PETROLEUM REVIEW

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June 1996

Offshore Technology Conference
Optimism in evidence at Houston

Poland
Prospects for motor fuel retailing

Forecourt shops
Boom or bust?

California
Implications of regulatory changes

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How well is your company performing in occupational hygiene?

An auditing and performance indicator workshop

Thursday 18 July 1996

Legislation, recent events and growing management expectations have all led to the increasing need for full health, safety and environmental (HSE) audits and the development of relevant performance indicators. Over the past 25 years, several of the larger companies have undertaken formal auditing of corporate health protection/occupational hygiene programmes. Many of these 'health' audits were on a qualitative basis only, and were somewhat unstructured in their approach and often formed part of a larger 'safety' audit. As the volume of legislation on specific aspects of helth protection have increased, so has the need for full, dedicated, audits and some form of performance indicators covering both the managerial and technical aspects of occupational hygiene and health protection programmes.

The audit systems which have evolved from these demands are many and various. They can differ in thier scope and methodology; some have been developed for large petrochemical sites or manufacturing plants with plenty of HSE resources, whilst others are for smaller concerns and can be concerned with only the very basic occupational hygiene needs. In 1993, the IP Occupational Hygiene Subcommittee published its own Code of Practice for Occupational Hygiene Audits. It is a quantitative audit system which is aimed mainly at the smaller companies which may not have their own in-house occupational hygiene trained expertise.

The workshop will present and discuss not only the types and development of audit procedures currently in use but future requirements and the development and establishment of relevant health performance indicators.

A copy of the programme and registration form will be available shortly from Conference Department, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR UK.
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CONTENTS

COVER PHOTO
Esso's Price Watch shakes up prices.

News in Brief

18 April

Chevron Overseas Petroleum (Qatar) and its partner MOL, the Hungarian Oil and Gas Company, have signed an exploration and production-sharing agreement with Qatar General Petroleum Corporation for a tract offshore Qatar believed to contain a number of promising crude oil prospects. The 3,000 square mile area, designated block 1NW, lies adjacent to the large North Dome gas field.

Exel Logistics–Tankfreight has secured a contract for the distribution of white oil petroleum products for Kuwait Petroleum (GB). The five-year contract, worth over £3m/yr, involves the collection of product from 10 UK supply points and delivery to the oil company's 500 forecourts and industrial and commercial customers throughout the country.

19 April

Deep Sea of Norway has awarded Kvaerner Rosenberg a NKr300m contract for the construction of the hull for a Bingo 8000 drilling rig.

20 April

Neste Oy and China Oil and Gas Pipeline Bureau have signed a letter of intent to build a large-scale LPG terminal on Huangdao Island in China's Qingdao Technical and Economic Zone, reports *AP-Dow Jones* in Beijing.

22 April

Chevron reports that the Destin Dome block 57 #1 well in the Gulf of Mexico has produced gas at a rate of 41 mncuft/d with no liquid hydrocarbons.

Raytheon Engineers & Constructors has secured an $82m contract from Avoca Natural Gas Storage to build a natural gas storage facility in Avoca, New York. The grass roots complex will store 4.4 bncuft of gas in salt caverns 4,000 ft below ground.

23 April

Saga Petroleum has acquired 30 percent stakes in production licenses PL086 and PL116 in the Varg area and a 25 percent interest and operatorship of PL069 south-east of Varg from Conoco Norway. Meanwhile, Conoco is to take over Saga's 30 percent ownership stake in PL174 which lies north of Troll.

The UK Health & Safety Executive has published a leaflet which outlines the main changes to be introduced offshore by the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR '95) which came into force this month.

24 April

The Harding field in the Central North Sea has flowed first oil at an initial rate of 5,000 b/d. Production is expected to reach 60,000 b/d by the end of the year. The field has estimated recoverable reserves of 185 mn barrels of oil and 200 bncuft of gas which will be reinjected until required for enhanced oil recovery at a later date.

Brown & Root AOC has been awarded the topsides process and utility systems hook up and commissioning contract for BP's new floating, production, storage and offloading vessel for the Schiehallion development.

The UK Health and Safety Commission has issued a consultative letter containing proposals for revised guidance on selecting standby vessels to attend offshore installations. The new guidance will form part of the Approved Code of Practice supporting Regulation 17 of the Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995 (PFEER).

25 April

Total reports that the Bongkot gas field in the Gulf of Thailand has increased its daily contractual quantity of gas from 250 to 350 mncuft/d, with a maximum capacity of 420 mncuft/d, following the inauguration of a new riser platform, flare platform and three additional wellhead platforms gathering the production of 28 new wells. A third development phase, which aims to increase field capacity to 630 mncuft/d by mid-1998, is currently under review.

Amoco Power Resources (Europe) has applied to the UK Secretary of State for Trade and Industry for planning permission to build a compact gas-fired electricity power station at Great Yarmouth. Capable of producing 350 MW of electricity, the plant is proposed to start-up in 1999.

28 April

President Clinton has lifted the 23-year ban on exporting Alaskan oil.

29 April

The UK government has given International Generating (UK) permission for the construction and operation of a 750MW combined cycle gas turbine generating station at Rocksavage near Runcorn in Cheshire.

Baker Hughes Process Equipment Company has acquired Vortoil Separation Systems. The merged operation will be headquartered in Rugby.

Amec Process and Energy has secured a contract for the provision of operating services for the floating production, storage and offloading vessel on Texaco's Captain field.

Technip-Geoproduction and McDermott Marine Construction have been commissioned by Elf Exploration UK to carry out a front end engineering design contract for its Elgin/Franklin field.

Phillips Petroleum Company Norway has awarded a $69m contract for the hook up of a new platform on the Ekofisk field in the Norwegian sector of the North Sea to a Kvaerner/Amec consortium.

30 April

Norsk Hydro has sold six percent of its interest in licence 104, block 30/9 of the Oseberg field, to Conoco. In return, Conoco has sold its 10 percent interest in licence 169, part blocks 25/8 and 25/11 in the Hermod field, to Norsk Hydro. Norsk Hydro has also sold 1.5 percent of its stake in licence 128, blocks 6608/10 and 6608/11 of the Norne field, and 20 percent of its share in licence 122, block 6507/2, to Agip.

1 May

North Sea Cables, together will all other Noskab Group companies, is now trading under the name Noskab.

Baker Hughes Process Systems is to supply a 72,000 barrels of water per day water injection system on a pre-assembled unit to the MacCulloch field's floating, production, storage and offloading vessel.

Kvaerner Oil & Gas Services has taken over the management and operation of Amoco Exploration Company's Great Yarmouth Marine Base under a £7m contract.

2 May

Shizuoka Gas Company has secured a 20 year contract with Malaysia LNG for the import of a total of 451,000 tonnes of LNG in the final year, reports *Lloyds List*.

Texaco Namibia Resources has acquired a 15 percent stake in the Kudu gas field offshore southwest Namibia from Energy Africa. The latter retains a 10 percent interest in the project.

4 May

Members of the Norwegian Federation of Oil Workers have gone on strike in sympathy with colleagues striking over wage agreements at four offshore service companies. Up to 40 percent of Norway's North Sea production is expected to be affected by the action.

News in Brief

6 May

The Petroleum Authority of Thailand is to invest $200m in new petroleum ventures in the Philippines, reports the *Financial Times*. Some 75 percent of the funds will be spent on a wholly owned retail oil business in the region.

Oil flows between northern Russia and the Transcaucasus have halted following a fire at the Ukrainian Lisichansk oil refinery, according to *Reuters*.

7 May

Kvaerner Oil & Gas Brasil has been awarded a US$42.5m contract from Petrobras for the supply of 23 subsea Xmas trees for the Albacora field, Marlim field and the adjacent RJS-377 block.

Stolt Comex Seaway has been awarded a $14m contract by Elf Angola for the installation and commissioning of 46 km of pipelines as part of the development of a series of gas fields off the coast of Angola. The pipelines, which will serve the Buffalo, Palanca, Pacassa, Impala and Cobo fields, are scheduled to be installed later this year.

Bardex Corporation is to supply the adjustable riser support system to be used on Oryx Energy's Neptune SPAR platform in the Gulf of Mexico.

8 May

US Congress has suspended the 4.3 cents per gallon petrol tax increase, enacted by President Clinton in 1993, for the rest of the year following the recent surge in pump prices which have increased by 20 cents per gallon since February. The Clinton administration also recently announced that it plans to release oil from the US strategic petroleum reserves in a bid to ease market pressures.

The UK Health and Safety Executive has launched a 'Good Health is Good Business' campaign which aims to raise awareness of occupational ill health in small and medium-sized businesses. Brochures and a video providing employers with advice on how to deal with work related health issues are available free of charge from the HSE.

9 May

Norwegian offshore oil workers have called off their six-day strike as support began to falter.

Hectronic AG, the Swiss manufacturer of tanker and tank overfill protection systems, recently acquired the Parking and Petroleum Systems Division of VDO Kienzle, formerly known as Mannesmann Kienzle. The new company, based in Bonndorf in Germany, retains the Hectronic name.

10 May

Romania is offering 15 onshore and offshore oil blocks in its first national licensing round. Nine of the blocks lie along the eastern rim of the Carpathians, the others are located near the Hungary and Ukraine border to the north, in southern Romania and on the Black Sea continental shelf. Companies must submit bids before 1 November 1996.

The 7,500-tonne jacket for BP Exploration's Andrew platform has been installed. The 10,000 tonne integrated deck is currently en route to the field.

13 May

Sir David Simon, Chairman of British Petroleum, has been named KPMH Businessman of the Year for 1996.

Premier Oil has expanded its oil and gas interests in the Far East with the signing of the Pangkah Block located offshore the east coast of Java. The block lies in one of the region's most prolific hydrocarbon producing basins. Premier has a 40 percent interest in the project. Other participants are Amerada Hess (36 percent) and Seafield Resources (24 percent).

14 May

Veeder-Root has secured a five year contract with Shell International to supply tank gauges to all of the oil company's UK sites and 70 percent of its European operations.

BJ Completion Services of Aberdeen has been awarded a contract to provide well completion make-up and pressure testing services for Amerada Hess operated platforms in the North Sea.

15 May

The British Ultimate Challenge team, led by David Hempleman-Adams, has successfully walked to the Magnetic North Pole. The journey, which began in Resolute Bay in Canada, took 30 days to complete (see *Petroleum Review*, May 1996).

16 May

Chevron Overseas Petroleum has signed a production sharing contract with China National Offshore Oil Corporation to explore for natural gas in the South China Sea.

Seeboard and Amoco have formed a new UK gas marketing joint venture to be known as Beacon Gas. The new company will enter the market in the second half of 1996 and is expected to be a key player in the southeast England domestic gas market when it opens up to competition in 1997.

17 May

Mr George Kynoch MP, Minister for Industry at The Scottish Office officially opened Shanks and McEwan's landfill gas power station at the company's landfill site at Greengairs by Airdrie.

Newsdesk

Italian service stations test out IFSF forecourt automation standards

Two Italian service stations – one owned by Fina at Vigevano, near Milan in northern Italy and the other by Agip near Bari in the south of the country - are the first in Europe to trial International Forecourt Standards Forum (IFSF) standards for forecourt automation on a fully operational basis.

The standards aim to simplify and standardise communications between forecourt appliances. The resulting interconnectivity networks offer more flexibility for matching equipment on site and eliminate the need to rebuild links each time any aspect of forecourt equipment changes, says IFSF.

Traditionally, various proprietary communications systems have been used to connect forecourt equipment supplied by a number of different manufacturers. Interfacing between these systems requires both time and considerable investment, says IFSF.

The interoperability of equipment resulting from the use of IFSF forecourt automation standards have eliminated this interfacing problem, thereby improving operational economics and enabling cheaper testing of new equipment designs on the forecourt.

The standards are based on a common communications system, which uses a one site local operating network (LON) bus and neuron chip to network every piece of equipment, and a set of definitive communication messages for information transmitted to or from each appliance on the site.

The Fina site uses Logitron pumps with LON capabilities connected to the LON site bus. Using a LON processor, a Logitron PC has a LON card with pump control functionality. This is connected to an IBM point-of-sale system. Other appliances at the service station will be connected to the IFSF communications bus in due course.

Meanwhile, the Agip service station is equipped with a site communications bus with a pump dispenser protocol featuring a pump controller. Half the forecourt operates the protocol over the site bus. Agip plans to put all protocols used on the forecourt on the same bus as they are developed. These will include protocols for the car wash, pole sign, note acceptor and tank gauge – all implemented applying the same IFSF protocol standards.

Fina's Vigevano service station

According to Mike Tunstall, European Card Services Manager at BP Oil, the IFSF sees the two test sites 'as a starting point and hopes to extend the benefits of standardisation to other areas such as building automation to lighting and optimisation of refrigeration and air conditioning units'.

Total acquires Phoenix operation

Total reports that it has the largest market share of any fuel distributor in East Anglia following its acquisition of Phoenix Petroleum on 1 April.

Based in Bury St Edmunds, Phoenix operates depots in Kings Lynn, Ipswich, Lenwade (near Norwich) and Buckden (near Huntingdon) and owns a lubricants centre near Newmarket. It also operates a network of small dealer-owned service stations and a fleet of delivery vehicles.

Phoenix will operate as a stand-alone business rather than be incorporated into the Total network.

Commenting on the takeover, Phil Wright of Phoenix said, 'The industry is becoming increasingly competitive and independents such as Phoenix need the backing of a major refiner to stay ahead of the game.'

Australian shale oil in prospect

It will take another decade before the oil locked up in shale deposits in Central Queensland is mined and processed at a substantial rate but commercial production of shale oil is now close to reality, said Sir Ian McFarlane, Chairman of Central Pacific Minerals and Southern Pacific Petroleum.

The so-called 'Rundle Twins' (Central and Southern) are now a third of the way through a major process of engineering, financing and negotiating with the Federal Government on the first stage of developing their shale oil deposit at Stuart, he said. The boost for the shale oil hopes has come through an alliance with the Canadian group, Suncor, which over years of operating its Canadian oil sands assets has reduced the cost of extracting oil to just under US$10 a barrel.

Sir Ian said that the Rundle Twins' planned full-scale operation at Gladstone, North Queensland, should cost about 30 percent less than Suncor's Canadian operation. The first stage of the Stuart operation costing A$217 million will be a demonstration plant.

New safety guidance for service stations

The UK Petroleum Industry Association (UKPIA) has published a new guidance note for service station operators and companies which supply petrol to such sites.

Petrol is classified as carcinogenic and therefore falls within the Control of Substances Hazardous to Health (COSHH) Regulations.

The guidance note, entitled 'Petrol at Retail Filling Stations – Application of COSHH Carcinogens ACOP', explains the legal requirements that have to be met by those working with petrol and provides advice on how to apply the regulations.

Gas competition

The start-up of competition in the UK domestic gas sector in southwest England on 29 April was marred by complaints from thousands of customers stating that they had been misled into switching from British Gas to a rival gas supplier.

British Gas and the Gas Consumers Council were contacted by 2,500 customers who had received 'goodbye' letters from British Gas which had been provided with details of those who had switched by its rivals. Many complained that they not realised that they had signed a contract with another supplier, while others had merely changed their minds.

According to the UK Department of Trade and Industry, 35,000 customers switched to one of the nine rival supply companies – far fewer than the 60,000 predicted by some in the lead up to competition (*Petroleum Review*, May 1996).

Newsdesk

Mobil expands its oil and gas interests in Kazakhstan

Mobil has acquired a 25 percent interest in the Tengiz oilfield in west Kazakhstan which has estimated recoverable reserves of at least six billion barrels.

Chevron continues to hold a 50 percent stake in the venture while government-owned Kazakhstan producing association Tengizmunaigaz holds the remaining 25 percent.

The deal, signed at the beginning of May, came just one week after the signing of a joint protocol to restructure the Caspian Pipeline Consortium (CPC) and to develop a 900-mile export pipeline from the Tengiz oilfield, through Russia, to the Black Sea port of Novorossiysk.

The protocol gives Mobil a 7.5 percent equity interest in the pipeline; Chevron, 15 percent; Lukoil, 12.5 percent; Rosneft, 7.5 percent; British Gas and Agip, 2 percent each; and Oryx and Kazakmunaigaz, 1.75 percent each. The remaining 50 percent is divided among the Kazakhstan, Russian and Omani governments.

According to Mr Balgimbaev, Kazakhstan's oil minister, the Mobil deal and the restructuring of the CPC signals that Kazakhstan is 'making steady progress toward developing its vast energy resources'.

Mobil is also part of a joint venture with three state-owned Kazakhstan companies exploring for oil and gas on the four-million acre Tulpar block in northwest Kazakhstan. It is also the only US-based member of the Caspian Sea Consortium, a group of seven international companies currently conducting a seismic survey of the Kazakhstan sector of the Caspian Sea (see *Petroleum Review*, February 1996).

Awards all round for John Brown

John Brown Engineers & Constructors' UK operations have won the Royal Society for the Prevention of Accidents (RoSPA) gold award for overall construction operations for the fifth year running.

The company received two further gold awards for its flue gas desulfurisation project for PowerGen at Ratcliffe in the United Kingdom and the Kerteh ethylene/polyethylene project in Malaysia.

Bronze awards were also received for John Brown in the northwest of England and the Ryazan oil refinery in Russia.

Fast-track Valhall development

The new wellhead platform on the Valhall field was installed on 20 April just 10 months from the date of commission, the fastest ever construction time in the North Sea, according to operator Amoco Norway.

The new platform has space for 19 wells which will increase total field reserves by approximately 82 million barrels of oil and 4.4 billion m^3 of gas.

Start-up of production was scheduled to begin last month, less than one year after the plan for development and operation was approved by the Norwegian authorities. Peak production of 125,000 b/d will be reached by the end of 1998.

Amoco Norway reports that close co-operation between partners, contractors and subcontractors helped improve project time and costs. Indeed, project costs have been reduced from NOK 2.1 billion at the time of partner approval in March 1995 to a current estimate of NOK 1.5 billion.

Amoco plans to use a new method to enhance well production. Several fractures will be made in the producing layers which will then be filled with sand to keep them open. While this will increase total well costs, depending on the number of wells treated in this manner, production will increase and create a positive net effect on the economics of the project, states Amoco.

Valhall's new wellhead manoeuvres into position

Court case victory for J-block owners

The UK High Court has ruled in favour of the owners of the North Sea Judy/Joanne project – Phillips Petroleum, Agip (UK) and British Gas Exploration and Production – declaring that gas buyer Enron Europe cannot refuse to agree to a commissioning date and thereby defer the commencement of its take-or-pay obligations.

Enron had wanted the gas to be reinjected until the autumn of 1996 because of a fall in gas prices in the United Kingdom.

This is one of a number of legal actions being taken by Enron in the United Kingdom and United States in a bid to escape from long-term contracts made at a time when gas prices were higher.

Offshore safety case re-evaluations

The UK oil and gas industry is being asked to re-check the safety calculations used in offshore platform safety cases following the release of interim findings of a joint industry project on blast and fire engineering for topside structures.

The multi-million pound research programme – established by the UK Health and Safety Executive (HSE) and 10 offshore operators in 1993 and managed by the Steel Construction Institute – has found that changes in air pressure during gas explosions on 'typical' offshore production facilities are in fact larger than assumed in the computer calculations traditionally used in the design of such platforms.

Test explosions were conducted on a mock-up installation built at Spadeam in Cumbria. It is the first time such experiments have been conducted anywhere in the world, says HSE.

A number of operators are being advised to re-check the calculations on which safety case risk assessments were based to see if any modifications may be required in light of the new information.

Extra measures that may be necessary include better risk prevention to stop such explosions happening in the first place and improved ventilation and explosion venting.

It is unlikely that the findings will require the shutdown or extensive rebuilding of installations. However, some older facilities nearing the end of their working lives may be retired early on cost grounds.

Work on the project will continue until early next year.

Newsdesk

Total imports VR technology

Total reports that the new vapour recovery unit (VRU) recently installed at its Leeds fuel storage terminal marks a double first – not only is the system's holding tank the first of its kind in the United Kingdom, the VRU processing method has never been used before in the country.

A holding tank stores the terminal's vapour emissions – which are at their highest levels during tanker loading operations – until such time as they can be passed onto the VRU for processing during the night when electricity costs are at their lowest. Alternatively, processing can take place at times when the terminal is not busy.

According to Total, such a system makes best use of the VRU which would otherwise be running below maximum capacity at all but peak vapour emission times.

Manufactured by McTay Engineering, the VRU uses advanced technology developed by Dow Chemicals in the United States.

Two carbon beds operate alternatively. Vapour is fed into the first bed which retains the hydrocarbons and allows fresh air to pass through. When this bed is full, it is switched for the second bed while the hydrocarbons entrained in the first are transferred to a refrigeration unit for conversion back into a liquid.

This liquid is eventually returned to the main fuel storage tanks at the terminal.

Shell set to return to Ogoniland

Shell has offered to clean up all oil spills in Ogoniland in south-east Nigeria and restart local development projects in the region if Ogoni communities will agree that company staff can return to the area in safety.

Shell states that its first priority would be to clean up the spills, regardless of whether they were caused by sabotage, and to make safe all facilities. The company withdrew all its staff from Ogoniland in 1993 following a period of violent confrontations with local communities.

'These proposals are offered in the spirit of reconciliation,' said Brian Anderson, Managing Director of Shell Petroleum Development Company of Nigeria Ltd (SPDC). 'All we need to start the process is the assurance of all Ogoni communities that our staff can work safely in Ogoniland.'

Shell is keen to point out that its first goal is to tackle the problems facing the Ogoni people rather than to restart production. The region was producing 28,000 barrels per day, equivalent to about three percent of SPDC's total production, when the company withdrew its staff in 1993.

According to Nnaemeka Achebe, SPDC Director & General Manager, Relations & Human Resources, the scale of the clean-up operation and its cost will not be known until the company has access to Ogoniland.

SPDC is one of six oil majors active in Nigeria. It operates the largest producing venture on behalf of the Nigerian National Petroleum Corporation (55 percent), Shell (30 percent), Elf (10 percent) and Agip (5 percent).

Ofgas proposes new price controls on TransCo's gas distribution operations

Ofgas announced its initial proposals for tougher price controls on TransCo, the pipeline distribution arm of British Gas, last month. If accepted, the average household bill could be reduced by £30 in the first year of the new price control which would enter into force on 1 April 1997. Meanwhile, industrial and commercial companies could expect savings ranging from £600 per year for small firms to nearly £40,000 for a large company with an annual gas bill of around £500,000.

The proposals include a cut in valuation of TransCo's assets from £17 billion to £9-11 billion and a reduction in the rate of return the company is allowed to earn. Ofgas aims to reduce TransCo's prices for 1997-98 by 20-28 percent and to reduce revenues by 14-22 percent. Thereafter, prices would be controlled by an RPI-X formula with X set at five. It is also proposed to change the form of the price control, adopting a price cap with a 50:50 split between fixed revenues and per therm revenues. Ofgas says this will reduce TransCo's risk and also lead to increased efficiency in the use of gas.

Director General of Gas Supply Clare Spottiswoode said that the proposals represented a 'fair balance between the interests of customers and the interests of shareholders'.

However, British Gas says the proposals could put the safety of the UK gas system at risk and could lead to the laying off of up to half its 20,000-strong workforce.

The stockmarket reacted with a sharp drop in British Gas share price.

Final proposals are expected to be published before the end of this month following consultations. If British Gas rejects the proposals, the matter will be referred to the Monopolies and Mergers Commission.

LPG agreement

Jet, part of Conoco, has signed a liquid petroleum gas supply agreement with Calor Gas that aims to better utilise the Conoco/Calor Gas-owned underground LPG storage cavern which lies 600 feet below the Humber refinery.

The cavern's 12,000-tonne storage capacity will be used to smooth out supply peaks and troughs, enabling more advantageous timing of supply deals on the spot market.

Jet is also to take over Calor's butane buying function as well as supplying propane to the company.

Alliance Gas splits into two new gas marketing companies

Alliance Gas is to be restructured by its joint venture owners BP, Statoil and Norsk Hydro.

The company, which holds a 12 percent share of the UK industrial and commercial gas sectors, will be split into two separate gas marketing companies – Alliance Gas which will be 100 percent owned by Statoil and BP Gas which will be wholly owned by BP. Norsk Hydro is pulling out of the joint venture.

The existing customer base, assets and staff will be divided between the two new companies and all contractual obligations, supply and levels of service maintained, state the companies.

According to BP, both it and Statoil 'see the developing gas market as having considerable potential – for example, the growing new market in spot gas and the impending opportunities to trade gas through the Interconnector to Europe.'

Statoil said, 'The joint venture has brought us to the top of the independent gas supply market. Like BP, we believe the time is now right to pursue our independent marketing and business strategies.' Statoil already has a major presence in Europe and now plans to develop its activities in the United Kingdom and Ireland. Indeed, it has already expanded its upstream activities through the recent acquisition of Aran Energy.

Anne Quinn, current Managing Director of Alliance Gas, will head up the new BP Gas business. John King will head up Statoil-owned Alliance Gas.

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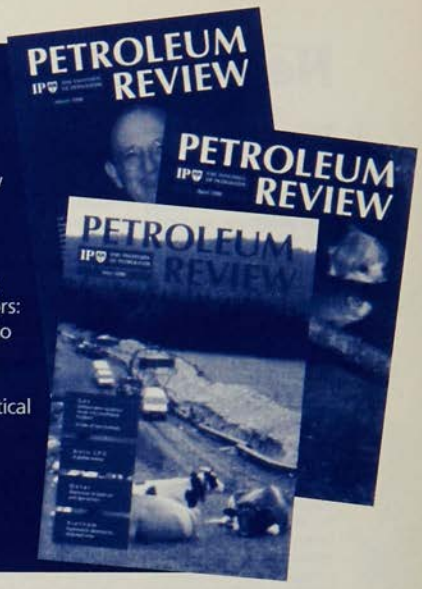

UK RETAIL MARKETING SURVEY

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Newsdesk

Talks on Phillips/Conoco joint venture

Phillips Petroleum and Conoco are discussing the possibility of combining their US refining, marketing and transportation (RM&T) operations and forming a 50:50 joint venture.

The joint venture would be created only if both companies agree it would improve financial performance and enhance the long-term viability of both companies' RM&T business in the highly competitive US market, while providing customers greater convenience and flexibility and ensuring the same high levels of quality and service, says Phillips.

The new company would market gasoline and other petroleum products under both the Phillips 66 and Conoco brands.

Liverpool Bay development to boost local economy

Last month the Rt Hon William Hague MP, Secretary of State for Wales, inaugurated the Liverpool Bay oil and gas development. 'This is a significant milestone for the country, marking the first oil production off the west coast,' he told guests at the ceremony.

The £1.1 billion development comprises four offshore oil and gas fields and an onshore gas terminal at Point of Ayr in North Wales (see *Petroleum Review*, January 1996). Oil production began in January and shipments in March. Four tankers have so far been loaded with crude from the offshore storage and loading installation, a permanently moored floating oil terminal. Three shipments of the new Liverpool Blend crude were depatched to Rotterdam and one for North America – the likely destinations of future shipments.

Gas is piped ashore to the Point of Ayr processing plant. From there a 27.5 km pipeline takes the gas to a reception facility at the new 1,400 MW Connah's Quay power station of PowerGen. Commissioning is currently taking place and the first contract gas, at a rate of 5.66 million cubic metres/day, will be taken by the combined cycle gas turbine power station later this summer.

The partners in this development are BHP Petroleum Great Britain plc (46.1 percent), LASMO Ltd (25 percent), Monument (Liverpool Bay) Petroleum Ltd (20 percent) and PowerGen North Sea Ltd (8.9 percent).

Howard Paver, President and General Manager of BHP Petroleum, described Liverpool Bay as BHP's largest single project operated by BHP Petroleum anywhere in the world.

Point of Ayr gas processing terminal

Mobil expands Saudi petrochem plant

Mobil and Saudi Basic Industries Corporation are to spend $2 billion on expanding their 50:50 joint venture petrochemical complex at Yanbu in Saudi Arabia. The project will double the plant's current output, making it one of the largest such complexes in the world. Over 1.6 million tonnes of ethylene and more than 2 million tonnes of derivative products will be produced annually.

The expansion plan includes the construction of an 800,000 tonnes/year ethylene cracker which will convert ethylene into 535,000 tonnes of polyethylene and 410,000 tonnes of ethylene glycol. The plant will also produce 260,000 tonnes of polypropylene.

Construction will begin in 1997, with start-up scheduled for early 2000.

IP President to head Transco

David R Varney has been appointed Chief Executive Designate of Transco International, one of the two independent businesses that are to be created when British Gas demerges next year. If the changes are approved, Transco International will inherit the pipeline and storage business of British Gas along with the company's international activities.

Mr Varney is leaving Shell where he has had a varied career stretching back 28 years. Having worked in Australia, Sweden and The Hague, his most recent appointments have been in London as Managing Director of Shell UK Downstream Oil and as Director, Oil Products Europe, Shell International Petroleum Co.

For the last two years he has been President of the Institute of Petroleum but his term in office ends shortly. It is interesting that another former IP President has also joined Transco – Dr Pierre Jungels, formerly with Petrofina and IP President from 1986 to 1988, is now responsible for exploration and production. Another familiar face will be that of John Wybrew, also ex-Shell, who has moved to Transco recently as head of corporate affairs, planning information services as well as health, safety and the environment.

According to Richard Giordano, Chairman and Chief Executive, British Gas, 'David Varney's appointment underlines our intention that Transco International will build shareholder value internationally on the foundations of the core skills of BG in exploration, production, transportation, distribution and power generation. These are in strong demand in developing gas markets overseas.'

At the same time British Gas has appointed Roy Gardner as Chief Executive Designate of British Gas Energy – the other half of the demerged British Gas. He joined British Gas in 1994, having previously been Managing Director, GEC Marconi Ltd.

Both Mr Gardner and Mr Varney take up their new appointments on 1 June. Contentious issues awaiting their arrival include the British Gas demerger, regulatory matters, the Ofgas price proposals – and the possibility of a referral to the Monopolies and Mergers Commission.

Iraq accepts UN agreement on oil sales

As Petroleum Review went to press, it was announced that, after three months' protracted negotiations in New York, the Iraqis have finally accepted a United Nations oil-for-food deal. While the immediate market reaction to the prospect of the first Iraqi crude to be sold abroad since the Gulf War was to move downwards, this proved shortlived and the market recovered since the deal had been expected for some time and had been rumoured to be imminent for the preceding week.

Under the memorandum of understanding, signed on 20 May by the Iraqi negotiator Abdul Amir Anbari and the UN legal counsel, Undersecretary General Hans Correll, the Iraqis are allowed to export up to $2 billion worth of oil over a six-month period in order to be able to purchase food, medicine and other humanitarian supplies for the Iraqi people. This is renewable if Iraq complies with all the conditions of the agreement – strict monitoring of oil sales as well as the distribution of food aid are vital elements of the agreement. The latter was thought crucial in order to ensure that the humanitarian aid reaches those most in need and is not siphoned off by the less needy on the way.

Oil sales, which are estimated at around 700,000 barrels per day (b/d) at current prices, will be controlled by the opening of an escrow account. It is laid down that of each $1 billion of oil sales, $300 million must go a UN compensation fund handling claims from governments, individuals and corporations arising from the invasion of Kuwait in 1990.

It also stipulated that the UN sanctions committee must agree the details of each and every Iraqi oil sale, including the price and export route.

Because some operational details remain to be fixed, it is as yet uncertain when oil will start to flow and which export route or routes will be used. It is likely that the pipeline from the northern fields through Turkey to Ceyhan on the Mediterranean will be one option, with exports via Iraq's own port at Mina Al Bakr on the Gulf another possible route.

At present, Iraq produces some 500,000 b/d (for internal consumption), compared with some 3 million b/d before the war. According to Iraqi officials, some 2.5 million b/d would be possible now if the UN sanctions were lifted. Reserves are currently put at 112 billion barrels, with more than one large field awaiting appraisal and development at some point in the future.

The Iraqis have now finally agreed to this deal, having refused to sign an earlier one first proposed back in 1991 because they believed that the proposed monitoring violated their sovereignty. However, the current deal represents only an interim agreement since the UN sanctions remain in force. For these to be lifted so that oil could be sold freely requires Iraq to prove that it has destroyed its armaments, returned stolen Kuwaiti property and accounted for Kuwaiti citizens missing after the war. For the moment President Saddam Hussein realises that he has little chance of satisfying the United Nations on such a score.

Reaction

UN Secretary General Boutros Boutros Ghali said, ' This resolution is based on one of the most important objectives of the United Nations, which is to alleviate the problem of poverty – and the poorest of the poor were suffering in Iraq.'

The return of Iraqi crude has been long awaited – the latest negotiations have been going on since February, while the original Resolution 986 was drafted more than a year ago by the Security Council as a means of relieving the suffering of the civilian population in Iraq. As a result it has largely been discounted by world markets; after the latest round of talks started on 6 May, the Brent price dropped from $20 to $18 on the day the deal was signed.

The vital question arising from this deal is how OPEC is going to manage to accommodate the volumes of Iraqi oil that will soon reach international markets. Since Saddam Hussein invaded Kuwait, fellow OPEC members have made up the shortfall. Because in some cases this meant investing in new capacity, they are not going to be willing to have their production quotas cut.

A regular OPEC meeting, scheduled for 5 June, is therefore likely to be long and stormy when it debates this issue. However, OPEC Secretary General Rilwanu Lukman has said that OPEC will 'do something' to accommodate Iraqi oil, without specifying what he had in mind.

Carol Reader

Oil companies fare better – and worse – in California

By Judith Gurney

Despite reductions in smog levels of 75 percent since the mid-1950s, California still suffers from severe air pollution, with air quality levels in the south of the state failing federal health standards for almost half the year in 1995. As a result, the downstream activities of oil companies in California continue to be subject to many federal, state and local regulations aimed at decreasing pollution attributed to the state's 10.6 million motor vehicles. Emissions from these vehicles fail to dissipate due to a weather phenomenon known as an inversion layer. Air cools as it passes over the Pacific Ocean and when it is blown inland over Southern California, it forms a cold layer near the ground underneath a layer of warmer air. The warm air cap prevents pollution from escaping upward, while the surrounding mountains keep it from moving further inland.

Oil companies, however, are not the only ones labouring under restrictions – there are also strict emissions regulations for heavy industries, foundries, waste incinerators, dry cleaners, commercial ovens and smudge pots used to protect crops from frost. In fact, few industrial and commercial activities escape regulation. As a consequence, some industries are beginning to think twice about setting up operations in California and oth-

ers already in the state are talking about leaving.

The waning of enthusiasm on the part of investors worries state officials. State Governor Pete Wilson, noting that California had been selected as the site for only two out of 24 planned large-scale investments in high-tech manufacturing between 1995 and 1998, has included measures in his 1996-97 proposed budget to reduce the burden of environmental controls. To some extent, the downstream oil industry is already benefiting from the more forgiving approach.

Downstream pressures ease

The California Air Resources Board (CARB), in a dramatic policy switch, announced early this year that it was postponing until 2003 the implementation of its rule regarding the sale of electric vehicles in the state. It abandoned its requirement that 2 percent of vehicles sold in California by 1998 by each of the vehicle manufacturers concerned – GM, Ford, Chrysler, Toyota, Nissan, Honda and Mazda – be zero emission vehicles (ZEVs), that is to say, electric vehicles. The manufacturers had persuaded CARB that the current state of technology did not permit the production of a ZEV – and certainly not a ZEV with air conditioning which California drivers demand – with a performance capability and at a price that the market would accept. They argued that it was impossible to extend the average range of lead acid batteries without recharge beyond 60 miles and that appropriate new battery technologies would not be available for several years. (Early experiments with sodium-sulfur batteries were abandoned when two ZEVs fitted with these caught fire during recharge.) CARB agreed that putting expensive, poor-performing ZEVs with a limited range on the market in 1998 could mean that customers would refuse to buy improved ZEVs at a later date.

This CARB decision affected car manufacturers, and thus refiners, in other states as well, as the federal Clean Air Act Amendments of 1990 gave individual states the choice between following its rules on motor vehicle emissions or following the stricter rules of California. Two states with significant gasoline markets – New York and Massachusetts – had opted to follow California and it is unlikely that these two states have the legal right to demand the production of ZEVs by 1998 now that California has abandoned this requirement. The federal Clean Air Act Amendment does not mandate the production of ZEVs.

Phase 2 reformulated gasoline

Although oil companies have avoided the intrusion of ZEVs in the motor vehicle fuel market, they must still reformulate the gasoline which they make and sell in California. Although the basic parameters that constitute federal and California reformulated gasoline (RFG) are the same – boosting oxygen, lowering vapour pressure, reducing benzene, olefins, aromatics and sulfur and adjusting distillation temperature – the approaches used in getting there and the magnitude of the reformation have been very different. In the past, CARB, which has the responsibility for enforcing emission regulations, has mandated a more prescriptive approach, setting specifications for each fuel parameter, while the federal EPA set performance standards, leaving refiners considerable latitude to decide how many and which of the parameters they adjusted to meet these standards.

California regulations require the use of Phase 2 RFG, with more severe emission controls than the original Phase 1 RFG, in 1996, four years before the federal deadline for its use nationally. However, CARB has relaxed its policy regarding the new fuel and is allowing individual refiners to determine the specific formulation of their product as long as it meets its requirements.

This change in attitude is partly the result of CARB's experiences when it mandated, in 1993, the use of diesel fuel with a more drastic sulfur reduction than that required by the Federal EPA. The result was supply shortfalls, price spikes and claims of engine damage, with farmers who depended on diesel for spring planting particularly agitated. In the end, CARB was forced to issue an emergency order exempting agricultural and other off-highway users from having to burn new diesel.

CARB also took note of the errors that the federal EPA made in introducing Phase I RFG nationally, when it allowed several regions to abandon the programme.

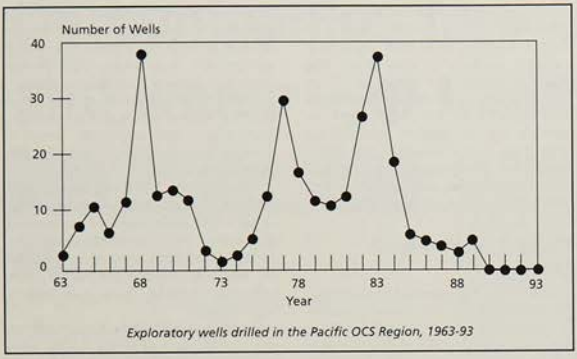
Use of Phase 2 RFG will be required throughout California, with no exemptions, a rule which removes the concern of refiners that they might spend the considerable sums needed to produce the new fuel only to have market areas opt out, making their investments unprofitable.

CARB planned a staged approach for the introduction of Phase 2 RFG, with refiners required to begin production on 1 March and shipment to distribution terminals on 15 April, with retail outlets required to sell it by 1 June. All 13 state refineries met the production and distribution deadlines; these refiners expect to use 85-90 percent of their gasoline production capacity to produce Phase 2 RFG, with production predicted to average 906,000 b/d.

Some concern has developed subsequently, however, over the price of the new gasoline at the retail level. It is more expensive to produce and by late spring it was selling at some retail outlets well above the 5-15 cents/gallon increase over conventional gasoline that had been predicted. Some independent marketers have asked the state to be ready to suspend Phase 2 RFG requirements during periods of supply squeezes, arguing that prices of the new gasoline were 32 cents a gallon more than conventional gasoline at some locations in late April, although they conceded that this was due partly to a run-up in crude oil prices and problems at two state refineries.

Upstream gets worse

While oil companies have received some benefit in their downstream activities from the relaxation of regulations by state authorities regarding emissions and from a more flexible CARB approach, the opposite is true for their

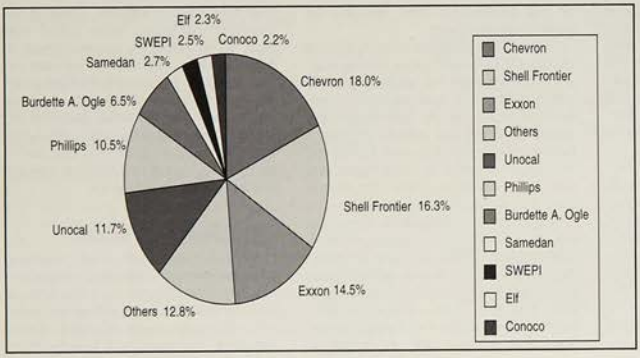


Exploratory wells drilled in the Pacific OCS Region, 1963-93

upstream activities. Environmental concerns have led to regulations from federal, state and local authorities which have effectively blocked offshore exploration and restricted production in state-controlled waters and in the federally-controlled Offshore Continental Shelf (OCS).

Oil production began off the Southern California coastline in 1896 with the development of the Summerland field in state waters; OCS exploration had to await the first US Department of Interior Pacific oil and gas lease sales in 1963. Subsequently, the DOI has conducted 11 OCS lease sales in the Pacific; nine of these were in offshore Southern California waters where a number of promising oil and gas finds have been made. The last lease sale, however, was in October 1984. The DOI has been restrained from holding further Pacific OCS lease sales since then by moratoria legislated by the US Congress and presidential decrees which cancelled sales scheduled for 1991, 1995 and later. There has been no exploratory drilling on the California OCS since 1989, although drilling has continued in previously approved development and production projects. The federal Minerals Management Service has not granted permits for geological and geophysical exploration since 1990.

These federal restrictions on exploration, combined with strict state and local constraints on the disposition of production, have persuaded some oil companies to relinquish or suspend their federal OCS leases. The major leaseholders left in the OCS are Chevron with 18 percent of all leases, Shell with 16.3 percent, Exxon with 14.5 percent, UNOCAL with 11.7 percent and Phillips with 10.5 percent. Chevron and Exxon are the most active operators of fields.



Companies holding interest in Pacific OCS leases as of November 1993.
Source: US Minerals Management Service

The saga of Point Arguello

The biggest field in the California OCS is Point Arguello in the Santa Maria Basin, discovered by Chevron and Texaco in 1981. Some nine miles long and almost five miles wide, Point Arguello's total oil in place has been estimated as 3 billion barrels, with primary recoverable reserves of 300 to 500 million barrels of oil and 200 billion cubic feet of natural gas. Although three production platforms were completed within a few years of discovery, Hermosa and Hidalgo by Chevron, Harvest by Texaco, production was delayed until 1991 by controversy regarding transportation to Southern California refineries, in particular to Chevron's El Segundo refinery in Los Angeles.

Fears of an oil spill affecting the scenic Santa Barbara coastline led to regulations which prevented the use of tankers to deliver production to the Los Angeles area. Even constructing pipelines and a processing facility onshore was extremely difficult. Chevron had to get approval from 44 regulatory agencies, comply with 160 permit conditions stipulated by Santa Barbara County officials and meet numerous regulatory requirements set by the state California Coastal Commission and the US Department of the Interior before production could

begin. Finally, in May 1991 Point Arguello began limited production with oil and gas production gathered at the Hermosa platform and sent from there by pipeline first to landfall at Point Conception and then to a nearby processing centre at Gaviota which was only allowed to process 100,000 b/d. The processed oil and gas then went by pipeline to Los Angeles for refining.

Chevron succeeded in getting an interim tankering permit at the start of 1989 for direct transport of some oil to Los Angeles but this was immediately rescinded following the *Exxon Valdez* Alaska oil spill in March of that year. The company applied for another tankering permit in 1991 but this application was denied; in 1993, it obtained a temporary tankering permit but lost this the following year. An earthquake in January 1994 damaged one of the shore pipelines south of Gaviota and to date there has been no final agreement regarding the construction of a new pipeline to Los Angeles refineries. Development of Point Arguello to its full production capacity has still not been reached five years after start-up due to these unresolved issues concerning shipment.

The other main ongoing OCS project offshore California is Santa Ynez, in the Santa Barbara Channel, where Exxon is the operator. Santa Ynez is a development expansion of the Hondo and Pescado fields and involved the construction of two platforms, Heritage and Harmony to supplement platform Hondo which began production in 1980. The project came on line in December 1993, with production piped to a Las Flores Canyon onshore facility. Exxon is hoping to produce 90,000 b/d of oil and 135 million cubic feet per day of gas by 1997. The only other OCS project is the longstanding, low production Carpinteria field further to the south.

State waters

In 1994, California passed the Coastal Sanctuary Act which imposed an indefinite ban on drilling in virtually all state waters along its 1,100 mile coastline – although it allowed certain exceptions in existing leases and on tracts adjacent to federal leases. Activity in state-controlled waters faces formidable resistance from environmental groups in Santa Barbara, the county whose offshore waters contain most of the known Californian offshore oil and gas reserves. As a result, both Chevron and Shell have asked for suspension of their leases in state waters.

Advances in extended reach drilling technology seemed to offer a way to get around restrictions on offshore exploration and production as it would allow drilling to be done from shore facilities. This was the idea behind Mobil's $1.8 billion Clearview project to develop the Monterey extension of the South Ellwood oilfield which was discovered in 1977 and believed to hold estimated reserves of up to 155 million barrels of oil and 155 billion cubic feet of gas. The field's existing platform, Holly, has produced from a state lease since 1966 but can only tap about a third of South Ellwood's reserves. ARCO planned to develop the untouched reserves with its proposed Coal Oil Point project but this was rejected by state authorities in 1978. Mobil, then a 50 percent partner in the field, bought ARCO's interests in April 1993; these included the Holly platform and the related Ellwood onshore processing plant and marine terminal. As a trade-off for its Clearview project, it offered to retire Holly early.

Mobil would have been able to go ahead with its Clearview project following the 1994 state ban on drilling in state waters as it filled an exemption qualification. However, it cancelled the project in February when the University of California at Santa Barbara refused permission to use its beachfront land for an onshore drilling rig.

Another state waters project in the offing earlier this year was one by the Molino Energy Company to develop gas resources about 20 miles up the coast from the South Ellwood field. In 1985, voters in a referendum in Santa Barbara County voted for a measure supporting a requirement that any new processing of offshore oil and gas production on the south coast of the county be limited to the sites of Gaviota and Las Flores Canyon. Molino then moved its proposed processing site close to the Gaviota facilities. Then in March Santa Barbara voters approved a measure requiring that any new onshore support facilities must be approved by a majority of votes in a regular election; this additional restriction persuaded Molino to abandon its project.

Abandonment is tricky

Ending production offshore California is not easy, as the process of decommissioning requires that oil companies meet not only federal and state regulations but those of Santa Barbara if the production facilities lie offshore this county, as most do. It took Chevron four years to secure the necessary permits to remove four platforms in the Summerland and Carpinteria offshore fields which had been shut down in 1992. With its partners, ARCO and Exxon, Chevron had to find ways to cut the emissions which were predicted to occur during the removal of the platforms. In addition, the decommissioning had to be scheduled during a period which would not affect grey whale migration patterns.

Some of the agreed emission reductions will be achieved as a result of alterations to vessels and equipment used to cut and remove topsides and jackets and for demolition of the legs; others will come from alterations to the engines on the tugs and barges that will take the resulting metal to shore for recycling. In addition, Chevron will achieve reductions through the use of offsets – reductions in emissions elsewhere in the area – by retrofitting five large commercial boats used for fishing and whale-watching in Santa Barbara Harbour with low emission, computer-controlled diesel engines.

When these abandonments have been completed, only a handful of producing platforms will remain in California state waters. It is unlikely that any more platforms will be allowed in state waters for a good while – and the future for new development in federally controlled OCS looks equally bleak.

UK transport policy – on the right road?

Transport policy in the United Kingdom has been the subject of prolonged and heated debate over the years as people have become increasingly concerned about congestion on the road and noise and pollution from traffic and its impact on health and the environment. In a bid to bring together the various threads of discussions, the UK government called for a 'national debate' in 1995, the conclusions of which were recently published in the form of a Green Paper entitled 'Transport – The Way Forward'.

The paper focuses mainly on issues in England. Last October the government produced a statement on transport priorities in Northern Ireland and will be publishing further statements addressing the issues in Scotland and Wales at a later date.

Continuing the debate

The report shows a clear understanding of the problems faced by today's transport sector. However, whilst it puts forward a number of suggestions for future change and improvement, it does not offer concrete solutions and plans of action but merely continues the debate.

Passing the buck

Much of the report's attention focuses, not surprisingly, on the road transport sector. Car travel in the United Kingdom has nearly doubled in the past 25 years and over a quarter of journeys are less than two miles. These are the most polluting of journeys as the catalytic converters need longer in order to warm up and work efficiently. While the government seems to accept that there is a need to curb future growth in the number of cars on roads, thereby reducing congestion and pollution, it seems reluctant to deal with the problem itself, instead passing the buck to the local authorities and saying that it is up to them to set local targets for cutting traffic volumes. Furthermore, it sets no ceiling for carbon dioxide emissions from vehicles despite calls from the Royal Commission on Environment Pollution for such emissions to be pegged at 1990 levels.

The report says that more money should be spent on improving public transport instead of building new roads. However, with much of this sector now privatised, there are doubts as to how much financial assistance, if any, would be available from the government to help this sector provide the improved standards and reduced fares needed to encourage use of public transport.

Other proposals considered by the paper include the possibility of increasing the maximum gross vehicle weight limit for lorries carrying containers to and from ports. At present, only those vehicles serving railheads can operate at 44-tonnes on six axles, the current maximum weight limit being 38-tonnes on four or five axles. This figure is to be increased to 40-tonnes on five axles on 1 January 1999, bringing the United Kingdom in line with the rest of the European Community.

The paper argues that such a move would impose no more wear and tear on roads and bridges because the extra weight would be spread over six instead of five axles. Furthermore, traffic would be reduced as fewer vehicles would be needed to carry the same volume of goods, which would, in turn, reduce overall fuel consumption and emissions.

There is a snag however – the lower unit cost of 44-tonne lorries would make them more competitive with the railways and could lead to some freight being switched from rail to road. This flies directly in the face of a statement elsewhere in the report that says the government is keen to encourage the transfer of freight from road to rail and water!

Finding funds

As regards financing of transport solutions, the government once again seems reluctant to commit itself. It continues to refuse to use road taxation to fund improvements in the transport infrastructure, because 'significant practical problems would be faced', preferring instead to rely heavily on private finance initiatives.

The road ahead

The government maintains that 'Transport – The Way Forward' is an 'agenda for action starting now which will begin to shape the way people actually use transport over the next few years'. However, only time will tell whether the government can be as flexible in finding and fulfilling solutions for the planning and financing of the UK transport infrastructure as it expects industry and individuals to be.

In his foreword the Secretary of State for Transport Sir George Young Bt wrote, 'Debate on transport will never end. There are too many differing points of view and alternative solutions. And people's priorities are bound to change over time. But the government believes there are many specific measures where there is a strong element of agreement – including reducing environmental impacts from transport; improving forward planning for our infrastructure and making better use of existing capacity; enhancing the role of public transport and moving more goods by rail.' In the meantime the most environmentally friendly option seems to be to buy a bicycle.

Kim Jackson

Vibrant OTC reflects buoyant upstream sector

That ubiquitous source of information, the taxi driver, en route to the 1996 Offshore Technology Conference in Houston, Texas, was unhappy. He knew of one hotel where 230 rooms had been booked by intending OTC visitors but only 35 had been claimed. Demand for taxis was also down on expectations but, fortunately, he was virtually alone in his pessimism. Statistics, of course, do not tell the whole story, as the quality of visitor is of prime importance for the exhibitor. That said, final attendance figures are expected to show a modest increase over the 1995 total of 33,351 and could be the highest since 1985. This year, about 1,400 exhibitors booked nearly 250,000 square feet of exhibition space and a record 285 presentations were made at 49 technical sessions.

By Philip Algar

What cannot be measured is the confidence of the industry but, judging by the enthusiasm shown during many conversations with speakers, exhibitors, politicians and industry personnel, the quiet optimism shown at the 1995 OTC has been supplanted by genuine confidence that the industry is on the threshold of a new chapter in its long history. The high crude oil prices experienced so far this year may prove unsustainable, for all the well-known reasons, but new technology is being devised and applied more speedily, management is becoming more efficient and governments more understanding. Above all, the industry is learning to survive and make money even at low crude oil prices, providing that some of the old concepts are abandoned. Partnerships, alliances and strategic relationships are now an essential part of the modern upstream industry.

In addition, the increased activity in a potential new province, west of Shetlands, and the revival in the deepwaters of the Gulf of Mexico, in part inspired by a more favourable tax regime, offer the industry two key areas for expansion. However, other overseas tracts are opening up to foreign participation and it was significant that most of the UK exhibitors mentioned the number of executive visitors from Latin America and the Far East. It was also interesting that Petroleos de Venezuela was exhibiting at the show, for the first time, to illustrate the opportunities for overseas involvement in the upstream sector and to inform other countries and companies in the region of its various skills.

In another indication of the changing nature of the industry, Chevron Employee Resource and Training Center was promoting its courses on a wide range of subjects which are available to employees and competitors alike. Its 'vision' is to be 'a leading worldwide, multifaceted learning and resource centre'. Amoco, with a nearby booth, was also seeking to publicise its exploration and production technical training but admitted that the response thus far has been slow. Chevron and Mobil were both seeking partners to share onshore facilities for their Gulf of Mexico operations.

Perhaps the companies might be persuaded to organise adult literacy courses for those intending to join the US oil industry. According to Dennis Heagney, Chairman of the International Association of Drilling Contractors and of Sonat Offshore Drilling, the sector faces a major problem in attracting new personnel with the right skills. He argued that if the US oil industry is to make the full use of new technology, more highly skilled individuals had to be recruited and trained than in the past. The industry was confronted by a shortage of people which threatened growth. 'The need to attract skilled new people to the business, especially offshore, has rarely been greater... but in the US, sadly but unarguably, the level of training of entry-level people has never been lower. I'm not talking about computer skills and the like but of simple literacy, which we once took for granted. Poor literacy among young Americans has become a tragedy of near-epidemic proportions. It could cripple the nation's competitiveness in all sectors, not just the oil and gas sector.' The same problem did not occur in North West Europe.

Houston, modestly describing itself as the 'golden buckle of the sun belt', is once again becoming more of an oil town, after the price crash of the mid-1980s. More companies are moving to

Houston and during OTC week, the Association of British Offshore Industries and the British International Trade Centre signed a Heads of Agreement, by which the two groups will work closely together to provide small and medium sized UK companies with office space, support and consultancy services, giving the UK companies access to 'an immediate creditable trading presence in the US in a cost-effective manner.'

The United Kingdom was well represented at OTC. A complete conference session and lunch were were devoted to the Atlantic Frontier and UK company representation at the exhibition was second only to that of the United States.

Award for Conoco

Conoco Inc won the OTC 1996 Distinguished Achievement Award, for the Heidrun Project in recognition of the company's 'design, construction, installation and start-up of the world's first concrete tension-leg platform hull. Developed in 345 metres water depth in one of the world's most harsh operating environments, the Heidrun Project represents a significant extension of offshore technology.

From the press conference

Jack Carter, senior advisor on international affairs at the US Department of Energy, maintained that the United States was seeking to diversify its sources of oil and was especially keen to encourage supplies from emerging producer nations, to reduce reliance on OPEC members. He was anxious to demonstrate to some foreign oil producers, such as the former Soviet Union, that by lowering taxes and encouraging activity, official revenue could eventually rise. He cited the increase in deepwater Gulf of Mexico activity, following royalty relief. Admitting that US reliance on overseas oil was too high and likely to continue growing, he said that it would be 'helpful' if the emphasis in the United States could move to alternative energy source, such as gas.

Debating the domestic potential still remaining in many areas denied to the oil companies, he said that the upstream groups, which had an excellent safety and environmental record, should 'get the word out more' if they wished to secure acreage in new areas. The government could do little 'until we make a case that it is safe, we won't make progress.'

Policy diffferences

When *Petroleum Review* suggested that US foreign policy support for embargoes and the activity of Senator D'Amato were the best UK overseas sales aids, he agreed that unilateral sanctions and the threat of sanctions against some countries did penalise US companies. It was difficult to persuade both the indigenous oil companies and overseas governments that the policy was desirable but the oil groups were beginning to realise that it meant a loss of jobs. He implied that if this was emphasised to congressmen, the pressure to impose such sanctions could fade.

Lord Fraser, the UK Department of Trade and Industry Minister of State, talking to *Petroleum Review*, was outspoken on the prospect of US action to curb trade with those overseas companies which had commercial relations with countries against which the United States had threatened embargoes. The United States had not thought through such a policy and had learned nothing since last year. If the policy was implemented, Lord Fraser could envisage a situation where no chief executive of a British company could visit the United States. If this were to happen, he implied that retaliatory measures would be introduced. Lord Fraser did not expect any changes in policy until after the US Presidential election in November.

Don Stacy of Amoco Eurasia, presenting a conference paper discussing his group's involvement in Azerbaijan, noted that oil industry activity there was influenced by the administration's decision not to grant humanitarian aid to the country, largely because of the war with Armenia. The oil companies wanted to work in the country but US government policy did not help. Likening the US position to Azerbaijan and Armenia, which opposed the granting of such aid, to that with the Middle East and Israel, he said that the United States did not have to sacrifice friendship with Armenia to protect its interests in Azerbaijan.

Mr Carter acknowledged that the subject of aid for Azerbaijan was a problem for US companies, 'in the political season', so he expected no change in the policy until the Armenian lobby in the United States accepted that such assistance would be good for the entire region. If Senator Dole, who supports the ban, were to recommend a change, there could be increased US investment in the area but much depended on Armenians in the United States.

The Norwegian Deputy Minister of Energy, Odd Erik Hansgaard, said that the country's continental shelf was now very profitable because of the advances in technology. The recovery rate for the Oseberg, Statfjord and Gullfaks fields, originally expected to be 30 percent, could eventually be as high as 60 percent.

The challenge now for the Norwegian sector was to develop new small fields as the size of new discoveries and oil prices had fallen. Cost reductions had been achieved through NORSOK and in the five years to 1998 it was hoped to reduce costs and lead times by up to half. Eighteen new oil and gas projects, with a total development cost of about $10 billion, had been officially approved between 1994 and 1996 and another 10 projects may be authorised later this year.

A new licensing round, offering acreage just in the Barents Sea, will be held this summer and awards will be announced in early 1997. Norway intended to compete actively in the international sphere, aided by a new initiative, INSOK, supported by the government and the oil and supply companies. Norway, according to the minister, is now a very efficient producing country and he rejected the idea that the recent labour dispute would react unfavourably on the country's reputation. The country was now the second biggest oil exporter in the world and output could peak at 3.4 million barrels/day early in the next century. Gas production, now at about 30 billion cubic metres a year could double by the end of the decade.

Norway had no plans to co-operate with OPEC to sustain prices by cutting output. Furthermore, if Norway were to co-operate again, it would be 'specific.'

Exhibition and conference

Some 100 British companies were represented at the exhibition, including 41 who travelled with the Association of British Offshore Industries, ABOI. This figure was 32 percent up on last year and the best for seven years. Others visited OTC under the auspices of Scottish Enterprise or the Shetland Oil Industries Group. Many of the UK contingent were at OTC for the first time and most were sufficiently impressed to say that they would return next year.

Both the exhibitors and a very busy Offshore Supplies Office were impressed not only with the quality of visitors but with the variety of countries they represented. About 30 percent came from outside North America and the United KIngdom and delegates from Argentina, Brazil, Chile, Colombia, Mexico and Venezuela, Malaysia and the Philippines were numerous. The key overseas markets for UK suppliers, identified by Ken Forrest of the OSO, are Azerbaijan, Brazil, Colombia, India, Indonesia, Kazakhstan, Pakistan, Qatar, Saudi Arabia and Vietnam.

The Energy Industries Council, with 260 member companies in the United Kingdom, received more visitors than last year and was impressed with the numbers from Latin America and the Middle East. David Valentine, Economic Development Manager of Angus Council, was very positive. 'You can't go to a better place for senior and experienced contacts and it's easy to develop relationships with the OSO and other official groups, all within a few yards,' he said.

Roger Ramshaw, General Manager, Conoco UK, speaking at a conference lunch, predicted that the initial predictions of Heidrun development costs, of $5 per barrel, could eventually fall by a fifth. The initial estimate of recoverable reserves was 750 million barrels but Statoil, now the operator, was suggesting 836 million barrels. However, as there are 2.9 billion barrels in place, Mr Ramshaw, arguing that recoverable reserve figures were very conservative, forecast that 1.2 billion barrels might be recovered.

At the conference session on the Atlantic Frontier and the technology involved, Tom Fife of BP and P Osborne of Shell claimed that 'Pace is the key attribute which typifies our current approach to developments in the Atlantic Frontier in pursuit of our intent to establish a major new hydrocarbons province.' New recent metocean work showed that an analysis of the extensive current measurements at Foinaven and nearby locations has revealed large variations in design current speed with location. 'For Schiehallion, ... a reduced current speed profile has been adopted, some 5 percent reduced compared with Foinaven.... The latest design criteria, (for Clair), show slightly reduced wind and waves when compared to Foinaven and significantly reduced currents, approximately 35 percent less than Foinaven.'

The future of Clair would be determined by this summer's extended well test. 'At present, it is planned that a first phase of development, focused on a core area of the field, with the potential for an 80,000 b/d development would follow a successful extended well test. The partnership's long term vision is that a further two or three phases will follow, leading to a possible 250,000 b/d field sometime in the next decade.'

The BP-Shell shared strategic intent was to establish the Atlantic Frontier as a major new hydrocarbon province and the specific goals are to achieve production of 100,000 b/d by 1996 and 300,000 b/d by the year 2000.

A paper by D Howes of BP, M Cropper of DDPS and G Prise of EGIS, on Foinaven and a basis for development wells, conceded that there have been many examples of weather-related equipment failure during the first year of development drilling on the field. 'Any equipment between the rotary table and seabed is vulnerable, with riser equipment, BOP pod umbilicals, and both riser and drilling heave compensation equipment being repeatedly damaged. Vibration, due to vortex shedding, has had a major impact due to the detriment of equipment run through the water column, with several cases of bolts and threaded connections vibrating loose. This is seen as an area where the development of more robust equipment is essential.'

Conoco's award-winning Heidrun project

Saudi Arabia plans future strategy

By John Roberts

Saudi Arabia's oil industry confronts a paradox. Production levels have never been more stable, yet prospects for drastic change have never been greater. For two and a half years, the kingdom's output has remained steady at 8 million barrels a day (mb/d), its OPEC quota. There has been no hint that the kingdom would either copy other OPEC members in producing above quota or that it would agree to any cut in its production as part of some overall accord. Moreover, there is every prospect that little will change in terms of OPEC quotas for several months.

Problem of Iraq

Yet the kingdom's oil planners are operating under a shadow. Iraq is currently negotiating for a limited lifting of UN sanctions. Eventually, as and when Saddam Hussein falls or if he should somehow fully comply with all UN resolutions, Iraq will once again be in a position to export millions of barrels of oil per day. Saudi officials state openly that they are worried about the return of Iraqi crude to the market. Their hope is that the inital volumes forecast under a partial lifting of sanctions, around 700,000 b/d at current prices, can be accommodated by OPEC over-producers, cutting output back to their quota level. Unofficially, they do not believe this will happen.

'The problem we face is that OPEC isn't ready to tackle Iraq and its own over-production,' a senior Saudi official told *Petroleum Review* recently. Even though OPEC's members are currently producing at around one million barrels a day above their collective 24.52 mb/d quota, no-one really expects such major over-producers as Venezuela and Nigeria to rein in production to accommodate Iraq. In other words the most likely outcome is that OPEC's members will simply agree to raise their nominal ceiling by 700,000 b/d, or whatever is required to incorporate the $2 billion per six months oil sales that Iraq is to be permitted, should the current negotiations on UN Security Council Resolution 986 prove successful.

Saddam Hussein's success in retaining power despite his defeat in 1991 and almost six years of economic sanctions may seem to make it unlikely that he will soon fall and that there is therefore any imminent prospect of a full-scale resumption of Iraqi oil exports. But none of the major governments concerned – the United States, Britain, France or Saudi Arabia – have any real indication as to whether he will last another five or six years or whether he might fall tomorrow. Thus Saudi Arabia cannot gauge what kind of response might be necessary to a full-scale return of Iraqi oil exports. All it knows is that its own, and Western, analysts consider quite believable Baghdad's assertions that Iraq could, at very short notice, export 2 mb/d of crude oil and that this could be increased to 2.5 mb/d within a few months. Such a level of exports would make a sizeable dent – almost 10 percent – in OPEC's share of physically traded crude.

It is a challenge that will have to be faced sooner or later. And even it is deferred a few years then, as and when sanctions are lifted, Iraq's ability to cause a massive dent in the market will simply have grown. Again, the Saudis take seriously Baghdad's assertions that in or around the year 2000 Iraq will have a production capacity of approximately 6 mb/d and an export capacity well in excess of 5 mb/d.

Since it is by no means sure that a full Iraqi return to the market can be accommodated within OPEC structures, Saudi Arabia clearly feels that it needs to possess some strong weapons in its own oil armoury if it is to meet such a challenge. As a result of the expansion programme initiated in 1990, the kingdom currently possess a production capacity of slightly more than 10 mb/d. Yet it has also embarked on one of the most ambitious oil development projects of modern times – the exploitation of the gigantic oil reserves of the Shaybah field.

Shaybah prospects

Shaybah was discovered a generation ago in 1968. Since then Saudi Aramco has routinely listed the field's proven reserve base at 7 billion barrels – larger than all of Britain's North Sea and West of Shetland reserves. But, at least from a Saudi perspective, Shaybah is remote. It lies 550 km from the nearest major Saudi oil installation, at Haradh, and more than 600 km from the terminals at Abqaiq – even though its position on the border with Abu Dhabi puts it only 150 km from the UAE's Gulf coast.

A year ago King Fahd took the decision that Shaybah was to be developed on a fast-track basis. In June last year, Ralph M Parsons was awarded the programme management contract for the overall $2.5 billion project and in February, together with Saudi Aramco, Parsons unveiled four separate bid packages covering producing facilities (costed at around $750 million), infrastructure (costed at around $240 million), the Shaybah to Abqaiq pipeline ($590 million) and downstream facilities ($90 million). The first awards are expected in June.

Industry sources believe that Saudi payments problems and the complexities of

Natural gas meets growing power demand

For the time being at least, there are no plans to export natural gas, although the kingdom certainly has ample reserves. Instead, Riyadh plans to increase the use of natural gas for power generation.

Saudi Arabia has huge power generation needs. Demand for electricity, encouraged by low prices, had been rising at an annual rate of 17 percent up to 1994. The sharp rise in electricity charges introduced in early 1995 has only marginally reduced power demand that now stands at around 73,000 million kWh, generated through an installed capacity of some 22,000 MW. According to official forecasts, power capacity should reach 28,000 MW at the beginning of the new century.

The state owned Electricity Corporation has decided to implement an ambitious 25 year programme for building power capacity. Contracts have been recently awarded for new power stations in Riyadh and Shuaiba, while expansion is taking place at Ghazlan, Shuqaiq, Rabigh, Medina, Asir, Jizan and Riyadh. Most of the new power units are gas turbines or gas-fuelled combined cycle units — formed of one or more gas turbines exhausting into heat recovery boilers supplying steam to one or more steam turbines — a cheaper option than other fossil fuels.

These units will use only a small portion of the huge Saudi reserves of natural gas – estimated at the beginning of 1995 at 5,154 billion cubic metres.

With a relatively stable gas demand from industry and a residential sector too small to bear the cost of building gas distribution grids, power generation seems to be the most promising market. This offers the advantage of reducing local demand for crude oil and oil products and hence freeing crude for export. Because most Saudi gas is found in associated form, it is difficult to export as its output is tied to that of crude oil which sometimes fluctuates erratically.

Around 50 per cent of Saudi domestic gas consumption in 1994 totalling 37.7 billion cubic metres went to the electricity generation/water desalination sector, followed by the industrial sector (25 percent), the oil operations of Saudi Aramco (15 percent) and other public activities (10 percent). The share of the power generation/water desalination sector in total domestic gas consumption is expected to increase, although slightly, throughout the next 15 years when total gas demand is forecast to reach 55 billion cubic metres.

To meet the growing gas demand, Saudi Arabia has been executing many large gas gathering and processing schemes. The most important, the Master Gas Gathering System (MGGS), became operational in the early 1980s and is now being expanded. The MGGS collects associated gas at gas/oil separation plants and pipes it to processing plants in the Eastern Province where impurities are removed, hydrogen sulfide is recovered for conversion to elemental sulfur and a sweet, dry gas is extracted for use as fuel or feedstock. From gas processing centres located at Shedgum and Uthmaniya, the remaining natural gas liquids (NGL) are piped to plants at Yanbu, Ras Tanura and Juaymah for fractionation into separate components. After the removal of ethane for use as a petrochemical feedstock or as a supplemental fuel, the NGL is further fractionated into liquid petroleum gas (LPG) and natural gasoline. The NGL from the Berri gas plant that does not collect ethane goes directly to Juaymah for fractionation. LPG is exported from Yanbu, Juaymah and Ras Tanura. In the fractionation plants, ethane is produced in gaseous form for use as a petrochemical feedstock in the industrial complexes at Yanbu and Jubail. Some butane is also used as feedstock at Jubail.

The capacity of the MGGS has been expanded in recent years, with the installation of additional gas gathering facilities. Processing capacity is now projected to reach around 75 billion cubic metres/year by 2005 from the original nominal capacity of 47 billion.

Further gas gathering schemes at Manifa and Zuluf fields were completed in 1993 and 1995 respectively. The 1993-96 MGGS development programme has been dominated by gas lift projects at Berri and South Safaniyah, costing $475 million. In 1997, Saudi Aramco will start work on four small gas gathering projects at a total estimated cost of $155 million. Future plans include a major $690 million gas gathering and lifting project at Central Safaniyah, two further phases of gas gathering at Manifa, costing $400 million, with the first phase coming on stream in 1998. The second phase will be operational in 1999, together with a $150 million gas lift project at Zuluf.

Naji Abi Aad

the project are likely to lead to substantial delays. Yet Aramco and the Saudi government have clearly given the project top priority. Aramco has said that the goal is to start production at a rate of 500,000 b/d by the end of 1999 and subsequently at a rate of 1 mb/d. Moreover, diplomatic sources in Riyadh suggest the kingdom intends to have some production available as early as 1998.

The Saudi Oil Minister (and former Saudi Aramco Chief Executive) Ali Naimi has constantly stressed that Shaybah is being brought on line to maintain Saudi capacity and not to increase it. It is necessary, he argues, to offset projected declines in the supergiant Ghawar oilfield. It seems more reasonable to consider that even if some of Ghawar's capacity is closed in, producing such a field as Ghawar would still imply an overall increase in total Saudi capacity. In this context, the emphasis in the recent IEA study on the rest of the world's reliance on Middle East producers to meet expected large rises in global demand should be borne in mind. The

IEA study (see *Petroleum Review*, February 1996) specifically forecasts that the kingdom will have a production capacity in excess of 11 mb/d once Shaybah comes on line.

Shaybah's development is particularly relevant in an OPEC context. On the one hand, it offers the kingdom an ability to increase its earnings whilst remaining within its quota; on the other hand, it gives the ability to increase output substantially should it ever come to feel that its revenue interests are no longer best served by adhering to quotas that fall so far short of its actual production and export capacity.

Financial crisis

The key issue is revenues. In 1994, the kingdom faced a very severe financial crisis and it is not yet clear that this crisis has been overcome. But two factors have certainly improved matters: oil prices rose in 1995 and for every one dollar increase in oil prices, the kingdom can expect to secure, on the basis of current OPEC quotas, an extra $2.7 billion in revenues. But the kingdom has also been engaged for several years on a sustained programme to maximise the return on its crude exports by narrowing the differential between the average price it obtains from its own exports and such markers as Brent or West Texas Intermediate. In 1993 the gap between the price the kingdom received for its crudes and Brent was routinely around three dollars, while there was a four dollar gap with WTI.

But in 1994, Saudi Aramco completed a programme to produce 200,000 b/d of Arabian Super Light crude from 85 wells in the newly discovered fields of the central region. These fields – Hawtah, Ghinah, Hazmiyah and Um Jurf – produce crude oil with an average gravity of 48° API. Output from these fields, transported via a 330 km new link to the main East-West Crude Oil Pipeline system, in effect raised Aramco receipts from its sales by around a dollar. Although Shaybah's crude is not so light – it averages around 41.5° API – the greater volumes of oil coming out of Shaybah should have a comparable impact on oil revenues. In other words, development of the central and Shaybah fields should, between them, ensure that the kingdom receives more than $5 billion extra per year in oil income. This extra income represents a vital contribution to the kingdom's finances, accounting for up to two percent of its GDP and helping the government to cut into its recent severe series of balance-of-payments deficits, which in recent years averaged more than $10 billion a year.

Saudi Aramco proved its ability to mobilise resources effectively to increase output in its response to the Kuwait crisis of 1990 and the consequent UN sanctions which took 3.0 mb/d of Iraqi output and a further 2 mb/d of potential Iraqi-controlled Kuwait output off the market. Seventeen previously mothballed gas oil separator plants (GOSP) were brought back into service and two new offshore GOSPs were installed in the giant Marjan project. These came on line in 1993 and were followed by a further pair of 250,000 b/d GOSPs at the Zuluf field in 1994. Onshore, two new 300,000 b/d GOSPs were completed by 1993 to serve the Uthmaniyah and Hawiyah areas of Ghawar, whilst a new central water injection plant was constructed at South Ghawar to maintain reservoir pressure.

Saudi Aramco has also stressed its use of advanced technology in offshore drilling techniques including a new multi-well offshore platform which consists of prefabricated modules that can be stacked to form structures capable of producing oil from any depth of water in the kingdom's Gulf fields. The company notes, however, that such advances are intended to maintain offshore production potential rather than to expand it.

Scope for expansion

There is certainly scope for significant further development. Aramco has noted that its achievements in the central region cover what it terms 'the initial production from these new fields,' implying expected output increases to come. Even with Shaybah on line, the kingdom will scarcely have reached its full potential. Aramco's original remit, when it was a US joint venture, essentially covered only the Eastern Province and the Gulf. But once it became a Saudi company in the 1980s, its remit was extended to cover the whole kingdom, save only those concessions related to the former Neutral Zone with Kuwait.

In 1986, the company initiated a nationwide programme of exploration and in 1989-94 made no less than 15 oil and gas discoveries. Eleven of those are in the central region, including the fields now producing Arabian Super Light. But in 1991 Aramco also discovered gas at Kahf in the northwest of the kingdom, a field which ENI considers could be easily linked in to the current Egypt-Israel gas line now under active consideration. Subsequently, a string of oil and gas finds were made at sites in the Red Sea coastal plain, ranging from Midyan in the far north to al-Wajh near Yanbu. These discoveries, however, have so far had only a relatively modest impact on overall proven reserves. These are now put at 259 billion barrels of oil for Aramco's area (with further 3 billion barrels in the former Neutral Zone) and 186.1 trillion cubic feet of gas.

The future of motorfuels retailing in Poland

By L Buckholz
Senior Project Manager
Enerfinance

While the oil markets of Hungary and the Czech Republic may offer more predictable prospects in the short term, Poland is the market that sets western oil companies' planning departments dreaming. A population of 39 million (four times the size of Hungary and the Czech Republic), car fleet growth of 5-7 percent per year, oil product consumption growth of 8 percent per year, and a serious lack of modern high-performance service stations all suggest unlimited potential for expansion on the doorstep of Europe where potential is limited.

And yet as every operator on the market knows, all this potential is just that: potential. Endless analysis is met with some cynicism by established operators, who after five unprofitable years feel that 'perseverance' is perhaps the better description.

Both viewpoints are correct. The Polish motorfuels market was among the most dynamic in Europe in 1995, as it has been over the last several years and will continue to be well into the next decade. Diesel/gasoil consumption rose by 3.2 percent between 1994-95, while gasoline consumption rose by 11 percent. The country appears to be well on the way to achieving a 14 million tonnes/year motorfuels market by 2005. And consumers are rapidly getting used to new western-style standards of service and merchandise when they purchase fuel. Shop sales too have gone from zero to as much as 30 percent of turnover in just five years.

But accessing this market is turning out to be slower than foreign entrants expected. While the market was opened to competition on the retail side early on, resulting in a proliferation of small independent retailers and new foreign companies, nothing else was deregulated. Foreign and Polish independent companies were permitted to compete with state-owned retailer/distributor Centrala Produktow Naftowych Pans (CPN) while saddled with import quotas, heavy taxes on imports, no access to national logistical assets, no possibility of investing in refining and forced to follow CPN's lead on prices.

Tariff barriers

Tariff barriers on motor fuels imports are among the most important of the problems. These make retail operations using imported product impossible. While tariffs on imported fuels have been on the decline over the last three years – from 21 percent to 15 percent on gasoline, and from 41 percent to 25 percent on gasoil – Poland angered its EU and CEFTA trading partners by its surprise decision this year to raise the tariff on gasoline imports from both these regions. Foreign operators are unable to import product from their European refineries, and yet are also squeezed by the aggressive pricing strategies of the Polish refineries on the wholesale side. The state-owned refining companies are able to import because they receive a rebate on import and excise taxes paid on motorfuels imports used to blend better-quality products. CPN also receives a small rebate on excise tax, justified on the grounds that it manages national product stocks and storage infrastructure. Until the barriers are removed, non-national entities cannot hope to compete with the domestic companies.

Removal of the barriers is contingent on the 'restructuring' of the oil sector, according to the Polish government. In theory, Poland is supposed to have spent the last few years hammering out a programme for overhauling its downstream oil sector – to make the sector competitive enough to withstand the onslaught by foreign operators. But late last year Poland announced it would apply to extend the tariff barriers until 1999, as is permitted under the terms of its Association Agreements in the event that restructuring of the oil sector is deemed insufficiently advanced. European oil companies claim that Poland has deliberately not advanced its restructuring in order to retain the barriers as long as possible.

Some western oil companies feel that Poland will again seek to prolong the extension period up until it actually joins the European Union, while others feel that by asking for the current extension, Poland has played its hand and that further delays will be impossible. Even so, no real liberalisation of the market will occur before 1999 at the earliest and possibly not until after

Poland's adhesion to the EU. The pay-off period for some will indeed be long – Exxon opened its first site in Poznan in 1991.

Lengthy but inevitable process

Yet despite the discouraging current situation liberalisation is inevitable. While certain participants may be able to slow the process, at this point they cannot halt or reverse it.

The oil sector is just one sector under discussion in the integration process outlined by the Association Agreements signed in 1991 between Poland and the European Union. The negotiations concern multiple sectors, some of which (coal, steel) have much more strategic weight than the downstream oil industry. Assuming that Poland's wish to join the EU is serious, it needs to give strong signals of its 'good intentions' in at least some of these sectors if it wants to avoid antagonising its negotiating partners.

Both negotiating partners have some leverage. Poland must cede on some points but it can also direct the process itself to a certain degree, particularly in terms of timing. The signs are that Poland will indeed try to push back the reform process to the last possible moment: the unwillingness to structure a concrete programme for reform, the invocation of delay in tariff barriers, and the general climate of protectionism all suggest this eventuality.

Delaying tactics may backfire

But the delaying tactics may be in vain. First, while Poland has finally evolved the basic structure of the company, Nafta Polska, that will regroup its national downstream assets, the current structure by no means guarantees the strong, competitive player the government is seeking to create. Secondly, Poland has also lost a lot of time. During the period of protectionism virtually no reforms that would allow its national entities to emerge as competitive operators – cost-cutting, staff reduction, administrative reorganisation – have been carried out. Even if Nafta Polska, which Poland has always presented as the preliminary step in any restructuring, were launched tomorrow, the country has very little time in which to carry forward its proposed programme. The Polish government thus has failed to put in place anything to defend a domestic operator challenged by the sudden arrival of more competitive operators.

Analysis of the deregulation process in other countries indicates that the government should, at a minimum:

1) Create a diversified new entity, regrouping all or part of the upstream activities in the country, downstream activities, viable petrochemical activities, and, above all, gas distribution activities. This diversification gives the operator sufficient weight within its own market to be competitive. The examples of Repsol and MOL show that gas distribution – where monopoly or regional monopoly distribution is more or less assured – operations are key. Nafta Polska is insufficiently diversified and includes only refinery shares, some of the CPN network, the CPN rail tanks and storage depots.

2) Act as rapidly as possible, in order to give the newly created entity the longest possible period in which to adapt. Poland has not undertaken any of these measures to date.

3) Put in place substantial protective measures during the transition period, shielding the operator over approximately five years. It is important that the new entity be able to benefit from the protection period in the distribution sector, and most especially in its network activities. It now appears that part of Poland's restructuring will have to be carried out after the barriers have to be removed. When the network activities of a company like CPN (formerly charged with managing the supply of oil products to the country, not with marketing) are not both massively modernised and at the same time protected during the transition period, there is risk of collapsing as Minol in East Germany did.

Instead of creating a strong national company, Poland may find that its only

BP opened its first service station in Poland in August 1995

option is to sell off the component parts of its downstream industry. But buyers may be in short supply. Most of the potential investors have excess regional refinery capacity, while Plock refinery, overstaffed and with potentially enormous environmental problems, may have few takers. Gdansk refinery would be more attractive but only to those investors with no local capacity. The CPN network is losing value, as its market share is constantly eroded. Some observers feel that the network is overrated anyway, and that only one-quarter of the sites are worth the cost of rebranding and environmental upgrading.

Refineries increase their weight on the market

For the moment, the delay in restructuring continues. One of the primary reasons is that none of the component companies really wants to be included in Nafta Polska at all. CPN and the two major Polish refiners, Petrochemia Plock and Raffineria Gdansk would prefer to continue to remain independent. These refineries have made rapid progress in re-orienting their operations in the new market economy, and under the current protectionist regime have greatly increased their profitability and their autonomy. The two companies formerly channelled most of their production through CPN, both wholesale and retail volumes. But the refiners distribute an ever-increasing proportion of their output directly – to major industrial users, supply contracts with small retailers, refinery gate sales to wholesalers. In 1994, the refineries covered 50 percent of the diesel wholesale market and 29 percent of the gasoline wholesale market. Both have plans to increase these percentages.

Moreover, the Plock refinery is following a deliberate policy of squeezing official wholesale margins down to a level where it is impossible to cover normal loading, storage and reloading costs. While Gdansk offers wholesale margins above those offered by Plock, these still appear inadequate to cover normal costs.

Both refineries are also moving into retailing operations, particularly franchising. The Gdansk refinery had a network of 10 franchised sites in March, with 40 more sites scheduled for completion by year-end. Plock has only one company-owned site so far. In March, the group reported 51 franchised sites, with plans for more.

Both refineries, particularly Plock, are likely to continue to play important roles on the market, whether inside or outside Nafta Polska.

This should not suggest that they are on safe ground. Their strong position arises because they have been protected.

Supply outlook

Calculations show that the Plock refinery has a natural market of 50-75 percent of the total market, depending on the degree to which the Plock price differs from the CIF NWE quotation. Surprisingly, Gdansk also has a large natural market which extends not only towards the south as far as Warsaw, but also towards the east.

However, while a certain role is assured, the failure to put in place substantive restructuring makes the Polish refiners vulnerable after protectionism ends, given the pressures from other refineries – the eastern German, Scandinavian and even the Czech refiners all have surpluses they would like to direct towards the Polish market. Overall regional pressures would be aggravated by plans of both refineries to add hydrocracking capacity.

Enerfinance calculations show that there is room for Schwedt and Litvinov

supplies, with each potentially supplying perhaps 5 percent of total Polish demand, once tariff barriers are lowered. The Leuna refinery, on the other hand, is doomed by its geographical position to supply only the most limited volumes, since it is squeezed between Schwedt and Litvinov, which will be in tight competition with the Polish refiners.

Supply and logistical issues are thus key in Poland, and are central to the development of competitive retailing operations.

Long-term outlook for the network

So what exactly are the opportunities further downstream? For the foreign companies already in Poland, the current profitability situation is glum; some may not be able to hold out until the market is fully liberalised. But even once the market is liberalised, there is not room on the Polish market for a dozen foreign operators all with plans for networks of 100+ sites.

The size of the Polish network, at roughly 4,800 sites, has remained stable over the last few years. CPN has invested in upgrading, rather than expansion, and foreign companies, with only 100 outlets, have hesitated to build up networks as long as tariff barriers persist.

While the refiners have built up small networks of franchised and branded sites, the biggest change over the last five years has been the appearance of so-called independent sites. These currently represent approximately 3,300 sites, equal to almost two-thirds of the network. But in terms of both location and quality, only a limited number of these sites can be described as 'real' service stations. The remaining sites are former garage station pumps that have simply been opened to the public (belonging to either agricultural machinery or public transport depots).

By 2005, Enerfinance forecasts a network of 5,200-5,700 sites, representing a rise of 20 percent in the total number of sites. While this is a strong increase, the shift in the composition of the network will be much more dramatic, as a large number of old service stations will be closed and replaced with modern sites. However this process is expected to be lengthy – in 10 years there could still be as many as 2,000 such sites. Filling stations/independent sites are expected to remain a feature of the Polish market for several reasons. Because they exploit family labour, these sites can survive in even very adverse conditions. Independently owned sites are often located in the countryside and are thus not in areas targeted by either CPN or by foreign operators: even if these operators wanted to leave the business it would be extremely difficult to find buyers. In fact, there is a role for them, given the dispersed, rural population of Poland. However the volumes sold by such sites, and hence their market share, are expected to decline rapidly.

Still, there is clearly a need for a large number of new service stations. Which companies will be involved? Last year was marked by the entry of several new players – Amoco, BP and Texaco. Some operators feel that since the Polish market has been 'stalled' over the last few years, these latecomers have not really missed their chance, provided they are willing to invest significant sums. Other disagree, claiming that the best sites in urban areas had been secured giving a lead that those now entering the market could never hope to match.

Given the strength of the Polish refiners, profitable operations are going to turn on logistical and supply advantages. On an operator-by-operator basis, some companies have supply options which they should take into account in determining the geographical spread of their networks. Some companies are probably being unrealistic in expecting that they can run competitive Poland-wide marketing operations without their own supply.

With its increase from six sites at end-1994 to the current 24 sites, Statoil has signalled its serious commitment to the Polish market. While the company has the financial strength to undertake this kind of long-term planning, it is undeniably well placed to achieve its network goals. Its plan to build a country-wide network appears less achievable, although at present sites are in the northern region which Statoil can reasonably hope to supply.

Similarly, Shell is in a good position with supply from Norway, Sweden and Denmark also from its share in the IOC consortium. This is coupled with Shell's extremely wide experience in every type of developing market, experience which other operators with good supply options cannot match. Neste, which might benefit from its Finnish refining and logistical synergies with its networks in the Baltics, nevertheless marked a pause in its network expansion over the last year, discouraged by the poor environment for non-domestic companies.

Operators like DEA and Agip, with capacity at Schwedt are showing prudence in targeting – at least so far – a western area network. However, Plock is surprisingly competitive in certain western regions and operators should not count on winning a share along the entire western border. Other operators appear to be taking major and possibly unrealistic gambles, lacking any kind of logistical advantage. Neither BP, Texaco nor Amoco has a particular logistical 'reason' for being in the Polish market, although it is possible that Texaco will tap its co-operation with Norsk Hydro to cover supply needs in Poland.

Conclusion

A final element in the development of retail networks in Poland is worth noting. Demographically and geographically, Poland offers a near-perfect profile for the development of hypermarkets – a large area, a high percentage of the population in rural areas, car equipment rates at equal levels in urban and rural areas, a lack of town centres in rural areas (a unique feature of the Polish rural sector). While the situation is unlikely to become as ruthless as in the United Kingdom or France, it is nevertheless a potential development worth monitoring by those interested in participating in the Polish motorfuels market.

Enerfinance has recently published a study, *The Future of Motor Fuel Retailing in Poland.*

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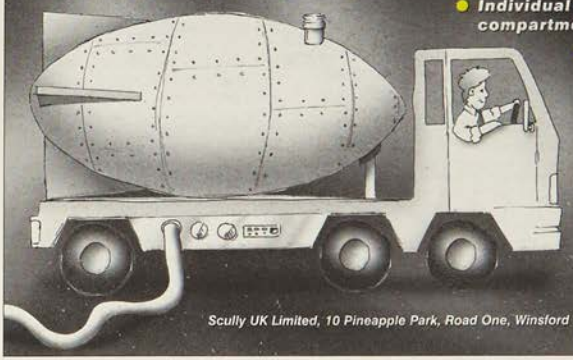

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The likely fate of forecourt shops – boom or bust?

By Kim Jackson

Service station forecourt shops accounted for 2 percent of retail sales in the United Kingdom in 1995, compared with just 1.6 percent of retail turnover in Germany and 0.3 percent in France. Indeed, UK forecourt shop sales have grown at a rapid pace, increasing by more than 40 percent over the past four years to reach £2.9 billion in 1995, a trend significantly boosted by the sale of National Lottery tickets in 1994/95.

Turnover in forecourt shops has, in fact, risen in all three countries despite the continuing decline in numbers of service stations. This decline has been fastest in France – over 24,500 sites have closed down since the mid-1970s. Approximately half of the service stations in Germany have disappeared in the same period, while the total number in the United Kingdom has fallen by under a half to about 16,200 last year.

These are the findings of a new study by Corporate Intelligence on Retailing. Entitled *Forecourt Shops in Europe*, the three-volume report provides a detailed analysis of the petrol forecourt shop business in the United Kingdom, France and Germany – the three largest markets in Europe.

A wider perspective

Falling fuel margins have been the main long-term reason for forecourt operators turning their attention to other possible sources of revenue. Indeed, this development has been actively encouraged by the oil majors who have adopted a progressively more professional approach to forecourt shop retailing in recent years by bringing in specialist management, negotiating new supplier contracts and developing new convenience store formats (some transnational) for both their own and independently-owned service stations. Meanwhile, many independents have established their own shops and wholesale links.

Those operators who have not expanded their forecourt services beyond the supply of fuel have suffered in the current petrol pump price war. As a result, at the beginning of this year, the UK Petrol Retailers' Association forecast that a protracted price war could reduce the number of UK service station outlets by a further 7,000.

While the motivation has essentially been the same in the United Kingdom, France and Germany, the outcome of the new forecourt shop strategies adopted over the past five years differs somewhat between the three markets.

As already mentioned, UK forecourt shop sales have more than doubled in the 1990s, boosted in particular by the sale of National Lottery tickets from the end of 1994. Some 9 percent of all lottery terminals in 1995 were installed in UK forecourt shops and accounted for 6.5 percent of total lottery ticket sales. This figure increases to 11 percent if the sale of Instant scratch cards is also taken into account.

Meanwhile, sales growth in France has been hampered by strong competition from the hypermarkets and supermarkets which account for nearly half of French motor fuel sales yet have no forecourt shops – not least because they are not permitted by law to sell ciga-

France, Germany, UK: Service Station Trends, 1975-1995

	France	Germany[b]	UK
No. of service stations[a]			
1975	42,360	35,519	31,426
1980	40,174	27,026	25,527
1985	34,324	19,019	21,140
1990	25,389	18,271	19,465
1994	18,656	16,450	16,971
1995	17,500 e	16,038	16,200 e

a Excluding motorway sites

b West Germany only: 18,300 in 1995 including eastern Germany

e estimated

Source: DHYCA (France); EID (Germany); Petroleum Review (UK).

rettes. There are also restrictions on newspaper and magazine sales.

In contrast, Germany has faced no such inhibiting constraints and has a particularly high level of sales per outlet – $622,379 per outlet compared with $345,769 per outlet in the United Kingdom and $108,000 in France, according to the report. Indeed, German forecourt shop operators benefit hugely by being exempt from the country's restrictive shop opening hours laws which limit other retailers' selling potential.

Facing the future

The report predicts that the number of service stations will continue to decline in the United Kingdom, France and Germany over the next few years with rural service stations, with no or minimal shop facilities, facing the greatest risk.

In the United Kingdom, the researchers expect forecourt sales to continue to outpace those of retailing in general in an increasingly competitive convenience goods market. Oil majors are expected to extend the current range of special offers available at their forecourt shops (such as loyalty cards, vouchers, free gifts), further raise the profile of their outlets, differentiate and refine their product mix – including more food service initiatives – and to place more emphasis on raising the level of customer service. Product turnover, excluding lottery sales, is forecast to rise from just under £2.6 billion in 1995 to nearly £2.75 billion in 1996 and about £3.45 billion by 2000.

Meanwhile, competition from hypermarkets and curbs on tobacco sales are expected to continue to constrain sales growth in France. However, the report suggests that some oil companies may introduce newer formats to boost short-term sales although, in the longer term, it may take a while for full potential to be reached given the French consumers' reluctance to make purchases at service stations. Most emphasis is expected to be placed on prestige autoroute sites and large-format urban convenience stores that outdo the traditional local grocer. French sales are forecast to rise from FFr 5.4 billion in 1995 to over FFr 7.4 billion by 2000.

The more mature German forecourt shop market is expected to show continued steady growth. The oil companies have scope to improve on existing formats and product offers and much attention is expected to focus on convenience grocery products. Sales of DM12.1 billion in 1995 are forecast to rise to DM15.8 billion in 2000.

France, Germany, UK: Forecourt Forecast Shop Sales to 2000

	1995	1996	1997	1998	1999	2000
France (FFr mn)	5,400	5,885	6,415	6,800	7,210	7,425
Germany (DM mn)	12,100	12,765	13,470	14,210	14,990	15,810
UK (£ mn)a	2,575	2,730	2,895	3,065	3,250	3,445

a Excluding lottery ticket sales

Source: Corporate Intelligence on Retailing estimates

Pricewatch causes upheaval at the pumps

The motor fuel price war initiated in January in the United Kingdom continues unabated, though prices have tried unsuccessfully to edge upwards again. Gasoline is in some instances now being sold below spot market prices – which have moved upwards in recent months.

By Carol Reader

The price war was launched by market leader Esso which extended its Pricewatch promotion from successful trials in Scotland and northeast England to the whole country. Esso aimed to match supermarket prices within three miles and prices at other outlets within one mile of each participating Esso service station, claiming that 70 percent of the population lives within two miles of one of its 2,000 outlets. At the same time it withdrew its long-established Esso Collection tiger token promotion.

Esso made this bold marketing move because earlier research showed that the prime requirement of its customers was low price. Esso Managing Director Ian Upson said, 'Esso is committed to giving its customers what they want which is quality fuels and convenient locations, but at lower prices. We have not started a price war as we're not undercutting the market but matching low prices which already exist, and it is not our intention to put anyone out of business.'

However, it caused mayhem amongst all its competitors – the other oil companies, the supermarkets and above all the independent retailers. According to a recent report from consultants Wood Mackenzie in Edinburgh, the effect on gross margins has been 'devastating'. Esso's move led to a marked reduction in average pump prices in the following weeks and, remarkably, an absence of price rises in March/April when bulk wholesale prices rose on the Rotterdam spot market. Was this why supermarkets increased their prices in early April, just before everyone took to the roads at Easter? At this time Shell, unusually, did not match the supermarkets' change and consequently prices moved lower again, cutting gross margins even further.

Winners and losers

Pricewatch is said to have brought Esso 'significant' increases in volumes sold. On the other hand, the losers have been the supermarkets, which admit that without their usual discount advantage they have lost sales. No actual figures are available as petrol sales are usually combined with the total retail sales in supermarket statistics. As a counter measures to Pricewatch, Tesco Club Card owners can now use their cards on forecourts for the first time, while some Sainsbury stores are offering discounts at the pumps if customers have already made purchases in the store. However, in some areas it is now possible to find that a supermarket's prices are not the lowest available.

The other losers are the independent dealers who are not in a position to compete on price. However, there are marked price variations throughout the country and averages published by various sources conceal wide price differences. In areas where there are no nearby supermarkets obliging Esso and others to bring their prices down or where no oil company support is given, prices are still much higher – by as much as 9 pence per litre. The difference between the lowest and the highest price nationwide for 4 Star gasoline is as much as 20 pence per litre.

However, the Petrol Retailers Association and others continue to protest loudly, desperately concerned that some of the independent retailers may be forced out of business, particularly in rural areas.

A recent report from NatWest Securities forecast that by the end of 1997 a cut of 20 percent in service station numbers was likely, with supermarkets featuring among the top 10 retailers.

Keith Greenhead, Divisional Manager, Fuel at PHH Vehicle Management Services, said in April, 'Many smaller fuel retailers are struggling against losses which have been engineered by the major companies to kill off the opposition and give them a bigger slice of the cake. If the market contracts, prices could rise significantly.... There will be far fewer places to fill up, with many rural areas utterly devoid of filling stations and less opportunity to shop around.'

The latest PHH statistics, based on business drivers using its AllStar Fuelcard, confirm that in April the lowest diesel, unleaded and superunleaded prices were in the city of Glasgow and the lowest 4 Star even further north in the town of Inverness. This low range must presumably indicate the success of Esso's first trials of Pricewatch in Scotland – which are still continuing.

The Parliamentary Select Committee for Trade and Industry is currently investigating petrol retailing and considering whether independent retailers should be protected from the 'unfair' practices of the retail chains and wholesale suppliers. Evidence has already been presented by a number of interested parties such as the supermarkets, the major oil companies, the PRA and the Office of Fair Trading, while oral

hearings are scheduled for the end of June and the committee's report will be made public later in the summer.

Pricewatch represents one company's reaction to the downstream challenges of today – static UK demand for petrol, declining profit margins and the growth of fuels business done by the supermarkets. Some oil companies have already moved out – Amoco and Burmah – while BP and Mobil are proposing to merge their European fuels and lubricants operations in order to maximise savings. Texaco is one of the companies that bring in extra revenue by concentrating on service and additional facilities; it has partnerships with Pizza Hut and Burger King. Others have similar deals, while many outlets have benefited from a totally new source of revenue – sales of National Lottery tickets.

It is generally agreed that the number of UK service stations closing this year will be high, perhaps 2,000-4,000. Roger Ebert, Managing Director for Manufacturing and Marketing, Texaco Ltd, summed up the increasingly tough conditions recently when he said, 'Whatever happens, petrol retailing in 10 years' time will look very different to the way it looks now.'

Statoil has developed a concept that is being used for all its new service stations in Germany, Poland and also in the Baltic states where every year it is opening 15-20 outlets, selling only unleaded gasoline. The new concept is also being incorporated when sites are upgraded – for instance in Ireland and Sweden. The new design aims to be functional as well as customer- and environment-friendly.

Environmental protection is an important element together with the recovery and re-use of materials. All sites are classified individually according to the environmental vulnerability of their surroundings. Where necessary, double-skinned tanks and/or automatic leak alarms are installed.

At Swedish service stations wastewater treatment facilities are installed in order to recover and recycle waste water from car washes and to reduce the consumption of chemicals. Even the illuminated signs are being examined, with low-energy systems under consideration in order to save energy.

All Statoil's service stations in Sweden have Stage 2 vapour recovery systems. In addition, the sites have automated tank metering, to reduce vapour emissions still further.

An innovative feature currently being tried out are old refuse bank waste disposal facilities, erected on the forecourt. Customers, and members of the general public, will be able to dispose of coloured and clear glass, tin and aluminium, paper and cardboard. The collected materials will then be sent to the appropriate facilities for recycling.

So far the collection points have been installed only in Sweden and in Ireland.

To reduce its own waste, the company is investigating the sale of lubes by pumps rather than container in order to cut back the quantity of waste packaging.

How the army fuels its operations

Field Marshall Erwin Rommel once said, 'Guns and ammunition are of little use in mobile warfare unless they can be transported by vehicles with sufficient fuel.' General George S Patton is reputed to have said, 'My soldiers can eat their belts but my tanks gotta have gas.' These statements, whether apocryphal or not, are even more apposite when applied to today's high-technology warfare than they were in the less sophisticated times of World War II. Even before the onset of a conflict, the full technological paraphernalia of a highly mechanised military machine requires vast quantities of fuel to be made available, be it on a beach or seaport of entry, on an inland airfield, or in a forward maintenance area. Without this fuel, all the expensive hardware of war becomes so much scrap metal.

By Lt Col MD Cooper, and WO2 N Jackson, Royal Engineers

Role of the Royal Engineers

The role of the Corps of Royal Engineers is to assist the armed forces to fight, move and live. Royal Engineer soldiers are military engineers – two types of engineer for the price of one. Firstly, they are combat engineers with the trades and skills to assist combat arms with their warfighting task. Secondly, they are general engineers with skills in many areas which can be used to support all phases of military operations. These include the logistics of fuel supply. However, within the UK Armed Forces, the responsibility for the provision of fuel to support operations

Operation Granby: Al Jubayal fuel tank farm. Designed and constructed by the Royal Engineers

is not simple. The Royal Logistic Corps is responsible for the storage, handling, quality control and transport of bulk fuel, whilst the RAF carry out a similar task within airfield perimeters. The Royal Navy is responsible for bulk movement by ship and the provision of anchorages for those ships. The Royal Engineers' role crosses many of the inter-corps and service boundaries and their task in support of operations is to design all types of installations, supply the specialist materials to build them, supervise and carry out their construction, test them and then, with the operator, commission them. Once they have been handed over to the operator, the corps provides technicians for the first-line repair of specialist fuels engineering equipment.

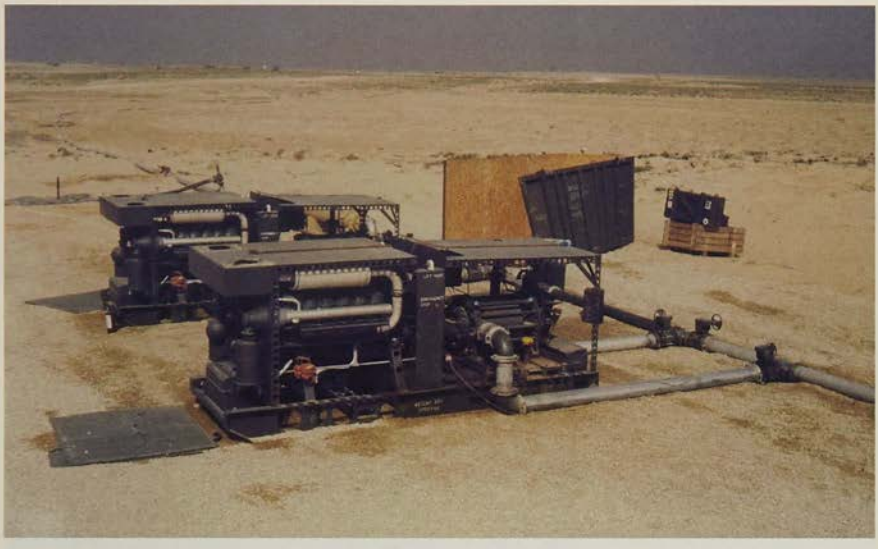
Within the Royal Engineers are two units essential for fuels engineering tasks. Firstly, the Specialist Team Royal Engineers. The corps has five of these teams, in both the Regular and Territorial Army, with a sixth Regular Team soon to be established. They are small teams of 20 to 30 men, commanded by a major who is a chartered engineer. They carry out design and project management, doing the technical design and construction plan for any fuel task and then supervising its construction. The Specialist Team includes essential technician and artisan tradesmen, specialist incorporated and technician engineers, petroleum fitters and machinists, specialist welders and draughtsmen.

Secondly, the Engineer Regiment which actually provides the plant, labour and resources as well as the essential command framework for such an operation. This unit totals 700, organised into a number of squadrons, and will take the Specialist Team under command for a fuels operation.

Cold War experience

During the Cold War the Royal Engineers were responsible for supplying Royal Army Ordnance Corps (later the Royal Logistic Corps) bulk fuel installations, which petroleum operators constructed and operated from equipment held within their Petroleum

Operation Yarra: Overhaul of filtration system on permanent fuel installation in Bahrain



Squadrons, with fuel drawn from emergency offtake points on the high-pressure Central European Pipeline System. Specialist Teams Royal Engineer, both Regular and Territorial, tapped into high-pressure pipelines, constructed cross-country pipelines up to five kilometres in length from the offtake to supply the installations, tested and commissioned these pipelines and then supplied the required fuel – diesel, petrol or aviation fuel.

With the widening of defence roles, after the Cold War, this task has 'mission-crept' to include the ability to offtake from any high-pressure system worldwide, as well as providing bulk fuel from such sources as rail tank cars, barges and ships.

One of the major roles of the Royal Engineers in peace, during a period of tension/crisis or war, is support to the RAF. Such support is provided both to main operating bases which are large permanent airfields with very complicated infrastructure and also, as a consequence of the RAF's ability to deploy airpower worldwide, to forward bases which may lack many of the sophisticated facilities of the main bases. In addition, RAF helicopters in direct support of land operations will need to operate from forward sites in the brigade or divisional area. The corps assists the RAF with the construction of installations and the provision of systems to supply bulk aviation fuel.

Operation Granby

For example, during Operation Granby, forward helicopter support bases were established with astonishing speed and regularity, often calling upon the knowledge of Sapper tradesmen not only on the technical design of workable fuel systems when equipment was scarce but in the battlefield engineering of protective bunds and troop shelters. Civilian airports were also utilised by the RAF as forward bases, bringing with it the problems of interconnection of military and civil fuel infrastructures, helping to form a militarily robust and viably engineered system that would allow operability of military equipment, whilst not interfering with civil procedures. This was a considerable task and took place at a number of locations including Oman, Bahrain, Dhahran and Tabuk. During peace time, assistance is often given to the RAF for such tasks as providing temporary fuel storage areas, whilst critical maintenance work has been carried out on permanent fuel installations. Other tasks have included the provision of tactical bulk fuel installations to provide extra fuel storage capacity during peak flying times – for example, during tactical flying exercises and air displays, or when aircraft are deployed to other airfields because of runway resurfacing or airfield redevelopment.

Amphibious operations, where troops are landed across a beach, are still a very effective way of deploying military power. Once ashore such

Operation Granby: Mainline pump station on the Kinghan Pipeline. Built by the Royal Engineers and the US Army Corps of Engineers

troops are very vulnerable until additional combat power can be landed. Much of this is mechanised and needs to be supported, particularly with fuel. The most rapid means of accomplishing this is to bring in the fuel from fuel tankers moored offshore by means of floating barges, or by constructing an undersea pipeline to transfer fuel from the tanker to an onshore storage facility at a rate of anything up to 700 tonnes per hour. This task would usually be carried out by an Engineer Regiment, utilising divers, plant operators, construction engineers, resources controllers and with the personnel from a Specialist Team under command. Once commissioned, the system is handed over to the Royal Logistic Corps to operate by means of fuel tankers, canal barges, overland pipeline, rail tankers or even by helicopters carrying underslung 1,900 litre rubber tanks.

During Operation Granby, apart from constructing bulk fuel installations, the Royal Engineers were asked to install a number of semi-permanent fuel tanks at Al Jubayal. The plan was to release the existing pillow tanks for use closer to the front line as well as creating a large buffer storage. When construction was complete, 42 permanent fuel tanks, each holding 125 tonnes of fuel, were manifolded together using local materials – a mixture of galvanised steel and high density polyethylene pipework (an example of Sapper improvisation). This gave a possible storage capacity of 5,250 cubic metres, enough for about 60 hours high intensity ground operations.

Also at this time the only method of transporting fuel to the forward areas was either by civilian hired road tankers whose drivers' skills were, at the very least, questionable or by the considerably overstretched resources of the Royal Logistic Corps tanker fleet. It was therefore decided to construct a cross-country pipeline from Al Jubayal (the force maintenance area) some 280 kilometres to Al Battin (the forward logistic area). The first 100 kilometres were to be constructed by the British.

Tragically, the designer of this pipeline, Major Jim Kinghan who commanded the Specialist Team in Saudi Arabia, was killed in the early stages of the conflict. His replacement inherited a comprehensive pipeline design portfolio enabling the successful completion of the first 100 kilometres in 20 days.

Contrary to popular opinion, the Kinghan pipeline, as it was later to be renamed, was not just 'slapped down' by the Royal Engineers but was, from conception, designed and planned in meticulous detail to a sound technical brief and paid great attention to local topography. The Royal Engineers, and the US Corps of Engineers, encountered sabkah, a type of quicksand swamp, precipitous rocky features that meant the re-routing of the pipeline or the anchoring of the pipe sections every 6 metres, and townships that had to be bypassed, not only for the safety of the local population but to stop opportunists helping themselves to a tank of free diesel. Several major roads were also encountered, where culverts had to be found to enable the pipeline to pass underneath, as well as a myriad of smaller trails that required the construction of buried crossings to allow the passage of Bedouin tribesmen in Toyota pick-up trucks! Once the pipeline was completed, tested and commissioned, it was capable of transferring almost 3,000 tonnes of fuel per day to the forward areas, so releasing manpower and scarce tanker assets for other tasks.

As a result of the destruction of key facilities by the Iraqis on their retreat from Kuwait, an immense works programme was undertaken by the Royal Engineers to help to re-establish power and water supplies. One of these tasks was the repair of Doha East power station. Here fuel had to be transferred from the permanent cross-country pipeline to the power station. Using a combination of military rigid and layflat pipes, as well as fittings from the power station warehouses that had not already been liberated by the Iraqis, a system was designed and built on the spot – without the luxury of design cells and drawing offices. The system consisted of nearly a kilometre of layflat hose, a couple of low-pressure pumps and an old water storage tank that had been re-commissioned for fuel storage. Again this task was carried out by the specialist fuels engineer tradesmen of the Royal Engineers – in particular, the specialist pipe welder from the Specialist Team who was able to cut into permanent pipelines and blank off open lines that were not required. None of this work would have been possible without the Royal Engineers' new Permanent Installation Repair Kit trailer that carried everything required to rehabilitate a permanent installation.

Bahraini task

After the end of the Gulf War, the Royal Engineers were asked to assist in the refurbishment of the permanent bulk fuel installations at Sheik Isa airfield in Bahrain. These installations, originally designed and constructed by the French, had been taken over by the Americans during Operation Granby but when the Americans returned home they were left in a state of disrepair. After three weeks both bulk fuel installations were up and running as well as a training programme for the Bahraini Air Force in their operation and maintenance.

Civil work

Support on fuel matters by the Royal Engineers is not limited to the armed forces – assistance has also been given to civilian agencies. For instance, in 1992 BP approached the army for assistance at their Sullom Voe oil terminal in the Shetland Islands. Petroleum fitters from the Specialist Team were asked to provide temporary fuel storage, whilst the terminal's own diesel storage tanks were overhauled. This was carried out by constructing bunded fuel tanks within the installation and running connecting pipework via low-pressure pumps to the terminal's diesel turbines.

With the knowledge gained from recent operations and new skills acquired from civilian contacts, the fund of expertise that can be called upon enables the Royal Engineers to carry out a range of activities, both military and non-military.

Forthcoming Events

June

3rd-4th
London: 'Automotive, Aviation and Marine Fuels'. Details: Abacus International, 214 Inchbonnie Road, South Woodham Ferrars, Essex CM3 5WU.
Tel: 01245 328340
Fax: 01245 323429

3rd-4th
Norway: 'Restructuring of the Nordic Electricity Industry'. Details: Bookings Department, IBC Financial Focus, 57-61 Mortimer Street, London W1N 8JX.
Tel: 0171 453 2703
Fax: 0171 323 4298

3rd-6th
Florence: '29th ISATA'. Details: The ISATA Secretariat, 42 Lloyd Park Avenue, Croydon CR0 5SB.
Tel: 0181 681 3069
Fax: 0181 686 1490

4th-5th
NEC Birmingham: 'Profitability through Innovation – The European Petroleum Industry's Response to a Regulated Retail Market Conference'. Details: Fiona Horan
Tel: 0181 742 2828
Fax: 0181 747 3856

4th-6th
Birmingham: 'Forecourt '96'. Details: Forecourt '96 Team, Blenheim Exhibitions & Conferences Ltd, Blenheim House, 630 Chiswick High Road, London W4 5BG.
Tel: 0181 742 2828
Fax: 0181 994 9735

4th-7th
Azerbaijan: '3rd International Caspian Oil & Gas Exhibition & Conference'. Details: Spearhead Exhibitions Ltd, Ocean House, 50 Kingston Road, New Malden, Surrey KT3 3LZ.
Tel: 0181 949 9222
Fax: 0181 949 8186

5th-6th
Gaydon: 'Gear up for Gas'. Details: Natural Gas Vehicle Association, 11 Berkeley Street, Mayfair, London W1X 6BU.
Tel: 0171 388 7598
Fax: 0171 355 5099

6th-7th
London: 'Best Practice Logistics in Oil Supply and Distribution'. Details: Debbie Graham, IIR Ltd, 6th Floor, 29 Bressenden Place, London SW1E 5DR.
Tel: 0171 915 5055
Fax: 0171 915 5056

10th-11th
Aberdeen: 'Mooring & Anchoring'. Details: The Bookings Department, IBC Technical Services, 57-61 Mortimer Street, London W1N 8JX.
Tel: 0171 637 4383
Fax: 0171 631 3214

10th-11th
London: 'The Financing and Economics of Gas and Electricity Projects'. Details: IBC Financial Focus, 57-61 Mortimer Street, London W1N 8JX.
Tel: 0171 453 2703
Fax: 0171 323 4298

10th-12th
London: 'Energy Derivatives Made Clear'. Details: International Quality & Productivity Centre, 3rd Floor, 83-84 George Street, Richmond Surrey TW9 1HE.
Tel: 0181 332 1112
Fax: 0181 332 1191

10th-12th
Bahrain: 'Middle East Petrotech '96'. Details: Overseas Exhibition Services, 11 Manchester Square, London W1M 5AB.
Tel: 0171 486 1951
Fax: 0171 486 8773

10th-12th
Johannesburg: 'Sub-Saharan Oil & Minerals Conference'. Details: Europe Energy Environment Ltd, 3 Hayne Street, London EC1A 9HH.
Tel: 0171 600 6660
Fax: 0171 600 5810

10th-13th
Birmingham: 'Turbo Expo '96'. Details: The International Gas Turbine Institute, The American Society of Mechanical Engineers, PO Box 422029, Atlanta, GA 30342 USA.
Tel: 1 404 847 0072
Fax: 1 404 847 0151

11th-13th
Netherlands: 'Fluid Handling '96'. Details: Koningin Wilhelminahaven NZ6, 3134 KE, Vlaardingen, The Netherlands.
Tel: 31 (0)10 234 1082
Fax: 31 (0)10 234 1172

12th-13th
Aberdeen: 'Advances in Riser Technologies'. Details: The Bookings Department, IBC Technical Services, 57-61 Mortimer Street, London W1N 8JX
Tel: 0171 637 4383
Fax: 0171 631 3214

13th-14th
London: 'Successful Strategies for Value Creation in the Oil & Gas Industry'. Details: EuroForum, 45 Beech Street, London EC2Y 8AD.
Tel: 0171 878 6888
Fax: 0171 878 6999

13th-14th
Norway: 'ICMES '96: Safe and Efficient Ships'. Details: The Institute of Marine Engineers, The Memorial Building, 76 Mark Lane, London EC3R 7JN.
Tel: 0171 481 8493
Fax: 0171 488 1854

13th-14th
Antwerp: '1996 European Oil Refining Conference & Exhibition'. Details: Edward Bradfield, WEFA Energy, Mappin House, 4 Winsley Street, London W1N 7AR.
Tel: 0171 631 0757
Fax: 0171 631 0754

13th-14th
London: 'Gas Trading & Risk Management'. Details: AIC Conferences Ltd, 2nd Floor, 100 Hatton Gardens, London EC1N 8NX.
Tel: 0171 242 2324
Fax: 0171 242 2320

13th-14th
Prague: 'Restructuring & Privatisation of the Electricity Industries in Central and Eastern Europe'. Details: Booking Department, IBC Financial Focus, 57-61 Mortimer Street, London W1N 8JX.
Tel: 0171 453 2703
Fax: 0171 323 4298

14th
Brussels: 'The Energy Charter Treaty: What It Means For Business'. Details: Mrs McKinlay, CPMLP, University of Dundee, DD1 4HN.
Tel: 01382 344300
Fax: 01382 322578

16th-20th
Florence: 'OMAE '96'. Details: Ms Daniela Mercati, Snamprogetti SpA, Viale De Gasperi 16, 20097 San Donato Milanese, Italy.
Tel: 39 2 5203 8524
Fax: 39 2 5203 2712

18th-19th
Moscow: '5th Moscow International Oil & Gas Projects Conference'. Details: International Trade and Exhibitions J/V Ltd, Byron House, 112a Shirland Road, London W9 2EQ.
Tel: 0171 286 9720
Fax: 0171 286 0177

18th-19th
Aberdeen: 'The Prevention of Oil Discharge from Drilling Operations'. Details: The Booking Department, IBC Technical Services, 57-61 Mortimer Street, London W1N 8JX.
Tel: 0171 637 4383
Fax: 0171 631 3214

Forthcoming Events

18th-20th
Birmingham: 'Breakthrough Logistics'. Details: Institute of Logistics, Douglas House, Queens Square, Corby, Northants NN17 1PL.
Tel: 01536 205500
Fax: 01536 400979

19th-21st
London: 'Introduction to Oil Industry Operations Course'. Details: Caroline Little, The Institute of Petroleum.

20th
Dusseldorf: 'Pinch Technology Forum '96'. Details: Sylvia Lister, Linnhoff March.
Tel: 01606 815100
Fax: 01606 815151

20th-21st
London: 'Independent Power-Europe: Prospects and Challenges'. Details: Corinne Redonnet, DRI/McGraw Hill, WImbledon Bridge House, 1 Hartfield Road, Wimbledon, London SW19 3RU
Tel: 0181 543 6212
Fax: 0181 545 6248

20th-21st
London:
'Decommissioning Offshore Structures Projects and Policy'. Details: The Bookings Department, IBC UK Conferences Ltd, 57-61 Mortimer Street, London W1N 8JX.
Tel: 0171 637 4383
Fax: 0171 631 3214

24th-26th
Aberdeen: 'The Subsea Engineering Series 1996'. Details: EuroForum, 45 Beech Street London EC2Y 8AD.
Tel: 0171 878 6888
Fax: 0171 878 6999

24th-25th
London: 'Oil and Gas Acquisitions and Disposals'. Details: Langham Oil Conferences Ltd, 37 Main Street, Queniborough, Leicester LE7 3DB.
Tel: 01509 881022
Fax: 01509 881576

24th-25th
London: 'Regulation & Investment in European Gas Pipeline Projects'. Details: SMi Ltd, 1 New Concordia Wharf, Mill Street, London SE1 2BB.
Tel: 0171 252 2222
Fax: 0171 252 2272

24th-26th
London: 'Introduction to Petroleum Economics Course'. Details: Caroline Little, The Institute of Petroleum.

24th-26th
London: 'International Exploration & Production Business Opportunities & Investment Strategies in Oil & Gas'. Details: Global Pacific & Partners Pty Ltd (Africa).
Tel: 27 11 886 4053/4
Fax: 27 11 789 5057

July

1st-4th
Leeds: 'Engine Emissions Measurement'. Details: Ms Julie Charlton, Department of Fuel and Energy, University of Leeds LS2 9JT.
Tel: 0113 233 2494
Fax: 0113 233 2511

3rd
London: 'Energy Issues in Central Europe: refining, marketing and distribution'. Details: Caroline Little, The Institute of Petroleum.

2nd-5th
China: 'China Offshore Expo '96'. Details: China Promotion Ltd, Room 2801, Tung Wai Commercial Building, 109 Gloucester Road, Wanchai, Hong Kong.
Tel: 852 251 17427
Fax: 852 251 19692

12th
London: 'European Auto-Oil Conference: the interrelationship between fuel standards, engine design and air quality'. Details: Caroline Little, The Institute of Petroleum.

18th-19th
Durham: 'Boundaries and Energy: Problems and Prospects'. Details: International Boundaries Research Unit (IBRU), Suite 3P, Mountjoy Research Centre, University of Durham DH1 3UR.
Tel: 0191 374 7705
Fax: 0171 374 7702

14th-19th
Cambridge: 'IEX '96'. Details: SCI Conference Department, 14/15 Belgrave Square, London SW1X 8PS.
Tel: 0171 235 3681
Fax: 0171 823 1698

Trading and technology: the challenge of interpretation

By Dr Nigel Harris
Product Manager, Saladin

Today's energy trading community faces significant business issues, among them the effects of global competition, the impact of environmental legislation, risk management and the constant drive to cut costs. It is these issues which are driving developments in information technology and, in particular, the growing demand for effective integration of information systems.

Energy traders are operating in a climate of increasing global competition, similar to that experienced in financial markets in the 1980s. Political changes in the former Soviet Union, world-wide deregulation of markets and a trend away from national control of the industry have pitched more companies directly into the cut and thrust of global competition. Increasingly, energy trading organisations with operations in more than one country are taking advantage of their global reach by trading as a single co-ordinated global team rather than separate regional business units. Global or not, companies recognise the need to 'trade smarter' – ensuring that traders are fully equipped to assess trading opportunities accurately and to optimise the trading activity of the organisation. This demands that internal information – the traders' perceptions of market activity, the shippers' knowledge of availability of vessels etc – is put to best use throughout the organisation. Information systems within the company must support greater sharing of information within and between offices around the world.

Environmental legislation is imposing its own pressures on the industry. Clean air legislation in the United States has led to the expansion of grades and introduction of seasonal specification changes. This has affected refining processes, logistics and inventory management and, together with a growing recognition of the cost of storage of refined products, has led to the adoption of 'just in time' inventory management. It has also complicated the analysis of downstream markets: organisations such as OPIS (Oil Price Information Service) and CPC (Computer Petroleum Corporation) which monitor the US wholesale petroleum market now publish over 100,000 different prices every day.

Risk management now forms a major part of energy trading activity. The Gulf crisis of 1990-91 and the associated oil price volatility spurred many companies to look more closely at hedging and risk control. Although the use of futures, options, swaps and other risk management instruments has grown substantially in recent years, there is strong awareness that the widespread use of derivatives is a source of risk in itself.

There is also growing awareness, among senior management, of the need to manage risk globally across the whole corporation, rather than within individual small trading teams. Companies are looking to take advantage of natural hedges where they can be identified and to co-ordinate risk management activities across the organisation to avoid costly inefficiencies and crossed hedges.

Impact on IT

To support this level of corporate perspective of trading and risk management activities, information technology systems need to change: deal capture, risk assessment and accounting systems need greater rationalisation and co-ordination.

At the same time, energy companies also face heavy pressure to cut capital and operating costs. Many have done so through formal business process re-engineering projects aimed at streamlining operations to reduce costs and increase flexibility. Many, too, are identifying and building their core capabilities, while outsourcing non-core functions; and de-integrating by selling off non-core business. The continuing need to cut costs extends into information technology and information feeds, driving consolidation of systems and data-feeds.

Three factors then – increasing global competition, growing concentration on risk management and the constant need to cut costs – are all driving much greater integration of information systems, to support the changing business. A key question is how thls integration can be achieved. The approaches so far can be categorised as build, buy or composite.

Build...

Over the past five years, a number of major oil and energy companies have undertaken large and ambitious projects involving the integration of all aspects of trading operations, from front-office through mid and back office. Almost all took far longer than planned and cost more than expected. Some had to be abandoned after the spend had reached four or five times the original estimate; others have been completed, but late and over-budget, to the dissatisfaction of the traders, operators and business managers who waited

so long for the results. By the time the project is complete, four or five years may have passed and the technology on which the 'new' systems are based already looks outdated.

buy...

As a result of some of these in-house development projects, it is now possible to buy an integrated trading system. TIBCO Inc is offering TIBENERGY, developed at Mobil, as well as the TEAMS (TIBCO Energy Analysis and Management System) solution which was developed at Chevron. SHL Systemshouse Limited is offering Phibro's ICTS (Integrated Commodities Trading System). Some oil companies, among them Statoil, have been marketing their own systems. Although there is a lot of activity in this area, deals are only starting to be signed; no full transplant of a system has yet been completed and all will require major customisation.

... or composite

The third approach to integration which is emerging is the 'best of breed' project where existing components from different sources are combined. This approach is more flexible, allowing different technologies to be brought into play as appropriate and can offer substantial new functionality early in the project. Some oil companies are looking to assemble their own 'best of breed' solution and solutions are also being promoted by business consultants such as Price Waterhouse and by TIBCO Inc.

Because there is no obvious universal solution to the integration of information systems, it seems clear that companies will need to invest in some degree of customisation or bespoke software development – and manage the associated risks – to meet the new challenges.

Technology issues

In adapting to support the needs of the business, information systems also have to keep up with rapidly changing technology. Choosing the correct technology basis is not so much an issue of choosing the best technology for the job but of choosing systems which will fare well in the battle for market share. Time and time again, technically excellent systems and architectures have been eclipsed by more basic technology which is better marketed. With market share comes a wider choice of applications, cheaper and more plentiful support tools and the assurance of continued support and enhancement of the chosen systems.

In addition, the relationship between users and the IT department has changed over the years. Traders no longer get whatever systems they want: IT departments now effectively control decisions about systems purchases, enforcing corporate IT standards more or less rigidly. If users are offered a choice, it is normally between systems which fit the corporate standard.

On the trader's desktop, we are seeing convergence towards Microsoft's new 32-bit operating systems to support the need for sophisticated graphical user interfaces and productivity tools. The majority of larger oil companies cite either Microsoft Windows 95 or Microsoft Windows NT as their emerging corporate standard.

At the server end of client-server systems, there is a much wider range of hardware and operating systems and the unifying factor is the use of TCP/IP (Internet protocol) for local and wide area network communications. Although most companies have corporate standards for server architecture, the range of different standards is much wider than at the trader's desktop with larger companies roughly split between a preference for Unix and for Microsoft Windows NT as server operating systems.

One of the key influences on thinking about the near-term future of information systems comes from the explosive growth of the Internet. IT departments and systems suppliers within the energy trading sector are keeping a close eye on developments in the World Wide Web, on technology such as Netscape's web browser and Sun Microsystems's Java programming language. They are also watching the growing use in other industries of Internet and web browser technology to provide a so-called 'Intranet' for sharing and communication of information on a closed network within an organisation. The apparent promise of Internet technology is, however, mitigated by concerns about performance, security and the difficulty of finding useful information on the Internet.

Saladin perspective

As specialists in energy information and market data-feeds, Saladin has found that, in many integration projects, the handling of price information has been rather neglected. The main focus of these projects, understandably, is on handling deal and transaction information. The issues involved in providing market prices for deal pricing, marking to market or analysis tend to be avoided. As a result, important information remains scattered around the organisation and is often transferred manually from one system to another or entered separately into several different systems.

Working closely with energy companies, Saladin has developed solutions, such as the EnergyServer information repository, which play a critical role in centralising the capture and storage of information and integrating the information flow between different components. At BP Oil Trading International, for example, EnergyServer has enabled the company to centralise the collection and checking of information previously held in 35 different databases, eliminating duplicate data feeds and providing a single source of clean, consistent data for use by all front, mid and back office applications. As an existing customisable product, EnergyServer is also providing core functionality within wider systems integration projects, giving users tangible benefits in advance of project completion.

Whichever approach to integration is selected, its success will depend on a partnership between senior management, traders and both internal and external information technology experts. The challenges presented by global competition, environmental legislation, risk management and the drive to cut costs are too significant to allow for anything less.

This is a revised version of a paper given at a seminar in February.

Gasoline volatility - do we really need Vapour Lock Index within EN228?

At present, the RVP (Reid Vapour Pressure), E70 (percentage of fuel evaporated at 70°C) and Vapour Lock Index (VLI) of European gasolines are set in the national annexes of EN 228. This standard was originally introduced to harmonise gasoline specifications in Europe. The national annexes were often selected with levels of RVP set for emissions abatement reasons rather than for driveability, although driveability satisfaction still needed to be achieved. Advances in vehicle and engine technology have improved the driveability response of the European car parc, with vehicles becoming less sensitive to changes in gasoline volatility. It is possible, therefore, that the original volatility limits, particularly the VLI, may be less appropriate as driveability controls and may also be a constraint on gasoline manufacture.

By R V Bazzani,
Fuels Technology Unit
BP Oil UK

Volatility

There are many criteria that a gasoline needs to satisfy in order to enable a car to operate effectively. One of the most significant of these, as ultimately detected by the customer, is its volatility, or in other words, its ability to evaporate at different temperatures. This affects the way a vehicle starts, under both hot and cold conditions, the way a vehicle drives during the warm-up phase and ultimately when fully warm. It will also influence fuel economy and emissions during all these phases. The driveability malfunctions which can occur if the volatility is not suitable include stall, hesitation, stumble, surge, backfire and idle roughness. It is therefore important that the correct volatility is available for the ambient conditions in which a vehicle will operate. It is the function of both national and in-house fuel specifications to ensure that the volatility of gasolines available in the market-place meet these criteria.

So what is the correct standard? There are three main criteria required for setting a volatility specification. Firstly, an accurate ambient temperature profile of the region, preferably containing data which includes individual monthly variations. This can be data generated by the Meteorological Office, for example. Secondly, detailed knowledge of the vehicle population in the region and thirdly, and most importantly, the driveability performance of these vehicles at different ambient temperatures and with fuels of different volatility. It is the combination of these three factors that are used to set volatility levels to satisfy the driveability requirements of a particular region. A compromise of any one of these criteria would significantly affect the accuracy and effectiveness of the final fuel specification as a driveability control.

Fuel quality regulations

The first European Standard for unleaded gaoline, EN228, was published in 1987. However, in 1988, the EC gave the European Committee for Standardization (CEN) a mandate to develop a more comprehensive specification for unleaded gasolines (premium and regular grades), plus European specifications for diesel

EN 228 Classification			
Class	Max. RVP kPa	E70 % volume min-max	Max. VLI
1	70	15-45	900
2	70	15-45	950
3	80	15-45	1000
4	80	15-45	1050
5	90	15-47	1100
6	90	15-47	1150
7	95	15-47	1200
8	100	20-50	1250

Table 1 - RVP/VLI sets within EN228

fuel and automotive LPG. The standards were circulated to the national bodies in the summer of 1992 for a formal vote for that autumn. In 1993, the updated EN228 specifications were officially ratified. Member states were required to adopt them as national standards by the autumn of 1993 and withdraw conflicting national standards by the same date.

Within EN228:1993 provisions are included for national bodies to select seasonal grades from the eight volatility classes (see **Table 1**) for a defined period of the year. These have to be specified in the national annex to the EN228:1993 specification. Values for RVP, E70 and VLI are quantified.

VLI is the relationship between RVP and E70 such that VLI = RVP (10* kPa) + 7* E70 (% vol). This equation has been used as an industry standard for many years as a method of correlating the front end of the distillation curve to hot weather driveability performance (vapour lock, etc). (It is similar to the driveability index (DI) as used in the United States, although the DI equation takes into account the whole boiling range of the distillation curve and is generally used for cold weather driveability.) It is particularly important to control the maximum VLI (thus limiting maximum volatility) during periods of hot weather in order to eliminate any potential driveability problems in the field. During periods of low ambient temperatures, it is fuels of low volatility which become critical, as vehicles generally require higher volatility to operate efficiently. Limiting the maximum volatility in winter is therefore not so critical as in the summer. Nevertheless, it has been known for driveability problems to arise when a mismatch of season and ambient temperature exists in the market, typically during seasonal change-over periods.

An example of some of the selected volatility classes from four typical markets within Europe is shown in **Table 2**. Each member country selects a class for summer, winter and possibly an intermediate grade. No other combinations of RVP and VLI are allowed from the different classes. Each class therefore represents the maximum volatility that is permitted for that season, typically set to allow for the highest ambient temperature likely to occur during that period.

Table 2 - Selected national annexes for EN228

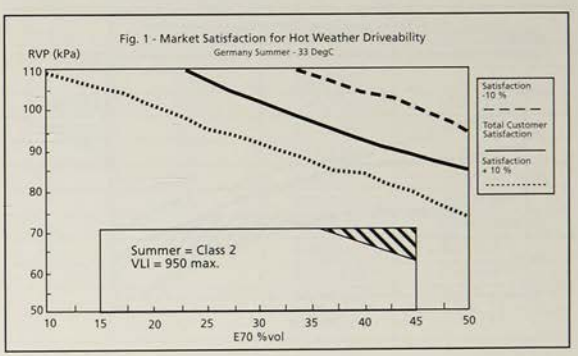
Market	Season (calendar dates and volatility classes)		
	Summer	Intermediate	Winter
France	1 20/6>9/9	3 10/4>19/6 10/9>31/10	6 1/11>9/4
Germany	2 1/5>30/9	2&6 Apr. & Oct.	Mix 6 1/11>31/3
Spain	1 1/4>31/10		4 1/11>31/3
UK	4 1/6>31/8		8 1/9>31/5

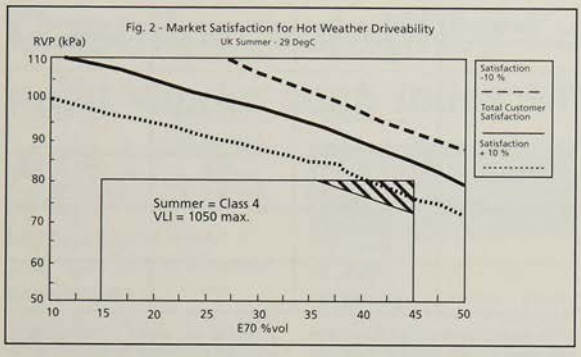
The process whereby individual countries chose certain volatility classes has been the subject of much debate in the European forum. There exists much pressure from both the political and environmental perspectives to reduce volatility; in particular RVP reductions are sought, as a means of reducing evaporative emissions from vehicles. In some cases, therefore, this lobby had influenced many countries to adopt an RVP limit for emissions abatement reasons rather than for satisfying driveability requirements. Under this scenario, if a classification is selected to meet a required maximum RVP limit, a country may be forced to use an unnecessarily restrictive VLI limit since the VLI stipulation is not optional. Furthermore, as advances in vehicle and engine technology have improved the driveability response of the car parc, with vehicles becoming less sensitive to changes in gasoline volatility, it is possible that the original limits may be less appropriate as driveability controls – and furthermore restrict – the way in which gasoline is manufactured.

Is VLI restricting manufacturing flexibility within EN228?

In order to quantify this issue, a detailed investigation was carried out at the BP Oil Technology Centre at Sunbury. BP operates a technical facility

Fig. 1 - Market Satisfaction for Hot Weather Driveability

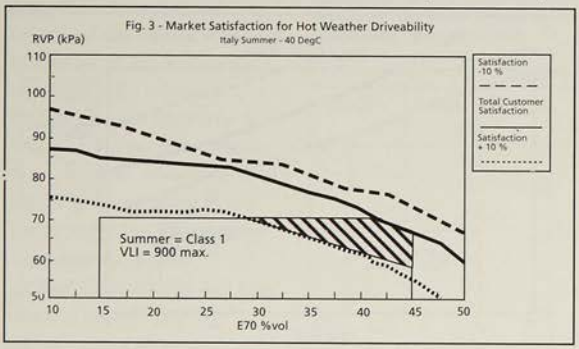




that can determine the level of driveability satisfaction of any western European market, for any fuel volatility, based on the vehicle population data for that market. This allows a market to be investigated for its sensitivity to gasoline volatility. BP uses this facility to tailor their gasoline volatility specifications to markets worldwide based on the actual vehicle performance requirements of a market. Vehicle performance data are generated through participation in an inter-industry working group, whose purpose is to generate both hot and cold weather driveability data over a range of ambient temperatures, on a selection of vehicle technologies representative of the European market. Vehicles are assessed for their sensitivity to a wide range of fuels of different volatility. BP's in-house database contains many hundreds of vehicles tested over many years. It is these performance data that, when subsequently linked with vehicle population data, allows a hot weather driveability market satisfaction plot to be generated for any ambient temperature range between 20°C and 40°C.

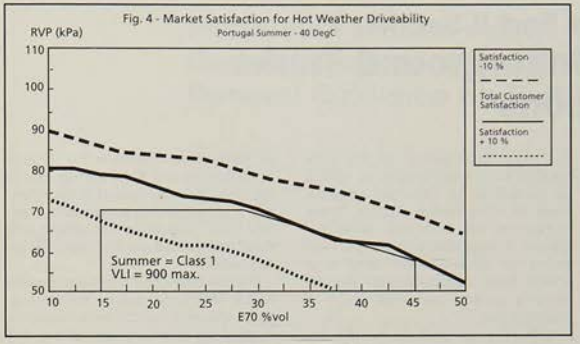
This exercise was carried out for 11 European markets: United Kingdom, France, Germany, Benelux, Spain, Portugal, Greece, Austria, Switzerland, Italy and Sweden. For each of these markets, the volatility classes for both summer and winter seasons were superimposed on the driveability satisfaction plot at the respective average monthly maximum seasonal temperature. This provided an immediate indication of the suitability of individual volatility classes for each country/season combination as a driveability control and whether any obvious discrepancies existed between volatility specification and technical requirements.

A selected cross-section of the data generated is shown in **Figures 1-4**. The shaded areas represent the amount of volatility relaxation possible, within the national annexes of EN228, at a level representing total market satisfaction. Although only a small cross-section is shown, there is much evidence to suggest that VLI is a redundant parameter among the majority of the European markets studied. These markets could quite easily operate in total safety, ie inside the driveability satisfaction criterion, without it. This would effectively mean using rectangular volatility boxes – the otherwise obsolete right-hand corner of the volatility box can be fully utilised thus allowing greater flexibility from a refiners point of view in the manufacture of gasoline. Such a change would not effect the maximum RVP and would thus not affect the fuel's tendency to produce evaporative emissions.



The German market (see **Figure 1**) has, without question, the most significant difference between volatility levels necessary to satisfy the market for driveability to those specified within its national annex of EN228. To take an extreme example, this market could safely operate with class 7 in the summer without endangering the market for driveability. This is due to the high percentage of vehicles in the German market possessing fuel injection, thus making the car parc less sensitive to fuels of lower volatility. However, the increases in RVP to achieve this would in practice go against the reasons for the reduction in RVP in the first place.

Compared with the German market, the Portuguese market has a much older vehicle population with the majority of



vehicles on the road still possessing carburetted fuel systems. As carburetted fuels systems are generally more critical than those with fuel injection, this will naturally have an impact on the volatility requirements of the market. This is clearly shown in **Figure 4** where no flexibility in the VLI specification is present during the summer. It can be seen that the volatility box chosen for this market is very close to the total market satisfaction line suggesting that the current VLI specification is therefore well matched to the volatility requirements of the car parc.

Of the 11 markets studied, many have varying degrees of relaxation available to them. The majority of markets, however, have volatility classes assigned within the national annexes of EN228 that are too restrictive as far as satisfying driveability requirements are concerned. This applies for both summer and winter seasons. For these cases, the parameter VLI becomes redundant under a maximum RVP control. In these circumstances, the combination of RVP and VLI is not necessary, indicating that EN228 could be rewritten, for most markets, without the inclusion of VLI (using a rectangular volatility box).

The impact of future gasoline quality

All the changes to year 2000 gasoline quality being discussed in the European Auto-Oil forum suggest an average RVP reduction of 10kPa. At the time of writing, a maximum RVP limit of 6kPa has been suggested for the summer months. If this does prove the way forward, it is possible, therefore, that future gasoline specifications will be set to meet a certain RVP limit. It can be seen from **Figures 1-4** that at lower levels of RVP, the corresponding VLI limit becomes even more redundant under this scenario. Furthermore, as vehicle technology improves and the older vehicles in the car parc become insignificant, the European market will, on average, become less sensitive to changes in volatility and will therefore increase the satisfaction level for a given volatility. Consequently, the gap between the volatility specification and the volatility market requirement will, in future, increase further.

Recommendations

The proposal for a revised VLI specification is shown in **Table 3**. It is designed to provide further scope within the existing volatility specifications in the national annexes of EN228:1993. These values are calculated according to the maximum volatility possible under existing classes and are achieved within driveability and emission constraints. The existing maximum RVP and E70 is retained in all cases. In cases where the VLI requirement is found to be redundant, this is shown as N.R.

It is strongly recommended that the CEN gasoline Working Groups reconvene to address the current status of EN228:1993. It is suggested that they re-examine the VLI limits up to those permitted by the maximum RVP and E70 for any volatility classes that national bodies may include if they think necessary. This would allow the use of the 'rectangualr volatility boxes.'

It is likely that EN228 will be revised to incorporate the changes in volatility that the EU may require in the future as a result of the European Auto-Oil programme. This may provide a suitable opportunity to review the changes to the current standard.

Country	Seasonal Classes	Current Max VLI	Proposed Max VLI
	Summer/Winter	Summer/Winter	Summer/Winter
A	2/6	950/1150	N.R.*
BX	4/7	1050/1200	1100/1250
CH	2/7	950/1200	N.R.*
D	2/6	950/1150	N.R.*
E	1/4	900/1050	925/N.R.*
F	1/6	900/1150	925/1200
GB	4/8	1050/1250	N.R.*/1250
GR	1/3	900/1000	900/N.R.*
I	1/5	900/1100	975/N.R.*
P	1/5	900/1100	900/1150
S	4/7	1050/1200	N.R.*

* VLI Not Required

Table 3 – Proposed Volatility Changes to EN228

NEW

Measurement Manual Part II Section 7
Calibration of Underground Tanks at Service Stations

Although a subsection of Part II Tank Calibration, this code covers only the calibration of retail service station underground tanks and therefore, in dealing with this somewhat special application, some procedures are at variance with other sections of Part II. Hence Section 7 becomes a stand-alone section and should be read with this in mind.

The initial requirement for this code resulted from investigations by several oil companies of reported wetstock losses at retail service stations. These highlighted the calibration of underground storage tanks as a significant source of measurement error that affects both automatic and manual gauging systems and may result in apparent loss.

Until now, no Code of Practice has directly addressed calibration of underground horizontal cylindrical tanks. Existing sections of Part II have been prepared for above-ground tanks but of those sections dealing with horizontal cylindrical tanks, only part of the procedures are applicable to underground tanks.

Traditional methods of calibrating horizontal cylindrical tanks either by take internal dimensional measurements, or use external strapping. In general, these measurement methods are only suitable for tanks before their installation, although the internal method may be applied if the tank has been emptied and cleaned to a high standard. Experience shows that a calibration table compiled from the tank manufacturer's drawings is likely to contain a significant level of error.

With the very large number of retail service station tanks in existence there are variations in terms of design and installation, plus operational restraints which make their calibration somewhat of a special procedure. But whatever method of calibration is adopted it must be both practical and economic and result in minimum down-time for the tank.

Currently there are several methods of calibration available for underground tanks and these are covered in the code. An overview of these methods is provided and subsequent chapters cover calibration equipment and detail the procedures for recommended methods.

In the Introduction reference is made to ISO 4269 which will be the international standard for the incremental fill method for calibration of vertical and horizontal tanks. Whilst the Institute of Petroleum endorses the use of the calibration procedure described in the ISO standard, it must be stressed that this IP code deals specifically with retail underground tanks and as such there is a difference in the requirements and recommended procedures. The code also assesses other calibration methods not described in the ISO 4269 standard.

Coincidental with the final drafting of this code, the CEN TC 221 specification for automatic tank contents gauges was being prepared. This CEN document contains informative annexes dealing with tank capacity tables and gauge installation which are aligned where possible with this code and vice versa.

Members of the Working Group who produced this document were drawn from the Commercial Measurement Committee PM-D-4 and the Service Station Marketing Committee DOC-4A.

J D Snook,
Chairman PM-D-4

This publication is available from the IP Library. Price £40.00. (25 percent discount for IP members)

IP
THE INSTITUTE OF PETROLEUM

Petroleum Measurement Manual: Part VII: Density, Sediment and Water. Section 1: General Guidance on Test Methods

The number of test methods for the determination of density, sediment and water contents of crude oils and petroleum products has increased markedly over the years as more sophisticated techniques have become available. As a result users have found it difficult to assess which may be best suited to a specific application. This guidance has therefore been prepared to provide a concise overview of the different procedures available.

The revised Part VII Section 1 provides a synopsis of laboratory test methods for the determination of density, water content and sediment content for use in the measurement of petroleum and petroleum products. It references relevant IP Standards and gives a brief outline of each method of test, its range of application and information on its precision.

The document also includes references of similar or technically equivalent standards published by other standardization bodies such as ISO, API, ASTM, AFNOR and DIN.

This is available from the Library, Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR. Price: £28.00 (25% discount for IP members).

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Joint meeting: Exploration & Production Discussion Group and Energy Economics Group

Myanmar (Burma) – Emerging Market Potential

Thursday 6 June, tea at 17.00 for 17.30 until 19.00

By Mr Keith Win, Principal, K E Win & Associates and **Professor Robert Taylor**, School of Oriental & African Studies

Please inform Jenny Sandrock at the IP if you plan to attend this meeting

IP
THE INSTITUTE OF PETROLEUM

Joint meeting: Energy Economics Group and Environment Discussion Group, London Branch

The New Environment Agency

Monday 17 June, 17.00 for 17.30 until 19.00

By Mr Ed Gallagher, Chief Executive, The Environment Agency

Please inform Jenny Sandrock at the IP if you plan to attend this meeting

Technical Report

UPSTREAM

The HSE-funded 'Shock Tube' experiment on heat exchanger tubing has been completed. Close agreement was obtained between the actual pressures and those predicted by the three contractors who modelled the experiment ahead of the test. This work validates the one-dimensional modelling packages. AEA Technology have completed the IP-sponsored analytical investigation into the theoretical phenomena and probable fluid dynamic interactions that occur inside an exchanger as a result of a tube failure. The final report will be completed shortly. The completion of this work allows the Task Group to commission a full-scale experiment into complex three-dimensional heat exchanger geometry. This programme will concentrate on measuring the internal fluid pressure, the shell strains and the effectiveness of the pressure relief systems. The HSE Buxton laboratory is proposing this research project. About half of the £200,000 cost will be provided by the IP and the HSE with the balance sought from users as part of a Joint Industry Project.

The Institute was involved with the organisation of the successful third CRINE conference 'Learning to Survive' and organised the second IP decommissioning conference 'Minimising the Impact of Decommissioning.'

REFINING AND MARKETING

The first complete draft of the HS(G)41 Replacement document covering service station construction and operation will be issued for consultation by members of the industry's Technical Co-ordinating Body this month.

The Environment Agency has agreed to be a member of the working group set up to develop the methodology used in the draft guidelines covering environmental risk assessment at service stations and the selection of appropriate facilities to address those risks.

A LACOTS/HSE/IP committee has developed an implementation plan for the new 'Performance Specification for Underground Pipework Systems at Petrol Filling Stations'.

Further comments have been made on the proposal to bring forward the implementation of the Approved Tank Requirements forming part of the proposed Carriage of Dangerous Goods Regulations, in order to introduce the provisions of the VOC Emissions Directive.

The Environmental Guidelines for Petroleum Distribution Installations have been published.

IP representatives attended meetings of the API Aviation Technical Services Subcommittee & 1581 Working Group in May to liaise on the joint 1996 programme of research work and on the IP Micro-filter Specification currently under development. Contracts have now been placed for the completion of three research projects for test protocols for filters which are part of the agreed programme. Two will be funded by the IP with the third funded by API. Parallel work funded by API and carried out by Exxon R&E is already under way.

The Work Group on Electrical Contractor Competency have recommended that guidance should be based on existing NVQs for installation and maintenance. Future petroleum-related NVQs should be developed by the Petroleum Employers Skills Council.

Advice on hazardous area delineation for road tank vehicle workshops has been formalised to assist with the revision of the Workshop Code.

The *Code of Practice for the Calibration of Retail Metering Pumps/Dispensers* has been published.

ENVIRONMENT

Work is well under way on IP guidelines setting out a protocol for the estimation of VOC emissions from downstream oil operations. Two sub-groups have been set up – one dealing with emissions from refineries and the other with emissions from marketing and distribution operations.

Two members from the underground and surface water sections of the new Environment Agency have joined the IP Oil and Water Steering Group together with an additional representative from the agency's head office.

MICROBIOLOGY

Work has started to compare two differing test methods to determine the presence of sulfate reducing bacteria.

It is hoped that work will commence later this year on the joint DIN/IP development of a biovulnerability test.

HEALTH

A guideline on the implementation of the Pregnant Workers Directive Regulations 1994 has been passed for publication.

The Nottingham University exposure assessment workshop which would have included discussion on techniques used in the IP epidemiology study has been postponed.

MEASUREMENT

PMM Part VII, Density, Sediment and Water, Section 1: General Guidance on Test Methods has been published.

PMM Part II, Section 7: Calibration of Underground Tanks at Service Stations will be published shortly.

Work on a new Petroleum Measurement Paper dealing with temperature corrections in tank calibration and tank gauging has been started in collaboration with API.

TEST METHOD STANDARDISATION

The 1996 edition of the IP *Standard Methods for Analysis and Testing of Petroleum and Related Products* has been published. This contains 16 new full test methods and four new proposed methods. In addition 11 test methods have significant technical changes. In line with IP policy, an additional nine European Norms and eight International Standards have been adopted as IP test methods and appear in this edition.

The Institute was represented at a meeting of ISO TC 28 petroleum products and lubricants held in Istanbul. Some important items regarding the future development of standard test methods were agreed. These included the use of certified reference materials and secondary working standards for the verification of apparatus performance and a revision of ISO 4259 determination and application of precision data in relation to test methods of. It was decided that biodegradability tests should not be developed until work on this subject has been completed within CONCAWE.

John Hayes,
Technical Director

IP
THE INSTITUTE OF PETROLEUM

Introduction to Oil Industry Operations

Wednesday 19 June – Friday 21 June

This course is designed as a general introduction to the whole range of oil industry operations from the search for oil and gas to the delivery of products to the customer. It will include an appreciation of the principal functions of the different parts of the petroleum industry and the inter-relationship between them. It is likely to be appropriate for:

- Participants from within the oil companies whose experience is limited to one function of the industry and who require a broader perspective of the industry's activities.
- Participants from financial and commercial institutions, other energy industries, analysts, suppliers, service companies and contractors; and government organisations who need an informed 'birds eye view' of the oil industry.

Topics to be covered during three days will include:

- Changing Perspectives in the International Oil Industry
- Natural Gas
- Basic Concepts of Drilling
- How Technology Serves the Business
- Marine Transportation
- Exploration for Oil and Gas
- Petroleum Production
- Introduction to Marketing/Distribution/Retail Markets
- Supply
- Refining

This is a self-contained course but is followed by:

Introduction to Petroleum Economics

Monday 24 June – Wednesday 26 June

This course is designed as a general introduction to the economics of the oil industry and may be particularly valuable to companies who do not hold their own in-house induction courses covering this subject. It is likely to be appropriate for:

- Participants from within the oil industry whose experience is limited to one function of the industry and who require a broader perspective of the economic factors affecting the industry.
- Participants from financial institutions, government, other energy industries and the supply and service industries which want to obtain an informed and concise introduction to the economic and commercial background to the industry.

Topics to be covered during the three days will include:

Geopolitics of Oil

- OPEC/Middle East
- Asia and Pacific Region
- Eastern Europe and the Former Soviet Union
- North America
- North Sea Basin

The Oil Markets

- Crude Oil Markets
- Product Markets
- Oil Price Reporting
- Oil Futures Market
- Oil Supply and Price – the Outlook

Structure of the Oil Industry

- Development of Major Oil Companies
- The National Oil Companies

For copies of the registration forms for both courses please contact
The Conference Department, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR. Tel: 0171 467 7100 Fax: 0171 255 1472

Technology News

Lasers used to determine VOC emissions at Gulf service station

Southwell Green service station near Nottingham is one of a small number of UK service stations to have installed equipment designed to capture the volatile organic compounds (VOCs) that escape via the pump nozzle as drivers refuel their vehicles. Normally, such petrol vapours escape into the atmosphere.

Gulf Oil – together with Mark Carsley, owner and operator of the Southwell Green site, and the National Physical Laboratory – recently undertook an air quality survey at this outlet. It was part of a study by the UK Department of the Environment into the effectiveness of such equipment.

A number of lasers and other light sources were shone across the forecourt and levels of VOC emissions determined from the amount of energy absorbed by the petrol vapour in the atmosphere. According to Gulf, the system can record concentrations of gases down to less than one part per billion.

'We believe this is the first time that this type of vapour recovery system has been put through these tests on a working service station in Britain', said Martin Brocklehurst, Gulf Oil's Head of Health, Environment & Safety. 'The results will help the government and industry to evaluate this technology and determine what part it may play in bringing about improvements in air quality.'

Results of the study will be available shortly.

The Southwell Green service station is equipped with two vapour recovery systems. The first meets European Union Directive Stage 1B vapour emission recovery standards currently being introduced in the United Kingdom. It captures VOCs released as the site's fuel tanks are refilled from road tankers. The second 'Stage 2' system – that tested – pumps the vapours, given off as motorists refuel their vehicles, back into the main fuel storage tanks at the service station.

Testing in progress at Southwell Green service station

New lube-oil dispensing pump

The sale of bulk lube-oil products provides the service station operator with the opportunity to increase profit margins above levels normally achieved through the sale of packaged lube-oil goods traditionally found on the forecourt shop shelf.

With this in mind, Norfolk-based Pumptronics has developed a self-service lube-oil dispenser which it claims is the first in the United Kingdom to have full Weights and Measures approval.

Available in either a mono or twin hose version for two products, the oil dispenser can interface with a a wide range of fuel monitoring and kiosk systems, states the manufacturer.

The unit is also offered with a volume-only display for use in the commercial refuelling sector or with a standard retail display for the garage forecourt.

The manufacturer has also recently unveiled a new range of dispensers specifically designed for truckstop and marina applications.

Lube-oil dispenser

Service station system management

Wayne Dresser's new one-stop ISM Nucleus EPOS system manages the operations of all of a site's indoor and outdoor payment terminals, dispensers, tank gauge systems and scanners. It facilitates faster throughput in both the kiosk and on the forecourt and reduces stock loss which, in turn, helps increase service station profitability.

The company also manufactures a wide range of fuel pumps and says that Stage 2 vapour recovery can be retrofitted to any of its Series 9000 pumps built within the last four years if a site's underground pipework is adequate.

Series 9000 petrol pump

Technology News

Control and safety for tanker loading

The new road tanker overfill prevention and grounding system from Scully combines a number of advanced safety features, including automatic and continuous self-checking of the entire system.

Requiring just one connection to the vehicle, the Intellitrol system features complete diagnostic information and communications and automatic detection of two-wire or five-wire optic tank truck sensors.

It is also capable of controlling up to 15 five-wire or eight two-wire vehicle sensors.

The system is compatible with existing Scully overfill prevention systems and incorporates individual sensor display by compartment and specific fault type, together with an infrared bypass feature designed to eliminate any unauthorised system bypass.

Intellitrol has been designed to meet EUROPIA 296007 requirements for automatic detection and switching between differing truck systems.

New tanker manlid sets the standard

The 300 Series road tanker manlid developed by EMCO Wheaton exceeds not only all UK coaming clearance criteria and proposed European CEN standards, but also current stringent Australian standards.

Derived from the 337/338 range, the 300 Series is fully retrofittable to tankers equipped with the earlier designs.

The new manlid is lockable and incorporates 24 bolt mounting, 10-inch fill and a low profile.

Linkman Tankers recently became the first UK road tanker operator to specify the new manlid, which will be installed on its fleet of 21 THOMAS petroleum spirit tankers.

New tanker manlid

Multi-parameter analyser

Rosemount Analytical, part of the Fisher-Rosemount group, has unveiled a new analyser which is capable of measuring pH and conductivity simultaneously.

Designed for use in the water/waste treatment, process control and pollution monitoring/control sectors, the Model 2700 Solu Cube analyser can accept, process and display signals from up to eight analytical sensors at any one time. It also has two 4-20mA analogue outputs and RS485, RS232 and Modbus communications for transmission of measured variables to other equipment such as PCs.

The analyser can measure up to eight parameters in any combination of pH, conductivity, percentage concentration, resistivity, oxygen reduction potential and temperature, thus eliminating the need to install and maintain several instruments in a multi-parameter installation.

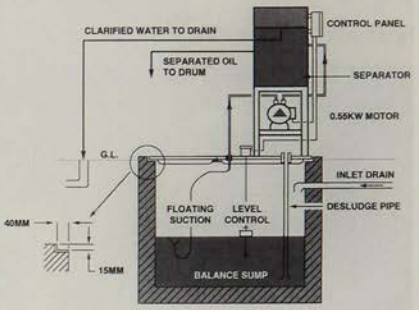
The company has also launched a new PC Windows software package – MeterSoft – for monitoring up to 32 measured variables from four analysers. This provides additional cost savings, says Rosemount.

Prototype oil separators

Hodge Stetfield of Aldershot has supplied two prototype Multipak separator units to Nonio Hiross in Portugal for the removal of oil from the run-off waters on its service stations.

The units are equipped with special base plates to facilitate insertion over a concrete sump. Such a design allows the oil removal system to be installed above ground relatively easily and cheaply.

Designed to produce an effluent suitable for discharge to foul drain or possibly the water course, depending on local regulations, the Multipak unit comprises a floating suction device, feed pump and separator and sludge discharge pipes. Typical discharge limits are 20-50 ppm of oil in water. Flow rate is in the range of 250-400 litres/hour.



Diagrammatic arrangement of oil separator

Portable fuel analyser

Originally developed for the US market to monitor the quality of new regulated gasolines, the PetroSpec GS500 portable fuels analyser has been launched on the UK market by Herzog-Varlen Instruments.

The precalibrated, filter-based unit accurately determines benzene, total aromatics, oxygenates, saturates, olefins, and octane number (both RON and MON) in approximately three minutes. It operates in the mid-infrared range and can be powered from the mains, a rechargeable battery or vehicle cigar lighter.

A pressurised sample introduction system prevents inaccuracies caused by evaporative changes in the fuel and preserves sample integrity, states the manufacturer. A double beam optical design eliminates instrument drift for increased measurement stability and accuracy over time. The unit also automatically corrects for base fuel interferences in component measurements.

The analyser is fully automated to allow use by non-technical personnel.

Portable fuel analyser

Technology News

Fuel storage tank and pipework system leak detection in the bag

Conventional fuel storage tank and pipework testers often require an interruption in processing activities for testing to take place. PSL Yorks' new compact self-contained leak detection system has been developed specifically to minimise such disruptions.

Under test conditions, the storage tank is sealed and a known low pressure applied to the ullage via the Precision Leak Detection System (PLDS). If the tank is sound, the pressure remains constant.

In the presence of a leak, however, the volume of ullage increases and the consequent decrease in pressure is registered on the system's integral high-resolution digital pressure gauge. PLDS is capable of detecting extremely low leakage rates, states the manufacturer.

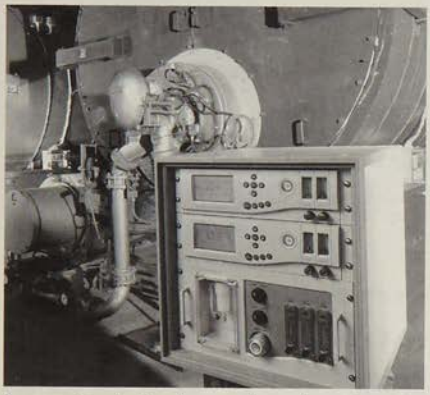
The application of a vacuum to the ullage allows the system to determine whether air or product is leaking from the tank while the stabilised negative pressure level is used to calculate the precise depth of the leak, assisting in its location, inspection and repair.

PLDS can be set up in minutes and the test process completed in a maximum of two hours in the case of a leak-free tank.

It can test two underground storage systems and associated pipework simultaneously, allowing a six-tank site to be tested within one working day while remaining in operation.

Leak detection system

Multiple gas monitoring system



Servomex has developed a gas analyser capable of measuring concentrations of sulfur dioxide and/or nitric oxide as well as levels of oxygen and carbon monoxide detected by more traditional systems.

The short-chassis 19-inch 3U Xentra 4900 houses a Servomex paramagnetic oxygen transducer plus any one of three miniaturised gas filter correlation infrared transducers which measure concentrations of carbon monoxide, sulfur dioxide and nitric oxide.

The larger, long-chassis version of the model also houses a paramagnetic oxygen transducer and any two infrared transducers.

Operation of two Xentra analysers in tandem under common control will allow monitoring of all four gases, states the manufacturer.

The large dynamic range of the transducers allows each to use both its measurement ranges at one time without switching.

The analyser offers a low cross sensitivity to water and carbon dioxide, both of which are common constituents of flue gas samples.

The manufacturer has also unveiled a compact converter in a standard 19-inch format which converts nitrogen dioxide and nitrous oxide into nitric oxide. This enables the Xentra 4900 analyser to measure *total* oxides of nitrogen in the flue.

Smart safe secures cash

Some three percent of total service station takings in the United Kingdom were estimated to be lost through internal theft in 1995, says McGunn Safe Company.

In a bid to combat this point-of-sale robbery, the company has developed Smart Safe 2000 which combines the features of a time-delay safe and float vending facility.

Instant drops of large notes and an audited change facility make each employee personally accountable. Cash drops are made into three colour-coded drawers that can be assigned by cashier, shift or lottery takings. Change is accessed via a PIN number. Activities of each employee are recorded by date, time and amount.

Time-delay and time lock features protect staff and takings. Programmable in English, French and Spanish, the system handles up to 99 different user access codes.

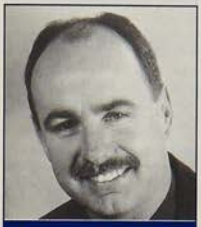
Smart safe

Contacts

Gulf Oil	**01242 225329**
Pumptronics	**01692 500640**
Wayne Dresser	**01875 822500**
Scully	**01606 553805**
Hodge Stetfield	**01252 314365**
EMCO Wheaton	**01843 221521**
Fisher-Rosemount	**01243 863121**
Herzog-Varlen Instruments	**01469 573216**
PSL Yorks	**01924 283200**
Servomex	**01892 652181**
McGunn Safe Company	**01329 832935**

People

Mr Roger Wood has joined British Gas as managing director of British Gas Service. Mr Wood joins from Matra Marconi Space UK and takes over from Mr David Wells who is to take early retirement. Mr Wood's previous experience includes time with ICL, Northern Telecom and STC.



The Expro, Group has appointed former Region Director for Continental Europe, *Mr Simon Ashton* to Region Director of Asia Pacific based in Perth, Australia. Mr Ashton, joined the Group 17 years ago and since 1983 has been posted in the Netherlands.

Dr Tony Ellis and **Mr Basil Owen** have joined the Environment Division of W A Fairhurst & Partners. They will join Dr Tom Cairney and Mr David Hobson both of whom have more than 20 years experience in researching and cleaning up contaminated sites.

The Board of Dana Petroleum is pleased to announce that **Mr Roy Askew**, a chartered accountant has been promoted to the Board of the company as Finance Director. Mr Askew trained with Ernst & Young and has had 16 years experience of the upstream oil and gas industry with Total, Shell and Pentex before joining Dana Petroleum.

JEBCO Seismic Ltd has announced the appointment of **Mr Colin Pearce** as Sales & Marketing Manager based in London. Mr Pearce will be developing new projects both within the United Kingdom and internationally, as well as promoting the company's existing database and non-exclusive seismic surveys.

Carl G Langner and Conoco Inc. were honoured at the Offshore Technology Conference Distinguished Achievement Awards held in May. Mr Langner received the Distinguished Achievement Award for individuals 'innovative and unique contributions in advancing offshore technology' and Conoco Inc received the award for companies, organisations and institutions.

Seafield Resources has announced two new appointments to their exploration team. Mr Lloyd K Forsey (above) has joined the company as Exploration Manager, NW Europe and Mr Christopher Pullen (below) has joined as Exploration Manager, International.

Centrilift has appointed *Mr Harry Pollemans* as General Manager, Asia. His previous position was as District Manager, for Continental Europe. Mr Pollemans will be based at the office of Inti Jatam Pura, the company's agent in Jakarta Indonesia.

Mr Julian West, formerly corporate development director of Enterprise Oil plc, joined Cambridge Energy Research Associates in April. He assumes responsibility as Director for International Oil Strategy operating from London and Paris.

Saladin has announced the election of **Mr Gary Fedor**, Senior Vice President, to the company's Board of Directors. Mr Fedor was recruited in 1993 from SSA Mid Atlantic where he was Director of Sales and Marketing.

***Mr Adrian Goodwin* has been appointed as Managing Director of OIS International Inspection plc and will be based at their corporate headquarters in Aberdeen.**

Fluor Daniel Lit has announced that Sir Robin Renwick has been named Chairman of their Board of Directors and has alsos been appointed to Fluor Corporation's international advisory boards. Sir Robin replaces Sir Francis Kennedy, KCMG, CBE who is retiring from the position later this year.

***Mr Stuart Monroe* (above), general manager of the Petrolite Corp, EuroChem Division and managing director of its British subsidiary, Petrolite Ltd., has assumed added responsibility for all speciality chemical operations serving petroleum industry markets in the Asia-Pacific region. Mr Monroe has appointed three locally based managers to supervise sales and service operations. *Mr J Graham Craig* will manage operations in Indonesia, based in Jakarta. *Mr John J Curtis* will manage operations in China, based in Shekou and *Mr R Barry Knobbs*, based in Singapore will manage all Asia-Pacific oilfield and refinery chemicals business outside China and Indonesia.**

Mr John Keenan has been elected to the board of directors of oil company Alliance Resources. Former director and president of the oil and gas division of Great Western Resources, Mr Keenan has been working as a general consultant to the company.

Publications

Artificial Intelligence in the Petroleum Industry (Volume 1): Symbolic and Computational Applications

Editors: Betrand Braunschweig and Ron Day (Éditions Technip, 27 rue Ginoux, 75737 Paris Cedex 15, France). 460 pages. ISBN 2 7108 0688 6. Price: FFr680 (paperback).

This is the first in a series of publications on the applications of artificial intelligence (AI) in the petroleum industry. Subdivided into two sections, the book first addresses symbolic AI and looks at knowledge-based interpretation, automated plan generation, model-based reasoning, case-based reasoning and constraint satisfaction systems. The second section on computational AI covers neural networks, fuzzy logic and genetic algorithms. Many of the chapters are extensions to papers presented at the CAIPEP and EuroCAIPEP conferences on AI in the petroleum industry held in Dallas and Aberdeen, respectively, in 1993.

Asphaltenes – Fundamentals and Applications

Editors: Eric Y Sheu and Oliver C Mullins (Plenum Publishing Corporation, 233 Spring Street, New York, NY 10013-1578, USA). 245 pages. ISBN 0 306 45191 3. Price: $79.50.

Asphaltenes have traditionally been considered complex and hard to characterise with certain of their fundamental properties, such as microscopic structure and solution dynamics, inaccessible to study by traditional macroscopic methods. However, more recently, new experimental methods have facilitated a greater understanding of asphaltene chemical structures. This publication takes an in-depth look at new experimental methods that characterise asphaltene structures from the molecular to colloidal length scale. It helps the reader understand how the fundamental characteristics of asphaltenes are related directly to their utilisation and explains how these characteristics impact various applications such as paving, coating, encapsulation and oil well production.

Practical Formation Evaluation

Robert C Ransom (John Wiley & Sons Ltd, Baffins Lane, Chichester, West Sussex PO19 1UD). 490 pages. ISBN 0 471 10755 7. Price: £60.

This publication provides information and methods pertaining to formation evaluation using well-log analysis. Well-log analysis is of fundamental importance in the search for hydrocarbons. Not only does it provide information on rock and pore fluid characteristics – such as lithology, host rock mineral composition, pore pressures and geological history – it also allows estimates to be made of reservoir porosity, saturation and thickness. Logging also provides valuable information required for trouble-shooting problems in injection and production wells and can be used to monitor production, gas storage, secondary and tertiary recovery and disposal operations.

Orimulsion – A Special Report

Pira Energy Group (PIRA Energy Group, 122 East 42nd Street, Suite 516, New York, NY 10168, USA). Price: $750 (PIRA retainer clients); $1,000 (non-clients). Subscribers receive three copies. Additional copies cost $75 each.

This latest report from the PIRA Energy Group provides an objective insight into the economics of manufacturing and delivering Orimulsion, the low-cost, bitumen-in-water fuel developed by Petroleos de Venezuela (PdVSA) and marketed by Bitumenes Orinoco (Bitor). It discusses Orimulsion's combustion and emission characteristics, analyses current and future costs from wellhead to delivery port, assesses the cost of electricity derived from Orimulsion and examines how the fuel will fare against competition from other fossil fuels.

Elements of Petroleum Processing

D S J Jones (John Wiley & Sons Ltd, Baffins Lane, Chichester, West Sussex PO19 1UD). 408 pages. ISBN 0 471 96489 1. Price: £27.50 (paperback).

This publication provides a useful insight into the day-to-day operations of the petroleum industry and will be of interest to chemical engineering students and professionals alike. Including 'rules of thumb' for refinery design, plant operation and process trouble shooting, the book outlines the complex structure and composition of crude oil in diagrammatic form and provides examples of calculation techniques taken from real industrial situations. It also introduces the reader to simple formulae for complex thermodynamic principles. Indexes, appendices and data are arranged for user-friendly searches.

Tensors of Geophysics for Mavericks and Mongrels

Frank Hadsell (Society of Exploration Geophysicists, PO Box 702740, Tulsa, OK 74170-2740, USA). 240 pages. ISBN 1 56080 029 1. Price: $53 (SEG members), $67 (non-members).

Geophysicists come from diverse academic disciplines such as physics, mathematics, engineering and computer science. While students from each discipline will have a mathematical grounding in these subjects as applied to time series analysis it is more than likely that they will have been taught in a different manner by different universities. This new publication provides such students with a source of a common language of mathematics that is appropriate to geophysics and focuses on five basic principles: conservation of momentum, conservation of energy, Maxwell's Equations, conservation of mathematical form and the embedding of calculi. Four sequels are to be published at a later date that will build on the foundations presented in this first volume.

Motor Vehicle Emission Regulations and Fuel Specifications in Europe and the United States – 1995 Update

CONCAWE Automotive Emissions Management Group, Special Task Force AE/STF-3 (CONCAWE, Madou Plaza 24th Floor, Madouplein 1, B-1210 Brussels, Belgium). 203 pages (paperback).

This regularly updated report summarises the changes in national and international laws and regulations governing motor vehicle emissions, fuel consumption, carbon dioxide emissions and automotive fuel specifications. In view of the increasing bulk of the report over the years, this 1995 update covers Europe and the United States only. A comprehensive worldwide review will be published in 1997.

Energy Sources and Policy – An Overview and Guide to the Literature

Israel Berkovitch (Turpin Distribution Services Ltd, The British Library Section, Blackhorse Road, Letchworth, Herts HG6 IHN).180 pages. ISBN 0 7123 0805 9. Price (inclusive of p&p in UK only): £33 (paperback).

Of interest to energy economists, policy analysts, students and researchers in a wide variety of disciplines and environmentalists, this book provides a complete overview of energy policy issues from UK, European and international perspectives. It helps the reader understand concepts as varied as the Gaia hypothesis and demand site management, magnetohydrodynamics and ocean thermal energy conversion and features summaries of key information that is normally buried in specialist literature. Each chapter contains a short reference list which includes some of the less well known report literature. The guide also contains a listing of UK and international organisations involved in the energy sector.

Institute News

NEW MEMBERS

Mr W Arundel, Fife
Ms P R Ashby, London
Mr A M Attwell, Surrey
Mr J J Ayanda, Continental Business Company Limited
Dr D R Blaikley, Barnet
Mr B D Booth, Kent & Sussex Fuel Services
Mr G A Borg, Vector Inspection Services Limited
Mr P Brownjohn, Farnham
Mr R W Carson, Esso Petroleum Company Limited
Mr G Catania, Malta
Mr T K Cheung, Kee Marine Service & Consultant Limited
Mr S P Davies, BOC Process Plants
Mr B Druery, Eastern Development Associates Limited
Mr P A Efere, Trans-Atlantic Management School
Mr J M Eide, Con-Tech a/s
Mr B Fontan, Caleb Brett Iberica SA
Mr N P Gladwell, Southampton
Dr R P Gould, Gould Technical Limited
Mr P J Griffin, Ashurst Morris Crisp
Dr B N Herbert, Sittingbourne
Mr A Herdman, Texaco Limited
Mr M J Hills, PE Research
Mr N C Horne, BOC Process Plants
Mr J Janseen, Oiltanking Malta Limited
Mr T J Jewitt, Lancs
Mr D Mawhinney, Renfrewshire
Mr P Mercer, Flogas Ireland Limited
Mr J H A Mundy, Mobil Oil Company Limited
Mr P I Nichols, Unicorn Consultancy Limited
Mr R J Pearson, Lancashire
Mr P F Riches, Texaco Limited
Mr G J Roberts, Nomikos (London) Limited
Mr T Rowland, Farnham
Mr G Scholte, Netherlands
Mr R H Stow, St Austell
Mr P Tarrant, Plymouth
Mr C Taylor, Woodward-Clyde
Mr D Upson, Immingham
Mr G Van Dyke, Vanco Energy Company
Mrs S P Warne, Cameron Markby Hewitt
Mr K M Williams, Swansea
Mr B Woodall, Oil Tank Suppliers Limited

STUDENTS

Mr G Nirmal, Glasgow
Mr M T Rahmani, Uxbridge
Mr R Shahjahan, London
Mr M A Swindall, Mobil Oil Company Limited
Mr D Tziotis, London

NEW FELLOWS

Mr A K Roychowdhury
Mr Roychowdhury is currently a management consultant in the petroleum business. He is also a Director of Tidewater Oil Company (India) Limited which he headed as the Chief Executive from 1987 to 1994.

Mr D G A McKenzie
Mr McKenzie graduated from the University of Glasgow in 1968. For 20 years he enjoyed a varied career with BP. He is currently Chief Executive for The Marine Technology Directorate Limited and is responsible for the co-ordination and management of research and technology transfer on behalf of government agencies, the Engineering & Physical Sciences Research Council and industry. An active member of the Institute, Mr McKenzie has been a member of the Upstream Operations Committee and presented a paper at the offshore safety conference.

NEW COLLECTIVES

Platts,
Wimbledon Bridge House,
1 Hartfield Road,
Wimbledon,
London SW19 3RU

Representative: Mr Abudi Zein
Platts is a major source of oil and petrochemical industry news and prices. Platts assessments are accepted as a reflection of market prices by government agencies, oil companies, traders, brokers, tax and custom authorities and many others.

HPT International Limited,
The Mead,
Fullerd Lane,
Sidcot,
Avon BS25 1NE

Representative: Mr J Hawkins
HPT International Limited is involved in the design and manufacture of flexible fire and blast-rated containment seals for the offshore oil and gas, power generation and petrochemical industries. Typical products include pipe penetration seals, linear joint seals, HVAC connectors, insulation and fire-rated jackets for actuators and valves.

DEATHS

We are sorry to announce the deaths of the following members:-

	Born
Mr K Davison	1937
Mr H W Slotboom	1904
Dr P W Tuckert	1921
Mr E R J Castle	1936

Humber Branch presentation to local 'Student of the Year' for petrochemical-based courses – in this case both BTEC, Process Technology and C&G Part 1 in Process Operation. From left to right: Martin Birtle (1996 winner), Alan Gardham (Grimsby College lecturer), Ian Lovell (Humber Branch Vice Chairman). The award was presented at the Humber Branch Ladies Evening in March.

Institute News

AROUND THE BRANCHES

LONDON

5th: Visit to Ford Motor Company, Dagenham Commencing 1.15

YORKSHIRE

12th June: Golf tournament

The Humber Branch held its Annual Dinner at the Beachcomber Club, Humberston, Grimsby, South Humberside. From left to right: G Stratford, A Hodson, B Soulsby, D Hughes, I Fowler (Chairman, Humber Branch), R Chatham, D Gunson (Guest Speaker), I Lovell, Q de Borrekens (LOR General Manager), M Johnson, J Kersey, R Brown (all committee members unless otherwise stated).

Benevolent Fund

The Institute of Petroleum has a Benevolent Fund for the provision of financial and other relief or assistance to necessitous persons who are or who have been members of the Institute and the necessitous wives, widows, families and dependent relatives of such persons as the Management Trustees in their absolute discretion think fit. If members of the Institute are aware of any such necessitous persons, even if their membership of the Institute has ceased, they are asked to inform the Institute. Applicants would be asked to complete a form giving details of their financial circumstances which would be treated in strict confidence. Help might be given for temporary difficulties, such as the cost of convalescence following illness.

Have you moved?

If so, please give your new address to the Membership Department.

PETROLEUM REVIEW INDEX 1995

Free copies of the *1995 Index for Petroleum Review* are now available on request from:

The Library,
The Institute of Petroleum
61 New Cavendish Street
London
W1M 8AR
Tel: 0171 467 7100

UK Deliveries into Consumption (tonnes)

Products	†Mar 1995	*Mar 1996	†Jan-Mar 1995	*Jan-Mar 1996	% Change
Naphtha/LDF	275,485	316,419	894,575	812,433	-9
ATF – Kerosene	549,491	584,637	1,568,564	1,736,961	11
Petrol	1,938,987	1,854,817	5,213,650	5,205,646	0
of which unleaded	1,187,378	1,224,662	3,194,705	3,414,621	7
of which Super unleaded	90,446	67,943	239,208	190,878	-20
Premium unleaded	1,096,932	1,156,719	2,955,497	3,223,743	9
Burning Oil	349,833	341,441	967,449	1,123,000	16
Derv Fuel	1,239,177	1,197,710	3,237,732	3,425,486	6
Gas/Diesel Oil	757,884	715,617	2,094,855	2,238,979	7
Fuel Oil	771,214	534,578	2,443,954	1,820,210	-26
Lubricating Oil	82,054	65,431	219,760	209,620	-5
Other Products	834,566	755,001	2,192,964	2,148,869	-2
Total above	6,798,691	6,365,651	18,833,503	18,721,204	-1
Refinery Consumption	551,038	555,262	1,602,144	1,638,056	2
Total all products	7,349,729	6,920,913	20,435,647	20,359,260	0

† Revised with adjustments *preliminary

IP
THE INSTITUTE OF PETROLEUM

The European Auto-Oil Conference: the interrelationship between fuel standards, engine design and air quality

Friday 12 July

To be held at the Cavendish Conference Centre, London

Following the completion of the European Programme on Emissions, Fuels and Engine Technologies (EPEFE) and the expected publication of the Draft Directives on Fuels and Vehicle Emissions by the Commission of the European Union, a period of hectic consultation and lively debate begins with this conference.

Representatives of the oil and motor industries, together with environmentalists, will respond to proposals from the Commission about the objectives and content of the Directives and the process for implementation before their execution through EU institutions, national governments and the European Parliament.

Despite two postponements of this event, following delays in finalising the legislation, it still provides a timely opportunity to hear the arguments and enter into the dialogue and will be crucial for general management, strategists and planners, as well as those charged with technical implementation of the forthcoming regulations.

A copy of the programme and registration form will be available shortly from Conference Department, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR UK. Telephone: 0171 467 7100 Fax: 0171 255 1472

IP
THE INSTITUTE OF PETROLEUM

Energy issues in Central Europe: refining, marketing and distribution

Wednesday 3 July

To be held at the Institute of Petroleum

The first of two IP conferences in association with the Department of Trade and Industry on the new developing energy markets of Central Europe, focusing especially on the 'new economic tigers', the Czech Republic, Slovakia, Poland and Hungary.

This event will concentrate on the opening of new investment and development opportunities in refining, marketing, transport and distribution, including analysis of environmental and financing considerations.

This is an important event for people and companies seeking to understand these new markets, especially contractors, equipment suppliers, consultants and service companies for which openings may arise as existing facilities are upgraded by indigenous organisations or with the involvement of major international investors.

A copy of the programme and registration form will be available shortly from Conference Department, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR UK. Telephone: 0171 467 7100 Fax: 0171 255 1472

ELAFLEX

ZVA Automatic Nozzles

ZVA Slimline* up to 80 LPM
ZVA 25 up to 140 LPM
ZVA 32 up to 250 LPM
* for diesel specify 'Drip Catcher'

"Safety Swivel" Reusable safety break coupling, fits to nozzle (to BS7117pt 1:1991).

For colour coding and product promotion ask for our range of:

Coloured: Covers
Anti-kink sleeves
Scuffguards
Pump hoses
Splashguards
Slogan badges
(can also have text and advertising logo)

For more information please contact us.

Vapour Recovery

The European Open System

New, ZVA 200 GR active automatic nozzle with internal vapour channel and vapour suction spout.

A small vacuum pump inside the dispenser sucks the petrol vapours in through the metal vapour spout and returns them to the ground tank.

The Elaflex Slimline 21 COAX vapour recovery hose is a lightweight, smooth cover, customer friendly rubber hose and is suitable for all types of petrol pumps including internal hose retractors.
Available in colours.
The Elaflex system is also suitable for retrofitting on to existing dispensers with modifications.

Elaflex Petrol Pump Hoses

Sizes : 16mm 19mm 21mm 25mm
Types: Glossline, Slimline, also low temperature versions.

Extremely lightweight and flexible, bright chrome, non corroding end fittings.

Superb colour stability. Fading hoses are not a problem faced by our customers.

Glossline range has a smooth high gloss finish which can be cleaned on site and be made to look "as new".

Long service life, ideal for modern pumps.

Stage 11 vapour recovery for the open system Slimline 21 coaxial hose; colours also available; all with special anti-kink sleeves.

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