Petroleum review

MARCH 1998

IP Week – Keynote speakers – Lunch – Dinner

Rt Hon Dr Gavin Strang MP explains UK transport plans

Mark Moody-Stuart challenges industry to speak out

Geological prospects

Have all the elephants been found?

Energy sources

The future belongs to gas

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

IP THE INSTITUTE OF PETROLEUM

DISCOVER FISHER-ROSEMOUNT PETROLEUM FOR ALL YOUR FLOW MEASUREMENT NEEDS

Fisher-Rosemount, the world's largest instrumentation company, has a proven history in designing and manufacturing products, systems and services for the process industry.

Now, this knowledge and success has been brought to Fisher-Rosemount Petroleum, a new division formed by combining the resources and expertise of Brooks Instrument and Micro Motion. World-wide, this provides:

- A combination of unique flow products, backed up by unrivalled knowledge of upstream, refining and downstream petroleum metering applications.
- A single-source supply of market-driven products including flowmeters, meter provers, custody transfer, fiscal measurement and terminal automation systems
- Superior technical support and services to meet requirements for global safety and weights and measures approvals.

Discover how Fisher-Rosemount Petroleum can streamline your flow measurement needs by contacting Graham Hawley at Fisher-Rosemount Petroleum, Arden Business Centre, Bredbury, Stockport, SK6 2SU.

Tel: 0161 430 7100 Fax: 0161 494 5328

Fisher-Rosemount Petroleum

FISHER-ROSEMOUNT™ Managing The Process Better.™

Petroleum review

MARCH 1998 VOLUME 52 NUMBER 614
£8.75 • SUBSCRIPTIONS (INLAND) £105.00 (OVERSEAS) £115.00

PUBLISHER

IP THE INSTITUTE OF PETROLEUM
A charitable company limited by guarantee
Director General: Ian Ward
61 New Cavendish Street
London W1M 8AR, UK
General Enquiries:
Tel: +44 (0)171 467 7100
Fax: +44 (0)171 255 1472

EDITORIAL

Editor: Chris Skrebowski
Deputy Editor: Kim Jackson
Production Manager: Emma Parsons
The Institute of Petroleum
61 New Cavendish Street, London W1M 8AR, UK
Editorial enquiries only:
Tel: +44 (0)171 467 7118/9
Fax: +44 (0)171 637 0086

e-mail: petrev@petroleum.co.uk

http://www.petroleum.co.uk

ADVERTISING

Alison James
Anne Marie Fox
Advertising Manager: Jolanda Nowicka
Production: Catherine Meade
Landmark Publishing Services, 8 New Row,
London WC2 4LH, UK
Tel: ***+44 (0)171 240 4700***
Fax: ***+44 (0)171 240 4771***

SUBSCRIPTIONS

Subscription Enquiries: Portland Press
Tel: +44 (0)1206 796351 Fax: +44 (0)1206 799331

Printed by The Thanet Press Ltd, Margate

US MAIL: *Petroleum Review* (ISSN 0020-3076 USPS 006997) is published monthly by the Institute of Petroleum and is available Periodical Postage Paid at Middlesex, New Jersey.

Postmaster: send address changes to *Petroleum Review* c/o PO Box 177, Middlesex, New Jersey 08846, USA.

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

ABBREVIATIONS

The following are used throughout *Petroleum Review*:

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

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

Front Cover: Mark Moody-Stuart at the IP Annual Lunch

Photo: Steve Ramsey, Ramsey Photographic

CONTENTS

NEWS

SPECIAL FEATURES

FEATURES

SUPPLEMENT – RETAIL MARKETING SURVEY

The most comprehensive guide to UK retail marketing data compiled by the Institute of Petroleum

REGULARS

From the Editor

Recognizing the contribution

The industry's annual gathering in London for IP Week was once again a great success with London's largest dining room, the Great Room at the Grosvenor House, full to capacity for the IP Dinner. The week started with a well attended conference at the Royal Aeronautical Society's luxurious headquarters in Park Lane. The theme 'Prospects to 2000' clearly identified four major influences on the industry: the increasing use of gas; the lack of viable alternatives to oil and gas to meet energy demands; the changing structure of the companies, particularly the state-owned companies as they move into private ownership and competitive markets; and the future role and position of the Middle East.

The annual Luncheon at the Dorchester was addressed by Mark Moody-Stuart who in his speech (see p12) challenged the industry not to lose the communications battle and to stand up for its achievements.

The 11th Oil Price Seminar addressed the price risk management instruments available to the industry and the exact way they can, and are, being used. Against a background of weak oil prices with spot Brent about to dip below $14 a barrel the seminar attracted an attentive audience.

The guest speaker at the Annual Dinner was the Right Honourable Dr Gavin Strang MP, the UK Minister for Transport, who in his speech (see p16) described the Government's evolving transport policy objectives. He was answered by David Setchell, the IP's President, who gave an entertaining speech summarizing the industry and the IP's achievements over the last year (see p20).

The IP's final event of the week was the one-day conference on 'Innovations in Offshore Field Developments'. A series of key industry figures described oil and gas developments offshore Norway, Brazil and in the Gulf of Mexico. They showed the way that technical and operational innovations have reduced costs to the point where even deepwater fields are fully competitive.

Offshore West Africa, the Gulf of Guinea can fairly claim to be the most exciting new oil province in the world. A series of major finds have made the area an exploration hot spot and one of the areas racking up the demand (and cost) of deepwater exploration rigs. (Latest developments in the area are described on p32.)

However, the industry is currently faced with the somewhat strange and possibly unstable situation in which the financial incentive to develop new production remains strong despite very weak oil prices. Technical innovation has been so effective that the development of areas such as the deep offshore, once thought of as naturally high cost, are now being developed and produced at fully competitive prices.

In contrast the size of the government tax take on most oil products is such that lower crude prices have only a limited impact on final selling prices and hence on demand. For those products where the tax burden is relatively low, such as heating gas oil and fuel oil, demand levels are under pressure from rival fuels, usually gas, and improved technology. The combined cycle gas turbine for electricity generation combines both threats in one all-conquering combination that is rapidly consigning the oil-fired power station to history.

As weak prices and crude oversupply are likely to persist for some time whatever Iraq chooses to do, the industry will be seeking ways to rebalance the market. As David Setchell, the IP President indicated in his speech at the Annual Dinner, if the UK Government elects to significantly tighten the taxation on North Sea field developments, up to 80% of the new projects could be at risk.

The Offshore Contractors Association (OCA) goes even further noting that the offshore oil and gas industry employs 380,000 of which only 30,000 are directly employed by the major oil companies. And pointing out that the industry has been responsible for 20% of the country's total annual industrial investment. The OCA predicts that if taxes are raised, up to £10bn of cumulative investment and 120 out of the 143 currently planned projects are at risk along with up to 50,000 jobs.

The short-term threats to development are considerable but the industry has to think well beyond any immediate problems. In the first of a two-part investigation (p23) we attempt to answer the question of how well the world is explored and how much is left to find? This month looks at our knowledge of how oil is formed and the conditions needed for a commercial accumulation to occur. Next month we will examine where the unexplored and underexploited resources are to be found.

Web World

When a company decides to develop a website a number of basic strategies can be identified: to project an image of the company; to provide details of products or services; to change or enhance the public perception of the company; to demonstrate competence or special skills or particular knowledge.

In practice these are not alternatives as most companies will wish to achieve some combination of them on their sites. The list is all of passive attributes, in that the viewer has no direct interaction. The simplest direct interaction is the sales sites such as the Internet bookshops like **amazon.com** where the user makes a selection using some form of virtual shopping trolley and then pays for the transaction with a credit card. Areas for this sort of approach in the oil and gas industry are data services, books and magazines but there seems little reason why standard oilfield consumables should not be purchased in this way. Virtually all areas which involve complex catalogues that require regular updating can reach their buyers more cheaply via the Internet. In the future industry buyers are likely to be spending rather more time on the Net.

Rather more exciting are the wholly new things that can be done on the Internet. Already at least one major oil company is posting construction contracts on the Net. Complex bid documents can be cheaply posted giving all contractors equal access and almost certainly making the process more competitive. If only certain companies are to be given access to the bid documents this can be done with access codes.

Another new service being planned is a directory of seismic surveys which will allow a company to determine what surveys have been done and who owns them for any area it is interested in. Details are to be found at **www.seismicworld.com**

This would appear to be just the beginning; already a Dutch company Netherlands Energy Research Foundation at **www.ecn.nl** is compiling a database of reusable equipment removed from offshore platforms, but all manner of surplus equipment and supplies could be offered. Acreage and prospects could be readily sold and exchanged via appropriately designed sites while governments are likely to increasingly post licensing rounds on the Net. Net publishing is also a cheap and effective way to disseminate regulations.

The IP's website continues to expand and this month we have introduced hotlinks to the principal oil futures markets at **www.nymex.com** as well as **www.ipe.co.uk** and at **www.simex.com**

For those readers who have not yet visited the IP's redesigned and improved website it can be found at **www.petroleum.co.uk**

Boulton gas ahead of schedule

Commercial gas sales from the Conoco-operated Boulton field in block 44/21a in the southern North Sea have begun three months ahead of the originally approved schedule. The field is currently producing around 114mn cf of gas per day from its first well. Conoco believes this to be the highest sustained rate in any Carboniferous well in the southern North Sea.

Designed and fabricated by SLP Engineering of Lowestoft, and based on a Gulf of Mexico design by Atlantia Corporation of Houston, the platform on Boulton is a slender structure which carries the production wells inside its legs. This offers physical protection to the wells while reducing loads on the jacket caused by wind and wave action, reports Conoco. Topsides design has been kept simple and the total platform was fabricated and installed in just 10 months, compared with a more typical period of nearly two years.

The entire platform was installed before drilling began. Platform hook-up and commissioning and installation of the 10-inch and 3-inch pipelines, each of which is 11 km long, were undertaken in parallel with the drilling programme. The pipeline installation contract – with McDermott-ETPM UK using the *Norlift* vessel – was Conoco's first use of reeled pipeline in this sector of the North Sea.

Boulton has recoverable reserves of approximately 165mn cf of wet gas which will be produced through two wells, one of which is the recently completed B1 well. The second B2 well is planned as a dual-lateral well to be drilled to a separate reservoir within the field. Produced gas flows to the Caister Murdoch System (CMS) complex around 11 km to the east for compression and transmission by the CMS pipeline to the Conoco-operated Theddlethorpe gas terminal.

Field partners are: Conoco 46%, Lasmo 44.5% and British-Borneo 9.5%.

Upbeat 1998 E&P activity in Australia

The 1998 activity forecasts released by the Australian Petroleum Production & Exploration Association (APPEA) indicate a continuing confidence in the future of the Australian oil and gas sector.

At a national level, exploration expenditure is forecast to increase by 51% to between $1.2bn and $1.6bn in 1998. The number of exploration wells spudded will be up by 13% on 1997 levels. Expenditure on development activity in 1998 is expected to remain at high levels with anticipated national expenditure in the range of $1.4bn to $1.7bn.

According to APPEA Executive Director Barry Jones, the Canarvon Basin in Western Australia continues to show the strongest levels of activity offshore with approximately 50% of offshore exploration expenditure and between 36% and 60% of offshore development expenditure projected to be spent in this region. Underlying this trend is the continuing growth in Australia's domestic gas market which has encouraged developers to delineate and develop previously identified gas reserves, the bulk of which lie in this region.

'The Cooper/Eromanga Basins in southwest Queensland and northeast South Australia continue to be the strongest performing onshore areas,' he continues. 'Up to 59% of onshore exploration expenditure and approximately 80% of onshore development expenditure is projected to occur in these basins.'

While welcoming the continuation of high levels of industry activity, Jones urges a note of caution in interpreting the national figures, pointing out that companies had prepared the data on activity expectations before commodity markets were affected by the impacts of the Asian currency crisis.

In Brief

United Kingdom

***The UK Health & Safety Executive** (HSE) has issued a reminder that the Electricity at Work Regulations 1989 (EAWR) and the Noise at Work Regulations 1989 (NAWR) have been amended to apply offshore as well as onshore and were scheduled to enter into force on 21 February. The amended regulations will be known as the Offshore Electricity and Noise Regulations 1997.*

***The Montrose Fire & Emergency** Training Centre claims to be the first company in the UK to offer simulator training for the floating production vessel market.*

***The Oil Industry Liaison Committee** (OILC) is to recommend that its 1,300 members be balloted on the proposal for it to become part of the MSF union's autonomous Offshore Section.*

***Smit Heavy Lift is to provide heavy lift** support services for the completion of three floating, production and storage vessels destined for the Banff, Janice and Pierce North Sea fields which are currently being built at Aker McNulty's South Shields yard on Tyneside.*

***UK Science, Energy and Industry** Minister John Battle has approved plans for the decommissioning of BP's North Sea Donan oil field installations and pipelines located in blocks 15/20a and 15/20b, in 140 metres water depth.*

Europe

***Ramco Energy has announced that its** recently acquired subsidiary Medusa Oil and Gas has completed the drilling and initial testing of the Krumvir 2 well in the Czech Republic. The well tested at a rate of 750 b/d – however, Ramco believes that the potential exists for future commercial production rates per well substantially in excess of this level.*

***A total of 17 oil and gas companies are** reported to have sought licenses in Denmark's fifth North Sea licensing round. Applicants included Agip, Amerada Hess, Enterprise, Phillips, Shell, Texaco, Arco, Kerr McGee and Saga. Concessions are to be allocated in summer 1998.*

***The European Union is planning to** launch a consultation in spring 1998 of all parties interested in the development of sustainable disposal methods for redundant oil platforms.*

Golden opportunity in North Sea

Shell Expro is to begin studying possible development scenarios for a gas/condensate discovery in the South Halibut Basin in the Outer Moray Firth area of the North Sea. Provisionally named Goldeneye, the discovery was made in late 1996 by exploration well 14/29a-3 which production tested at a surface constrained rate of 22mn cf/d.

Meanwhile Amerada Hess, operating for a group including Brabant, Talisman and Statoil on their 20/4b-6 exploration well, has encountered a hydrocarbon bearing reservoir which shows that the Goldeneye field extends into Amerada's block 20/4b.

Shell and Amerada have agreed to share the post-drill evaluation results from the two wells and are to jointly analyze data obtained from a high resolution, development 3D seismic survey carried out by Shell Expro in summer 1997. Further data will become available from Shell's 14/29a-4 exploration well, to which the 20/4b group is contributing, currently being drilled to the east of the Goldeneye discovery.

While development plans are at an early stage, one of the prime considerations for engineers studying possible schemes is to establish a means of evacuating the gas from an area which currently has no processing infrastructure. Studies are also aimed at identifying environmental sensitivities with a view to producing an environmental impact assessment.

Black Sea E&P focus

The Board of Black Sea Energy reports that its Tura joint venture in Russia achieved an oil production rate of 8,850 b/d by the end of 1997, its first year of operation. Approximately 73% of Tura's 4Q1997 production of 706,000 barrels was sold into export markets with the balance held for delivery in 1998.

Black Sea is currently participating in three joint ventures in Russia: the Tura project covering 1.1mn acres in the northern Kalchinskoye exploration block; the Kuban project which involves the rehabilitation of the Anastasievkso-Troitskoye oil field; and the Radonezh project which holds the licence to conduct exploration activity on the 1.3mn acre block immediately adjacent to the Tura block.

The company forecasts that production from Tura will rise to 11,000 b/d in 1998 and 20,000 b/d in 1999. Kuban's reserves are estimated at 26mn barrels of which 16mn are proven, and the remaining 10mn classed as probable.

The Radonezh block contains an estimated 7mn barrels of proven reserves with a total recoverable reserve potential in excess of 1.4mn barrels.

Canadian farm-in for Shell

Shell Canada is to drill and operate four exploration wells and conduct 500 km of seismic on exploration licenses held by Corridor Resources on Anticosti Island, Quebec, under a farm-in deal agreed in December 1997. The first two wells will be drilled in 1998 with the third scheduled to be spudded by the end of 1999. The fourth well will be drilled by the end of 2000.

Upon completing its farm-in obligations, Shell will earn an undivided 100% working interest and will retain 100% of the funding obligations in the farm-out lands subject to a 12% overriding royalty payable to Corridor on production from exploration licenses covering an area of 260,000 acres (the 'A' lands) and a 10% overriding royalty payable on production from the exploration licences covering around 2.1mn acres (the 'B' lands).

Once 5mn boe have been produced and removed from the Island, Corridor's 12% and 10% overriding royalties will automatically convert to 35% and 30% Corridor working interests in the A and B lands respectively.

Tough penalties for EIA non-compliance

UK Science, Energy and Industry Minister John Battle has announced that tough new sanctions for failing to comply with UK Government regulations or breaking consent conditions are among changes to draft regulations which will apply the Environmental Impact Assessment Directive to the effects of offshore UK oil and gas exploration and production.

Other changes made following consultation during 1997 on a previous draft include increasing the time available for public comment on a company's environmental submission about a project from 14 days to four weeks and a simpler process for the Government to decide which projects require assessment.

The revised text of the regulations to implement the 1985 Environmental Impact Assessment Directive (85/337/EEC) is being circulated for further comment before being laid in Parliament.

In Brief

North America

***BP Exploration (Alaska) and Chevron** USA are reported to have aligned their leasehold interests in the eastern part of Alaska's North Slope which encompasses the Sourdough, Flaxman and Point Thomson discoveries. Under the agreement, BP will hold a 56% stake in the companies' joint lease holdings in the region, Chevron holding the remaining 44%.*

***Arco Alaska has begun work on the** 365mn barrel Alpine oil field on Alaska's North Slope following issuance of the final US Army Corps of Engineers permit. Three appraisal wells are to be drilled in winter 1998 in order to test development concepts and to determine any additional reserves. Initial production of 40,000 b/d is expected in early 2000 with a peak production of 70,000 b/d planned in 2001.*

***Elf Exploration has announced that its** Virgo discovery on Viosca Knoll 823 in the Gulf of Mexico is to be developed by a conventional four-leg, 14-slot drilling and production platform. The facility, set in 345 metres of water, will have a daily production capacity of 120mn cf of gas and 15,000 barrels of oil. First production is scheduled by year-end 1999.*

***The well that achieved first oil for the** Hibernia project in Newfoundland is reported to have broken the Canadian record for production volumes. The well, fully perforated in early December 1997, is producing at 40,000 b/d. The previous record was around 25,000 b/d from a single well.*

Middle East

***Hungarian oil and gas company Mol** has been awarded an exploration permit for the North Mukalla block 48 in Yemen. The company holds a 100% working interest in the project. A three-year exploration programme is scheduled to begin this year.*

***Chevron is to extend its technical** services agreement with Kuwait Oil Company (KOC) for another three and a half years. Under the agreement, Chevron will provide services for the development and transportation of crude oil from Kuwait's Burgan field, said to be the second largest oil field in the world.*

Green light for Renee and Rubie projects...

The UK Department of Trade and Industry has approved the development plan for the Renee and Rubie fields located in North Sea blocks 15/27 and 15/28b, respectively.

The two fields will be developed via a subsea system tied back to Amerada Hess's *AH-001* floating production facility located on the nearby Rob Roy/Ivanhoe fields. Oil will be exported via the existing pipeline to the Elf-operated Flotta terminal on the Orkneys while gas will be transported to St Fergus, Scotland, via Texaco's Tartan platform.

Development will take place in two stages. Stage I will consist of one production well and one injection well on Renee and a production well on Rubie. Stage II, approximately 12 months later, will utilize a further production well and another injection well on Renee.

Major contracts are already in place for the supply of subsea controls (Kvaerner FSSL), umbilicals (Oceaneering Multi Flex), pipeline installation (Stolt Comex) and the subsea manifold (KYE).

Production is expected to commence in 4Q1998 at an initial rate of 22,000 b/d of oil, increasing to 27,000 b/d in 4Q1999.

Phillips Petroleum is operator of block 15/27 holding a 43.77% interest and partners are Agip 17.26%, BG Exploration and Production 16.47%, Amerada Hess 14% and Deminex UK Oil and Gas 8.5%. Participants in block 15/28b are Phillips Petroleum (operator) 27%, Deminex UK Oil and Gas 40%, Amerada Hess 19.22%, British-Borneo Expro 4.78% and ONEPM Exploration 9%.

... and Corvette and Ketch gas fields

The UK Government has given Shell Expro the green light for the £233mn development of the Corvette and Ketch fields in the southern North Sea.

Combined flow from the two fields is expected to peak at 450mn cf/d of gas – representing around 3% of average UK total gas demand, according to company Gas Director Gary Vassie.

Ketch is located in block 44/28b and will cost around £153mn to develop. It is a medium sized reservoir with estimated recoverable reserves of 390bn cf of gas which will be recovered by natural depletion.

Seven production wells are planned from a normally unattended installation (NUI) located in 55 metres water depth. Provision has been made for additional drilling and the future development of near facilities potential. Construction of the 12-slot, four-legged platform has been awarded to Odebrecht SLP which is building the topsides in Lowestoft and the jacket on Teesside. A combined installation for the 1,200-tonne jacket and 1,100-tonne topsides is planned for 3Q1999.

First gas from Ketch is scheduled to flow in 4Q1999 and will be sold separately by Shell and Esso within their existing gas portfolios. The field is expected to produce at a peak rate of 150mn cf/d.

Gas evacuation will be via a new 28-km pipeline to the Conoco-operated Murdoch platform and then via Conoco's Caister Murdoch System to the Theddlethorpe gas processing plant. The 18-inch Ketch-Murdoch line will also provide sufficient ullage to allow the export of future potential finds in the area. It will be installed by Allseas of the Netherlands in 3Q1998 by its pipelay vessel *Lorelay*.

The £80mn Corvette field is located in block 49/24a in 31 metres water depth. Like Ketch, it will be developed by a four-legged, 12-slot NUI which will be operated by remote control from Bacton in Norfolk.

Heerema Hartlepool is constructing the 1,000-tonne topsides at Teesside while the substructure will be built at its Vlissingen yard in the Netherlands. Installation is scheduled for 3Q1998.

Field reserves are estimated at 200bn cf of gas. First gas, which will also be marketed separately by Shell and Esso, is scheduled for 4Q1998.

Gas will be delivered by pipeline to the Bacton gas terminal via the Shell Expro-operated Leman Alpha platform. Corvette production is expected to peak at 300mn cf/d.

Shell UK acquired a 100% stake in part of southern North Sea block 49/23 which contains an extension of the Corvette gas field last month.

The equity was obtained from block 49/23 licence holders Amoco (30.77%), BG Exploration and Production (30.77%); Amerada Hess (23.08%) and Enterprise Oil (15.38%).

In Brief

Russia & Central Asia

The third development well on the *Azerbaijan International Operating Company's Chirag-1 platform is reported to have entered production at a rate of 3,200 barrels of oil per day. This is expected to rise to 9,400 b/d in the near future.*

Austrian oil and gas company OMV is *reported to have signed a memorandum with Turkmenistan covering oil and gas exploration in an area north-east of the Amu-Darja river over 1998.*

Lukoil and Kazakhoil are reported to *have agreed to the joint development of Caspian oil fields whose borders are currently being disputed by Russia and Kazakhstan.*

Lukarco, the joint venture formed by *US company Arco and Lukoil of Russia in February 1997, has signed an agreement to assume Lukoil's 60% interest in the D-222 block in Azerbaijan. Known as Yalama, the block is located about 150 km north-west of Baku in the Caspian Sea. Seismic operations are planned during 1998 and 1999.*

It is reported that Rosneft and *Sakhalinmorneftegaz plan to join a US consortium to develop the Kirinskoye prospect offshore Sakhalin Island. The two Russian oil companies will each take half of a one-third share conceded by Mobil and Texaco.*

Asia Pacific

Woodside Petroleum is reported to *have signed a production sharing agreement with the Cambodian Government covering offshore blocks V and V1 located in the eastern part of the Gulf of Thailand.*

British-Borneo Petroleum Syndicate is *reported to have acquired a 7.73% stake in Australian oil and gas company Petroz which holds interests in oil and gas fields in the Timor Sea offshore western Australia and in Queensland's Surat Basin.*

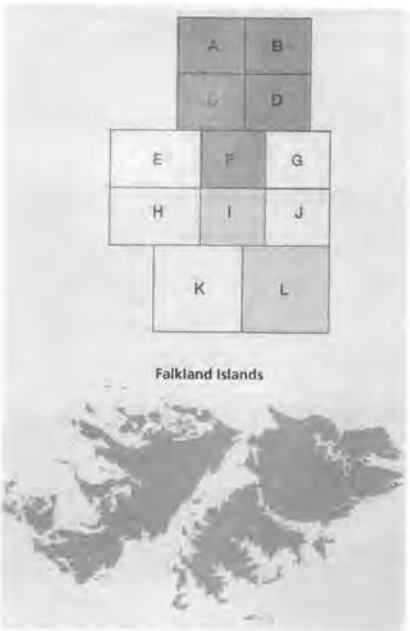
Hardy Oil & Gas has announced a new *commercial gas discovery in its South West Miano licence onshore Pakistan. The well is reported to have proven minimum reserves of around 350bn cf of gas. Total reserves in the Sawan field are put at between 1tn and 2tn cf of gas.*

Falkland Island drilling programme

Amerada Hess has outlined the drilling programme for five tranches offshore the Falkland Islands to be developed under the Falklands Offshore Sharing Agreement (FOSA). Established by the four operators of the tranches – Amerada Hess, Shell, Lasmo and the International Petroleum Corporation Falkland Islands (IPC); together with their respective co-venturers – in a bid to reduce upfront exploration costs, FOSA sets out the principles of cooperation in the planning and operating of all drilling and associated activities. Upfront costs are estimated in the region of $25mn.

The Falkland Islands Government has awarded licences for seven tranches in the Northern basin. Five of these tranches (see shaded areas on map) – A (Amerada Hess), B (Shell), C and D (Lasmo) and F (International Petroluem Corporation Falkland Islands (IPC)) – will be explored from early spring 1998 until late spring 1999. A total of five wells will be drilled in water depths of between 250 to 470 metres during this period, with the option of more wells in the future depending on the success of the initial phase.

The wells will be drilled by the *Borgny Dolphin* (pictured) which is currently enroute to the Falklands. Fitted out to full UK North Sea standards, the rig was upgraded for Falklands operations after completing work for Shell UK in the Outer Moray Firth. Exploration drilling will take place from April 1998 to February 1999. The rig is expected to operate for a period of 45 to 60 days at each of the five wells, at a day rate of $130,000/d. Amerada Hess will drill May to June 1998, Lasmo July to August 1998, IPC September to October 1998, Shell November to December 1998



and Amerada Hess, again, late December 1998 to February 1999.

Initial seismic studies look promising and a number of potential 200mn to 400mn barrel structures have been identified along with some smaller structures in the 80mn to 100mn barrel range.

The five tranches to be explored in this initial drilling phase cover an area equivalent to one UK North Sea quadrant or about 30 North Sea blocks. Licences are for a period of up to 57 years with three exploration periods allowed totalling up to 22 years and one exploitation period of up to 35 years. Licence holders are required to appoint an approved local person as their agents to facilitate communication between the Falkland Islands Government and the licensee. Under the terms of the licence, licence holders must register as companies and establish an office in the Falkland Islands before production commences. Acreage rental is paid annually, with rents rising from $30/sq km to $8,250/sq km during the licence period. All profits are subject to Falkland Island corporation tax and royalty.

The FOSA group has taken much effort to fulfil its responsibilities to the marine environment as a whole and to the fishing industry with each company commissioning a series of environmental screening studies in the area to be drilled and the immediate surroundings. An environmental forum – The Falkland Islands Exploration and Production Environmental Forum (FIEPEF) – has also been established, comprising representatives from the Falkland Islands Government, local interest groups and FOSA environmental specialists. The forum is chaired by independent expert Professor Alisdair MacIntyre who also chairs the Atlantic Frontier Environmental Forum. An Environmental Impact Assessment (EIA) has also been carried out over the areas on which drilling operations will take place.

In Brief

***Woodside Petroleum's Laminaria oil** project in the Timor Sea is reported to be running about $250mn above budget and at least six months late. Start-up is now not expected until September 1999.*

Latin America

Shell is reported to be selling its key *operations onshore Colombia as part of a drive to focus on the undeveloped opportunities that lie offshore the country. The company has set up a new subsidiary – Shell Exploradora y Productora de Colombia – which is currently examining prospects offshore that could be developed with state-run company Ecopetrol.*

***An Arco-led consortium has signed a** production sharing contract covering deepwater block 27 offshore Trinidad and Tobago. Arco holds a 45% working interest in the block; partners Petrobras and Union Texas hold 40% and 15%.*

***Occidental Petroleum is to sell 100% of** the stock of Compania Occidental de Hidrocarburos – which holds Occidental's interest in the DZO block oil field development project in Venezuela — to Union Texas Petroleum for $204.5mn in cash plus payments of up to $90mn over six years based on oil prices.*

***Total reports that a total of six** extended-horizontal-reach wells are to be drilled from the Alfa Sur base onshore Tierra del Fuego as part of a programme to develop the Ara West field bordering the Hidra field which is already in production.*

***State oil company Petroecuador is** reported to be seeking foreign investors for the $700mn development of the Ishpingo-Tambocha-Tiputini and Imuy fields in the Amazon Basin, Ecuador.*

***Oryx Energy is reported to have dis**covered oil at its Yuralpa prospect on block 21 in the Oriente Basin, Ecuador.*

***Petroleos Mexicanos (Pemex) is** reported to have drilled two new exploration wells in the Gulf of Mexico – one drilled in the Campeche Sound, the other in a field on the Tabasco state coast. Initial results are said to be promising.*

Africa

***Shell has been awarded an oil explo**ration contract offshore Morocco. The 8,445 sq km area lies 20 km north of the city of Agadir.*

Sliced Spar for Norway ferry dock

The long-running 'what-to-do-with-the-Brent-Spar' debate seems to have finally drawn to an end with Shell publicly announcing its preferred solution. From the short list of six options, Shell has gone for the Anglo-Norwegian Wood-GMC re-use option in which cleaned slices of the Brent Spar will form the supporting pillars of a new quay extension at Mekjarvik near Stavanger in western Norway.

While carefully noting that the decision represented a one-off solution for a one-off structure, Heinz Rothermund, Managing Director of Shell Expro noted that the Wood-GMC proposal represented 'the Best Practicable Environmental Option through the exacting individual analysis and careful balance which the UK Government requires for each offshore installation', noting that 'Our decision is based on what is technically sound, the risks to life and limb, and a realistic assessment of the costs – as well as on detailed environmental analysis'. He went on to draw attention to the fact that it was an option that had not been available when decommissioning of the Brent Spar was first considered but that current location in a sheltered Norwegian fjord allows it to be safely raised from the water.

According to Shell the economics of disposal have changed significantly over recent years as a result of tighter regulation and increased environmental controls. Shell estimates the project cost of deep sea disposal at £17–20mn of which the tow from Norway would account for £4.7mn and the rest being the cost of resurveying to internationally acceptable standards of the potential disposal sites.

The Wood-GMC bid at £21.5mn giving a project cost with contingencies of £23mn–26mn which was regarded as broadly comparable with the disposal option. The full scrapage option proposed by Brown and Root and second only to the Wood-GMC proposal in terms of Shell's evaluation of technical feasibility was much more expensive at £49–52mn.

Providing the UK and Norwegian governments approve the proposal, ferry users at Mekjarvik could be driving on a new quay supported by the remains of the Brent Spar by the summer of 1999.

Spar 'slices' positioned for quay extension

North Sea operators consolidate interests

Total, Statoil, Norsk Hydro, Saga, Mobil and Agip plan to consolidate reserves on several fields offshore Trondheim, Norway, which will be jointly developed as part of the Haltenbanken South project.

The aggregate reserves of the project's fields – Kristin, Tyrihans, Lavrans and Trestakk – are estimated at 1.5bn boe, 40% of which are oil and condensates, 60% gas. The latest delineation wells are currently being drilled at an average water depth of 300 metres. Several development options are to be assessed in 1998.

Saga will act as operator for development and production while Statoil will be operator of the pipeline network and terminal facilities.

The dawning of a new gas frontier?

The Aurora project, founded by Texaco, Conoco and TOTAL Oil Marine in May 1997 to evaluate gas infrastructure opportunities for potential field developments on the Atlantic Margin, has doubled in size. BP Exploration, Mobil North Sea and Shell UK have joined phase two of the programme which will aim to enhance technical definition and economic viability of the various gas transportation and processing alternatives identified in the first stage.

Work will focus on in-depth studies of critical mass reserve figures, price forecasts of natural gas products, production levels required for investment and other fundamental drivers. Phase two is scheduled for completion in September 1998.

The six individual oil companies will continue with their respective Atlantic Margin exploration drilling programmes. Results from 3D seismic data and other information will be incorporated into the Aurora study to help determine potential gas export routes and landfall sites.

In Brief

Lasmo has increased reserve estimates *for its Elephant oil discovery in Libya to more than 500mn barrels after analysing results from the F2-NC 174 appraisal well which tested at around 9,000 b/d and showed that the field extended further south than originally thought.*

BP has signed a production sharing *agreement for a 40,000 sq km area in the Zambezi Basin with the Government of the Republic of Mozambique and ENH, the Mozambique state oil company. BP plans to acquire and process 15,000 km of 2D seismic during the 1H1998.*

Kvaerner Oilfield Products is to supply *a subsea production system for the Soekor E-AR project offshore South Africa.*

The Egyptian General Petroleum *Corporation (EGPC) has invited bids for its 1998 Round-1 licensing round to explore and develop oil and gas projects in Egypt. Nine new blocks are being offered with a total acreage of 170,188 sq km. Three of the blocks are located offshore in the Mediterranean Sea, three in the Gulf of Suez and two onshore in the Western Desert. The closing date for bids is 30 April 1998.*

Energy Africa Haute Mer, a 56.25% *owned affiliate of Energy Africa, has announced a new oil discovery on the Elf Congo-operated Haute Mer exploration permit, offshore Congo. The Bilondo Marine 1 well has tested at 8,520 b/d.*

Ranger Oil has been awarded a 25% *stake in block 19 offshore Angola. The block covers approximately 1.2mn acres and lies in offshore Kwanza Basin in water depths ranging from 300 metres to 1,800 metres. The first exploratory well is scheduled to be drilled in 1999.*

Shell and Agip have signed a production *sharing contract with the Trinidad & Tobago government for oil and gas exploration in block 25(a). The 1,388 sq km area is located 80 km east of Trinidad in water depths of up to 1,300 metres. Shell holds a 60% stake in the block and will act as operator. Agip holds the remaining 40% interest.*

PetroCanada is reported to have made *a natural gas and condensate discovery in Algeria. The Timellouline Sud-1 well is the third discovery in the company's exploration programme on the Tinrhert block. Six drill stem tests flowed at cumulative daily rates of 117mn cf of gas and 5,280 barrels of oil.*

WEC calls for future finance reform

In its 1998 WEC statement, 'Financing Energy: The Challenge Ahead', the World Energy Council has called for fundamental energy changes in many of the lesser developed countries to ensure that sufficient private finance can be mobilized, both internationally and locally, with which to fund their growing local energy investment requirements.

The changes include the mobilization of local financial resources by building effective domestic capital markets, workable legal and regulatory frameworks and market based pricing for energy with the ultimate elimination of subsidies.

The WEC has concluded that global financial resources are more than adequate to meet the vast foreseeable needs of the global energy sector providing that the resources can be mobilized.

It estimates that the world will require up to $30tn (at 1990 values) – equivalent to one and a half times global gross domestic product in 1990 – during the 1990–2020 period to finance the investment needed for energy projects to meet an expected 70% to 100% increase in global energy demand, most of which will be in the developing countries.

According to WEC's report of the 1997 study 'Financing the Global Energy Sector – the Task Ahead', this should be feasible providing reforms are undertaken to raise sufficient private finance from domestic savings and international capital markets to complement declining funding possibilities from the international agencies and governmental budgets.

WEC reports that lessons drawn from global experience show that the key elements for attracting private finance for energy sector investment from domestic savings and international capital markets are: the rule of law and contract enforceability; credit worthiness both at macro-economic and energy enterprise levels; sector policies including ultimate market related pricing based on reducing subsidies over time to reflect full energy costs to the point of delivery; transparent legal and regulatory frameworks to signal pricing/tariff policies; bankability of investments; creation of effective domestic capital markets and institutional capabilities; and government commitment to sustained and effective action for reform, long-term planning and change.

The 1998 WEC statement concludes by saying that if these changes are not implemented then the two billion people who today are unable to satisfy their basic needs for energy supplies are likely to increase in number and suffer even worse economic deprivation in the future.

UK crackdown on shipping emissions

UK Shipping Minister Glenda Jackson has launched a major initiative to cut pollution from all commercial and leisure craft using UK ports. All ports – including harbours, marinas and terminals — are now required to draw up plans to ensure that appropriate facilities are available to take waste produced by sea-going vessels.

As part of its waste management planning process, each port authority will have to:

- analyze the amounts and types of waste produced;
- consider the type and capacity of waste facilities;
- consider the location of its waste facilities and how easy they are to use;
- ensure the facilities are effectively publicized;
- submit a written plan to Government; and
- review the planning process regularly.

Ports will also have to consider how to charge for waste facilities so as not to discourage their use.

Chevron earnings ahead of target

Chevron Corporation has reported that preliminary net income for 1997 was a record $3.310bn, up 27% from 1996 net income of $2.607bn. Operating earnings were $3.180bn, up 20% from the $2.651bn earned in 1996, after excluding special items in both years.

According to Chairman and CEO Ken Derr, the company reached its earnings goal of $3bn one year ahead of schedule. He attributed the earnings improvement to the 'excellent performance' of the company's US refining and marketing operations – which more than doubled 1996 earnings in 1997 to $662mn as a result of increased refined product demand and improved sales margins – and its 4% growth in international liquids production to 731,000 b/d.

Net operating earnings after special items in the chemicals sector also picked up slightly in 1997, increasing by $28mn to £228mn.

United Kingdom

***The UK motor industry's benevolent** fund organization BEN reports that it is now providing help and support for more than 8,000 men, women and children, an increase of over 1,200 since the end of 1996. It has also opened a new workplace day care centre for the elderly in Coventry. Officially opened by BEN patron HRH Princess Alexandra, the centre is named Arthur Wilson House in memory of BEN's founder.*

***Former UK Energy Minister Tim Eggar** has been appointed Chief Executive of Monument Oil & Gas.*

Europe

***Statoil has reported a 1997 operating** profit of NKr17bn, a drop of NKr1.2bn from the previous year's figure of NKr18.2bn. Net profit for 1997 was NKr4.3bn, compared with NKr5.3bn in 1996. Overall revenues were NKr124.7bn, up NKr17.7bn from 1996.*

***TOTAL reports that its 1997 sales** figures increased by 8% compared with those the previous year, closing at FFr191bn at year-end 1997. Operating income rose to FFr13.6bn, 33% higher than 1996, while net income increased by 35% to a record FFr7.6bn.*

***Hungarian oil and gas company Mol** has reported record results for 1997. Net income, before non-recurring items, increased by 95% to Forint (Ft) 30.8bn ($164.6mn) from Ft15.8bn in 1996. Consolidated net revenues rose by 28% to Ft634.9bn ($3.4bn) while operating profit grew by 57% to Ft50.6bn ($270mn).*

North America

***Gulf Canada Resources is reported to** be planning to sell its UK assets and part of its western Canadian natural gas pipeline network to raise C$850bn. The funds raised will help lower the company's C$2.8bn of long-term debt.*

***Gaz de France and Hydro-Quebec** have formed a new joint venture – MEG International. The new company is to take over the projects currently being studied by Novergaz, a subsidiary of Noverco in which Gaz de France and its Quebec partners hold an 80% interest.*

BP reports record profit for 1997...

BP has announced record profits for 1997 of £2.822bn on a replacement cost basis before exceptional items, a 13% increase over the record set in 1996. Fourth quarter results were however 4% down on a year earlier levels at £636mn. The decrease was attributed to adverse currency effects as a result of the continued strength of sterling and the impact of the Asian currency crisis. The total dividend for 1997 increased by 13% to 22 pence per share.

Chief Executive John Browne has claimed that the oil company's fortunes are no longer closely tied to the price of oil. He also reported that he expected oil, prices to remain near the lower end of a $15 to $20 per barrel range, seen over the last ten years, during 1998. Browne also noted that BP's return on average capital employed (ROACE) at 17% in 1997 placed it above its immediate peer group of major oil companies.

In terms of sectors the upstream business reported the smallest profit growth at 2% in 1997 while chemicals grew by 7% and the downstream sector by a spectacular 41%. The dramatic improvement in the downstream sector is attributed to the impact of the joint marketing with Mobil.

Browne stated that while oil production during the year had been disappointing, recording a growth of just 10,000 b/d to 1.251mn b/d largely as a result of delays in bringing the Foinaven field onstream, in contrast, gas volumes rose by 8% to 1.663mn cf/d. A total of 10 new oil and gas field developments are due onstream in 1998, including ETAP, Schiehallion and Viking, and are expected to help BP achieve its 5% production volume growth in 1998.

... but Shell's results are disappointing

The Royal Dutch/Shell Group of Companies posted a disappointing set of results for 1997 last month. Results on an estimated current cost of supplies (CCS) basis, excluding special items, were £4,904mn, 6% lower than a year ago. (However, in dollar terms, the figures are just 1% lower than the record level achieved in 1996.) Reported net income for the year was £4,736mn compared with £5,691mn in 1996 – a drop of 17%. The decrease was attributed to the strengthening of sterling and the US dollar over the last year, together with the recent currency crisis in Asia. Final dividends have been proposed of Fls1.80 per Royal Dutch Petroleum Company share (Fls3.10 for the full year, up 17.5% from 1996) and of 8 pence per share for Shell Transport and Trading Company (13.1 pence for the full year, up 6% from 1996).

Lower operating costs and increased oil production partially offset the impact of lower crude oil prices on exploration and production during the year. However, earnings excluding special items in this sector fell 8% from levels recorded in 1996 to £2,914mn at the close of 1997.

Improved performance in Europe and Canada led to a 6% increase in refining and marketing earnings on a CCS basis to £1,862mn. Continued cost reduction and higher volumes contributed to a 2% improvement in chemicals sector performance which closed the year with earnings of £692mn.

The return on average capital employed (ROACE) for 1997 was 11.4% versus 13.2% a year earlier on a sterling reported income basis and 11.6% versus 11.9% on a dollar CCS earnings basis.

Crude oil production in 1997 was 1% higher than the previous year, at 2.3mn b/d. Gas sales fell 4% at 8bn cf/d, mainly due to the warm weather. Total oil product sales increased by 4% to 6.6mn b/d. The Group plans to increase oil production by 5% to 2.6mn b/d and gas sales to 8.9bn cf/d during 1998.

Chevron plans to increase global production

Chevron has announced a number of 'growth initiatives' aimed at increasing its international liquids production by up to 9% per annum over the next three years.

Key areas of production growth include the Tengiz field in Kazakhstan (production expected to rise from 160,000 b/d to 250,000 b/d within the next three years); Angola and the Congo in Africa (output forecast to increase by 250,000 b/d by 2001); Nigeria (output rising from 400,000 b/d to 600,000 b/d in the next four years); Venezuela (the LL652 project in Lake Maracaibo is forecast to exceed 100,000 b/d in about five years); Hibernia (onstream in November 1997, expected to reach 150,000 b/d by mid-1999); North Sea (Britannia field due onstream in 3Q1998, peak production expected to be 740mn cf/d of gas and 70,000 b/d of liquids); and the Gulf of Mexico (Genesis field due to enter production in December 1998).

In Brief

***Following the currency crisis in the** Asia-Pacific region, the US Department of Energy is reported to have cut its 1998 forecast for world oil consumption by 200,000 b/d to 75.7mn b/d.*

***Unocal is to exchange the bulk of its** Canadian oil and gas assets for shares in Calgary-based Tarragon Oil & Gas. The deal is reported to be worth C$308mn.*

***UK independent oil and gas company** British-Borneo is reported to have formed a three-year alliance with privately owned exploration and production company Spinnaker in order to expand its operations in the Gulf of Mexico, the area in which Spinnaker's operations are centred.*

***It is reported that Mobil plans to** restructure its organization into seven business units – an international exploration and production (E&P) division and a North American E&P unit; two refining and marketing arms, one international and one covering North America; global midstream; chemicals; and technology. The change is not expected to result in any job losses.*

Russia & Central Asia

***Chevron and Shell have agreed to** cooperate in new oil and gas projects in the Caspian region. The companies will jointly identify and develop new projects in the areas of exploration, production, transportation, and marketing of crude oil, gas liquids and natural gas.*

***Gazprom is reported to be planning to** sign a strategic gas alliance with Eni of Italy to share expertise and develop new reserves and other areas.*

Asia Pacific

***Indonesia is reported to be looking at** the prospect of temporarily freezing oil imports and the servicing of foreign currency corporate debt in a bid to stabilize its economy following the recent collapse of the rupiah. It is thought that suppliers may be reluctant to delay or cancel deliveries under long-term contracts with state-oil company Pertamina because of the current weak oil price.*

Latin America

***The Argentinian government is** reported to be planning to sell its remaining 20% stake in oil company YPF and its interests in all other privatized companies.*

UK traffic growth picks up speed

The number of cars on the road in the UK is set to rise over the next five years by 10% compared with 6% in the past five years despite a slowing down in the economy, predicts the latest motoring report from automotive services group Lex Service.

Entitled *1998 Lex Report on Motoring – Driving for the Future*, the report forecasts that the UK economy will slow down over the next two years, but then recover strongly at the end of the millennium. New car sales usually follow the country's economic condition and are thus expected to fall by 5% per annum as interest rates rise and consumer expenditure slows. However, once the economy recovers at the end of the decade, new car sales are forecast to rise again, reaching 2.4mn by 2002 – the largest single new car market ever recorded in the UK.

Overall the total number of vehicles on the road is predicted to rise by 10% by 2002.

The survey also found that British motorists are strongly in favour of the Government reducing congestion by investing in public transport, managing the road network more effectively and encouraging the production of more fuel-efficient vehicles. Some 89% of those surveyed were in favour of the introduction of 'tougher' MOTs with stricter exhaust emission controls in a bid to eliminate the one million older cars that are responsible for a high percentage of vehicle emissions.

Used oil filters – where does the oil go?

A study conducted by Save Waste and Prosper on behalf of the Environment Agency's Oil Care Campaign has indicated that over 7,000 tonnes of oil is disposed of in used oil filters every year.

Around 1,000 used oil filters were drained and crushed in order to find out how much residual oil was left after removal from a vehicle. Results showed that filters from cars and light commercial vehicles contain, on average, 0.14 litres of oil while filters from HGVs contain 0.30 litres. Undrained filters may contain about 40% more than this.

A study carried out by the UK Environment Agency in 1995 as part of its ongoing research into the figures on national waste oil arises indicated that 19,000 tonnes of waste oil is 'disappearing' to the environment annually. This latest study by Save Waste and Prosper suggests that up to 40% of this could be attributed to oil filters.

The likely disposal routes for oil filters was also investigated. Of the waste oil filters arising from commercial garages, industry estimates indicate that between 10 and 20 million are currently being recovered for recycling and that this figure is increasing rapidly. This means that between 20% and 40% of the waste oil filters produced annually are recovered in this way. The remainder should be disposed of as special waste. However, it is thought that many small garages and even some larger ones are still disposing oil filters into waste skips where they are destined for general waste landfill sites.

Of particular concern is the activity of DIY motorists who, on changing their oil filters, are left with virtually no disposal alternative but the domestic waste bin. Oil recovery banks for used oil are provided by many local authorities to collect oil from such motorists, but very few provide facilities for collecting oil filters. An estimated 25% of services is carried out by DIY motorists – adding around 1,000 tonnes of waste oil to domestic waste.

New recycling organization cleans up oil

A new organization has been established to represent the interests of those companies in the waste management industry responsible for ensuring the safe disposal of post-use oil and related oil-contaminated wastes throughout the UK and Ireland.

The Oil Recycling Association (ORA) provides a complete range of services for the recycling of wastes arising from the servicing of vehicles and equipment at garages and at engineering works. This includes not only post-use lubricants, but also oil and fuel filters, catalysts, batteries, oily rags, hydraulic and cooling fluids, etc. ORA members also collect and dispose of waste fuels, oil slops and oil-contaminated waters that arise on land and sea.

Many of the waste materials are recycled for further environmentally sound and productive use: oil is recovered as fuel for use in power generation and quarries; metal filter casings are sent for smelting; batteries go for lead recovery; and catalysts are sent for precious metal recovery.

In Brief

United Kingdom

***Centrica is reported to have renegotiated** its North Sea 'take-or-pay' contracts with Phillips, Fina and Agip. It is to make two payments totalling £43mn (before tax) to the three oil companies and reduce contract prices to current market levels for remaining field reserves from October 1998*

***Mercury Asset Management Private** Equity has raised £116mn to buy oil and gas pipeline inspection company Pipeline Integrity International (PII) from BG plc. The new company will be called Pipeline Integrity International Group.*

***Enron Europe is to supply Centrica** with over 5bn cm of natural gas over a 10-year period beginning in 2001. The sales agreement links the price of natural gas to the screen-based International Petroleum Exchange (IPE) natural gas futures contract.*

***Scottish Power is reported to have** signed a preliminary agreement for the conversion of the nearly depleted Hatfield Moors Yorkshire gas field into a storage facility capable of storing 4.1bn cf of gas. The company is believed to be the first utility to step into this sector in which British Gas has held a monopoly.*

***London's International Petroleum** Exchange (IPE) is reported to be planning a move to a hybrid system of open-outcry and electronic trading.*

Europe

***A consortium comprising Gaz de** France and a Berlin electricity utility is reported to be taking a 51.2% stake in Gasag, the company responsible for gas distribution in Berlin, for $780mn. The acquisition has yet to be ratified by Parliament.*

***BP has announced that it no longer** plans to sell the Lavera refinery in France as it has not found a suitable buyer. Instead, the facility will become part of the BP/Mobil European refinery network.*

North America

***PdVSA of Venezuela is reported to be** acquiring a 50% interest in Amerada Hess's St Croix oil refinery in the US Virgin Islands for $625mn, payable over 10 years. A new joint venture will own and operate the plant.*

NEWS Downstream

Whopper Shell service station deal

The three-year, £45mn partnering agreement between Shell (UK) and David McLean Contractors – under which the latter is responsible for construction work undertaken as part of the recently announced Shell (UK)/Burger King deal (see *Petroleum Review*, December 1997) – has received a boost following Shell's recent acquisition of Gulf's UK retail marketing operations.

The acquisition included Gulf's 445-strong network of service stations and its commercial fuels and lubricants businesses.

The additional 445 sites – 215 of which are company owned and 230 dealer owned – increases the total value of the partnering contract to around £60mn. Redevelopment work at the new locations, which includes the construction of Burger King sit-down restaurants, will be incorporated into the original three-year programme agreed between Shell and David McLean. Around 120 of the former Gulf sites are to be included in the 1998 refurbishment programme.

One of the 200 Shell service stations built and refurbished under its three-year agreement with David McLean Contractors

Top performers in fuels industry

The recently published *Plimsoll Portfolio Analysis – Fuels, First Edition 1998* identifies five top players in the fuels industry which have performed way above average in terms of pre-tax profits over the past four years. It also shows that 26% of fuels companies were unable to make a profit at all.

Based on the published company accounts of 2,196 companies in the fuels sector, the report identifies Shell Transport and Trading as the 'best profit making company in the fuels industry' with a 100.9% pre-tax profit margin. Burmah Castrol Finance is ranked second, recording a 78.4% pre-tax profit margin, and Mainline Pipelines third with a 64.8% pre-tax profit margin. Fourth is Conoco Petroleum with a pre-tax profit margin of 56.6%, while Biozyme Laboratories is fifth with a 42.6% pre-tax profit as a percentage of sales.

In comparison, the average pre-tax profit margin for the fuels industry was found to be 1%.

Company size appears to be a factor in the ability to make a profit. The largest companies, those with a turnover in excess of £28.6mn, managed an average 1.2% pre-tax profit margin while the smallest companies, those with sales less than £3.9mn, reported an average of 1.1%. Around 32% of the loss makers fall into this latter category.

The main report is available from Plimsole Publishing in Middlesbrough (Tel: +44 (0)1642 257800), costing £305. Supplements (where available) cost £205. Readers of *Petroleum Review* can claim a 5% discount.

In Brief

Occidental Petroleum has announced *the completion of the sale of its natural gas transmission and marketing subsidiary MidCon to K N Energy for $3.49bn. K N Energy has also taken on $500mn in liabilities under the deal.*

Canadian natural gas transporter *TransCanada Pipelines is to acquire Nova Corporation to create what is reported to be the fourth largest energy services company in the world with assets of C$21bn and a 35,000 km pipeline network.*

Middle East

UN Secretary-General Kofi Annan is *reported to have proposed more than doubling the amount of oil that Iraq is allowed to sell under the UN oil-for-food humanitarian agreement. It is proposed that Iraq be allowed to sell $5.2bn-worth of oil every 180 days, with $3.55bn allotted for the purchase of food and medical supplies.*

Gaz de France, US company NorAm *Energy and Amisragas (American Israeli Gas Corporation) have formed a joint venture, Medgas, to promote their natural gas projects in Israel.*

Russia & Central Asia

Shell is to purchase Estonia's second *largest fuels retailer, EK, which operates 31 service stations in the country.*

Conoco and Azerbaijan's state oil *company Socar are to conduct a joint study of Azerbaijan's natural gas processing industries.*

Russian oil company Lukoil has *acquired a 51% stake in Romania's Petrotel oil refinery as part of a move to better target the European and Black Sea markets.*

Asia Pacific

Japanese oil refiner and distributor *Nippon Oil is reported to be planning to invest $276mn (Y35bn) in new refining facilities at its Muroran plant on Hokkaido Island, Japan. Work is expected to complete late 1999.*

Esso (Thailand) has finalized plans to *invest $400mn in a major aromatics plant at its Sriracha refinery on the east coast of Thailand. The plant will produce 350,000 tonnes per year of paraxylene.*

Avoiding losing the argument by default

Addressing the assembled industry executives at the IP Luncheon in the Dorchester Hotel during IP Week, *Mark Moody-Stuart*, Chairman of Shell Transport and Trading and a Managing Director of the Royal Dutch/Shell Group, challenged his audience that, despite its impressive track record, the industry was in danger of losing the communications battle.

Mark Moody-Stuart, Chairman of Shell Transport and Trading and a Managing Director of the Royal Dutch/Shell Group

He said:

Since the energy crises of the 1970s the world energy industry has significantly improved its performance, using resources more efficiently and lessening its impact on the environment. The overall amount of energy produced has soared to meet rapidly expanding demand while prices have, in real terms, declined significantly.

And yet, despite this seemingly impressive track record, public perceptions of the industry are, at best, ambivalent and often quite negative. Although the industry has committed its share of mistakes, its predicament arises from its own failure to articulate its views.

The industry is in danger of losing the communications battle. The public regards the industry's product – cheap, clean energy – as a right rather than as an achievement. It has lost sight of the real balance of costs and benefits which must, of necessity, be taken into account. To avoid a one-sided public discussion, every industry executive must put the case for the industry as often and as effectively as he or she can.

I have a very simple proposition to put to you today – and it is that we are losing the battle – the communications battle.

Abraham Lincoln said that public opinion is everything. 'With public sentiment nothing can fail; without it nothing can succeed.' Today, when people think of the energy industry, they don't think of the many benefits we bring, they think of the Brent Spar or of the *Braer* spill. In the court of public opinion we – energy companies – are condemned as being dirty, polluting and not very efficient. Many believe in a looming environmental catastrophe, that we are 'going to choke to death' because of air pollution.

Furthermore, some believe that it is only a matter of a short time before the fossil fuel industry dies. People buy and use our products but they fear the overall effect of our industry. These views fall apart when analysed – some are absolute nonsense – but many believe them.

Our contributions – which I am sure you will agree with me are many – are dismissed or not understood. Today people take instant, clean energy as a right – not as an extraordinary product of industry.

Just flick on the switch and the power is there. A relatively few decades ago, many considered that to be a wonderful achievement. In many parts of the world they still do. Hundreds of millions in the least developed countries are still crying out for such privileges.

But, here in the West, people take the benefits for granted and only focus on the problems.

When something goes wrong, the industry is seen only as a problem, not as a contributor. The blame for this – I don't want to be too harsh here – but the blame really lies at the feet of our industry.

We have failed in one of our primary duties. We have failed to continuously remind people of the benefits – and we have also failed to remind them that they have to balance up the costs against those benefits.

Affordable clean energy is an absolutely vital contribution to all human endeavour. Without it, we cannot advance. Make no mistake about it. Despite the many advances we have made, despite the miracles that technology has wrought in the last few decades, the primary challenge facing the world today is the age-old problem of poverty. For many, many people

Left to right: Ian Ward, IP Director General, Mark Moody-Stuart and IP President David Setchell

The top table: foreground David Setchell, and clockwise Mark Moody-Stuart, Chris Moorhouse, Claudio Capsoni, Harvey Smith, Jorge Zemella, David Saunders, Ian Ward, John Blythe, Colin Harvey, John Banfield and Chris Fay

grinding, dire poverty is still the overwhelming fact of life. Here in the UK we live in relative comfort. In far too many other places, life is still short, brutish and short.

Energy – clean, controllable, affordable – energy, is an absolute prerequisite for the fight against poverty. It is an absolutely essential prerequisite for all social and industrial progress. Without the energy we produce there can be no social progress, no material comfort, no prospect of a better life. Everything else – food, shelter, education, medicine – everything is predicated on the supply of clean, affordable energy.

Just try to imagine today's society without the energy our industry produces. It is simply impossible. Yet, the absolutely vital contribution of our product has come to be taken for granted. We need to remind people that the provision of sufficient, cheap energy is absolutely essential to virtually every human endeavour.

If we want to build a better world – and I sincerely believe that all of us here do – then we must ensure that our industry's contribution is not only understood but also valued. To do that we have to go out and argue our case. We cannot afford to lose the argument by default.

Today, in our increasingly contentious and untrusting world,many are calling the existence of our industry. They see the down sides, they know the costs. But, do they fully appreciate the benefits?

We spend a lot of time arguing about the exact nature of the environmental impact of our activities. That is well and good, and I am not going to argue against it. We may have been too slow to acknowledge the negative impact we have, and we also may have been a bit slow in moving to lessen that impact. It is good that we are now dealing with that side of the equation. But, we must also focus on the other side – on the innumerable benefits we bring to society.

I am continually astonished at how little positive value is given to our activities. Everyone in developed countries – at all stages of their lives – benefits from our product. From the premature baby sleeping peacefully in an electrically powered incubator, to the old age pensioners being transported in an ambulance, they all directly benefit from our industry.

The products and industries that have grown from hydrocarbons are legion. Virtually every industrial product, from a simple shirt to a Boeing 747, depends directly or indirectly on our industry. Ours is truly a hydrocarbon age and, despite the costs, I firmly believe that the benefits it has brought, and continues to bring, far outweigh the costs.

Yet, look at how the industry is portrayed in the popular media – think of the seemingly endless television shows warning of imminent environmental catastrophe. Then look at the tabloids. According to this the whole world is going to burst into flames. The facts are wrong, but who cares? The image is so powerful and emotional that it carries the day.

Endless repetition of these accusations has obviated the need to produce any evidence. Repeated statements become the truth.

When I was a child my father used to read us *The Hunting of the Snark* by Lewis Caroll in which a motley crew led by the Bellman set off by boat to hunt a mythical beast:

'Just the place for a Snark!' the Bellman cried,
As he landed his crew with care;
Supporting each man on the top of the tide
By a finger entwined in his hair.

'Just the place for a Snark! I have said it twice:
That alone should encourage the crew.
Just the place for a Snark! I have said it thrice:
What I tell you three times is true!'

Over time something rather similar has been done to us – accusations have been repeated so often that many now take them to be reality. Say it three times and it is true. This problem has been exacerbated by a general fear of science and complicated new technologies. The general level of understanding is very low and, too often, public opinion is driven by alarmists pedalling dubious science.

I heard an excellent story last year; an American schoolboy won a science prize for a project in which he urged people to sign a petition demanding strict control or total elimination of the chemical he called 'dihydrogen monoxide'. And, he had plenty of good reasons.

- It can cause excessive sweating and vomiting.
- It is a major component in acid rain.
- It can cause severe burns in its gaseous state.
- It can kill you if you inhale it accidentally.
- It contributes to erosion.
- It decreases the effectiveness of automobile brakes.
- And it has been found in tumours of terminal cancer patients.

He asked 50 people if they supported an immediate ban on the chemical. Forty-three said yes, six were undecided and only one knew what the chemical was: dihydrogen monoxide, H_20, water.

Rebutting the charges

Confronted with that type of nonsense we have tended to just dismiss the critics as being ill-informed. That has been doubly unfortunate as it has led us to

Left to right: Mark Moody-Stuart, David Setchell and IP President-Elect Chris Moorhouse

Left to right: Shell Senior Executives Colin Harvey, Rob Walvis and Chris Fay

disregard serious points while failing to point out what we have achieved.

A good example is the air quality debate. In the current discussion many – including those arguing for new regulations – believe that air quality in London is getting worse. Here, another paper calls city air 'chemical wharf air'!

Now, I have children and I want to see them – and their children – breathing ever cleaner air. And, the air in London should be cleaner – we have worked for that – and we will continue to actively do so. But, let's not forget the progress we have already made. Compared to the early fifties the air in London today is very clean. It isn't pristine, but it is a lot cleaner. Furthermore, as the latest AA figures show, consistent improvement can be seen in more recent times, since 1993 when catalytic converters were introduced. Emissions of all toxic substances – NO_x, VO_x and RO_x, compounds – have declined even as the number of vehicles has continued to rise.

The people who are driving new regulation need to understand that. They need to know the progress that has been made and how it has been made. Furthermore they need to understand that the situation is NOT deteriorating, that we have made progress and that we are going to continue to do so.

We could make even faster progress by taking action on the smoke belchers and on particular highly congested black spots. If you live on a street with static traffic and high levels of pollution you will find it difficult to believe that things are improving. We should encourage action to tackle such problems. That would help solve the problems and allow us to blow our own trumpet – to remind people of the progress that has been made.

The same principle applies in relation to possible climate change. Again, many people have bought the worst-case argument and they see the energy industry as being at fault – as, in a way, being the villain of the piece. Much as we did with the air quality issue, we in the industry have tended to drag our feet. Instead of facing up squarely to the debate we have tended to bury our heads in the sand and hope that it would go away. The danger is that we could become like the tobacco industry – continuously and blindly denying the obvious truth. That would clearly be a major error. As an industry we have to face up to this critical challenge and take a positive, leading role.

Changing energy markets

In the last 150 years energy markets have evolved in response to changing needs. Last century wood gave way to coal. This century's transport revolution depended on oil. Natural gas has become increasingly important. Competition between fuels will continue to drive this evolution which has halved the average carbon content of fuels. Although oil is likely to remain the most convenient transport fuel, supplies may peak within two or three decades. Consumption of gas could double in the first half of next century, because of its efficiency and cleanliness. Renewable sources – wind, biomass and solar – could be supplying a tenth of the world's energy by 2020, and half by 2050. Energy efficiency has continuously improved. However, there are good reasons for expecting technological advance, better communications, market reform and social change to bring faster improvement in future.

This is the context in which the world must respond to the possibility that human activities are causing damaging climate change. And let me be clear, we in Shell freely admit that possibility. But because wood and coal emit more carbon dioxide than oil or gas, the carbon intensity of energy supplies is steadily declining. Shell scenarios suggest that continuing changes in fuel supplies and increasing efficiency could mean that carbon emissions start falling in the first half of next century.

Therefore, we absolutely support prudent precautionary measures – which are flexible, economically realistic and long term – to encourage this process. Emissions trading between nations will help flexibility. Shell companies are contributing by reducing emissions from their own operations, playing a leading role in developing gas markets and investing in commercial renewable energy. In line with that approach we supported the Kyoto summit and, although much remains for negotiation, we believe the outcome was reasonable.

I believe that a broad understanding of the possible effects of the waves of technology we are witnessing is necessary to provide a basis for realistic policies. In the lead up to Kyoto we took a close look at some of the climate change models and we felt that the impact of the continued technological change was not always fully taken into account. Instead they simply extrapolated the effects of presently known technologies – creating a truly daunting statistical picture. The one thing we know for certain is that there will be changes in energy use patterns – life is not a strait line extrapolation of today.

Lies, damn lies and statistics

Mark Twain, who coined 'lies, damn lies and statistics' had a dim view of such linear extrapolations. He began his career as a pilot on Mississippi river boats and he observed how developers were cutting off the meander loops to make the river trips shorter. In fact, he worked out that the river was shrinking by more than one-and-a-third miles every year. So, being statistically minded,

he worked out that a million years ago, the river was 1.3 million miles long and stuck out into the Gulf of Mexico 'like a fishing rod'. Then, looking forward to the year 2600, he worked out that, by then, the river would be just a mile and three-quarters long.

Extrapolations have always been, and always will be, appealing. But, for better or worse, there are very few straight line graphs in the real world.

Naturally all of us must be humble enough to admit we could be wrong on these matters. That is why prudent precautionary measures are necessary. But, further than that, I believe we should not yet go. We also have to take into account probable and possible changes in energy patterns.

Furthermore, where the public understanding of what is achievable is a long way from reality, we have an obligation at least to put the facts on the table.

Fossil fuels will continue to play a major role for decades to come. Indeed, while their market share might drop, overall consumption of fossil fuels is unlikely to peak before about 2020.

There may be surprises – breakthroughs in fusion, or in fuel cell or solar technology for example – and the fuel mix is going to evolve, and become even more varied, but fossil fuels will certainly not disappear. New technologies, not raw material shortages, will be the force which gradually displaces fossil fuels from their present dominance of the fuel mix.

An essential pre-condition of the development of such technologies is the creation of wealth. Without that wealth we cannot undertake research and we cannot develop new techniques. Therefore, not only is the continued health of our industry compatible with any serious notion of sustainable development, it is an essential building block of such development. It is our industry that is going to drive the waves of new technology, just as we did in the past.

So, one of the greatest challenges for us is to get that message across – to convince people that our industry is a vital part of the struggle for a sustainable, healthy, clean environment. To do this we have to actively engage those who would criticize us. How do we do that?

Let's speak out

First, as I hope has already come through clearly, we have to, at every opportunity, stress the benefits that our industry creates. This is what gets us out of bed in the morning – the contribution we make to a better future. Let's drive that message home.

Second, we must acknowledge that we might have done better. Owning up is very difficult but, if we are to move this debate forward, it is absolutely necessary.

Third, we have to recognize that, in all of these issues, that it isn't simply a matter of black and white. So often we have to say to critics it is more complicated than that, there are more aspects to consider.

We also have to admit that the campaigners have, over the years, got a lot of things right. Many have come up with excellent ideas and have pushed the industry along in positive ways – lead-free petrol and catalytic converters come to mind here.

In the long run we are all working for the same thing – a better, cleaner, safer world. Responsible environmental activists are not our enemies, they help us to become more sensitive to the issues. We should aim to broaden the current debate and, by so doing, create the basis for a continuing dialogue between interested groups.

Ladies and Gentlemen, I began today with the proposition that we were

Shell's Peter Hunt and Mobil's John Banfield

losing the battle, that our critics had outmanoeuvred us and that we are in danger of losing the argument by default. I put that argument strongly, bluntly, for effect. I don't believe we have lost the argument – as yet. But, I do believe that there is a serious danger that we could do so.

Our industry delivers a product – reasonably priced energy – that is so fundamental that its benefits are often overlooked. There are some very real and very serious dangers in that. We – all of us – must put the case for the industry as often and as effectively as we can.

We have to help people to appreciate that the industry's contribution is vital to the continued well-being of mankind. Otherwise we do run the risk of losing the debate by default, and that would be catastrophic for everyone: society in general would lose the opportunity to use an inventive and effective industry to achieve goals that we all want.

Minister explains new transport policy at IP dinner

The guest of honour and keynote speaker at this year's IP Dinner was the Right Honourable *Dr Gavin Strang MP*, Minister for Transport. In his address to the 1,500 guests at the traditional Annual Dinner at the Grosvenor House, Dr Strang explained the basis of the Labour Government's new transport policy and its implications for fuel specifications as the administration strives to reduce traffic congestion and improve air quality.

Rt Hon Dr Gavin Strang, MP, Minister for Transport

IP President David Setchell hosted the occasion flanked on the top table by the two after-dinner speakers Dr Strang and Robbie Glen, the retired Prison Governor of Barlinnie.

Dr Gavin Strang said:

May I start by paying tribute to the excellent work that the Institute does which I know is respected by all the government departments. I think that we all are very grateful and very appreciative of the great reputation which the Institute has acquired over the years.

It is a privilege and a pleasure to be here because, like everyone else, I appreciate and value just what a huge contribution the oil industry makes to our economy – the thousands and thousands of jobs which are dependent on the industry, the large net contribution which you make to the United Kingdom's balance of payments and, of course, the revenue which the Treasury manages to extract from you, which of course makes such an important contribution to all the things we want to do as a Government.

Now it is no accident that you have the Minister for Transport here; quite clearly the transport industry is of huge importance to the oil industry, indeed it is the major consumer of your product.

I thought it might be useful if I just said a few words about where we are in relation to transport policy, perhaps saying a bit more about air quality and

Left to right: Rt Hon Dr Gavin Strang, MP, Minister for Transport; David Setchell, IP President; Ian Ward, IP Director General; and Chris Moorhouse, CEO, BP Oil International and IP President-Elect

auto-oil which are obviously issues of importance to the industry.

As you know we have embarked on a major review of transport policy in this country, and we have committed ourselves to publishing a White Paper, that is a major statement on transport policy, hopefully in May. It will be the first White Paper on transport policy for over 20 years and so we are determined that it should be a really historic document and something which will set us in a new direction. We have completed a consultation, a tremendous consultation, with over 6,500 responses from a whole range of organizations, including major oil companies, and we are very grateful to all the people and all the effort that has been put into the response to our consultation document. We have had a whole range of seminars up and down the length and breadth of the country.

And I think what that consultation shows is that there is a new consensus emerging, there is a recognition that we cannot carry on as we are doing, that there have to be some changes in our approach to transport policy in this country. This is against a background of traffic projections for this country which indicate that over the next 20 years, on the basis of unchanged policies (and taking into account the planned increase in fuel duty by 6% more than inflation each year), traffic growth is likely to be 40% over the next 20 years. I think that everyone appreciates that something has to be done otherwise the position becomes more and more unbearable.

Now we have to see the development of our transport policies in the context of the Government's other overriding objectives: our objective to build a modern, competitive economy in which people will want to invest and create wealth, and provide jobs; our objective to create a more socially inclusive, a more socially just society; and our objective to protect and enhance the environment. And clearly when it comes to a modern economy, it goes without saying that to have a successful economy we have to move people and goods around efficiently and not held up – wasting hours, wasting money in large queues and in congestion. So from the point of view of our economic development we need to ensure that we have effective transport policies.

In terms of a socially inclusive society it is the case that a large number of people in this country do not have access to a car, that they are dependent on public transport – and we have seen quite a decline and rundown in public transport over the years and we need to reverse that partly on grounds of social justice. And of course, we also want people to be able to afford cars; there are still many people living in rural areas, many people on low incomes, that do not have a car and would like to have a car – so the idea that somehow our approach is anti-car is misguided. In fact, there are many households that do not have a car, do not have access to a car, who hopefully as the years go by through higher living standards will be able to get the benefit, the freedom and flexibility which comes from having a motor car.

In terms of protecting our environmental, I think it is clear to everyone that the environmental issue is one that is driving transport policy just as it is driving your own industry more and more these days. Perhaps I can say a little bit more about that because basically what we are talking about here is, on the one hand the problem of air pollution in our major cities, the problem of particulates and NOx gases, and on the other hand the issue of greenhouse gases and global warming.

Traffic pollution damages the health of millions of children and vulnerable people, particularly frail and elderly people with respiratory problems. In January, the Department of Health published new research on the general effect of air pollution, including that from traffic, on standards of health. It suggests that each year, air pollution may bring forward the deaths of between 12,000 and 24,000 people. And between 14,000 and 24,000 hospital admissions and re-admissions may be associated with short-term air pollution. This isn't an exact science, but it does give you some idea of the benefits that could flow from cutting air pollution from traffic.

We know that air pollution damages health and the environment. And because of this we take the issue very seriously. We have brought forward the review of the National Air Quality Strategy for completion by the end of this year. The Strategy sets standards for air quality in Britain, based on an assessment of the effects of eight main pollutants on public health. These standards have been used to set specific policy objectives for each pollutant, to be achieved by 2005. Reducing emissions from transport sources is key to achieving these objectives – especially for oxides of nitrogen and particulates. Originally the review was planned to take place in 1999, but we want to move more quickly than this and look at the prospects of delivering cleaner air sooner.

Last week Michael Meacher announced the terms of this review. It will be thorough and cover a wide range of issues including:

- the standards and objectives themselves;
- new evidence coming to light on health effects and on the costs and benefits of air pollution abatement measures;
- the possibility of extending the number of pollutants in the Strategy;
- additional measures to reinforce the fight against air pollution, particularly enforcement against vehicle pollution; and

- the relationship of the Strategy to our fundamental review of transport policy and to forthcoming European legislation.

During the review we will be keen to hear the views of all organizations with an interest in air quality issues. To help with this we are establishing an Air Quality Forum. Michael Meacher announced last week how this would operate and my Department wrote to a wide range of interested organizations to consult them on the terms of reference and membership of the Forum.

The Forum will provide a mechanism for key stakeholders to put their views to Government during the review. To keep the operation of the Forum manageable, however, membership is limited to organizations with a broad interest. We are proposing to invite UKPIA to represent the oil industry. But we recognize that many other bodies will have an interest in and should make an input into the work of the Forum. We will, therefore, circulate all Forum papers to a much wider list of organizations – including a number of oil companies – and we will welcome written contributions from them. Any proposals for amending the National Air Quality Strategy will be subject to full public consultation.

A similar strategic approach is soon to be adopted across Europe. The Ambient Air Quality Assessment and Management Directive was formally adopted in September 1996. It sets out the framework for air quality policy in Europe – giving the general monitoring strategy and concerns to be addressed when setting limit values. It lists 13 pollutants, each of which will be covered by a 'daughter' directive setting out the actual limit value and specific monitoring requirements. Reductions from transport sources will need to make a significant contribution to achieving some of these limits. They will be especially important to the first daughter directive, which covers sulfur dioxide, nitrogen dioxide, particles and lead. We are giving priority to taking forward the draft proposal from the European Commission for the first daughter directive during the UK Presidency of the European Council of Ministers.

And, of course, the other side of the coin is Kyoto. The fact is that the issue of global warming is one which is a challenge to us all, certainly a challenge to the transport and oil industries. The UK has taken a lead on this – as you know Tony Blair made a very strong statement on it when he was in New York last year and the Deputy Prime Minister John Prescott brokered the deal at Kyoto. What comes out of this quite clearly is that we have to reduce car dependancy, we have to walk more, we have to cycle where it is appropriate, but above all we have to be prepared to use public transport. And that means that the challenge that we need to provide better public transport, more reliable, more efficient, safe and clean public transport and public transport that is affordable will be clearly one of the big challenges facing the Government's transport policy in the years that lie ahead.

But of course we all know how convenient, how flexible, how much pleasure we get out of the motor car. There will always be a vast number of journeys which we will want to make by motor car. That is why we attach so much importance to getting cleaner vehicles, to reducing the emissions and that is why we set up a cleaner vehicles task force which I share with Ian McAlistar, the President of the Society of Motor Manufacturers and Traders. We have involved the heads of major companies in industry and we are grateful to Keith Taylor of Esso who represents the oil industry on this task force. I believe there is a lot which will come out of the task force. I believe we are going to set out quite clearly what the problem is, set out the best, most authoritative advice for the UK Government, for Europe and for business generally. We are in the business of encouraging people to buy cleaner and greener vehicles.

I recognize the important progress which the oil industry has made in the development of cleaner fuels – especially through the marketing of unleaded petrol. Unleaded petrol now accounts for over 70% of sales and this

Left to right: Don Garwood, ex-Chairman of Essex Branch and David Setchell

figure will continue to rise as new vehicles enter the market.

The benefits of cleaner fuels will also be achieved through the Auto-Oil programme. I believe that the common position on the fuels directive balances necessary changes against the needs of industry, reflects the concerns of all Member States and will make a significant contribution to the improvements in air quality. This is especially true with regard to the sulfur content of motor fuels. Lower sulfur concentrations not only contribute to reductions in SO_2 emissions, but also allow manufacturers to take advantage of new technologies. Continuously regenerating particulate traps and de-NOx catalysts both need the vehicle to run on low-sulfur fuel if they are to work effectively.

A sulfur content of 50 ppm would allow these technologies to be used throughout the vehicle fleet and is a realistic long-term level for industry to achieve. I recognize, however, that early implementation of this standard for all diesel fuels could place significant costs on industry and believe that its inclusion in the common position as an indicative standard for 2005 is the best way forward. I understand that the average sulfur content of petrol in Europe is currently 400 ppm. The Commission proposed to halve this to 200 ppm by 2000. And the common position went even further and agreed on 150 ppm. This is a very significant reduction which will bring many health and environmental benefits – and which we welcome. The Council supported the Commission's proposal to reduce the sulfur content of diesel fuels to 350 ppm in the year 2000 and added an indicative level of 50 ppm for 2005. The UK will seek to maintain these standards in any discussions with the European Parliament.

One of the most important issues before the Environment Council during Britain's Presidency of the European Union is the European Commission's strategy to reduce CO_2 emissions from new cars. I understand that negotiations between the Commission and representatives of the European car manufacturers have now reached an impasse. In the wake of Kyoto, it is vital that progress is made in this area. EU ministers have made it clear that they will look at regulatory or fiscal alternatives should the voluntary approach fail. I would urge ACEA, the European motor manufacturers' trade association, to come forward quickly with constructive new proposals to show that the voluntary approach can work.

I said at the beginning that one of our objectives is to build a modern economy, to give us the living standards, the jobs and the wealth which we all want to benefit from. And of course it is industry which we look to to achieve that and I am sure that I am not just speaking for the Government but I am also speaking for other members of Parliament who I see in this room that we see our role as providing a framework, we aim to provide a legal framework which will enable us to achieve some of the objectives I indicated but will also enable you to do the job of creating the jobs, of creating the wealth, of creating the profits which the country needs. You are people who achieve these things – all we can do is provide the framework. I pay tribute to what you have achieved and I wish you well for the future and trust and hope that the oil industry whether it is downstream or upstream will continue to make the huge contribution, the huge beneficial contribution, that it makes to the UK economy. And it is for that reason that it is a great privilege and pleasure to me to ask you to be upstanding and join me in a toast to the Institute of Petroleum.

Left to right: Francis Gugen, Amerada Hess; Charles Smith, IP past-President; and Robbie Glen, after-dinner speaker

Left to right: David Setchell with Carol Reader, former Editor of *Petroleum Review* who retired in June 1997.

David Setchell giving his final presidential address at the 1998 IP Dinner

IP President reviews the year's progress

***David Setchell,* President of the Institute of Petroleum in his reply to Dr Strang's toast to the Institute drew attention to the way the industry has prospered over the last year despite limited returns in the downstream sector. He went on to review the achievements of the Institute over the year and noted the oil industry's major contribution to the UK economy while indicating the potential threat to future North Sea developments if the tax burden was increased.**

May I first of all welcome everyone here tonight. Thank you for supporting not only the IP Dinner but also for supporting other IP events this week which have brought visitors to London from the four corners of the earth.

In particular I am delighted to welcome our principal guest Dr Gavin Strang, Minister of State for Transport who has so generously found time in his busy diary to speak here tonight and to propose a toast to the Institute of Petroleum.

There are six past presidents of the Institute here tonight to whom I extend an especially warm welcome complete with my thanks for the tremendous service they gave to the IP in their years in office. One past president advised me on speaking after dinner in this remarkable ice rink: 'Thank the main speaker,' he said, 'give a short report on Institute affairs, but talk briefly and not to laboriously about the state of the industry and don't talk too loudly – in case you disturb conversations or slumber in the four corners of the room.'

Another past president invited me to dinner at his Park Lane penthouse – which is no doubt a normal perk for past presidents. After dinner we watched the 9 o'clock television news together and saw a report from the City showing a crude oil futures trader who was standing on an outside ledge on the 14th floor of a building.

It wasn't entirely clear whether he was standing there with intent or whether he was cleaning the windows to boost his diminishing returns. My host said: '£100 he won't jump'. I took the bet. The man jumped. My host immediately handed over £100 which I refused to accept admitting I had seen the BBC version of the jump earlier on the 6 o'clock news. My host said he'd seen that too but didn't think he'd do it twice in one night.

Thankfully I know of no oil traders jumping from buildings of late. Generally speaking the oil industry did well and prospered in 1997 – although the downstream companies here in the UK at least are still struggling with single digit returns on capital employed. And the oil industry continued to make significant contributions to the UK economy. Eight per cent of total Government revenue came from oil – Petroleum Revenue Tax, duty on fuels, VAT, and corporation tax – £25bn or thereabouts. The UK oil industry is one of the world's most efficient – the two initiatives, Crine in the upstream and Active in the downstream, have reduced costs immeasurably – and still 345,000 jobs are directly employed by it plus over 1mn indirectly.

The oil and gas industry accounts for over 20% of total annual investment by UK productive industry; the offshore industry alone has to date invested £155bn in 1997 money, the equivalent of 17 Channel Tunnels or 200 Millennium Domes.

Continuity of this level of investment could be in jeopardy if the Treasury review of offshore taxes proved to be unfavourable. The impact of a negative change in the UKCS fiscal regime would be enormous. The UK would become unattractive for international investment. Over 80% of planned projects would be at risk, representing some £10bn of capital investment over five years. More than 40,000 jobs would be put in jeopardy or double that if the effect in local communities is also taken into account. Now by all accounts the Chancellor does not actually need to increase taxes further so perhaps we can encourage our principal guest to bear the message to the Chancellor that he can reinforce his commitment to long-termism in the economy by encouraging technological development and investment in the UKCS thereby assuring increased tax revenue from a growing and thriving oil industry.

The downstream sector faces a different kind of investment challenge. In the air quality debate one year ago there was still a glimmer of hope that the European Commission's proposals based on sound science and sound cost benefit analysis might win through. But it now seems likely, as the proposals are put through the political process in Strasbourg, that the European oil refining industry will be saddled with a bill for ecu50bn. Here we have a business which is already over-invested, grossly oversupplied and earning very little, needing to find a further ecu50bn. MEPs claim that the cost can be recovered for less than one penny on each litre sold. Technically that may be correct but it will only be possible if supply is shortened, more refineries close and the beleaguered motorist pays more for very little improvement in air quality.

There are many other initiatives in place of developing within the work of the Commission which affect the oil industry. Their impacts vary all the way along the supply chain from large combustion plant emissions through to auto-oil fuel specification. Many of these measures have appeared as 'piecemeal' and there is a pressing need to take a more coherent approach allowing a more rational and sensible approach where the efficacy of different measures is properly ranked on performance and costs.

Our own Government is taking a coherent and responsible approach with the Transport Policy Review the result of which will emerge as a White Paper in May. This is a complex mixture of issues – economic, environmental, social and political – heavily orientated around lifestyle choices. A coherent transport policy is badly needed. The Government is to be complimented on being prepared to tackle the problem; and since the outcome will in considerable measure affect the oil industry, I hope the Minister of State will call on the industry for help in the dialogue and in the development of this policy.

Being heard is one thing, being listened to is quite another and influencing the debate around the big issues is yet something else. There is a concern in the oil industry that while we may achieve the first we score low marks on the other two. Our integrity is sound, we behave responsibly, we deliver incomparable value to society but no-one knows about it, no-one understands what we do and across a broad spectrum of constituencies we are not held in the highest regard. Furthermore we have left the various media free to those who would attack us by failing to provide the facts and the counter argument. I sense this concern is shared across the industry, upstream and downstream, and great effort needs to be invested in building our reputation. We have so much to be proud of – lets make sure our constituents know about it – only then will we be able to influence the debate.

Reputation is somewhat ephemeral, it needs continuous sustenance and promotion. It could be said that much of the Institute's work is focused on this continuum whether it be the expansion and dissemination of knowledge and understanding of oil industry activity or enhancement of the integrity of its behaviours. The IP does not claim to nor propose to do the Full Monty for the industry but there is more it can and will add to its contribution in this respect.

The IP's technical programme in 1997 completed and published 16 guidelines, codes and standards and it carried out a number of research projects, many of which were undertaken jointly with other organizations. Some of these organizations are regulators and growing cooperation with these bodies strengthens rather than diminishes the self-regulating nature of our industry. A new development last year was a database of retail service station incidents, a good fit with HSE oil spill reporting plans, and two more databases on climate change and distribution terminal incidents are planned for this year.

The Institute's information dissemination programme continued to develop successfully. Conferences and seminars continue to attract increasing numbers of delegates and we believe a redesigned *Petroleum Review*, our monthly publication, will increase its circulation and provide the industry and its adherents with valuable information and perspectives. On-site information services including the library are going to be increasingly on-line. Already we have 150 pages on the Internet and this will grow further in 1998.

Enhancements of the IP's website will be a vital step in widening access to the

Left to right: Klaus Kohlhase, Consultant; Peter Ellis-Jones, IP Vice-President and Treasurer, WPC; Basil Butler, CBE, IP past-President.

range of available learning experiences and in increasing the IP's appeal to younger people as potential service users and members. These learning experiences will underpin a broad IP Lifetime Learning framework which will be relevant to members as they take direct responsibility for the development and management of their own careers. While this Lifetime Learning programme will not offer accreditation, from its inception it will enable members of professional bodies to use IP programmes in their own continuous professional development schemes. This programme will expand knowledge of the oil industry and enhance the skills of its members thereby, on both counts, promoting the industry's reputation.

I reported a year ago that the IP has a permanent staff of only 36, relying through its committees and working groups on the much appreciated efforts of about 1,000 volunteers who are individual members of the IP or employees of corporate members. With downsizing, the number of volunteers is diminishing and beginning to have a major impact on the IP's technical work. This in turn will eventually impact the industry and, so, while thanking the many volunteers for their valuable and much appreciated work, I am asking corporate members to dig a little deeper into their manpower reserves to find the support which the IP badly needs.

In the face of diminishing resources the IP permanent staff have done remarkably well to achieve as much as they have and Council would like me to thank them most warmly. Not least, with this week's events in mind, including tonight's dinner, I must thank Jane Hill and Pauline Ashby for their brilliant organization. I particularly wish to thank Ian Ward, the IP's Director General, for bringing his enthusiasm, energy and expertise to this task and for making my two years as President so enjoyable. The Council of the Institute is also comprised of volunteers and I am particularly indebted to them for their support and wise guidance in directing the IP's affairs.

My term of office ends in June when I hand over the Presidency to Chris Moorhouse, now head of BP Trading. I shall do so with some reluctance because I have really enjoyed this job which is more privilege than chore; but I shall do so at the same time with the assurance that Chris will be an excellent President, committed to the Institute's mission and objectives.

Enjoyment, reward, fulfilment, excitement are all words which describe my own oil industry career and for all that I thank all of you for making the industry a place where all these words can be applied. And I have enjoyed tonight's dinner – in itself a sumptuous feast – but throughout I have felt a certain disquiet because I find myself sitting between two Scotsmen. Nothing wrong with that in this politically correct world I hear you say. But I am a Yorkshireman and occasionally when Scotsmen and Yorkshiremen are together there is confusion when it comes to paying the bill. Attempts have been made to distinguish one from the other and the most appropriate distinction I know is that when a Scot opens his purse a moth flies out but when a Yorkshireman opens his the moth is dead. I heard recently of two Scots and a Yorkshireman having dinner at Sharrow Bay, a remarkably fine restaurant about halfway between Sheffield and Glasgow. Eventually the waiter brought the not inconsiderable bill to the table and asked: 'Who will pay?' 'I will,' said the Yorkshireman. Two days later there was a headline in the *Glasgow Herald*: 'Scottish ventriloquist found dead in alleyway.'

The gentleman on my left may not be a ventriloquist but he is a man of many parts – golfer, barker, cricketer, athlete and he was a junior professional footballer but his career was cut short tragically at an early age – due to lack of ability. Robbie Glen instead turned to a more secure profession and became a prison governor. He served at Barlinnie prison in Glasgow and as Governor of Cornton Vale – Scotland's only female detention establishment. After that he retired. I am delighted and most grateful he will speak next and I'm certain we can look forward to getting the inside story.

Once more may I thank Gavin Strang for accepting our invitation to speak this evening – and to all our guests may I say how pleased we are to see you here and we hope you will continue to enjoy an entertaining evening. Might I now ask the members of the Institute to join me in a toast to our guests. ●

Party over for another year

Have all the elephants been found?

In his controversial book, *The Coming Oil Crisis*, Dr Colin Campbell contends that the world is facing an impending physical shortage of oil, a view based on his contention that exploration has now become so sophisticated and the world so well explored that there are few geological surprises left. In the first of a two-part series, *Gordon Cope* examines the geological basis and the reaction of senior geologists in the industry to Campbell's argument.

Dr Colin Campbell, a world-renowned petroleum geologist, believes that the world is about to enter into an oil crisis that will have far greater long-term impact than the politically inspired shock of the 1970s. 'Almost 90% of the world's conventional oil has been found,' notes the British expert. 'This time, an oil price crisis cannot be solved by bringing in flush production from known basins awaiting development. There is a finite limit.'

The finite limit is, according to Campbell's data, 1,800bn barrels of conventional oil, of which 807bn barrels have been produced, 818bn barrels remain in reserve, and 175bn barrels, or approximately seven-year's supply, are yet-to-find (end 1997 figures).

But, is our grasp of geological science sufficiently robust to state with confidence that only 175bn barrels remain undiscovered? There are over 900 sedimentary basins on earth. How can we be sure that each one has been sufficiently examined?

Campbell's estimate of the amount of conventional oil left to find in the world is based upon geological understanding of the processes of oil formation and accumulation. 'Advances in technology have made exploration and production highly efficient,' he notes. 'The geological processes responsible for oil accumulation are now very well understood. Of particular importance was the geochemical breakthrough of the 1980s that made it possible to identify and map the zone generating oil and gas. It not only showed which trends had potential but it allowed large tracts to be written off as non-prospective, once the critical information had been gathered.'

Improved assessment

Scientific understanding of the limits of the petroleum cycle which control formation, migration and entrapment of oil is key to Dr Campbell's argument. 'Geochemistry, for instance, can specifically identify not only source but the date of generation. It has revolutionized the search for oil, permitting a much improved assessment of what the world's oil endowment actually is.'

According to Campbell, the primary source for petroleum are algae, primitive marine life forms. Algae are composed of proteins, carbohydrates and lipids (fats). In order for algae and related organisms to proliferate enough to form source rocks, several factors must combine. 'The critical factors are sea temperature due to latitude and the supply of nutrients.'

The Humboldt current off Ecuador, South America, is a contemporary analogue of the conditions needed for prolific algal growth. 'North-moving currents are driven westward by offshore winds and replaced by deeper waters welling upwards.' These deeper waters are heavily mineralized, and support the proliferation of micro-organisms on which the whole food chain is built. Examination of the geological record using paleontology (the study of fossils), and paleoecology (the study of ancient environments), reveals that there were few periods in the geological past in which conditions were conducive to the explosion of life forms needed, ultimately, to create petroleum. These include the Devonian, Jurassic and Tertiary periods.

Tiny fraction survives

In order to create oil, says Campbell, organic material must be preserved intact. 'Most organic matter is oxidized or consumed by other organisms. Only a tiny fraction survives deposition on the sea floor. It is only in the depths of stagnant marine troughs and deep lakes, where the oxygen content is low, that large amounts of the organic material can be preserved in sufficient concentration to act as a source rock for oil.'

Campbell also notes that the plate-tectonic-induced break-up of an immense land mass 200mn years ago was crucial for the formation of source rocks. 'The world's most prolific oil province is in the Middle East, where organic material formed in warm Jurassic seas and accumulated in stagnant sink holes and lagoons within a broad carbonate platform that received only limited amounts of sediment.'

As sediments accumulate, temperature and pressure conditions increase. 'Organic matter that has survived oxidation begins to break down into its chemical components. Methane begins to form at sediment depths under 2,000 metres. Oil is generated between 2,000 and 4,500 metres. At greater depths, oil breaks down into natural gas.' The peak

Year		1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1992-96	1987-96
2D Seismic	Total	875.4	1,159.3	1,171.2	1,6230	1,856.1	1,722.3	1,584.6	1,446.5	1,346.1	1,059.1	7,160.7	13,845.7
('000 Line km)	Offshore	643.6	745.8	884.9	1,211.0	1,324.1	1,291.2	1,098.2	1,023.8	881.5	732.1	5,026.8	9,836.3
3D Seismic	Total	0.38	5.7	12.1	19.9	29.7	48.7	53.3	70.8	93.4	118.4	384.6	452.3
('000 sq km)	Offshore	0.18	2.4	6.3	12.9	19.1	29.4	25.5	43.2	62.9	94.8	255.8	296.7
New field wildcats	Total	5,550	5,560	4,540	4,640	4,030	3190	3,020	2,800	2,810	2,890	14,680	39,000
(NFWs)	Offshore	540	760	650	830	730	510	510	510	450	540	2,530	6,040
Appraisal wells	Total	8,640	9,050	8,280	8,420	7,620	5,960	6,970	8,360	7,300	7,020	35,610	77,620
	Offshore	340	390	380	320	310	320	270	270	290	280	1,420	3,160
Develop't wells	Total	45,350	43,920	38,010	42,170	40,130	37,220	41,700	40,830	45,240	46,880	211,870	421,450
	Offshore	1,500	1,730	1,670	1,860	1,680	1,470	1,750	1,630	1,600	1,550	8,000	16,430
Liquids reserves*	Added in yr	13.92	12.63	10.79	9.69	10.04	7.80	4.00	6.45	5.62	5.24	29.11	86.18
(bn barrels)	% of yrs prdn	80%	68%	57%	50%	48%	40%	21%	31%	27%	25%	28.8%/yr	44.7%/yr
Gas reserves*	Added in yr	38.90	100.00	65.41	101.40	13.27	39.58	33.77	32.10	59.62	38.73	203.8	522.42
(tn cf)	% of yrs prdn	78%	192%	120%	181%	240%	69%	59%	58%	105%	64%	71.0%/yr	116.6%/yr

Source: Petroconsultants World Petroleum Trends
**Data for world excluding US and Canada*

Table 1: Key world exploration data 1987–1996

generation period for oil occurs in a 'window' around 2,500 metres, and only lasts a relatively brief period of time.

Once oil forms, it needs to escape from its source rock. Clays and muddy limestones, which most often form source rocks, have very low permeability, and if newly formed oil had to rely on the normal rate of escape, most would end up being cooked to gas first. There must be sufficient generation of oil in order to increase the fluid pressure to the point where the source rock fractures, and oil, which is less dense than water, can begin to migrate toward the surface.

Oil migrates through rocks that have sufficient pore space and permeability to allow it to flow. Coarse sands, similar to that encountered on a beach, provide adequate permeability, even when they have solidified to sandstone.

Degraded into tar

In order to form a commercial deposit, oil must be trapped within a reservoir. A trap can be stratigraphic, such as an overlying layer of impermeable clay, or structural, such as a fault that cuts off the lateral movement of the oil. However, the trap must have formed before the critical oil-formation window, or the oil will simply migrate to the surface and be degraded into tar.

Once the oil has accumulated in a trap, it is under further threat. Most traps are not perfect seals and tend to leak. Destruction of the initially trapped oil can occur due to erosion, which brings the trap to the surface, or burial, which carries the trap deep enough for the oil to be broken down into natural gas.

As a result of these limiting factors, says Campbell, very few basins offer conditions suitable for the creation of large accumulations of conventional oil, and of those, very few survive as large oil fields. 'Only a very small fraction of the oil generated actually finds its way into exploitable oilfields.'

New sources?

If most relatively unexplored basins have little yet-to-find potential, then what about basins that already have significant oil production? Is it possible to find large, new sources within prolific regions?

'The bulk of what remains to be found lies in ever smaller fields within the established provinces,' says Campbell. 'We can estimate this amount by old-fashioned geological judgement relating the maturity of exploration with the underlying geology, and there is now sufficient data to use statistical approaches.'

Campbell notes that Jean Laherrere, a French oilman with an interest in statistics, adapted a law of distribution stating that objects in a natural domain plot as a parabola when their size is compared with their rank on a log-log format. 'For example, the populations of the larger towns can be plotted to yield the population of a country down to the smallest settlement,' says Campbell. 'It means that when the larger oilfields in a basin have been found, their size distribution can be used to predict what the ultimate recovery will be. It works best in a clear-cut natural domain – a single petroleum system with a common source-rock.'

One theory raised to refute Campbell's argument is that conventional oil may not be associated with organic material and sediments – it may simply arise primordially from crystalline basement rock, and hence be in much greater quantities than expected from sedimentary origin. 'If that were the case, you'd expect to find oil that didn't have remnants of cholesterol and other organic compounds in them,' says Dr Robert Kinghorn, a geochemist at Imperial College. 'But we have yet to find oils devoid of specific organic compounds which come from living matter. All the evidence we've got so far is that oil is produced from sedimentary organic matter.'

In general, experts within industry and academia concur with Campbell's geological thesis. 'He's fundamentally sound on his point that there's not all that much left to find,' says Richard Hardman, Exploration Director of Amerada Hess, and President of the Geological Society. 'He uses Petroconsultants' databases, which are the best available on a worldwide basis.'

When the petroleum industry goes looking for undiscovered 'elephants' around the world, it relies on a combination of scientific elimination and high-grading similar to Campbell's approach.

'A significant percentage of basins can be eliminated because of insufficient sediment thickness to create an oil

window,' says Francis Harper, a consulting geologist who worked for many years on BP's global exploration strategy. Drilling results, onshore exposures and seismic evidence can accurately reflect the thickness of sediments. 'We can definitely not bother looking at many of the deep water basins, for instance, because they are thin sediments over ocean crust.'

Another large portion of basins can be eliminated because they do not have good-quality source rocks at the appropriate level to generate commercial quantities of oil. 'We can use drilling or surface samples, then extrapolate them into adjacent areas,' says Harper. 'We down-graded much of the US Eastern Seaboard because of the perceived lack of good quality source rocks.'

The lack of potential reservoirs is one reason why Antarctica, which is effectively unexplored, has low potential. 'There are oil-prone Upper Jurassic shales on the Antarctic Peninsula, so there should be potential for oil,' says Harper. 'But the evidence of good-quality quartzose sands (which make good reservoirs), is lacking.'

Finally, many basins are eliminated because they have been so thoroughly explored over the last century of oil production that nothing is left. 'Many have already been effectively exhausted,' says Harper.

Only a few dozen basins make it out of that filtering process. Of these, a further winnowing can be accomplished by examining timing and plate tectonics. 'Using the plate tectonic model is almost taken for granted these days,' says Hardman. 'We looked at Brazil to help us determine if we should look at Africa. We liked what we saw, and ended up drilling in Namibia.'

Not surprisingly, many of the basins that make the final cut already have sufficient oil production history to suggest statistical methods to define yet-to-find conventional oil.

'The criticism of most statistical work is that extrapolations don't account for surprises, and what we're looking for is surprises,' says Harper. 'You are trying to find a sample of an actual population, and to do that, you need data from unconstrained exploration. There is a lot of data from the Gulf of Mexico basin, for instance, but the deep offshore, which is a large part of the piece, hasn't been available until recently, and you can't extrapolate the available statistics into deeper waters.'

More efficient

'I agree with Campbell in that technological advances have made us more efficient at exploring for oil,' says Harper. 'But there is still sufficient uncertainty to cause the difference between Campbell's numbers (175bn barrels yet-to-find), and those published by the United States Geological Survey (500bn barrel yet-to-find).'

'His ideas don't work for areas we don't understand,' says Hardman. 'He can only talk about things that are known. For instance, when Shell was drilling in Oman, they encountered gas in the Silurian. It wasn't known, so you can't estimate something like that.'

How do Campbell's numbers compare to industry's? 'I estimated the yet-to-find to be about 250bn barrels until recently, but I would prefer about 300bn barrels now,' says Harper. 'Campbell's definition is more restrictive than mine. I consider more deepwater and infill as conventional.'

'His result is likely to be on the pessimistic side because it doesn't take into account unknown producing horizons,' says Hardman. 'My gut feel is that there are about 200 to 400bn barrels yet-to-find, but he's fundamentally sound in his point that there's not all that much left.'

'There is not so much difference as appears because different definitions are being used,' responds Campbell to the higher estimates. 'The USGS (for instance), admits that less than half of its reserves are 'ready-to-produce' implying that the balance is much less than sure. The USGS study is now four years old, and about 80bn barrels have been produced since it was made, reducing the reserves.'

'The main difficulty with higher yet-to-find estimates is timing,' he adds. 'The discovery rate has been falling for years and is now down to 6bn b/y (**Table 1**), despite all the advances in knowledge and technology. 'It means that it will take a minimum of 30 years to find even my 175bn barrels. Consequently, the higher estimates, even if valid, cannot contribute much to peak production, which is my main concern.'

In next month's issue, *Petroleum Review* will examine the impact that drilling technology, seismic exploration, reservoir calculation and geopolitics will have on yet-to-find and ultimate-recoverable estimates of conventional oil. We will also high-grade some of the last remaining exploration hot-spots in the world.

	2D Seismic* ('000 line km)		3D Seismic* ('000 km²)		New Field Wildcat Wells	
1	Mexico	76.5	UK	22.1	USA	1,572
2	Australia	57.0	Norway	21.9	Canada	198
3	India	36.1	Egypt	7.2	Australia	116
4	Norway	32.6	Nigeria	6.9	Argentina	87
5	Brazil	25.7	Angola	6.7	Russia	86
World Total:		**553.0**	**World Total:**	**118.4**	**World Total:**	**2,889**

* Comparable seismic data unavailable for North America and CIS
Source: Petroconsultants SA

Table 2: Exploration activity 1996

In *The Coming Oil Crisis*, Campbell argues that it is no longer possible to find enough giant fields to offset our voracious appetite for cheap oil. 'Almost all potential basins have now been identified and investigated to some degree by seismic means and drilling. It is almost inconceivable that any new significant province remains to be discovered.'

Campbell defines conventional oil as 'that basket of hydrocarbons that has supplied more than 95% of all oil produced to date, and which will continue to dominate supply until well after peak.'

Non-conventional sources, such as oil sands, very deepwater and heavy oil, cannot satisfy more than a tiny percentage of current demand without huge investment and/or collateral environmental damage. 'Most non-conventional is very slow to produce, and won't have a significant impact on peak production.'

- Total Conventional oil produced: 807bn barrels*
- Reserves: 818bn barrels
- Total Discovered: 1,620bn barrels
- Yet-to-find: 175bn barrels
- Ultimate Reserves: 1,800bn barrels
- Date when Middle East OPEC (Abu Dhabi, Iran, Iraq, Kuwait and Saudi Arabia) controls 30% of world production: 2000
- Midpoint of Depletion Date: 2003
- Price spikes and supply shortages will appear as OPEC controls more production, and world production declines.

*All figures as at end 1997

The future belongs to gas

Three major developments on the world natural gas scene in 1997 are pre-eminent. In order of their likely commercial impact, they were: Asia's financial crisis; agreement on the Draft Directive to liberalize EU gas markets; and widespread claims that gas-to-liquids technologies are on the verge of becoming fully commercial. Asia's crisis is a powerful negative factor – especially for the LNG business – but it is likely to be of only short duration. The two other developments promise substantial medium and long-term benefits for the natural gas business, writes *Fred Thackeray*.

A slow-down in the growth of natural gas consumption in Asia had already become apparent towards the end of last year. In the preceding 10 years it had more than doubled, rising at an average rate of almost 8% per year. In 1996 it increased by 8.7%. But in 1997, its rate of growth dropped sharply to less than 5%, according to preliminary estimates made by *Petroleum Review*.

This year, it seems possible that Asia may record no growth at all in natural gas consumption. The impact will be greatest on the LNG trade. In 1997 the world's two largest LNG importing countries – accounting for 75% of total world trade – experienced a sharp check. Japan increased its imports by an estimated 3.8% to about 66bn cm, compared with an increase of 10% in 1996. South Korea increased its imports by 23% to about 16bn cm against an increase of 38% in 1996. With their financial affairs now in disarray, it seems almost inevitable that in 1998 the development and implementation of new LNG projects will be delayed.

Beyond that, however, the underlying pressures for economic expansion and improvements in living standards throughout Asia will expand electricity requirements and the demand for natural gas as the favoured fuel to generate power.

This will be seen most dramatically over the next few years in India. The country is, so far, one of the least affected by the region's financial crisis. Ironically, this is because it had not yet fully opened up to external influences. But, due partly to the pressure of steadily expanding population – up by 165mn in the past 10 years – real GDP has been expanding at over 7% a year.

This has been accompanied by sharply increasing requirements for electricity and a rapidly widening gap between indigenous gas supply and forecast demand. The growth of demand by 2000 has been forecast by India's Ministry of Petroleum at no less than 31bn cm. With indigenous production stagnant, to meet this by imports would require the impossible – development of LNG projects which would add 50% to total Asian LNG consumption. Therefore it is not surprising, that, notwithstanding political and institutional obstacles, commercial proposals for LNG imports have been made by several companies which between them total at least 15bn cm/y. These proposals, however, will take at least three to four years to implement.

The check to the growth of Asian natural gas consumption last year was coupled by 1.5% reduction of consumption in EU, as the result of warmer weather, and static consumption in the US. In Russia consumption increased by about 2%. For the world as a whole, therefore, it may be provisionally estimated that the percentage increase in natural gas consumption was less than 2% to a little over 2.2tn cm. This compares with an increase close to 5% in 1996. An educated guess would give an estimated increase this year of about 4% to say 2.3tn cm.

Faster long-term growth

The pattern of past consumption growth of natural gas and competing fuels is shown in the accompanying tables, collated on the basis of estimates published last year by BP. The two aspects which stand out particularly are:

- the much faster expansion of gas in Asia than in any other region;
- the fact that in all regions gas consumption grew more rapidly than oil; also that in all regions except North America, gas consumption grew more rapidly than that of coal.

These patterns are set to continue. The numerous factors which have converged to support past rapid expansion of gas demand will continue to do so in future when the checks in 1997/98 are passed. Most powerful of these factors probably is the world's apparently insatiable demand for electricity. The development of the combined cycle gas turbine (CCGT) enables electricity to be produced at lower costs and higher efficiencies and, when using natural gas, with lower pollution of the atmosphere. A closely related factor is the belated realization in Europe that support must be given to combined heat and power (CHP) plants. These can achieve efficiencies as high as 90% reducing fuel consumption and pollution. And the most appropriate fuel is generally natural gas.

In Europe there are other major factors promoting gas demand growth. Not least is the pressure of available supplies. Three principal supply sources are competing vigorously for European markets — Russia, Norway and Algeria. Each of these relies heavily for its export earnings on natural gas; and each has actual or potential export capacity well in excess of its presently contracted sales volumes. Additionally, these same

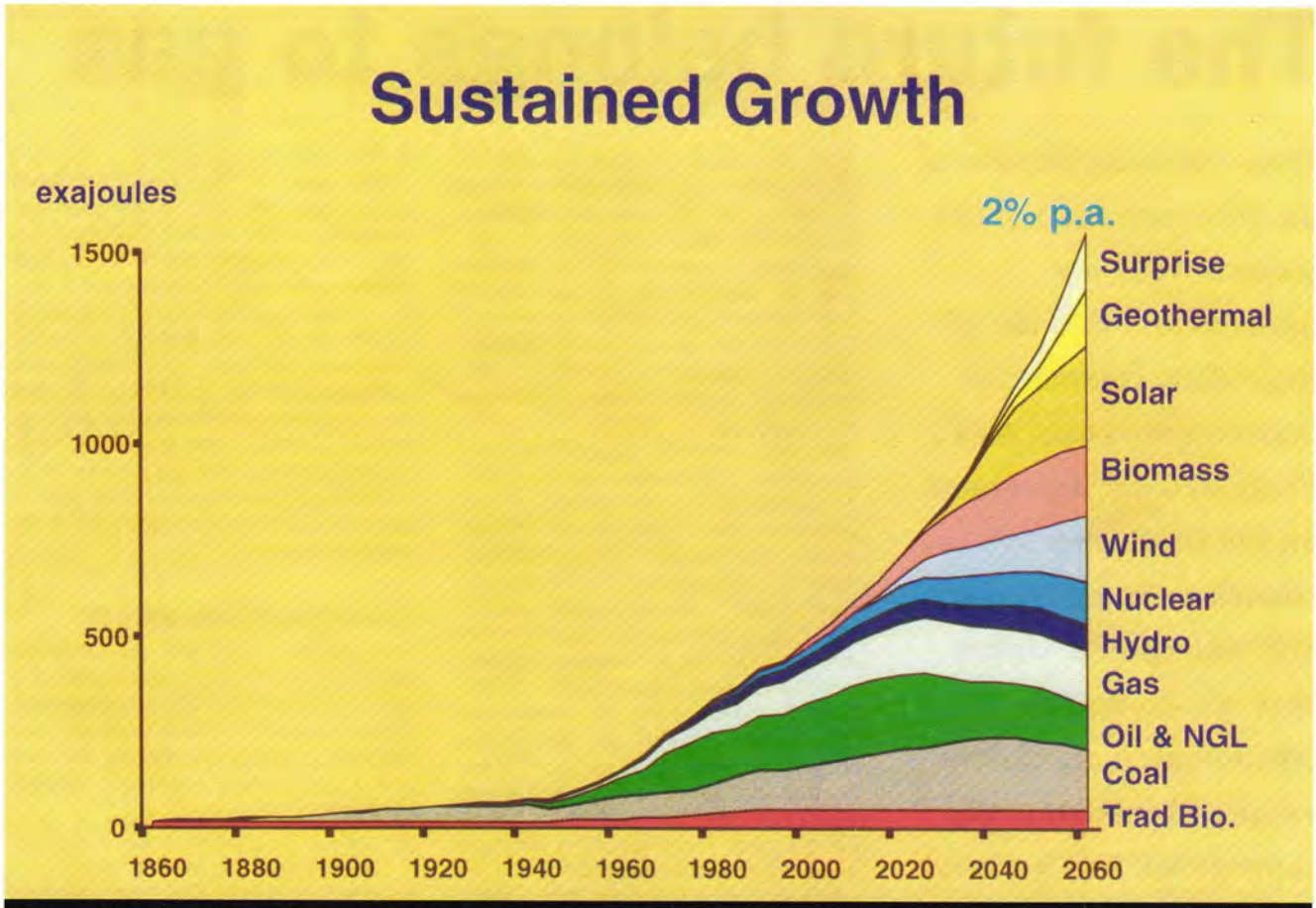


Figure 1: Shell diagram showing the contribution of the various fuels to enable sustained growth. (1 exajoule = $1x10^{18}$ joules approx. + 26.3bn cm natural gas)

markets in Europe are seen as targets by several other potential suppliers, ranging from Trinidad to Turkmenistan.

Within the EU the established marketers and operators of the major pipeline systems are likely to find themselves increasingly under attack by suppliers seeking to use the market liberalizing measures of the new internal gas market Directive. This Directive is full of loopholes and its effectiveness depends very much on the policies and enforcement actions of individual governments. Indeed, the fact that it can be approved as a 'non-contentious' measure by any Council of Ministers (not necessarily one concerned with energy matters) reflects the extent to which its potential impact has been diminished by wordy circumlocutions. Nevertheless it represents an important step towards greater competitiveness and thus to lower prices. This is likely to increase demand in a market which is already larger than Russia's and two-thirds the size of the US market.

Joker in the pack

In the longer term the factors outlined above may well be wholly outweighed by what many see as the greatest technological advance in the oil and gas industry for decades. Over recent months there has been a succession of announcements by competing oil and research companies that appear to herald the arrival of commercially viable technologies to convert methane to synthetic crude and high quality middle distillates.

All the new technologies are based on versions of the Fischer-Tropsch process. This has a long pedigree for the conversion of coal to liquid fuels in 'emergency' situations – in Germany during the Second World War and by Sasol in South Africa. Since 1993, it has been used in the Shell Middle Distillate Synthesis (SMDS) plant at Bintulu in Malaysia. This was the first commercial-size (12,500 b/d) gas-to-liquids (GTL) plant to be built. It was made profitable by focusing much of its production on high quality waxes and a proportion of high cetane non-polluting diesel. Now it is being challenged by several alternative processes. At least 14 oil companies, research companies and contractors have entered the field. These include most of the oil industry's giants – Exxon, BP, Texaco, Amoco, and Chevron.

Texaco has been the first of the majors to follow Shell in committing to a commercial (as opposed to a pilot) plant. This will be much smaller than

	1982	1996	% inc
Natural gas	1,315.7 (20.7%)	1,971.8 (23.5%)	49.9
Oil	2,787.9 (43.8%)	3,312.8 (39.5%)	18.8
Coal	1,878.3 (29.5%)	2,257.0 (26.9%)	20.2
Nuclear	231.7 (3.6%)	621.3 (7.4%)	168.1
Hydro	155.1 (2.4%)	218.1 (2.6%)	40.6
Total	**6,368.7 (100%)**	**8,381 (100%)**	**31.6**
Total excl Natural gas	**5,053 (79.3%)**	**6,409.2 (76.5%)**	**26.8**

World natural gas and energy growth 1982–1996 (mn toe)

the SMDS plant, just 2,500 b/d, and aimed at the production of synthetic crude. It will possibly be barge-mounted and located in the Gulf of Mexico or Caribbean area. Partners in the venture are Brown & Root and the Houston-based research company, Syntroleum. The scheduled onstream date is the third quarter of 1999.

Although no other firm commercial projects have been announced, there is immense interest and fierce competition to reap the fruits of many years of expensive research. For the most part the companies announcing their proposals have declared that their processes offer commercial viability in competition with crude oil at $20/b. As it happens, in the wake of the flood of GTL announcements, crude oil prices have recently fallen below this level. However, the expectation is that GTL costs can be further reduced to compete when crude oil is as low as $15/b.

Some of the companies participating in GTL developments have emphasized the scope for small-scale plants to give value to 'stranded' gas resources which are located far from potential markets and too small to justify LNG projects. Others, however, have been looking seriously at very large possible projects in locations such as gas-rich Qatar, Russia's Yamal Peninsula fields, the Shtokmanskaye fields in the Russian Arctic, the similarly located fields onshore in Alaska and Norway's deepwater Barents Sea area. GTL is one of the options being studied in the Aurora project, evaluating how to commercialize Atlantic Frontier gas west of Shetlands.

The exciting prospects opened by the new technologies are epitomised in a statement by Arco's President for Exploration and Production. Announcing a pilot plant GTL project, he declared recently that 'gas conversion fits well into our global growth strategy and we are beginning to incorporate it into our exploration and development planning around the world'.

It remains to be seen how rapidly the promise of GTL technologies can be converted into significant commercially profitable projects. One unexpected snag could turn out to be the limited availability of the specialized engineering knowhow. There can be little doubt, however, that recent developments give yet another boost to the prospects for natural gas, if not tomorrow then the day after.

A Shell analysis, undertaken in 1994 but published only recently, provides interesting illustration of how the significance of natural gas in the world's energy supply may grow in the longer term. **Figure 1,** reproduced from the Shell analysis, shows the picture up to 2060 in a scenario dubbed 'Sustained Growth'. The basic assumptions of this scenario are growth of primary energy supply at an average 2% per year supporting an average growth of real GDP at 3% per year.

The analysis was not directed at natural gas but accompanied a statement about Shell's commitment to developing renewable energy sources, particularly solar power, biomass and forestry. Shell was not prepared to issue the figures on which its impressive diagram is based. However, study of the diagram indicates that on the premises underlying the analysis, world natural gas use is foreseen to expand from about 1.4tn cm in 1980 to around 3.5tn cm by 2020 and thereafter to sustain this level for the following 40 years to 2060.

Shell's publication also discussed an alternative scenario, which it called 'Dematerialisation', defined as a world in which 'human needs are met through technologies and systems requiring a much lower energy input'. The fascinating thinking which underlies the analysis even in the published summary, lies outside the scope of this article; but the following paragraph is highly relevant. 'Coal and oil growth is lower', the authors say, 'in dematerialisation than in sustained growth. However, more gas is being used to compensate for the delayed take-off of photovoltaic solar, postponed from 2020 to 2050. This technology remains a niche application until nano-technology becomes widely applicable'.

	1982	1996	% inc
Natural gas	181.1 (15%)	312.1 (20.9%)	72.3
Oil	601.6 (49.9%)	670.3 (44.8%)	11.4
Coal	309.2 (25.6%)	247.2 (16.5%)	(20.1)
Nuclear	79.5 (6.6%)	226.1 (15.1%)	184.4
Hydro	35.0 (2.9%)	40.3 (2.7%)	15.1
Total	**1,206.4 (100%)**	**1,496 (100%)**	**24.0**
Total excl Natural gas	**1,025.3 (85%)**	**1,183.9 (79.1%)**	**15.5**

** Excludes a few unspecified minor countries. Includes East Germany*

Western Europe* natural gas and energy growth 1982–1996 (mn toe)

	1982	1996	% inc
Natural gas	181.1 (20.9%)	312.1 (32.7%)	72.3
Black oils*	377.6 (43.5%)	394.8 (41.4%)	4.6
Coal**	309.2 (35.6%)	247.2 (25.9%)	(20.1)
Total of the above	**867.9 (100%)**	**954.1 (100%)**	**9.9**

** Middle distillates (ie gas oils and kerosenes) and fuel oils. Figures include bankers*
*** Perforce includes coking coal*

Western Europe natural gas and its competitors 1982–1996 (mn toe)

	1986	1996	% inc
US and Canada	513.3 (30.8%)	706.1 (32.2%)	37.6
Latin America	75.7 (4.5%)	115,2 (5.3%)	52.1
Europe	300.3 (18.0%)	418.3 (19.1%)	39.3
FSU	561.0 (33.6%)	526.2 (24.0%)	(6.2)
Middle East	73.2 (4.4%)	142.5 (6.5%)	94.7
Africa	27.6 (1.7%)	47.8 (2.2%)	73.2
Australasia	19.2 (1.1%)	23.8 (1.1%)	24.0
Asia	98.1 (5.9%)	210.7 (9.6%)	114.8
Total	**1,668.4 (100%)**	**2,190.6 (100%)**	**31.3**

Regional breakdown of world natural gas consumption (bn cm (%))

Caspian ambitions one cause of Russian merger mania

In November 1997 a succession of events occurred which will prove a watershed for the world's oil industry. At the beginning of the month, Royal Dutch Shell agreed to form an alliance with Gazprom based on a 'priority partnership'. Immediately after, BP announced that it was entering into a similarly deep alliance with Sidanco, writes *Alex Stewart.*

Following the Shell and BP announcements, Mikhail Khodorkosky, the Chairman of Menatep Bank which controls Yukos, announced what seemed initially outlandish, his goal to make Yukos the largest oil company in the world, yet by the middle of January he had acquired Eastern Oil and Sibneft to create the re-named Yuksi, the largest oil company in Russia. The displaced leader, Lukoil, responded by announcing a new alliance with Gazprom to create a still larger, though looser, agglomeration. The process has not ended, but even so, suddenly most of the world's largest oil companies are located in Russia (see **Table 1**).

The key factor prompting this sudden consolidation is the government's proposed sale of 90% of its holding in Rosneft. Rosneft was initially the oil industry's equivalent of a state holding company. It still enjoys the benefits of its state lineage, especially in strategic exporting areas, such as in Sakhalin, and in the Caspian. Gazprom, Sidanco, and Yuksi are all targeting the Far East and the Caspian to a greater or lesser degree. For Sidanco the Asian market has always been a major goal, and if it could acquire Rosneft it would become the dominant player in the Far East.

Learning from the West

Besides seeking to position themselves for higher growth in export markets, the other driver behind the internationalization of the industry is the desire to learn from the West. However, it is worth recalling here how Japan responded to the opening up to western market forces over 100 years earlier. Two slogans were then in popular currency. One, declared by the modernists, was 'Japanese Spirit, Western Learning', the other, by the reactionaries, 'Revere the Emperor, Expel the Barbarian'. Both slogans were essentially nationalistic, which also probably reflects current Russian ambivalence towards the West.

For the time being, 'Expel the Barbarians' as a point of view is clearly on the retreat. Gazprom began this retreat after the success of its first ADR at the end of 1996 which brought it into contact with global capital markets. It liked what the market could do for it if it played by its rules. The alliance with Shell cements this change of direction. Yukos is now positioning itself to do the same, and Sidanco has gone so far as to recruit several dozen western oil men into positions of senior management, including the appointment of a western chief operating officer.

Table 1 showing leading Russian oil companies and their western counterparts indicates that the period of western tutelage could be a relatively short one, bearing in mind the size of these new Goliaths. Possibly the 'big is best' school of thought could give way to a focus on value, in which case companies would exploit their functional strengths, as is happening in the West. However, this does not seem an immediate prospect. Gazprom has demonstrated that size works well in opening up overseas markets. If exporting and investment overseas are the keys to unlock growth, then the strategy of becoming bigger will not be abandoned rapidly.

Access to capital markets

The most important effect of the Russian oil industry's consolidation is to ease access to capital markets. The appetite for Russian oil paper is strong, which demonstrates the market's faith in the industry's potential, and not just in its relatively undervalued assets. This was demonstrated by the ease with which Yukos financed the acquisition of Eastern Oil, even though it took place against the backdrop of the Asian Crisis when the spill-over on to Russian stock markets was especially strong. In circumstances where access to capital is becoming relatively easy, the main purpose of a partnership with a foreign oil company is to be able to offer a relationship inside Russia in return for access to markets overseas.

This is clearly so in the case of Gazprom's tie-up with Shell. Domestically, Gazprom is in the process of dividing up spheres of influence in the far north of Siberia between itself and Lukoil. It will use Shell's technology to develop some of the more difficult fields but Lukoil is likely to be the key partner from a long-term point of view.

	Oil and liquid reserves	Gas reserves boe	Total reserves boe
Royal Dutch	8,846	8,207	17,053
Shell	–	–	–
Mobil	3,419	3,194	6,613
Chevron	4,364	1,860	6,224
BP	2,402	1,822	4,224
Gazprom	13,400	62,900	76,300
Yukos	–	–	14,800
Sidanco	–	–	13,400
Lukoil	10,286	2,152	12,438

Table 1: Russian oil majors vs Western oil majors, 1996

It is instructive too that one of the first contracts which Yukos began to re-negotiate after it was taken over by Menatep Bank was with Amoco in the same region. For Menatep it was no longer obvious that it needed to be locked into a relationship with Amoco when it could raise finance as easily by itself.

Golden opportunity

Similar levels of discomfort for foreign oil majors could be felt soon in Sakhalin, once the outcome of the Rosneft sale has been decided. Sakhalin represents a glowing opportunity to earn hard currency for Russian oil companies. The size of recoverable reserves on the Sakhalin shelf is not dissimilar to the figures associated with the Caspian (40 bn barrels upwards).

Several consortia have been formed to develop the fields, output from which will be sustainable at over 100,000 b/d, so that the total output from Sakhalin could reach 500,000 b/d, with even higher equivalent amounts of gas becoming available. Russian oil companies were unable initially to exploit the region owing to lack of finance (the technology could be acquired once the finance was in place).

This will now change once Rosneft becomes part of a larger Russian entity, albeit one which will probably have a western strategic partner inside it. Currently Rosneft has a leading share in the Sakhalin 1 consortium, but in addition it has been trying to obtain a stake in Sakhalin 3 and to renegotiate the terms of Sakhalin 2. It is almost bound to achieve these objectives now. Moreover, as part of a larger Russian-led group it is likely to be able to accelerate pipeline construction plans to Japan, Korea and China, either in competition with the plans for a pipeline to China sponsored by BP-Sidanco from the Irkutsk region, or in association with it.

Exports are expected to sustain most of the growth in domestic production, therefore after the Russian oil giants have established themselves into larger groupings, the next challenge will be how to expand into markets overseas. Currently the existing export pipeline is full. The immediate options to expand capacity are:

- the CRC pipeline from Tengiz to the Black Sea, which will pass through Russia;
- increasing transport by train (which sharp cuts in freight tariffs will encourage); and
- further expansion of inland water traffic.

Longer term there are port and pipeline projects proposed around the Baltic. There are also various schemes to reach the faster-growing Asian markets by pipeline via Mongolia or NW China. To meet higher demand from Asia, Sakhalin, East Siberia, and to a lesser extent the Caspian region will be key exporting regions. Currently the leading Russian companies in each region are Rosneft (Sakhalin), Sidanco (East Siberia) and Lukoil (Caspian). Gazprom and Yuksi would both like to increase their access to these markets by acquiring Rosneft.

The most ambitious route to Asia is by pipeline to China. Gazprom is keen to pipe gas from West Siberia into China via the Altai region south of Novosibirsk in central Siberia. For oil companies a better solution may present itself when the Chinese CNPC begins construction of the pipeline across Kazakhstan eastward (preparations for this are due to begin at the end of 1998 with completion set for 2005). West Siberian oil producers could link their existing lines into the pipeline in return for helping to finance the Kazakh section of the pipeline.

The combination of Russian, Chinese and Kazakh financing would both create a more powerful geopolitical nexus in that politically unstable corner, and send another message to the West that it cannot count on its access to better capitalized balance sheets to secure all of the infrastructure projects in the region. This matters to the West because ownership of pipelines also determines export allocations.

The other option to expand output is to acquire oil reserves outside Russia. Lukoil was the first Russian oil company to adopt this strategy. By 2010 it projects an increase in oil production from 60mn t/y to 75mn t/y, 45% of which will be sourced from outside Russia compared to the less than 25% currently sourced. The bulk of its foreign investment is located in the contiguous areas of the Caspian and Middle East (**Table 2**). Iraq is currently the key investment area, rather than the Caspian, where it has a 52.5% interest in the West Qurna fields, accounting for 2.6bn barrels of the 4bn barrels of its reserves booked outside Russia on a proven basis (added to its domestic inventory of 10bn barrels).

In the Caspian it has reserves booked of 1.3bn barrels. Its partners in Iraq include Zarubezhneft, a shadowy state-owned operation, formerly responsible for the state's interests in overseas oil ventures. Zarubezhneft continues to provide a service to the Russian state, mainly in places like Iraq, where Russia's influence has always been strong, and where hostility to the US remains pervasive. Russian investment in Iraq may prove much more rewarding, and geo-strategically significant, than the better-known prospects of the Caspian. Oil reserves in Iraq are much larger, the quality of the crude is higher, extraction costs are much

Year	Oil '000 b/d	Gas bn cm
1986	11,295	469.2
1987	11,480	507.7
1988	11,440	550.2
1989	11,190	574.4
1990	10,450	597.9
1991	9,320	599.8
1992	8,035	597.4
1993	7,155	576.5
1994	6,420	566.4
1995	6,205	555.4
1996	6,075	561.1

Source: BP Statistical Review

Russian production of oil and gas 1986–1996

lower, and there are no transportation barriers.

Iraq is all the more attractive for Russian companies because it is off limits to the West. US policy is therefore indirectly helping Russia to forge closer relations with two of the world's largest sources of hydrocarbons, and to gain better access for oil exports to Asia. The Middle East link could prove valuable in future oil scenarios given the geostrategic importance of the region (one scenario is suggested below). The US meanwhile is stuck with a much less rewarding prospect: maintaining the status quo in Saudi Arabia – essentially to keep up oil prices – which benefits Russia's economy disproportionately more than America's; and seeking to ensure multiple pipelines out of the Caspian in order to avoid a route via Iran, even though commercially this would be the best of the various alternatives.

Iran is the shortest transport route to the Indian Ocean and the Far East for Caspian crude. The Kazakhs are consequently especially impatient to open up this route, and in July 1997 they sold an interest in the large Uzen field, nearest to the Turkmen border, to the Chinese state oil company, CNPC, on the understanding that the Chinese would help to build a pipeline through Turkmenistan to Iran. At the same time, the Kazakh government served notice to US oil interests that they had until the third quarter of 1998 to come up with a commercially viable alternative to the Iranian route or suffer the consequences.

The southern route will benefit Russian oil companies handsomely, as there are already several positioned in the region to take advantage of such a pipeline. Russian oil interests in the northwest of the Caspian will also have access to the southern pipeline if CNPC builds a section south from its concession in the Akyrau region of northwest Kazakhstan to link up to it.

Surprise scenario

Bearing in mind the twin importance of the Asian market and of the Middle East and Caspian in supplying it, there are scenarios which could allow Russian oil companies to benefit nicely from the insertion of their investments in the Caspian and Near East. One such 'surprise' scenario is that Saudi Arabia abandons production restraint, Opec disintegrates, oil prices slide, and western oil majors are forced to secure alliances with the few oil exporters with access to the massive reserves and low production costs, mainly in the Middle East or Russia, which will be necessary to sustain market share in a low oil price environment.

The Russian mega oil companies will be in a strong position to dictate the terms of an alliance if by then they have developed their frontier reserves in the north and their oil concessions in the Near East and the Caspian. However, like political Opec, while it worked in the 1970s this kind of oil hegemony would not last forever, as there would be a reaction against it. The West could be expected to set in motion a full-scale search for non-hydrocarbon alternatives, supported by legislation to bias the market in favour of these alternatives. This final shake-up would then probably signify the Hydrocarbon Age had come to an end. The cycle set off in November 1997 would have come full circle.

Project	Country	Lukoil Share (%)	Total recoverable A,B,C1(mn bbl)	Net Lukoil (mn bbl)
Azeri, Chirag, Guneshli	Azerbaijan	10	3,800	380
Yalama	Azerbaijan	60	370	220
Kumbol	Kazakhstan	50	300	150
Tengiz	Kazakhstan	5	5,400	270
Karachaganak	Kazakhstan	15	1,800	270
West Qurna	Iraq	53	5,000	2,625
Melelya	Egypt	12	100	12
Elhauria	Tunisia/Libya	15	400	60
Discovered reserves				**3,987**
Shakhdeniz	Azerbaijan	10	1,800	180
Karabakh	Azerbaijan	32	1,300	416
Exploration potential				**596**

Source: ING Barings

Table 2: Lukoil's international upstream projects

UK Deliveries into Consumption (tonnes)

Products	†Dec 1996	*Dec 1997	†Jan-Dec 1996	*Jan-Dec 1997	% Change
Naphtha/LDF	335,221	321,056	3,010,343	2,341,456	-22
ATF – Kerosene	634,852	637,184	8,049,168	8,388,028	4
Petrol	1,754,193	1,873,503	22,187,531	22,231,368	0
of which unleaded	1,213,539	1,393,100	15,002,598	15,986,116	7
of which Super unleaded	42,882	40,043	700,690	514,717	-27
Premium unleaded	1,170,657	1,353,057	14,301,908	15,471,399	8
Burning Oil	406,608	415,712	3,326,498	3,298,206	-1
Derv Fuel	1,060,498	1,241,506	14,379,781	14,994,189	4
Gas/Diesel Oil	636,705	677,897	7,631,407	7,307,623	-4
Fuel Oil	609,390	300,792	6,853,770	3,843,775	-44
Lubricating Oil	63,121	66,991	864,309	874,705	1
Other Products	735,014	675,966	8,786,269	8,571,092	-2
Total above	6,235,602	6,210,607	75,089,076	71,850,442	-4
Refinery Consumption	595,124	577,372	6,623,132	6,571,952	-1
Total all products	6,830,726	6,787,979	81,712,208	78,422,394	-4

† Revised with adjustments *preliminary

Deepwater discoveries promise sharp rise in oil production

The onshore and shallow-water areas of countries bordering the Gulf of Guinea have been attracting the world's oil companies since the 1960s. But the area's prospects have been transformed by deep-water discoveries made over the past year or so. Billion-barrel fields, mostly with easily worked geology, bring prospects of production rising towards 5mn b/d in the early years of the next century, from about 3.7mn b/d at present.

Accordingly, the Gulf of Guinea has emerged as one of the world's exploration hot-spots, with major companies and a number of small operators beating a path to the region. A desperate shortage of deep-water drilling rigs – and consequently high rig-rates – is the main brake on the pace of work. Poor transport infrastructure and inadequate local facilities for construction and maintenance operations are the other main problems, writes *Martin Quinlan*.

Historically, the attractions of the Gulf of Guinea area have been its prolific – although, individually, often small – oilfields, together with the good quality of its crudes and the relatively short tanker journey to the refineries of western Europe and the US east coast. However, there are also some significant disincentives to investments there: governments tend to be unstable and avaricious, local communities can be hostile, corruption is endemic, and local service and supply facilities are often of dubious quality.

Deepwater operations have the attraction of avoiding local friction, and even hostilities, as evidenced in Angola where offshore production continued its meteoric growth throughout the years of civil war. Governments are still notoriously unstable, but most have now realized that the companies must be attracted with reasonable tax and licensing terms. Corruption and poor support facilities remain as problems; oil companies cope with the latter by sourcing virtually all of their supplies and services from overseas.

The big attraction of deepwater work is the exciting geology. Explorers enthuse about the number of large rivers which drain into the Gulf of Guinea, giving rise to numerous targets in Cretaceous and later layers. Similarities to the geology of Brazil's prolific Campos Basin, on the other side of the Atlantic, add further spice. As most of the deepwater territory coming up for licensing has seen little or no exploration with modern techniques, there are high hopes for making the large discoveries which characterize a new oil province.

Another attraction is that offshore conditions are not as demanding as in many other frontier provinces. Although some Gulf of Guinea licences extend into genuinely frontier water-depths of more than 2,000 metres, much of the newly licensed territory lies at depths of 200 to 1,000 metres. Further, even in the Gulf of Guinea's deeper areas, there are expectations that developments will involve less-demanding engineering solutions than, for example, in the UK's turbulent Atlantic Margin.

The Gulf of Guinea can experience high winds, but wave-heights rarely exceed five metres and currents are not excessive. Tension-leg platforms and compliant towers, as used extensively in deepwater Gulf of Mexico areas, are therefore likely to be suitable for Gulf of Guinea conditions. Floating production, storage and off-take (FPSO) vessels are also likely to be used, although maintenance facilities for these high-tech vessels might not be available locally.

What's been discovered

On the basis of deepwater drilling work to date, Angola has emerged as the clear winner. Elf's Block 17 is the focus: the company's Girassol-1 well, completed in April 1996, found a five-zone reservoir, and two appraisal wells (both drilled from a location 6 km away from the discovery well) have located additional zones. Reserves in the structure are estimated at 700mn barrels; the crude is mostly light, and productivity of the reservoir is high. Waterdepths at the two well-sites are 1,365 metres and 1,300 metres respectively.

Elf made early moves to develop Girassol, and is now reviewing tenders for the supply of an FPSO vessel with a processing capacity of 260,000 b/d of liquids and a storage capacity of at least 2mn barrels. The company expects to drill 27 production wells, two gas-injection wells and three water-injection wells for the first phase of the development, with at least 15 more wells to be drilled subsequently. Start-up is targeted for mid-2000.

In August last year, Elf made another large discovery with its Dalia-1 well, drilled just 3 km east of the Girassol-1 location at a waterdepth of 1,360 metres. With a flow of 16,000 b/d of 23°API crude from two zones, the Dalia discovery is thought to be even larger than Girassol. Development of Dalia was already being discussed – probably, despite its proximity to Girassol, using a

separate FPSO because of its size – when Elf made another large find. This was with the Dalia-2 well, drilled 8 km from Dalia-1 and completed late 1997. Test results from Dalia-2 were not released but Elf said that 'the thicknesses and qualities of the reservoirs encountered by this well are comparable to those of Dalia-1'. Waterdepth is 1,250 metres.

Shares in Block 17 are Elf 35%, Esso 20%, BP 16.67%, Statoil 13.33%, Norsk Hydro 10% and Fina 5%.

Chevron – operator of the offshore Cabinda licence, Angola's main producing area – has also made substantial deepwater discoveries. In Block 14, the deepwater area west of the Cabinda licence, the company discovered the Kuito field with the D14-2X well, completed in April 1997. The well tested 7,500 b/d of medium gravity crude. Three delineation wells drilled that same year confirmed Kuito as a major discovery, with reserves thought to amount to at least 700mn barrels. Waterdepth is about 300 metres.

Chevron says it is going ahead with a fast-track development project for Kuito, using an FPSO. Development drilling is scheduled to commence in mid-year, with start-up targeted for early 1999. Initial flow will be about 50,000 b/d, with a plateau of 200,000 b/d foreseen.

Early this year the company announced another large find in Block 14. The D14-6X well, drilled at a waterdepth of 440 metres, tested 7,300 b/d of 36°API crude from a structure named Landana. Chevron says it will now carry out additional 3-D seismic work. It is planning to drill at least three exploration wells on other structures in the block.

Participants in Block 14 are Chevron 31%, Agip 20%, Total 20%, Sonangol 20% and Petrogal 9%.

Nigeria, although the leading oil producer in the African continent, has experienced some disappointments in deepwater areas. Since 1993, 13 blocks of Nigeria's deepwater territory have been awarded. Major operators – including Exxon, Shell, the BP/Statoil alliance, Mobil, Conoco, Agip and Elf – are involved, bringing heavyweight financial and technical backing to the work. But the bottomline is that drilling results have not come up to expectations.

One good discovery is known to have been made. This is Shell's Bonga structure, found in block 212 with the Bonga-1 well, completed in early-1996. Because neighbouring blocks are available for licensing, Shell did not release the well's test results. But the find was appraised with a second well, and in the industry it is thought that reserves amount to at least 350mn barrels. Waterdepth at location is 1,020 metres.

Shell says that options for developing Bonga are now being considered. The choice is likely to be between an FPSO or a tension-leg platform. The project is certain to be costly, with a total bill of perhaps $1,000mn. (Because of high rig-rates, Shell says the Bonga-1 well alone cost $30mn.) The field will therefore need good flow characteristics, as well as substantial reserves, to make the development profitable. Participants in the licence are Shell 55%, Esso 20%, Agip 12.5% and Elf 12.5%.

Shell has also made a discovery on its other deepwater block, 219. The Ngolo-1 well, drilled in 1996, is thought to have established the presence of a substantial reservoir, but it has not been appraised.

The other explorers have received less encouragement. The BP/Statoil alliance has drilled five deepwater wells, finding oil with three of them. But the best discovery, Oyo-1, was regarded as too small – with reserves estimated at 100mn b – to justify development in this high-cost area. The BP-Statoil alliance has now demobilised its drilling team in Nigeria, although it is considering returning to drill two wells this year.

Elf drilled two disappointing wells in Block 309, but has plans for another two wells in Blocks 222 and 223. Mobil, meanwhile, abandoned its first well in block 221 after running up expenditures of $20mn. Agip began drilling in block 309, but then suspended the programme while it carried out additional seismic work.

Congo (Brazzaville) has one truly deepwater discovery under appraisal and various other fields, one already producing, at less extreme depths. The deepwater find is Elf's Moho, located only 15 km west of the Nkossa producing field but at a much greater waterdepth – 800 metres, compared with 150 to 300 metres at Nkossa.

The Moho-1 discovery well found light 38–41°API crude in two zones, testing 2,200 b/d and 3,500 b/d. An appraisal well confirmed the discovery of a substantial reservoir, and another appraisal is scheduled. Reserves are estimated provisionally at about 400mn barrels, but this figure is thought to have a considerable up-side potential. Elf is planning to install an early production system on Moho by mid-1999, with output to be piped to Nkossa's facilities. Participants in the licence in which Moho and Nkossa lie are Elf 51%, Chevron 30%, Hydro-Congo 15%, Energy Africa 2.25% and IFC 1.75%.

Nkossa is regarded as the Gulf of Guinea's first deepwater producing field, because the 150 to 300 metres depth (with the two wellhead platforms located at 170 metres) represented a step-change from previous shallow-water operations in the area. Expected difficulties in constructing facilities locally persuaded Elf to use a large concrete barge to accommodate production equipment, utilities, injection facilities and living quarters, all of which were hooked-up and commissioned in France before the barge was towed to location. This made the development very costly, at $1.8bn to tap reserves of 600mn barrels.

Nkossa was expected to flow at a plateau rate of 120,000 b/d, but production has fallen some way short of this, averaging about 85,000 b/d last year. Because of the heterogeneous nature of the Nkossa structure, there have been difficulties in maintaining reservoir pressure. This leaves the processing facility with considerable spare capacity, which Elf plans to utilize for other developments – initially Nkossa South.

The latest Congo (Brazzaville) field to come on-stream is Agip's Kitina, north of Moho and lying in water 130–300 metres deep. Kitina was developed with a steel platform located at a waterdepth of 140 metres, with crude piped to the Djeno terminal. Production started late last year, and is expected to build up to 45,000 b/d in 1999. Participants are Agip 35.75%, Hydro-Congo 35.0% and Chevron 29.25%.

Deepwater exploration has turned Equatorial Guinea into a significant oil producer. Before Mobil's Zafiro field came onstream in August 1996, the country's output was limited to a minor volume of condensate. Zafiro, near the border with Nigerian waters and at a depth of 120 to 520 metres, is now flowing 80,000 b/d. Output is limited by the capacity of the *Zafiro Producer* FPSO. Participants are Mobil 75% and United Meridian 25%.

A number of other discoveries have been made in the vicinity of Zafiro. It is likely that these will be developed by the installation of a fixed platform on the Jade field, at a waterdepth of about 150 metres.

Other prospects

The other countries around the Gulf of Guinea now seeing activity in deepwater areas are Ivory Coast, Gabon and Namibia. Recent licensing offers should make for a good pace of work in Ivory Coast and Gabon this year, but Namibia has failed to live up to expectations so far. In Senegal and Ghana the authorities have been in discussion with companies over deepwater licences, and there are hopes of awards this year. But, with drilling rig availability limiting the pace of work in the area, these countries might not progress beyond seismic surveys for some time. ●

Upstream

The IP has continued to provide administrative support to PSE/17 and its sub-committees which coordinate the UK input to the development of international standards for the petroleum and natural gas industry. The development of good standards requires technical input from the industry. The Institute has played a proactive part in persuading Crine Network and the DTI Oil, gas and petrochemicals Supplies Office (OSO) to fund increased participation. The sum of £250,000 is now available to encourage further UK experts to assist with developing standards in the ISO working groups. Two experts have been identified to date and will be awarded contracts against the initial £25,000 to be spent in 1997. The challenge for 1998 will be to identify appropriately qualified experts and to persuade companies to make them available to work on producing the standards which the industry will use globally.

A new monthly feature 'Everyone Needs Standards' has been introduced in *Petroleum Review*. Information is also being updated regularly on the IP Internet web site which has continued to attract 'hits'.

The Health and Safety Laboratory at Buxton is now carrying out a series of full scale experiments of tube rupture in the complex three dimensional geometry of a real shell and tube heat exchanger. The aims of this study are to validate the computer codes used to assess the safety of existing and proposed exchangers, establish greater confidence in their predictive capability and further aid the development of design and operations guidelines. The IP is project managing this study and contributing £135,000 of the £319,000 cost with the balance being contributed by the Health and Safety Executive and from government research funds. The final report and guidelines are expected to be completed by the middle of 1998.

The Institute is contributing £50,000 to a joint industry project on the 'Safe and Optimum Design of Hydrocarbon Pressure Relief and Blowdown Systems' (RABS). The Institute was represented at a meeting of participants in Aberdeen in December. This £290,000 study is expected to take two years to complete and is being project managed by the Centre for Marine and Petroleum Technology although it has been agreed that the resultant industry guidelines will be published by the IP.

There is an industry need for an agreed methodology to ensure the integrity of equipment used to drill high pressure/high temperature wells in ever deeper water from fixed installations. UWG Ltd was therefore commissioned in January 1998 to define the riser and conductor engineering analysis methodology at an expected cost of some £30,000. It is intended to provide a companion document to the guidelines published by the IP two years ago on operations from floating drilling vessels. The work is due for completion at the end of 1998.

The Institute has been invited to project manage the Energy Use and Emissions in Platform Decommissioning study on behalf of the Offshore Decommissioning Communications Project (ODCP). The aim of the study is to develop a common methodology for calculating the energy use and emissions associated with decommissioning offshore platforms. The values to be input into the calculations will also be agreed. A workshop was held at the IP in order to define the scope and contents of the guideline document to be produced by the middle of 1998. The Institute is funding the £30,000 cost of this study from its research budget.

Microbiology

Work continues on the revision of *IP 385 Determination of the viable aerobic microbial content of fuels and fuel components boiling below 390°C – Filtration and culture method*, prior to its submission as an ISO new work item.

The development of a Biovulnerability Test for Petroleum Products continues. It has been recommended that an initial simple chemical test be carried out on the fuel. A trial to test the robustness of such a technique is being conducted in Germany.

Test Method Standardization

The 1998 edition of the *IP Standard Methods for Analysis and Testing of Petroleum and Related Products and British Standard 2000 Parts* has been published. A CD-ROM version of the book will be published in mid-1998 by John Wiley and will be included in the cost of the book. In future the book and the CD ROM will be published at the same time.

An invitation workshop on the Determination of the Sulfur Content of Fuels will be held on 26 March at Shell Research Thornton. This is one of a series of invitation workshops on selected test methodologies that are planned for 1998 and 1999.

Environment

Work is nearing completion on the 'IP Guidelines for the Investigation and Remediation of Contaminated Retail Sites'.

A joint industry DETR/HSE working group has been established to investigate the feasibility of producing a combined off-site risk assessment for safety and environmental considerations in determining hardware and operational requirements.

A conference on European Acidification Strategy, the Goals of Public Policy and its Cost to Industry is planned for May 1998. This conference is being run in association with the National Society for Clean Air and Environmental Protection and PowerGen.

Measurement

Comments received on *PMM Part III, Manual Measurement of Level in Tanks, Section 1: Non-Electrical Methods*, have been resolved and the document aligned with the draft ISO standard, which is based on the IP draft. Publication is expected shortly.

Work on finalizing the second edition of *PMM Part XII, Static and Dynamic Measurement of Light Hydrocarbon Liquids, Section 1: Calculation Procedures*, has been deferred while other publications are being completed. Publication is expected mid-1998.

Health

The scanning on to CD-ROM of a major portion of the documents used in the development of the IP Epidemiological study is now nearing completion prior to the transfer of all documents from Nottingham University to Birmingham University where the study will now be centred. Discussions are taking place with Professor Harrington at the Dept of Occupational Health, Birmingham University on possible next stages in the development of the Epidemiological study.

The new guideline on Environmental Epidemiology has been completed and will be published in February. Consideration is now being given to the preparation of a paper on the 1996 IP Environmental Epidemiology workshop conclusions for publication in a peer review journal.

The new guideline on the *Declassification of Tanks Previously in Leaded Service* has been completed and was published in February.

A closed workshop has been proposed to consider the Effects of Prescription Medication on Human Performance. This is currently scheduled for the 3Q1998.

A contract has been placed with Newcastle University to examine the appropriateness of biological monitoring for benzene at exposure levels experienced in the oil industry.

Arrangements are being made for representatives of the ACH to discuss the results of the recent study on the causes of death of drivers at Immingham terminal with representatives of the Transport & General Workers Union which sponsored the original work.

Refining and Marketing

The Marketing Committee has raised the matter of poor attendance and representation on some downstream technical committees and has initiated an analysis of attendance at meetings as a prelude to further actions by the Downstream Operations Committee.

Following comments received in the ballot *Guidelines for the Control of Hazards Arising from Static Electricity* and concerns about aviation fuel safety, sections have been revised and publication is now expected this month.

The cross-industry working group has carried out the functional analysis of electrical work and required competency level at service stations. Following agreement this will form the basis of NVQs for electrical practitioners carrying out this work.

The Area Classification working group has completed its final review of the contractor's report on the replacement method for calculating the extent of hazardous areas. A first draft of the revised Code has been prepared for working group review. The proposed changes to the calculation procedure are significant and will require extensive review and debate. In addition enquiries have been made into sources of expertise to carry out research into the effects of hydrogen concentration in gas mixtures on the extent of associated hazardous areas. The above activities will delay publication of the updated and extended guideline scheduled to replace the current Area Classification Guideline.

A working group has been set up to obtain data and to make recommendations for replacement of worn equipment on terminal loading facilities and road tankers.

Comments were submitted on HSE's consultative document on draft Petrol Regulations.

Comments were submitted on the revised draft of the HSE's Operational Guidance, with particular reference to the proposal to bring the risk assessment methodology in line with practice in other areas of HSE's activity. The final consultation draft of the companion Industry Technical Guidance document has been issued to member organizations of the Industry's Technical Co-ordinating Body.

A Panel member will represent the UK on the new CEN/TC221 WG to develop a European standard for underground pipework systems. The IP Performance Specification has been submitted as a base document.

The trial of the test protocol Vapour Recovery Regulations to determine the maximum number of loading arms that can load simultaneously has been successfully completed. The final report is being agreed prior to discussions with HSE to obtain its support.

The Panel has reviewed the draft CEN standard for testing, inspection and marking of petroleum tankers for input to UK response to the CEN Enquiry Document.

The RTV Workshop Code is ready for publication but it became necessary to carry out an assessment of the hazardous area associated with tanker degassing operations using a recognized industry dispersion model. Publication is now expected in the 1Q1998.

The draft procedures for reclaiming duty on recovered vapour at bonded locations has been submitted to HMC&E for approval.

It is planned to carry out tests on split-compartment deliveries at selected service stations in conjunction with LFCDA to determine whether these can be done safely.

A consultant has been appointed to complete drafting of the LPG Code Volume 2 covering small containers in 1998.

Aviation

The Aviation Committee Chairman, Mr S J Shimmin, resigned from the post at the end of 1997. IP Council have endorsed David Spencer as the new Committee Chairman.

The committee, and its sub-committees, are focusing their efforts on increasing the safety awareness of apron users with respect to aircraft refuelling. There are continuing reports of third parties causing damage to hydrant pit valves/couplers, despite the safety measures that are already in place. This topic is obviously of paramount importance and will form part of the programme of the Aviation Conference to be held in autumn.

John Hayes, Technical Director

Crine Project Manager Appointed

Crine Network have confirmed Colin Weil as the person who will be responsible for managing its £250,000 efforts to increase participation of UK experts in ISO/TC 67 working groups in 1998. Colin has been involved in international standardization activities for several years, and is currently the ISO project leader for the 'Plate heat exchanger' standard being developed in ISO/TC 67/SC 6/WG 8. He is a long-standing member of the IP. Further information regarding the Crine Priority Programme for 1998 is available on the IP website. If you would like to participate in the development of standards, please phone Colin Weil direct on +44 (0)181 428 0369.

Two Crine Contracts agreed

The first Crine Contract was awarded to Dr Paul Frieze, who is Convenor of Panel 3 under Working Group 5 of ISO/TC 67/SC 7. WG 5 is responsible for drafting 13819-4 'Petroleum and natural gas industries – Offshore structures – Part 4: Floating structures' and Panel 3 has the task of preparing the section which covers Inspection and Condition Monitoring. Funding will enable Dr Frieze to collate relevant material from existing documentation and convert it from a working stress format to limit state terms. Hull inspection and maintenance is recognized as being a key issue in the operational integrity of FPSOs and potentially a significant cost item. Crine funding will ultimately help realize the benefits of collating the 'best' international information into one set of requirements.

The second Crine Contract will boost the UK input into ISO/TC 67/WG 7 'Materials for use in H_2S containing environments in oil and gas production'. Dr Ed Wade will be funded to participate in the working group, which is charged with drafting four parts of the corrosion protection standard ISO 15156. Dr Wade's experience is particularly suited to expediting the drafting of Part 3 'Corrosion resistant alloys (CRAS) and other alloys'.

Marketing and distribution

CEN/TC 221 Service Station Equipment Two new WGs have been set up to produce standards for underground pipework systems and submersible pumps. The IP will be represented on the former to promote the IP performance specification as the basis of the new standard.

CEN/TC 296 Road, Rail and Portable Tanks The Conveyancing Panel is currently involved in Developing the UK response through BSI to the formal CEN Enquiries on the standards for non-pressure tanks and their equipment, and inspection, testing and marking of all tanks.

Industry Technical Guidance for Petrol Filling Stations

The Electrical and Marketing Committees are heavily involved in the review of the final consultation draft of this industry-led guidance to replace the technical content of HS(G) 41. The IP and APEA plan to jointly publish the document at the same time that the new Petrol Safety Regulations under the Health and Safety at Work Act are implemented. HSE is producing an accompanying operations guidance document.

National Adoption of European and International Standards

A policy and implementation plan for the adoption of ISO/TC 67 and CEN/TC 12 standards has recently been agreed with BSI. Graham Thomas of BP has developed the protocol in anticipation that a significant number of standards for use by the petroleum and natural gas industry will be published in 1998. This industry has concentrated its effort on developing international standards and no technical effort is currently being devoted to producing specific European versions. The aim is to 'do it once, do it right and do it internationally' such that one set of words can be used globally.

CEN/TC 12 has therefore contracted ISO/TC 67 to develop the work items on its programme in a form suitable to be parallel voted as European standards using the procedures established by the Vienna Agreement. Assuming a successful vote, national standards bodies are then obliged to adopt these European standards and their use is mandatory. For example, ISO 11961 'Petroleum and natural gas industries – Steel pipes for use as drill pipe – Specification' was parallel voted as EN ISO 11961 and published in November 1996. In the UK it then became the first of the standards on our current programme to be adopted and is now available as BS EN ISO 11961:1997.

The new implementation plan defines the procedures to be followed by BSI to cover such aspects as preparing and agreeing the national foreword and the text to be included in any informative annex. These will now be prepared and distributed with the draft for public comment (normally at the DIS ballot stage). National elements cannot introduce changes to the specifications but may, for instance, include mention of any national standards that have been superceded or provide clarification on issues where international consensus could not be achieved.

Where the international standard is not on the European programme, it may be adopted as a BS ISO standard and its use is then voluntary. The preference will be to recommend adoption without modification and to encourage the use of international standards by the industry. If you require clarification of the detailed procedures involved, please contact Beverley Barrett at BSI (Tel: +44 (0)181 996 7128).

Control valve noise cut and fieldbus foundation set

Fisher Controls, part of the Fisher-Rosemount Group, has developed a new control valve trim which is said to reduce the noise level of a control valve operating under severe service conditions by up to 40 dBA. According to the manufacturer, such noise attenuation is about 25% to 30% more than that offered by conventional multi-hole trim and tortuous path designs.

Claimed to be particularly suitable for use in installations with high pressure drops and high flow rates, the WhisperFlo™ trim design utilizes laser-machined discs which are stacked and permanently fused into a rigid cage assembly. The stack is precision honed to exact dimensions and ready for immediate use within standard Fisher globe valve designs.

Six key noise control techniques are employed by WhisperFlo: multi-stage pressure reduction; reduced acoustical conversion efficiency at each stage; frequency spectrum shift; exit jet independence; velocity management and a complementary body design.

The Fisher-Rosemount Group also recently announced that a complete suite of Foundation fieldbus products will be available later in 1998.

A digital fieldbus can carry vast amounts of information – not only about the process but also about the equipment controlling it. According to the Group, unlike other fieldbus technologies originally developed for discrete manufacturing applications, the Foundation fieldbus was specifically developed to meet process industry needs. It is designed to offer users equipment inter-operability and incorporates 'device description' technology to accommodate future equipment innovations with no loss of inter-operability.

Tel: +44 (0)1243 863121
Fax: +44 (0)1243 867554

WhisperFlo™ trim

Termite weir oil skimmer unveiled

Heavy-duty skimming and pumping equipment manufacturer Ro-Clean Desmi has unveiled its new Termite Oil Skimmer. Based on the company's proven Terminator design, the new lightweight unit is said to be capable of skimming and transferring all types of oil and is suitable for use in near shore or open water conditions.

The Termite's large, free-floating weir lip system allows nearly six inches of vertical travel which provides good wave following even in choppy seas, states the manufacturer. The weir height adjusts automatically to match the discharge rate of the pump, making the skimmer easy to operate and ensuring high recovery efficiency at all flow rates. According to Ro-Clean, recent tests indicate that the Desmi weir can achieve average recovery efficiencies greater than 60% under wave conditions.

The new skimmer has a draft of only 12 inches, making it particularly suitable for use in shallow waters, while its high buoyance to weight ratio and low inertial mass offers good sea-keeping characteristics.

The skimmer head has a total weight of 210lb with the pump fitted. All components are manufactured in marine grade aluminium, stainless steel or polypropylene. It has a single lift point, towing point and hose connections below the waterline. The unit's screw pump can be easily removed and used independently as a transfer, offloading or tank cleaning pump.

Tel: +1 804 857 7041
Fax: +1 804 857 6989

Millennium audit

Asset management and inventory software company IT-Map has launched Version 2 of its IT-Map 2000 package in order to meet growing customer demand for software that can record the Year 2000 compliance of embedded processors in tools and products as well as software.

Developed in 1996, IT-Map 2000 not only allows organizations to record whether their hardware, software and networks are Year 2000 compliant, it also helps to determine dependencies between components. This enables companies to ascertain the effects of changing one element on the rest of the IT infrastructure.

Version 2 takes the process one stage further by including three more elements: building infrastructure systems such as heating and automatic lighting; products such as televisions and washing machines as well as large projects such as aircraft or submarines; and measurement and testing tools used on the manufacturing shopfloor.

Other new features include a laptop computer inventory collection system; the ability to define compliance procedures that show the different stages of compliance (recording data, contacting supplier, receiving reply from supplier and making product compliant), a built-in word processor, and a report writer and query system.

Available in multi-user PC and client/server versions, IT-Map 2000 prices start at £8,750.

Tel: +44 (0)1582 454454
Fax: +44 (0)1582 402530

Radar-based tank level readings in real time

Saab Tankradar™ Pro is a modular designed non-contact radar level gauge that provides real-time measurements of liquid levels. Three standard versions are available from the Swedish manufacturer Saab Tank Control: (1) Lite – for tanks without internal structures outside hazardous areas and offering a measurement accuracy of ±10 mm; (2) Standard – suitable for most tanks, even those with echo-disturbing internal structures, with an accuracy of ±10 mm; and (3) Gold – the most advanced version with an instrument accuracy of ±5 mm and suitable for most tanks including those equipped with multiple agitators, beams, heating coils and other sources of false echoes. All three versions are said to operate without maintenance at a low life cycle cost.

The tank level gauge system has no moving parts and is not in contact with the surface of the liquid. The unit's antenna is the only part located in the tank and comes in three types: rod, horn, or process seal. Light and simple to install, the gauge is self-calibrating, features an easy to read display and is equipped with serial and analogue outputs.

Tel: +46 31 37 00 00
Fax: +46 31 25 30 22
e-mail: sales.stc@marine. combitech.se

Taking coiled drilling technology subsea

Drilling and well construction operations represent a substantial proportion of offshore field development costs, especially in deep water areas such as the Atlantic Margin. Coiled tubing (CT) technology is increasingly seen as a cost-effective way of putting a drill bit in the reservoir and is currently being applied to a widening range of downhole applications, from new wells to re-entries.

As part of developing the uses of CT technology, the UK Centre for Marine and Petroleum Technology (CMPT) has established a joint industry project to develop 'Drilling Independent Of Depth' (DIODe) – a concept which is based on adapting coiled tubing technology for seabed well construction and intervention operations.

DIODe is perceived as a mobile unit, capable of being easily moved from one seabed location to another with minimal surface facilities and, perhaps, ultimately no surface facilities at all. Using established remote control technology, the system will be controlled via an umbilical to a surface support vessel. The same umbilical will be used to supply DIODe with power, drilling fluids and other consumables, possibly utilizing the closed loop drilling fluid systems developed for underbalanced drilling. According to CMPT, many of the enabling technologies needed to develop such a system are either already in place or close enough to being in place to have sufficient confidence that they will be available soon.

Phase 1 of the project will commence this year with a feasibility analysis, followed by a scoping study designed to flesh out the concept, define the objectives in more detail, properly identify the technology gaps and set out the plans to fill them. This first phase will comprise two parallel activities. One will be to monitor and interact with ongoing projects and studies into the development of CT technology, the other will be to examine the specific needs of a seabed CT unit.

Phase 2 will fill the technology gaps, developing the outline design of a complete system and planning for the development and field testing of a prototype. Phase 3 will cover the building and testing of a full prototype. The final objective is to develop a generic technology set upon which all the contributing contractors and manufacturers can base their own competitive in-house products and services.

Tel: +44 (0)1224 853400
Fax: +44 (0)1224 706601
e-mail: cmpt@cmpt.co.uk

EPS patent pending

Baker Hughes' ESP (electrical submersible pump) division Centrilift has announced that the company has applied for a patent for an innovative solution to deploying ESPs using coiled tubing with the electrical power cable running down the centre of the tube. The system is known as 'Electro-coil'.

The new technology is expected to enable oil companies using ESPs to pump fluids to the surface to cut costs as installation and workover times are claimed to be substantially quicker than with traditional methods. In addition, the system is said to be capable of pumping greater volumes of fluids up the main well casing rather than up the $2^{3}/_{8}$-inch coiled tubing with the cable insulated inside the tube.

The new system is to be installed in wells in Alaska. The first North Sea installation to use Electro-coil tubing deployment is expected to be announced soon.

Tel: +44 (0)1224 772233
Fax: +44 (0)1224 771021

Diesel pump discount

Midlands-based Avery Berkel Forecourt Services is offering a 10% discount on the price of its Auditor FS pump controller which has recently been re-engineered.

The Auditor FS system combines a heavy-duty diesel pump and fuel monitor in a single, space-saving unit. Capable of dispensing and monitoring fuel usage from a single piece of equipment eliminates the need to build up a piecemeal system of expensive additional parts, states the company. The unit's compact design makes it particularly suited to confined locations or where stand-alone or wall-mounted fuel monitors are unsuitable. It requires a 240V power supply and comes with a 12-month parts and labour warranty.

Tel: +44 (0)121 558 1112
Fax: +44 (0)121 555 6062

NEWS Technology

Handy gas and vapour detection

Anachem, in association with Gastec, has unveiled a new gas detector tube pump for the measurement of gas and vapour concentrations in the atmosphere.

Manufactured from a rugged polymer for easier handling, durability and a better grip, the device incorporates an end of stroke indicator in the handle for easier reading when analysis is complete. It also features a lighter pull handle than found with other models.

There are in excess of 450 different types of detection tube available from Anachem for use with the Gastec Precision Gas Sampling Pump. Coupled with the launch of this latest development is a new comprehensive detector tube list with new tube chemistries.

Anachem
Tel: +44 (0)1582 745000
Fax: +44 (0)1582 391768

Visual indicators

A new range of large visual indicating instruments with display ranges from 100 mm to 300 mm diameter is now available from Record Electrical, part of the RTM Group.

The intrinsically safe panel/control room instruments have been tested by BASEEFA and have received Intrinsic Safe Certification to European standards.

The units have been specifically designed for the control room or field mounted within an IP66 enclosure.

Tel: +44 (0)161 928 6211
Fax: +44 (0)161 926 9750

Portable oil and grease analyser

Infracal is a new, small, portable oil/grease analyser now available in the UK from Quantitech. Using a microprocessor controlled infrared filtometer, the unit is designed to accurately measure oil and grease concentrations in solids, sludges and water. The result is displayed in parts per million (ppm) or mg/l on an LED screen. Analysis typically takes less than 30 seconds per sample, claims the manufacturer.

The analyser is small and compact, and weighs less than 5 lb. It operates from a 12V dc power supply, can therefore be run from a car battery, and has no moving parts requiring adjustment or alignment. The unit is also said to be insensitive to vibration or changes in temperature and humidity.

A choice of sample stages is available accepting either 1 cm quartz cuvettes or IR cards.

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

Cutting storage tank vapour emissions

A significant amount of vapour is emitted via an underground storage tank's vent pipe during filling operations. For example, during a 36,000-litre drop the equivalent of 72 litres of fuel can be lost through such emissions, representing up to £36 in potential revenue according to Lincoln Partners which has developed a new add-on device to eliminate such losses.

Conventionally, when a delivery takes place air is forced down the tanker connection hose and internal pipework to the bottom of the tank which causes extreme turbulence. The vapour this produces is forced into the atmosphere through the vent pipe.

The Piccolo device developed by Lincoln Partners however, is said to effectively purge the system of air before it reaches the product, dramatically reducing turbulence and eliminating vapour loss almost entirely. It is also claimed to offer the advantage of reduced delivery time and enhanced gauging accuracy, in addition to increased profitability.

The unit can be retrofitted in around two hours or can be installed during tank manufacture.

Tel: +44 (0)116 277 2700
Fax: +44 (0)116 277 2900

New engine lube oil cuts fuel consumption

Fina recently unveiled a new, 100% synthetic lubricant for passenger cars that is said to dramatically improve fuel efficiency and performance in both gasoline and diesel engines.

The low volatility of Fina First 0W40 lubricant is claimed to help engines reduce fuel consumption by up to 30% when compared with conventional mineral or semi-synthetic oils and even fully synthetic grades of higher SAE viscosity. It is also said to offer superior protection with an advanced, fast-flow formulation that reduces the engine's internal friction, creating an oil film on critical engine parts much faster than other motor oils with a high SEA viscosity grade.

Tel: +44 (0)1372 726226
Fax: +44 (0)1372 744769

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

NEW Publications

Safety and the Year 2000

(Available from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 6FS, UK). ISBN 0 7176 1491 3. 76 pages. Price: £15.

This report, commissioned from Glasgow-based consultants Real Time Engineering, finds that the Year 2000 date-discontinuity problem potentially exists in every type of programmable electronic system – from mainframe computers to microprocessors and embedded chips. The publication begins with an overview of the types of problem that can occur, illustrating the ways in which date-sensitive systems may malfunction or crash. It goes on to offer practical guidance and a methodology which businesses can use in assessing how far their safety-critical systems are vulnerable to date-discontinuity problems. It also provides guidance, once problems have been identified, on how to plan and implement a remedial programme, with advice on setting priorities using a risk-based approach.

It is interesting to note that although the change from 1999 to 2000 is the most readily-recognized aspect of the Year 2000 problem, 9 September 1999 is also a potentially critical date because of its representation as '9999', which some computer systems may interpret as an 'end code' at which point the system may shut down. There are also potential problems associated with the fact that 2000 is a leap year – some systems may be incorrectly programmed and risk failure at 29 February 2000 or 31 December 2000 (the 366th day).

Mooring Equipment Guidelines, Second Edition 1997

(Available from Witherby & Co Ltd, 32–36 Aylesbury Street, London EC1R 0ET, UK). ISBN 1 85609 088 4. 185 pages. Price (hardback): £60 (postage included for UK-based subscribers).

Wide variations are found in mooring practice and equipment in the shipping industry. At one extreme moorings may be inherently unsafe for certain environmental conditions while, at the other, an incomplete understanding of mooring requirements could result in a system which is overdesigned and unnecessarily expensive for the purpose intended. This book has been published by the Oil Companies International Marine Forum (OCIMF) in a bid to help establish a set of guidelines for mooring practice and equipment. The information is applicable not only to oil tankers but also to many types of cargo carrying ships. First published five years ago and now extensively revised, the book sets guidelines for recommended minimum requirements developed by an OCIMF task group which included representatives from Intertanko, the International Chamber of Shipping and the International Association of Classification Societies. The text is supported by nearly 80 drawings and plans.

Tomorrow's World: Britain's Share in a Sustainable Future

Duncan McLaren, Simon Bullock and Nusrat Yousuf (Earthscan Publications, 120 Pentonville Road, London N1 9JN, UK). ISBN 1 85383 511 0. 382 pages. Price: £12.95.

Researched and written by the Friends of the Earth, this publication argues that Britain needs to significantly reduce its rate of consumption of resources – energy, metals, minerals, chemicals, land, wood and water – in order to allow developing countries to escape from poverty and to prevent further environmental damage. According to the environmental group around 20% of the Earth's population currently consumes over 80% of the world's available resources. Furthermore, while many in the western world lead a life of material comfort, around 1.3 billion people exist on less than $1 per day. The book sets targets for reduced resource consumption levels and aims to show how such targets can be met. These goals include a 30% cut in carbon dioxide emissions by 2010 and 90% by 2050; increasing car efficiency by 50% by 2010 and cutting traffic levels by 10% by 2010.

Subsea 97 – Production and Control

(Knighton Enterprises, 2 Marlborough Street, Faringdon, Oxon SN7 7JP, UK). ISBN 1 898237 34 8. 208 pages. Price: £85 (plus p&p).

This publication is a compilation of the papers presented at Subsea 97, held in London on 10 and 11 December 1997. Focusing on subsea production and control, the proceedings cover a range of topics including a look at the use of multiphase boosting and flowmeters to enhance production and well testing, subsea high pressure/high temperature developments, future challenges in subsea production control and life cycle cost analysis of deepwater subsea projects.

Employment and Industrial Relations Issues in Oil Refining

(International Labour Office, Millbank Tower, 21–24 Millbank, London SW1P 4QP, UK). ISBN 92 2 110769 8. 94 pages. Price: £9.45 (plus p&p).

At its 267th Session in November 1996, the Governing Body of the International Labour Office decided to include in the programme of sectoral meetings for 1998/99 a tripartite meeting on employment and industrial relations issues in oil refining. This publication has been prepared as a basis for discussions at the meeting which will be attended by representatives from 19 different countries around the world. The report looks at recent economic and technical trends in the refining sector and general employment trends at a regional and national level. It also addresses the institutional and procedural aspects of industrial relations as well as industry specific and national features. Other industrial relations issues covered are contract labour; health, safety and environment; remuneration; and working conditions.

FT Guide to North Sea Operators, 1998: A Company-by-Company Review

Meg Leitch (FT Energy, Maple House, 149 Tottenham Court Road, London W1P 9LL, UK). ISBN 1 85334 889 9. 323 pages. Price: £380.

First published in 1987, this comprehensive listing details each North Sea operator in alphabetical order providing contact information for both the parent company and its UK operations together with details of licence interests and supplementary information where available. Data including details of the chosen development option, current field status, contracts and production capacities on a field-by-field basis for each project in which the operator has an interest.

Motor Vehicle Emission Regulations and Fuel Specifications: Part 1 – Summary and Annual 1996 Update *and* Part 2 – Detailed Information and Historic Review (1970–1996)

(Concawe, Madouplein 1, 1210 Brussels, Belgium). Part 1: 78 pages; Part 2: 228 pages.

Prepared for the Concawe Automotive Emissions Management Group by its Special Task Force AE/STF-3, Part 1 of this report (No. 5/97) summarizes changes in worldwide legislation and regulations governing motor vehicle emissions, fuel specifications and fuel consumption. It details current and proposed legislation on emissions limits and emissions testing, vehicle inspection and maintenance programmes and legislation aimed at controlling in-service emissions performance, fuel consumption and carbon dioxide emissions, plus fuel specifications and characteristics. It should be read in conjunction with Part 2 which provides similar information on a historical basis and covers in detail many aspects of the topics covered in Part 1. It is intended that Part 1 will be updated annually, whereas Part 2 – a comprehensive reference document – will be revised at longer term intervals.

Membership News

NEW MEMBERS

Mr S Alhat, India
Mr K M Bacchus, Twickenham
Mr S Barnes, Ocean Energy Limited
Mr P Bearne, AIC
Mr C Bennett, Stanford-le-Hope
Mr F B Beveridge, Fife
Mr D J Brown, Burnley
Mr D Burakov, Russia
Mr G J Burnett, Metco Services Limited
Mr M P Byatt, Clyde & Company
Mr M C Carey, Carbern Limited
Mr G A Carney, Peter Brotherhood Limited
Mr M Cassidy, Cleveland
Dr J Christopeit, Avia Mineralol AG
Mr D P Collins, Adlers Chartered Surveyors
Mr P Collishe, Doncaster
Mr R T Cox, Caltex Petroleum Corporation
Ms J Daly, Engen Petroleum Limited
Mr M R Devlin, Ellon
Mr S J Doherty, Ware
Ms M A E Dunne, Clyde & Company
Mr K Dunstan-Kundaya, Kent
Mr N Dvorets, Polar Shelf Limited
Mr E Erdelyi, Czech Republic
Ms L A Floyd, Apache Corporation
Ms T Fokianou-Malaveta, Dep-Eky SA
Mr W Folta, Polar Shelf Limited
Mr C Fowler, Amoco (UK) Exploration Company
Professor M F Fox, Leicester
Ms H P Franklin, Felixstowe
Mr A Frolov, ISC Arkhangelskgeoldobycha
Mr M J Gaughan, Aberdeen
Mr N R Girdham, Barton-on-Humber
Mr B Gray, William De Broe plc
Mr L Hammer, Polar Shelf Limited
Mr S A Hatton, 2H Offshore Engineering Limited
Mr P Heaton, Manchester
Dr J A Helm, France
Ms P Hodges, Herbert Smith
Mr T E Howell, Wotton-Under-Edge
Ms N Hueller, Commerzbank AG
Mr G R Hughes, J & H Marsh & McLennan Marine Limited
Dr P T Jeffs, Cieco Exploration & Production Limited
Mr A C Jonas, Burgess Hill
Mr E R Jones, AMEC Process & Energy Limited
Mr Y Kadjoian, ISC Arkhangelskgeoldobycha
Mr H Kaye, Malta
Mr A Khramushin, Nitek Corporation
Mr J E Kirkman, Faithful & Gould
Mr K Kohlhase, Germany
Mr M C Lavallin, Exeter
Mr D Lee, Maersk Contractors
Mr A J Leeser, CDP
Mr T V Leport, Scunthorpe
Dr J J M Lewis, Landmark Graphics Corporation
Mr J C T Lisle, Arthur Andersen
Mr A T Lloyd, Oracle Corporation UK Limited
Mr R Loekting, Art A/S
Mr W Lui, Greenford
Ms C MacDougall, Paribas
Mr O Makhdumi, Marketline International
Mr M Matin, Esso Petroleum Co Limited
Mr I J McGawn, Maybole
Mr D J Miles, NERA Telecommunication
Mr J S Mills, Shell UK Limited
Mr M Minale, Minale Tattersfield & Partners
Mr A Mitrofanov, Nitek Corporation
Mr M Morgan, Matthews Daniel International
Mr E Morrison, Aberdeen
Mr J A C Morrow, Lymington
Mr C Murton, Alan Cobham Engineering Limited
Mr J L Nicks, Evesham
Mr R Nocivelli, Marketline International
Mr T J Oborne, A Searle & Company
Ms S Penhallurick, NatWest Bank
Mr A V Pheasant, Dresdner Kleinwort Benson Limited
Mr A Plant, Denholm Shipping Services Limited
Mr D Preston, BG Plc
Mr U Pumpurs, Ventspils Transit Service
Ms D Pytel, Interfocus
Mr M Quinlan, Welwyn
Mr S Rasool, Gaffney Cline & Associates
Mr A Rauswall, Borealis AB
Dr M A Ridley, London
Mr K Rolls, Sedgwick Energy Limited
Mr C Russell, Felton
Dr M Salim, Saudi Aramco
Mr F Sigon, Snamprogetti Limited
Mr H M Skipp, Guildford
Mr I Skoks, Ventspils Nafta
Ms H L Stack, Yorkshire Electricity Group
Mr B D Stanley, Kuwait Petroleum Italia
Mr D G Steenkamp, Sasol Oil (Pty) Limited
Mr I Stuart, Zenocean
Mr V Taknov, Nitek Corporation
Mr B C Taylor, KCA Drilling Limited
Mr M A Thomas, Glos
Mr Y Tyustin, ISC Arkhangelskgeoldobycha
Mr S Ullah, Western Atlas International
Dr A van Klarenbosch, Marakon Associates
Mr J N W Vickers, J Henry Schroder & Co Limited
Mr S Vithal, India
Mr A J R Warr, Bromsgrove
Mr N T Wood, Arthur Andersen
Mr M J Young, Aberdeen
Dr E Zahavi, Caribbean Petroleum Corporation

NEW STUDENTS

Ms V L Acha, Hampshire
Squadon Ldr S M Bickers, School of Petroleum
Lt H J Clark, School of Petroleum
Mr D P Homan, Irish Republic
Ms T J Martin, School of Petroleum
Mr R Nadek-Sepaht, London
Mr M O Onyekweleonwu, Nigeria
Mr O A Oyetunji, Dundee
Mr P Oza, London
Flt Lt S N Penn, School of Petroleum
Mr M A Preston, School of Petroleum
Mr J O Sampson, Dundee
Mr M A Scannell, Oxon
Mr P M Skinsley, School of Petroleum
Mr B J Smith, Flintshire
Mr N Thwaites, London
Mr M Vassiliou, London

DEATHS

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

	Born
J Church	1927
J G Davies BA	1932
D A Dean	1928
S Dolman	1937
Dr W Domzalski	1918
G E Everist	1911
D R E Garrett	1930
G A F Grindle	1902
A L Mills	1926
H Singh	1945
J A L Spiers	1926

Membership News

NEW FELLOW

Dr Geoff Tobin FInstPet
Dr Geoff Tobin is a Senior Process Manager at MW Kellogg's European Headquarters near London. He is involved with refinery strategic planning and conceptual studies as well as technology upgrading. Geoff spent most of his 25-year career in the refining and petrochemical businesses with the BP Group of Companies, being based in Belgium, Australia, the UK and the US. He also worked for a time at Foster Wheeler Energy Ltd as Chief Refinery Consultant.

NEW CORPORATES

Reliance Industries Ltd, 9th Floor, Maker Chambers IV, Nariman Point, Mumbai 400 021, India.
Tel: +91 22 284 7964 Fax: +91 22 2851835
e-mail:ravinder_kumar@ril.com
Representative: Mr Ravinder Kumar, General Manager
Reliance Industries Ltd is India's largest private sector industrial company in terms of gross assets, sales and profit. Its business activities include textiles, petrochemicals, exploration and production. Also a 300,000 b/d refinery under construction on the West Coast of India is likely to commence during 2Q1999. Reliance Industries Ltd enjoys a favourable stand in the international markets.

Petronas Carigali Overseas (UK) Ltd, Television House, 269 Field Lane Road, Eastcote, Middlesex HA4 9XA.
Tel: +44 (0)181 582 0181 Fax: +44 (0)181 582 0161
Representative: Mr Nusral Danir, General Manager
Petronas Carigali Overseas (UK) Ltd is a subsidiary of Petronas, the national oil company of Malaysia. The company has been established in the UK since 1997 and is currently seeking oil and gas opportunities in this region.

Safeway Stores plc, Safeway 3, 6 Millington Road, Hayes, Middlesex UB3 4AY.
Tel: +44 (0)181 756 3868 Fax: +44 (0)181 756 2946
Representative: Mr Andy Goddard, Category Controller
Safeway Stores plc is one of Britain's leading food retailers with stores throughout England, Scotland, Wales and Northern Ireland. Over 160 stores have petrol stations built to exceed current and expected environmental standards.

516 Specialist Team Royal Engineers, Chetwynd Barracks, Chilwell, Nottingham NG9 5HA.
Tel: +44 (0)115 957 2379 Fax: +44 (0)115 957 2377
Representative: Captain P A McIlveen RE
516 Specialist Team Royal Engineers supplies the RAF, Army and Royal Marines with the expertise needed in the construction and repair of permanent and expeditionary petroleum infrastucture to enable them to function and complete military tasks.

Forecourt Engineering Ltd, 15 Invincible Road, Farnborough, Hampshire GU14 7QU.
Tel: +44 (0)1252 378 222 Fax: +44 (0)1252 377 433
Representative: Mr Tony Jenner, Managing Director
Forecourt Engineering Ltd is involved in the installation and maintenance of pumps, tanks and associated equipment for USL in retail and commercial refuelling environments. It also offers specific support for Red Jacket and Pumptronics series 100 and 200 equipment.

Williams Southern Ltd, Turnfield Court, The Moors, Thatcham, Berkshire RG19 4PT.
Tel: +44 (0)1635 871828 Fax: +44 (0)1635 871784
Representative: Mr G McGiven, Contracts Director
Williams Southern Ltd is a building and civil engineering contractor, specializing in the design and building of petroleum filling stations. Services offered include site decommissioning, demolition, refurbishment and maintenance through to design and construction of new or re-developed sites.

T.R.B. (London) Ltd, 83–85 Mansell Street, London E1 8AN.
Tel: +44 (0)171 481 9442 Fax: +44 (0)171 480 5951
Representative: Mr Neil Langley-Evans, Manager
T.R.B. (London) Ltd is an insurance and re-insurance consultants to the oil, gas and petrochemical industry.

Corporate members of the Institute are entitled to hire our well-equipped Lecture Theatre and meeting rooms. For those requiring a central London venue at a reasonable cost, our facilities offer very good value. Catering can be provided, if required. For brochure and further information, please contact Susan Ashton on **Tel: +44 (0)171 467 7107** or **e-mail: sashton@petroleum.co.uk**

Branches Regional Organizer appointed

We have now appointed Peter Gauntlett as our Branches Regional Organizer in the North of England. Peter has many years of experience in the industry, particularly in fuels distribution and has many exciting contacts across the region.

We have made a second appointment, initially in the Midlands area, where Mike Ward (previously Chairman of Midlands Branch) is going to work one day a week for us, specifically on developing relations with current and potential corporate members.

The IP and Lifetime Learning

Lifetime Learning means, quite simply, learning as a way of life. In today's business climate, you, the individual, must now take responsibility for your own 'employability' and the management of your own career. There is a growing and continuing need to retrain, develop new skills and acquire additional expertise so as to remain employable. You can obtain much more information about Lifetime Learning and the IP's activities in this area in the *Lifetime Learning Supplement* to the 1998 February edition of *Petroleum Review*.

What will the IP do for me?

As well as providing a forum for debate and networking, a major source of industry related information, learning experiences and signposts to other learning opportunities, the IP has now created a *Lifetime Learning Plan* and *Workbook* which you can use to manage your own development. It provides guidance and advice as well as a model from which to work. The IP *Lifetime Learning Plan* and accompanying *Workbook* are available only to members of the Insitute who should contact our Membership Department for a copy.

Around the Branches

A full listing of Branch Events is available on the IP website:
http://www.petroleum.co.uk
or, if you require further information please contact your individual Branch Secretary.

EVENTS Forthcoming

MARCH

9–11 **Singapore**
Asia Upstream '98
Details: Babette van Gessel, Global Pacific & Partners, South Africa
Tel: +27 11 782 3189
Fax: +27 11 782 3188
e-mail: global.pacific@pixle.co.za

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

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

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

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

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

14–19 **Dubai**
Middle East Petroleum & Gas Conference
Details: The Conference Connection Inc, Singapore
Tel: +65 356 0960/1
Fax: +65 356 0962

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

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

23–24 **Vienna**
Policy and Multilateral Investment in the Oil and Environmental Industry of the CIS Countries
Details: Mrs E Holacky, PREMAG Conference Services
Tel: +43 1 502 330
Fax: +43 1 502 3311

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

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

24–25 **London**
Energy for Industry 98
Details: IIR Exhibitions, UK
Tel: +44 (0)171 453 5309
Fax: +44 (0)171 453 5306
e-mail: helenwhalley@compuserve.com

24–25 **Aberdeen**
Reservoir Engineering Forum '98: Improving Recovery Rates in Marginal Fields
Details: EuroForum, UK
Tel: +44 (0)171 878 6886
Fax: +44 (0)171 878 6885

25–26 **Aberdeen**
Cradle to Grave: Whole Life Asset Management in Oil
Details: Suzanne Epstein, IQPC, UK
Tel: +44 (0)171 691 9191
Fax: +44 (0)171 691 9192
e-mail: enquire@iqpcmail.co.uk

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

25–26 **Watford, UK**
European Conference – Product Data Technology Days 1998
Details: Dan Lipsher, Society of Petroleum Engineers, US
Tel: +1 972 952 9306
e-mail: dlipsher@spelink.spe.org

25–26 **UK**
PDT Days '98
Details: Bill Mesley, Quality Marketing Services
Tel: +44 (0)1252 878482
Fax: +44 (0)1252 877386
e-mail: billm@qmsstep.demon.co.uk

26–27 **Amsterdam**
IPPs & Merchant Power Plants in Europe
Details: Rebecca Luing, IBC Financial Focus, UK
Tel: +44 (0)171 453 2703
Fax: +44 (0)171 323 4298
e-mail: rebecca.luing@ibcuk.co.uk

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

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

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

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

30–3 April **Oxford**
1998 International Oil Supply, Transportation, Refining and Trading Course (SP1)
Details: Jenny Butterworth, The College of Petroleum and Energy Studies, UK
Tel: +44 (0)1865 250521
Fax: +44 (0)1865 791474
e-mail: jenny@colpet.ac.uk

31–1 April **Aberdeen**
Evacuation, Escape and Rescue Offshore (EER '98)
Details: Sarah Moore, Energy Logistics, UK
Tel: +44 (0)1628 525492
Fax: +44 (0)1628 521928

31–2 April **UK**
Subsea Engineering Training Course and Workshop
Details: OCS Technology Group, UK
Tel: +44 (0)1462 712049
Fax: +44 (0)1462 711889
e-mail: GroupOCS@aol.com

EVENTS Forthcoming

APRIL

1–3 **London**
SCADTEL '98
Details: Rebecca Smith, Energy Logistics International, UK
Tel: +44 (0)1628 525492
Fax: +44 (0)1628 521928

1–4 **Vietnam**
Vietnam Oil & Gas Expo '98
Details: CP Exhibition, Hong Kong
Tel: +852 2511 7427
Fax: +852 2511 9692

1–3 **Amsterdam**
Production Chemicals in the Oil Industry
Details: The Centre for Professional Advancement, Amsterdam
Tel: +31 20 638 28 06
Fax: +31 20 620 21 36

2–3 **Manchester**
8th Biennial Colloquium on Computational Fluid Dynamics
Details: Mrs I Bowker, UMIST, UK
Tel: +44 (0)161 200 3702
Fax: +44 (0)161 200 3733
e-mail: Irene.Bowker@umist.ac.uk

12–16 **Paris**
The Biennial Industrial Technology and Process Exhibition
Details: Comite des Expositions de Paris, France
Tel: +33 1 49 09 60 00
Fax: +33 1 49 09 60 03

13–17 **Jakarta**
Basic Seismic Interpretation Including 3-D
Details: OGCI Training Inc, US
Tel: +1 918 742 7057
Fax: +1 918 742 2272
e-mail: training@ogci.com

14–18 **Staffordshire, UK**
Geoscience '98
Details: The Geological Society, UK
Tel: +44 (0)171 434 9944
Fax: +44 (0)171 439 8975
e-mail: conf@geolsoc.cityscape.co.uk

15–16 **Houston**
SPE/International Coiled Tubing Association Roundtable
Details: Dan Lipsher, Society of Petroleum Engineers, US
Tel: +1 972 952 9306
e-mail: dlipsher@spelink.spe.org

15–18 **Bath, UK**
Corrosion and the Environment
Details: Caproco International, UK
Tel: +44 (0)1480 407600
Fax: +44 (0)1480 407619

16 **Southampton, UK**
Emerging Markets for New Materials and Adhesives in the Marine Environment
Details: Offshore Technology Management, UK
Tel: +44 (0)1483 821543
Fax: +44 (0)1483 821544

20 **London**
Multinational Investment and Human Rights: Forging a Consensus
Details: The Royal Institute of International Affairs, UK
Tel: +44 (0)171 957 5700
Fax: +44 (0)171 321 2045

20–21 **London**
1998 North Sea Conference: The Infrastructural Challenges Ahead
Details: Emma Jackets, Petroleum Economist, UK
Tel: +44 (0)171 831 5588
Fax: +44 (0)171 831 4567
e-mail: petecon2@easynet.co.uk

20–21 **London**
Fuel Cell Technology: Producing 'Green Cars' at a Profit
Details: Anita Ferrari, IQPC, UK
Tel: +44 (0)171 691 9191
Fax: +44 (0)171 691 9192
e-mail: enquire@iqpcmail.co.uk

20–22 **Bahrain**
3rd Middle East Geosciences Conference and Exhibition
Details: Overseas Exhibition Services, UK
Tel: +44 (0)171 486 1951
Fax: +44 (0)171 486 8773
e-mail: oilexhibit@aol.com

21 **London**
Environment Trade and Investment
Details: The Royal Institute of International Affairs, UK
Tel: +44 (0)171 957 5700
Fax: +44 (0)171 321 2045

21–22 **Stavanger**
FPSO-Norge '98
Details: OCS Technology Group, UK
Tel: +44 (0)1462 712049
Fax: +44 (0)1462 711889
e-mail: GroupOCS@aol.com

21–22 **Istanbul**
Mediterranean Gas Conference
Details: Overview Gas Conferences, UK
Tel: +44 (0)171 613 0087
Fax: +44 (0)171 613 0094

21–22 **London**
New Entrants in European Energy
Details: Rebecca Luing or Sarah Ritchie, IBC UK Conferences
Tel: +44 (0)171 453 2703
Fax: +44 (0)171 323 4298

22–23 **Bahrain**
Geo '98
Details: Arabian Exhibition Management WLL, Bahrain
Tel: +973 550033
Fax: +973 553288
e-mail: aeminfo@batelco.com.bh

22–23 **Aberdeen**
Managing Your Post-Inventory Year 2000 Project in the Oil and Gas Industry
Details: EuroForum, UK
Tel: +44 (0)171 878 6886
Fax: +44 (0)171 878 6885

22–25 **Marrakesh**
26th IRU World Congress – Road Transport, Driving Trade and Tourism
Details: International Road Transport Union, Switzerland
Tel: +41 22 918 27 00
Fax: +41 22 918 27 41

23–24 **Aberdeen**
Advances in Downhole Technologies
Details: IBC UK Conferences
Tel: +44 (0)171 453 5491
Fax: +44 (0)171 636 6858

23–24 **Houston**
Third Annual Gas & Electricity Trading Summit
Details: Global Change Associates, US
Tel: +1 914 949 6798
Fax: +1 914 948 5301
e-mail: 76111.424@compuserve.com

23–24 **Stavanger**
Floating Production Training Course
Details: OCS Technology Group, UK
Tel: +44 (0)1462 712049
Fax: +44 (0)1462 711889
e-mail: GroupOCS@aol.com

23–24 **London**
Transnet 98: Emerging Channels & Technology for Retail Financial Services
Details: Chiara Muzzi, Worldwide Business Research, UK
Tel: +44 (0)171 691 3000
Fax: +44 (0)171 691 3001
e-mail: transnet@wbr.co.uk

26–1 May **Perth**
LNG Symposium
Details: The Alphatania Partnership, UK
Tel: +44 (0)171 613 0087
Fax: +44 (0)171 613 0094

IP Conferences and Exhibitions

Conference and Exhibition

Oil Spill Response – The National Contingency Plan

Gatwick: 10–11 March 1998

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

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

This Conference will address all the important issues:

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

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

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

International Conference on

Emerging Markets for Emission Trading – Opportunities from the Kyoto Protocol and the Implications for Business

London: 11–12 May 1998

Sponsored by the United Nations Conference on Trade and Development (UNCTAD) and supported by the Department of Trade and Industry and the Department of the Environment, Transport and the Regions.

Speakers include: The Rt Hon **Michael Meacher** (Minister for the Environment), **David Varney** (Chief Executive, BG plc), **Adair Turner** (CBI), **Dr William Kyte** (Head of Corporate Environment Unit, PowerGen plc), **Denis Tunnicliffe** (Managing Director, London Underground), **Bill Hare** (Greenpeace International), **John R S Guiness** (Chairman, BNFL) and **Ken Newcombe** (Division Chief, World Bank, USA).

The Programme and registration form will be available mid-March 1998.

International Conference and Exhibition

Metalworking Fluids

Birmingham: 3–4 June 1998

The Programme and registration form will be available mid-March 1998.

Annual Introduction Courses

Introduction to Oil Industry Operations

London: Wednesday 17–Friday 19 June 1998 and

Introduction to Petroleum Economics

London: Monday 22–Wednesday 24 June 1998

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

International Conference

Aviation 2000 – Safety and Operations

London: 1–2 October 1998

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

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

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

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

Diary Dates

Exploration & Production Discussion Group

'1998: Outlook and Challenges for the Oil Industry'

Thursday 12 March 1998 17.00 for 17.30 until 19.00

Andrea Felsted, Energy Correspondent, Lloyd's List International

IP Contact: Jenny Sandrock

Energy Economics Group

'The Future Is Not What It Used To Be'

Wednesday 25 March 1998, noon – 14.15

Sir Malcolm Rifkind,
consultant to BHP Petroleum Ltd

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

This meeting includes a buffet lunch at a cost of £15. Prior registration is essential. Please apply for a form.

IP Contact: Jenny Sandrock

Energy Economics Group

in association with London Oil Analysts Group (LOAG)

'Financing the Oil Industry'

Tuesday 21 April 1998, 17.00 for 17.30

Peter Nicol, Oil Equity Research Analyst, Goldman Sachs
and
Carol Bell, Oil Banker, Chase Manhattan Bank

IP Contact: Jenny Sandrock

All meetings are held at the Institute of Petroleum unless otherwise stated. Please tell the IP contact if you plan to attend any of these free meetings.
Tel: +44 (0)171 467 7100
Fax: +44 (0)171 255 1472

It just goes to prove that not all branch meetings are technically based! As you can see from the photo, Jo and Tracey from the IP's Membership Department are getting to grips with the origins of Gin. Essex Branch invited the staff from the IP to join them for a special evening which featured Hugh Williams (above) and Liz Page from United Distillers talking about just how the taste and distinctive smell of Gordon's Gin is created – and it looks as if they also got to sample it for themselves!

MOVES People

John Thompson has replaced **Alex Blake-Milton** as Corporate Communications Manager, Elf Oil UK. He has been with the company for 26 years.

Gary L Tooker, Chairman of the Board of Directors of Motorola, has been elected to the Arco Board of Directors. He joined Motorola in 1962, and held various positions including Chief Operating Officer, President, and Vice Chairman and Chief Executive Officer.

The Zurich Group has appointed *Leonard Magrill*, previously Director and General Manager, Marketing and Planning of Texaco, as Head of Development for its Global Energy Unit. Dr Magrill has 24 years' experience in planning, supply, operations and finance in most aspects of the energy sector and has held UK board level appointments for the last five years. He will provide strategic analysis and guidance on the energy industry.

Chevron Corporation has appointed **Gary M Masada** as President of Chevron Research and Technology Co, and **Hayward A Payne** as President of Chevron Real Estate Management Co. Masada replaces **Bruce Frolich** who has retired after a 30-year career at Chevron. Masada started his career with Chevron in 1972 and was most recently Manager of Workforce Planning and Leadership Development for Chevron Corp. Payne replaces **John Westmoreland** who left to lead Chevron Corp's Year 2000 computer conversion. Payne was most recently General Manager of Technology Support and Laboratory Director for Chevron Petroleum Technology Co.

JR Thomas has been appointed Retail General Manager of BP, based in Milton Keynes. He succeeds **Bret Holden**, who now works in BP Oil's executive office in London. Thomas was previously a Senior Business Advisor and the BP Oil Brand Manager at BP's headquarters in London before his last position of Retail Marketing Manager for Europe.

Anne Marie Cannon, who joined Hardy Oil & Gas in 1996, has joined the company's Board as Business Development Director. Cannon has 14 years' experience in economic planning, management and corporate finance gained during various positions within Shell Expro, Thomson North Sea and Schroders.

Following **Martin Saarikangas'** appointment as President of Kvaerner's Shipbuilding Group, changes in the organization have included the appointments of **Pekka Laitto** as President and COO; **Kaj Liljestrand** as Executive Vice-President, Marketing and Sales; **Seppo Kuosa** as Senior Vice-President and Yard Manager of Kvaerner Masa-Yards' Helsinki New Shipyard; and **Toivo Ilvonen** as Manager of Purchasing at Kvaerner Masa-Yards' Turku New Shipyard.

Dr Gert Maichel, spokesman of the Management of Kassel-based Wingas GmbH, has become Director of the Thermosets Department at BASF AG in Ludwigshafen. **Burkhard Genge** has taken over Maichel's previous responsibilities in addition to his activities as Member of the Executive Board of Wintershall AG.

Arve Johnsen, former President and Chief Executive of Statoil for 15 years, has joined the Board of Directors of Tuskar Resources plc. Johnsen operates his own law firm and is a director of a number of companies. **Frank Traynor** has retired from the Board. He has been associated with Tuskar since 1982 and a Director for many years.

The Society of Petroleum Evaluation Engineers (SPEE) officers for 1998 are: President – **Gene B Wiggins III** (Spirit Energy 76); Vice-President – **Andrew A Merryman** (Coopers & Lybrand); and Secretary/Treasurer – **Richard J Miller** (Richard J Miller & Associates). Immediate Past President, **Forrest A Garb** (Forrest A Garb & Associates) is the fourth member of the Executive Committee. New board members include: **J D Hughes** (Aggieland Salt Water Disposal); **Brian E Ausburn** (J R Butler & Co); and **Harry J Gaston**, Jr (Ryder & Associates).

Peter Hollins has taken up his post as British Energy's new Chief Executive, based at the company's London headquarters. Hollins was previously Executive Director of EVC, a joint venture between ICI and Enichem of Italy.

Det Norske Veritas (DNV) has named *Dr Gary Kenney* as Director of its Process Industry Group in the US. Kenney joined DNV in 1994 with 20 years' diverse risk-oriented experience which he gained with Cremer and Warner, the Arabian American Oil Co (now Saudi-Aramco), Bell Laboratories and Firestone Tire & Rubber Co.

Atlantic Power has appointed *Iain Lanaghan* as Group Finance Director. Lanaghan was previously with PowerGen International where he held the position of Finance Director, responsible for investments of $600mn in international projects covering financing, construction and operations in Australia, Europe, India, Indonesia and Thailand.

Exxon's Board of Directors has nominated **Walter V Shipley** for election as a Director at the company's annual meeting in April. Shipley is Chairman and Chief Executive Officer of the Chase Manhatten Corporation and the Chase Manhattan Bank. He is also a Director of Bell Atlantic Corporation and Champion International Corporation.

Kevin Watts, Corporate Development Director of Enterprise Oil, has been appointed to the Board as an Executive Director. In addition to his current responsibilities he will take responsibility for new ventures and the development of new core business areas.

William E Wade is the new President of Arco. He was previously Executive Vice-President with responsibility for domestic and international oil and gas businesses. **Ken Thompson**, President Arco Alaska Inc has been appointed Executive Vice-President with responsibility for the upstream operations in Alaska, the Asia-Pacific rim and California, as well as overseeing the company's worldwide exploration programme. **Kevin O'Meyers**, Senior Vice-President of Arco Alaska, has been appointed President and Chief Operating Officer of the wholly owned entity.

The new Chairman of the Association of British Oil Exploration Companies (BRINDEX) is **Mark Hope**, Technical Director of Enterprise Oil. Other senior appointments within the Association are: Vice-Chairman – **John Walmsley**, Chief Executive, Hardy Oil & Gas; Hon Secretary – **John Hogan**, Chief Operating Officer, Lasmo; and Hon Treasurer – **Charles Jamieson**, Chief Executive, Premier Oil.

C A J Herkströter, President of Royal Dutch Petroleum Company, will retire from his position in June. **M A van den Bergh**, Managing Director since July 1992, has been appointed President with effect from July. **M Moody-Stuart**, Chairman of the Shell Transport and Trading Co, will succeed Herkströter as Chairman of the Committee of Managing Directors, and van den Bergh will become Vice-Chairman of this Committee.

Did you know that the IP web site has:

NOW been redesigned for easier access?

featuring

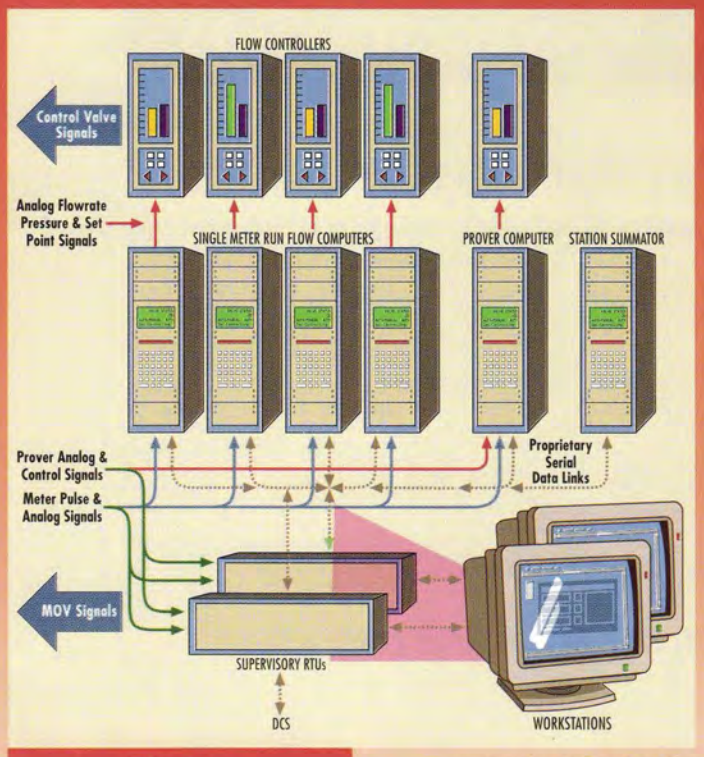
- A News in Brief Service – updated daily
- Full details of IP publications and conferences
- Hot-links to over 70 other oil and gas industry sites
- Key data such as names and addresses of all the leading oil and gas companies operating in the UK
- Corporate Directory – giving details of the IP's corporate members and their activities with hot-links to their sites
- Oil & Gas Energy for the World – a guide for schools and colleges
- What's On at the IP and Around the Branches
- Now over 150 pages of data and information about the IP and industry activities
- Featuring full details of 1998 Membership Challenge
- Lifetime Learning – Competence standards

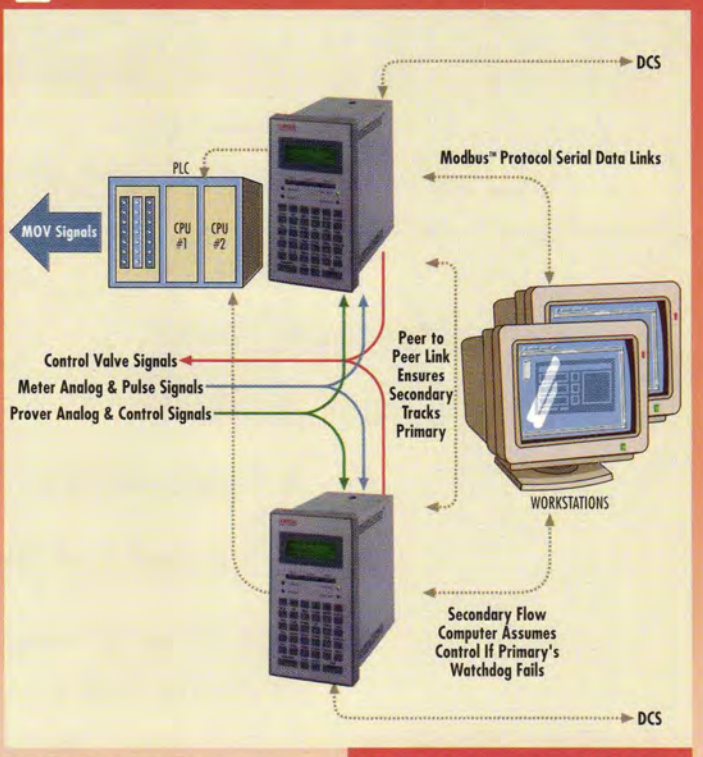
The IP website

– the first step in any data search

http://www.petroleum.co.uk

Your Flow Computer Choice!





The Past | ***Typical Redundant System Integration*** | **OMNI- Present and Future**

At one time, your multi-run measurement choices were limited. No longer. Consider these Omni Flow Computer benefits when planning your next liquid or gas metering project:

- Integrated multi-tasking, interrupt-driven execution with a math co-processor and field-proven firmware
- Latest embedded surface mount technology, with memory expansion and high-speed communication
- Modular, plug-in CPU & I/O extends product life without obsolescence risks
- Fully integrated product development, manufacturing and technical support
- Multiple meter runs and station database in a single unit
- Simple integration with any DCS or PLC for large projects and redundant systems
- Reduces the total cost of ownership including operations and maintenance
- Eliminates Spectre of Year 2000 compliance and custom solutions

With a worldwide installed base connected to over 10,000* meters, a THREE-YEAR WARRANTY and full technical support, the choice of the future is decidedly in Omni's favor. Call, fax or e-mail us today to find out more about the industry standard for today and tomorrow.

*Based on multi-run capability units

Measure the difference®

P.O. Box 11 • Woodbridge IP12 1NE, U.K.
Tel: (44) 1394-386333 • Fax: (44) 1394-386334
Website: http//www.omniflow.com

Omni