FEBRUARY 1992

The Institute of Petroleum

PETROLEUM REVIEW

Survey

Information Technology for the downstream sector

Mongolia

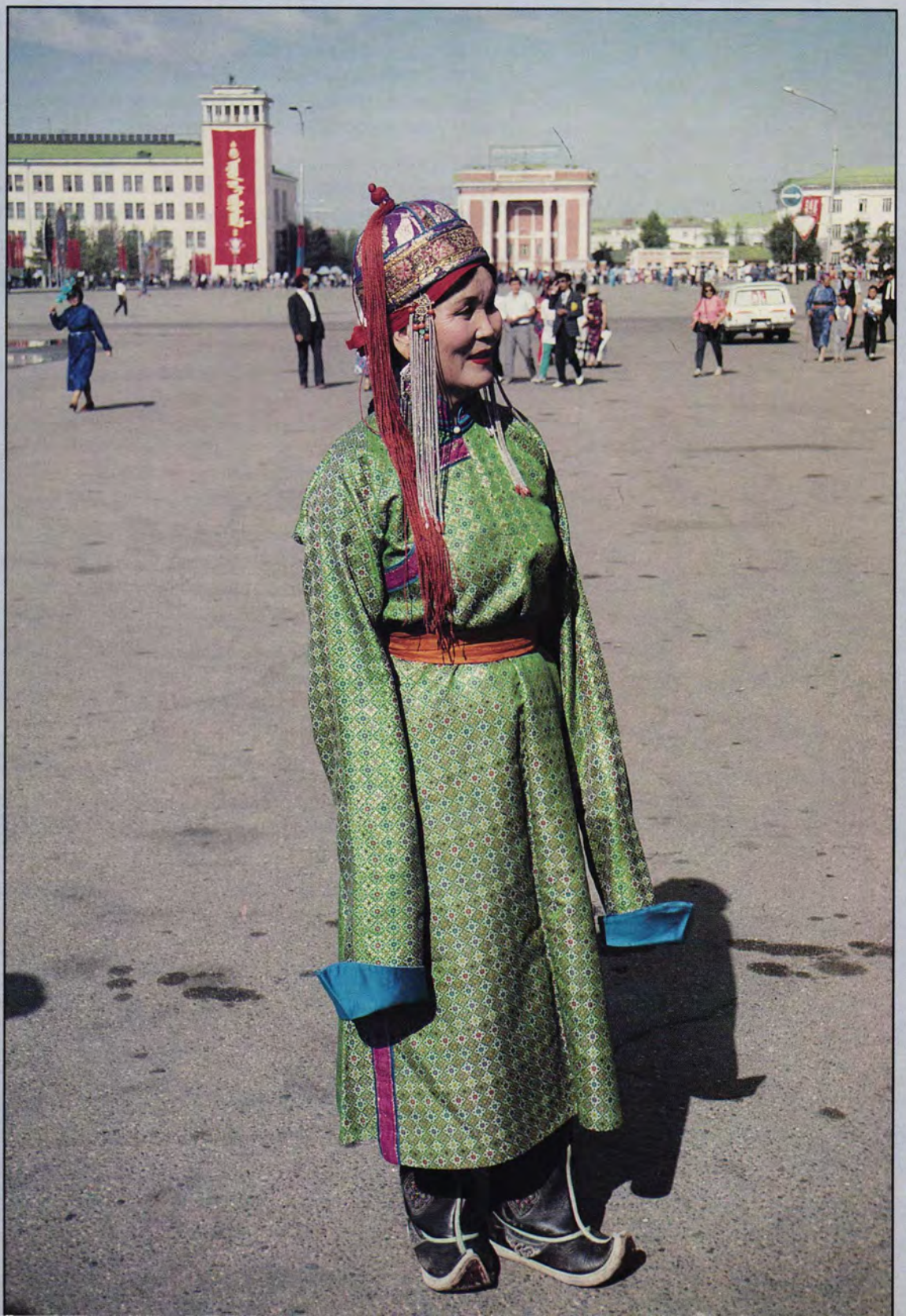
The first-ever exploration acreage awards are imminent

Azerbaijan

A report and pictures direct from Baku

Flammability

Research into the development of flammable atmospheres above residual fuels in storage



PETROLEUM REVIEW

February 1992 Volume 46 Number 541 £6.00

Subscription (inland) £60.00 (overseas) £75.00

PUBLISHERS

Published Monthly by
INSTITUTE OF PETROLEUM
A charitable company limited by guarantee

Director General: *Ian Ward*

Membership Services Director: *Roger Sparrow*

61 New Cavendish Street,
London W1M 8AR
Telephone: 071-636 1004. Telex: 264380
Fax: 071-255 1472
For details of membership, including Petroleum Review at no extra cost, please apply to the Membership Department.

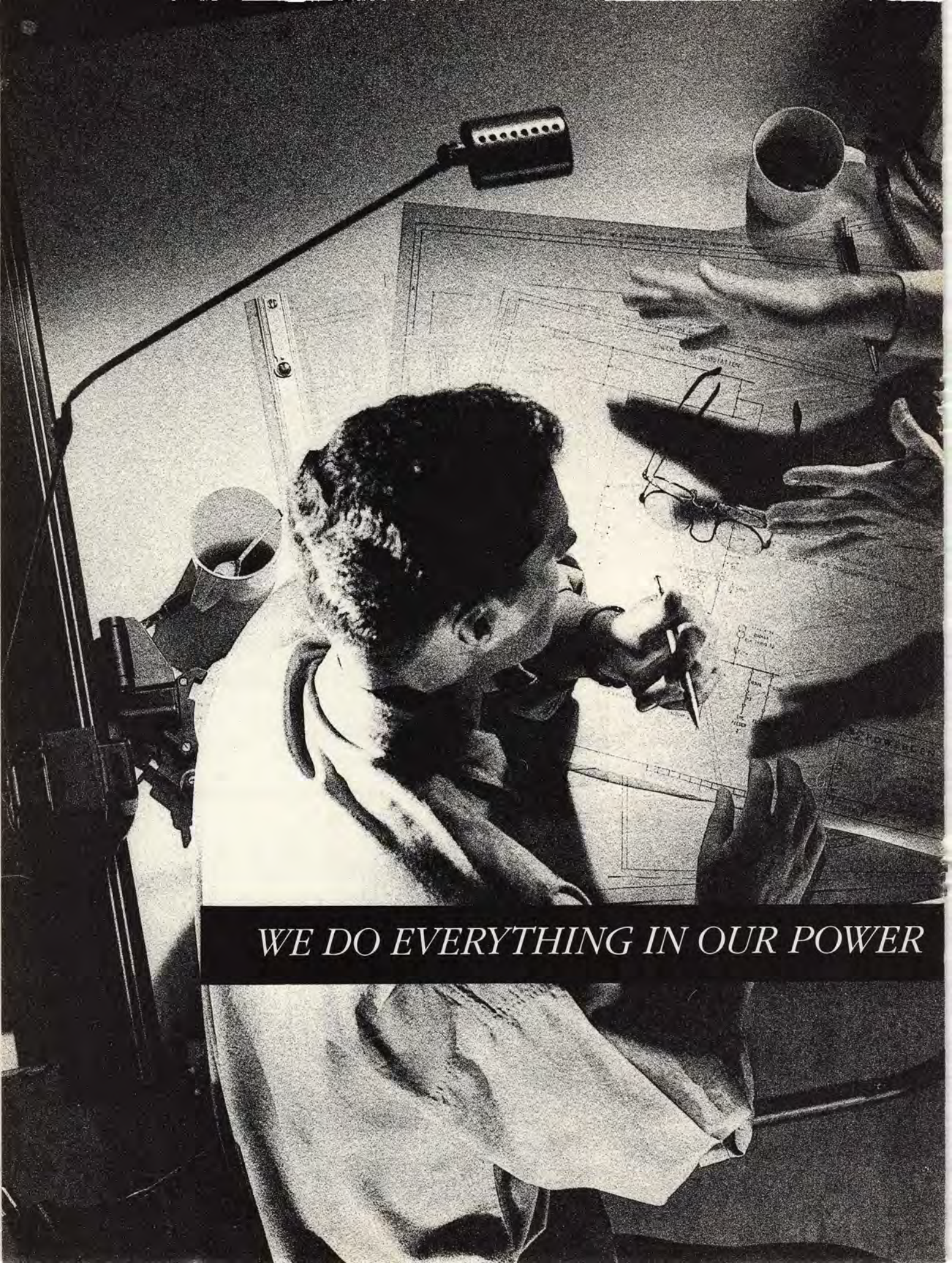
Printed by Eyre & Spottiswoode Ltd, London and Margate.

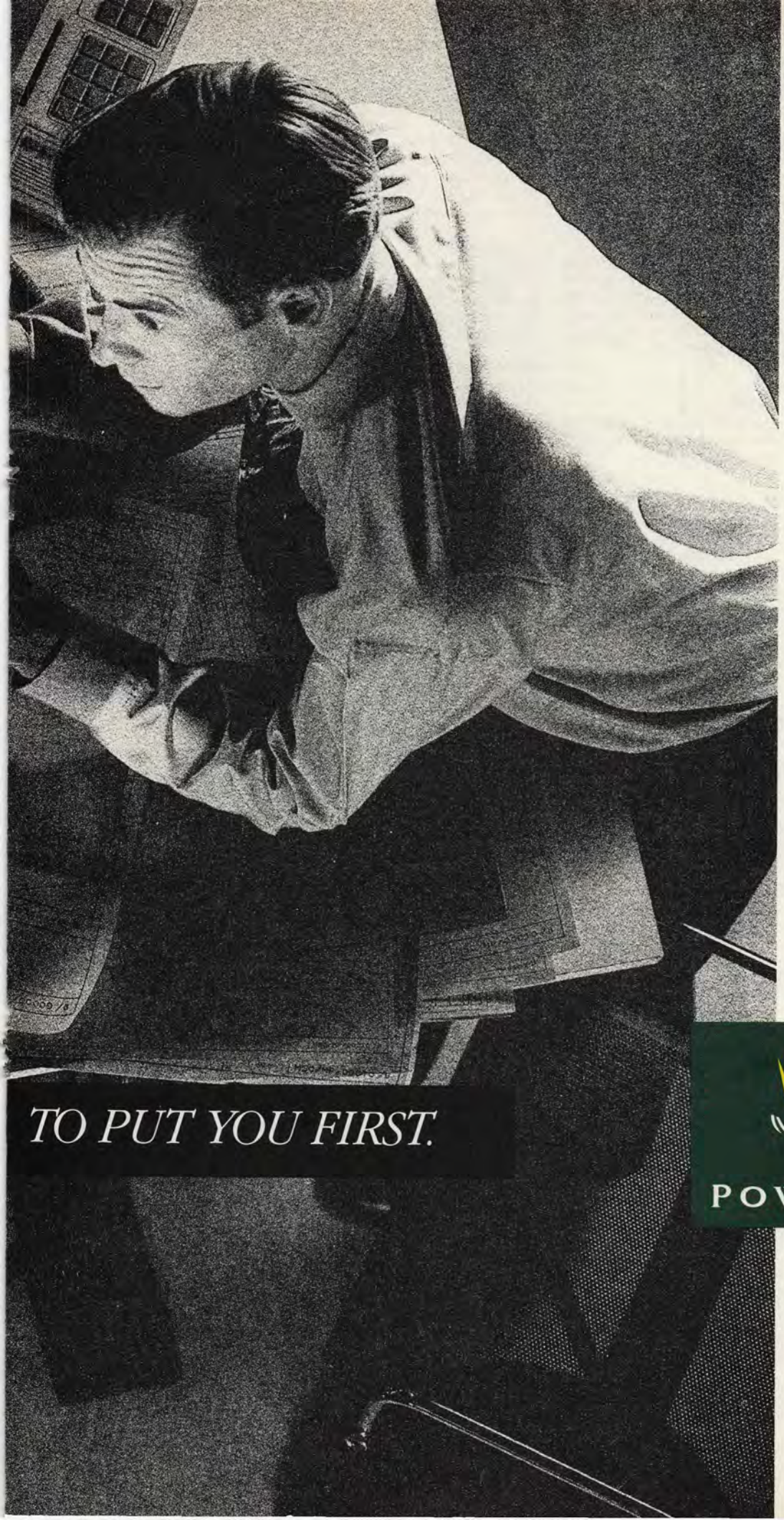
US MAIL: Second class postage paid at Middlesex, New Jersey.
Postmaster: send address changes to C&C Mailers International, 40 Foxhall, Middlesex, New Jersey 08846.

ABC ISSN 0020-3076
MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

Contents

Cover photo of Subaatar Square in the centre of the Mongolian capital, Ulaanbaatar. Photo by Alan Sanders, School of Oriental and African Studies.


WE DO EVERYTHING IN OUR POWER



TO PUT YOU FIRST.

In the new energy environment, we face new challenges. Electricity suppliers must answer calls for higher levels of commitment by being more accessible, flexible and responsive. That's why PowerGen is dedicating itself to understanding your business in-depth.

In our hands, electricity has become not just a business overhead, but a manageable resource that can contribute much to the smooth, efficient running of your company. We do everything in our power to help you use energy in the most productive and cost-efficient way possible.

POWERGEN

PowerGen plc
Haslucks Green Road,
Shirley, Solihull, West Midlands B90 4PD
Telephone: 021-701 2914

. . . news in brief

7 December

Brazil's state oil company Petrobras has announced that oil production has started from the Coral field in the vast Santos Basin.

Shell Oil, the US subsidiary of the Royal Dutch/Shell Group expects to spend about $2.7bn for capital and exploration in 1992, down $400m from 1991's anticipated expenditures.

9 December

A world record for the heaviest single object to be lifted by crane has been set with the successful installation of a 10,750 tonnes module on the Piper Bravo oil platform in the UK North Sea.

British Gas has had discussions with the Irish government about laying a gas pipeline link to the Republic. The line would run from south-west Scotland, near Stranraer, to Dublin, with a spur to Belfast to provide Northern Ireland with an imported gas supply for the first time.

10 December

Aberdeen-based Marine Offshore Management has won a four-year contract with BP to provide managed inspection services for a range of UK North Sea installations.

After 10 years of operation and overall output of more than 25m tonnes, Abu Dhabi Gas Industries Ltd has created a New Projects Division to boost production at existing plants.

Britain and Argentina have agreed to discuss possible cooperation in exploring for oil and other resources in the waters around the Falkland Islands.

11 December

Gerard Engineering of Aberdeen has been awarded a contract by Mobil North Sea to play a key role in developing the oil company's environmental-protection procedures manual for its gas reception and processing facility at St Fergus.

According to the Department of Energy, exploration and appraisal drilling activity in 1991 finished at about 188 wells — 14 percent down on the 1990 figure.

12 December

Adobe Resources, the New York based energy company is to be merged into Houston-based Santa Fe Energy Resources under a merger agreement signed by the two companies.

13 December

Australia and Indonesia have approved 11 oil production contracts in a jointly controlled area of the Timor Sea, which lies between the Northern Territory and the Indonesia island of Timor.

Seafield Resources, which last year bought a 5 percent stake in the North Sea Victor gasfield has revealed plans for a Stock Market flotation and raising £6.3 million through a share sale.

14 December

North Sea company Hydra-Lok has won a contract to supply services to Statoil.

18 December

Statoil has found oil off northern Norway in the Nordland II area following years of unsuccessful prospecting in the area.

Agip has signed a contract with Algeria's Sonatrach to search for new energy sources.

BP has abandoned plans to build an artificial island in Poole harbour to extract further oil from its Wytch Farm field.

19 December

The UK sector of the North Sea could see up to 50 new platform orders by the end of 1995, according to a report from the National Economic Development Office.

Iran has tapped into the world's largest gas field, finding reserves worth £120bn where its Gulf waters meet Qatar's

LASMO has won its take-over bid for Ultramar by a narrow margin to become one of the largest independent oil companies.

Oil extracted from rapeseed is being used to power diesel engines in Austria on a commercial basis.

BP and Atlantic Richfield have emerged as the largest winners in a redetermination of equity interests in the Amethyst field in the southern basin of the UK North Sea.

Statoil has agreed with partners on NKr11bn phase one plan for development and operation of the Sleipner West field to be presented to the Norwegian Energy Ministry.

20 December

The Health and Safety Commission has issued revised guidance to the petroleum industry on the permit-to-work system which was seen as a major contributory factor in the Piper Alpha disaster.

French state-owned oil company Elf Aquitaine has announced first oil production from the Tchendo field in the Congo.

3 January 1992

First oil has started flowing from the Angus field in UK North Sea blocks 31/21 and 31/26a operated by Amerada Hess.

8 January

Seven leading Japanese ship-builders are forming three bidding groups in a concerted effort to attract the Qatar's $2bn LNG carrier programme.

10 January

The latest North Sea oil boom, which has seen Scottish construction yards working to capacity for two years, is coming to an end according to Highlands Fabricators' Managing Director, Mr Malcom Dorricot.

The Australian government has given the go-ahead for offshore oil exploration in the Otway Basin southwest of Melbourne, in spite of threats of sabotage by environmental activists.

11 January

The US Coast Guard Oil Spill Response Plan Negotiated Rulemaking Committee, where it is hoped public and private consensus on rulemaking will be achieved, met for the first time.

13 January

UK oil and gas independent Monument has announced a promising oil discovery off the coast of Sarawak in eastern Malaysia.

An agreement has been reached between the International Maritime Organisation and Hanseatic Marine Training School in Cyprus whereby the body will use a private school for the training of IMO recognised teachers for the first time.

16 January

Five leading offshore service companies have formed a new training body in a bid to boost productivity and safety standards in the UK North Sea. The new body will be called the Services Contractors Training Group.

North Sea service and supply companies must develop export opportunities while North Sea activity is still high, according to business strategy specialist Douglas Westwood Associates.

Oil from the land-locked steppes

By Terry Knott, Knott Associates

After 70 years as the second oldest communist state, major social change is sweeping one of the most isolated countries in the world. In Mongolia, political reform is demanding a new economic order and within that new economy, self-sufficiency in oil production is seen as the key element in sustaining an independent nation almost as large in area as Western Europe.

There is no doubt that oil reserves are present beneath Mongolia's endless steppe and Gobi desert but for a poor country only just beginning to find its feet in the world of free markets, winning those reserves is presenting a major challenge.

Photos by Alan Sanders

Negotiations begin in earnest this month in the first-ever round of exploration acreage awards in Mongolia. The aim is to attract major capital investment and knowhow from foreign oil companies to develop the largely untapped oil reserves of this vast country. But the drive for energy self-sufficiency, while paramount to Mongolia as it struggles to establish a market economy, faces some tough hurdles. Not least among these is the lack of hard currency and infrastructure to support an oil industry and the remoteness of the country's landlocked location between Russia and China.

Aware of the magnitude of the task, Mongol Gazryn Tos (MGT), the state petroleum company formed in 1990, is forging ahead with plans to open up the country to western oil companies. In addition to some 370,000 square kilometres of acreage — equivalent to about a quarter of the country — now under offer in nine contract areas in the west and south, MGT is also actively organising a second round of bidding to begin this coming June. This will be for a further 11 contract areas in the eastern part of the country, covering another 156,000 square kilometres, for which a seismic survey is currently underway.

At present Mongolia has no oil and gas production. Historically, it has relied on imports from its Soviet neighbour, bringing in some 800,000 tonnes of petroleum products by train each year. Over the past 10 years this has accounted for about a third of all imports to the country in monetary terms, although costs were always well below market prices in deals involving the bartering of Mongolian products such as mineral concentrates, timber and cashmere.

With the demise of the communist system in the Soviet Union, aid has been cut and payment for oil is now being demanded in hard currency at world prices, pushing energy cost up to well over 50 percent of Mongolia's export earnings. This economic crunch, coupled with the question of future reliability of supply from a neighbour now in turmoil, is accelerating the need for rapid exploitation of local resources.

New Petroleum Law

In February last year the Great People's Khural or parliament adopted a new Petroleum Law, one of several reforming laws now passed or in the pipeline to radically restructure Mongolian society since its first free elections in July 1990.

Tough problems face Mongolia as it establishes a market economy, not least the country's infrastructure.

Under the Petroleum Law, intended to pave the way for foreign investment with production sharing contracts, licences granted will provide an initial exploration period of five years. It will be possible to extend this term on two occasions, each for a further two years. The ensuing period for development and production is set at 20 years, with extensions being negotiable up to two periods of five years.

The amount an oil company will receive as return on its investment will depend on the specific field, for example on its size and location. However, MGT's general intention is to allow a company to recover its cost from 40 percent of the oil production, which can be repatriated in hard currency. The remaining 60 percent production revenue will be shared between MGT and the company in a negotiated split.

But to win a contract, and particularly if extensions are needed, a foreign company must be prepared to invest quite significantly in the construction of the infrastrucure, not only in pipelines and refineries, but also general civic facilities. Equipment needed for exploration and development can be imported and exported without duty but the law stipulates that it must be the latest design capable of producing at least 20 percent of the discovered reserves in a field. There is also an emphasis that operations must be conducted with due regard to the environment — covered by another new law — and that training and knowhow must be passed on to nationals.

According to the Mongolians, about a dozen oil companies have expressed interest in carrying out petroleum operations, among them BP, Enterprise, Hamilton Brothers and Total. All are keeping their intentions rather secret, although BP did conduct a field survey over a 12-month period, checking on some 1,000 locations for hydrocarbon potential.

Prospects

According to Zaanhuugiin Baras, director of the State Geological Centre in the capital Ulaanbaatar, there is ample geological survey evidence to indicate oil is present in a number of regions; in fact, about 40 years ago oil was produced from two fields.

The first indication that Mongolia has oil potential came in 1931 from American geologist Tenner. He recorded burning shale and bitumen 300 km south of Ulaanbaatar and later in other areas, said Mr Baras, including Choibalsan basin in the east, one of the areas which will be offered later this year. Detailed exploration of the Zuunbayan, Tamtsag, Nyalga and other eastern basins was carried out with the help of the Soviets from 1947, with wells averaging 1,000m, establishing the existence of oil-bearing Cretaceous source rocks. But the wells never reached the 3,000–4,500m depth which modern estimates show to be the likely payzone.

However, development drilling from the end of 1950 did lead to production from the Zuunbayan and Tsagaan Els fields in the East Govi basin. Zuunbayan produced 54,000 tonnes of oil in 1954 but later produc-

Petroleum potential of Mongolia

Source: Exploration Associates/SSI/Geolab

tion began to decline. About 200 wells were drilled in this field and numerous attempts made to stimulate production of the low sulphur, waxy crude, with little effect. All production ceased when the refinery was destroyed by fire in 1969. About 30 km to the southwest in the Tsagaan Els fields, production from about 16 wells was experimental, yielding 160 tonnes in 1955, but never really took off because of the lack of facilities to lift and transport the oil, again having a high paraffin content.

Now, to meet the needs of its 2·1 million population, almost half of which still follows the nomadic life on the steppe amidst 25 million livestock, MGT reckons it needs to produce over 5,000 tonnes a day, about 36,000 barrels. In the longer term, Mongolia would like to export oil, much as it has its rich coal resources to the Soviet Union in recent years. With the nearest port over 1,000 km distant, pipeline transportation through Russia or China would be necessary.

In terms of oil reserves, there is good reason to believe it may achieve this, says William Penttila, vice president of Exploration Associates International of Texas (EAIT), which acted as technical advisor to MGT.

'The country has excellent prospects for significant oil resources, having a sizeable number of sedimentary basins, thick sediments, oil seeps, very good source rocks and the potential for large oil traps. Based on the data we have now, Mongolia's possible recoverable oil resources are probably around five billion barrels of oil equivalent,' he observed. 'By using known source rock data with new information about total sediment thickness within the 13 major basins, the resources may be even higher than this. The current data also indicates that the size of the largest oil fields may be in the 100 to 700 million barrel range.'

EAIT worked with the Mongolians from late 1989 to produce a major report on oil potential to serve as essential marketing information to the international oil and gas companies. The task involved translating and evaluating unpublished reports and data collected over the previous 50 years by Soviet and East European geoscientists including surface mapping and some limited seismic data.

'Mongolia's possible recoverable oil resources are probably around five billion barrels of oil equivalent'

A more detailed follow-up report on the sedimentary basins of south-central Mongolia appeared in August last year, compiled by EAIT in conjunction with Stratigraphic Services International in the United Kingdom and Geolab in Norway, as a joint venture with MGT. A similar report for the eastern basins, containing gravity and magnetic data and access to oil samples from the former producing fields, is planned for April this year, said Mr Penttila. Some 67 individual and company enquiries have been forthcoming related to the opportunities, with more than 20 companies purchasing exploration data so far.

Applications for the nine contract areas in the west and south closed at the end of last month and licences are expected to be let soon. These areas are 40–50,000 square kilometres on average. There were originally 10 but, according to Mr Penttila, the most northerly, adjacent to the Russian border in a pristine mountainous area with a large lake, was withdrawn on environmental grounds.

The 12 areas planned for development in eastern Mongolia are smaller on average but cover the East Govi basin with its previously producing Zuunbayan and Tsagaan Els fields. Acreage in the Choibalsan, Nyalga and Tamtsag basins will also be offered on a production sharing basis, applications opening this June for award early next year. Western Geophysical has recently been shooting a 1,500 km speculative seismic survey in three of the basins, which was scheduled for completion about now and will be commercially available. ■

Competition in the gas market

British Gas and the Office of Fair Trading (OFT) have reached broad agreement on proposals to introduce greater competition into the industrial and commercial gas market.

British Gas originally required assurances that adjustments to the tariff formula would be implemented to reflect changes on the profitability of the gas business.

The company has since withdrawn these requirements after appealing to Mr John Wakeham, the Energy Secretary. Mr Wakeham assured British Gas that due to the changes it is making in its industrial business, Ofgas (Office of Gas Supply) would review a tough new formula for domestic customers which is due to come into force in April.

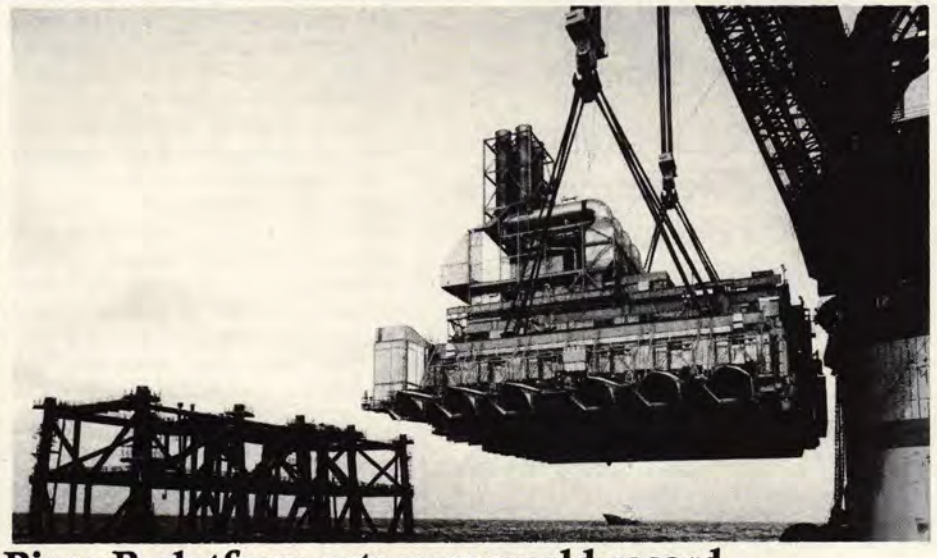
However, Sir James McKinnon, Director General of Ofgas has said that, 'There can be no question of prices in the tariff (domestic) market increasing as a result of developments in the industrial market'.

The OFT had threatened to refer British Gas to the Monopolies and Mergers Commission unless it dropped the conditions it had attached to the agreement.

Sir Gordon Borrie, Director General of the OFT said of the original agreement: 'I am pleased that it has proved possible to arrive at arrangements with British Gas which should benefit industrial and commercial gas consumers. The measures now agreed provide the opportunity for competitors to British Gas to plan and organise their own operations in order to bring about those benefits.'

British Gas says its objectives had been to put forward a package of proposals which would stimulate competition while causing the least possible damage to shareholder value and the least disruption to the gas market in Britain as a whole. It has taken into account concerns expressed by consumer bodies, competitive suppliers, North Sea producers and others about aspects of the OFT recommendations.

The British Gas response to the proposals includes:
***An assurance that it will plan to supply only 40 percent of the firm and interruptable industrial and commercial gas markets by 1995.**
***The reorganisation of the company's gas business in Britain into two separate trading units — gas transportation and gas trading/services which would facilitate a transparent and non-discriminatory basis of operation and separate regulation.**



Piper B platform sets new world record

A new world record for the heaviest single object to be lifted by crane was set when part of the Piper B platform, weighing 10,750 tonnes, was successfully installed by the crane vessel, DB-102. The operation involved a 300-strong crew and was equivalent to lifting a 12-storey office block.

The Piper B platform is operated by Elf Enterprise in association with Texaco Britain Ltd, LASMO (TNS) Ltd, and Union Texas Petroleum Ltd. The consortium is investing over £1.3 billion in the development of the Piper, Saltire and Chanter fields — all of which are due to begin production this year.

Indonesian exploration

Indonesian exploration is in the middle of an upturn and UK companies are playing a key role according to a report published by Arthur Andersen.

The number of exploration permits awarded, and more significantly the spending commitment attached to these awards has risen considerably over the past five years. 1991 was the first time for some years that the amount of new acreage signed approached the record level set in 1982 when the price of Indonesian oil averaged $37 per barrel. In 1991 it was around $20 per barrel.

In an area traditionally dominated by US companies, British companies accounted for 21 percent of the exploration expenditure committed over the past three years; this compares with just 10 percent for the three years 1986 to 1988. BP alone has committed $217 million over this period, more than any other company. BP's first field, Pagerungan should come on stream during 1993.

Cambodian offshore

A consortium in which Repsol Exploración holds a 25 percent interest, has signed an agreement with the Cambodian government for the exploration of an offshore block in that country. Other companies also participating in the consortium, with a similar interest of 25 percent, are Australasian Oil Exploration Ltd (Ampol), Santos Exploration Pty Ltd, and Premier Oil Pacific Ltd who acts as operator.

Airport pipeline

Construction authority has been granted for an Esso pipeline to link Birmingham International Airport with an existing line from Southampton to the Midlands. The £20 million link will be in the form of a 51 km spur running from Droitwich to the airport and then on to the existing Esso distribution terminal at Bromford.

Guidance on permits-to-work

Revised guidance on permit-to-work systems in the petroleum industry, taking into account some of the lessons learned from the Piper Alpha disaster, has been published by the Health and Safety Commission's Oil Industry Advisory Committee (OIAC). It expands and updates existing OIAC guidance published in 1986.

Permits-to-work are used to make sure that certain potentially dangerous operations are carried out safely, by formally identifying the precautions that must be taken. They are used especially in maintenance and repair work, when it is essential that the plant or equipment being worked on is properly isolated and made safe.

Mr Gareth Dykes, Head of the Chemical Manufacturing National Interest Group of the Health and Safety Executive (HSE), who chaired the OIAC working party which prepared the new guidance, said: 'Safe systems of work are essential in this industry, and a key component of a safe system is often a permit-to-work. Their importance cannot be over-estimated. If anyone doubts that let them look to the Piper Alpha disaster, where failures in the operation of the permit-to-work system contributed to the tragic consequences.'

The revised guidance is for use both onshore and offshore. It contains new information about training, system and equipment isolation and the responsibilities of people involved in operating the system. It also deals with handover procedures and the difficulties that may arise when multiple permits are in use at one and the same time, or jobs are interrupted — situations that may cause dangerous confusion.

Guidance on permit-to-work systems in the petroleum industry, ISBN 0 11 885688 X, is available from HMSO and booksellers, price £2.50.

Thai contract

The Petroleum Authority of Thailand (PTT) has awarded a £1.3 million contract to British Gas to inspect and appraise the condition of its main natural gas pipeline in the Gulf of Thailand.

The combined inspection and 'Fitness for Purpose' assessment is being undertaken in preparation for an increase in the volume of natural gas from 690 to 780 million cubic feet per day when the Funan and other gas fields in the Gulf of Thailand come on stream.

Data from the inspection work will also be used to plan additional offshore pipelines in the future as Thailand develops its energy resources.

LASMO plans for the future

LASMO which narrowly won its take-over bid for Ultramar last year has confirmed that it intends to remain a purely upstream exploration and production company.

The result of the take-over could hardly have been closer — by the close of the offer LASMO controlled 54.6 percent of Ultramar's shares.

As a first step in selling Ultramar's downstream assets it intends to establish Ultramar Canada Inc and Ultramar Inc as stand-alone businesses while a detailed review of options is considered.

LASMO believes that the Canadian refining and marketing operations are attractive and will be of interest to both established domestic companies and to foreign investors. The company's Corporate Development Director, Norman Davidson Kelly, said 'The refining and marketing activities in Eastern Canada, where Ultramar has a leading market position, are of crucial importance. We firmly believe that there is a future for these businesses operating independently.'

Mr Jean Gaulin, Chief Executive of Ultramar Plc and Mr Nick DiTomaso, have agreed to remain with the company to advise on the downstream disengagement in both Canada and the United States.

Oil output record praised

John Wakeham, Secretary of State for Energy congratulated the UK oil and gas industry for maintaining output of oil from the North Sea despite all the problems posed by implementation of the safety recommendations in Lord Cullen's report on the Piper Alpha disaster.

In a New Year message to Mr Sam Laidlaw, the President of the UK Offshore Operators' Association and Mr Roland Shaw, Chairman of the Association of British Independent Oil Exploration Companies, Mr Wakeham said that the safety measures rightly had first priority but the industry's record of maintaining output had been impressive.

'It is already clear,' he said 'that production in the second half of the year (1991) is running above 1990 levels and with new investment now coming to fruition, the trend for future years will be strongly upwards'.

Charringtons, a leading independent distributor of fuel oils, are to sponsor the RAC International Historic Rally for the next three years.

The 1992 'Charringtons Historic' takes place in and around Bath between 27–29 March 1992 and is expected to attract some 120 competitors. Among the 24 timed sections of the rally will be Radnor Forest in Wales, the grounds of stately houses Weston Park, near Telford and Bowood House, near Chippenham, the Castle Combe racing circuit and the famous Prescott hill climb.

Commenting on the company's decision to sponsor this event, Chief Executive, Andrew Johnson said: 'Classic car rallying is Britain's fastest growing motorsport and, with the recent acquisition of John Hudson & Company, Charringtons is Britain's fastest growing independent oil distributor. As we have been delivering liquid fuel since 1953, it is particularly appropriate we should sponsor classic car rallying, which covers the fifties and sixties.'

Andrew Johnson, Chief Executive, Charringtons (holding checkered flag), with a Charringtons fuel tanker dwarfing Timo Makinen's Mini Cooper.

Europe looks east

By Robert McLeod

The European Energy Charter, signed by 43 nations last December, will provide the framework for an open and competitive energy market in Europe and will provide the means for Western interests to enter the race to develop Eastern Europe's energy reserves.

Although the Charter is concerned with the whole range of the energy sector, the strategic, economic and social importance of developing Russia's oil and gas reserves is recognised as its focal point.

It is only the initial step. An agreement in the form of an international treaty is still to be signed and specific protocols for particular sectors and projects have yet to be hammered out.

The Charter, just the first step towards the goal of developing Eastern Europe's energy reserves, has been strongly supported by most states since it was first proposed by Dutch prime minister, Mr Ruud Lubbers, in June 1990.

The main thrust of the document deals with access to, and conditions for, exploitation of resources; rules on investment; free trade in energy; co-operation on product standards and quality; and research development and innovation. As yet, however, there are no specific agreements in place and it is hoped that within six months some agreements will be ready for implementation.

The Dutch government has been at the forefront of negotiations in support of the initial proposal and recognises the 'readiness and political will' of the other signatories to reach a basic agreement.

The next step

Deputy director-general of energy in the Dutch Ministry of Economic Affairs, Mr Laurens Knegt, spoke to *Petroleum Review* about the challenges now facing the further development of East-West energy co-operation.

'The next step has to be a fruitful negotiation of a basic agreement followed by sector protocols. The basic agreement is an international treaty which deals with a set of horizontal issues common to a number of sectorial protocols (investment protection, transit, sovereignty, etc) as well as with institutional aspects of Charter co-operation.

'The basic agreement has first priority. Wherever possible The Netherlands will play an active role in promoting the speedy adoption of the basic agreement. In the past year the contacts with the UK government and a number of other governments on issues regarding the Charter process have been frequent, open and informal.

'This of course is of particular significance because the United Kingdom is chair of Working Group II responsible for negotiating a basic agreement. In our discussions we will stress the importance of focusing on the significant energy problems of the central and Eastern European countries, including the Commonwealth of Independent States (CIS). We have to focus on creating sound energy and energy-related policies in these countries and try to avoid so-called West-West negotiations.'

Mr Knegt also stressed that the development of Russian reserves is not the only objective of the Charter and that nuclear safety, energy efficiency and environmental improvement, political co-operation and the creation of market economic conditions are also key points.

Russian reserves

Russian reserves, however, must be central to the Charter and one key oil expert close to the Dutch government agreed that 'the principle aim [of the charter] is the development of Russian energy'.

A similar point was made by Mr H Mulder, senior vice-president of ABN AMRO Bank, in an address to the International Symposium on the European Energy Charter in The Hague last November when he said that the 'Soviet Union is a key factor . . . because of its abundant energy resources, of which particularly natural gas has significant potential for both further domestic use and increased exports to west and central Europe'.

In 1989 West and Central Europe had an import requirement for natural gas of 135 billion cubic metres (bcm) of which 110 bcm was supplied by the Soviet Union and 25 bcm by Algeria. This figure was expected to rise to 325 bcm per annum by 2010 but the continued supplies at recent levels from both these sources must be under some risk at the present time.

In a speech to the Eastern European Natural Gas Seminar at London in January, Mr Lubbers pointed out that the demand for gas will increase in Europe as its environmental advantages are developed more in the power generation sector and the process of reconstruction of energy demand in Central European countries continues.

He added that there exists a relatively long time-lag for gas investment projects and indicated 'that, as a consequence, additional supply for Europe, especially in the short term, seems to be limited. The possible result could be a supply gap in the next decade'.

The CIS contains 37.6 percent of the world's proved gas reserves, 6.8 percent of the oil reserves and 22.1 percent of the coal reserves, Russia holds about 90 percent of these.

'As far as the development of Russian reserves is concerned' said Mr Knegt, 'the necessary technologies

and know-how are owned by private companies. Many Dutch companies are developing contacts with possible Russian counterparts. A well established presence is the joint venture in which Shell and Fracmaster are involved.

Priorities

'Priorities for the development of the Russian petroleum industry are, in my view:

- to establish a stable, market-orientated exploration and production climate;
- to develop co-operation with Western companies, oil companies as well as suppliers of equipment and services;
- to reverse the decline in oil production which is currently taking place;
- to enhance the efficiency of energy production, transport, refining and use; and
- to develop new gas and oil fields in an environmentally acceptable way.'

Despite the progress that has been made, there remains considerable work to be done before companies can expect to see returns on their investments.

According to Mr Mulder, speaking before the Charter was signed: 'A European Energy Charter without the prospect of concrete plans to develop [the USSR's] potential would be incomplete.'

It is hoped that the agreement will be signed within six months and that protocols can be begun after that. It is unlikely, however, that the installations and infrastructure eventually developed will be as competitive as those in the Middle East or the North Sea in the short or medium term.

It is believed unlikely that project-specific plans for development will be made public within the next six months, partly due to the political shake-up in the former Soviet Union which has meant, according to one analyst, a mushrooming of the number of people and agencies that need to be involved in coming to any agreements.

Forty-eight countries were invited to sign the charter. Five former Soviet Republics; Estonia, Lithuania, Moldavia, Kirghizstan and Turkmenistan did not sign but it is expected that they will do so at a later date.

Mr Laurens Knegt

The involvement of Central and Eastern Europe and the former Soviet Union is seen as essential to the Charter. 'Among those countries Russia certainly has a key role,' added Mr Knegt. 'In negotiations parties will take due account of the needs and desires of Russia.

'I am convinced that the Charter discussions have already had an influence on the development of a climate of confidence between East and West.'

Oil-rich Azerbaijan opens up

By Laura Le Cornu

Azerbaijan, enjoying a latter-day oil rush since the recent opening-up of its century-old oilfields to foreign exploration, will now be in the world markets to sell its own oil products.

'Azerbaijan is now in charge of its own petrol. Beginning from 1992, we will be in the world market selling our own oil products,' Azeri Prime Minister Hasan Hasanov told foreign reporters recently. 'We want Western oil firms to come and invest here,' he added.

Until World War II, the Caucasus and Caspian Sea oilfields were to the Russians what Texas was to Western oilmen. Production took off in the late 1870s but declined as attention focused on significant finds in the Volga-Urals region and then West Siberia.

Because of lack of investment, the oil flow from Azerbaijan has fallen from 445,000 barrels per day in 1940 to 430,000b/d in 1965 to 244,000b/d as of end-1990, accounting for about two percent of total Soviet output. Moscow currently pays 346 roubles for a ton of Azeri oil — about $3 at the black market rate.

Foreign interest

Oil facilities which have not seen Western oilmen since the turn of the century have witnessed a solid flow of foreign firms in recent months.

'I have seen all the Western oil companies, from A to Z,' said chief engineer Valekh Aleskerov of Azneft, the onshore oil and gas production company, pointing to a stack of business cards on his desk.

Recent deals include one by Amoco which signed a joint venture agreement with Kaspmorneftegas, the offshore oil and gas extraction firm, to develop a large oilfield in the Caspian Sea. Bechtel is involved in the modernisation of one of the two refineries in Baku.

'Azerbaijan and the Caspian Sea area will become a big hydrocarbon province,' said one visiting oil expert from a US oil company based in Houston. 'I am impressed by the high level of education. Any Western firm would employ local staff.'

Over three quarters of the country's crude output of around 11 million tons comes from fields in the Caspian Sea where reserves are confined to the uppermost layer of up to 1,000 metres. 'They have drilled 7,000 metres and they've got the technology to drill more,' said an American oil executive.

No exact figures for reserves are available. 'It's a state secret,' Mr Hasanov said. Western oil experts believe 1.5 billion tons might still be waiting to be extracted.

Making money in Azerbaijan is still way down the road. New oil exploration is expected to take at least five years. Experts say it will take some time before the Western oil giants enter the market. 'They are still cautious. For the time being, smaller, specialised firms will move more aggressively into the market,' said one.

Telecommunications is one drawback, with a telephone connection to the outside world taking sometimes as long as three days.

'We are very much at the beginning of the road. Everything has to be prepared from scratch — the petrol law, foreign exchange regime, everything,' said Cengiz Israfil, a Turkish adviser to the government. 'We are sorry that we cannot sign an agreement with you because of the uncertainty concerning our laws,' read a recent telex sent from a Baku firm to a Turkish businessman interested in the Azeri market.

Problems

The Caspian Sea oil is shallow and high-quality, and its production is inexpensive. But transport is costly and old refineries inefficient.

Azerbaijan is landlocked, surrounded by Armenia, Georgia and Iran. A 1,700km pipeline running from Baku to the Black Sea Georgian port town of Batumi has not been operating for over 20 years. Transport by ships northwards through the Volga-Don rivers is not feasible, due to freezing of the waters in winter months as well as limited capacity.

The only railway into Iran runs through Armenian territory and is subject to attacks by Armenian guerillas fighting a four-year-old war with Azeri forces over Nagorno-Karabakh, an Armenian-dominated enclave on Azeri soil. There is also talk of constructing a pipeline from the Caspian Sea to Iran.

Local oil officials complain that transport by the Soviet rail system is becoming increasingly costly as the newly-independent republics demand customs and port duties in hard currency.

'Now all the republics have started talking dollars,' said Faramaz Mamedov, deputy director at Baku's old oil refinery — first built over a century ago, and with annual capacity at around 13 million tons of crude.

New ventures

Overlimited of Austria and Baku-Invest, an Azeri-German joint venture, are involved in the modernisation of the refinery. Greek Motor Oil has set up a joint venture to produce paraffin and fuel oil at one of the plants.

Initially, Mr Mamedov said, access to the European markets would be by rail to the Ukrainian port of Odessa, about 1,800km to the northwest. The Ukraine has recently told Azerbaijan that it will charge $15 per ton in service fees.

Beginning this year, Azerbaijan will also use Iran as a channel to sell petroleum products on world markets via the Caspian Sea.

The republic has recently signed an

agreement with the National Iranian Oil Company (NIOC) to export half a million tons of gas oil to Iran in early 1992.

But Azeri officials say Iran is a problematic trade partner. 'They prefer to deal with Moscow — this is a political issue,' said Mr Mamedov, 'They are afraid of direct contact with us.' Iran, with 15 million Azeris of its own, has not recognised Azerbaijan's independence declared last August.

Payment from Iran is another hurdle. 'I asked them to open a bank account in Istanbul or Zurich. They said they will only open an LC through an Azerbaijan bank. But we do not have such a bank yet. They told me they had Islamic revolution laws — but I don't know what that means,' said Mr Mamedov.

A reluctance to reveal information, lack of legal framework as well as questions over who is in charge are some of the hurdles confronting first-class Western oil companies surveying the Azeri oil industry.

The onshore and offshore oil and gas entities have been joined under one ministry but Western oil executives complain that the divisions continue to act like separate competing bodies.

'Secrecy is a legacy of the past. Everyone still has a safe in his room to hide data,' said an American oil expert. 'They do not know how to react to us; they don't know who is in charge,' he added.

'We seek investment, know-how and technology,' said Oktay Ibrahimov, a deputy director at Azneft. Previously all joint venture agreements were handled through Moscow. 'Now, deals will be conducted directly with the republic of Azerbaijan,' he said.

Baku refinery.

Azerbaijan, a major supplier of basic oil industry equipment, has been suffering chronic shortages of spare parts and replacement equipment following the disintegration of the former Soviet Union. Inflow of equipment from neighbouring republics has dropped by more than half, said Mr Aleskerov.

Annual crude oil output from some 9,000 onshore wells across the country is about 2.3 million tons. Over 200 new wells are dug every year, said Mr Aleskerov.

Azneft has recently signed an exploration agreement with Pet Holding of Turkey. According to the deal now awaiting Finance Ministry approval, Pet will provide badly needed equipment in exchange for petroleum products.

Turkish construction firm Attilla Dogan is expected soon to announce a new joint venture with US and Azeri partners for offshore oil exploration. Officials from Attilla Dogan, who are also considering constructing an oil pipeline to the Black Sea through Armenia, say transport of crude oil is a critical problem facing western oil firms.

Some oil executives say business opportunities through Turkey, which shares strong lingual and cultural ties with Azerbaijan, offer significant advantages to foreign investors.

Phillip Honisett, director of ABC, an Ankara-based business consultancy firm, said Turkey's recognition of Azerbaijan's independence has made it easier for Turkish firms to enter the Azeri market. He said several US customers are looking to set up joint ventures with Turkish firms to export modern drilling rigs to Azerbaijan from Turkey.

Political crux

The Azeris fear that the very oil wealth that could give the republic's seven million people immense prosperity could doom it to remain in Moscow's clutches. 'The Russians will never let us go because of the oil,' said Suad Fataliyev, a young Azeri businessman.

'We cannot cut our economic ties with the former Soviet republics overnight,' said President Ayaz Mutalibov, before flying to the Kazakh capital of Alma Ata to sign a confederation treaty along with 10 other former Soviet republics. ■

Platform at 28 April field in the Caspian Sea. *Photos by Oleg Litvin*

What is artificial intelligence?

By John Fraser, Artificial Intelligence Applications Institute,
University of Edinburgh

Artificial intelligence (AI) is being used increasingly in the world around us. In Japan, for instance, no electrical appliance worth its salt appears on the shelves without the letters AI associated with it somewhere; Marks and Spencer use AI to help sift through graduate applicants; American Express use AI to authorise credit for customers. In this article I describe briefly what AI is, how it has been applied in petroleum, in particular exploration, and what the current trends are.

What is AI?

Somebody once described AI as 'the study of things that humans can do and computers can't yet do,' Cynics read this as 'the study of things that computers will never be able to do', but it is fair to say that AI has provided plenty of real solutions to real problems. In contrast, what we might call 'conventional' computing has tackled tasks which humans are not very good at, such as doing lots of calculations quickly or processing, collating and presenting many pieces of information at once.

AI should really be thought of as a discipline which has provided new ways of tackling problems with computers, some of which have proved to be better than existing methods. Some of the programming techniques which have been developed within AI are:

- the handling and presentation of symbolic rather than numeric data
- the ability to explain how a particular piece of information was discovered or deduced
- the ability to handle incomplete or uncertain data
- the ability to handle new situations

Another strong feature of AI has been the development of innovative and accommodating user interface. Facilities such as overlapping display windows, icons, pop-up menus, mice and touch screens have had their roots in AI programming.

Disciplines within AI

AI breaks down broadly into these disciplines — knowledge-based systems, neural networks, vision and natural language.

Knowledge-based systems

The area of AI with which people are most familiar is probably expert systems or knowledge-based systems. These computer programs have been used to assist in a wide range of tasks such as interpretation of rules and regulations, monitoring and diagnosis of physical systems (from humans to oil-gas separators) or design and configuration (from electronic chips to offshore installations).

The essence of expert systems is that they embody the specialised know-how or one or more individuals. They can have several advantages over conventional computer programs and there are many examples of their use in the petroleum world.

The kinds of tasks that knowledge-based systems address have been categorised into Analysis, Synthesis and Modification **(Figure 1)**. So far knowledge-based systems have made a significant contribution to analysis and modification tasks, with less progress in the harder synthetic tasks of design, planning and scheduling.

Neural networks

Many people will also have heard of neural networks, the basic theory of which has been around since the 1960s but which really took off in the mid 1980s with the arrival of more powerful computers. They are particularly good at classification and identification tasks where a good body of data already exists, such as reading characters on a page, deciding how well a drill bit is performing, classifying producing wells or identifying fossils from photographs.

Neural networks have the capacity to learn associations between certain characteristics in existing data sets and then make these associations when presented with new data. They have one major advantage over most expert systems: they are tolerant of incomplete data or new situations. They also have a disadvantage; the way they find an answer is hidden in lots of numbers, whereas the expert system has an explicit representation (usually in some semi-natural language) of its knowledge.

Vision

Two essential skills for a robot are a) sensing and interpreting the surrounding world and b) sensibly controlling its own actions. Automating the first often involves simulating vision, ie taking a 2-dimensional image and deciding which objects are in the vicinity and deciding what are their shapes, positions, speeds etc. Automating the second can involve amalgamating systems with different capabilities, such as those of learning, planning and plan execution.

Vision has itself been one of the main disciplines in AI, while robot control calls on knowledge-based systems and many other subdisciplines of AI.

There are few examples of vision applied to petroleum, although Schlumberger have been using vision techniques for interpreting seismic data.

Natural language

'Natural' language refers to the language which you or I or Mr Average would normally use in communication, as opposed to some specially designed or coded set of symbols and structures, such as Morse code. There are many difficulties in having a machine emulate human understanding of language; it is difficult for a machine to be aware of the context in which something is communicated or the tone of voice in which a statement is delivered. Generating language is equally difficult.

The advantages of being able to understand and generate natural language are apparent when one thinks of the possibility of automatic translation, the difficulties for some handicapped people in communicating and the complexity of controlling sophis-

IP WEEK

IP

The Institute of Petroleum

LUNCHEON MEETING

TUESDAY 18 FEBRUARY 1992

To be held at
The Dorchester Hotel, London

THE GUEST OF HONOUR AND SPEAKER

will be

Mr Kenneth T Derr,

Chairman and Chief Executive Officer, Chevron Corporation

who will speak on the subject

'LETTER FROM AMERICA'

The environmental debate in the United States is playing a prominent role in determining that nation's energy policy. Mr Derr will discuss this issue and other aspects of US energy policy and will assess their worldwide implications for petroleum companies and foreign governments alike.

For a copy of the ticket application form, and further information, please contact **Caroline Little,** The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR, UK. Telephone: 071 636 1004. Telex: 264380. Fax 071 255 1472.

IP

EXPLORATION AND PRODUCTION DISCUSSION GROUP

The next meeting of the E&P Discussion Group will be held at the Institute on **Thursday, 20 February 1992** starting at 5.30 pm. (Tea and biscuits will be available from 5.00 pm.)

Subsea developments — The way to the future

Speaker: **Mr Norman C Chambers,**
Managing Director, Rockwater Ltd

If you would like to attend this meeting please contact **Mr A E Lodge,** Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR. Tel: 071-636 1004.

ticated machinery such as aircraft.

Again, there are few examples of natural language applications in petroleum, but they may become more important as, for example, a) we get better at making sense of large accumulations of data or as b) we provide non-computer programmers with the ability to write their own programs just by describing their problems in terms which are familiar to them.

AI in petroleum

It is fair to say that the first flush of expert systems in the early 1980s delivered less than its promise. Nevertheless there are companies which have already made a big success out of using AI. Prominent among them in petroleum have been Schlumberger, Elf, Shell and BP.

In 1990 l'Institut Français du Pétrole (IFP) produced a report of their survey into AI in the petroleum world, which covered Europe, North America and South America. It estimated that around $300 million had been spent by the petroleum industry in the previous 10 years on AI related projects and identified the start of a 'second wave' of AI applications which would be sustained as long as the price of oil remained close to $20 a barrel.

The survey found that AI had been applied to geological, geochemical and geophysical interpretation; reservoir engineering; drilling and completion; offshore production; transportation; refining and petrochemistry; and safety studies. A good summary list of applications in these various categories can be found in Lideniro Alegre's article in the November 1991 issue of the *Journal of Petroleum Technology*. It also found, however, that very few projects (of the order of a dozen) had so far resulted in systems which are used as finished products.

In reality there are many more working systems, but of course companies jealously guard their successes. As far back as 1987 Shell intimated that they had 50 knowledge-based systems in operation or under development and by 1989 that figure had risen to 125. Shell have also been prominent in applying neural networks. They have reported that operational systems typically pay back within one year. BP too are known to have many successfully delivered systems.

In terms of AI, the vast majority of projects have used knowledge-based systems or expert systems. Planning is probably the next most popular area but neural network applications are generating a lot of interest, particularly for classification or curve correlation. It

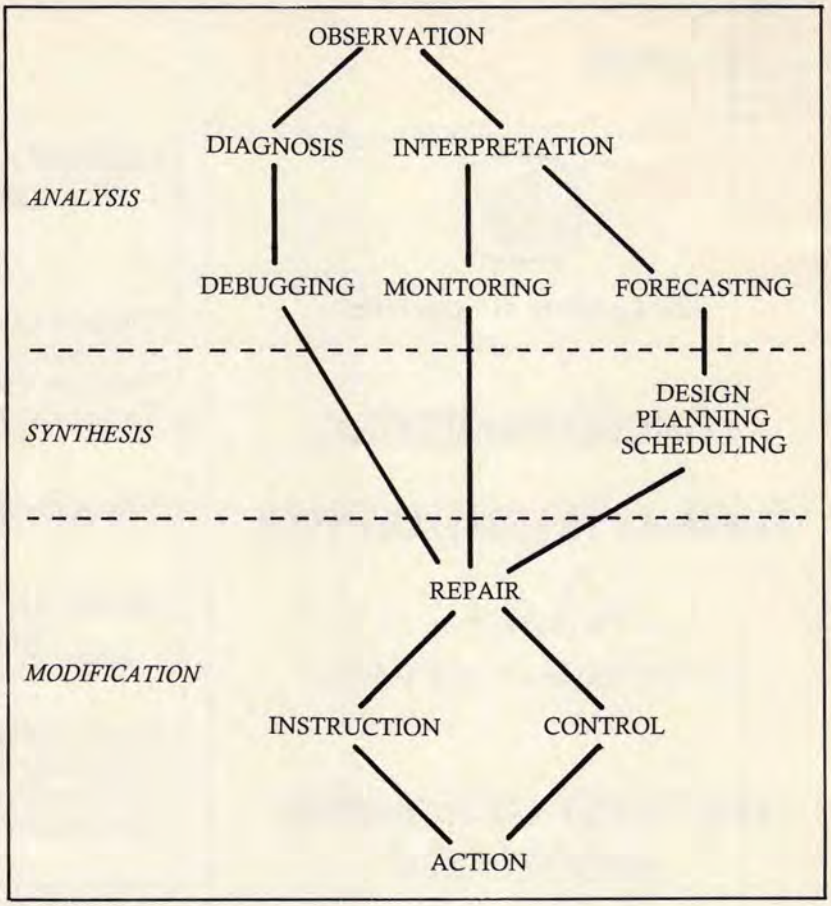


Figure 1: Task types.

is perhaps surprising that robotics have not attracted a larger level of interest in the petroleum world. Robots have been used extensively in the nuclear industry to carry out hazardous operations, particularly clean-up.

The most prominent AI groups in the United States are in Schlumberger, Amoco, Arco and Texas A & M University. The latter has hosted CAIPEP (Conference on AI in Petroleum Exploration and Production) for the last four years.

In the United Kingdom there are several small AI groups including British Gas, Shell, BP and Texaco, while in the rest of Europe Agip, Elf and IFP are active. IFP hosted the inaugural EuroCAIPEP in October 1991. (It is interesting to note the reasons given by the 100 delegates for attending EuroCAIPEP: see **Figure 2**).

Petrobras in Brazil have made big strides in their use of AI in the last three years (they hosted the inaugural Latin American CAIPEP in November 1991), while Maraven in Venezuela are also active.

Schlumberger's philosophy is to provide its engineers with AI tools and let them build their own systems. The other AI groups are keener to use AI specialists to perform 'knowledge engineering' in writing systems for others to use: just as you would get a dentist to fix your teeth or software specialists to do your inventory control system, so you would get knowledge engineers to produce your knowledge-based system.

Of the companies with smaller or no AI groups, Exxon are supporters of AI. Conoco are also keen and are adopting parent company DuPont's philosophy of providing users throughout the whole company with commercial shells and encouraging them to build their own systems to handle tasks which are important to their everyday work. Thus a company like Conoco is actively using expert systems technology to assist in all kinds of activities, both 'scientific' and 'business'.

AI in exploration

In petroleum exploration many companies have identified interpretation problems (eg petrophysical log interpretation, well log correlation, depositional environment interpretation and well test interpretation) as being particularly suitable for the application of AI techniques. The main motivation has been the desire to

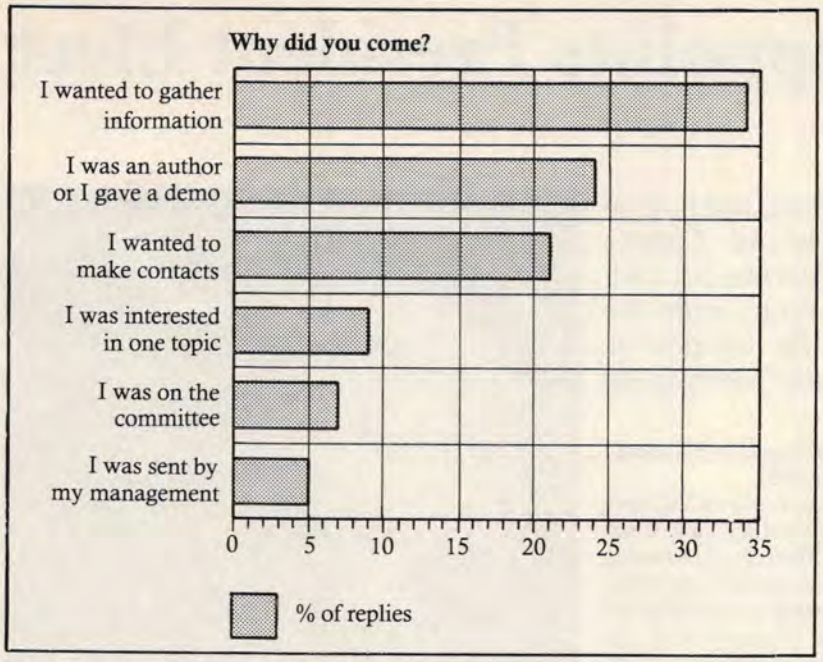


Figure 2: Reasons for attending EuroCAIPEP.

improve both the speed and the quality of interpretations. Neural networks are often used for the low level signal processing part of these tasks, with knowledge-based systems used for the intermediate reasoning. These systems often take geological information as another data source, to aid the reasoning process. As such they require the ability to reason with uncertain or missing data.

The most ambitious systems developed to date are high level AI applications eg in prospect appraisal. With advances in AI techniques such as fuzzy reasoning, case based reasoning, and advances in the representation and reasoning of geological structures, systems can be developed which will support parts of the exploration geologists' task. The most complete support aid for the task of prospect appraisal developed to date was called XX, developed at the University of Southern Carolina.

At the Artificial Intelligence Applications Institute in Edinburgh we have been working on two of these larger applications, PEXES and SPIRIT. The objective of PEXES is also to help exploration geologists in the appraisal of frontier basins. It will make browsing of brain databases easier and more constructive and will assist in the identification of analogue basins.

The objective of SPIRIT is to assist reservoir engineers of varying abilities and experience in interpreting oil well pressure tests. SPIRIT will consider not just the well test pressure data but will also use both engineering data about the well being tested and geological data about the reservoir in which the well is located.

Current and future trends

With the possible financial benefits of programs like XX, PEXES and SPIRIT, in terms of increased productivity and quality of analysis, it is likely that similar systems will be developed in the future. These systems will not replace geologists or engineers, neither will they be stand-alone AI systems: they will be integrated with databases, geographic information systems and other geoscience software programs.

Increasingly, oil companies are expecting engineers and geologists to use recently developed sophisticated software packages. In order for those packages to be used correctly and productively, the user requires on-line guidance. Thus, another area where significant effort is likely to be spent is in the development of intelligent interfaces to conventional software programs.

I also predict a split in upstream AI applications away from what I would call 'knowledge intensive' work to *data* intensive and *model* intensive work. The trends will be away from expert systems towards, on the one hand, systems which automate the acquisition and application of new information from large amounts of gathered data and, on the other hand, towards systems which place more emphasis on modelling the underlying principles and processes.

Finally organisations will also seek more ways of using AI to improve the business side of their operations, for decision support and policy planning, through the use of models of how organisations, people and economies behave.

In time the petroleum world may come to respect the stamp of the letters AI just as much as the Japanese buying public respect it! ■

Acknowledgment

I acknowledge the assistance of my colleague Dr Ian Harrison in the preparation of this article.

IP Council appoints President Elect

The Institute of Petroleum Council, meeting on 10 December last year, appointed Charles Smith, Managing Director of Chevron UK Ltd, as President-Elect of the Institute with the intention of nominating him for election as President at the Annual General Meeting on 9 June.

Charles Mayfield Smith was born 62 years ago in Edinburgh and qualified as a Chartered Accountant in 1952.

After two years' national service and three years with Vauxhall Motors Ltd, he joined Gulf in May 1957 as an accountant. From February 1962, he served for three years as Manager, Accounting and Services of Nigeria Gulf Oil Company when Gulf's activities in Nigeria were being started up. Following a period in the Comptroller's Department, London, as Representative for Exploration and Production and a training assignment in the United States, he was transferred in 1969 to Cabinda Gulf Oil Company in Luanda as Manager of Financial Services.

He returned to London in July 1972 as Regional Director of Economics — Government Agreement Department, involved largely in West African operations but also in financial and economic matters relating to Gulf's Middle East activities and latterly North Sea operations. In 1976, he returned to Luanda as General Manager — Cabinda Gulf Oil Company, following which he spent from April 1980 until October 1981 as Manager of Planning, Gulf Oil Exploration and Production Company in Houston, Texas. He then returned to Lagos as Managing Director of Gulf Oil Company (Nigeria) Limited until April 1985 when he took up his present position as Managing Director of Chevron UK Limited — the company operating the Chevron exploration and production interests in the UK North Sea.

He is a past President of UK Offshore Operators' Association. He is a Fellow of the Institute of Petroleum and served as a Vice President from 1988 to mid-1991. He is also a member of the IP Oil Industry Liaison Committee.

He chaired the committee which organised the Petroleum Science and Technology Institute established in Edinburgh in 1989 and served on its Board of Directors from 1989 to 1992.

He and his wife, Isobel, have two sons and one daughter, all of whom are married and living in the London area.

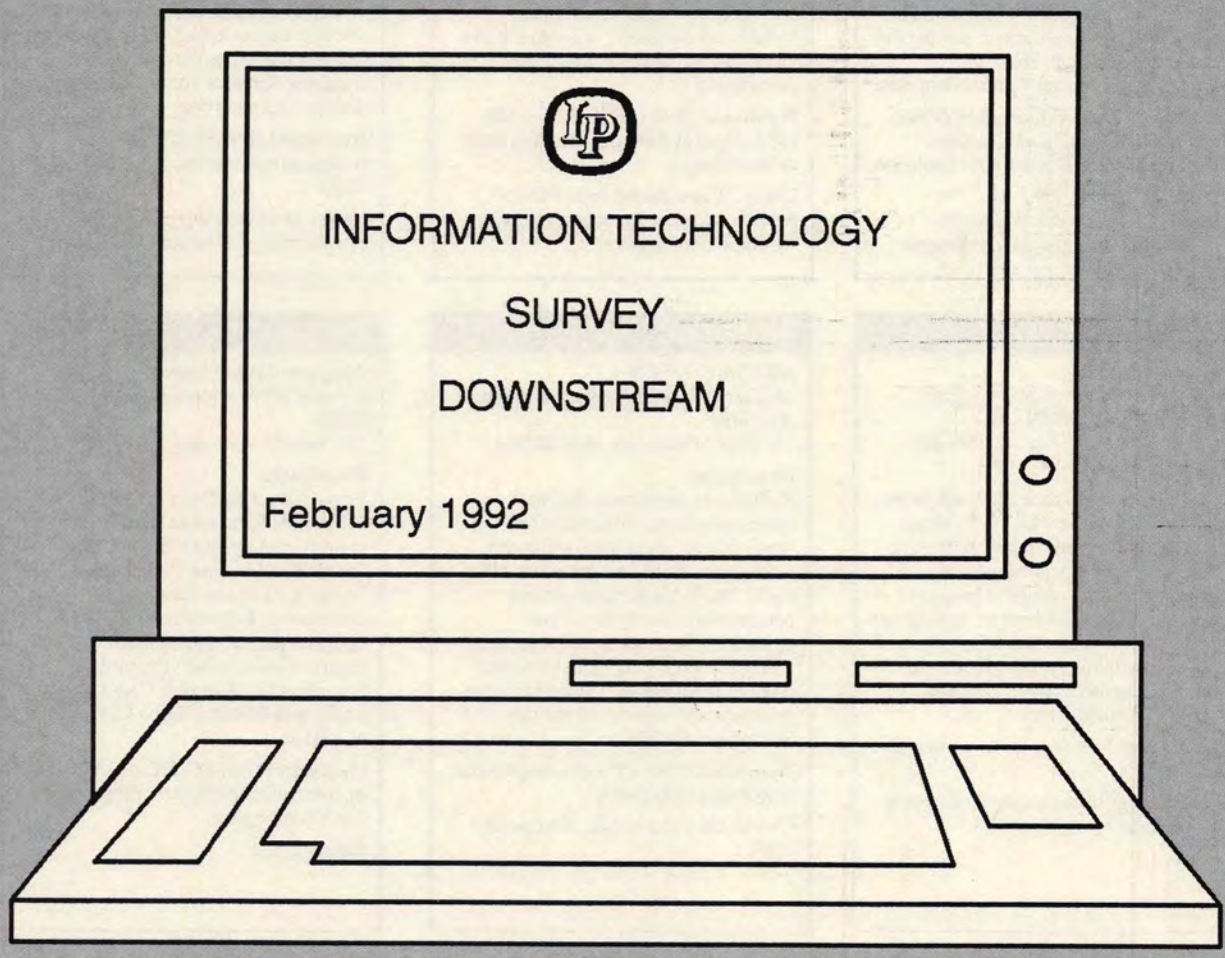
Charles Smith

New offshore software directory

In August 1990, Hollobone Hibbert and Associates Limited published the first edition of *Software directory for the offshore industry*.

This proved very popular, and a new second edition is to be published in the middle of the year by MTD Ltd, who have acquired the copyright. This new edition will have about 50 percent increased coverage, organised as before by subject areas with indexes of suppliers and categories. New features include an index of program names.

For further details, contact Sharon Clark or George Richardson at The Marine Technology Directorate Limited, 19 Buckingham Street, London WC2N 6EF. Telephone: 071-321 0674, facsimile: 071-930 4323.



INFORMATION TECHNOLOGY SURVEY-DOWNSTREAM

INFORMATION TECHNOLOGY SURVEY-DOWNSTREAM

Calma Dimension III

Computervision, a Prime Company
Computervision, 9805 Scranton Road, San Diego, CA 92121
Tel: 619-587-3000, Fax: 619-453-5026

Description
An integrated system of design, analysis, and data management software tools that may be customised to serve multi-discipline engineering and construction environments. Composed of a three-dimensional modelling package, and associated 2D drafting and documentation system, with a series of modular design applications, serving the Process Mechanical, Structural, Electrical and Process Control designers.

Hardware: DEC VAXStations (VMS) and Hewlett Packard workstations supported by the Domain/OS. Evolution to UNIX is underway.

Users: Over 300 sites worldwide including owner-operators, engineers and constructors.

Map Info System — MISS

Sovereign CS Ltd
24 Pellhurst Road, Ryde, Isle of Wight PO33 3BN
Tel: 0983 62735, Fax: 0983 617104

Description
Map-Plan information system operating within AutoCAD viewing and plotting combined Raster-Vector hybrid files. System can include buildings and services at various levels, components, parts lists, element ordering and cost codes operating and emergency procedures all linked locally and nationally. Automatic live video can be input for on-screen monitoring.

Hardware: IBM compatible — MS DOS. Optical disks (re-writable) and/or hard disks.

Users: Water Authorities, Public Service Utilities, Emergency Services, Insurance Companies.

Maximo Series 3

PSDI UK Ltd
No 5, Woking Eight, Forsyth Road, Woking, Surrey GU21 5SB
Tel: 0483 727000, Fax: 0483 727979

Description
Maximo Series 3 is a new computerised maintenance management system from PSDI for microsoft windows 3 with SQL fully relational database. Modules include asset register, condition monitoring, failure analysis, work order tracking, inventory control, purchasing, labour resource and calendars. Also provides full user customisation utilises for changing database configuration screen designs and reporting.

Hardware: IBM PS/2 compatibles,windows 3, LAN, DOS, OS/2.

Users: 384 including BP Oil, BP Engineering, Sovereign Oil, Amoco.

HYSIM

Hyprotech Ltd
400 119 14th Street, NW Calgary, Alberta, Canada T2N 1Z6
Tel: 403 283-7710, Fax: 403 283-4764

Description
Comprehensive, completely interactive flowsheet simulator for plant design, process evaluation studies. Extensive database, property packages, oil characterisation, complete range of unit operations and built-in intelligence make this simulator ideal for sectors of the energy industry: gas processing, oil refining, petrochemical, chemical, synthetic oil industries.

Hardware: PCs, VAX, PC networks, and MACs.

Users: Over seven hundred companies worldwide.

Shiftplan

ABZ Software Ltd
15 Union Street, Aberdeen, Scotland AB1 2BU
Tel: 0224 573316, Fax: 0224 581900

Description
Shiftplan is a computerised staff rostering system. You enter shift requirements, personnel, skills and safety rules. Shiftplan generates the roster. Shiftplan ensures suitable personnel are rostered to cover absences. Training may be recorded. Shiftplan checks expiry dates when producing the roster. Comprehensive printouts and reports. Single user Shiftplan is £9,000.

Hardware: IBM, PC and compatibles. Single user or network.

Users: 250 users in UK, Europe and USA.

Prime Factor FFT

Alligator Technologies
PO Box 9706, Fountain Valley, CA 92708
Tel: 714 850-9984, Fax: 714 850-9987

Description
Prime Factor FFT is a Fast Fourier Transform Subroutine Library written entirely in Assembler. It performs forward and inverse Fast Fourier Transforms in one and two dimensions. Prime Factor FFT will optimise for the type of math coprocessor installed. Example programs for Microsoft C and Quick Basic, and Borland Turbo C, Pascal, and Basic.

Hardware: IBM PC/XT/AT/386/486 or compatible hardware. Floppy drive math coprocessor.

Users: 2,500.

Leakstop

Honeywell Control Systems Ltd
Charles Square, Bracknell, Berkshire RG12 1ED
Tel: 0344 424555, Fax: 0344 416240

Description
A real-time transient model that accurately tracks the movement of batched and variable composition products through a pipeline system.

Hardware: DEC VAX.

Users: Proven technology used in many oil refineries worldwide.

Dovetail

Compower Ltd
Walsall Road, Cannock, Staffs WS11 3HZ
Tel: 0543 464999, Fax: 0543 464895

Description
Dovetail is an integrated computerised employee information system covering payroll, personnel, pensions and administration, with links to time recording systems.

Hardware: Not applicable.

Users: Large and small organisations nationwide.

Minitab

Clecom Ltd
Research Park, 97 Vincent Drive, Edgbaston, Birmingham B15 2SQ
Tel: 021-471 4199, Fax: 021-471 5169

Description
Statistical data analysis package offering wide range of statistical functions and a user-friendly interface.

Hardware: IBM PCs, Macintosh, wide range of workstations, minis and mainframes.

INFORMATION TECHNOLOGY SURVEY-DOWNSTREAM

Teamwork

Cadre Technologies Ltd
Centennial Court, Easthampstead Road, Bracknell, Berkshire RG12 1JA
Tel: 0344 300003, Fax: 0344 360079

Description
The Teamwork range of case products provides the complete solution for software and system developers. Teamwork provides solutions for analysis, design, performance modelling, requirements management, database design, and program development in C/CXX ADA and Fortran. Methods supported include object orientated analysis and design, Yordon Hately and Ward-Mellor.

Hardware: SUN, HP VX, DEC UTRIX, DEC VMS, IBM AIX, IBM OS/Z, HP Domain.

Users: GPT, Rolls-Royce, BT, Hewlett-Packard, IBM, GEC-Marconi, Ferranti, Motorola, AT & T, BNR.

MICROTOPAS

Topas (UK) Ltd
Lacemaker House, Chapel Street, Marlow, Bucks SL7 3HQ
Tel: 0626 475111, Fax: 0628 474883

Description
Microtopas incorporates a range of modules to handle bulk/package order processing/stock control, multi warehousing and blending. Its purpose is to provide an inexpensive solution to manage the manufacture and distribution of bulk and package product (eg lubricants/anti-freeze). Microtopas may be interfaced to proprietary third party accounting systems.

Hardware:
IBM Compatible PC's/LAN's. UNIX version available in 1992.

Users:
Esso Affiliates through-out Africa, Europe and Scandinavia.

TOP/AS

Topas (UK) Ltd
Lacemaker House, Chapel Street, Marlow, Bucks SL7 3HQ
Tel: 0626 475111, Fax: 0628 474883

Description
A comprehensive order processing/ distribution system for the petroleum industry. Versions available for petroleum suppliers/distributors/bulk liquid distribution. TOP/AS is a flexible and sophisticated method of processing, planning and execution of orders, also accommodating the integration of manpower and vehicle resources, stock management and integrated accounting modules.

Hardware:
IBM AS/400 range — any model.

Users include:
Fuel Oil Supply, Rickerby Fuels, Wessex Petroleum, Fuelserv, Hardy Craske.

Storage Data Manager (SDM)

Honeywell Control Systems Ltd
Charles Square, Bracknell, Berkshire RG12 1ED
Tel: 0344 424555, Fax: 0344 416240

Description
SDM provides a sophisticated single window monitoring interface of tank gauges for both the tank farm operator and upper level accounting software programmes. The database contains tank-specific data such as strapping tables, correction factors, alarm limits, or dynamic data such as levels, transferred volumes, and a time to a desired tank level.

Hardware: TDC-3000/Micro TDC-3000 distributed process control systems.

Users: Proven technology used in many oil refineries worldwide.

PD-Plus

Deerhaven Tech Soft-ware
7 Shady Lane Drive, Burlington MA 01803, USA
Tel: 617 229 2541, Fax: 617 229 2541

Description
PD-Plus is a PC-based program for simulating chemical processes, including refinery systems and non-ideal chemicals. It handles multiple-operation flowsheets with recycle streams. An interactive mode provides complete user control of the simulation and rapid evaluation of different process conditions. A large pure-compound database is available. Source is available under special license.

Hardware: IBM-compatible PC-XT/ AT, Intel 8088-80386-80486 with coprocessor, hard disk.

Users: Approx 100

Prodabas

Aspentech UK Ltd
Sheraton House, Castle Park, Cambridge CB3 0AX
Tel: 0223 312220, Fax: 0223 66980

Description
Integrated process engineering system which takes a design from the ideas stage through to production of detailed processes documentation in terms of specification sheets and process flow diagrams. PRODABAS streamlines work and yields benefits such as improved engineering productivity, error elimination, quality management and better process documentation.

Hardware: Digital VAX, PC Networks.

Users: Engineering and manufacturing companies worldwide.

PM/PS

Solomon Associates Ltd
3–9 Sheet Street, Windsor, Berkshire
Tel: 0753 833100, Fax: 0753 831965

Description
PM/PS is a PC based linear programming system specifically aimed at oil refineries. As powerful as mainframe systems PM/PS features an easy to use menu system and comes complete with a database including all refinery process units and blending. Over 150 crudes are included in the integral assay data.

Users: Oil refineries and government energy departments.

Process Modelling & Optimization

Honeywell Control Systems Ltd
Charles Square, Bracknell, Berkshire RG12 1EB
Tel: 0344 424555, Fax: 0344 416240

Description
A package providing the tools to allow models to be easily implemented and problems solved based upon real-time data from the LCN.

Hardware: TDC-3000/Micro TDC-3000 distributed process control systems.

Users: Proven technology used in many oil refineries worldwide.

IBM-Siemens-Link

ICC Ltd
40 Castle Street, Cirencester, Glos GL7 1QH
Tel: 0285 656045, Fax: 0285 656041

Description
Communications interface program to enable connection of high level process control or plant management systems to the Accuray 1180 Microplus system, Siemens Teleperm M system and Honeywell system.

Hardware: IBM.

Users: Multiple.

INFORMATION TECHNOLOGY SURVEY-DOWNSTREAM

TOPFLIGHT

Topas (UK) Ltd
Lacemaker House, Chapel Street,
Marlow, Bucks SL7 3HQ
Tel: 0626 475111, Fax: 0628 474883

Description
TOPFLIGHT is a package solution for companies involved in aviation refuelling. It controls the daily operations of refuelling/servicing/fast turn around of aircraft, providing instant availability of sales movement information, allowing for immediate invoice preparation. Detailed stock reconciliation and aircraft particulars provide essential planning information for manpower and vehicle resources.

Hardware: IBM Compatible PCs/LAN.

Users: Esso/Exxon installations worldwide.

TOPAS

Topas (UK) Ltd
Lacemaker House, Chapel Street,
Marlow, Bucks SL7 3HQ
Tel: 0626 475111, Fax: 0628 474883

Description
Developed for the petroleum industry and aimed at petroleum majors requiring a customised solution, TOPAS is a series of core modules including order processing, stock management, scheduling and distribution. Each version is re-engineered to meet the companies individual requirements, providing required interfaces to EDI, process control etc.

Hardware: TOPAS may be adapted for any mid-range/mainframe platform.

Users: Esso UK, Esso Italy, Shell Marine, Conoco, Gulf Petroleum, Shell Bitumen.

TEROMAN

SD-Scicon UK LTD
Wavendon Tower, Wavendon, Milton Keynes MK17 8LX
Tel: 0908 585858, Fax: 0908 282219

Description
Teroman is a maintenance and materials management system. It is a modular system covering the functions equipment and work reference data, work control, resource planning, preventive and predictive maintenance inspections budgeting and cost management, contracts management materials catalogue, warehousing inventory control and purchasing, installed and supported in over 150 sites worldwide,

Hardware: IBM43XX, 30XX, 9370, AS400, HP3000, HP9XX, DEC, MICROVAX, VAX

Users: 160 users in UK, Europe, USA, Middle East and Australia.

TOP/CPM

Topas (UK) Ltd
Lacemaker House, Chapel Street,
Marlow, Bucks SL7 3HQ
Tel: 0626 475111, Fax: 0628 474883

Description
A centralised plant maintenance system providing the total solution for central computerised management and control of maintenance at multiple sites. The system encompasses preventative and predictive maintenace, defect recording, monitoring, updating and distribution of standard procedures to incorporate all health and safety requirements.

Hardware: IBM AS/400 as the central database, with PCs at remote sites.

Users: Esso UK.

Speedup

Aspentech UK Ltd
Sheraton House, Castle Park,
Cambridge CB3 0AX
Tel: 0223 312220, Fax: 0223 66980

Description
Flexible process modelling system with unique facilities for rigorous dynamic simulation, process optimisation, model development, operator training. Benefits include safety, better design, superior control, easier feedstock changeover and optimal plant operations. May be used off-line or for greater benefit can be linked directly for on-line use with appropriate control systems hardware.

Hardware: Digital VAX, UNIX

Users: 90 worldwide.

SPQC-II

Honeywell Control Systems Ltd
Charles Square, Bracknell, Berkshire RG12 1EB
Tel: 0344 424555, Fax: 0344 416240

Description
A real-time statistical control package which operates in the TDC 3000 application module to provide a full range of control charting functions. Includes complex control chart calculations, alarms, statistical filtering and control chart history, all designed for use in process control.

Hardware: TDC-3000/Micro TDC 3000 distributed process control systems.

Users: Proven technology used in many oil refineries worldwide.

TOPCAP

Topas (UK) Ltd
Lacemaker House, Chapel Street,
Marlow, Bucks SL7 3HQ
Tel: 0626 475111, Fax: 0628 474883

Description
TOPCAP is a cost efficient tool to assist the planner in the development of an efficient delivery plan. TOPCAP automates the first pass allocation of all orders to available driver and truck resource, generating a plan within 3/4 minutes as opposed to 2/3 hours of manual effort.

Hardware: IBM Compatible PCs.

Users: Esso affiliates throughout Scandanavia and Esso UK.

Midnight Express

Compower Ltd
Walsall Road, Cannock, Staffs
WS11 3HZ
Tel: 0543 464999, Fax: 0543 464895

Description
Compower Ltd is one of the country's leading computer services bureaux, specialising in EFTPos services, electronic data interchange (EDI) payroll and associated human resource management systems. Compower's Midnight Express EFTPos service and its complementary local account card facility provide retailers with a highly efficient payment receiving, invoicing and banking administration system.

Hardware: Not applicable.

Users: Thousands of petrol retailers.

Simpleplot

Buss Ltd
29 Campus Road, Bradford, West Yorkshire BD7 1HR
Tel: 0274 309214, Fax: 0274 370502

Description
Simpleplot is an independent library of Fortran subroutines for plotting graphs. It supports linear and logarithmic normal probability scales and axes, polar graphs, surface drawing and contouring of 3-D data, 3-D representation of 4-D data, and pie charts with user-controlled tilting. It interfaces with hardware features and graphics devices.

Hardware: DEC VAX, IBM PC, Sun SPARC, DEC Station.

Users: Over 500 worldwide.

INFORMATION TECHNOLOGY SURVEY-DOWNSTREAM

PDMS ISODRAFT

Cadcentre Ltd
High Cross, Madingley Road,
Cambridge CB3 0HB
Tel: 0223 314848, Fax: 0223 65737

Description
Piping isometrics and Boms are produced from the 3D piping network database. Spool isometrics construction and fabrication isometrics are produced complete with detail produced automatically. Complete with detail information matched to suit the issue (shop/site). For example; geometric piping data is made available for transfer into material control packages.

Hardware:
Silicon graphics, Prime, DEC VMS, DEC ULTRIX, HP.

Users:
50 installations worldwide.

SAP R/2 System

SAP UK Ltd
Unit 6, Weybridge Business Park,
Addlestone Road, Weybridge, Surrey
KT15 2UF
Tel: 0932 850550, Fax: 0932 850882

Description
SDP's R/2 System covered the entire spectrum of business software for the mainframe environment. Functionality covered includes financials, human resources, sales order processing, fixed asset accounting, production planning and control, materials management, plant maintenance and cost accounting. Multi-currency, multi-language functionality is the advantage of this real-time system from SDP.

Hardware: IBM Mainframe or compatible UNIX version to follow in 1993.

Users: On request.

SETCIM

SD-Scicon UK LTD
Abney Park, Manchester Road,
Cheadle, Cheshire SK8 2PD
Tel: 061 491 3683, Fax: 061 428 5009

Description
SETCIM is an advanced manufacturing integration and supervisory control system. It is designed for companies wishing to incorporate plant data into their overall computer integration strategy. SETCIM is an on-line, real-time database management system which integrates with PLCs and industrial computers below and with MRPII, scheduling and management information systems above.

Hardware: Digital's VAX product family, Hewlett Packard's HP900 series 800.

Users: 20 users mainly Norwegian oil and gas platforms.

Blend Ratio Control (BRC)

Honeywell Control Systems Ltd
Charles Square, Bracknell, Berkshire
RG12 1ED
Tel: 0344 424555, Fax: 0344 416240

Description
BRC performs the temperature corrected flow ratio control, analyser interfacing, and trim operations associated with the execution of blend recipes.

Hardware: TDC-3000/Micro TDC-3000 distributed process control systems.

Users: Proven technology used in many oil refineries worldwide.

Blend Property Control (BPC)

Honeywell Control Systems Ltd
Charles Square, Bracknell, Berkshire
RG12 1ED
Tel: 0344 424555, Fax: 0344 416240

Description
BPC is a DEC VAX resident package that utilises the Minos non-linear optimiser to determine the optimum blend recipes based on component values, properties, and stream interactions. BPC is interactive with the blend ratio control package BRC and may be integrated to a production scheduling package.

Hardware: DEC VAX.

Users: Proven technology used in many oil refineries worldwide.

Event History 800

Honewell Control Systems Ltd
Charles Square, Bracknell, Berkshire
RG12 1EB
Tel: 0344 424555, Fax: 0344 416240

Description
On-line statistical process control and historical data collection software package residing on the DEC VAX. Integrates with TDC-3000 through the computing module 50S. Provides collection and archive of LCN event initiated data, plus retrieval. Makes historical data available on-line for analysis.

Hardware: DEC VAX.

Users: Proven technology used in many oil refineries worldwide.

Fourgen Accounting

Softgen Technology Ltd
Unit 4, Technology Park, Belfast
Road, Antrim BT41 1QS
Tel: 0849 428088, Fax: 0849 465982

Description
Fourgen Screen, Fourgen Report, Fourgen Menus, Fourgen Nominal Ledger, Fourgen Purchase Ledger, Fourgen Sales Ledger, Fourgen Sales Order Processing, Fourgen Purchase Order Processing, Fourgen Stock, Fourgen Asset Register, Fourgen Payroll.

Hardware: HP 9000, ICL DRS 6000, RS 6000 (IBM), Sequent, MIPS, Sun, SCO Xenix/Unix, other Unix.

Users: Kuwaiti Petroleum, Charles Hyde & Sons, Vitafoam.

Supplyline International

Compower Ltd
Walsall Road, Cannock, Staffs
WS11 3HZ
Tel: 0543 464999, Fax: 0543 464895

Description
Supplyline International is a modern and secure method of transferring and exchanging information electronically. A pc-based multilingual enabling package, allowing the transfer of documents between trading partners. Compower supplies the software, hardware if required, training and experience to back this EDI system.

Hardware: Any IBM compatible pc.

Users: Many national, local and multinational companies.

MGG

SD-Scicon UK LIMITED
Wavendon Tower, Wavendon, Milton
Keynes MK17 8LX
Tel: 0908 585858, Fax: 0908 584620

Description
Matrix Generator Generator (MGG) is the flexible cost-effective way to develop mathematical programming (MP) models. It combines all the advantages of matrix generator languages into a simple ultra high-level language. MGG is simple to use and easy to learn.

Hardware: VAX/UNIX/IBM.

Users: 80 sites, 20 users mainly Norwegian oil and gas platforms.

INFORMATION TECHNOLOGY SURVEY-DOWNSTREAM

MIRIAM

SD-Scicon UK LTD
Sanderson House, 49 Berners Street, London W1P 4AQ
Tel: 071-580 5599, Fax: 071-636 6134

Description
Stochastic next-event process simulation using a network flow algorithm to model the behaviour of a continuous production system over a period of time. Reports are produced on all aspects of system performance from total production figures to detailed equipment failure statistics and maintenance requirements.

Hardware: IBM compatible 486 PC.

Users: 20 users mainly Norwegian oil and gas platforms.

PROMIX

SD-Scicon UK LTD
Abney Park, Manchester Road, Cheadle, Cheshire SK8 2PD
Tel: 061 491 3683, Fax: 061 428 5009

Description
PROMIX is a system offering a complete business solution to process manufacturers. It has application modules covering manufacturing distribution and financial management. PROMIX is based on a fully relational database digitals Rbd and is engineered using a 4GL language gembase key to PROMIX is its network approach enabling planning and center of sequential and parallel process by products co-products and output from any stage.

Hardware: Digitals VAX product family.

Octane 2000/Site Manager

JDC Data (UK) International
Imperial Way, Watford, Herts WD2 4UN
Tel: 0923 242522, Fax: 0923 251933

Description
Octane 2000 is a pc-based network point of sale to back office system. The application set provides unique functionality and flexibility due to its design and the industry standard technology it uses. Site Manager is a modular licensee dealer back office system. JDC is a European systems company specialising in solutions to the petrol retailer. They market a range of applications and services.

Hardware: Point of sale — NCR 7052. Back office — IBM compatibles.

Users: British Petroleum, Statoil, Burmah, Q8, Shell.

Involve

American Technical Publishers Ltd
27-29 Knowl Piece, Wilbury Way, Hitchin, Herts, England, SG4 0SX
Tel: 0462 437933, Fax: 0462 433678

Description
Interactive videodisc instruction suitable for training in instrumentation subjects include the following temperature, pressure, level and flow. Troubleshooting control systems, calibration instrumentation test equipment, electronic maintenance, industrial process control and digital instrumentation. Allows users to learn at their own pace.

Hardware: IBM info window touch display monitor pioneer, LDV-4200 video disc player.

Users: Not known.

MIMI

SD-Scicon UK LTD
Wavendon Tower, Wavendon, Milton Keynes MK17 8LX
Tel: 0908 585858, Fax: 0908 584620

Description
MIMI is a flexible product for production planning and scheduling combining database, operational research and expert systems technologies. MIMI will aid the decision making process and offer measurable benefits including lower, production costs increased throughput and reduced inventory levels.

Hardware: VAX (VMS), IBM (mainframe), various UNIX.

Users: 100 sites worldwide. 20 users mainly Norwegian oil and gas platforms.

Task Monitoring Module (TMM)

Honeywell Control Systems Ltd
Charles Square, Bracknell, Berkshire RG12 1ED
Tel: 0344 424555, Fax: 0344 416240

Description
TMM allows the management of tanker loading, pipeline transport and all other product movements. It displays transfers on a single window universal station according to tasks queued up by the scheduling department for all operating personnel. In addition it provides a report of each product transfer.

Hardware: TDC-3000/Micro TDC-3000 distributed process control systems.

Users: Proven technology used in many oil refineries worldwide.

Fourier Perspective III

Alligator Technologies
PO Box 9706, Fountain Valley, CA 92708
Tel: 714 850-9984, Fax: 714 850-9987

Description
Fourier Perspective III with Dataview is a stand-alone menu driven signal analysis package which performs one-dimensional Fourier transforms with linear systems and publication quality graphics. Fourier Perspective III features forward and inverse FFT, convolutions, deconvolutions, power spectrum, cross spectrum, autocorrelation, and cross correlation.

Hardware: IBM PC/XT/AT/386/486 or compatible hardware. Floppy drive.

Users: 2,500.

SCICONIC

SD-Scicon UK LTD
Wavendon Tower, Wavendon, Milton Keynes MK17 8LX
Tel: 0908 585858, Fax: 0908 584620

Description
SCICONIC is the fast accurate and reliable way to solve mathematical programming (MP) problems. SCICONIC is an algorithmically advanced MP package which solves linear integer and non-linear MP problems. It may be used as a stand-alone system or as the platform for business applications.

Hardware: VAX/UNIX/IBM.

Users: 150 sites/20 users mainly Norwegian oil and gas platforms.

Upstream Computer Survey will appear in September.

For your free entry contact *Petroleum Review* on 071-636 1004.

IP WEEK

DOING BUSINESS WITHOUT PAPER

The impact of EDI (Electronic Data Interchange) on the upstream and downstream oil industry

Thursday 20 February 1992

To be held at the

Cavendish Conference Centre, London

This conference will set the scene by introducing EDI, showing its importance in many industries, its impact in Europe and hearing the views of an oil industry director. The afternoon is devoted to reports of the current EDI activities in the oil industry in the United Kingdom, both upstream and downstream. Associated with the conference there will be an exhibition from EDI service providers.

Programme

Chairman: Dr Roger Till, Chairman, Oil Industry Interest Section, EDIA, The British Petroleum Co. p.l.c.

An introduction to EDI and welcome to delegates
Dr Roger Till

Keynote Address
Mr Rodney Wallace, Finance Director, Conoco (UK) Ltd.

EDI in Europe
Mr Emile Peeters, Head of the TEDIS initiative, DGXIII, Commission of the European Communities

EDI in the retail industry
Mr Ian O'Reilly, Divisional Director Applications Development, Tesco

EDI PROJECTS IN THE OIL INDUSTRY

Joint interest billing
Mr David Howard, Conoco (UK) Ltd.

Product exchange reconciliation
Mr Bill Hogg, BP Oil (UK) Ltd.

Aviation fuel transactions
Mr Mark Hyde, International Air Transport Association

Oil and oil product pipeline transactions
Mr Peter Windebank, Esso Petroleum Co. Ltd.

For further information and a copy of the registration form, please contact **Susan Ashton,** The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR, UK.
Telephone: 071 636 1004. Telex: 264380. Fax 071 255 1472.

Planning on change

By Phil Collomosse, Associate Director, CMG

The oil and gas industry is unusual in the extent of its vertical integration. No other industry takes its materials at so early a stage, takes them through every stage of the manufacturing, refining process, handling most of its own waste in the process, and then wholesales and retails the product itself. As a consequence, most oil and gas companies are engaged in a dizzying range of activities which bear directly on their business. The trend towards outsourcing of various kinds of non-core activity which has developed in recent years in most industries seems designed for the oil and gas industry. Most companies have one or two core activities and a mass of peripheral tasks which may or may not lend themselves to outsourcing.

In our experience, the desire to concentrate management effort on core activities is often only the most obvious strand in a complex web of reasons for considering outsourcing. These may include the need to improve the performance of in-house services, difficulties in obtaining and retaining skilled staff, the need to manage a substantial change in the provision of services — perhaps associated with a major shift in business strategy, or to take advantage of new technology. Finally the need to focus on cost, quality and productivity may also be requirements.

When taking an outsourcing decision, there is a need to ensure that the flexibility associated with an in-house service is maintained in order to be able to respond to changes in business direction and objectives. Similarly, the need to identify and retain core skills for the areas to be outsourced is vital. Finally, outsourcing often involves significant cultural change. Success often depends on recognising the impact that this can have and in establishing the appropriate relationship with a vendor to manage the change.

Outsourcing

Outsourcing is the current vogue term for the service which has, in one form or another, been known as Facilities Management, or as bureau. Like the name, the popularity of the service changes. Reports yary as to its effectiveness, its responsiveness to change, its ability to respond to out of the ordinary demands, and its potential for causing disruption.

The benefits of IT outsourcing are well known and constantly repeated by the vendors of the services. The demerits are that for each of the benefits offered, the vendor may, to one degree or another, fail to deliver, and if the failure is sufficiently grave, to find another vendor or to return to an in-house service, is costly in time and money.

Given that there are benefits to be had, and given that many companies do outsource IT services and many of the contracts are extremely long standing, then presumably, the pitfalls of outsourcing are avoidable and the benefits attainable. So how is the right arrangement made? How should the move from in-house to externally managed IT be made? The answer, in my view, is that it is crucial to avoid even contracting a service vendor until quite far down the road. A supplier is the wrong person to ask before a proper study has been made of whether outsourcing is a viable option: any service vendor will give advice, though not necessarily good, and certainly not impartial, about how in particular the desired change should be made. That is a big jump from curiosity about the benefits of outsourcing. The decision to make the move is implicit in the fact of the enquiry. Stop, take stock, start again.

To change or not to change: that must be the first question. If the change is to be made then, at some stage, consultancy will be vital to advise and to help manage that change. If left entirely to the suppliers, there is no-one independently defending the client company's interests.

Seek advice

The time to bring in a consultant is at the beginning when they may not simply manage the change but analyse your situation and define and clarify your needs so that it can be seen if the answer is outsourcing or not, and if not, then what? It has been known that consultants have been brought in to advise on outsourcing and advised that the right changes could make for a far better operation in-house and without the disruption of the move. It has even been known for consultants to advise that the problem is the overall management of the IT function — the lack of direction and strategy from above. As this is a criticism of the very people who have hired the consultants, it is not an easy criticism to make but a consultancy worthy of the name would make it nonetheless. That after all is what they are there for — as corporate doctors — and would be of little use as such if they merely issued placebos and bland assurances that all is well.

Given that consultancy at the earliest stage is being proposed as the answer to all ills, what is there to be said about the usual criticisms of consultants — that they have pie in the sky notions, head in the clouds, no real knowledge of their client's industry and are off the site before any real problems emerge. The simple answer to that is that a good consultancy will do what it is briefed to do. The consultancy should be given what, with any luck, will later be given to the service vendor: a clear, concise and all inclusive contract covering the entire range of services required. In business, there is nothing more secure than a good contract.

Specialised IT consultancies, like CMG, have the expertise which ena-

CMG is not an oil company but Shell get more mileage out of us.

In the last five years, CMG – Computer Management Group – has been involved in over 30 different projects with companies of the Royal Dutch/Shell Group both in Holland and the UK.

The most recent assignment has been the design and development of a computer system to support trading on the oil market.

Like all projects undertaken by CMG, this one has mileage built into it. The object of the exercise is to support the activities of Shell International Trading Company – maintaining the existing competitive edge throughout the 1990s.

This talent for responding to future as well as present day needs is a feature of CMG thinking. We've been involved in many similar operations in our 27 year history.

Over that time we've expanded rapidly to become Europe's leading independent supplier of Management Consultancy, IT Consultancy, Software Development, Business Systems and Facilities Management.

Our client list includes a large proportion of Europe's top 100 companies and covers sectors from manufacturing and retailing to finance and government.

Now ask yourself this question: wouldn't your company benefit from a unique brand of consultancy, systems and services?

Call in CMG and fill up with some new ideas.

CMG
— Computer Management Group —

Steve Bishop

Telford House, Tothill Street, London SW1H 9NB
Telephone: 071-233 0288

CMG. Systems for success.

London – Manchester – Amsterdam – Rotterdam – Utrecht – Groningen – Den Haag – Frankfurt – München

bles them to provide a complete service if required, rather than opt out after the survey stage.

What the consultant is required to do can be divided into four fairly self-explanatory phases:

1. The development of a strategy based on a clear definition of the objectives to be achieved and the options for achieving them. Assuming the change is deemed necessary, and only then, the next stages come into play. This is a crucial stage and one often entirely bypassed as potential clients opt to contact a vendor as their first move.
2. Planning the change — not just to a broad brush degree but down to the finest detail of what, where, when, how and with what. The whole process must be entered into a matrix so that each action may be plotted and evaluated in terms of its effect on subsequent actions.
3. Implementation — this is not the automatic process it can appear; the rollover from one system to the next requires fine attention to detail and usually still takes time; the kind of IT operation suited to outsourcing usually has a continuous data processing function which absolutely may not be interrupted.
4. Review — once in place some settling in will be needed in order that the new systems can begin to mesh. Often ignored here is attention to the 'soft' side. The humans in two different organisations have to learn to work together. On the client side this can mean working in new and strange ways which can require extensive training.

Essential planning

This kind of process requires rigorous planning, so that each side may know the progress at any given point and know where to go next. This kind of attention to detail, on so large a project, is something that may not be sketched on the back of an envelope or kept in the head of even the most brilliant consultancy project leader. It requires care and method. The way to ensure that these are there is to ensure that the whole project is guided by a recognised project planning methodology.

The way to do this is to check the consultant of choice has a British Standards certification. The standard which has been almost universally adopted by the IT industry and which is the basis for TickIT, the Department of Trade and Industry sponsored certification for the IT industry is BS5750 part 1 or ISO 9001. A basic requirement of that

Phil Collomosse

standard is 'the establishment and maintenance of a documented quality system as a means to ensure that product conforms to specified requirements.' For the planning and implementation of major IT projects, a proven methodology is the guarantor of success. CMG's methodology, Commander, has been established from over 27 years experience as an IT services provider and is used throughout the group on all projects.

For an outsourcing project, only with a structured approach, with full involvement from key members of the client organisation, will the optimum blend of in-house and externally provided resources be found.

Whatever the industry, the balance of where to hand the IT function over to the control of an outside agency is probably the most crucial issue. Clearly, the client company must retain overall responsibility for the IT function. It is also likely that they will want some staff involved on a day-to-day basis in liaison with the service vendor; where the balance is struck is an important matter of strategy to be decided while the parameters of the contract are being set. The point to remember is that while routine tasks may safely be left to the vendor, and some decisions will have to be made by them also, any decisions which affect the quality of data or which could affect the future direction of the company — if for example the service vendor wanted to make changes in the computer equipment servicing the clients' data — then the decision must lie with the client. The balance between client and supplier regarding responsibility for service delivery and control of assets is the key to a successful relationship. Services may easily and wisely be subcontracted; autonomy may not.

Training is another issue which can easily slip by unnoticed. The client company will be left with only a small rump of an IT department, mostly at a senior level. It is unwise to assume that they will automatically be able to master their new job. IT connects the two jobs but only tangentially through the common data handled. The job in the first instance is to manage a large IT data-handling operation; in the second to act as co-ordinator and supervisor of an outside contractor. Essentially they are different jobs and the same people are not necessarily suitable for both.

This point also acts to emphasise why the decision to move to a service vendor is best made with the help of consultants and why it is a strategic decision and emphatically must be made by senior executives. A decision which could end in the departure of most of a company's IT workers is a sensitive one. Great care must be exercised in deciding when to involve the IT department as their contribution is vital to success. In the event, many of those people will be likely to be re-employed by the service vendor but it is an observable certainty that in-house workers, in any field, are hostile to outsourcing. ■

INFORMATION TECHNOLOGY SURVEY-DOWNSTREAM

SD-Scicon UK LTD

Wavendon Tower, Wavendon, Milton Keynes MK17 8LX
Tel: 0908 585858, Fax: 0908 281006

Company description
IT consultancy computer software system design/implementation and systems integration for the oil, gas and petrochemical industries. Skills include mathematical modelling realtime software and systems design, database design and analysis Scada systems, reliability analysis and open systems. Full hardware and software facilities management services, project management and quality assurance.

Users: Oil companies worldwide.

Applications: Refining and processing; petrochemical plant systems; pipeline control and monitoring; engineering management maintenance and materials distribution and marketing.

CMG Information Consultancy Services

Telford House, Tothill Street, St James's Park, London SW1H 9NB
Tel: 071-233 0288, Fax: 071-799 2017

Company description
Provision of IT related technical and management consultancy services, particularly in the areas of IT strategy, feasibility, information planning and analysis, package selection, structured systems development communications and networking project management, transition management and quality assurance.

Coverage: UK, Netherlands and Germany, BP, ESSO Petroleum, Shell, BPA

Applications: Oil trading, retail, marketing, lubricants, refining, finance, distribution, transport, office systems, human resources and quality improvement.

Sovereign CS Ltd

39 Cuckoo Hill Road, Pinner, Middlesex HA5 1AS
Tel: 081-866 0713, Fax: 081-429 0959

Company description
Comprehensive surveys and data capture for inputting to CAD and Facilities Management. Aerial photographs of complex combined with buildings, pipelines above and below ground including processing existing hard copy data to computer. System consultants and developers providing a one stop total solution with hardware and software customised to system requirements.

Coverage: Water authority

Applications: Site development planning, space utilisation, emergency services, planned maintenance, security, archive, works maintenance, plant operations, insurance records, chemical–explosive monitoring.

Science Systems Ltd

Rubislaw Den House, 23 Rubislaw Den North, Aberdeen AB2 4AL
Tel: 0224 310778, Fax: 0224 310037

Company description
Software and systems house specialising in the project management, design, development, installation and support of a range of applications from industrial control to management information systems. Development of systems using 3rd generation languages such as C, Ada, Pascal, and Coral 66 and database products including Oracle, Ingres, Sybase, Paradox and Clipper.

Established: 1980

Hardware: PCs, workstations & large multi-processor systems.

Applications: Production & Drilling reporting systems. Emergency response systems.

SCS Ltd

Safety Critical Software Ltd, 40 Castle Street, Cirecenster, Glos GL7 1QH
Tel: 0285 656045, Fax: 0285 656041

Company description
SCS is a BS 5750, ISO 9001, EN 29001 registered software engineering company specialising in scoping designing and creating interfaces between plant management, MRP or any high level system and DCS/Scada and intelligent or dumb instrumentation systems.

Establishment: 1989

Users: Worldwide

Applications: Process control and safety critical automation of manufacturing processes. Also communications or high integrity applications.

Electronic Software Distribution

(ESD), Buckingham House, Buckingham Street, Ayelsbury HP20 2LA
Tel: 0296 398854, Fax: 0296 432829

Company description
ESD allows large users of PC software to save time and money by purchasing PC software electronically. Users can access a wide range of products from a secure system. The software can be transmitted on normal telephone lines or by digital links. Ideal for updating coputer systems off-shore or internationally.

Established: 1989

Users: Confidential

Applications: Using a standard PC, the ESD user can download software, buy a site license or upgrade their entire installed base.

Buss Ltd

29 Campus Road, Bradford, West Yorkshire BD7 1HR
Tel: 0274 309214, Fax: 0274 370502

Company description
Buss offers a package called Simpleplot which is a library of Fortran subroutines for plotting graphics. It contains many facilities and interfaces with hardware features and graphics devices. The company has long term experience in the graphics software field.

Established: 1981

Coverage: UK, Germany, USA and many more.

Applications: Graphics.

GT Systems

Cotton House, 493 Union Street, Aberdeen, Scotland AB1 2DB
Tel: 0224 212200, Fax: 0224 592244

Company description
Computing contract house providing systems programming and datacomms personnel on a contract and staff basis for IBM m/f, Decvax, HP and PCs. Skill ranges cover commercial, realtime and 4GLs.

Established: 1979

Coverage: UK, Europe and USA

Applications: All commercial, realtime and 4GL development.

Aspentech UK Ltd

Sheraton House, Castle Park, Cambridge, CB3 0AX
Tel: 0223 312220, Fax: 0223 66980

Company description
Provides dynamic process modelling software programs to the process industries. Develops and markets process engineering database technology.

Established: 1983

Coverage: 90 companies worldwide

Applications: Process industries.

INFORMATION TECHNOLOGY SURVEY-DOWNSTREAM

Digital Applications International Ltd

8 Queens Gardens, Aberdeen AB1 6YD
Tel: 0224 624422, Fax: 0224 624433

Company description
An independent systems house specialising in the implementation of computerised realtime industrial and process control applications. These include offshore systems for control and monitoring, metering database systems, and systems integration. Other application areas involve warehouse control, process control and support and maintenance.

Established: 1971

Users: Britain, Germany, Holland

Applications: Consultancy, turnkey systems, engineering effort and support/ maintenance in systems integration, metering, scada, networking, communications, telemetry, distributed control, supervisory control etc.

TM Services Ltd

5 Charterhouse Square, London EC1M 6EE
Tel: 071 867 8600, Fax: 071 867 8787

Company description
Management and technical consulting services to the oil, gas, chemical and process industries worldwide, capability covers evaluation, project and operational phases including exploration, drilling, production, pipelines, terminals, refining, manufacturing, distribution, marketing and support services. Consultants have hybrid qualities which blend operational experience with information management expertise.

Established: 1980

Countries: UK, worldwide

Applications: Consult about and implement documentation management systems manuals and procedures, design and implement computerised modelling and expert system based decision support systems.

Topas (UK) Ltd

Lacemaker House, Chapel Street, Marlow, Bucks SL7 3HQ
Tel: 0626 475111, Fax: 0628 474883

Description: Topas have specialised in the petroleum industry for fifteen years, building a reputation for understanding the requirements of the business and providing solutions that work. In addition to providing bespoke and package software solutions for a world wide market, Topas offer a wide range of professional, impartial consultancy services.

Hardware: PCs, Mid-Range and Mainframe.

Established: Established in 1977

Countries: Installations in UK, Europe, North/South America, Asia, Scandinavia, Africa and Middle East.

Applications: Feasibility Studies, IT Strategy, Product Evaluation, System Design, Business Consultancy etc.

Logica Industry Ltd

68 Newman Street, London W1A 4SE
Tel: 071 637 9111, Fax: 0372 363 073

Company description
Logica is a leading software, systems and consultancy company with activities worldwide. Logica industry has a long and successful track record in supplying IT solutions to the oil and gas industries, with projects carried out in the UK, mainland Europe and further afield.

Established: 1969

Coverage: BP group-wide, Shell group-wide and all major independents

Applications: Systems analysis and design. Systems integration and turnkey implementation. IT strategy studies. Communications consultancy. Project management. Package evaluation. Applications facilities management.

Solomon Associates

Sceptre Gate, 3–9 Sheet Street, Windsor SL4 1BN
Tel: 0753 833100, Fax: 0753 831965

Company description
Solommon Associates provides general consulting services for the refining and process industries concentrating on issues which affect competitive performance. In addition to yield and strategic modelling we are active in the field of maintenance planning of maintenance planning and control systems.

Users: Refiners, Government agencies.

Applications: Linear Programming, Cost allocation, Process economics, maintenance systems.

ABZ Software Ltd

15 Union Street, Aberdeen, Scotland AB1 2BU
Tel: 0224 573316, Fax: 0224 581900

Company description
Our range of products and services are designed with both portability and compatibility as major considerations. We therefore provide systems for all major PC environments, including DOS, UVIX, Windows and OS/2 as well as Novell. Mini and mainframe development is also available.

Establisment: UK 1986

Applications: Data processing applications and report generation.

JDC Data (UK) International

Imperial Way, Watford, Herts WD2 4UN
Tel: 0923 242522, Fax: 0923 251933

Company description
As a European systems and services company JDC has many years experience in the design, development and integration of forecourt systems.

Coverage: Statoil, BP and NCR Corp

GT Computers Ltd

Cotton House, 493 Union Street, Aberdeen, Scotland AB1 2DB
Tel: 0224 592244, Fax: 0224 212200

Company description
Computer manufacturer (OEM) for all types of PCs, stand alone network server, industrial & hazardous area.

Established: 1990

Users: UK

Applications: Systems software only. MSDOS, Novell.

Can Information Technology really automate refinery scheduling?

By Robin Stokes, Senior consultant, SD-Scicon UK Ltd, (an EDS company)

Recent developments in Information Technology (IT) are making it easier to automate the mundane parts of refinery scheduling — chores such as data acquisition, number-crunching and publishing daily orders and stock projections. This article reviews these IT tools, and discusses their pros and cons from a user viewpoint. However, it is very doubtful whether IT could ever replace the flexibility, the imagination to cope with the unusual and the judgement of colleagues' ability to deliver that are the essential qualities required of a refinery scheduler.

Despite this, even automating 80 percent of the job is well worthwhile. Automation helps to eliminate unnecessary mistakes, allows more time to work out options thoroughly and so improves the overall quality and accuracy of schedules and stock predictions. Improved accuracy in stock predictions allows refineries the option to reduce safety margins on working stock, thus releasing working capital. Alternatively, greater flexibility in timings of supplies and liftings results in savings by increasing the number of potential market opportunities for spot trading and tanker charters.

Scheduling function

The scheduler's function is to produce (to tight deadlines).
a) detailed orders for the process units and tank farm for the next two to three days,
b) predictions of available stocks and ullage for crude and products for the next 10–15 days.

These are based on constantly changing data on current plant status, tank stock levels, expected supplies and liftings, and planned maintenance shutdowns of equipment and plant.

The schedule is guided by an overall refinery plan, which is usually based on an optimal solution of a Linear Program (LP) model. This is used to identify the critical constraints on refinery operations such as limiting product qualities, processing feedrates, operating severities and outpoints.

Scheduling is a complex job requiring extensive training and experience to understand and make value judgements on the issues involved. However, it has also involved collating data from refinery reports, head office telexes, shipping agents, etc. The schedule has been put together from laborious calculations from pencilled stock graphs and bar charts. These techniques have been, or are being, replaced using IT.

Information flows

IT is now being used for data acquisition as computers are ideal tools for handling and storing constantly changing data. Data is often already available as computer output from existing systems, usually specialised packages concentrating on a particular business function. The table below shows typically the types and sources of information.

Information	*Source System*
Tank stocks	Automatic tank gauging
Plant performance	Distributed plant control system/ real-time database
Tank and rundown qualities	Lab/process analysers
Shipping & pipeline movements road and rail liftings	Head office/ supply and distribution

These systems are usually stand-alone and their output data need to be brought together (integrated) into a centrally organised refinery database. This raw data has to be manipulated to be consistent and meaningful for the scheduler. For example, lab quality data for a tank is invalid and should be automatically deleted once that tank starts to be re-filled. Scheduling needs the flexibility to have all data updated overnight, or on demand.

The ability to integrate these systems has only recently become available due to several parallel developments in IT.

Data communication networks have become easier to install as Local and Wide Area Networks have become common with standards such as Ethernet, Token Ring, etc. Fibre-optic cables have enabled large quantities of data to be transferred between many users and systems without network overload.

Most software packages and hardware now have built-in interfaces and drivers to link easily into database systems.

The central database used is normally one of the common Relational Database Management Systems (RDMS), such as ORACLE, DB2, Sybase. RDMS routinely handle the control of the database including access and presentation of the data, updating security, back-up, etc. RDMS have had problems in handling frequent data updates from real-time systems, and been slow at producing complex screens. However, these problems have been solved by a combination of improvements in the RDMS versions and computer hardware and the use of cunning tricks dreamed up by experienced systems integrators.

Systems integration

Refinery systems integration is costly. Each database has to be specially customised to the particular needs of each refiner, wherever possible incorporating existing investment in applications and hardware. However, refiners who have pioneered systems integration have been delighted to achieve payback in under two years.

Systems integration also has an additional benefit in that it allows the latest daily schedule and stock forecast to be communicated easily to the whole refinery as well as head office.

Schedule creation requires extensive calculation and training to achieve expertise. Computers are good at performing calculations, and once 'trained', or programmed, computers never forget, go home, take vacations, or change jobs as human schedulers do!

Three common techniques are used by programs to create refinery schedules:

- Simulation
- Spreadsheets
- Special packages.

Simulation

These programs aim to simulate refinery operations accurately. Unit yields and rundown qualities are calculated from sophisticated process models running as sub-routines of the scheduling program. Product blends are optimised on the stocks and qualities of components available at any given time.

The program is initially set up with current plant status and tank stocks, future oil imports/exports and shutdown commitments. The program then calculates the next event to happen, ie feed tank empty, rundown tank full, ship arrival, pre-set time expiration, etc. The scheduler must then decide the next move. The program then chugs on to the next event and so on to the end of the scheduling period. Data on stocks, tank qualities, unit and blend operations by time are stored on file. It is thus possible to backtrack, investigate alternatives and run 'what-if?' stimulations on process models during the run.

These programs need to be custom-built, as packages have not been previously readily available. This makes implementation and support somewhat costly. Unfortunately these programs tend to be rather inflexible and user unfriendly. It can take an inordinately long time (hours!) to complete a schedule due to the number of often trivial decisions that are required.

Movements for the next three days are known accurately. After this, details become increasingly inaccurate and fuzzy. Shipping ETAs are typically +/− one day as shipping is weather, tide and port congestion dependent. Shippers insist on maintaining contracted +/−five percent parcel size flexibility as late as possible before loading. However, simulation requires the same accuracy throughout the scheduling period. This leads to the nonsense of inputting fuzzy data to a meaningless level of accuracy — ie garbage in, garbage out. Soon users stop wasting their time running the program.

Spreadsheets

A cheaper, simpler alternative is to use PC spreadsheet packages. The columns of the spreadsheet can be used to represent time, with rows used to represent stocks, unit feed rates, feed tanks, operating modes. Fixed formulae are programed into the spreadsheet to convert unit charges into yields

Developments in IT are radically changing refinery systems.

and blend components to products. All feed changes are simplified to occur at midnight, so that all unit runs and blends take integer days to complete.

This results in a cheap, rough and ready stock forecasting tool that is easy to learn and use. Because of the inherent inaccuracies, large safety margins on ullage and working stock have to be allowed to avoid possible future overfills or stockouts.

Manual data input, usually from computer output, is very tedious and error-prone. The benefits of automatic initialisation from the refinery database are tremendous.

From an IT viewpoint, spreadsheets are bad news, notoriously difficult to document and maintain. In practice many spreadsheets rely on the good offices and memory of the local spreadsheet guru. There is no validation on manual spreadsheet input, which makes it very difficult to bring back the spreadsheet forecast into a database for general use by others outside the scheduling department. Finally security and back-up rely entirely on rigorous house-keeping discipline and avoiding human errors — disasters are inevitable!

Special packages

Recently a workstation package has been developed specifically for refinery scheduling using database technology, combined with a unique LP and scheduling system combining advances in expert systems and user interfaces.

The database is set up in the form of tables and 'sets' or classes which are standard forms of refinery LP input. There are built-in links to RDMS for easy loading of current input data and export of finished reports back to the refinery systems. The database automatically updates related tables whenever a change is made anywhere, thereby maintaining consistency.

The refinery LP model is set up as a multi-period model, which solves sequencing problems, so that the production of low sulphur fuel oil is restricted to periods after the arrival of low sulphur crude. Use is made of modern LP algorithms, such as Successive LP, to optimise around non-linearities, eg inter-period stockholding of unknown quantities of components of unknown quality.

This package has the unique feature of automatically producing a schedule based on the optimal LP solution. This is done using an expert system to interpret the solution and to incorporate good practices, such as JIT ('Just-In-Time') product blending. The result is a rough first attempt schedule, that probably needs some manual modification.

Manual modification uses Graphical User Interface techniques. Unit and blend operations are presented as a bar chart in a window of the colour screen. Tank stocks versus time are shown simultaneously on another window. Operation timings and run lengths can be changed by 'dragging' the appropriate bars to left or right, with the corresponding effects on tank stocks seen immediately on the accompanying window.

This package is just successfully completing implementation at pioneering refineries and looks like becoming the current 'best of breed'. However, even this program cannot answer the really difficult scheduling judgement decisions such as whether next week's potential stockout of product A is better, or worse, or more likely to happen than a stockout of product B. ■

Virtual reality

By Tim Lawrence

Virtual reality may sound like a science fiction fantasy but it is now science fact. Over the next few years it could change the face of engineering and the petroleum industry. The design and construction process could occur in an artificial computer-simulated reality rather than the material world. The potential for saving time and money and to embark on more complex projects will be huge.

Virtual reality creates the illusion of being immersed in an artificial world, or of being present in a remote location in the physical world. For state of the art virtual reality, one must be able to move around in a computer-generated environment and interact with it.

To enter virtual reality — or "cyberspace" — a person needs three pieces of equipment: a head-mounted display (HMD), which is made up from two miniature television screens mounted in a headset and provides the wearer with a three-dimensional view of an imaginary world; a glove fitted with fibre-optic sensors, known as a DataGlove, which manipulates imaginary objects in the imaginary world; and a set of computers calculating the space co-ordinates for each particle of the virtual world, at about 32 million commands per second.

If the HMD and gloves are linked not to a computer model but to a robot that has two eyes, located as far apart from one another as human eyes, a neck which can move like a human neck, ears containing microphones and a handlike gripping device, the system is known as a tele-operator or tele-robotic system.

The technology is mainly at the research and development phase and it remains crude and cumbersome. There is a time-lag when the computer calculates each new position as the visitor moves through the virtual world and the virtual world does not yet match the density and sensual immediacy of the real world. Practical examples of virtual reality are limited.

The technology is also extremely expensive. It costs hundreds of thousands of pounds to buy a virtual reality design kit, including the hardware, computers, gloves, goggles and sensors, according to Howard Rheingold, a leading authority on virtual reality and the author of a new book on the subject. He predicts that within 10 years the price will have come down to several thousand pounds.

Less sophisticated versions of the technology can already be bought at a cheaper price. Virtual Presence, a UK company, sells WorldToolKit, a version of virtual reality minus the headset, for about £2,500. You cannot get inside the computer but you can still visualise, simulate and interact with graphical data in three dimensions.

Designers of all kinds will benefit from virtual reality, according to Mr Rheingold. While they understand computer designs far better than their clients, he says, the best way to explore a three-dimensional design, whether you are a designer or the person who will use the design, is to walk around in it and handle it.

'There are big savings to be made from avoiding mistakes,' he said 'Anything that helps engineers, planners, architects, contractors and clients debug problems at the design stage is worth the cost of the project, which can often total millions, sometimes billions of pounds.'

Mr Rheingold believes that one of the most lucrative industrial applications of virtual reality could be in the field of refinery design. 'Companies such as Shell spend billions of dollars building refineries and often millions of dollars on model prototypes. If you build one of these models and then find you need to change it several times, it may well be worth investing in virtual reality.'

Kees van der Heijden, head of scenario planning at Shell Centre in London until 1990 and now a lecturer in strategic management at Strathclyde University, is enthusiastic about the possibility of combining an architectural 'walk-through' with process-control simulation.

'Shell spends a lot of money building models of a refinery to calculate the layout of pipes to the nearest millimetre before building the real thing. Several of these models are often built before a successful prototype is reached. While these models can cost hundreds of thousands of pounds, if they help Shell avoid making one or two mistakes then it is worth it,' said Mr van der Heijden.

'But with virtual reality you could walk through the plans and get a better insight into the working of the refinery. It is much easier to envisage plans if you can actually interact with them. In cyberspace if you want to you can shift a virtual pipe with the DataGlove and see what happens. All of this will eventually be at a lower cost than the present system of building models,' he added.

Mr van der Heijden also believes virtual reality could be used for strategic thinking. 'Day-to-day competition dominates a company's thinking but it is important to take a longer, strategic view. Virtual reality could help managers take a step into the future by creating a scenario and getting the managers to enter this scenario, interact with it and devise a strategy,' he said. He accepts that this second application is less practical than the first but in a market as competitive as petroleum any advantage gained could provide huge gains.

Mr Rheingold thinks the whole process could be taken one step further. If all the planners could be there together, via some kind of telepresence, they could save on communication and transportation costs as well as eliminating expensive misunderstandings.

Engineers are already experimenting with the possibilities of virtual reality. Prototypes exist and buildings have been built. It is far cheaper than building mock-ups and infinitely reusable.

Computer screen designs cannot be instantaneously converted into virtual reality but the process is fairly easy. As computers become more powerful and the technology develops, the process will become speedier.

Despite his enthusiasm, Mr van der Heijden remains cautious. 'Virtual reality may be the technology of the future, but we have to be realistic. The presentational side of virtual reality is coarse and there is still a lot of work to be done before cyberspace resembles reality. Only then will things take off.' ■

BP abandons artificial island scheme

By Robert McLeod

BP and its partners involved in the development of the Wytch Farm oilfield in Dorset have shelved plans to build an artificial island in Poole Harbour and instead are searching for a suitable onshore site for seaward drilling extensions; a move which would save the developers £100 million.

The turnaround in plans is a result of 'significant recent advances' in long reach drilling made in the 12 months since plans for development of the offshore section of the Sherwood Reservoir were first proposed.

The Sherwood reservoir sits 1,600 metres below the harbour and extends some eight kilometres out to sea. Recent developments in the drilling of extended reach wells in the North Sea and elsewhere has led the consortium to believe that from a well drilled five kilometres out to sea it can recover almost 80 percent of the estimated 100 million barrels of oil in the offshore section of the reservoir. If a well reach of six kilometres is achieved, then it expects to retrieve at least 90 percent of the reserves.

BP holds a 50 percent stake in the Wytch Farm oil field development in conjunction with Arco British (17.5 percent), Premier Oil Dorset (12.5 percent), Clyde Petroleum (Dorset) and Purbeck Exploration (each with 7.5 percent) and Goal Petroleum (5 percent).

At present the company believes it can successfully drill five kilometres from a point around Brand's Bay close to the existing Goathorn Peninsula wellsite or on adjacent agricultural land. This would also avoid drilling on the Studland Peninsula National Nature Reserve.

There is also a likelihood that research planned by the company could increase drilling distances and improve recovery rates still further.

BP has stated that it will not proceed further with the Hook Island Parliamentary Private Bill, relating to fishing and navigation rights in inshore waters and jurisdiction over the artificial island, which is currently awaiting its third reading before the House of Commons.

Wellsite F on the Goathorn Peninsula.

The Wytch Farm field was discovered in 1974 and production comes from two oil-bearing sandstone strata. The Bridport reservoir, 900 metres below the surface, contains original reserves of approximately 30 million barrels and is located entirely under Poole Harbour. The Sherwood reservoir has original recoverable reserves of 270 million barrels. It underlies the Bridport reservoir and extends eastward beneath Poole Bay with approximately 100 million barrels of recoverable oil in the offshore area.

The onshore development of Sherwood reservoir has been in full-scale production from existing onshore well sites since June 1990. The oilfield now produces in excess of 60,000 barrels of oil, 10 million cubic feet of sales gas and up to 500 tonnes of LPG (propane and butane) each day.

BP and its partners will now begin discussions with Dorset planning authorities and with local landowners, residents and environmental bodies to identify the best location for a new five-acre onshore site from which to drill the long-reach wells. This will lead to detailed development plans for submission to the Department of Energy.

The majority of land around Brand's Bay is a private estate, mostly forested, while the area directly to the south is National Trust land leased to farming interests.

The company will carry out further technical and environmental studies before submitting a planning application as the area contains several Sites of Special Scientific Interest and the bay itself is classified as an Area of Outstanding Natural Beauty.

A proposal is expected to be ready by the end of this year which will enable drilling to commence some time in

1993, with the first production wells coming onstream in 1994. This is two years earlier than the likeliest production from the proposed island development.

As there are available well slots at the Goathorn Peninsula site, the company may be able to commence drilling earlier with a possibility of an even earlier production start-up.

Wytch Farm manager, Mike Harding, said: 'When we first examined options for producing the offshore reserves two years ago, the assumption was that improvements in technology would not extend our drilling reach enough to achieve adequate recovery from onshore.

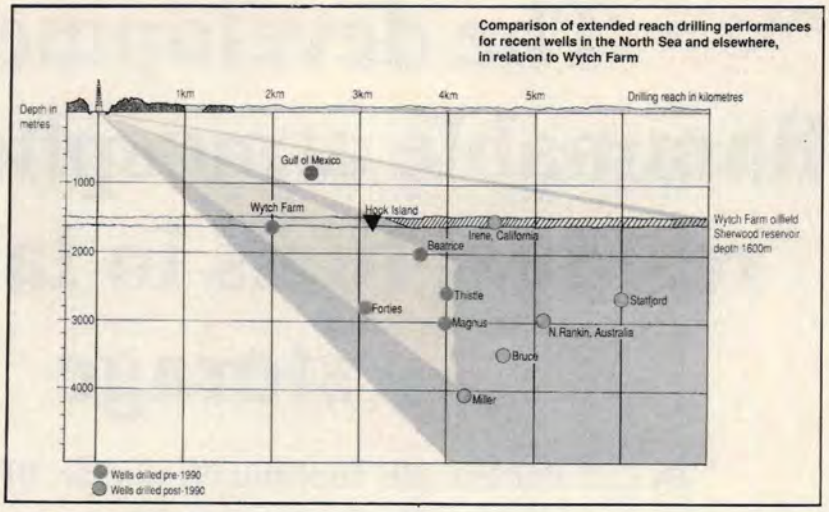
'But drilling successes in the North Sea and other parts of the world during the past year and the knowledge we have gained from a year of full production from the Sherwood reservoir have satisfied us that we can now achieve a reach of five kilometres and recover the bulk of the offshore reserves. The additional research we plan could increase drilling distances and recoveries still further.

'As a result, we and our partners now have a proposal which we believe is economically and environmentally more attractive than an artificial island,' he added.

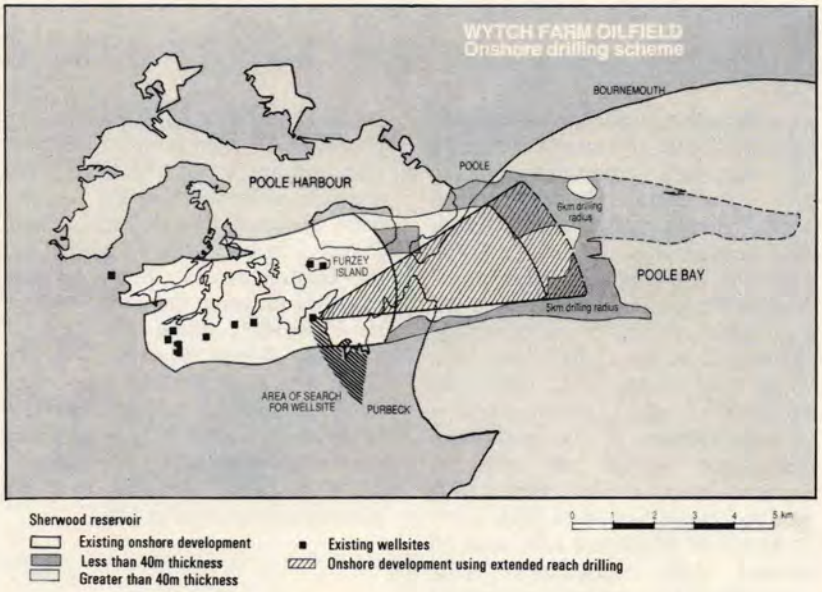
Previous to 1990 long-reach wells such as Thistle and Magnus have extended four kilometres down to depths of 3,000 metres. Since then several wells have surpassed this distance including N Rankin (Australia, five kilometres and 3,000 metres) and Statfjord (six kilometres and 2,700 metres).

The target drilling performance required to recover the Wytch Farm oilfield reserves under Poole Bay from an onshore wellsite is 3.5–6.5 kilometres and 1,600 metres.

One major factor that BP believes will aid the development of the project is a plan to inject water directly under the oil-bearing layer into the aquifier rather than around the periphery, reducing the number of well-sites into the reservoir.



Target drilling performance required to recover the Wytch Farm oilfield reserves under Poole Bay from an onshore wellsite



BP believes that there are other considerable benefits from the onshore proposals including limited construction impact and industrial benefits from advances in extended reach drilling.

There will also be considerable financial savings from the switch to an onshore site. Initial estimates for the Hook Island development put the cost of the project at a minimum of £180 million. Onshore development is expected to cost around £80 million.

At present, BP has no further plans to continue onshore exploration in the Dorset area although there is work going on offshore in the Channel. The company maintains a 'guarded view' that Wytch Farm represents the only major discovery in the area. ■

The development of flammable atmospheres above residual fuels in laboratory storage

By CJS Bartlett, DE Hall and NJ Gudde, BP Research Centre, Sunbury-on-Thames

In recent years, consideration has been given by the oil and marine industries to the degree of flammability of ullage space atmosphere in residual fuel tanks. This has resulted in the publication of an information bulletin (1) by the Oil Companies International Marine Forum. Measurement of the flammability of vapours in tank ullage spaces in Germany (2) has shown that, in 45 land storage tanks examined, there was no significant concentration of hydrocarbons in the headspace. Experience within the industry, however, has shown that bunker tank headspaces can have flammable levels in excess of 20 percent LFL with 50 percent LFL sometimes being exceeded. It has also been established that high percentage LFL's can exist when the storage temperature is well below the measured flashpoint. In addition, laboratory studies showed that there was a potential for the formation of flammable atmospheres at temperatures below the flash point of the fuels investigated and that the lower flammable limit (LFL) could be exceeded at temperatures up to 33°C below the conventionally measured flash point.

Work has been carried out at the BP Research Centre, Sunbury-on-Thames, to investigate, under laboratory conditions, the release of light hydrocarbon gases from three components used in blending residual fuels — straight-run (SR) atmospheric residue, visbroken residue and decant oil. The latter stock is a bottoms fraction obtained from the catalytic cracker and differs strongly in chemistry from the other two. All three are potential components of residual fuel products. All were sampled hot from unit run down lines at a BP refinery and were thus as fresh as possible. Samples were collected directly into 5 litre round drums (3 litres in each) and immediately sealed. Attempts were made to measure the flash point of these residues using the Pensky-Martens Tester Method, IP 34. However, no consistent data were obtained using this method. Using the Setaflash method, IP 303, the following flash points were obtained — decant oil 101°C, visbroken residue 110°C and SR atmospheric residue 115°C.

Analysis

Analysis of headspace gases was carried out using three separate techniques — gas chromatography (GC), explosimeter and modified Setaflash. All sampling from the drums was carried out via a specially designed sampling cap, which enabled a syringe to be used to take a headspace sample directly, but ensured minimal exposure time.

Gas chromatography

GC analysis was carried out on a Perkin–Elmer 8500 series chromatograph equipped with thermal conductivity and flame ionisation detectors. Measurement of the light hydrocarbons enables the potential flammability of the mixture to be calculated using Le Chatelier's rule. The LFL of the hydrocarbon mixture is calculated by a simple application of the Le Chatelier formula, corrected for temperature if required, and the flammability expressed as a ratio of the total hydrocarbon concentration to this calculated LFL. The resulting ratio, expressed as a percentage, has come to be known as the UKPIA (UK Petroleum Industries Association) Index.

Explosimeter

Explosimeter measurements were made using a 'Gascope' combustible gas indicator. These monitors have been available for many years for the detection of methane in mine atmospheres. Detection is achieved by combustion of the vapour/air mixture on the surface of an electrically heated catalytic filament. Heat of combustion raises the temperature of the catalyst which causes an increase in resistance of the heating filament. Limits in their use are their varying response to hydrocarbons of different molecular weights and the fact that the catalyst is susceptible to poisoning. Pentane or hexane is recommended* as the calibration gas that gives the best quantitative accuracy for a mixture of hydrocarbon vapours. Reference (1) refers to a 'more conservative estimate of flammability'. We believe this phrase is open to mis-interpretation — calibration using pentane will give a good approximation of the calculated LFL for a mixture of C_1—C_6 hydrocarbons but an over-estimation for a mixture of C_1—C_3 hydrocarbons. Conversely, calibration with methane will underestimate the flammability of a C_1—C_6 hydrocarbon mixture.

The calibration was checked using standards of pentane and hexane prepared in the laboratory and their flammability confirmed.

Modified flash point

A commercial apparatus (Setaflash as detailed in IP 303) was modified slightly by the addition of a luer socket to the liquid injection port. This provided a gas tight path from a luer-tipped syringe into the test chamber. 60ml gas samples were injected into the empty sample chamber, the flame dipped and observations recorded of a flash, a halo or anomalous behaviour. In the latter instance, the dip flame did not pass smoothly into the test chamber but was excluded or extinguished without a flash.

Headspace analysis of the samples as received was determined using all three techniques. Results are given in **Table 1**. All the fuels were found to have significant headspace gas concentrations, with the decant oil and the visbroken residue substantially higher than the straight run product. GC analysis showed the gases to be mainly methane to C_4 hydrocarbons. Good agreement was obtained between the techniques.

After initial analysis the samples were subjected to further examination. After venting with air until a level of < 10 percent LFL was obtained (using the explosimeter), one sample of each product was stored at ambient, in an oven at 55–60°C, and at ambient after dilution (to differing extents) with a hydrotreated catalytically-cracked light gas oil. The atmospheres were sampled periodically, with samples from the oven storage batch being taken after three to five hours cooling at ambient. It is believed that the influence of the cooling period on headspace composition will be negligible for a static system. Results for the temperature effect are given in **Tables 2** and **3** and for the effect of dilution in **Table 4**.

Results

Results show that at ambient, the undiluted fuels release gases only slowly into the headspace resulting in atmospheres well below the flammable limit (**Figure 1**). Storage at elevated temperatures showed a dramatic increase in the quantity and rate of hydrocarbons released (**Figure 2**). The rate of release was found to be a very strong function of temperature, with the release of methane being 50–100

Sample		UKPIA Index	Setaflash test	Explosimeter
Decant oil	1	92% LFL	Halo	>100% LFL
	2	112% LFL	Large halo	>100% LFL
	3	125% LFL	Flash	>100% LFL
	4	119% LFL	Anomalous	>100% LFL
SR atmos residue	1	36% LFL	No flash	50% LFL
	2	36% LFL	No flash	46% LFL
	3	37% LFL	No flash	49% LFL
	4	37% LFL	No flash	54% LFL
Visbroken residue	1	96% LFL	Large halo	>100% LFL
	2	101% LFL	Halo	>100% LFL
	3	118% LFL	Anomalous	>100% LFL
	4	120% LFL	Anomalous	>100% LFL

Table 1: Flammability measurements of initial gases

Sample	UKPIA Index	Setaflash test	Explosimeter
Decant oil			
12 days	13% LFL	No flash	25% LFL
26 days	25% LFL	No flash	42% LFL
40 days	35% LFL	No flash	52% LFL
SR atmos residue			
12 days	9% LFL	No flash	13% LFL
26 days	21% LFL	No flash	28% LFL
40 days	27% LFL	Anomalous	36% LFL
Visbroken residue			
12 days	21% LFL	No flash	33% LFL
26 days	41% LFL	No flash	63% LFL
40 days	55% LFL	No flash	74% LFL

Table 2: Flammability tests of samples stored at ambient

Sample	UKPIA Index	Setaflash test	Explosimeter
Decant oil			
18 hrs	61% LFL	Halo	95% LFL
32 hrs	102% LFL	Large halo	>100% LFL
50 hrs	119% LFL	Flash	>100% LFL
66 ..rs	126% LFL	Flash	>100% LFL
SR atmos residue			
18 hrs	29% LFL	No flash	35% LFL
32 hrs	41% LFL	No flash	54% LFL
50 hrs	48% LFL	No flash	62% LFL
66 hrs	54% LFL	No flash	66% LFL
Visbroken residue			
18 hrs	68% LFL	Halo	100% LFL
32 hrs	112% LFL	Large halo	>100% LFL
50 hrs	128% LFL	Flash	>100% LFL
66 hrs	126% LFL	Flash	>100% LFL

Table 3: Flammability tests of samples stored at 55–60°C

Sample	UKPIA Index	Setaflash test	Explosimeter
Decant oil			
1:4 dilution	87% LFL	Halo	>100% LFL
1:1 dilution	34% LFL	No flash	44% LFL
SR atmos residue			
1:4 dilution	54% LFL	No flash	54% LFL
1:1 dilution	24% LFL	No flash	26% LFL
Visbroken residue			
1:4 dilution	164% LFL	Flash	>100% LFL
1:1 dilution	99% LFL	Large halo	>100% LFL
Diluent	0% LFL	No flash	4% LFL

Table 4: Flammability tests of diluted samples

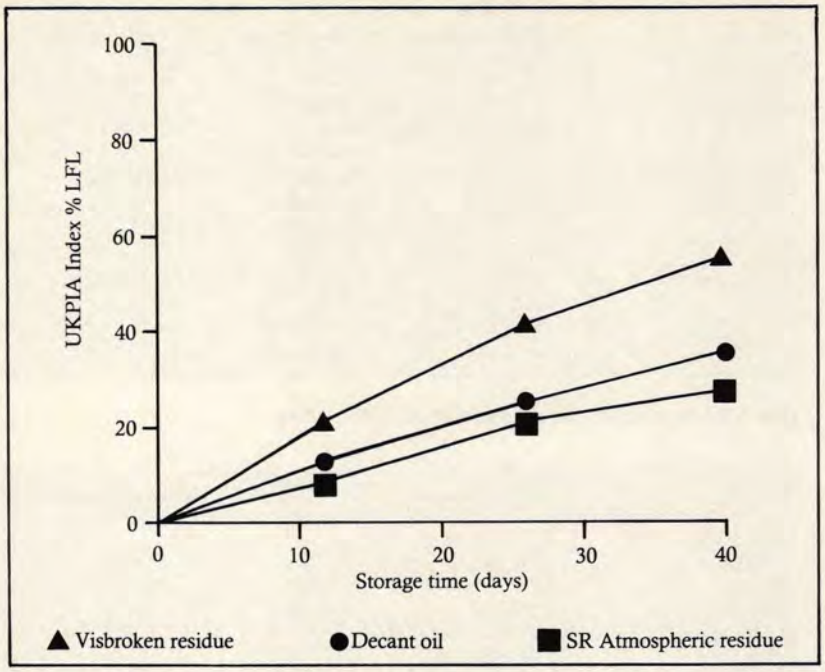


Figure 1: Development of atmospheres above residues stored under ambient conditions.

times as fast at 60°C than at 20°C for all three residues. Both the decant oil and the visbroken residue gave atmospheres of > 100 percent LFL (UKPIA Index value) after about 35 hours, although the release rate for all samples decreased with time. Dilution also resulted in atmospheres well in excess of the flammability limit for the decant oil and the visbroken residue, with the excess dependent on the extent of dilution (either with 1 or 4 parts gasoil, see **Table 4**). A few anomalous 'Setaflash' results were observed and are believed to be caused by headspace oxygen depletion, possibly due to fuel oxidation reactions.

The most abundant single component in the gases collected was methane in all cases. The decant oil yielded mixtures containing a higher proportion of heavier hydrocarbons, isoalkanes and alkenes than the other two residues. As catalytic cracking is known to produce a high proportion of isoalkanes, the predominance of these in the headspace is consistent with the suggestion that the gases originate from the production process.

The flash points of the fuels as determined using the IP 303 apparatus in its conventional role were all in excess of 100°C and showed no large differences between the residues. It proved impossible to obtain consistent flash point results using the Pensky–Martens Closed Tester (IP34). The Pensky–Martens method is a dynamic procedure ie the flame is applied to a stirred and heated sample at regular intervals. Thus equilibrium conditions are not attained. In the Setaflash method, however, the sample is maintained at the expected flash point temperature and the flame applied after a specified time. It can thus be described as an equilibrium method, although the conditions of the test will not necessarily equate to the conditions of the storage experiments. We believe it is for this reason that conventional flash point measurements gave no useful information concerning the release of flammable gases as described in this work.

This work has raised questions concerning the mechanism of the gas release. Suggestions had been made that occlusion (lower molecular weight hydrocarbons being trapped as bubbles during manufacture) may be occurring rather than the setting up of a true liquid/vapour equilibrium ie a kinetically as opposed to a thermodynamically controlled process.

In order to investigate this further, a sample of decant oil was subjected to repetitive overnight heating at 60°C and the headspace analysed daily by GC. Once the levels of hydrocarbons had steadied, the can was vented and the exercise repeated until a new equilibrium was established. This allowed the rate of release of the light (C_1—C_6) hydrocarbons to be monitored over a series of cycles. Data are given in **Table 5**.

When the ullage is flushed, material is lost from the system. Dissolved gases then pass from the liquid to the gas phase to re-establish the equilibrium, thus reducing the liquid phase concentrations from their values immediately after flushing. The liquid phase concentrations were thus reduced as the number of flushings increased.

If Henry's Law is assumed to have applied, the equilibrium gas and liquid phase concentrations are linearly related and thus the gas concentration prior to each flushing is also related to the total number of flushings. The variation of gas concentration with cycle number (n) may be represented as a straight line graph of $\log(G_n)$ versus n (where G is the gas concentration). This may be used to obtain an experimental Henry constant from the gradient. Values are shown in **Table 6**.

Week:	1	2	3	4	5	6	7	8
Hydrocarbon:								
C_1 (% vol)	1·52	0·25	0·06	0·012	0·005	0·003	0·002	<0·001
C_2 ,,	1·05	0·48	0·32	0·15	0·098	0·051	0·026	0·009
C_3 ,,	1·21	0·82	0·80	0·53	0·55	0·39	0·29	0·168
C_4 ,,	0·87	0·70	0·80	0·58	0·80	0·61	0·515	0·394
C_5 ,,	0·24	0·22	0·26	0·21	0·25	0·26	0·23	0·195
C_6 ,,	0·04	0·04	0·05	0·04	0·05	0·05	0·05	0·042
LFL (% vol)	2·64	2·19	2·02	1·94	1·89	1·84	1·81	1·73
Flammability (as % of LFL)	185·2	112·6	111·8	76·3	90·2	71·5	58·4	46·8

Table 5: Equilibrium hydrocarbon values and flammability levels (ullage 0·8)

In order to establish whether these experimental values correspond to a true thermodynamic equilibrium, comparisons were carried out with data generated by a computer simulation of atmospheric residue spiked with C_1–C_5 hydrocarbons. These values are also shown in **Table 6**.

	From gas phase data		Independent values	
Carbon No (C_n)	*Liquid conc (mg/kg)*	*Henry constant (% vol per mg/kg)*	*Liquid conc (mg/kg)*	*Henry constant (% vol per mg/kg)*
1	10 (0·3)	0·50 (0·03)	<40	0·74
2	27 (3)	0·067 (0·001)	40	0·10
3	104 (16)	0·014 (0·001)	40	0·025
4	303 (138)	0·0029 (0·0005)	230	0·008
5	n.a.	n.a.	280	0·002

Note: Bracketed numbers indicate estimated error

Table 6: Results of Calculations

Conclusions

Conclusions that can be drawn from this work are:

- Observations discussed here confirm that flammable gases can be released under laboratory conditions from both visbroken and cracker residues in sufficient quantities to generate flammable atmospheres at temperatures below fuel flashpoint. Significant amounts of gas are also released from SR atmospheric residue.
- The flash points of the residues studied were all in excess of 100°C and gave no useful indication of their tendency to release gas.
- Good correlation was obtained at room temperature between explosimeter readings, UKPIA Index (as derived from GC measurements) and the actual flammability.
- Data obtained on the rate of release of light hydrocarbons from decant oil obeys a simple mathematical model based on equilibrium thermodynamics. The thermodynamic constants derived from the experimental data are in reasonable accord with values derived theoretically.
- Hydrocarbons present in the fuel are not occluded but are genuinely soluble and are released by a thermodynamic mechanism in accordance with Henry's Law rather than a kinetic mechanism.

This evidence, together with previous studies, demonstrates that flash point does not fully represent the potential flammability hazards of residual fuels because within the duration of a flash point test true vapour/liquid equilibrium is not established. Flammable atmospheres were generated in this work by dilution of two residues at 20°C, well below the measured flash point. It is considered unlikely that improvements to flash point methods currently being pursued by the Institute of Petroleum will alter this conclusion, since flash point is based on the assumption of vapour/liquid equilibrium. In the opinion of the authors more work is necessary to find alternative methods to address this problem.

This report describes hydrocarbon release under laboratory storage conditions and the relationship to tank storage conditions has not yet been established. Studies are continuing at the BP Research Centre to investigate a suitable method to determine the intrinsic potential of a fuel oil to develop a flammable atmosphere. Until such time as a method becomes available, it is important to appreciate that flammable atmospheres may exist in fuel oil tankage at temperatures well below the product's flash point. ■

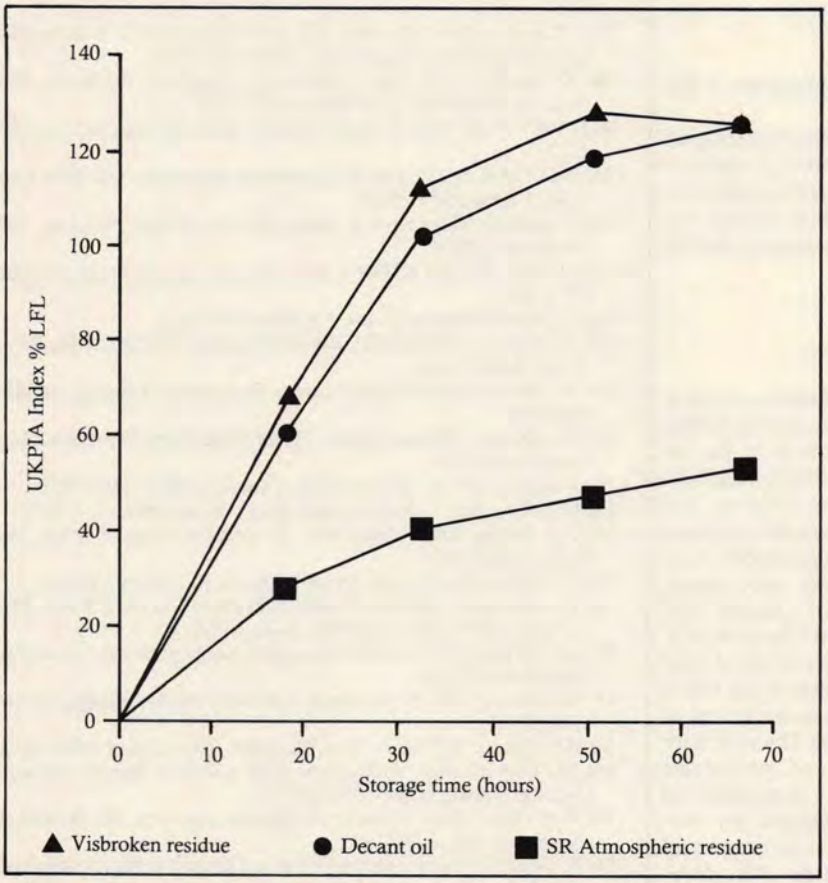


Figure 2: Development of atmospheres above residues stored at 55–60°C.

References

(1) Oil Companies International Marine Forum (OCIMF). An Information Bulletin on the Flammability Hazards Associated with the Handling, Storage and Carriage of Residual Fuel Oils. December 1989.

(2) H. Bothes, E. Brandes, T. Redeker. Investigation of the Formation of Explosive Vapour/Air mixtures during the storage of Heavy Fuel Oil. DGMK Project 318, BMFT Ref No RGB 82088 (1985).

Acknowledgement

The authors would like to acknowledge the contribution to this work of Dr R W Hiley (MOD) during a period of secondment to BP Research.

Institute News

Fellows' Ties

- New exclusive ties for Fellows.
- TWO designs in either silk or polyester.
- Each design incorporates broad blue and red stripes with a fine gold line, with the IP's crest watermarked faintly within the blue stripe. One design additionally incorporates a single embroidered full colour IP crest.
- Silk ties £17.99 each
  Polyester ties £9.50 each
- Available now.
- Order forms are being mailed to all Fellows.
- **Any immediate enquiries to Jackie Little on 071-636 1004.**

New Year Honours

Professor A Wilson OBE, Research and Development Manager, Total Oil Marine
Miss S M Dymott MBE, Head of Nursing Services, Esso Petroleum

Obituaries

W J Browne

We report, with much regret, the death in November of Bill Browne, aged 75.

Bill played a prominent part in the Petroleum Information Bureau, an organisation financed directly by the oil companies, which was incorporated into The Institute of Petroleum as its Information Department in 1969, with Bill as its head. On his retirement in 1978, the Information Department and the IP Library were integrated.

M J W Lofting

Michael J W Lofting BSc (Geology) DIC (Reservoir Engineering), a Fellow of the Institute of Petroleum, died suddenly on 20 December 1991. He had been involved in the oil industry since 1958 and worked initially for The Burmah Oil Company as a wellsite and field geologist in Pakistan and Burma. After further technical and management postings within the Burmah organisation in the United States, Australia and the United Kingdom, he was successively Executive Chairman of BOC (Australia) Limited and Executive Vice-President of Burmah Oil and Gas (formerly Signal Oil) in the United States. In 1975 he returned to the United Kingdom as Managing Director of Burmah Oil North Sea Limited and in 1976 he was appointed to the Board of Burmah Oil Company Limited as Executive Director with responsibility for Burmah's exploration and production interests. Following a short secondment from Burmah to the British National Oil Corporation he established his own consulting firm in December 1977 to offer a technical and management service to the industry. At the time of his death he was still actively engaged in the consulting business.

New Collective Member

Jordan Engineering UK Limited, Millbrook Road, Stover Trading Estate, Yate, Bristol, BS17 5JW. Tel: (0454) 315252.
IP Nominated Representative: Mr Roland Johnson, Marketing Director.

Jordan Engineering UK Limited comprises three main operating units: Fabrications, specialises in high quality stainless steel and non-ferrous fabrications for the process power and architectural cladding industries;

Construction, a quality assured site based contract management contractor undertaking — mechanical plant installations, process pipework, pre-assembled units and sub-contractor management;

Personnel provides qualified experienced engineering staff and site personnel from a data base of known referenced and security cleared personnel.

New Members

Mr DG Adams, 94 Digby Road, Corringham, Stanford-Le-Hope, Essex SS17 9BU
Mr FC Agbakolom, PO Box 7579, Port Harcourt, Rivers State, Nigeria
Mr AC Alexander, 6 Hosefield Road, Aberdeen AB2 4NB
Mr RC Bain, 234 King Street, 2nd Floor, Aberdeen AB2 3BU
Mr A Ball, 12 Green Lane, Padgate, Warrington, Cheshire WA1 4HH
Mr RC Barson, 12 Moorland Road, Boxmoor, Hemel Hempstead, Herts HP1 1NG
Mr GR Beattie, 12 Hilltop Drive, Westhill, Aberdeen AB32 6PL
Mr DW Bennett, 74 St James's Street, London SW1A 1PS
Mr D Bills, 3 Royfold Crescent, Aberdeen AB2 6BH
Dr PJ Boon, Ciba-Geigy Additives, Tenax Road, Trafford Park, Manchester M17 1WT
Mrs MA Brown, 16 Overhill Way, Winstanley, Wigan, Lancs WN3 6HF
Mr J Cassells, Tech Sales Mgr, TK Valve Ltd, Pitreavie Business Park, Queensferry Road, Dunfermline, Fife KY11 5PU
Mr D Cassidy, Tech Rep, Ciba-Geigy, Ciba-Geigy Additives, Tenax Road, Trafford Park, Manchester M17 1WT
Mr MMB Clark, High Kylston, Dunure Road, By Ayr, Scotland KA7 4LD
Mr NG Coles, 5G Oxford & Cambridge Mansions, Old Marylebone Road, London NW1 5EF
Mr B Collins, Baker Sand Control, PO Box 61486, Houston, Texas 77208-1486, USA
Mr RL Cree, Fernhill, 59 Green Road, Bangor, County Down, N Ireland BT19 2QA
Mr S Crofts, 18 Marine Court, Aberdeen AB1 2LG
Mr JR Crouch, SAMAREC, Riyadh Refinery, PO Box 3946, Riyadh 11199, Saudi Arabia
Mr H Davies, 9 Ardler Road, Lower Caversham, Reading, Berkshire RG4 0AE
Mr RA Denyer, Thames Matex, Oliver Road, West Thurrock, Grays, Essex RM16 1EY
Mr P Dick, Ardmore, Church Road, Osterley, Middx TW7 4PH
Mr GJH Dowling, 7 Church Lea, Burton Lazars, Leics LE14 2UU
Mr AR Evans, Areco Associates, 21 Trehern Close, Knowle, West Midlands B93 9HA
Mr EE Forbes, House No 6, Street 17, Block 10, Jabriya, Kuwait
Mr TR Freeman, Highland Leasing & Finance (Pty) Ltd, 2 Bell Street, Fairmount 2192, Johannesburg, South Africa
Mr GT Galloway, Mobil North Sea Ltd, Grampian House, Union Row, Aberdeen AB1 1SA
Mr JS Garside, Ash House, Ernocroft Road, Marple Bridge, Cheshire SK6 5DY
Mr RN Gibson, 10 Dickins Way, Horsham, West Sussex RH13 6BQ
Mr SG Gibson, Bow Valley Petroleum UK Ltd, Fanum House, 48 Leicester Square, London WC2H 7LT
Mr RA Gray, Gray Offshore Production Services, 42 Broadlands, Carnoustie, Angus DD7 6JY
Mr JB Gregg, 110 Heatherstone Avenue, Dibden Purlieu, Southampton SO4 5LA
Mr JH Gridley, NOC, 7777 Decarie Boulevard, Montreal, Quebec, Canada

Institute News

Mr JEG Haines, 51 Hunt's Road, Stratford-on-Avon, Warks CV37 7JJ
Mr P Harman, 52 Holly Lane, Marston Green, Birmingham B37 7AL
Mr JP Hepworth, Managing Director, INTEC (UK) Ltd, Rhodes House, 114 St Leonards Gate, Lancaster LA1 1NN
Mr JJ Heyes, 5 Capsthorne Road, Wilmslow, Cheshire SK9 6LU
Mr JG Hodson, Caleb Brett, East Saxon House, 27 Duke Street, Chelmsford, Essex CM1 1HT
Mr SJ Hooper, Andersen Consulting, 2 Arundel Street, London WC2R 3LT
Mr GS Howard, 12 Birch Road, Burghfield Common, Reading, Berkshire RG7 3LS
Mr JE Huffstutler, Offshore Surveys International, Spa Wells, Low Dinsdale Neasham, Darlington DL2 1PL
Mr H Huyssen van Kattendijke, Thames Matex, 15 Linton Road, Barking, Essex IG11 8JB
Mr T Iwasaki, 94 Chanctonbury Way, London N12 7AB
Mr RM Knight, 28 Riversmead, Hoddesdon, Herts EN11 8DP
Langford, S, AEA Technology, Environmental Safety Centre, Building 146.3, Harwell Laboratory, Oxfordshire OX11 0RA
Captain AM Lawson, Saudi Aramco Box 1258, Ras Tanura 31311, Saudi Arabia
Mr WK Legatt, Enron Europe Ltd, 34 Park Street, London W1Y 3LE
Mr MA Lench, Bechtel Ltd, PO Box 739, 245 Hammersmith Road, London W6 8DP
Mr REJ McCann, 2929 Rolido Drive, #122 Houston, Texas 77063, USA
Mr IW McGerty, Carmichael & Clarke Co Ltd, 3607 Shun Tak Centre, 200 Connaught Road, Central, Hong Kong
Mr KHB Memberr, PO Box 8081, Federal Secretariat, Port Harcourt, Nigeria
Mr M Mijnlieff, Thames Matex, Oliver Road, West Thurrock, Grays, Essex RM16 1EY
Mr G Millett, New House, High Street North, West Mersea, Essex CO5 8JX
Mr BW Morse, UNDP—Govt of Botswana, Pvt Bag 00252, Gaborone, Botswana
Mr CC Nicholson, Mgr, Corporate Affairs, British Petroleum, Britannic House, 1 Finsbury Circus, London EC2M 7BA
Mr E Parry, 37 Trinity Road, Rayleigh, Essex SS6 8QB
Mr P B Rhind, Operations Manager, Enger, Mobil Court, Thibault Square, Cape Town, South Africa (correction)
Mr G Richmond, 2 Oldfield Avenue, Milltimber, Aberdeen AB1 0JX
Mr JR Shepherd, Blagden Packaging, Westinghouse Road, Trafford Park, Manchester M17 1DS
Mr D Skrgatic, Tech Development Manager, Canongate Technology Ltd, 36 Inglis Green Road, Edinburgh EH14 2ER
Mr J Slee, General Manager, East African Energy Co Ltd, 14 Southampton Place, London WC1A 2AJ
Mr L Smyth, Engineering Teacher, Community School, Falcarragh, Co Donegal, Ireland
Mr CS Stansfield, Managing Director, C & S Stansfield Ltd, Unit 10, Boundary Road Ind Estate, Sturmer, Haverhill, Suffolk CB9 7YH

Students

Mr LE Moller, 40 Perth Road, Dundee DD1 4LN
Miss I Suwaidi, PO Box 4QL, London W1A 4QL
Mr DR Wilson, 14 Seafield Crescent, Aberdeen AB1 7RD

Around the Branches

Aberdeen
11 February: AGM, presentation and tour of The Offshore Survival Centre, Offshore Survival, Robert Gordons Institute of Technology.

Edinburgh and South East Scotland
20 February: 'Contract Management: Some keys to success', Dr J Morse, Project Director, Grangemouth Development, BPC, (joint meeting with IChemE).

Essex
12 February: AGM followed by 'Oil Spill Response on the Thames', Captain P Bush, Assistant Harbour Master (Lower District) and Oil Pollution Officer, Port of London Authority.

Humber
13 February: AGM followed by 'Alternative Fuels', speaker to be announced.
28 February: Annual Dinner

London
18 February: 'Trends in Automotive Fuels and Lubricants', Mr NJ Tilling, Paramins Group, Exxon Chemicals.

Midlands
12 February: AGM.

Northern
18 February: AGM followed by 'Emprox and Synthetic Metal-Working Fluids', speaker from ICI.

Southern
19 February: Visit to the Air Traffic Control at Segensworth.
4 March: Talk by Sir Colin Marshall, Chief Executive of British Airways.

Stanlow
19 February: 'Emission Controls in Combustion Plants', Mr R Baker, Babcock Energy, (joint meeting with the Institute of Energy).

Shetland
18 February: AGM, followed by Mr Alan Higgins, Chevron, speaking on 'Looking ahead at the Ninian Field'.

South Wales
20 February: AGM and 'Confessions of a Diet Counsellor', Mrs P Forrester.

West of Scotland
6 March: Petroleum Dinner.

Yorkshire
11 February: AGM followed by Hot Pot Supper.

Deliveries into Consumption

UK deliveries into inland consumption of major petroleum products — Tonnes — November 1991

Products	*Nov 1990†*	*Nov 1991**	*Jan–Nov 1990†*	*Jan–Nov 1991**	*% change*
Naphtha/LDF	272,900	304,470	2,792,020	3,037,720	9
ATF—Kerosine	467,200	505,350	6,113,670	5,717,720	−6
Motor Spirit	2,023,200	1,982,620	22,361,230	22,013,190	−2
of which unleaded	760,930	856,410	7,530,230	9,000,290	20
Super unleaded	84,510	103,400	843,570	1,066,700	26
Premium unleaded	676,420	753,010	6,686,660	7,933,590	19
Burning Oil	184,350	226,160	1,794,980	2,105,240	17
Derv Fuel	938,070	928,100	9,844,820	9,857,080	0
Gas/Diesel Oil	703,310	709,470	7,312,940	7,345,290	0
Fuel Oil	739,970	843,280	11,330,197	11,110,430	−2
Lubricating Oil	63,540	69,170	766,473	708,180	−8
Other Products	488,250	554,070	5,630,870	6,165,180	9
Total above	5,880,790	6,122,690	67,723,840	68,060,030	0
Refinery Consumption	482,220	480,180	5,310,320	5,521,570	4
Total all products	6,363,010	6,602,870	73,034,160	73,581,600	1

†Revised *Preliminary

. . . technical report

Exploration and Production

The Institute's Exploration and Production Committee has been reconstituted as the Upstream Operations Committee to co-ordinate exploration and production activities. The membership of the new committee includes representation from operating companies, UKOOA and the E & P Forum.

The Task Group which has been set up to examine the structural and pressure integrity of subsea wellhead/wellhead connector/BOP stack systems when drilling deep water and/or high pressure wells has developed a scope of work to analyse the fitness for purpose of the pressure containing system.

The Code of Practice for the Safe Handling of Drilling Fluids is scheduled for publication in late April/early May.

Refining and Marketing

The Refining Safety Code is now out of print. Publication of a further short run will include a notice advising purchasers that some areas of the Code are being revised.

Preparation of a Code dealing with Bulk Storage and Transfer Facilities will be considered by a Downstream Operations Committee working group.

The Work Permits Working Group has completed a draft guidance concerning the application to refineries and terminals of the recent OIAC publication 'Guidance on permit-to-work systems in the petroleum industry'. (*see page 61*)

Marketing Committee has undertaken an analysis of the emergency shut-down arrangements at member companies' road loading facilities in order to arrive at a commonly accepted standard which could be introduced nationally with the aim of simplifying the emergency action to be taken by drivers, many of whom visit a variety of companies and locations.

A small working group is looking at the possibility of tanker drivers being given discrete PIN numbers for use with swipe cards used to gain access at a variety of loading installations.

A group has been set up to look at a number of environmentally sensitive aspects of terminal operation.

The Safe Loading Pass Scheme operated by all the majors is being updated to take into account a number of innovations including the use of radio telephones in road tankers.

A meeting is being held with the APEA, HSE and various contractor bodies to develop the draft code of safe practice for contractors being prepared by Panel A.

The initial draft of the marketing code relating solely to terminals has been circulated to members of Marketing Committee for comment.

A modified version of the Institute's Road Tanker Design Code combined with the Bottom Loading, Vapour Collection and Overfill Prevention Code has been submitted by BSI to CEN for consideration as to the basis for a new CEN code.

Aviation Committee is defining two projects related to airport hydrant leak detection and prevention. One examines the effectiveness of a portable stopple device; the other concerns acoustic correlation techniques for leak detection and location. These projects are to be funded from the IP Research Budget.

Measurement

The publication 'Recommended UK Operational Practice for the Proving of Gantry Meters Fitted with Electronic Heads,' was published in December 1991.

Petroleum Measurement Paper No 5: Guide to Coriolis Direct Mass Flowmeters is being revised following review of the extensive comments received from a ballot of the Direct Dynamic Mass Measurement Committee (PM-D-5) and other experts. The document will be issued shortly to the Petroleum Measurement Committee and API for ballot.

The publication 'Statistics for Static and Dynamic Measurement,' is now in the final editing stage.

Examination of two API Codes, submitted by ANSI for 'fast-tracking' as ISO Standards, has revealed a problem with references within the document. At our suggestion, BSI has enquired with ISO Geneva, who confirm our belief that all referenced documents in a Standard are regarded as part of that Standard. This poses a potentially major difficulty for the IP and the API in having their published Measurements Standards fast-tracked through ISO since the practice is to reference extensively other sections of our Petroleum Measurement manuals. ISO approval of one Standard would therefore require approval of all the referenced Standards. Further enquiries are being made via BSI.

The Fourth Oil Loss Conference, dealing for the first time with the control of losses in refining, was held at the IP on 30/31 October 1991. Copies of the Conference Preprints are available.

Standardization

The IP sent a delegation to the ASTN DO2 meeting held during December in Austin, Texas. A report of this meeting will appear in the next Standardization News. At this meeting Mike Hurcombe gave a presentation prepared by the IP which outlined test method development within Europe and proposed greater cooperation between the IP, DIN and AFNOR. In addition it gave the IP's view on the future of joint IP/ASTM test methods and the special relationship between the two organisations.

Health and Environment

A paper on the Institute's Epidemiological Study of Refinery and Oil Transportation Workers was presented at an International Symposium on the Health Effects of Gasoline held in the United States. The paper was well received and copies of the report have been circulated to relevant government, health and safety, trade union and European bodies. Consideration is now being given to further studies.

The second stage of the investigation by BIBRA of Bioavailability of Carcinogens from Oil has been approved.

A proposal is being developed for a state-of-the-art review on the use of bioremediation products in the biodegradation of oils and emulsions, resulting from marine oil spills.

John Hayes, Technical Director

New IP operations committees — upstream and downstream

Two senior IP committees have been reconstituted in order to provide technical advice and guidance to the Institute on oil industry issues which will need to be addressed and to make recommendations on the provision of adequate resources for the recommended plans and programmes of work. The identification of appropriate issues to follow up is not always easy for IP staff who are not themselves directly involved in the day-to-day problems of the industry. The company directors and other senior personnel who are on the IP Council and Management Committee are extremely helpful and supportive to the Institute but they are busy people and are often several levels removed from those who carry out the detailed technical work in their organisations.

For many years, the Engineering Committee co-ordinated IP downstream activities, while the Exploration and Production Committee, based in Aberdeen, dealt with upstream activities. Much good work was done but for some time it had been evident that the membership of these two committees was not appropriate and that new terms of reference were required. A special study on the committee structure was carried out last year by Mike Salter, then Chairman of the Engineering Committee. On his recommendation, it was decided to replace the two existing co-ordination committees with two new committees — an Upstream Operations Committee and a Downstream Operations Committee with fewer but more senior members.

Downstream Operations Committee

The Downstream Operations Committee (DOC) has been set up with David Brown, Distribution Manager, BP Oil UK Ltd, as Chairman with committee members drawn from individuals at refinery operations or distribution manager level, together with several chairmen of committees reporting to DOC. Probably the most important role of DOC is to oversee the production of additional relevant downstream sections of the IP Model Code of Safe Practice by its committees.

These Codes of Practice offer objective and practical guidance on safe operating systems and procedures but take due cognisance of commercial, political and public pressures. They are an exercise in self-regulation by the industry, using the Institute's independent role to minimise confrontation and bring into the committees and working groups those people who are able to make a constructive, informed and unbiased contribution. The most recently published sections of the IP Model Code of Safe Practice include Area Classification for Petroleum Installations, Bitumen Safety and Electrical Safety.

The Airports Code is used internationally whilst the Code covering Road Tanker Design, which has recently been updated, forms the basis for UK legislation and has been adapted by BSI for submission to the European Committee for Standardisation (CEN) as a European standard. UK regulatory authorities, such as the Health and Safety Executive, have contributed to, or adopted, various IP Codes including Area Classification, Electrical and Liquefied Petroleum Storage. In addition, working groups are currently updating existing codes and, in some cases, are developing guidance ahead of European legislation eg the Bottom Loading Vapour Collection and Overfill Prevention Code and the Guidelines for the Design and Operation of Gasoline Vapour Emission Controls — both now nearing completion.

Upsteam Operations Committee

An Upstream Operations Committee under the chairmanship of David Carr, Production Manager, Esso Exploration and Production UK Ltd, has also been set up, with parallel membership and objectives to DOC. For many years, the Institute displayed a heavy bias towards downstream activities which led to criticism from many in the industry and the Department of Energy, because of the importance of North Sea oil and gas fields to the UK economy.

Recently, much effort has been put into an initiative for correcting this imbalance. For example, useful Codes of Safe Practice have been published for both Onshore and Offshore Drilling and Production Operations but the initiative needs the direction and focus that the Upstream Operations Committee can provide. The present work to produce a Code of Safe Practice for Well Control during the Drilling and Testing of High Pressure Offshore Wells provides a good example of the Institute meeting an industry need in an objective rather than a prescriptive manner, which accords well with the HSE's declared policy in North Sea safety matters. It is accepted that no two wells are the same and that different detailed drilling and testing procedures can be equally valid. Nevertheless, certain basic principles can be agreed by consensus. In upstream activities, as in downstream, the existence of such codes can make life easier for both regulator and operator and be reassuring to the workforce and public in the face of inevitable, if undeserved, mistrust of the companies in the wake of offshore incidents such as Piper Alpha and Ocean Odyssey.

Additional activities

It is hoped the new committees will be able to help the Institute in various other ways such as defining appropriate research projects, advising IP staff and other Institute committees on suitable subjects for conferences and *Petroleum Review* articles, and providing guidance on how to react to the media. The IP is an excellent forum for discussing and undertaking an objective analysis of health, environmental and safety issues before they become items of public confrontation.

Lastly, but most important, the new committees will help to maintain good relations with other organisations, such as the UK Petroleum Industry Association, the UK Offshore Operators Association, the UK Onshore Operators Group and the Oil Industry International Exploration and Production Forum, which have complementary roles, to ensure that the limited company and consultant expertise available is used to best effect on worthwhile issues. ■

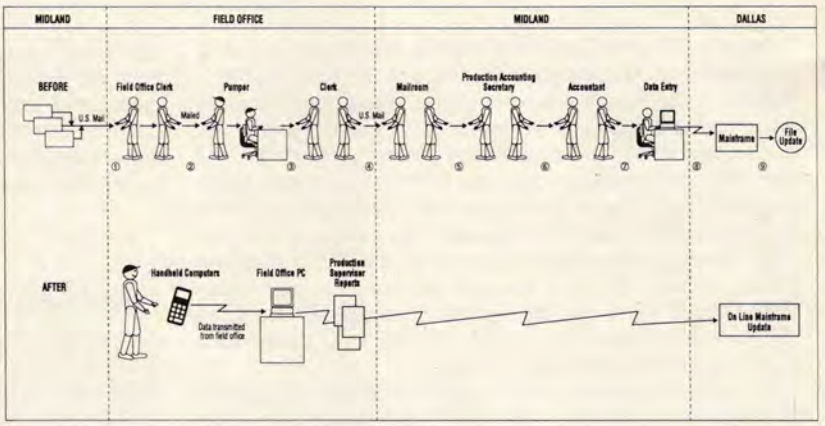
ARCO signs contract for Fujitsu handheld computers

ARCO Oil and Gas Company has signed a contract with Fujitsu Systems of America (FSA) for its AcuTote™ 29161S intrinsically safe, handheld computer system. The system is an integral part of ARCO's Field Data Gathering Project and will be used to automate a variety of manual data recording and collection and activities. Installation is currently underway and will continue over the next 24 months.

Successful in the route accounting market, the AcuTote 2900 has been adapted for use in any hazardous environment requiring a portable data collection device. Surface mount technology ensures the stability of internal components against severe shock and vibration, making this UL913-compliant handheld ideal for use in the harsh environments of the oil and gas industry. Connected via modem or a direct link to a host computer system, AcuTote uploads captured data and accepts file downloads.

According to Ken Looney, manager, Special Projects Group for ARCO, Fujitsu's AcuTote system was selected for a number of reasons. High on the list was their ability to provide an intrinsically safe device, which means the system is fully certified and has successfully passed the Full Intrinsic Safety Certification battery of tests. 'In our business, safety is a requirement, not a luxury. The safety of our employees, our customers, and our environment is of utmost concern in all aspects of operation,' said Looney, 'While safety is a key consideration, we also needed a system that was tough enough to withstand the harsh operating conditions we're faced with.'

ARCO HANDHELD IMPLEMENTATION
DOCUMENT FLOW CHART
BEFORE/AFTER HANDHELDS



Prior to selecting the AcuTote system, ARCO conducted a pilot test of the equipment with three lease operators or 'pumpers,' and their supporting administrative clerk. Oil well test forms, down-time reports and metred volume sheets were the first procedures/documents to be automated. A substantial savings in man-hours was immediately recognized. Initial savings of 16 hours a month per pumper and 10.8 hours a month for the clerical staff were seen. With 108 pumpers slated to receive handheld systems, this translates into a savings of more than 2,100 hours per month. An additional time savings of nearly 50 hours per month is expected when ARCO expands the AcuTote implementation to include the Production Accounting Department.

Improvements in data accuracy are also evident. Prior to using AcuTote, nine paper exchanges occurred between the initial manual recording at the well site and transmission of data to the host computer system at headquarters. This process was not only time-consuming, but error prone due to the number of 'data handlers' involved in each transaction. With AcuTote, paper hand-offs have been reduced from nine to zero, resulting in improved data integrity and instant access to accurate operating data and other information used in management decision making.

The responsibility for production data input, along with data accuracy, will now reside with the individuals closest to source — the lease operators/pumpers. As a result, they are empowered to control and verify data input/output, and can recognize and correct potential discrepancies early on.

Automated respirator fit testing

A new TSI PortaCount Plus Respirator Fit Tester designed for completely automated respirator fit testing is now available from Bristol Industrial & Research Associates Limited (BIRAL) of Portishead, Bristol. The PortaCount Plus allows for much faster tests, significantly reducing the amount of time and work associated with fit testing.

The PortaCount Plus operates as a stand-alone instrument or with FitPlus Fit Test Software, included with each unit. As a stand-alone instrument, it is fully programmed to guide the user through the fit testing process. The pass/fail level and number of exercises can be set from the front panel and a digital display indicates the exercise number in progress. The fit factor is calculated and displayed at the end of each test, along with the words 'pass' or 'fail'.

The FitPlus Test Software provides special flexibility by allowing the user to customise the test protocol to meet his/her individual needs. The pass/fail level, number of exercises and exercise durations can be set from the keyboard. FitPlus also offers additional convenience by displaying large exercise descriptions on a computer screen, making it possible to see the descriptions and monitor the process from across the room.

In addition, the PortaCount Plus allows employees to be tested in their own respirators by using optional sampling adapters. With an adapter, the instrument samples from the respirator breathing zone while allowing the respirator to function normally. Other benefits include time-saving database features that allow the user to search for, retrieve, view on screen and print individual fit test records.

Document register programme launched for offshore industry

A document register programme for the engineering, construction and offshore industries has been launched by Glasgow-based systems and software house, Computer Implementation Limited.

TDOC (Technical Document Information & Reporting System) is a computer-based system which is designed to organise and control the whole procedure of issuing transmittal notes and registering documents.

The system records every relevant event in an engineering or construction project from the creation, revision, issue, to the receipt (and verification of receipt), of technical documents. It replaces all the manual registers found in every drawing office. It also allows documents to be referenced by more than one number.

TDOC is capable of dealing with an organisation's own documents, other people's documents, and issues and returns of any document. A powerful search feature means that the details of any document, revision, or job/contract can be quickly located. In addition, the programme can be interrogated to provide a full audit trail of actions — over 80 management reports can be produced from the system.

The programme offers the industry three primary benefits. In the event of a problem, the company will bave exact documentary evidence of who did what and when. Secondly, with documents and revisions running into many thousands the company will have its technical documents better organised. Thirdly, better organised documents contribute to quality control — in fact TDOC meets the rules laid down in BS5750 Para 4.4 for document control. All these benefits have an effect on costs and, ultimately on the bottom line, said Richard Townsend-Rose, managing director of Computer Implementation.

He added: 'By using a computer to organise the information, the repetitive work associated with manual document registers can be completely avoided.'

The programme has already been adopted by a number of offshore engineering organisations including Offshore Design Limited (Piper Alpha redevelopment), Stena Offshore (CATs project), and Amerada Hess (SCOTT project).

TDOC will run on any IBM PC or compatible.

New advances in emergency shutdown systems

A testable trip amplifier, believed to be the first made available to the industry, is being launched by Rotork Instruments Ltd of Luton as an addition to the proven Protech range of high integrity emergency shutdown (ESD) equipment. It is know as the Protech ES167 module.

Also available on an ESD system is diagnostics capability right down to card level for display on a DCS or PC screen. This system can operate via various forms of communication, to link from offshore to an onshore installation.

This innovation is made possible by using the Protech ES800 processor-based interface unit, which is a gateway station for automated on-line testing,trip sequence and diagnostics. Although the ES800 is programmable, no loss of integrity is incurred as solid state technology is used and the programme is not part of the safety circuit. It is therefore said to be superior to traditional programmable systems which rely on software integrity.

New keyboard gives the best of both worlds

Intek have launched a new keyboard for use in oil and gas processing, mining, quarrying and generating industries. The Armagard Keyboard is resilient to rough handling, dust and fluids, and is designed to overcome the limitations of both ordinary and membrane technology.

Ordinary computer keyboards can get damaged, clogged up and become unreliable. Membrane units fare better, but have less feel and can be more difficult to use.

The Armagard Keyboard has full travel, moving keys for ease of use, is steel cased to withstand rough handling and is completely sealed against dust and fluids.

High reliability capacitive switches, identical in feel to those found on most computer keyboards, are mounted inside an epoxy powder coated steel case. Neoprene rubber gaskets are used to seal the unit to IP65 standards.

The keys themselves and the gaps between them are sealed, by a transparent flexible polyurethane overlay, moulded to the shape of each key.

This is fitted from within the steel case and is held tightly down onto the keys, making it almost undetectable. The overlay is extremely hard wearing, guaranteed for 2 years and is replaceable.

The finished assembly is very robust, impervious to dust, fluids, grease, oil, and other contaminants whilst being as easy to use as a standard keyboard.

Mhidas accidents database released on compact disc

Information crucial to safety management in hazardous industries is to be released on CD-SOM (compact disc) as an updated version of the existing on-line MHIDAS database. The new MHIDAS, which relates to over 4000 accidents in 95 countries since 1965, is being marketed by a joint venture consisting of AEA Technology's Safety and Reliability consultancy (SRD), the Health and Safety Executive (HSE) and SilverPlatter.

The information which it contains is intended to aid emergency planning and complement the theoretical framework used in safety assessments. In the new CD-ROM format, it will be faster to access and easier to manipulate. And, although users will need an IBM-compatible PC and CD-ROM drive, any extra expense will be less than the costs of the original on-line service.

MHIDAS was created in 1986 by SRD and the HSE for validating theoretical assumptions and judgements in safety assessments. It contains information on incidents involving hazardous materials which resulted in, or had potential to produce, an off-site impact. This means anything from evacuation to casualties or damage to property or the environment. All of the information is in the public domain, had been gathered largely from press cuttings, and is updated constantly.

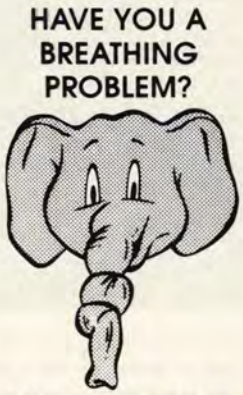
Coded information is stored under 24 separate fields which can be searched independently or in combination with any other field(s). Field headings include Data/Place, Hazard Type, Specific Causes, Number of Deaths, Casualties and Evacuees and Damage in US Dollars.

'What we have here is a vast information bank of how things went wrong in the past,' says Andy Harding, the MHIDAS database manager at SRD. 'These are lessons which today's safety practitioners in emergency planning, transportation and civil protection cannot afford to ignore and for safety and reliability consultants like SRD, they are also an essential component of safety models.'

The MHIDAS Database will be delivered along with three other occupational health and safety databases (HSELINE, NIOSHTIC and CISDOC) on SilverPlatter's OGH-ROM CD-ROM product.

Sabre launches CAREline

As part of its customer support programme, Sabre Group has launched Sabre CAREline, a computerised database designed to provide instant advice on respiratory protection required for more than 1,400 hazardous chemicals commonly found in industrial environments.



A team of eight specialists within Sabre's customer support department will be on call during office hours to answer enquiries.

In response to specific questions on the nature of the problem, the gas in question and its concentration, the enquirer receives a list of appropriate products to solve the problem, together with information on the irritant.

Regular use of the new service is being encouraged by allocation of spinal CAREline numbered membership cards. With customer details held on the system, fast and efficient access to the database may be achieved.

The new CAREline covers not only Sabre s range of breathing apparatus but also filtration products launched at last year's RoSPA Exhibition.

Customer support manager Mike Wray said that introduction of the new service was intended to put to effective use expertise the company had built up over more than 20 years, for the benefit of Sabre's international customers and potential customers.

Drilling operations trainer

The costs and risks of training students in drilling operations can be dramatically reduced with an innovative software package from Drilling Systems (UK) Limited of Ringwood, Hampshire.

The Drilling Operations Trainer (DOT) has been specifically developed for international drilling courses providing trainees with an extensive range of driling operations. Working together in syndicate groups, students use the simulator to drill a well, whilst maintaining full rig reporting procedures and duties.

The instructor can exploit the unique feature of the DOT by creating an unlimited number of well exercises. Each exercise can be customised for a particular wellsite scenario whether it be drilling, cementing or dealing with downhole problems.

There is an extensive facility to maintain the wide range of equipment catalogues including bits, deviation equipment, and fishing tools. All exercises can be configured to suit the local geology whether it is in the North Sea or the Austin Chalk.

The trainees, working from the instructor-configured exercises, are able to practice skills and training already learnt in lectures. They plan and execute a drilling programme by optimising hydraulics, treating mud systems, or configuring BHAs. The trainee is required to diagnose problems, select remedies and suffer time and cost penalties for any mistakes. Any number of exercises can be saved or loaded, thus allowing several attempts at difficult operations such as kicking-off or cementing.

The student has a free choice in bit selection and BHA components. The DOT supports all rotary, motor and steerable BHA's, facilitating both straight hole and deviated drilling.

Contact List

Computer Implementation	041 637 3124
Bristol Industrial & Research	0275 847787
Sabre	0494 431580
Intek Electronics	0352 85603
AEA Technology	071 389 6503
Rotork Instruments	0242 514418
Fujitsu (San Diego, Ca)	+619 481 4004
Drilling Systems (UK)	0425 472211

. . . people

Mr David Varney, above, has joined the Board of Shell UK Limited as a Managing Director responsible for Shell UK's downstream activities; covering oil marketing, distribution, supply, refining and trading. Mr Varney was formerly Head of Marketing, Branding and Product Development for Shell International Petroleum Company Limited, a position he held since March 1990. He succeeds **Dr Roy Reynolds** who has retired.

Mr Ed Raymond has been appointed to the new position of Business Development Manager with Aker Lasalle, the Aberdeen-based offshore contracting group. Mr Raymond is succeeded by his former Operations Manager, **Mr Jim Fraser.** Mr Fraser has 30 years experience in the offshore industry, including assignments as Production Manager in the Far East and Offshore Installation Manager in the North Sea.

Mr Ian Blood, below, has been appointed Director and General Manager, Exploration and Acquisitions, Conoco (UK) Ltd. Mr Blood replaces **Mr Ian Gray** who has been appointed Director and General Manager, Business Development, Conoco (UK) Ltd.

The Health and Safety Executive have appointed **Dr Allan Sefton** as Director of Operations in HSE's Offshore Safety Division. Dr Sefton is currently HSE Area Director for West and North Yorkshire. From 1986–1990 he led HSE's National Interest Group specialising in hazardous installations and the transportation of dangerous goods. In particular, he was responsible for developing the mechanism for assessing safety cases for 'top tier' major hazard installations. In 1989 he gave expert evidence on this area of HSE's work to the Cullen Inquiry.

Godsell, Astley and Pearce part of Exco International Plc have appointed **Mr Gordon Watson,** previously with Eurobrokers and **Mr Alan Dweck** from the Godsell, Astley & Pearce Capital Markets team to be part of a new Commodity Derivatives Section which will have an emphasis on energy related products.

The International Association for Energy Economics (based in Washington DC, USA) has awarded its 1992 annual prize for 'outstanding contributions to the field of Energy Economics and its literature' to **Professor Peter R Odell,** Professor Emeritus of International Energy Studies at Erasmus University, Rotterdam, The Netherlands. The Award will be presented at the IAEE's 15th Annual International Conference to be held in Tours in France in May 1992 where Professor Odell will deliver the prizewinner's address. Professor Odell is a fellow of the Institute of Petroleum.

Codd Johnson Harris has announced that **Mr Stephen Leigh,** formerly a Senior Consultant with SMCL Oil and Gas Limited, has joined the partnership.

Mr Leigh has extensive experience in senior managerial recruitment and worked previously for Hoggett Bowers and Charles Barker Selection. He will be primarily responsible for providing a service to clients in the oil and gas/energy sector.

The British Institute of Non-Destructive Testing has announced the appointment of **Mr Andrew S Murray** to the position of Secretary to the Institute.

Mr Murray holds a degree in applied physics from Heriot-Watt University, is a member of the Royal Aeronautical Society and a member of the British Institute of Management. His latest appointment was as Administration Manager with International Aerospace Limited, Cranfield.

British Gas has appointed two new Board members — **Mr Howard W Dalton,** currently Managing Director, Exploration and Production and **Mr Philip G Rogerson,** currently General Manager, Finance ICI plc. Mr Dalton's continuing responsibilities will encompass the company's oil and gas interests worldwide. Mr Rogerson will be responsible for managing, controlling and developing the financial activities of the company; he succeeds **Mr Allan Sutcliffe** who resigned through ill-health.

Following the departure of Dr Roy Reynolds from Shell, the United Kingdom Petroleum Industry Association Limited has elected **Mr D Clayman** from Esso as its President.

The following senior appointments have been made at Enterprise Oil — **Mr Iain Paterson** has succeeded **Dr Myles Bowen** as Exploration Director; **Mr Julian West** also joins the Board as Corporate Development Director while **Vivien Gaymer** has succeeded **Mr Geoffrey Jennings** as Company Secretary.

Dr Bill Smail, previously Strategic Planning Manager for Esso Expro UK, has been appointed Controller of Gas Purchasing within the Gas Supplies Department at British Gas.

The Society for Underwater Technology has presented the following awards:

President's Award for outstanding contributions to underwater technology was presented to **Mr Mike Borrow OBE.**

David Partridge Commemorative Award, sponsored by the SUT and Offshore Energy Technology Board for achievements of excellence in underwater technology, was awarded to **Mr Ian Ball** of Shell UK Exploration and Production.

Diving Operations Award, sponsored by Houlder Diving Research Facility Ltd, was presented to **Mr Gary Jones** of Subsea Offshore Ltd.

Best Journal paper, sponsored by Shell UK Exploration and Production, was presented to **Dr Trevor Whittaker** of Queens University Belfast.

Oceanography Award, sponsored by DRA, was presented to **Mr Dennis Ardus** of British Geological Survey.

Mr Dave Bradfield, above, formerly General Sales Manager, Plenty Metrol Division of Baker Hughes Ltd, has been appointed Sales and Business Development Manager for Natco (UK) Ltd, design engineers to the oil and gas processing industry.

Mr Hugh Lee has been appointed by WEFA Energy as Manager of World Coal Trade and Power Systems. Mr Lee was former Deputy Head of British Coal's Economic Planning Unit and a Manager in IEA Coal Research.

Mr Syd Abbott, below, has been appointed Field Manager for the Chevron-operated Ninian oilfield. He succeeds **Mr Alan Higgins** who has assumed responsibilities as Field Manager for the Alba oilfield development which is due to start production in early 1994. Mr Abbott will be responsible for the day to day operation of the three Ninian platforms including safety, production, planning and environmental support. He also has responsibility for Chevron's liaison with the other field operators involved with the Ninian Pipeline System including BP, Total and Unocal.

FORTHCOMING EVENTS

February

5th
Aberdeen: Seminar on 'Successful Techniques for Maintenance Management in the Oil and Gas Industry'. Details: Maria Genco, PSDI, No 5, Woking Eight, Forsyth Road, Woking GU21 5SB. Tel: (0483) 727000. Fax: (0483) 727979.

7th
Cranfield: Seminar on 'Flow Measurement Update'. Details: Short Course Administrator, Department of Fluid Engineering and Instrumentation, School of Mechanical Engineering, Cranfield Institute of Technology, Cranfield, Bedford MK43 0AL. Tel: (0234) 752766. Fax: (0234) 750728.

10th–12th
West Thurrock: Course on 'Oil and Gas Metering'. Details: John Fyfe, IITS (UK) Ltd, Caleb Brett Division, Wellheads Crescent, Dyce Industrial Park, Aberdeen AB2 0GA. Tel: (0224) 722324. Fax: (0224) 722894.

11th
London: Conference on 'Crisis Management for the Maritime Industry'. Details: Linda McKay, Conference Organiser, Legal Studies and Services Limited, Gilmoora House, 57–61 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 631 3124.

11th-12th
Houston, USA: Conference on 'Energy Strategies — The Quest for Markets'. Details: Cambridge Energy Research Associates, Charles Square, 20 University Road, Cambridge, MA 02138, USA. Tel: (617) 497 6446. Fax: (617) 497 0423.

12th
Aberdeen: Conference on 'The latest developments in safe escape, evacuation and rescue from offshore installations'. Details: Customer Services, IIR Scientific and Technical, 28th Floor Centre Point, 103 New Oxford Street, London WC1A 1DD. Tel: (071) 412 0141. Fax: (071) 412 0145.

17th
London: Conference on 'Volatile Organic Compounds — Major decisions for industry'. Details: Amanda Wright, IBC Technical Services Ltd, Gilmoora House, 57–61 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 631 3214.

17th-18th
Singapore: Conference on 'Pacific Petroleum and Energy Finance and Investment Exchange'. Details: Global Pacific Enterprizes Pty Ltd, 25 Kevin Avenue, Avalon, Sydney 2107, NSW, Australia. Tel: (612) 973 1912. Fax: (612) 973 1925.

17th-21st
Aberdeen: Course on 'Petroleum Exploration and Development Economics'. Details: DCA Consultants Ltd, Rosewall Cottage, Main Road, Aberuthven, Perthshire PH3 1HB. Tel: (0764) 63936.

18th
London: Seminar on 'Oil Price Information'. Details: Mrs Catherine Cosgrove, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR. Tel: (071) 636 1004. Fax: (071) 255 1472

18th
London: Lecture on 'Gas Pipelines BS8010 and Risk Assessment — A Case Study'. Details: Mr A A Reed, The Pipeline Industries Guild, 14/15 Belgrave Square, London SW1X 8PS. Tel: (071) 235 7938.

18th-19th
Nuremburg, Germany: 'Hydrogen Energy Technology III'. Details: VDI-Gesellschaft Energietechnik, Postfach 10 11 39, W-4000 Dusseldorf 1, Germany. Tel: 49 211 6214.

19th
London: Conference on 'Legal and Economic Aspects of the Privatised UK Electricity Industries'. Details: European Study Conferences Limited, Douglas House, Queen's Square, Corby, Northants NN17 1PL. Tel: (0536) 204224. Fax: (0536) 204218.

19th
London: Institute of Mining and Metallurgy Petroleum Lecture 'The outlook for oil and gas in the nineties' to be given by Sir Peter Holmes, Chairman and Managing Director of Shell Transport and Trading Company. Details: The Institute of Mining and Metallurgy, 44 Portland Place, London W1N 4BR. Tel: (071) 580 3802.

20th
London: Conference on 'Doing Business Without Paper — the impact of EDI (electronic data interchange) on the upstream and downstream oil industry'. Details: Susan Ashton, The Institute of Petroleum.

20th
London: Conference on 'The Fire Properties of Construction Materials'. Details: Society of Chemical Industry, 14/15 Belgrave Square, London SW1X 8PS. Tel: (071) 235 3681. Fax: (071) 823 1698.

25th
London: Conference on 'Effects of Harmonising Standard in Europe — Pressure Vessels'. Details: Liz Hyde, IBC Technical Services Ltd, Gilmoora House, 57–61 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 631 3214.

25th-27th
London: Course on 'Introduction to Petroleum Exploration for Non-Geologists'. Details: The Administrative Secretary, JAPEC, c/o The Geological Society, Burlington House, Piccadilly, London W1V 0JU. Tel: (071) 434 9944. Fax: (071) 439 8975.

26th-28th
Santiago, Spain: Conference on 'Deepwater and Marginal Oilfield Development'. Details: Offshore Conference Services, 57–36 Apsley End Road, Shillington, Hitchin, Herts SG5 3LX. Tel: (0462) 712049. Fax: (0462) 711889.

26th-28th
London: Course on 'Offshore Pipeline Engineering'. Details: Nadia Ellis, IBC Technical Services Ltd, Gilmoora House, 57–61 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 631 3214.

27th-28th
London: Conference on 'Managing Energy Price Risk'. Details: IIR Limited, 28th Floor Centre Point, 103 New Oxford Street, London WC1A 1DD. Tel: (071) 379 8040. Fax: (071) 412 0143.

27th-28th
London: Conference on 'Contractual Default and Risk Limitation in Offshore Supply and Construction Contracts'. Details: Linda McKay, Legal Studies &

FORTHCOMING EVENTS

Services Limited, Gilmoora House, 57–61 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 631 3214.

March

2nd
London: Conference on 'Pricing and Structuring: Energy Swaps'. Details: IIR Ltd, 28th Floor, Centre Point, 103 New Oxford Street, London WC1A 1DD. Tel: (071) 379 8040. Fax: (071) 412 0143.

2nd-6th
Orlando, USA: Conference on 'Energy from Biomass and Wastes'. Details: Susan Robertson, IGT, 3424 South State Street, Chicago, IL 60616. Tel: 312 567 3881. Fax: 312 567 3857.

3rd-5th
Leeds: Course on 'Biofouling and Biocorrosion'. Details: Helen Smith, Department of Continuing Professional Education, Continuing Education Building, Springfield Mount, Leeds LS2 9NG. Tel: (0532) 333236. Fax: (0532) 333240.

4th-6th
Amsterdam, The Netherlands: 'First International Conference on Carbon Dioxide Removal'. Details: ICCDR c/o KIvI, PO Box 30424, 2500 GK, The Hague, The Netherlands.

8th-12th
Divonne les Bains, France: '8th Advanced International Petroleum Executive Seminar'. Details: Dr Bob Gale, Seminar Manager, Petroleum Economics Limited, Piercy House, 7 Copthall Avenue, London EC2R 7BU. Tel: (071) 638 3758. Fax: (071) 638 3708.

9th-13th
Edinburgh: Course on 'Production Logging'. Details: Tom Inglis, Centre for Continuing Education, Heriot-Watt University, Riccarton, Edinburgh EH14 4AS. Tel: (031) 451 3014. Fax: (031) 451 3005.

10th
London: Conference on 'What's New in Lube Oils'. Details: Miss Caroline Little, The Institute of Petroleum.

16th-20th
Oxford: Course on 'Introduction to Oilfield Exploration and Production' Details: The College of Petroleum and Energy Studies, Sun Alliance House, New Inn Hall Street, Oxford OX1 2QD. Tel: (0865) 250521. Fax: (0865) 791474.

17th-19th
Chislehurst: Course on 'Safety of Electrical Equipment in Potentially Explosive Atmospheres'. Details: Sira Communications Limited, South Hill, Chislehurst, Kent BR7 5EH. Tel: (081) 467 2636. Fax: (081) 467 7258.

19th-20th
Aberdeen: Course on 'North Sea Risk Analysis'. Details: DCA Consultants Ltd, Haughend Farm, By Dunning, Perthshire PH2 9BX. Tel: (0764) 84664. Fax: (0764) 84665.

23rd-24th
Aberdeen: Conference on 'Achieving Total Quality Offshore'. Details: IIR Ltd, 28th Floor, Centre Point, 103 New Oxford Street, London WC1A 1DD. Tel: (071) 412 0141. Fax: (071) 412 0145.

24th-26th
Coventry: Conference co-sponsored by the IP on 'Pipeline Systems'. Details: Mr David Crow, BHR Group Limited, Cranfield, Bedford. Tel: (0234) 750422. Fax: (0234) 750074.

26th
London: Mr Robert Horton, Chairman of British Petroleum Plc will speak at a meeting of the British Institute of Energy Economics. Details: Mrs M Scanlan, BIEE, 37 Woodville Gardens, Ealing, London W5 2LL. Tel: (081) 997 3707. Fax: (081) 566 7674.

24th-27th
Montrose: 'Offshore Basic Fire Course'. Details: Course Booking Unit, Offshore Fire Training Centre Ltd, Forties Road, Montrose, Angus DD10 9ET. Tel: (0674) 72230. Fax: (0674) 77335.

29th-1st April
London: 'Fourth Conference on Petroleum Geology of NW Europe'. Details: Conference Associates and Services Ltd, Congress House, 55 New Cavendish Street, London W1M 7RE. Tel: (071) 486 0531. Fax: (071) 935 7559.

30th-3rd April
Oxford: Course on 'Government and the Oil Industry: Relationships and Regulations'. Details: The College of Petroleum and Energy Studies, Sun Alliance House, New Inn Hall Street, Oxford OX1 2QD. Tel: (0865) 25021. Fax: (0865) 791474.

April

1st-3rd
Strasbourg, France: Conference on 'The Rational Use of Energy and the Environmental Benefits'. Details: Conference Office, Watt Committee on Energy, Savoy Hill House, Savoy Hill, London WC2R 0BU. Tel: (071) 379 6875. Fax: (071) 497 9315.

6th-10th
Leeds: Short Course on 'Diesel Particulates'. Details: Sheila Speedy, Department of Continuing Professional Education, Continuing Education Building, Springfield Mount, Leeds LS2 9NG. Tel: (0532) 333226. Fax: (0532) 333240.

7th-12th
Lagos, Nigeria: First international oil, gas and petroleum exhibition — 'The World of Oil in Nigeria'. Details: Glahe International Group Ltd, Woodcroft, Bures Hamlet, Suffolk CO8 5DU. Tel: (0787) 228164. Fax: (0787) 228164.

12th
Moreton-in-Marsh: Course on 'Chemsafe Transport Emergency Response'. Details: Ron Cameron, Marketing Manager, The Fire Service College, Moreton-in-Marsh, Gloucestershire GL56 0RH. Tel: (0608) 52156. Fax: (0608) 51788.

13th-17th
Edinburgh: Course on 'Reservoir Modelling'. Details: Tom Inglis, Centre for Continuing Education, Heriot-Watt University, Riccarton, Edinburgh EH14 4AS. Tel: (031) 451 3014. Fax: (031) 451 3005.

27th-29th
Southampton: 'Oil Spill Familiarisation Course'. Details: The Oil Spill Service Centre, Lower William Street, Northam, Southampton, Hampshire. Tel: (0703) 331551. Fax: (0703) 331972.

28th
Dubai: 'Britain in the Gulf 92'. Details: International Conferences and Exhibitions Ltd, 51–53 High Street, Kings Langley, Herts WD4 9HU. Tel: (0923) 261988. Fax: (0923) 261669.

28th-29th
London: Conference on 'Energy Use and the Environment — Cleaner Energies for the Future'. Details: IBC Technical Services Ltd, Gilmoora House, 57–61 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 631 3214.

University Of Dundee

SENIOR LECTURER ON PETROLEUM POLICY AND ECONOMICS

CENTRE FOR PETROLEUM & MINERAL LAW & POLICY
(Salary Scale £24,922 – £28,165)

The Centre for Petroleum and Mineral Law and Policy is a leading UK and global institution for graduate studies, research, professional training and advisory services in natural resources and energy law, policy and economics. A new interdisciplinary programme is being set up with the support of major international resource companies. The programme will bring together legal, policy and economics expertise and focus on providing education and training and on emphasising current themes, such as environment, East European investment, natural gas, privatisation and European integration aspects of the natural resources and energy industries.

A newly established senior lectureship on petroleum policy is now available with the Centre. The post is funded by a major international oil company and carries the potential for further advancement/upgrading in case of successful performance. The Centre is looking for an experienced professional (preferably with a strong economic and/or policy-oriented background) from the oil and gas industry, with academic and research potential and interest, and international outlook, ability to work in a team and negotiate effectively within the University, the industry and industry associations. The senior lecturer is expected to participate actively in a dynamic interdisciplinary team led by Professor Thomas Walde, Director of the Centre, with particular reference to teaching, professional training, publication-oriented research and consulting. The incumbent will be expected to collaborate also with the University's Department of Economics and Management and support its MBA programme with a perspective to create a specific energy and industry MBA.

Dundee University offers an attractive location with high quality of life (cost of living, accommodation, environment, health and recreation, education) and the post offers considerable opportunity for self-directed creative activity.

Further particulars from, and applications in writing with 9 copies of CV (or, if posted abroad, one copy in a format suitable for photocopying) and the names and addresses of three referees to the Personnel Office, The University, Dundee DD1 4HN, tel (0382) 23181 ext 4015. Please quote reference EST/2/92/PR. Closing date: 2nd March 1992.

The University is an Equal Opportunities Employer

UK Retail Marketing Survey

March 1992

The UK Retail Marketing Survey, published annually with the March issue of Petroleum Review, has established itself as a definitive source of statistics and information.

Vital statistics cover retail outlets by brand, self-service sites, supermarkets and motorway sites, derv and unleaded sales as well as the market's geographical breakdown and details of up-to-date UK retail prices for 4-star, unleaded petrol and derv.

With details of over 60 companies operating these outlets, the survey provides valuable market research information.

This comprehensive 32-page publication is compiled from source material obtained directly from the companies concerned and from other organisations.

Copies are available, at a cost of £40 each, from:
The Library, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR.
Telephone: 071 636 1004. Fax: 071 255 1472.

ORDER FORM

Please send me ..... copies of the 1992 UK Retail Marketing Survey

I enclose my cheque for £ .....made payable to the Institute of Petroleum

Name .....

Company .....

Address.....

.....

.....

..... (ED)


TAMOIL.
THE JOURNEY HAS JUST BEGUN.
Winner Advertising
TAMOIL
ON THE ROAD WITH YOU

Inspectorate's Oil and Petrochemical Division has been awarded BS 5750 : Part 2 : 1987 for its inspection operations. In addition its UK oil laboratories are now also NAMAS approved.

This reinforces Inspectorate's total commitment to quality and demonstrates its leadership in providing a comprehensive service in cargo surveying and laboratory analysis throughout the UK and in all the world's major oil trading locations.

You can rely on Inspectorate for a highly responsive, independent and professional oil inspection service.

INSPECTORATE

Inspectorate Ltd
Oil and Petrochemical Division, 2 Perry Road, Witham, Essex CM8 3TU, UK
Tel: 0376 515081/515050 Telex: 987238 Fax: 0376 520819