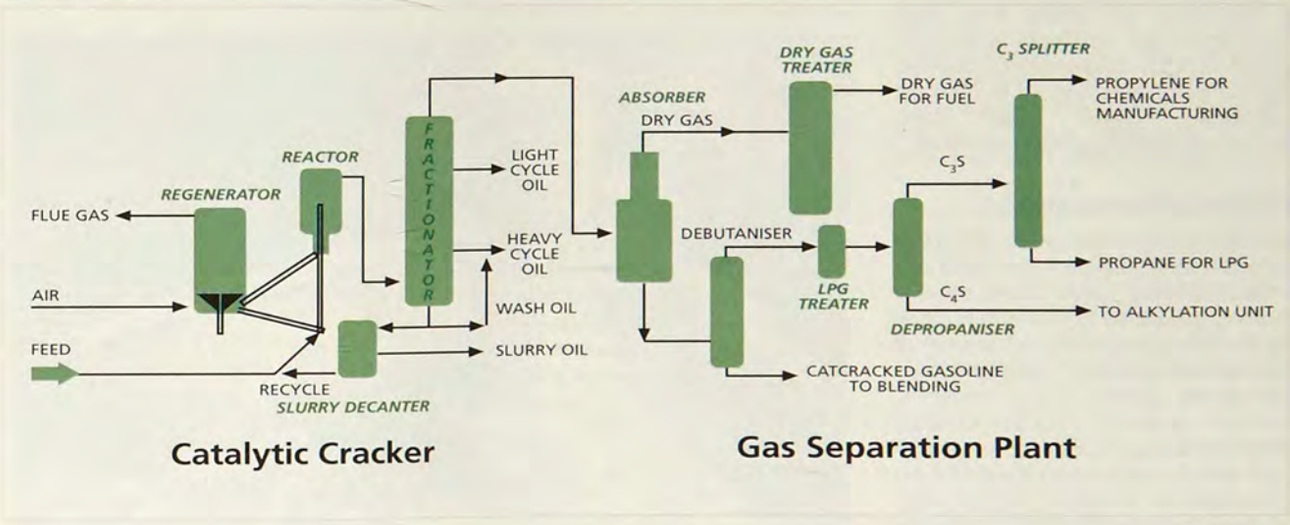


Figure 4: Flowchart showing FCC unit and associated gas separation plant

The evolution of safe, environmentally friendly flares

By John F Straitz III, PE

Flares are essential safety systems for energy exploration, production, processing, transportation and storage. They must work right, each and every time, regardless of wind or weather conditions and despite wide variations in the flow of waste gases or offgases, otherwise the consequences could be catastrophic.

In the 1920s and 1930s, most flares were little more than pipes in the sky – crude, smoky, bad-smelling devices, ignited by flaming arrows to burn off unwanted 'waste gases' from exploration fields and early refineries.

History of innovations

As worldwide consumption of hydrocarbon fuels increased in the 1940s and 1950s, elevated open flares became more sophisticated. Refractory-lined burner tips, surrounded by an array of continuously burning pilots to ignite flammable waste gases instantly, became common. Large density-differential, labyrinth-type, molecular seals were installed below those burners to prevent air intrusion in an attempt to keep combustible air/gas mixtures out of elevated stacks.

Other early attempts to improve safety and reliability in oil/gas exploration, petroleum refining, gas processing, and energy transportation and storage included:

- Development of dependable flame-front pilot-ignition systems;
- liquid seals and disentrainment drums (to preclude dangerous 'burning rain' caused by liquid carry-over into elevated stacks); and
- improved methods for properly designing flares (ie to prevent lazy flames from licking down the stacks of oversized flares).

Steam, water and air blowers were (and still are) used to reduce smoke, odours and thermal radiation from elevated flares. Steam injection is widely used in refineries. Unfortunately for people who work in, or reside near, those refineries, steam injection creates very annoying sounds. High frequency, jet-like noises and low frequency rumbles rattle windows and doors miles away. Steam or water injection and condensate also crack the hard refractory lining of conventional flare burners. Because the massive 'mole seals' do not prevent air penetration down inside flare burners and stacks, burning takes place deep inside those burners, seals and stacks. This can create very dangerous situations.

In the 1940s, there were early attempts to control smoke, noise, odours and visible nuisance flames by enclosing flares and lowering their objectionable profiles. Early efforts by Esso (now Exxon) incorporated combustion technology and equipment developed by the National AirOil Burner Company (now NAO Inc), headquartered in Philadelphia.

Perhaps the most significant innovation for elevated open flares is the Fluidic Seal™, a no-moving-parts kinetic seal, developed in the 1970s, that consists of a series of one-way baffles, built into the alloy tip of a

Designed to destroy 100 tonnes per hour of volatile organic compounds, this smokeless steam-free enclosed flare is located in a refinery near a major international airport, surrounded by dense urban development

refractory-free flare burner. This patented configuration employs the principle of the Tesla diode (boundary layer effect) to turn back all intruding air before it can penetrate into a flare burner or stack – while allowing a free flow of uninterrupted waste gases in only one direction.

More than 2,200 refractory-free Fluidic Flare™ burners, with flame retention rings that maintain compact, swirling combustion patterns immediately above the flare tips, are now in service, onshore and offshore. Retrofits for open flare installations, where refractory-lined burners required frequent costly and potentially dangerous replacements, now number more than 500.

Burners are the heart of all flare systems. Instrumentation and controls are the brains and nervous system. An effective air penetration seal is a flare's primary immune system, preventing damage and destruction caused by burning inside and metal corrosion that can lead to catastrophic explosions.

Table 1

Burner configuration	Principal problems	Reliability
Side-mounted	Many, including the need for complex staging systems and large quantities of steam (with noise and pulsation problems); high maintenance and poor performance due to thermal expansion of exposed burners and headers	Poor*
Jet/steam	Inadequate staging; low freqency noise, flame quenching	Poor
Matrix fin	Very severe thermal expansion, high maintenance, poor performance	Poor
Free-floating, multi-tip, multi-jet	None identified	Very good

**These high-maintenance installations can be retrofitted for natural draught, steam-free operation*

Good neighbour flares

Enclosed flares have also changed dramatically since the early efforts of the 1940s – and they are still changing. Today, there are four basic types of enclosed flares, differentiated primarily by burner configurations (**Table 1**).

State-of-art enclosed flares are extremely safe, ultra-reliable, easy to service and environmentally friendly. They combine dependable, complete destruction of waste gases, offgases and watery low-energy slurries (or atomised sludges) – with no visible flame, no smoke, no odour and very low noise.

Smokeless flaring is accomplished without any costly steam, assist gas, purge gas, water spray, or troublesome air blowers. Hence, there are no steam pulsation/noise problems, no complex, maintenance-prone steam headers, no smoky emergency discharges and no dangerous maintenance on elevated flare stacks.

To satisfy the most stringent environmental, noise and nuisance control regulations, many small high-technology hidden burners replace a highly visible and objectionable open burner; a low-density ceramic replaces high-maintenance refractory linings; a passive acoustic fence and gravel bed replace expensive, noisy and troublesome steam, water sprays and forced air blowers.

The low-profile, fully enclosed 'ground flares' discussed here typically employ more than 100 free-floating, vertically fired and fully protected staged burners – instead of one burner, or a limited array of burner configurations. Sometimes called populated area combustors or thermal oxidiser flares, fully enclosed units are hybrids, developed from open flares and enclosed incinerators.

An enclosed flare designed to burn up to 250 tonnes per hour (t/hr) of gas with a 40 to 50 molecular weight, where flaring is regulated to (a) maximum noise level of 75 dBA at 3 feet from the flare, (b) no visible flame or nuisance light, (c) no nuisance heat, and (d) complete compliance to all applicable emission restrictions would consist of:

- 294 vertically fired, natural draught staged burners, operating at 5 psig
- an 57-feet outside diameter enclosure, 100-feet high, for the combustion chamber, and
- a 86-feet diameter protective fence, 12-feet high.

Favourable paybacks

Such a flare system would cost approximately £1.5 million, installed. However, by eliminating the need for steam, steam-related maintenance, purge gas, airblowers, frequent maintenance and replacement of refractory and frequent replacement of traditional refractory-lined elevated flare burners, the payback for a low maintenance, environmentally sensitive, enclosed flare would be very favourable.

State-of-the-art ISO-9001 designs eliminate the need for conventional refractory and its frequent, costly repairs. There are no refractory spalling problems, no need for slow heat-ups and slow cool-downs and none of the noise that occurs in enclosed ground flares that use firebrick or castable refractory lining. The light weight of the ceramic (approximately 5.33 lbs/cubic feet compared with 80 to 140 lbs/cubic feet for firebrick and castable refractory) translates, through

heat absorption and retention, into very rapid heating and cooling responses to changes in waste flow rates.

The relatively soft ceramic insulation in the lining walls does not reflect noise. Instead, it damps (attenuates) and absorbs combustion chamber pulsations, even when a quality-built enclosed flare with natural draught burners is operated in excess of five times its rated design capacity – a very significant safety factor.

Operating an enclosed flare with side-mounted burners that require steam is very, very costly. It also presents serious noise and expensive maintenance/downtime problems.

While steam is commonly used for smokeless operation of elevated open flares, it is not required for state-of-the-art enclosed flares with properly staged, free-floating vertically fired burners. These burners ensure smokeless operation through highly turbulent mixing and swirling of waste gases into a vortex, thus eliminating the need for steam, water spray, assist gas and forced air. (A properly designed enclosed ground flare can also destroy watery waste streams, with heating values as low as 60 Btu/standard cubic feet, without any assist gas.)

Burners are the key to performance and reliability of enclosed flares (see **Table 1**).

A properly installed natural draught enclosed flare can operate safely and dependably at full capacity under any conditions, including power failure.

For remote locations, where there is no urban congestion, in-ground earthen enclosed flares also provide smokeless, invisible flaring without any costly steam or purge gas. Waste streams are spread out over efficiently staged burner areas to provide optimum mixing with ambient air. Staged rows of flare burner tips, standpipe-mounted above buried pipe manifolds, assure efficient and complete destruction of waste streams. As with fully enclosed flares, a gravel bed protects buried carbon steel piping and manifolds from radiant heat and flame damage. It also absorbs noise, while acting as a sponge to trap and dike any liquid spillovers, thus preventing fire damage.

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US downstream consolidation and bifurcation

By Peter S Adam

Several years of dismal performances finally prompted US petroleum marketers and refiners to consolidate in a big way, starting last year. This restructuring is already altering the configuration and dynamics of marketing and refining in North America. In the years ahead, returns seem set to improve industry-wide. But a rising tide of marketing and refining profitability will not lift all the boats, at least not all equally, particularly since there may be more to some of these recent alliances, partnerings, divestitures and mergers than first meets the eye. A more concentrated US refining and marketing sector might mean more fireworks rather than greater stability.

It is widely believed that the US Federal Trade Commission will give Shell and Texaco the green light to integrate downstream operations into a joint venture covering the mid-continent and west coast regions of the United States. Together the two companies control slightly less than 13 percent of the country's total refining capacity. Even with such combining of assets, the US refining industry will be much less concentrated than other industries in the USA in which the top two participants control major shares of their respective markets: soft drinks, 75 percent; beer, 69.6 percent; cosmetics, 51 percent; and automobiles, 60 percent.

The Shell/Texaco arrangement follows Mobil and BP's partnering downstream in Europe and earlier significant US refining and marketing sell-offs by BP and Exxon to independent Tosco, now ranked as the sixth largest refiner in the United States. With over 860,000 barrels a day (b/d) of capacity, the independent now is right behind Mobil, with just under a million. Tosco figures it can run Exxon's Bayway refinery and BP's 190,000 b/d Marcus Hook refinery more profitably than the majors could. So far it has, and Wall Street continues to bet it will continue to do so. Not without reason; Tosco acquired Bayway for a paltry $175 million. Whereas Exxon ran it at 180,000 b/d, Tosco cranked the facility up to 285,000 b/d.

Currently, unconfirmed press reports indicate that Mobil and Amoco are considering combining their US marketing and refining assets.

Smaller refining and marketing companies, Ultramar, Diamond Shamrock, and possibly Marathon Oil and Ashland, have been merging their downstream operations too; and in the case of Ultramar/Diamond Shamrock (UDS), which was formed last year, also buying assets shed by majors. UDS is acquiring Total's downstream US operation, which includes 150,000 b/d of refining capacity. In addition, Valero Energy recently purchased refineries from another smaller US independent, Basis Petroleum, which makes Valero now one of the top 15 US refiners, knocking Texaco, whose deal with Shell is yet to be fully finalised, off the list.

The urge to merge

Both approaches to marketing and refining combination – among the behemoths, alliances, joint ventures and partnerings; and among the smaller companies, mergers and acquisitions – appear to be winners. The intensity of the urge to merge, and ally, has been company-specific, though.

The divergent paths consolidations are taking could favour the biggest of the majors, now fast becoming mega-majors, and the smaller independents, placing those caught between the two at a comparative disadvantage in the years ahead.

At the end of last year, 15 companies accounted for roughly two-thirds of US refining capacity (15.8 million b/d). There were three tiers of major refiners: five at the top – Shell, Chevron, Amoco, Exxon and Mobil, each with about one million b/d of capacity each, six in the middle: Sun, Star Enterprise, Koch Refining, BP, Citgo and Marathon, with upwards of half a million; and then, Conoco, Tosco, ARCO and Texaco with less than half a million each.

Texaco, when combined with its Star joint venture (Texaco and Saudi Refining Co), would total 990,000 b/d, enlarging the top five to six.

As presently configured, the Shell-Texaco combination – which may eventually include Star – would control about 14 percent of retail market share in the joint venture area and just over 6 percent of total US refining capacity.

Texaco will contribute four refineries

with a combined output of 390,000 b/d, and Shell four, with about 560,000 b/d, making the joint venture almost as big as Shell's current US refining operation. Together with Star's 605,000 b/d, the amalgamation – which would have more than 1.5 million b/d of capacity – would be the biggest refining company in the USA.

The joint venture, as it now stands, will also include about 19 crude and products terminals from Texaco and 57 from Shell; about 7,000 Texaco branded retail fuel outlets and 5,500 from Shell; as well as 10 lube plants from both with under 65,000 b/d of total capacity.

Partnering between (un)equals

The Shell-Texaco venture, (56 percent Shell, 44 percent Texaco) is not a partnership between equals. It reflects the comparative need of each for such an arrangement. (By way of contrast, the Texaco-Saudi joint venture is a 50/50 deal which involves Texaco's downstream east coast operations.)

According to BZW Oil and Gas Research, Texaco's refining margins have been sub par for a while, averaging about $0.71 a barrel in 1992-96, the lowest of all the majors which together averaged $0.92 a barrel over the period. On the other hand, Shell's margins were near the top, at $1.30 a barrel, behind ARCO at $1.64 which enjoys a particularly strong position on the west coast and Alaskan crude production, and recently privatised ENI, with $1.39, over the same period.

Consistent with this refining performance, Shell has been earning a better return on capital than Texaco; 10.3 percent in 1992-96, compared with Texaco's sub par 9.5 percent. The industry average was 9.6 percent over the same interval (BZW figures).

Shell is also the more conservatively financed of the two. Its debt to capital ratio is 15 percent, compared with Texaco's 33.6 percent.

Tarnished by experience

It is not a foregone conclusion that the latest joint venture will be a winner. Managing alliances can be perplexing. Recurring conflicts within Caltex, the long-standing partnership between Texaco and Chevron in Africa, the Middle East and Asia, provides evidence that such marriages are not all wedded bliss. Also, the unwieldiness of the Texaco-Star arrangement, manifest when investment decisions cause tension, is unlikely to be diminished with the addition of another party.

Consolidation does not always get an uncontested thumbs up from the capital markets either. History reveals companies' faith that bigger is better, that economies of scale can carry the day, is, at best, simplistic. For instance, the break-up of Standard Oil more than a half century ago was bitterly contested. Certainly its economies of scale suffered diminution. Yet a few years after the Standard Oil dissolution, appreciation of the baby-Standards' stock outpaced the market by a significant order of magnitude. The combined value of shares in Exxon (then Esso), Mobil, Chevron, Sohio, etc – the companies that the break-up spawned – became worth far more than Standard Oil's had ever been.

Creating many happy returns?

Nonetheless, the allure of such arrangements is easy to understand. According to an analysis of business alliances carried out by John Treat of Booz Allen & Hamilton, strategic alliances, long a feature of the petroleum landscape, are expanding rapidly.

'Over the past five years,' Mr Treat notes, 'they've grown 42 percent annually.' Traditionally they have focused on upstream operations in a single country. But now they are increasingly regional or even global in scope.

According to an analysis of 2,500 alliances conducted from 1989 to 1993, such arrangements are capable of generating much higher returns generally than conventional corporations: 18 percent, compared with an US industry average of about 12 percent. Energy alliances' return on investments (ROIs) are much greater, about 22 percent, second only to entertainment, where such arrangements generate about a 25 percent return.

There has been a notable change of late in what prompts such arrangements though, Mr Treat notes. 'They used to be used for position-building. Currently though they aim to build capabilities that confer lasting competitive advantage.'

While neither Shell nor Texaco has publicised the cost savings forecast from their partnering, analysts have been less reticent. A *Wall Street Journal* article announcing the move pegged it at about $2 billion annually. Fred Leuffer of Bear, Stearns, the US-based securities company, puts it at closer to $800 million pre-tax. Mobil and BP pegged the cost savings of their European downstream joint venture at $400-$500 million pre-tax annually. This figure is in line with the smaller Ultramar/Diamond Shamrock merger which, according to documents filed with the Securities and Exchange Commission at the time it was announced, was expected to reduce

costs by $75 million a year for the half a million b/d Canadian/US refining and marketing company.

Mexico fares better

Notably absent from the Texaco-Shell joint venture is Shell's 225,000 b/d refinery in Deer Park, Texas, that is already part of a 50/50 joint venture with Pemex. Deer Park has been configured to run on heavy Mexican Maya crude. No-one expects Pemex or the Mexican government to allow upstream participation any time soon. However, this unusual joint venturing may place Shell – whose particularly heavy-handed approach in Mexico earlier in the century prompted the Mexicans to nationalise their petroleum industry and keep all foreigners out – first in the running, should the sector open up. Other hydrocarbon activities, gas pipelines, for example, already have.

The fact that Star is likely to be involved in the consolidated enterprise could well give Shell the access to Saudi crude on the preferential terms it has long sought for half a century or more.

Fumbles and recoveries?

Some interesting language in Shell's press release concerning the joint venture calls to mind the recent controversy Texaco has suffered with regard to human resources practices. It suggests why Texaco would agree to a junior partner status in the joint venture and reveals the stark reality of this company's position: 'Both Texaco and Shell have agreed to the strategic importance of establishing a new company that will be a leader in diversity, which will embrace inclusion, openness and equal opportunity for all employees and business partners. As part of establishing the new company, comprehensive employment and business partnering initiatives will be developed that are aligned with its business objectives.'

The company, whose senior managers once were known to insist that, regardless of the business wisdom of doing so, Texaco would market everywhere in the contiguous United States because that was the way Texaco did things, has now, for all intents and purposes, become an adjunct of a Saudi enterprise on the one hand and a British/Dutch trading organisation on the other.

As Texaco aggressively prospected for reserves on Wall Street in the 1980s, it badly stumbled in the Getty Petroleum matter and ended up in bankruptcy. Many contend that it was the Saudis' continued supply of crude without requiring costly guarantees that saved Texaco from sale or liquidation. Meanwhile, Royal Dutch/Shell was quietly buying all the shares of Shell US that it did not already own.

The shrinking sorority

Apparently it has been true for a while now that non-US majors know how to play the game better than at least some of their US counterparts. If a top tier of mega-majors can outmuscle the US remnants of the seven sisterhood, and smaller companies can generate better rates of return than 'integrated' majors, it does not leave certain US members of the dwindling once-proud sorority with much manoeuvring room. Belying the high share prices of some of the integrated US oil companies, possibly a temporary state of affairs, divestitures and shot-gun marriages will offer respite but not a solution in the longer term to problems arising from deficient operating strategies, outmoded organisational structures and flawed corporate cultures.

Institute of Petroleum's Annual General Meeting

The 84th IP Annual General Meeting took place on 10 June 1997, with the President Mr David Setchell in the chair.

Presenting the President's Report, he outlined the progress, achievements and changes made by the Institute in his first year in office, including the broad conclusion drawn from the recent survey of individual members (see *Petroleum Review*, April 1997). 'While the 30 percent who responded are broadly satisfied with what the IP does, the survey and verbatims from other ad hoc studies reaffirmed some of the changes we are making and our vulnerabilities if we do not make them,' he said. 'Only by doing this will we keep members who feel they get value from their membership and from the time they invest in the Institute's affairs. It is also the best chance we have to attract new members, younger members who count relevance, excitement and value added in addition to the privilege of simply belonging.'

Mr C Moorhouse, Chief Executive, BP Oil UK Ltd, was elected to Council

He focused in particular on two changes that the IP is currently making in a bid to bring added value to its members. The first change will follow a review of its technical work and the committee structure which enables the work to be carried out. The process for identifying new technical work will be improved in order to ensure that the Institute does not duplicate work done by others and to best make use of the restricted financial and human resources available.

The second change is the introduction of a lifetime learning programme that aims to increase the knowledge within and about our industry, enhance members' skills and, eventually, enhance the industry's reputation as this knowledge and skills are put to productive use. Mr Setchell believes that such a programme will also provide a successful means of attracting new young members on whom the future of the Institute will depend.

He concluded by acknowledging the assistance he had received from IP Director General Ian Ward, Council and its Committees.

Orders of the day

For the year 1997-98, Messrs T Moore and D Sharp were re-elected as Honorary Secretary and Honorary Treasurer respectively.

IP President Mr David Setchell (top) presenting the President's Report

Awards

Jim Snook FInstPet became Chairman of the IP Commercial Metering Committee, PM-D-4, in 1982 while employed by Esso, and continued in that role until 1996. He remains Vice-Chairman of the Petroleum Measurement Committee and a member of the Petroleum Measurement Steering Group.

Under his chairmanship, PM-D-4 and associated Working Groups have had an outstanding record of producing Codes of Practice and Guidelines, especially in the field of metering on-road loading gantries.

The IP Codes form the accepted industry basis for the calibration and verification of such meters. He was a major contributor to the Guidelines for Measurement Practice for Petroleum Products Leaving Bonded Installations published in 1995. Under the government policy of deregulation, the IP Guidelines have been adopted by HMC&E as the definitive guidance on petroleum measurement for duty accounting purposes.

More recently, he has been involved in guidance for the calibration of dispensing pumps at service stations, the calibration of underground tanks at service stations, and the calibration of additive injection systems at terminals. He represents the Institute on the European Standardization Committee, drafting a Standard for the calibration of underground tanks. Other major interests and involvements have been in the field of automatic tank gauging systems and the development of onboard computer systems for road tankers.

His drive and enthusiasm has made him a popular choice as chairman of several conferences and workshops dealing with petroleum measurement issues.

There were two vacancies for Ordinary Members of Council and three nominations. Messrs I Fotheringham, retired, and P Haar, Senior Consultant, KBC Process Technology, were seeking re-election, while Mr R Ward, Director, Robin Ward Associates, stood for the first time. Following a ballot of members, I Fotheringham and P Haar were elected.

Mr C Moorhouse, Chief Executive, BP Oil UK Ltd, was appointed as a nominated member of Council, following the retirement of Mr K Taylor who had completed his six-year term as a Member of Council.

Deputy Chairman of the London Branch Mr N Brenton was elected as Branch representative on Council.

The Report of Council was presented by IP Director General Ian Ward and subsequently adopted.

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

Mr Setchell concluded the meeting by presenting Awards of Council, in the form of a large cut-glass rose bowl, to Messrs B Beaton, J Church, D Garwood, J Snook and N Tierney.

Noel Tierney MInstPet (right) joined the Irish Branch over 15 years ago. Using his professional skills as a PR manager in Irish Shell, he rapidly became involved in many of the activities of the branch. Over time he became the major contact point between the branch and New Cavendish Street, with the relevant government departments and with all the major companies operating in Ireland.

His professional expertise and attention to detail have contributed enormously to the success of Irish Branch functions, enhancing the image of the Institute of Petroluem in Ireland.

Those who have been involved in running the Irish Branch over the years – current committee and all of the past six presidents – are very aware that the current strength and well-being of the branch is in no small way due to the quiet unassuming but highly effective input from Noel Tierney over the last 15 years.

Awards

Bill Beaton FInstPet (right) was one of the founder members of the West of Scotland Branch in 1976. An active committee member, he was elected Branch Chairman in February 1987 and he continues to hold this post today.

He has successfully developed the Annual Branch Dinner. Recent speakers have included Pik Botha, King Constantine of Greece and The Princess Royal.

He also arranges the celebrity lectures at which representatives of the oil industry are given the opportunity to meet the local business and political community. These lectures are extremely popular and as a result of a recent event which focused on the Brent Spar controversy, the branch was instrumental in coordinating with several of the local engineering institutes to provide an audience for a Shell presentation on environmental issues.

He has made a considerable contribution to the development and local standing of the Institute and the oil industry in west of Scotland.

John Church MInstPet has been a member of the Precision Evaluation panel since 1970. In 1977 he was appointed Chairman of this panel, a position he still holds.

Following the retirement of Ivor Smith (Chairman of the Method Evaluation Sub-Committee ST-L) in 1982, the Institute found itself almost totally reliant upon him for the development and application of statistical techniques for the precision evaluation of test method data. He rapidly gained a position as a respected international figure in the petroleum test method field and has established a first-rate working relationship with ASTM. This has led to a joint IP-ASTM approach to statistical techniques and the development of an International Standard, ISO4259, for the determination of precision data in petroleum test methods. He has been the project leader of this standard for the past 10 years.

Don Garwood FInstPet has had a career in the oil industry that spans some 45 years but it was not until 1988 that he became a member of the Institute and immediately joined the Essex Branch.

In 1989 he became Branch Treasurer and in 1990 recruitment officer. He pursues the recruitment of new IP members with considerable success.

From 1991-94 he was one of the Branch representatives on Council and in 1993 he became Branch Chairman and has only just stood down from this position after two terms of office.

His commitment, enthusiasm and contribution have been major factors in the success of Essex Branch over recent years.

Critics target the Atlantic Frontier

The following extracts are taken from speeches made when Greenpeace launched its campaign to stop oil exploration and production in the Atlantic Frontier

Peter Melchett, Executive Director, Greenpeace UK

> *'I am now writing to you, as I did your predecessor, to urge you to discontinue the development of the Atlantic Frontier proposed oilfields off the northwest coast of the United Kingdom.*
>
> *'The Atlantic Frontier development is a clear and disastrous case of unsustainable development and one which sends entirely the wrong signal to other nations, both industrial and industrialising.'*
>
> *Letter to Tony Blair*

Peter Melchett said, 'This campaign is designed to protect the climate. Not simply by arguing that "something must be done". But by engaging with a solid, real target which is a lynchpin of the problem – that is the exploration end of the oil industry. And, with an equally real, solid solution – solar power.

Greenpeace is targetting 'what the oil industry calls the Atlantic Frontier: a project to create a massive new oilfield in the Atlantic north and west of Britain. It is here, we believe, that government should draw a line in the sand and say "no new oil" – we already have more than enough to create a huge problem.

'We have high hopes for our new government. We also have low expectations. Why? Because of the overwhelming inertia of "business as usual". As the climate scientists have clearly told us, in the case of fossil fuels and the climate, business-as-usual spells disaster.

'While John Gummer was banging away at the Climate Convention, even denouncing fossil fuels and the fossil fuel lobby, the UK government's official policy has been to expand oil production at home.

'The world has too much oil already. The time has come to say "enough is enough", and to recognise that the Atlantic Frontier oilfield would be an act of insanity in a place of beauty.'

Chris Rose, Deputy Executive Director, Greenpeace UK

Chris Rose said: 'What is needed, of course, is an international political regime to phase out fossil fuels and replace them with renewable energy sources, and this is a task for government which we hope Shell will join us in calling for.'

He stressed that climate change was happening. According to the scientists of the Intergovernmental Panel on Climate Change (IPCC), it is now discernible. He added, 'Carbon dioxide continues to rise. The IPCC forecasts a global average increase in temperature of 1.5-3.5°C by 2100. This spring Greenpeace sailed round an island in Antartica which used to be part of an ice-shelf connected to the mainland. But no longer.'

He continued: 'In 1990, scientists working for the United Nations Environment Programme (UNEP) set [ecological] limits at one degree above pre-industrial levels, and one-tenth of one degree per decade. They also set limits for sea level rise. To meet the UNEP 1°C limit and avoid extensive ecosystem damage, we calculate that the carbon budget is about 225 billion tonnes of carbon. In real terms, this means that 95 percent of all the fossil fuels thought to exist below ground, must stay there... Only one-quarter of the fossil fuel reserves – oil, gas and coal – can ever be used... Oil alone could take the world over the limit.

'This is why, as a matter of logic, we believe it is wrong and irresponsible to go on exploring for more fossil fuels... Indeed, it is clear that fossil fuels must be phased out – they will not "run out" as some people still think.

'The oil industry, the flagship of fossil fuels, is trying to increase use of oil. BP for example wants a 5 percent annual increase in its production... The oil industry is storing up the fuel that can, quite literally, destroy nature.'

Sarah Burton, Director, Campaign for Sane Energy

Sarah Burton told the press: 'Thanks to Tim Eggar and his friends we now have the softest tax regime for offshore oil of anywhere in the world except Ireland.

'The Atlantic Frontier is not just swarming with oilmen looking for oil, it is swarming with birds, sea life and whales. In fact it is the richest habitat in Europe for whales. Scientists describe the Rockall Trough that runs along the continental shelf as a "motorway for whales" because there are so many migrating sperm whales and other species.'

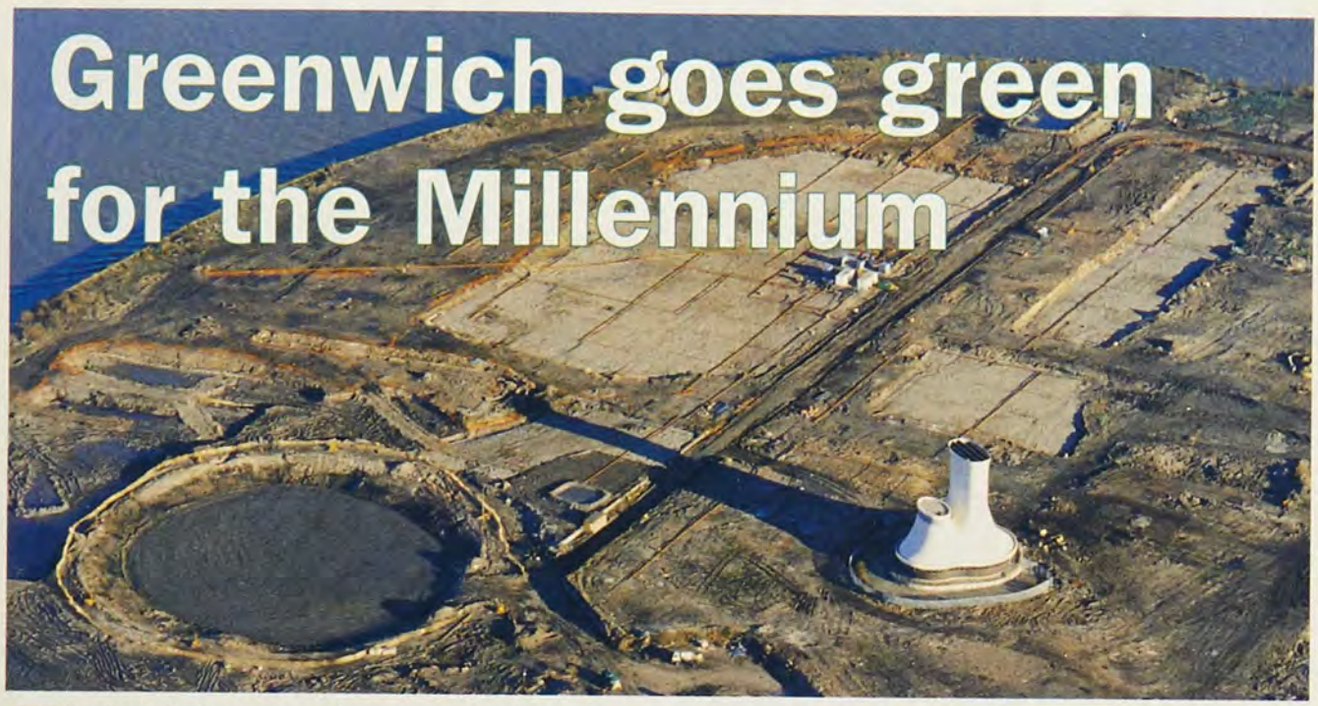
Supporting the new Greenpeace campaign, she said: 'BP see themselves as the greenest oil company. We say to them – show your commitment by pulling out of further oil exploration.'

Jane Wildblood, Campaign Director, Greenpeace UK

She said: 'People accuse environmentalists of not seeking solutions. In reality it is government and industry which has the power to bring in environmental solutions.'

She also stated: 'BP makes solar panels but doesn't have any on its offices – so we put some on for them.'

Greenwich goes green for the Millennium



The installation, operation and decommissioning of what is thought to be the largest in-situ soil cleaning project ever undertaken in the United Kingdom was recently completed on schedule at the Millennium site in Greenwich, south of the River Thames. Construction of foundations for an enormous dome spanning some 18 acres has now begun. Designed by Lord Rogers, the dome will house the year-long Millennium Exhibition, starting on New Year's Eve 1999, and be the focal point of national celebrations to mark the start of the new century.

The fast-track regeneration project was undertaken by Fluor Daniel GTI on behalf of Port Greenwich Ltd (a wholly owned subsidiary of BG plc). A gas works had operated on the site for almost a century before closing more than 20 years ago. Both the soil and groundwater were heavily contaminated, in particular by volatile hydrocarbons, from long-discontinued manufacturing practices, and remediation of the 43,000m^2 site was necessary before construction of the Millennium Dome could begin.

The worst of the tarry contaminated soils, some 180,000m^3, was excavated by contractor Edmund Nuttall for off-site disposal at licensed landfill sites.

The bulk of the remaining contamination was removed from the 10.6-acre treatment area by one of the world's largest and most 'aggressively operated' soil vapour extraction (SVE) systems ever built.

System set-up

The in-situ remediation system – designed, installed and operated by Fluor Daniel GTI – consisted of 300 vapour extraction wells in six treatment cells, interconnected by over 5-km of piping and manifolds. Six high capacity blowers located in a central equipment compound created a vacuum to draw air through the contaminated subsoil. Air flowing through the subsurface volatilised the contamination while stimulating in-situ biological degradation with naturally occurring micro-organisms metabolising the contamination in the ground.

Each of the six treatment cells was activated at two-week intervals. Such a staggered start-up gave the company time to install wells and equipment in other treatment cells while collecting operating data used to fine-tune the treatment process for peak removal efficiency.

Installation of the first treatment cell of 7,500m^2 was completed in just 10 days, while installation of all six cells and the associated pipework took just six weeks. Treatment was completed after 115 days.

John Waters, Project Director for Fluor Daniel GTI, told *Petroleum Review* that: 'The 106 tonnes of containment mass withdrawn from the site during 20 weeks of operation is

A bird's eye view of the Millennium Exhibition site and 43,000m^2 soil vapour extraction system (see also front cover)

A section of one of the six treatment cells

unprecedented for an in-situ remediation system.' He added, 'The successful completion of this project has demonstrated that contaminated brown field sites can be prepared for beneficial reuse.'

Monitoring system efficiency

Mr Waters also commented that the innovative in-situ approach used at Greenwich is substantially more cost-effective, when used under appropriate conditions, than traditional methods of excavation and off-site disposal.

Data was monitored on a daily basis so that it was possible to ascertain when the operation had been successfully completed in each treatment cell. Once contamination levels in a cell had been reduced to levels agreed with the UK Environment Agency and the 50 extraction wells within that cell turned off, air flow to the other wells could then be increased to enable more 'aggressive' treatment in areas where the contamination was heavier. The system was finally decommissioned only after the Environment Agency confirmed that the contamination in all cells had been reduced to the agreed level.

Work has now begun on laying drainage and access roads and building the foundations for the Millennium Exhibition Dome.

Kim Jackson

Beyond the Millennium

While the Millennium Exhibition raises the profile of Greenwich both nationally and internationally, much is planned for the area that will long outlive the Millennium celebrations. The entire Greenwich Peninsula represents an opportunity to redevelop a district of London with the aim of maximising the quality of life of the community.

Traditionally, inner-city redevelopment has been somewhat piecemeal. However, the plans for Greenwich are for a more 'visionary' approach looking at the area as a whole.

Instrumental to the opening-up of the area will be the Jubilee Line extension, scheduled to become operational in 1998. It will provide access to central London from Greenwich in just 15 minutes.

Focus on the forecourt

The annual IP European Retail Conference and specialist half-day seminar, held in association with the Forecourt International Exhibition and Convenience Retailing Show, at the NEC in Birmingham on the 3 and 4 June, once again provided a popular forum for the discussion of current issues affecting petrol retailing in the United Kingdom and the rapidly developing market of Central Europe.

By Kim Jackson

The theme of the 1997 conference, 'Revolution on the forecourt – or just evolution?', reflected the tumultuous changes seen in the UK retail market over the past 12 months. Chaired by Peter Ellis Jones, Director, Tawe Oil Management and Vice President, the Institute of Petroleum, the day's proceedings focused on the growing position of supermarkets as suppliers of fuels, the consolidation of the industry and the decline in small dealer networks and the fightback by the major oil companies through aggressive pricing. Particular emphasis was placed on the changing character of service stations with the development of combined retail sales.

The keynote address was given by Ian Upson, Managing Director, Esso Petroleum Company Ltd. He explained that over the years there has been one constant in the motorfuels market – *change*. Indeed, over the past decade, that pace of change has picked up considerably as the supermarkets have increased market share and offered the motorist a different style of fuels retailing with low prices a key factor.

As supermarket volumes have grown, so Esso's own share of the market has declined. In a bid to halt this trend, the company conducted a study of consumer expectations and concluded that it needed to change the pricing stance of its network, placing more emphasis on lower prices and convenience and less on promotions. Thus, Pricewatch was born and, as *Petroleum Review* readers are well aware, the UK petrol pump price war began.

Looking to the future, Mr Upson said that he did not believe that fuel demand would grow significantly, if at all, over the next five years. 'Vehicle fuel efficiency, combined with a government taxation policy which will continue to add to the price at the pump, and potential concerns over vehicle exhaust emissions in urban areas, could well lead to reduced consumption,' he commented.

In order to achieve satisfactory returns in this environment, he said that: 'Retailers will have to take further steps in all parts of the business to reduce costs and improve efficiency. In addition, conventional petrol stations without the benefit of higher site volumes enjoyed by the supermarkets will need to further develop existing revenue streams and develop new profit opportunities.'

History repeats itself

While agreeing with Mr Upson that the UK fuels market is one in which continuous change is taking place, Alan Pond, Chairman, Oakstead Holdings Ltd, suggested that many of the changes are not new events in commercial life but simply an updated repeat of history – ie evolution not revolution. For example, he reminded delegates in a most interesting presentation that in 1924 Shell underestimated the resolve of a Russian new entrant into the UK market and challenged it with a price-cutting strategy which set the scene for a 15-year price war.

Outlining his own 50-year career as a rationed customer in 1947 and dealer principal from 1953, he went on to reflect on how government industrial policy has evolved over the years. He questioned whether vertical integration is now working in the public's interest when upstream margins, only available to a few, are being used to gain market share, and when predatory pricing, as defined by the effect on competition, has resulted in substantial site closures, job losses and mergers in conflict with the market balance accepted in the 1990 Monopolies report.

He asked whether there should now be a new inquiry, with a six-month interim statement of intent to be challenged during the main hearing. 'If predatory pricing were to be proven, would not this lead to legitimate claims for compensation?', he enquired. 'If it were not proven, then Monopolies would have to accept and publicly state that there is only future room in the market for vertically integrated companies or those large enough to import or buy product at disproportionately low prices.' Either way, Monopolies cannot sit idly by, renege on its responsibilities and allow the industry to rapidly evolve without comment, he concluded. At least then, everyone would know where they stood.

Supermarket stance

David Coles, Marketing Director, Somerfield Stores Ltd, had his chance later to voice the supermarkets' viewpoint. The fifth largest UK food retailer,

with a turnover of around £3 billion per year, Somerfield operates some 600 stores with sizes ranging from 1,000 square feet to more than 40,000 square feet. It operates 13 small petrol forecourt supermarkets and recently entered into a partnership with Elf Oil UK to trial pilot stores at a number of the oil company's forecourts – the first of which opened in Balham in November 1996, the second in Chiswick this April.

Mr Coles explained that the changing demographics and lifestyles of the UK population represented a tremendous opportunity for a growth in the forecourt food retail sector.

'Grocery retailers have the experience, skills, resources and experience required to help you [the oil companies] capitalise on this opportunity,' he said. He went on to outline those strengths that supermarkets could bring to bear:

- a strong food branding providing consumer confidence in the product on offer
- established store concepts and layouts
- substantial range enhancement and control of products
- a well-established supply chain capable of handling and distributing fresh foods and dairy products to a network of outlets
- food retail and operational skills
- buying power that can tip the economic balance of retail shops.

A look at lubricants

Changing course slightly, Graham Ellis, Chairman and General Manager, Mobil Oil Company Ltd, provided an overview of the role of lubricants in tomorrow's forecourt environment. He commented that while the future holds changes for the forecourt, and in particular the forecourt shopping environment, lubricants will continue to have an important role to play in securing revenue.

However, the market for lubricants, is also changing following recent developments in engine technology. For example, longer engine drain intervals and the requirement for less

Open for business

The first day of the European retail conference and seminar, entitled 'Equipping the Forecourt – Opportunities in Central Europe', formed part of a wider government initiative launched by the UK Department of Trade and Industry (DTI) and the Foreign and Commonwealth Office (FCO) in January. Called 'Open for Business', the 18-month trade and investment campaign is aimed at increasing the awareness of UK companies to the emerging business opportunities in Central Europe.

The potential market is huge – as illustrated by the few statistics that Ms Brazyna Lapczynska, DTI Export Promoter Hungary presented to the delegates. Between them, the five Central European markets have over 65 million consumers and by 1998 the combined foreign trade of these markets is expected to be worth at least £125 billion, twice what it was valued at just seven years ago, with, individually, some of the highest growth rates in Europe.

Although perhaps not a traditional market for UK companies, the region is nonetheless becoming increasingly important to the United Kingdom as a trading partner, the more so as all five markets have formally applied to join the European Union having already attained Associate Member status. Indeed, it is quite possible that negotiations to join the EU may start, for some if not all the five markets, in the New Year under the United Kingdom's six-month Presidency. In addition, Poland, Hungary and the Czech Republic have all recently become members of the OECD – a status confirming their 'arrival' as serious economic players on the world stage.

Illustrating this point, in 1996, all five markets featured in the top 80 export markets for UK goods and services. UK exports grew by over 30 percent, while exports to Poland alone rose by 43 percent from £945 million to £1.3 billion. However, on average, UK market share of foreign trade in these markets was largely static, about 3 percent, meaning that despite the impressive growth of UK trade, the United Kingdom is, at best, only holding its own against competition from Germany, Austria, Italy and France.

Steps one, two and three...

The DTI/FCO campaign has three phases which have the ultimate aim of doubling UK exports by the end of 1998 to $5 billion and of encouraging 100 new investment projects.

- The first phase, which is now starting to draw to a close, is an awareness – raising programme which is being delivered by a series of seminars promoting, in broad terms, the Central European market-place.

- Phase two, of which the IP seminar was one of the first elements, focuses on the opportunities for UK companies offered in particular business sectors. Primarily, the aims of this phase are to provide UK companies with access to information on their chosen market and physical access to that market's principal players, those with whom they should seek to build a business relationship.

- The third phase, due to commence in the New Year, will concentrate on outward investment opportunities in Central Europe. This phase will seek to demonstrate the importance and necessity of building a long term commitment to the market if UK companies seek, realistically, to establish themselves as committed players in the market-place.

The above is based on a paper by Ms Brazyna Lapczynska, DTI Export Promoter – Hungary.

top-up has reduced overall demand while higher specifications and environmental legislation have altered the type of lubricants required by the consumer. As a result, retailers will have to be more brand specific, more quality specific and be able to provide expert sound advice on products in order to meet consumer needs and develop a customer loyalty. Mr Ellis also emphasised that the types of lubricant on offer and styles of marketing would have to be tailored to suit individual cultures in Europe.

Regulatory focus

Shifting away from retailing strategies, the conference concluded with a look at the new operating regulations for service stations in the United Kingdom in a paper presented by Dr Steve Rooker, Head of Petroleum and Flammables Policy, Health and Safety Executive.

The Health and Safety Commission (HSC) began a review of all health and safety regulations in 1992 in a bid to remove unnecessary administrative or legal burdens on business while ensuring existing safety standards were maintained. Because of certain developments in the European Union, the wide-ranging review of flammables safety legislation was slimmed down to concentrate, primarily, on petroleum.

A consultative document on the new safety regulations will be issued next month with a three-month consultation period. The aim is for revised draft regulations to be presented to the Commission next January and signed by ministers by the following March.

The proposals represent a sea-change in the approach to safety at service stations. The licensing regime enshrined in the Petroleum (Consolidation) Act 1928, for example, will be replaced by goal-setting legislation. However, a permissioning regime will be maintained with respect to the design and construction of new service stations and where hardware changes are planned for outlets could affect safety. In each case, the prior consent of the local enforcing authority will be required before construction work begins. There will also be a requirement for changes of site operator to be notified to the enforcing authority.

While the primary duty to operate a service station safely falls on the site operator, the regulations recognise the often complex contractual arrangements between site operator and site owner to ensure that both co-operate to ensure hardware and other safety equipment are properly maintained. To underpin the general duties is a requirement for the site operator to write down the outcome of the risk assessment for fire and explosion hazards regardless of the number of people employed on site.

In addition, the new regulations rationalise and update the law on the filling of plastic and metal petrol containers and storage in domestic and industrial premises.

To underpin these major changes, HSE is preparing guidance on the meaning of the regulations and a new guidance document aimed at site operators and managers on how to operate a service station safely. It will include practical guidance on how to undertake a risk assessment and what options are available to minimise the fire and explosion risks on-site so far as is reasonably practicable. It is also preparing a leaflet for the public on the dangers of petrol, safe dispensing and domestic storage.

Opportunities in Central Europe

In co-operation with the UK Department of Trade and Industry, the associated half-day seminar was entitled 'Equipping the Forecourt – Opportunities in Central Europe'. Chaired by Richard Reynolds, Chairman, East European Trade Council, the seminar outlined the opportunities available to the oil industry and forecourt equipment suppliers from the potentially large markets in Central Europe.

Stephen Brooks, Principal Consultant, Wood Mackenzie Consultants Ltd, kicked off proceedings with an overview of the recent developments of fuels retailing in the region as a result of market deregulation and liberalisation. His analysis of the relative size of the retail motor fuels market within the individual companies of Central Europe highlighted the importance of Poland with total demand for fuel in 1996 exceeding 7.5 million tonnes – somewhat dwarfing that in the Czech and Slovak Republics, Hungary and Romania.

The potential for future market growth in the region was indicated by examination of car ownership levels which at present remain low by western European standards but which are expected to show substantial increases over the next 10 years in line with growth in GDP per capita. Focusing on the service station infrastructure in the region, comparison of national retail network densities within each country showed Central Europe to still be comparatively underpumped relative to the mature markets of western Europe – a fact underlining the potential for growth according to Mr Brooks.

He also outlined the role of national, former state-owned players in deregulated markets and those markets in the early stages of development and liberalisation – a topic covered in comprehensive detail by *Petroleum Review* earlier this year (see January 1997). Since publication of this earlier article the Romanian government too has outlined plans to restructure its oil and gas sector, including a new law introduced in April allowing foreign oil company land ownership rights. Previously, such rights were only granted through local companies having at least one Romanian shareholder. Meanwhile, state-owned national oil company Compania Romana de Petrol (CRP), created in 1996 to manage the state's downstream oil interests, is set to lose its monopoly while marketing affiliate Peco has been split into 41 different regional entities.

Procurement priorities in MOL

Homing in on the Hungarian market, Susan Gadó, Procurement Manager, MOL, outlined the company's plans for the new Millennium under its 'MOL 2000' programme. She stated that the major selection criteria and priorities of procurement of equipment and services for the company's network of service stations were:

- compliance with MOL standards as well as western technical standards together with a reliability of some 10 to 15 years
- good references and a stable financial background
- a wide and extensive service background and operating experience
- acceptable sales terms and conditions including price, delivery date, terms of payment and suppliers', guarantees and last, but by no means least
- environmental considerations, an issue that is becoming increasingly important as European legislation continues to crack down on emissions.

While much of MOL's development plans have focused on its domestic market, the company also operates a number of service stations in the Slovak Republic, Ukraine and Romania – where the company plans to expand its network over forthcoming months.

Setting the standard

The second session of the seminar included a look at the standards being developed by the International Forecourt Standards Forum (IFSF) in a bid to harmonise equipment interconnectivity and communication standards. Nine oil companies – Agip, Aral, BP-Mobil, Esso, Fina, Kuwait, Shell, Texaco and Total – have been working together since 1993 to develop the standards which provide a range of operational benefits and cost savings for the service station operator (see *Petroleum Review*, July 1996).

Ian Nayler, President, IFSF and John Carrier, IFSF Technical Chairman, provided delegates with a background to the development of the standards and outlined future plans, including an increased number of pilot sites testing equipment meeting the IFSF standards, the establishing of IFSF 'ambassadors' in various countries and the setting up of a demonstration centre near Heathrow at which different vendors could install and demonstrate their equipment to potential customers.

Exhibition showcase

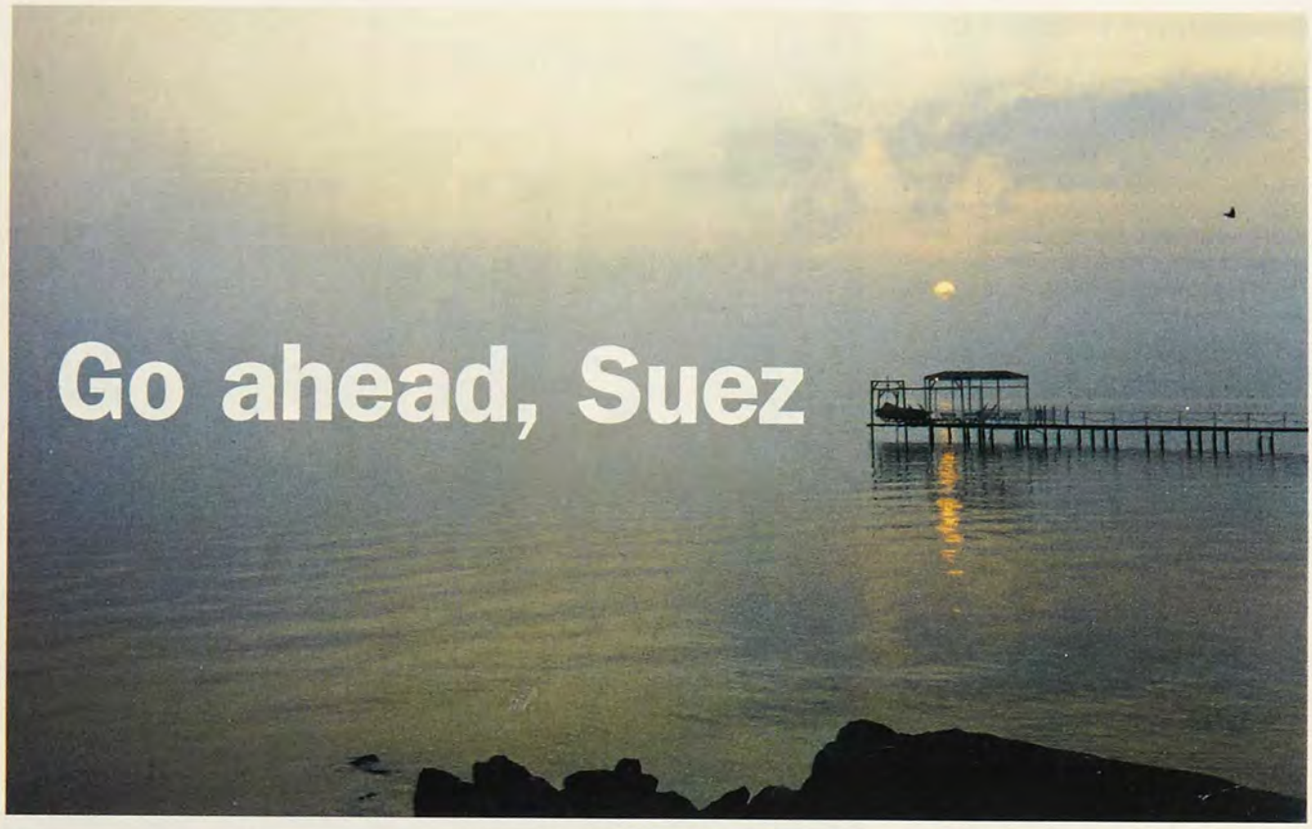
Once again, Forecourt International 97 was held alongside the Convenience Retailing Show. While the number of stands was reported to be down on the last show, most exhibitors seemed pleased with the levels of interest they received.

Representation by the oil companies was relatively small with Texaco and BP/Mobil the only mainstream oil companies on show, while UK regional oil company Bayford Thrust was exhibiting for the first time. That said, many familiar names were there including vehicle wash manufacturers Ryko International, California Kleindienst, Atlantis International and Karcher; signage specialists Digitext Display Systems and LumiTronic Industries; and pump dispensing equipment companies Gilbarco and Wayne Dresser.

Not surprisingly, environmental interests were high on the agenda with a number of companies displaying automatic tank inventory management and monitoring equipment, including Emco Electronics and Veeder Root, while others such as International Bioremediation Services offered a range of bioremediation services.

Somewhat ingeniously, one vehicle wash company – Wilcomatic – used its absence from the show as a marketing ploy, placing an advert in *Forecourt Trader*, sponsor of the show, stating that it had decided instead to reward its customers with a host of 'rather generous offers'. Let's just hope that not too many other companies decide to follow this approach next year!

Go ahead, Suez



By Dr Naji Abi-Aad

In an effort to ward off competition and arrest the decline in its income, the Suez Canal Authority (SCA) will not raise the Canal's transit rates this year. It is offering greater incentives to oil tankers, gas carriers and other vessels using the waterway. Meanwhile, the SCA is again considering enlargement of the canal to enable more vessels to use it.

Following declines in both 1993 and 1994, there was an even sharper drop in the volume of crude oil, gas and petroleum products carried through the Suez Canal in 1995. It plunged by some 30 percent to around 41.37 million tonnes from about 59.41 million tonnes in 1994, mainly because of a 36 percent drop in northbound shipments from some 50.12 million tonnes to around 32.35 million tonnes. The volume carried from north to south also declined in 1995 to 9.03 million tonnes (see **Table 1**). Last year, the total volume of petroleum carried through the waterway is estimated to have dropped further to about 40 million tonnes. The canal's receipts totalled some $1.94 billion in 1995 before declining to an estimated $1.8 billion last year.

The drop in the volume of oil passing through the canal and the decline in its revenues explain why the SCA decided not to increase its tolls in 1995 and then in 1996 to cut the waterway's transit fees for crude oil, petroleum products, LPG and LNG tankers by 10 percent, whether laden or in ballast, and to offer volume discounts off the announced rates for crude oil tankers on round trips through the canal.

Bigger discounts

Greater incentives for 1997 include bigger discounts. Thus a discount of 5 percent off the 1997 rates applies to a round trip of the same tanker if the client transports 1-2 million tonnes of

Year	North–south	South–north	Total
1991	14,342	70,535	84,877
1992	11,987	71,283	83,270
1993	15,540	60,502	66,042
1994	9,288	50,120	59,408
1995	9,026	32,348	41,374

Table 1: Suez Canal petroleum traffic 1991-95 ('000 tonnes)

crude oil per year (in 1996, the 5 percent discount applied to the transport of 1-4 million tonnes), 10 percent for 2-3 million tonnes (4-5 million tonnes in 1996), and 30 percent over 3 million tonnes (over 5 million tonnes in 1996). After including the above discounts, a maximum toll of Special Drawing Rights (SDR) 330,000 (about $475,000) is applied to a crude oil tanker on a round trip regardless of the tonnage and the volume carried. Furthermore, clients who wish to transport specific quantities of crude oil from the Gulf through the Suez Canal in 1997 can apply to the SCA for special agreement on appropriate transit rates for the quantities involved, regardless of the usual quantity discounts **(Table 2)**.

For LNG carriers, a discount of 35 percent off the 1997 rates is applied to loaded northbound trips and southbound trips in ballast. Likewise, a 25 percent discount is applied to southbound loaded trips and northbound trips in ballast. The SCA already concluded in 1995 a 25-year agreement with Qatar for a 30-35 percent reduction in transit fees for LNG shipments through the Canal, in the event that Qatar exports LNG to eastern Mediterranean countries such as Israel and Jordan, or to West European markets. The Abu Dhabi Gas Liquefaction Company, which already exports LNG to several European countries through the canal, has subsequently negotiated with the SCA a 35 percent reduction in transit fees for its shipments.

Other existing discounts and concessions continue to apply. These include the abolition of an old surcharge of 10 percent on tankers with a beam of over 66m and the reduction of rates on supertankers in ballast on the return trip from the United States to the Gulf, on environmentally friendly tankers (2 percent discount for double hulled ships and 4 percent for segregated ones) and on tankers that lighten their load at the offloading terminal of the Suez–Mediterranean Pipeline (Sumed) at Ain Sukhna on the Gulf of Suez in order to meet the canal's draught requirements.

Indeed, Very Large Crude Carriers (VLCC) or Ultra Large Crude Carriers (ULCC) can unload part of their cargoes into the Sumed pipeline at the Ain Sukhna terminal, transit the canal partly laden and then fill up again at the Mediterranean Sumed terminal of Sidi Krir. Since April 1995, moreover, tanker operators have had an added incentive for choosing this option since crude tankers of over 250,000 dwt that unload part of their cargoes at Ain Sukhna for transport through Sumed now pay a preferential transit fee for passing through the waterway.

In another bid to encourage VLCCs and ULCCs that now transport much of the world's traded oil to use the canal, a new 'ship-to-ship' service started up in March 1992 that enables large tankers to unload their oil on to smaller carriers for transit through the waterway. A VLCC or ULCC can now discharge part of its cargo at the terminal of Sidi Krir where it is loaded on to a 'Suez Max' size vessel that carries the oil to its port of destination. The supertanker then takes on a full cargo of oil at Sidi Krir for transport in the other direction.

Deeper and deeper

As part of its strategy of attracting more vessels and large tankers to use the canal, the SCA is now again seriously considering another deepening of the waterway's draught to 20m (250,000 dwt laden). The last enlargement of the canal was completed in November last year when the capacity limit for fully-laden ships was raised to 200,000 dwt, with a maximum draught of 18m and a beam of 49-50m. The recent expansion included the construction of additional inlets enabling convoys of ships going in one direction to tie up and wait for ships going the other way to pass.

Table 2: Suez Canal petroleum transit fees in 1997 (SDR/tonne)

	Crude oil		Refined products		LPG		LNG	
	Laden	In ballast	Laden	In ballast	Laden	In ballast	Laden	In ballast
1st 5,000 tonnes	6.49	5.52	6.75	5.52	6.75	5.75	7.50	6.38
2nd 5,000 tonnes	3.62	3.08	3.77	3.08	3.77	3.21	4.18	3.56
Next 10,000 tonnes	3.25	2.77	3.43	2.77	3.43	2.92	3.81	3.24
Next 20,000 tonnes	1.40	1.19	1.93	1.19	2.42	2.06	2.68	2.28
Next 30,000 tonnes	1.40	1.19	1.93	1.19	2.42	2.06	2.68	2.28
Above that	1.21	1.03	1.93	1.03	2.42	2.06	2.68	2.28

Photos by Liliana El Minyawi

By offering incentives to oil tankers and gas carriers and other vessels using the waterway and enlarging the scope of its activities by further enlarging the canal and developing new facilities in its area, the SCA also hopes to ward off competition from other routes and means of transport as a potential result of a peaceful environment in the Middle East.

In fact, peace in the region would bring significant changes in the physiognomy of the area's oil industry and would turn upside down the regional map of transport and export routes. When the peace process reaches a happy end, the borders between Israel and all its neighbours are opened and the UN sanctions and embargo against Iraq are completely lifted, there will no longer be any major obstacle to Gulf countries utilising disused oil transport systems to the Mediterranean, and Iraq would be able to use its oil export outlets through Turkey, Saudi Arabia, Syria and Lebanon, as well as Israel. In addition, many projects for oil and gas export pipelines in the Middle East would be resurrected.

All these potential developments in the Middle East are likely to have a great impact on the traffic through the Suez Canal which has already been affected by a recent expansion in the capacity of the Sumed pipeline and may have to compete with an expanded pipeline network linking Sumed to Saudi Arabia. A growing role is also expected for Israel's Tipline crude pipeline from Eilat on the Gulf of Aqaba to Ashkelon on the Mediterranean coast.

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Jet fuel market in Israel – from monopoly to competitive environment

By Yoav Armoni,
Assistant to Managing Director, Israeli Fuel Authority

The jet fuel market in Israel, which for many years operated in a totally non-competitive situation, is now undergoing substantial changes which will result in a competitive environment to the extent possible in the Israeli petroleum environment.

Until 1988 the entire petroleum sector in Israel was highly centralised. There were only three oil companies (Paz, Delek and Sonol) and the government authorities divided the market among them. These companies controlled all activities, including import of crude oil, transport, refining, distribution and marketing of petroleum products. The sole refinery company (ORL) served merely to process crude for the oil companies in return for refining fees. The sector was tightly planned and controlled by the government and functioned on a cost-plus basis.

In 1988, the government began to reform the oil sector. The reform, implemented gradually, included the end of the cost-plus basis system, reducing the government involvement, ending price control of petroleum products (prices for the final consumer) and enabling new companies to operate under competitive conditions. In addition, ORL began to operate independently. However, since it was a monopoly, it was necessary to control ex-refinery prices. The ex-refinery pricing system is based upon cif Med assessments as published by Platt's in order to reflect the international petroleum product market.

Initially, the reform did not include the jet fuel sector. The three oil companies continued to be the only ones dealing with jet fuel which they marketed through their fully-owned subsidiary – Aviation Services Ltd (ASL). ASL operates at Ben-Gurion International (BGI) airport as well as at other airports in Israel under an exclusive licence issued by the Israel Airports Authority (IAA).

As a result, the three oil companies, acting through ASL, constituted a monopoly, both for the supply of jet fuel and providing the auxiliary services. Although jet fuel supply was a monopoly, no price control was imposed mainly because there was no practical way to distinguish between the jet fuel price and the auxiliary services price (because of the comprehensive-exclusive licence). Additionally, since jet fuel is identified as an export product, it is not possible to impose price control upon its consumer price. As a result the airlines which serve BGI airport (local as well as foreign airlines) were forced to pay significantly higher prices than at European airports.

Recent reforms

In August 1994 the government decided to restructure the jet fuel market by opening it to competition. An inter-ministry committee (Ministries of Transport, National Infrastructures and Finance) was established in order to recommend to the ministers concerned how to implement the government decision. The committee presented its recommendations in September 1995 but for various reasons and under heavy pressure these recommendations were frozen.

After the May 1996 elections in Israel, the Minister of National Infrastructures and the Minister of Finance decided to implement the committee's recommendations and to sign the relevant government decrees.

These decrees came into force on 1 September last year. Local and international oil companies and traders will be able to supply jet fuel at BGI airport to their customers. This jet fuel can be obtained from local oil refineries or from imports but it must meet Jet A-1 (Nato Code F-35/DERD 2494) specifications.

In parallel, as of 1 January, ASL has been prevented from selling jet fuel at BGI airport and jet fuel is now supplied competitively. At the same time the Fuel Authority started to control the prices of

Development of jet fuel sales 1994-96

(Million gallons)

	1994	1995	1996	Annual Average Growth
Ben-Gurion International, Tel Aviv	168	189	201	9.4%
Other airports (International and domestic)	9	11	12	15.6%
Total	177	200	213	9.8%

The market share of El-Al (flag carrier) is about 50% of Tel Aviv supply

Source: Fuel Authority

storage and refuelling services which are provided by ASL.

The result of the new policy was fairly successful for the jet fuel users. The total into-plane costs were reduced by 2.5-8.9 cents/gallon (the 'monopoly margin' of ASL), depending on the airline alternative price prior to the reform.

Additionally, foreign oil companies started to look for ways to operate in the local jet fuel sector. The first joint venture agreement was signed between Caltex and local marketing company Dor Energy and other joint ventures are expected. This is a welcome result of the reform and hopefully more will follow.

The IAA and the Fuel Authority are planning to issue a tender for an additional into-plane services supplier in the second half of this year. Participants may be any company that has experience in such activities, a financial competence and can offer a competitive price for the into-plane activities. While the second into-plane services supplier will operate at BGI airport, the Fuel Authority will remove the price control from these services.

The Fuel Authority, having reviewed the situation at BGI airport, will consider instituting a similar system at other international and domestic airports in Israel.

The Israeli petroleum market has changed since 1988 and there is now a competitive environment in many market sectors. As of September last year, the jet fuel market has also been liberalised.

Although many parts of the oil market are still controlled by monopolies because of years of centralised operations, the market is now more open to competition.

Development in this direction depends now, more than before, on the willingness of international oil companies to do business in Israel and the new competitiveness in the supply of jet fuels makes it easier than in the past.

Development of aircraft and passenger traffic for 1992

	1992	1993	1994	1995	1996	Growth 1992-96	Annual Average Growth
International airports							
Ben-Gurion (Tel Aviv)							
Passengers	4,338,471	5,009,066	5,918,163	6,819,682	7,013,208	61.6%	12.8%
Aircraft	30,734	36,330	43,439	47,354	50,159	63.2%	13.1%
Eilat & Ovda							
Passengers	175,600	241,900	314,500	368,166	384,487	119%	22.1%
Aircraft	1,920	2,380	2,760	4,212	4,495	134%	24.8%
Domestic airports							
Passengers	1,248,340	1,363,050	1,568,740	1,726,560	1,990,158	59%	12.4%
Aircraft	156,610	170,840	185,840	164,612	191,654	22%	5.7%

Source: Israel Airports Authority

1996 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			Kerosine			Fuel Oil				
	4 Star Leaded	Premium Unleaded	Super Unleaded	4 Star Leaded	Premium Unleaded	Super Unleaded	Premium Kerosine	Regular Kerosine	Aviation Kerosine	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	2.2	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

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

Focus on Iranian gas: development and export

By Colin Barraclough

Iran's priorities have switched during the past year: while demands for gas reinjection in its oilfields are still vital, the country's desire to develop an export market for natural gas has grown. Despite the threat of US sanctions on foreign firms investing more than $10 million a year in Iran's hydrocarbons sector, foreign companies are bidding for far-reaching offshore development projects.

At present, gas production, which is handled by the oil ministry through the National Iranian Oil Company (NIOC) and the National Iranian Gas Company (NIGC), stands at about 40 billion cubic metres a year (bncum/y), a figure which NIOC intends to boost to 82 bncum/y by 2000. Much of current output is associated gas but significant reserves of non-associated gas, such as the Qeshm field, are also present.

With known natural gas reserves of 21 trillion cubic metres (tncum) in early 1997 – second only to Russia's in the world – Iran enjoys an enormous long-term potential for the export of piped or liquefied gas. But the principal constraint on the development and export of its reserves over the past decade has been the huge capital costs involved in gas-gathering schemes and the problem of raising finance.

Long-term view

Yet some practical thinking at the oil ministry, outlined at a gas conference held at Kish Island in February, has resulted in an achievable long-term development plan based on five major priorities. Iran is now committed to:

- developing its gas deposits, particularly those shared with neighbouring countries
- substituting petroleum-product use with natural gas
- reducing gas flaring by gas injection programmes
- securing market share for Iranian gas in neighbouring states such as Turkey, Pakistan and India, followed by exports to the Far East and Europe
- creating the facilities and legal framework necessary to attract foreign capital.

Several times over the past decade Iran has announced that it was on the verge of developing its gas reserves. In the past, however, the oil ministry was prone to drawing up ambitious 'wish lists' of development projects with little regard for the availability of external financing. Now, however, foreign firms are lining up to negotiate development contracts, Western banks are willing to finance offshore projects and potential customers are talking seriously about orders and development costs. So what has changed?

The development of Iran's gas reserves falls in line with the government's commitment to promoting non-oil, export-orientated commodities. State investment in the petrochemicals, steel and agriculture sectors, for instance, has allowed private and public producers to develop new export markets, primarily in the Far East, the former Soviet Union and the Gulf states. The volatility of the oil markets has a deleterious effect on budget planning: price surges on the international oil market can lead to windfall receipts – oil sales came in $3.5 billion over-budget in 1996, for instance – but state budgets are perennially under threat from potential price falls. While oil sales remain lucrative and crucial to Iran's economic development, the government has renewed its commitment to diversifying external sources of income.

Rising demand for natural gas in the region and in the Far East have also encouraged the Iranian government to compete with other producers such as Oman and Qatar which are surging ahead with their own development plans. While exporting gas is profitable only when world oil prices are high enough to warrant the use of gas as a cheaper alternative, the forecast increase in long-term demand for gas feedstocks should ensure that the high capital cost of development is met through self-financing 'buy-back' contracts which the oil ministry has developed.

The Iranian government is also anxious to reduce domestic demand for oil and oil products, which is increasing at a rate of 8 percent a year. Conscious of the opportunity cost of lost oil sales (which President Hashemi Rafsanjani has estimated at several billion dollars a year), the government is promoting the use of gas for industrial and domestic needs, thereby cutting demand for petroleum products such as kerosene and reducing pressure on refineries and freeing more resources for export. Already, domestic consumption of gas has risen fourfold since 1988, from 11.4 bncum/y to more than 40 bncum/y in 1996, and an additional 300,000 gas consumers a year are to be added to the network.

Development projects

For the first time since the 1978/79 Islamic Revolution, Iran has invited foreign contractors to invest in its strategic hydrocarbons sector. Gas recovery features strongly in the 12 offshore development projects currently under

Projected Iranian gas exports

Project	Volume bncum/y	Starting year	Cost ($m)*
Iran-Turkey Pipeline	3-10	1999	1,620
Iran-Armenia Pipeline	1	1999	135
Iran-Nakhichevan Pipeline	0.5	1999	20
Iran-Pakistan Pipeline	8-16	2002	2,000
Iran-Europe Pipeline	8-32	2005	11,000
Iran-Far East Pipeline	6	2002	1,800
Total at: year 2000	4.5		305
year 2005	41.51		16,575

* For pipeline: transmission cost only, and for LNG: liquefaction cost only.
Source: National Iranian Gas Company

offer by the oil ministry: by far the largest is the South Pars field in the Gulf, which is linked with Qatar's North Field reservoir. Studies indicate that the field could produce up to 35 million cubic metres (mncum) of gas a day for the domestic market and up to 50,000 b/d of condensate for export. Some 9.1 tncum of gas is in place, of which 6.8 tncum is reckoned to be recoverable.

In 1992, an Italian-led consortium began preliminary work on the $1.7 billion effort to tap the field's massive reserves but the difficulties of raising foreign financing proved insurmountable and the project collapsed the following year.

Iran went ahead with the $900-million first phase of the project itself. The Oil Engineering and Expansion Company, an Iranian contractor, is expected to complete the first phase by 2000. The US assault on Iran's buy-back plans has delayed contracts for the second and third phases but negotiations for the second phase are underway with Total and the Royal Dutch/Shell Group; Malaysia's Petronas may also be competing. NIOC has said that the second and third phases of the project could run concurrently with the first if agreements can be reached with foreign contractors.

The development of the North Pars field near Kangan has been slower. The idea was first mooted before the revolution, with proposals for the export of LNG; plans were dusted off in April 1993 but preliminary discussions with Technip, Snamprogetti and Saipem, as well as with Toyo and Royal Dutch/Shell, fell through in 1994 in the face of financing difficulties.

Funds for the development of the Khuff formation underlying the Salman oilfield (some 30 percent of which lies in Abu Dhabi) have been included in the 1997/98 Iranian budget, however, and work on the project is expected to begin later this year.

Export plans underway

At the same time, Iran is contemplating a huge export drive for its gas sector. With the expansion of its offshore projects, NIGC has released plans to export 4.5 bncum/y of natural gas by the end of the decade and nearly 10 times that amount (41.5 bncum/y) by 2005. Iran's first priority is to advance plans for transporting natural gas by pipeline to regional markets such as Pakistan, India, Turkey, Armenia and Azerbaijan. In the second stage, NIGC is contemplating the export of gas to Europe and the Far East by pipeline and in the form of liquefied natural gas (LNG). Negotiations with Pakistan and India are progressing but agreements have already been reached with Turkey and Armenia.

Some of the long-term plans, especially those involving costly LNG facilities, would require foreign financing. Transmission and liquefaction costs of the projects, excluding upstream development costs, could total $16.6 billion. Even without the presence of unilateral US sanctions, finding the capital to support multi-billion dollar gas export pipelines in the Middle East will be difficult but NIGC has said that build-own-operate schemes are allowed by the Iranian constitution.

Construction of a pipeline between Iran and Turkey began in April. Proposals for a pipeline through Turkey to supply gas to central and west Europe have been under consideration since 1988 but political disruptions in Central Europe dashed hopes of a speedy implementation of plans. Instead, Turkey signed a 22-year agreement worth some $20 billion in 1996 for the supply of natural gas to fill its own needs. The pipeline, which is expected to start deliveries late next year, will carry an initial 4 bncum/y of Iranian gas, rising in subsequent years to 10 bncum/y.

Construction of a $190 million onshore gas pipeline from Turkmenistan to northern Iran is also scheduled for completion by the end of this year. The 200-km, 40-inch pipeline will run along the eastern edge of the Caspian Sea and will link up with a 30-inch pipeline in the existing Iranian network south of the Caspian. The pipeline will initially supply Iran with 2 bncum/y of gas rising to 8 bncum/y by 2007. The gas, which will be used in power stations in northern Iran, will free up some fuel oil which Iran will be able to export from the south.

Other pipeline projects are under consideration (see box), including regional connections with Armenia and Azerbaijan's autonomous province of Nakhichevan; longer pipelines to Pakistan and the Far East are earmarked for the second phase of Iran's export plans.

Future outlook

Iran's gas reserves will clearly grow in importance as various constraints limit crude oil production capacity in the long term. It is likely that Iran will have to complete its planned Turkey and Turkmenistan pipeline projects in order to demonstrate both to potential customers and western banks that it has the ability to achieve its ambitious aims. Sourcing overseas finance for the more ambitious export pipeline projects will be difficult, particularly in the face of continued US sanctions on the industry but the seriousness with which potential regional customers are considering Iranian gas bodes well for the oil ministry's chances.

US sanctions in Iran

By John Roberts

These are interesting times for Iran. A new president and fresh hopes for an end to international isolation could provide the country's hard-pressed hydrocarbons industry with a badly-needed influx of fresh capital. But while the Iranian officials may imagine that the world will beat a path to their door in the hope that US sanctions will eventually be lifted, they need to remember that if they want to do business with the rest of the world, they will have to do business on terms which are both commercial – and attractive – to potential investors.

This is perhaps the real problem that Iran faces. There is no lack of interest in its energy potential, but the global oil and gas industry retains considerable doubts as to the best way in which it can secure a piece of the action.

Topic of debate

The issue came to the fore at a recent conference held in Nicosia to consider the impact of US and/or UN sanctions against Iran and two other 'pariah' states in the Middle East: Iraq and Libya. The conference also considered whether sanctions might be lifted – and on this it received a distinctly mixed set of answers.

On the commercial side, Dr Narsi Ghorban of the Iran Association of Energy Economics listed the enormous sums which Iran hoped to see invested to develop its various hydrocarbon reserves.

These comprised between $30 billion and $40 billion for oil-related development and between $25 billion and $32 billion for gas-related projects.

The projected oil expenditures included:

- Some $15-20 billion to maintain production at Iran's current Opec quota of 3.6 million barrels per day (mnb/d)
- Some $10-12 billion for development of offshore oilfields in both the Gulf and the Caspian
- Some $3-5 billion on gas injection for secondary oil recovery
- Some $2-3 billion for construction of new oil refineries

The projected gas expenditures included:

- Between $10 and $13 billion for gas development
- Some $3-4 billion for gas processing
- Some $12-15 billion for gas transmission

Dr Ghorban seemed well aware that what Iran is currently offering in its 'buy-back' deals may not be enough to entice foreign investment on the scale required if these ambitious goals are to be met. Despite sanctions, he insisted, Iranian industry could operate. He then added: 'If the fiscal terms can be improved, other firms will be much more interested in participating in Iranian projects.'

He was clearly treading a fine line between the government's determination to ensure that there was no real breach of Iran's 1987 Oil Act, which prohibits the National Iranian Oil Company (NIOC) from surrendering equity or entering into production sharing agreements (PSAs), and the belief of western oilmen gathered in Nicosia that if Iran wanted to secure such development, it would have to open its oilfields up to production sharing agreements. However, when asked whether 'buy-back' was merely a fancy term for a type of equity arrangement, both Dr Ghorban and his colleague, Dr Ali Shams Ardekhani, the Secretary

'There is no lack of interest in Iran's energy potential, but the global oil and gas industry retains considerable doubts as to the best way in which it can secure a piece of the action'

General of the Iran Chamber of Commerce, Industry and Mines, moved swiftly to deny this was the case.

Under the buy-back arrangements, which have made only a little progress since the first such accord was signed with France's Total in 1995, NIOC is prepared to offer foreign companies a repayment formula which includes an agreed rate of return. Although Total is understood to have secured repayment for its work on the Sirri field through the direct sale of one-third of the oil it produces, the Iranians say this does not constitute an equity or PSA accord since, they insist, it will only have access to this stream until its costs have been met and its guaranteed rate of return secured.

For the time being, sanctions are clearly a constraint. Indeed, judging by US participants at the conference, notably former US Assistant Secretary of State for the Near East Robert Pelletreau, they will likely remain a constraint for some time. The conference was held at the end of April, a few weeks before Iran's presidential election. Indeed, right up to the polls on 24 and 25 May, only a few US officials were prepared to pay any attention to the prospect of a victory by the moderate (as the US politicians, he eschews the word 'liberal') Iranian cleric, Muhammad Khatemi. Instead, most US officials remained convinced that Iran's clerical leadership would simply not allow their own chosen candidate, Ayatollah Nateq-Noori to face defeat. Against this background it is scarcely surprising that although it is now becoming academically respectable for former US officials – most notably ex-National Security Advisers Zbigniew Brzezinski and Brent Scowcroft – to question the US-Iranian stand-off, there has so far been no high-level official support in Washington for a major review of US policy towards Iran.

Pelletreau, who held his position as the State Department's top Middle East official until last March, warned in Nicosia that if the US adjudged Iran to have been responsible for the truck bomb attack which killed some 19 US servicemen at Dhahran in Saudi Arabia in June 1996, then Washington 'will respond strongly including, possibly, demanding the imposition of United Nations sanctions'.

Other speakers warned of the likelihood, and dangers, of US military retaliation against Iran if Washington reaches such a conclusion.

But it was sanctions that dominated the Nicosia meeting, with most speakers seeking to find ways around the various international or unilateral US sanctions against the three pariah states. In practice, no-one is yet certain as to just how rigorously the Clinton Adminstration will seek to interpret or enforce last year's d'Amato Act imposing sanctions on countries whose citizens or companies have knowingly made new investments of $40 million or more on or after 5 August 1996. It would be particularly important, said David Sellers, of the Paris-based international lawyers Frere Cholmeley, 'to see how the US gives effect in practice to the sanctions – and thus to monitor the list of sanctioned entities to be published in the Federal Register' and to monitor the list of projects tendered in the oil and gas sector to be published in the register to which sanctions might apply.

'No-one is yet certain as to just how rigorously the Clinton Adminstration will seek to interpret or enforce last year's d'Amato Act imposing sanctions on countries whose citizens or companies have knowingly made new investments of $40 million or more on or after 5 August 1996'

Dr Ghorban was certainly worried about the impact of sanctions on Iranian development although his only comment on this was that 'if you have sanctions, it will not be stopped – but it will be slowed down'.

This would be bad news for Tehran. Answering questions, Dr Ghorban acknowledged that much of the investment required for oilfield development was simply to maintain production at current levels. 'To maintain production we have to develop new fields,' he said, before adding, in response to further questions, 'the development of new fields is definitely on, if we are going to increase capacity – I don't see anything wrong with that.'

There was a distinct feeling that Dr Ghorban was on the defensive, wanting to acknowledge that Iran needed to offer something more than buy-back, but unsure what could be offered in the light of the cleric's constitutional bar on equity and PSAs. In contrast, Dr Faleh al-Khayat, Director-General of Planning at the Iraqi Oil Ministry, was highly forthcoming about ways in which foreign investors might secure equity in a range of upstream and downstream oil projects.

Gas projects in the pipeline

Where the Iranians did seem on firmer ground was with regard to gas. The existence of US sanctions has so far not stopped Turkey from awarding the first of a number of contracts currently out for tender in connection with its section of a projected pipeline to bring Iranian gas to Ankara. Dr Ghorban said that between the start of 1997 and the end of 1999, Iran would be spending around $1,620 million on developing its section of the Ankara pipeline, with capacity initially set for 1999 at 3 billion

cubic metres per year (bncum/y), but rising rapidly to 10 bncum/y. By the same date, he noted, two smaller export pipelines being built by Iran would also be operational. One of these, to carry 1 bncum/y, will go to Armenia and cost some $135 million and the other, a 0.5 bncum/y capacity, would be built a few kilometres north of the current Caspian gasline near Neka to the Azerbaijan border at a cost of just $20 million.

What is different about the latest Iranian gasline proposals to Turkey is that after the initial connections are made next year between the current northeastern Iranian gas distribution centre at Tabriz and the eastern Turkish city of Erzerum, Iran will move directly to increase the volume of gas it can pipe up to Tabriz by constructing a new, direct 56-inch pipeline link from Qazvin, southwest of Tehran, to Tabriz. This is seen as the first stage not only in a pipeline serving Ankara and southern and western Turkey, but which can also be extended to southern Europe.

With regard to the Iran-Turkey pipeline, Sellers told the Nicosia conference that the d'Amato Act was specifically worded to cover responsibility for development of petroleum resources located in Iran. In other words, while Turkey might insist that all its investment was for infrastructure within Turkey itself, the US Administration and backers of the d'Amato Act might take a very different view. However, Sellers noted, 'if the Administration elects to interpret the Act in this way, it will be bound to run into even greater opposition from foreign governments and businesses than presently exists.'

In this context, it is worth noting that other Iranian sources contacted by *Petroleum Review* in recent weeks have said that the Iranian-funded project to build a limited 8 bncum/y pipeline down the eastern coast of the Caspian from the Turkmenistan gas fields around Korpedzhe to Kurt-Kui in north-central Iran is nearing completion. The main section inside Turkmenistan is finished, the Iranians say, and the Iranian section will be completed around the end of July. Once completed, this line will be used to supply both Iran and Turkey with gas.

Dr Ghorban and Dr Ardekhani also noted the costs entailed in what Iran hopes will turn out to be a major project to supply Pakistan and India with gas. Dr Ghorban said that by the year 2000, Iran could be supplying Pakistan with as much as 8 bncum/y of gas from a system that would be designed eventually to deliver 16 bncum/y to Iran's southwestern neighbour. Such a project would cost around $2 billion. By 2004, iran could also be supplying India with up to 16 bncum/y of gas via an expanded line through Pakistan, a project currently costed at $3.5 billion.

'US sanctions are going to create a major problem for investing companies and host countries for some time to come'

Ardekhani certainly believed that it made more sense for Iran to look eastwards once the Turkish line was up and running, rather than seeking to focus on additional European markets. He recalled, he said, making a proposal for a gasline to India and Pakistan in the 1980s, calling the project 'a pipeline for peace and prosperity'.

Peace of course is a word which everyone likes to use. Indeed, Tehran has called its over-arching gas project by initials PEACE – which stands for Pipeline Extending from Asian Countries to Europe – and which seeks to use Iran as a hub for intercontinental gas traffic. In effect, Iran would construct an internal gas ring, from which a set of major pipelines would extend. Two would be for delivering gas from the system: one would head northwestwards to Europe via Turkey and the other southeastwards to the subcontinent via a land corridor to Pakistan. On the incoming side there would be one line entering from the southwest, bringing gas from Qatar and the Arabian side of the Gulf, whilst two or three other lines would bring in gas from Turkmenistan: one from the north and the Caspian coast and the other, possibly, from the giant Dauletabad gas field to the northeast.

The Iranians, as ever, were very good at setting out the list of projects they hoped to implement, whilst remaining sketchy on the details of just how, in the wake of their failure to conclude most of their 11 proposed buy-back deals, they intended to raise the money for actual project implementation – or how they might overcome the political obstacles that also stand in the way of many of their major gas pipeline projects.

It was the international lawyer, David Sellers, who best summed up relations between the USA and Iran when he told the apparently true story of an exchange heard over marine short-wave radio. The exchange went like this:

'We see you on our radar. You are in our path. Please alter course.'

'No, you alter course.'

'You are in our path. Alter course immediately.'

'No. You alter course.'

'We are a US aircraft carrier on active service. Alter your course immediately!'

'We are a lighthouse. Suggest you alter course.'

In this light, Sellers concluded, US sanctions are going to create a major problem for investing companies and host countries for some time to come – 'at least until one or the other party decides to alter course'. However, he noted: 'At present it looks as if there will not be just one but a series of head-on collisions over this issue.'

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Information for Energy Group

Members of this group visited the Institut Français du Pétrole on 26 June, and will hold a social event in the summer to discuss 'Reengineering the energy information service' at a conference on 6 November.

To join this lively forum of information professionals specialising in the energy industries, contact Catherine Pope on 0171-467 7112; e-mail cp@petroleum.co.uk

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Information: Somebody must have written something about what you want – but how to find it among the millions of articles in thousands of journals published worldwide? Don't despair. If it has been published, there is a good chance that it can be found on some database.

Databases: You have heard of the Internet – the World Wide Web on which everything can be found and you cannot find it. An on-line database makes it much easier, and quicker, by storing information generally by subject area. Most of the databases are found on 'hosts' such as Orbit or Dialog. The hosts publish catalogues listing all the databases available and the information they store. The way information is stored is fairly uniform – that makes it easier to find – usually title, author, journal, date, together with a short abstract and keywords. Some give the full text.

For the upstream petroleum industry and related subjects the obvious place to start is Petroleum Abstracts from the University of Tulsa. This indexes articles from thousands of petroleum related journals worldwide in all languages, gives each article keywords and an abstract, in English.

So, when you ask, we search the database using the keywords you have given us. The more keywords we are given, the more we can narrow down the search and hence the more precise hits we will get.

For example, entering the keywords 'horizontal drilling' might produce several thousand articles. Adding 'North Sea' might narrow it down to a few dozen. And if that is too many, then we can cut it down by adding another keyword or putting in a cut-off date.

Eventually, in a matter of minutes if you are in a real hurry, we will produce a bibliographical list with abstracts of the articles you are hoping for; you will select the most relevant and we will obtain the full text.

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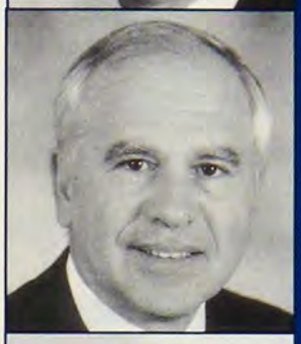

British Petroleum Company plc has announced changes to the Board. *Mr Russell Seal* will retire with effect from 1 September 1997 after 33 years with the Group. *Dr Rolf Stomberg* will also retire with effect from 1 January 1998 after 27 years with the Group.

Dr Chris Gibson-Smith **(above) and *Mr Richard Olver* (centre) have been appointed Managing Directors of the Company with effect from 1 September 1997 and 1 January 1998 respectively.**

Consequently, *Mr Rodney Chase* (below) will become Deputy Group Chief Executive and will relinquish responsibility for Exploration and Production and assume responsibility for Refining and Marketing. Mr Olver will assume responsibility for Exploration and Production from Mr Chase. Dr Gibson-Smith, a Fellow of the Institute of Petroleum, will assume responsibility for Mr Seal's portfolio of Group Policies and Regions with effect from his appointment to the Board.

BJ Services Company has made appointments to two senior management roles. **Mr Stan Lawson** has been appointed North Sea Operations Manager and **Mr Bert Platje** has been appointed as Area Operations Manager for Continental Europe. Both will report to Mr Rick Needoba, Regional Manager of the Europe and Africa region.

Fortune Oil plc has appointed **Mr Napoleon Y S Chu** to become General Manager for Trading and Industrial Marketing and **Mr Frank Li** as Deputy General Manager and Director of Retail Operations. Mr Chu will be responsible for managing Fortune Oil's existing product trading activities. Mr Li will be responsible for the day-to-day management of Fortune Oil's chain of petrol stations.

Mr Tom Snead has been appointed Vice-President of Fisher-Rosemount Systems & Solutions. Mr Snead's appointment follows the death of **Mr Ken Maddock** in January.

Kvaerner Oil & Gas has appointed **Mr Alan Wilson** to the position of Business Development Manager. Mr Wilson's previous post was as divisional director with Aker Oil & Gas Technology.

Mr Chris Hunt has been appointed Company Secretary to the UK Petroleum Industry Association. His new position started on 1 May when he replaced **Mr Andrew Mennear** who has returned to BP. Mr Hunt is on secondment to UKPIA for three years by Elf Oil.

Mobil Europe and Central Asia Ltd has appointed *Mr John Banfield*, Director, Downstream Business.

The Society of Petroleum Evaluation Engineers (SPEE) has announced the names of its officers for 1997. They are as follows: **Mr Forrest A Garb** – President; **Mr Gene B Wiggins III** – Vice-President; **Mr Andrew A Merryman** – Secretary/Treasurer. **Mr D Russell Long**, as immediate Past President, is the fourth member of the Executive Committee. The SPEE Board members are as follows: **Mr William D Anderson, Mr Richard J Miller** and **Mr John Thibeaux.** They will join existing board members: **Mr Ricardo E Garza, Mr J D Hughes, Mr J Douglas Lang; Mr Kerry A Pollard** and **Mr J Glenn Robinson.**

Mr Michael E Wiley has been elected Executive Vice President of Arco. His prior position was Chairman, Chief Executive Officer and President of Houston-based Vastar Resources, Inc, and before that Arco Senior Vice President and President of the company's Lower 48 oil and gas company.

After 25 years at Esso Petroleum Co Ltd, *Mr Bob Thompson* has joined rutland scott group as a Senior Partner to be responsible for health and safety and project management, mainly in the forecourt sector.

Two new directors have joined the Board of Total Oil Marine plc. They are *Mr Henry King* (left), Solicitor, and *Mr Rolf Erik Rolfsen* (centre), Managing Director of Total Norge. *Mr Angus Gow* (right), who is Legal Manager of Total Oil Marine plc has been appointed as Company Secretary replacing *Mr Michael Mills*, who is now retiring.

Technology News

Flash new tester launched on market

A new type of automatic flashpoint tester for the standardized testing of fuels, waxes, greases, oils and bitumen has been unveiled by Petrotest Instruments of Dahlewitz, near Berlin.

The Pensky-Martens PMA-4 tester comes with three cup/lid assemblies so that the three samples normally required per test can be prepared in one step. Each cup has its own lid with stirrer and temperature sensor. The excess cups are cooled until the first test is done. Then the old cup is simply exchanged by a new one which is connected to the machine by twisting the multi-function pivot head which automatically connects the stirrer, igniter, flashpoint detector and temperature probe.

Test parameters can be called up as a whole from an integrated database so that, for most tests, very few manual inputs are required.

The unit has a gas igniter as well as a special long-life electric igniter. The latter can be used to relight the gas igniter's flame if it goes out unintentionally. A display indicator shows when the electric igniter is reaching the end of its useful working life.

Measuring just 23cm in width, the flashpoint tester requires very little space under the fume hood. Furthermore, as an operator is not required to attend the test, no-one is at risk of being exposed to noxious fumes.

Automatic flashpoint tester

Enhanced flow computer library

Solartron has added a complete suite of viscosity calculations to the applications library in its 795x family of flow computers designed for advanced process control in the oil and petrochemical industries. The enhanced library supports all of the company's viscosity transducers, including vibrating element and rotating bob types.

A liquid's viscosity changes with temperature. However, users need to know viscosity at a specific base temperature for routine quality control. Traditionally, the oil industry used expensive, laboratory-style viscometry equipment installed in an analyser house but the nature of the equipment means it must be housed in a safe area, requiring the liquid to be transported some distance for analysis. The delay between line sampling and viscosity measurement often exceeds 20 minutes, making precise control of processes almost impossible. Solartron's flow computers eliminate such measurement delays and facilitate precise process control. They also have the ability to combine viscosity measurements with densities, pressures and temperatures in order to calculate percentage weights and volumes.

Vibrating element viscosity transducers are supported by new applications library

Solid catalyst alkylation technology

UOP of Des Plaines, Illinois is currently discussing the commercialisation of its new Alkylene™ solid catalyst alkylation process with refiners. The new process is designed to enable refiners to meet the demands for reformulated gasolines with a more environmentally friendly light olefin upgrading technology.

'Current processes that upgrade light olefins to alkylate use either hydrofluoric (HF) acid or sulfuric acid, both of which require significant handling safeguards, are potentially corrosive and generate difficult-to-dispose-of by-products,' explains the company. In contrast, the solid catalyst used in the UOP Alkylene process resembles traditional hydrocarbon conversion catalysts but eliminates such by-products.

Capital investment for the new process is reported to be lower than that required for sulfuric acid alkylation and comparable with that for HF alkylation.

Monitor valve beats fuelling errors

A new monitor and control valve designed to eliminate the risk of the wrong fuel grade being delivered into storage tanks has been developed by Alan Cobham in Dorset.

The monitor valve requires no external power for operation and uses a density measurement principle to determine whether the appropriate fuel grade is being passed into it. It is sensitive to a change in fuel density of just 1 percent.

The unit employs floats which have a density corresponding to the upper and lower limits of the specific fuel for which the unit has been designed. The floats are linked to the valve chamber in a by-pass arrangement. When fuel of the correct density passes the monitor, the floats remain in their rest positions, allowing the liquid to pass through the valve. Fuel of the wrong grade causes the floats to move, shutting the by-pass and resulting in valve closure.

The monitor must be fully drained to re-set it. This ensures that all contamination is eliminated from the system.

Monitor and control valve

Solving corrosion problems in refining

NACE International has released a new windows version of REFIN•COR, a database of some 40 years worth of shared solutions to refinery corrosion problems, including minutes of meetings of the NACE Committee T-8 on Refining Industry Corrosion from 1957 to 1996.

Version 3.0 of the software package incorporates a number of new features such as enhanced search capabilities and options and the ability to view the 'hit list' and search results simultaneously. 'Shadow files' can also be created while a results map diagrams the search as the user types.

Searches may be conducted by specific words or phrases, specific meeting dates (an index also allows the user to match locations with dates), or names and participants. The database also includes an acronym index, alloy index, technical papers index and trademark index.

Search results can be saved and printed out as required.

Technology News

Three-in-one solution for service station forecourt clean-up

A three-product system for biologically cleaning service station forecourts has been developed by Biotechnics. All three products are environmentally and ecologically friendly and simple to use, states the manufacturer.

The first product – OT8 – contains a blend of biodegradable cleaning agents, enzymes and a naturally occurring oil specific bacteria and is used to remove stubborn oil stains from block paved forecourt areas. When rinsed from the surface after application, the biological active wash water continues to degrade soilage within drains and on site interceptor systems. The product is not recommended for use on Tarmac.

The second product – SOBO QB – is a pH neutral water based degreaser designed for daily maintenance, cleaning of petrol pumps and forecourt oil stains. It is non-emulsifiable so that when discharged to a site's interceptor system the oil and water separate within minutes, thus enhancing the performance of the interceptor.

Bio Tubes (patent pending) complete the clean-up package. They are biologically active oil absorbing tubes designed to float on the surface of the second and third chamber of the interceptor. Best applied after routine cleaning of the interceptor, the naturally occurring oil specific bacteria within the tube digest up to 2kg of free surface oil every week. Some six to eight weeks are required for the bio-mass to form within the tubes.

Clean-up steps one...

two...

and three

Offshore hat-trick

Montrose-based Merpro Group has scored a hat-trick of firsts with the delivery of an effluent water treatment (EWT) plant for heavy duty crude to Texaco's *Petrolia* semi-submersible rig on the Mariner field in the North Sea.

As well as being the biggest portable crude separation unit ever built, the plant is the first of its kind with the ability to handle heavy crude oils and the first to be installed on a semi-submersible rig.

At some 500 tonnes wet and designed as one integrated package, the plant is several times larger than conventional systems which link three or four packages together totalling no more than about 40 tonnes. According to Managing Director Bert Smith, the fact that the new unit can handle heavy crudes, which previously had to be ignored, will enable many new and existing fields to be tested and assessed in situ much more thoroughly than before.

New low-flow sensor unveiled

Fisher-Rosemount has unveiled a new low-flow Micro Motion Coriolis sensor for metering mass flow and density of gases and liquids over flow rates as low as 100 g/hr in temperatures ranging from -200°C to +204°C. The relatively large diameter of the CMF010 sensor tube ensures very low pressure drop across the full operating range while the single tube design incorporates features making the sensor immune to line vibrations. It has an accuracy of ±0.1 percent for liquids and ±0.5 percent for gases.

Light enough to be mounted in-line supported entirely by the process pipework, the sensor can also be fixed in place with mounting bolts.

Cable accessories for petrochem plants

3M Electrical Products can now supply a complete range of cable management accessories meeting the requirements of the petrochemical sector. Some 80 customised kits cater for instrumentation and control cables and power cables up to 11kV.

Highly stable resins ensure that the accessories are resistant to hydrocarbons while cold shrink jointing, connecting and terminating eliminates the need for a heat source in hazardous areas and reduces application time.

Cable accessories specific to the petrochemical industry

Automatic density profiling

Whessoe Varec has just completed a one-year trial in which an ITG intelligent tank gauge installed on a high-sulfur gas oil storage tank eliminated unnecessary injections of jet fuel used to homogenise tank contents by 'rolling' upwards, thereby saving the refiner some £15,000.

Before the ITG was installed, the tank was rolled routinely at the end of each filling operation – on average around once a month. Now, as the tank is filled, the gauge continually performs automatic density profiling, allowing refinery staff to monitor the settling process and apply rolling only if necessary.

The device measures all parameters required for calculation of inventory, providing on-line level density, temperature and water interface data and eliminating the need for multiple instruments or manual dipping.

On the right track

Aegis is a new tracking system developed by Communications & Measurement Technologies Ltd that enables land seismic crews working in remote areas to be tracked by their base station.

An on-line monitor gives observers and crew managers instant information on the position of vehicles and other seismic hardware as well as personnel.

Each mobile has its own ID and at pre-determined times transmits a data packet including position and status, such as whether the report is general position or low/high priority alarm.

User-defined alarms are automatically triggered in the event of a mobile unit running into difficulties, such as a vehicle hijack, a mobile straying beyond a guard zone area or lack or movement after a defined time.

Technology News

Improved virtual reality design system

The latest version of Cadcentre's Review Reality virtual reality, walk-through plant visualisation software offers enhanced performance and new features to improve the level of realism and availability of engineering information in plant review sessions.

Shadows and anti-aliasing, the process of making any jagged edges in a model appear smoother, are now generated directly by the software and enable more details to be realistically displayed. Furthermore, the system will now run on all OpenGL hardware and can support the entire range of Silicon Graphics desktop workstations, including the latest O_2 and Octane systems, reducing any need for the client to further invest in new graphics-intensive hardware. Running speed has also been improved.

Other improvements include the ability to display engineering and safety information during a project review. Engineering tag numbers, stencilled labels, signboards and other 'stick on' images such as control panel facias can be placed on surfaces in the model to make items easier to identify and provide non-engineering staff a much better understanding of the final appearance of the plant.

The company also reports that is has licensed Review Reality to the University of Teesside for use in its recently opened virtual reality centre.

The University of Teeside virtual reality Centre

Liquid/gas phase detection patent

Imo Pump has received a patent award for a system that will detect interstage phase change from liquid to gas within a multistage pumping machine.

The method was developed while trying to provide automatic pump shutdown or boost pump startup in the event that a rise in gas content occurred while pumping crude oil in the field before it was completely degassed.

The detector will also provide advanced warning of incipient pump cavitation well before the normal symptoms such as an increase in noise or vibration occur. The system is said to be applicable to nearly any type of pump that produces its pressure rise in stages such as screw pumps and gear pumps.

Liquid/gas phase detector

'All voltage' ultrasonic level switch

A compact ultrasonic level switch which can operate on any voltage between 22 to 263 AC or DC has augmented Magnetrol International's range of level and flow controls.

The Echotel 919 switch can detect high or low-level alarm across a wide variety of liquids, including viscous, light liquids as well as aerated or liquids containing suspended solids.

Ultra sonic level switch

Nitrogen generation offshore

Packaged nitrogen generating systems which ensure a readily available supply of inert gas for applications in the offshore oil and gas sector are now available from SAS Ltd.

Based on membrane separation technology, the SAS systems provide an efficient on-site facility for gas production, eliminating the need for a costly liquification plant or cylinder gas deliveries. Up to 2,500m³ of nitrogen can be delivered per hour, at purities of up to 99.5 percent, for the safe purging of storage tanks and pipelines and for gas charging of safety shutdown/control equipment.

The gas generating packages comprises a rotary screw compressor along with cooling filtration, nitrogen generator and product receivers, all mounted on a support frame. Gas storage facilities can be incorporated in the packages to operate at pressures up to 350 bar.

Nitrogen generation package

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3M Electrical Products	01344 858895
Whessoe Varec	01325 301100
Communications & Measurement Technologies	01908 218200
Cadcentre	01223 556655
Imo Pump	+1 704 289 6511
Magnetrol International	01444 871313
SAS	01942 724248

Forthcoming Events

July

2nd-4th
Vienna: 'The Integration of Central European, Baltic and Balkan Countries in the European Energy Economy'.
Details: EFCEE Secretariat, 35-1105 Electricity Street, 2800 Mechelen, Belgium
Tel/Fax: +32 15 20 48 57

3rd
London: 'Focus on Fouling: Profit from Best Practice'.
Details: Pascale Hicklin, HFTS Head Office, 392.7 Harwell, Didcot, Oxon OX11 0RA.
Tel: 01235 432908
Fax: 01235 831981

7th-8th
Sheffield: 'First International Symposium on Incineration and Flue Gas Treatment Technologies'.
Details: Conference Section, IChemE, 165-189 Railway Terace, Rugby CV21 3HQ.
Tel: 01788 578214
Fax: 01788 560833
E-mail: alomax@icheme.org.uk

7th-8th
London: 'Visions of Tomorrow – Improving the Quality of Life Through Technology'.
Details: Anne Lomax, Conference and Events Department, Institution of Mechnical Engineers, 1 Birdcage Walk, London SW1H 9JJ.
Tel: 0171 973 1258/1261
Fax: 0171 222 9881

7th-10th
London: '8th Annual Land Pipeline Engineering Training Course'.
Details: Bookings Department, IBC Technical Services, 57-61 Mortimer Street, London W1N 8JX.
Tel: 0171 453 2712
Fax: 0171 631 3214

14th-17th
Kuala Lumpur: 'The 7th Malaysian Oil, Gas and Petrochemical Engineering Exhibition'.
Details: Ms Heather Edkins, Overseas Exhibition Services Ltd, 11 Manchester Square, London W1M 5AB.
Tel: 0171 486 1951
Fax: 0171 486 8773

14th-18th
London: 'Reservoir Simulation – Essential Technology for Reservoir Management'.
Details: Sally Verkaik, Imperial College, Continuing Education Centre, Room 515 Sherfield Building, Exhibition Road, South Kensington, London SW7 2AZ.
Tel: 0171 594 6882/1
Fax: 0171 594 6883
E-mail: cpd@ic.ac.uk

World Tribology Congress
8-12 September 1997

At Westminster Central Hall and IMechE Headquarters, London

Organised by the Tribology Group of the Institution of Mechnical Engineers, the first World Tribology Congress has the full support of more than 30 associated bodies worldwide. The five-day Congress will include more than 350 oral presentations by speakers from over 50 countries. In addition, there will be an exhibition and around 600 poster contributions.

Sponsored by NSK-RHP, AEA Technology, GKN and Climax Molybdenum.

For further information, please contact:

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London
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Email: wtc@imeche.org.uk

UK Deliveries into Consumption (tonnes)

Products	†Apr 1996	*Apr 1997	†Jan-Apr 1996	*Jan-Apr 1997	% Change
Naphtha/LDF	241,870	173,132	1,054,303	599,704	-43
ATF – Kerosene	611,975	649,138	2,348,857	2,463,740	5
Petrol	1,872,894	1,883,015	7,114,264	7,195,187	1
of which unleaded	1,260,358	1,333,332	4,788,709	5,047,957	5
of which Super unleaded	68,202	44,136	265,862	176,730	-34
Premium unleaded	1,192,156	1,289,196	4,522,847	4,871,227	8
Burning Oil	287,345	273,576	1,433,626	1,385,925	-3
Derv Fuel	1,162,704	1,277,731	4,590,377	4,852,766	6
Gas/Diesel Oil	623,230	631,237	2,877,927	2,683,557	-7
Fuel Oil	564,331	277,805	2,435,995	1,773,702	-27
Lubricating Oil	73,838	75,185	286,917	288,004	0
Other Products	739,584	703,298	2,934,633	2,820,387	-4
Total above	6,177,771	5,944,117	25,076,899	24,062,972	-4
Refinery Consumption	536,363	534,824	2,170,834	2,185,349	1
Total all products	6,714,134	6,478,941	27,247,733	26,248,321	-4

† Revised with adjustments *preliminary

Institute News

NEW MEMBERS

Mr J Abbott, Fife
Mr J Abuabu-Dadzie, Ghana National Petroleum Corporation
Mr J Adams, BJ Process & Pipeline Services Limited
Mr P B Allan, Penningtons
Mr R S Allen, Plymouth
Mr D M Allen, Leigh
Mr A Ambrosetti, Kroll Associates
Ms W Arthur, Chessington
Mr J Bracey-Gibbon, London
Mr S Brod, Netherlands
Mr P H Brooker, James R Knowles
Mr C Buckley, Merrill Lynch
Mr D R Burton, Kinross
Miss I L Byng, London
Mr F P Byrne, J D Edwards (UK) Limited
Mr M Carella, Britannia Group
Mr K F Chan, Sworn Measurers & Weighers (HK) Limited
Mr J R Chapman, Chippenham
Mr M J Chick, Crawford THG Technical Services
Mr N J Clayton, Dresdner Kleinwort Benson Limited
Mr I A Cobban, Sandy
Mr P Connery, MID Consultancy Limited
Mr W A Cross, Carless Refining & Marketing Limited
Captain P Dalby, Southampton
Mr W A R Davie, Schlumberger
Miss S M Dopp, SGS-CSTC Standards Tec Services
Mr R Enever, Samata Enterprises (UK) Limited
Dr G Feiler, IPR
Mr S Fisher, PDI Limited
Mr J E A Fitzgerald, Pilot Drilling Control
Mr A J Fox, Edward Rushton Son & Kenyon
Mr A P Fox-Leonard, Petroil
Mr R K Fraser, ERM Energy
Mr L R Gonzalez, Headington
Mr T B Govan, North Lanarkshire Council
Mr D Gray, MID Consultancy Limited
Mr D M Gray, HSBC Investment Bank plc
Mr I D Greenwood, Cheshire
Mr D S Gurney, Price Waterhouse
Mr M R Hall, Cleanaway Limited
Mr D C Holmes, Dorest
Mr R G Johnson, London
Mr H Land, Wijsmuller Salvage BV
Rear Admiral R C Lane-Nott, The Centre for Marine & Petroleum Technology
Mr B J Lawson, Sedco Forex Technical Services Inc
Mr G A J Mampaeij, Mampaey Offshore Industries BV
Mr B McAleer, London
Mr R McGarry, Dublin
Mr M McTague, Ecotech
Mr P Micklethwaite, London
Mr J Mlinaric, Country Global Trade
Captain A Moore, Andrew Moore & Associates Limited
Mr J Mulkens, Institut Royal Belge du Petrole
Mr R D P Mullion, Tampimex Oil Trading Limited
Mr J Mylchreest, Schroders
Mr A Netchaev, Russia
Mr N O'Shea, Irish Refining plc
Mr E Onoruvwe, London
Miss L S Parsons, London
Mr G Philip, Cory Towage Limited
Mr V Piemonti, Nuovo Pignone
Mr D R Poole, Hullbridge
Miss T J Puckering, Esso Petroleum Company Limited
Dr E Raveendran, Abu Dhabi National Oil Company
Mr G R Reeves, Liverpool
Mr G Sagemo, Dresdner Kleinwort Benson Limited
Miss B Schofield, Cameron McKenna
Mr W E Sharp, SJH Consultants
Mr P Shone, Texaco Limited
Mr A M Slim, Arab Bank plc
Mr G Smith, London
Miss L Smith, LEK
Mr S W Sprague, Cory Towage Limited
Captain M H Stott, Lancs
Captain W J Stuart, South Australian Dept of Transport
Dr M Sweeney, London
Mr P A Tighe, Ove Arup & Partners
Mr L Tsangarides, Middx
Mr A D Tukur, Daddo Maritime Services Limited
Mr S Townsend, Wright Express Corporation
Mr I C Tulloch, Lerwick
Mr B J Turnock, C H Jones Limited
Mr J R Van Der Honing, Lumitronic Industries BV
Mr Z Vigh, Hungary
Mr I M Walker, Currie & Brown
Mr R J Walsh, Isla Giatt Limited
Mr T A Wharton, Pontypridd
Mrs C Willcox, Elf Atochem UK Limited
Mr A N Wilson, Northern Ireland
Mr J L J Wilson, ERT Limited
Mr M I Wingrove, Herne Bay
Mr S Wood, Stanford-le-Hope
Mr D R Wright, Witham
Mr R A Wyness, ERT Limited
Mr J A Young, J Y Services Limited
Dr R Y Zubi, London

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Miss K Chevallier Boutell, London
Mr K C Ertug, London
Mr A Kabir, CPMLP-University of Dundee
Mr C Koumiotis, Liverpool
Mr S G Masters, Imperial College
Mr J Patel, London
Mr S Turki, Robert Gordon University

NEW COLLECTIVE

Linland (UK) Ltd,
41 Coopersale Close,
Woodford Green,
Essex IG8 7BQ

Representative: Mr L N Nwanemuogh
Linland (UK) Limited is a refinery and petrochemical company. Linland (UK) Ltd is a trading leader in oils, additives, fluids, solvents, aromatics, hydrocarbons, dyes and specialised chemicals.

DEATHS

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

	Born
P D B Barks	1922
N Beach	1923
W H Bradley	1923
W Jamieson	1913
D A Mills	1932
E Redhead	1948

AROUND THE BRANCHES

East Anglia
19 July: River trip on Norfolk Broads

Institute News

NEW FELLOWS

Mr C J S Bartlett
Mr Bartlett is currently the Technology Chief for the Defence Evaluation & Research Agency with responsibilities for the development of technical and sales strategy and capability in the fuels area, on behalf of the Ministry of Defence and third-party customers. An active member of the Institute, Mr Bartlett is Chairman of the Standardization Committee and the BSI Liquid Fuels Committee.

Mr Colin Harvey
Mr Harvey graduated with a first class BSc Honours degree in Chemical Engineering from University College, London. He then joined the Shell Refining Company Limited at its Shell Haven refinery before moving to the Hague to work in manufacturing development. He subsequently held various appointments at the Stanlow refinery, Shell Haven, Singapore and and Shell International in London. Mr Harvey was appointed General Manager, Trading, Supply and Distribution for the downstream businesses of Shell UK Ltd in 1989 before moving to Shell International as East and Australia Area Co-ordinator in 1994. Mr Harvey was appointed a Managing Director on the Board of Shell UK Ltd in September 1995, with responsibility for all downstream activities.

Mr Alan Hope
Mr Hope is currently the Managing Director of Inspectorate plc's operations in Africa, Middle East and Pacific Rim. These areas form an integral part of Inspectorate's worldwide oil and petrochemical inspection activities. He is an active member of the Essex Branch.

Captain Tony Goh
Captain Goh is a marine consultant and surveyor for TG Marine Services Pte Ltd based in Singapore. He is currently reponsible for all technical work and is the principal surveyor and consultant within the company. Prior to coming ashore, he spent some 14 years at sea on worldwide training, in all trades of seamanship, on many types of vessels including serving as master in command on general cargo vessels, oil and chemical tankers.

Mr A G Severn
Mr Severn is currently a Director of the Oil and Chemical Department for CWA Consultants Limited. His responsibilities include the management of resources in the resolution of complex problems arising from the shipment of oil and gas. He has also acted as an expert witness. An active member of the Institute, Mr Severn works on the PML-3 panel and has contributed to the Petroleum Measurements Manual.

Correction
A typographical error ocurred in David Batey's article, 'Gang wars on the forecourt' *in the June issue. The final paragraph should read as follows:–* Back in the 1970s supermarkets were plotting their move from raffish high street stalls to out-of-town temples for exotic produce and upwardly accented service. Separately, oil companies determined on "total site exploitation" as they discovered, first the money-printing possibilities of car wash, and then the easy cleanliness of sweets and cigarettes compared to oil and tyre changes. Both species have enjoyed goods times in their chosen step-outs; both have adjusted to threats to their territories. As they now choose gangs, and vie for leadership of those gangs, they recognise that the prize is custom volume that derives from "massive" marketing. For us plain possums, the customers, the prize is better deals all round — well into the future.

Certificates of Appreciation have recently been awarded to the following:

Mr John Daborn
John has been an active member of the IP, representing NPL for many years, with a particular understanding in rheology and temperature measurement. He has continued as Chairman of ST-C-3 since his departure from NPL. Recently, he has successfully completed the correlation programme on kinematic viscosities of gas oils at 40°C, to IP 71 test procedures.

Mr Mark Roberts
Mark joined the IP Precision Evaluation Panel, ST-H-1 in 1964 and became Chairman in 1966, a position he held until 1976. In 1986 he joined the Oxidation Tests panel, ST-C-2, becoming Chairman in 1988. In addition he acted as Secretary to ST-C, and subsequently ST-C/D, until 1995. During this time he has contributed a great deal to Test Method Standardization. Unfortunately, in the summer of 1996 Mark was taken ill and will be unable to continue as Chairman of ST-C-2.

Obituary

Robin Keir Watson

The many friends of Robert Keir Watson in the oil industry and at the Institute of Petroleum will be saddened to learn that he passed away after a short illness on 4 May, at the age of 82 years.

Founder and Chairman of the West of Scotland Branch over 20 years ago, Robin was a graduate of Glasgow University from where he joined the Plessey Group. Following a serious car crash from which it took some time to recover, he left Plessey, set up as a consultant and became Chairman, Glasgow Junior Chamber of Commerce. He subsequently became Chairman, British Polar Engines and thereafter Chairman, William McGeogh & Co Ltd, the Glasgow subsidiary of Electrical Engineers.

In 1983 Robin received an Award of Council for his work in setting up and guiding the West of Scotland Branch of the Institute of Petroleum. In his capacity as a consultant he continuously served the industry, the University, the oil companies and Glasgow Chamber of Commerce, becoming a Director of Glasgow Opportunities and helping to establish new enterprises in the West of Scotland.