PETROLEUM REVIEW

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April 1997

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Tuesday 29 April

The Gibson Hall,
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'Power, Competitiveness and Responsibility'

Sir David Simon CBE,
Chairman
The British Petroleum Company plc

Admission, which will be strictly by ticket only, is free of charge.

Tickets and further information are available from:

Pauline Ashby
The Institute of Petroleum
61 New Cavendish Street
London
W1M 8AR

Tel: 0171 467 7100
Fax: 0171 255 1472

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International Conference on

'The Safe Operation of Tankers in Coastal Waters and Approaching Terminals'

To be held at the Cavendish Conference Centre, London

Thursday and Friday 8-9 May

This international conference will follow the official publication of the UK Marine Accident Investigation Branch report into the *Sea Empress* accident and will review the lessons that have been learned from a sequence of casualties in coastal waters including the *Exxon Valdez, Braer, Borga* and *Sea Empress*. The papers, each given by a prominent specialist in his subject, will review the latest technical, operational and legal developments affecting the ability to operate large tankers safely in coastal waters.

For a copy of the programme and registration form, please contact:
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The Institute of Petroleum,
61 New Cavendish Street,
London W1M 8AR
Tel: 0171 467 7100
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COVER PHOTO
Production platform in BP's Magnus oilfield in the North Sea
Photo courtesy of British Petroleum

News in Brief

18 February
Total (40 percent) and partners Maraven (30 percent), Statoil (15 percent) and Norsk Hydro (15 percent) have begun basic engineering studies for the development, production and upgrading of Orinoco extra-heavy crude from the Orinoco belt in the Zuata region of Venezuela. Overall investment in the project is estimated at some $2.7bn.

24 February
OMV has announced that an appraisal well in the Jade field, located in block 30/2c in the central North Sea, has flowed at a rate of some 2.4 mncum of gas per day and 9,700 barrels of condensate per day. Production is expected to begin as early as the fourth quarter of 1998.

Amoco Norway Oil Company, BP Norge and Phillips Petroleum Company Norway are proposing closer co-operation within operations relating to their fields in the southern part of the Norwegian shelf. Over 60 areas have been identified where potential cost savings could be made by closer co-operation between the companies – such as mobile rig sharing, procurement, specialist maintenance and inspection, offshore telecommunications and logistics.

25 February
Chevron has discovered a major natural gas field offshore Western Australia in the Gorgon/Chrysor trend in the Carnarvon Basin. The Dionysus-1 well tested gas at a combined rate of 127 mncuft/d. The company plans to acquire additional seismic data later this year. Further exploratory drilling is expected to follow.

BG plc and the Brooklyn Union Gas Company of New York have reached an agreement under which the latter, through its subsidiary KeySpan International, will acquire a 24.5 percent interest in BG's Phoenix Natural Gas and Premier TransCo Ltd subsidiaries. Phoenix is currently building a gas distribution system and natural gas market in Ireland, initially in Greater Belfast, while Premier TransCo owns and operates the gas pipeline linking Scotland and Northern Ireland.

Aberdeen-based Wood Group Offshore Limited has secured two new contracts from Wintershall and Talisman Energy for supply base services at the company's Great Yarmouth facility to support drilling activity in the southern North Sea.

Elf Petroland has announced two significant offshore gas discoveries on blocks K1a and K4a in the Dutch sectors of the continental shelf. First production from block K4a is planned later this year by way of a subsea development through the K4-6 well. A second field in block K4a will be brought onstream in 1998 using an unmanned satellite platform.

Simon Storage has completed a £1.2m investment programme on a new bottom loading facility for petroleum road tankers at its Immingham storage terminal. The new facility comprises two bottom loading gantries, and tanker parking and assembly points, and is linked into existing tankage. Safety features include interlocking automatic earthing and overspill protection and a vapour return system which will be linked into a vapour recovery unit in due course.

26 February
Amoco and Tractabel have signed an agreement with the government of the Hashemite Kingdom of Jordan, represented by the Ministry of Energy and Natural Resources, for the development, construction and operation of a gas pipeline system within Jordan.

Honeywell Control Systems has secured a $5m contract for the supply of a distributed control and safety system for the Dukhan Arab 'D' Gas Cap Recycling Project – the first risk and reward alliance project to be undertaken in the Middle East.

27 February
Amoco and Shell have announced plans to combine their oil and gas producing assets in the Permian Basin area of west Texas and southeast New Mexico, reports *Lloyd's List*. Amoco will hold a 64 percent interest in the new Altura Energy limited partnership, with Shell holding the remaining 36 percent.

28 February
The Vatican has asked Italian oil group Eni to provide technical and scientific support for a 'facelift' of St Peter's Basilica in Rome, states the *Financial Times*. The project will be completed in time for the new millennium and the celebration of 2,000 years of Christianity.

BG, Fina and Petrofina are among a number of blue-chip companies sponsoring the Surrey Scholars' Scheme launched by the University of Surrey. The scheme aims to attract post-doctoral graduates from around the world to undertake research at the university.

3 March
Kazakhstan has awarded a 15-year contract to Bridas, the Argentinian energy independent, to operate the country's national gas pipeline system, reports *Lloyd's List*. The pipeline system handles some 50 bncum of gas per year.

Siemens Norway has secured a $2.25m contract to construct accommodation and utility modules for the Troll C platform. Work is scheduled for completion by summer 1998.

SubSea International has secured a $10m contract from Apache Energy for the fabrication and installation of a product export system on the Stag oilfield offshore Australia, according to *Lloyd's List*. First oil is expected later this year at an initial rate of 25,000 b/d.

4 March
BP's Andrew development has won the Major Project of the Year category in the new Quality in Construction awards – sponsored by the Construction Industry Board, Department of the Environment and *Construction News* – and was named overall winner as the Project of the Year. The field came onstream in June last year, producing oil six months ahead of schedule and over £80m below budget.

BG Exploration and Production Ltd has announced an oil discovery in UK block 15/23d located some 160 km northeast of St Fergus. The 15/23d-13 discovery well tested at flow rates in excess of 7,500 b/d and 9 mncuft/d of associated gas. Conceptual studies are already underway in a bid to reduce time to first production. Discussions have also started with adjacent field operators to evaluate the possibility of a fast track development.

Union Texas Petroleum Holdings Inc has agreed in principle to acquire a 40 percent working interest in the Contract Area 11/05 exploration block in Bohai Bay offshore of the People's Republic of China. The interest is being acquired from operator Phillips China Inc which will hold the remaining 60 percent working interest.

Enron Europe has acquired Oxford-based retail gas marketing company PanEnergy Services UK.

5 March
Hardy Oil & Gas has reached an agreement to acquire a 15.5 percent shareholding in independent India exploration and production company Hindustan Oil Exploration Company Limited. Hardy will acquire some £2.9m of new shares.

Saudi Yanbu Petrochemical Company (Yanpet), a joint venture affiliate of the Saudi Basic Industries Corporation, has completed an engineering study on a major expansion project that will add a new 800,000 mt/year ethylene cracker, a 535,000 mt/year polyethylene plant and a 410,000 mt/year ethylene glycol plant to the existing Yanbu complex.

News in Brief

6 March

Raytheon Engineers & Constructors has secured a $24m contract for a restructuring project at the Netherlands Refining Co (Nerefco) in Rotterdam that will improve margins by converting to a single-site operation at Europoort. The $150m project includes a new hydrofiner and sulfur plant and is scheduled to complete by the fourth quarter of 1998.

7 March

More than 112,000 customers have signed up to switch from British Gas to a new gas supplier in the latest phase of opening up the UK domestic gas market which began in Kent and Sussex today.

10 March

Stolt Comex Seaway has been awarded a $7m contract from Saga Petroleum for the installation of the mooring system for the Varg oil production and storage vessel.

Harland and Wolff has been awarded the contract for the upgrading of the Dolphin-operated semi-submersible drilling rig *Bideford Dolphin*. Conversion work is expected to be completed by the end of the third quarter of this year.

Elf Exploration UK has awarded a contract for the construction of the Elgin-Franklin production, utilities and quarters platform to the TMB consortium comprising TPG (UK), McDermott Marine Construction and Brown & Root McDermott Fabricators. The platform will be built at Barmac's yard at Nigg in Scotland.

Exxon Corporation has announced a new Gulf of Mexico deepwater discovery. The Hoover discovery may contain reserves in excess of 100 million barrels of oil equivalent, reports the company. It is located just 15 miles from Exxon's Diana discovery in Alaminos Canyon blocks 25 and 26.

11 March

Orogen Minerals, which holds the Papua New Guinea government's interests in a number of the country's large resource projects, has taken a 20 percent interest in the consortium planning to pipe gas from Papua New Guinea to Queensland, Australia, reports the *Financial Times*. The A$2bn project aims to deliver gas by 2001.

Oceaneering International Services is to sell its North Sea diving assets and operations to DSND Oceantech. The combined operations will be managed out of Aberdeen. Oceaneering reports that its other North Sea operations will not be affected.

12 March

Deminex UK Oil and Gas has acquired Shell's 15 percent interest, together with Esso's 15 percent holding, in the Selkirk discovery in the North Sea. It has also acquired both Shell and Esso's 50 percent interests in licence P233, block 15/18a in return for Deminex' 26.7 percent shareholding in the Wendy discovery and its 28.712 percent stake in licence P215, block 21/29b which contains part of the West Guillemot discovery.

Elf Petroleum Qatar has begun production from the Alkhalij field located in block 6 offshore Qatar. The initial production rate of 6,000 b/d is planned to be increased to 30,000 b/d by year-end.

MAI has received a $1.5 million award from the World Bank to study the redevelopment of five of Azerbaijan's major offshore oilfields, including Oily Rocks, Bakhar and Bulla More. The contract from SOCAR is being funded by the World Bank's Petroleum Technical Assistance Project for Azerbaijan. The study will include the specification of all the new production facilities as well as an environmental assessment of the project.

13 March

The New York Mercantile Exchange and the International Petroleum Exchange have announced that they are discussing areas of cooperation that would create a greater efficiency for their mutual customers, including cross margining, systems cooperation and a joint electronic trading system. The two exchanges hope to reach an agreement by the third quarter of this year.

Dana has entered into two option agreements with Waterford Finance and Investment Ltd. The first option covers the acquisition of a further 20 percent of the issued share capital of YuganskOil for some $3m. The second is to acquire the entire issued share capital of Atlantic Intertrade Ltd, a company whose sole asset is 500 ordinary shares in Evikhon, a Russian open joint stock company, representing 5 percent of its issued share capital. The deal would cost some $6.25m.

The Sleipner West field in the Norwegian Sea was officially inaugurated today by Vigdis Finnbogadottir, former President of Iceland, at operator Statoil's head office in Stavanger.

Medusa Petroleum plc has announced that it intends to seek admission, via a placing, to the Alternative Investment Market of the London Stock Exchange. Medusa will undertake exploration and production of oil and gas in Central Europe. It comprises Medusa Oil Ltd and Medusa Oil and Gas (Europe) BV, Tullow Czech Operations Ltd and Tullow Czech Investments Ltd.

14 March

British Steel's Tubes & Pipes business and Ramco Oil Services Ltd have formed a new company – British Steel Ramco Pipeline Services Ltd. Located at British Steel's Hartlepool Pipe Mill complex, the new venture will offer new facilities for the provision of single and multi-layer coatings and associated services to the pipeline industry.

Independent process engineering group KBC is soon to achieve a listing on the London Stock Exchange. The placing, which has been fully underwritten by Cazenove & Co, is expected to raise some £5.3m for the company.

17 March

Oryx Energy has begun producing from its Neptune project in the Gulf of Mexico. Production from the first well is running at 4,800 barrels of oil equivalent per day (boe/d) while the facility commissioning is being completed. Peak production of about 25,000 boe/d is expected by late summer as six additional pre-drilled wells are completed. A second production peak of about 25-30,000 boe/d is expected in 1999.

Esso Norge and Heerema Tønsberg have signed a letter of intent for the engineering, procurement, construction, installation and commissioning of a wellhead platform for the Jotun oilfield on the Norwegian Continental Shelf. The topsides engineering will be done by ABB Offshore Technology at Billingstad and the topside fabrication at Heerema's yard in Tønsberg.

Newsdesk

UK government gives Conoco the go-ahead for Banff field development

Conoco has been given the green light by the UK government for the full development of the Banff field in the central North Sea, following a six-month early production phase.

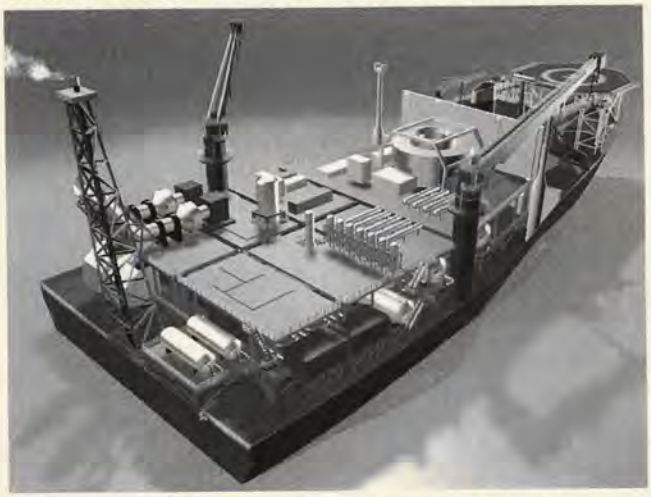
The field will be developed using a floating production, storage and offloading (FPSO) vessel provided by Norwegian seismic company Petroleum Geo-Services. Production operations will be subcontracted to Atlantic Power.

The vessel – currently being fabricated at the Hyundai Mipo yard in Ulsan, South Korea – will feature a 'ramform' hull, a design previously only used on seismic vessels, the 'delta' shape of which provides a large load-bearing capacity of up to 16,000 tonnes and a stable work platform. It will have a 120,000 barrel storage capacity with a further 500,000 barrels of storage to be provided by a distant moored floating storage unit and, later, a shuttle tanker. The 3,500-tonne topsides process facility – the fabricator of which has yet to be announced – will handle some 60,000 barrels of oil and 90,000 barrels of fluid per day.

Recoverable reserves are estimated at some 60 million barrels of oil and 39 billion cubic feet of associated gas, although additional potential exists in other areas of the field and could result in further development. Field life is estimated at seven years.

Initial production will be through the two development wells drilled for the early production system. Two new water injection wells are also to be drilled before first oil which is scheduled for June 1998. Oil export will be by double-hulled shuttle tanker, while associated gas will be transported via an 8-km flowline to a tie-in on the Central Area Transmission System (CATS).

Co-venturers in Banff are: Conoco (operator) with 31.7 percent; Enterprise Oil, 27.9 percent; Ranger Oil, 26.2 percent, Hardy, 12.4 percent and Santos Europe, 1.8 percent.



Banff's new FPSO will incorporate a 'ramform' hull design

Study of Scottish rural petrol stations

The Scottish Office has commissioned consultants Environmental Resource Management (Scotland) to carry out research into the social, economic and environmental issues surrounding petrol prices and supply in rural areas of Scotland.

The study will be undertaken in two phases. The first will involve gathering and collating data on the characteristics of petrol stations in rural areas, including prices and trends over the last five years. The second phase will survey a sample of rural petrol stations to find out about their activities, and survey households in sample areas to obtain information on petrol purchasing behaviour and views on the role of petrol stations in the community.

'The study will provide a better understanding of the contribution that petrol stations make to local economies and the community as a whole, and help in identifying innovative ways of securing and maintaining petrol supplies in rural areas', commented Secretary of State for Scotland, the Rt Hon Michael Forsyth MP.

Fortune invests in Chinese oil depot

Fortune Oil plc is to invest £4.05 million in new oil depot facilities at Jiangmen in the Guangdong province of China. Due to be operational in May this year, the new depot will be the largest storage facility in the region with a total storage capacity of 40,000 cubic metres. A jetty capable of unloading up to 3,000 metric tonne ships is also to be built.

The depot will be the sole supplier of fuel oil to the nearby Xi Jiang power plant – due to be commissioned by June this year – which has an anticipated 150,000 metric tonne annual fuel requirement, rising to 420,000 metric tonnes in 2000. It will also supply oil products to industrial and commercial customers in the Wu Yi region.

The deal complements Fortune Oil's recent £2.7 million investment in the Shantou depot which is scheduled for completion by the end of this year.

Conoco signs Belgian gas transport deal

Conoco (UK) Ltd has reached agreement with Belgian gas distribution company Distrigaz to route gas exported from the United Kingdom through its pipeline network to the border with Germany.

The deal enables Conoco to fulfil a 10-year contract signed with Wingas of Germany in 1996 covering the supply of one billion cubic metres of UK natural gas per year with deliveries to start in October 1998.

Gas produced from Conoco's North Sea portfolio will first be transported through the UK gas grid, then via the new UK-Continent Gas Interconnector and through the Distrigaz gas transportation system in Belgium to Aachen on the German border where it will be delivered into the new Wingas-operated WEDAL pipeline for sale in the German market.

Conoco has a 10 percent interest in the Interconnector which entitles it to an annual transportation capacity of two billion cubic metres.

Arco approves West Sak funding

Arco's Board of Directors has approved funding for the Phase 1 development of the West Sak heavy oil accumulation on the North Slope of Alaska.

Initial development plans call for the drilling of 50 wells and the installation of associated facilities. Work is scheduled to begin in October, pending co-owner approval and receipt of necessary permits. First production is expected before the end of the year. Arco will invest $54 million in the $92 million project.

Phase 1 will develop 51 million barrels of new reserves and add production of 7,000 barrels of oil per day (b/d) while total development of the West Sak core area couid require more than 500 additional wells and yield additional production of some 62,000 b/d.

The relatively shallow West Sak oil accumulation overlies much of the Arco-operated Kuparuk field and is estimated to have over 15 billion barrels in place. Extensive use of the Kuparuk field's drill sites, common lines and processing centres will help Arco to minimise costs of developing the new field.

Newsdesk

Moves made on Moran development

Oil Search Ltd Managing Director Peter Botten told an analysts' briefing that the Moran field in Papua New Guinea was now much larger than the joint venture partner initially thought but would cost less to develop than the A$2 billion Kutubu oilfields.

Mr Botten said that the Kutubu joint venture partners were working on having their production development licence expanded to Moran – given that most of the field lies in the area covered by the licence – to enable a startup by September.

Unitisation discussions have started between the Kutubu partners and the parties to the other exploration leases which straddle the field. Mr Botten predicted that the Kutubu partners would spend $100 million on both production facilities. This expenditure would include the upgrading of the Agogo field facilities from 10,000 barrels per day (b/d) to 30,000 to 40,000 b/d and the drilling of two wells, Moran 3X and Moran 4X. He said initial construction would be limited to 10,000 b/d until the compressors were installed early next year and would then rise to 30,000 b/d. Kutubu's production was expected to fall to 80,000 or 90,000 b/d from 100,000 b/d last year. However, Oil Search hoped to double production levels some time in 1998 with the onset of Gobe and Moran.

New oilfield development in Ecuador

The Ecuadorian Ministry of Energy and Mines has issued a decree which clears the way for Arco Oriente Inc and partner Agip Petroleum (Ecuador) Ltd to begin development of the Villano oilfield in eastern Ecuador.

The decree authorises modifications to the companies' existing development plans to include the construction of a 130-km secondary pipeline to transport oil from the planned Villano field processing facilities to the Transecuadorian Pipeline System. The new pipeline is designed to carry 80,000 barrels per day (b/d) of crude oil and is due to become operational by 1999. Initially carrying 30,000 b/d, the pipeline's excess capacity will be available for other developments in the area as well as providing Arco and Agip the potential to increase production from Villano.

Arco holds a 60 percent stake in the Villano project and will act as operator of both the field and the new pipeline. The oil itself is owned by the Ecuadorian government which will reimburse the two partners for their investment in oil exploration, development and production after development is complete and production begins.

West of Shetland oilfield hat trick

British Petroleum and Shell have discovered a third oilfield in the Atlantic Margin west of Shetland. The Suilven discovery lies to the north of their Foinaven and Schiehallion fields.

The exploration well on block 204/19 was not tested but log and core data confirm the presence of hydrocarbons, states BP. It is too early to estimate reserves and more work is required before establishing whether the discovery is commercially viable.

The companies also report that they are considering further exploration and appraisal options in the area – a plan greatly assisted by the recent UK Department of Trade and Industry announcement to designate and offer for licensing two new blocks – 204/14 and 204/15 – to the north of the area in an out-of-round procedure. The new blocks will be offered separately. They are not subject to a claim by the Faroe Islands which is still in talks with the United Kingdom regarding the nearby contested 'white zone'.

Shell/Texaco US downstream merger

Shell Oil Company and Texaco Inc are to combine the major elements of their midwestern and western US refining and marketing activities and their total US transportation, trading and lubricants businesses. The new company will, however, continue to market gasoline under both the Shell and Texaco brands.

'An alliance of Texaco's and Shell's downstream operations is a major step toward much needed change,' said Texaco Chairman and CEO Peter Bijur. 'By uniting the complementary strengths of these organisations, we will create a new entity with economic potential far greater than the sum of its parts. The result will be a more competitive company with the ability to create long-term jobs, greater value for both brands, reliable sources of quality products at competitive prices and the best possible returns for our shareholders.'

Shell will have a 56 percent interest in the new company, with Texaco holding the remaining 44 percent. The joint venture is expected to achieve substantial efficiencies largely by adopting the best practices of both companies and from shared management systems, business processes and support functions. Savings are not contingent upon the closure of any refineries or other major operating facilities. Future decisions, however, will be made on the basis of achieving the objectives of the business plan, state the companies.

Assets of the combined venture include eight refineries with a total refining capacity of 948,000 barrels per day, some 6.1 percent of the total US refining capacity, and approximately 11,212 branded retail outlets in 28 states. It will also own or have partial interest in 76 crude oil and product terminals and a total combined ownership interest in some 43,600 miles of pipeline throughout the United States. The venture will operate 10 lubricants plants with a combined capacity of 62,150 barrels per day.

The companies' combined share of branded gasoline sales and consumer automotive lubricants are each expected to be slightly less than 15 percent of the US market.

Exploration, production and chemical businesses of the two companies are not included in the deal.

Shell and Texaco also report that they and Saudi Refining Inc have made 'significant progress' in discussions to combine their eastern US refining and marketing businesses (see *Petroleum Review*, August 1996). An agreement is expected to be reached in the second quarter of this year.

LR to certify Canadian development

Lloyd's Register is to carry out certification on the Sable Offshore Energy Project (SOEP) in Nova Scotia, Canada.

SOEP consists of six fields with total recoverable natural gas reserves of 85 billion cubic metres in water depths of 20-80 metres. The project is in the regulatory review and front-end engineering phase – regulatory approval is expected in early autumn.

The project will be developed in two tiers, the first scheduled to produce gas for sale by late 1999. Facilities in place by this time are expected to consist of fixed steel platforms at the North Triumph and Venture fields linked by a gas pipeline to a central gas gathering and treatment platform at Thebaud, infield pipelines and a 225-km pipeline to a gas treatment plant near Goldboro, Nova Scotia.

The second tier will see development of reservoirs at the nearby South Venture, Glenelg and Alma fields.

Newsdesk

Two powerful additions to Milford Haven towage fleet

The arrival of the 5,095 bhp, 66-tonne bollard pull tractor tug *Millgarth* at Milford Haven at the end of February completed an £8 million investment by Cory Towage Ltd aimed at meeting the enhanced towing services required by its port customers, the oil refiners.

The tug joins her sistership, *Anglegarth*, which became operational in January. The two vessels are among the most powerful tugs of their type in the United Kingdom.

Both tugs were ordered from Damen Shipyards in 1995, following the award of a contract to Cory Towage by the Texaco, Gulf Oil and Elf refineries.

They have displaced two of the existing vessels in the Milford Haven fleet – one of which, the 4,000 bhp *Tito Neri* with 50-tonne bollard pull, was on bareboat charter from Italy and will now return to her owners. The other, *Stackgarth*, will be redeployed elsewhere in the Cory Towage UK-based fleet.

The *Millgarth* tug arrived at Milford Haven in Feburary

Fire-fighting capabilities of the two new tugs are to Lloyd's Register's FiFi 1 standard. The vessels also carry some 30 tonnes of foam in double bottom tanks supplying two fire-fighting monitors mounted above the wheelhouse which have a water throw of up to 120 metres.

The vessels are also among the first tugs to be certified by the UK Marine Safety Agency for oil recovery operations. For these duties, each is provided with dedicated double bottom tanks of 100m³ total capacity for the storage of recovered oil. For oil pollution control duties, provision has been made for the tugs to carry 1.5m diameter Rouland booms and a skid mounted power pack, with other equipment carried including salvage pumps.

SMART shopping with Shell

Shell has announced that a consortium of retailers is joining its SMART card loyalty scheme. Launched in 530 outlets in Scotland on 14 March and to be rolled out nationally later this year, the scheme links Shell with high street retailers Currys, Dixons, John Menzies, Vision Express and Victoria Wine as well as Commercial Union, Hilton Hotels and The Link.

The company expects more household names to join the scheme, claiming that customers will be able to collect SMART points on up to 70 percent of their weekly shopping.

Shell reports that SMART has been a 'tremendous tool' for many parts of its business, from network planning to product layout in its Shell Select Shops, since its launch in 1994. It is confident that the link-up with an increasing number of companies will help it to 'attract new customers and give everyone more choice when collecting and redeeming points'.

Gulf of Mexico licensing round

There were a record number of bids for Central Gulf of Mexico offshore blocks at the US Minerals Management Service auction lease sale 166 held on 5 March. Some 103 companies made 1,790 offers for 1,032 blocks.

A partnership of Kerr-McGee (66.7 percent) and Agip (33.3 percent) made the highest bid of the day – more than $8 million for deepwater block 286 located in Mississippi Canyon; the second highest bid was for adjacent block 287 submitted by Keer-McGee (33.3 percent), Agip (33.3 percent) and British Borneo (33.3 percent). In addition to Shell and BP, which are heavily involved in the Gulf, a number of other non-US companies were active participants in this auction, including Agip, British Borneo, Statoil, Petrofina, Petrobras, BHP and Elf, both on their own and in partnership with others.

More than half of the blocks receiving bids were deepwater sites, many with depths of over 2,500 feet. Technological advances which have made exploration and production more efficient and less costly, unusually high well productivity in deep reservoirs brought onstream and US government royalty relief for frontier projects have fuelled the recent surge of interest in deepwater prospects. While integrated companies mostly sought deepwater blocks in this sale and independents blocks in shallow waters, there were some notable exceptions.

The Minerals Management Service will evaluate the high bid for each block, which measures approximately 9 square miles, before awarding a lease. It must announce its final decision within 90 days of the sale and may reject any bid as too low. It estimates block values on the basis of geologic, engineering and economic data but does not make its values public until after an auction.

Murco pulls out of merger

Murphy Oil Corporation (Murco) has pulled out of negotiations with Elf Oil UK and Gulf Oil regarding the proposed merger of the three companies' UK refining and marketing operations after deciding that the advantages of scale of the newly merged company 'would not significantly improve Murphy's existing, cost effective and efficient downstream system'.

Commenting on the decision, Murphy President and Chief Executive Officer Claiborne Deming said: 'In the UK, we believe we can better achieve our goals through the continued rationalisation of our existing low cost retail marketing network and now even more effective refining assets. Efforts will be focused on developing a niche, leading edge company.' The company also stated that mergers or joint ventures with other companies would be evaluated as part of this strategy.

Elf and Gulf subsequently announced that they plan to complete their merger without Murco. Christian Cléret, Managing Director, Elf Oil UK Ltd, explained, 'The original plan was a combination of Elf and Gulf; Murco's withdrawal simply restores that concept.' David Setchell, Managing Director, Gulf Oil, added: 'The benefits and synergies originally identified remain unaffected by Murphy's decision. The priority for Elf and Gulf is now to accelerate merger plans towards a successful conclusion.'

New high street gas alliance

Amerada has teamed up with Dixons Stores Group to market gas to customers in Currys stores throughout Devon, Cornwall, Somerset, Dorset, Avon, Kent and Sussex, the first areas in the United Kingdom to have opened up to domestic gas competition over the past year. It is the first such initiative between a high street retailer and gas supplier.

Diary Dates

Exploration and Production Discussion Group

'Oil Exploration and Production – is purity best for shareholders?'

Tuesday 15 April, 17.00 for 17.30 until 19.00

By Dr Pierre Jungels, Chief Executive, Enterprise Oil plc

IP contact: Jenny Sandrock

Energy Economics Group

'The Niger Delta and its Oil'

Thursday 24 April, 17.00 for 17.30 until 19.00

By Alan Detheridge,
Senior Corporate Adviser,
Shell International

IP contact: Jenny Sandrock

London Branch

'Back to Basics – Liquefied Petroleum Gas'

Wednesday 21 May 17.15 for 18.00

By David Hepworth, Conoco Limited

LPG fulfils an important role in the gaseous fuel sector despite the growth of natural gas. Because it is stored in the liquid phase it offers significant advantages for many specialist applications, from industry to the garden barbecue. David Hepworth will explain the sourcing, supply and marketing of LPG. He will also consider potential new areas of development that will strengthen its competitiveness and ensure a long-term future.
The meeting will be preceded at 17.30 by the Branch AGM and will be followed by light refreshments.

Enquiries: Mrs E Walker, Hon Secretary, London Branch, Tel: 01926 404768 or Mr J M Wood at the Institute, Tel: 0171 467 7128

Cancellation

Please note that the event originally scheduled for April, Fuel Retailing – The Hypermarket's Perspective, has had to be cancelled owing to the lack of a speaker.

'Annual Visit – The Royal Mail Sorting Office, Mount Pleasant'

Wednesday 18 June

The Annual Visit of the Branch will be to the Royal Mail's Mount Pleasant Sorting Office in Clerkenwell. There will be a guided tour of the office, one of the largest in the world, commencing at 18.00. Numbers will be restricted to 20 visitors. Those wishing to attend should notify Mr J M Wood at the Institute in writing or by fax not later than 30 May

Mr J M Wood, Fax: 0171 255 1472

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: 0171 467 7100 Fax: 0171 255 1472

Newsdesk

You can be sure of ... getting to work on time

Part of Shell Centre in London changed hands last year and the former offices are now being sold as luxury flats. The curved 10-storey block, usually called the Downstream Building by Shell employees, has been renamed the White House. Situated on the South Bank of the River Thames it has excellent panoramic views of the Houses of Parliament in one direction and St Paul's Cathedral in the other.

The new flats are now being widely advertised as minutes from Waterloo International railway station and adjacent to the Royal Festival Hall. However, the advertisements fail to mention their proximity to Shell Centre's tower offices. Some of Shell International's current employees might be tempted to forgo daily commuting with all the associated hassle and choose instead to live next door.

UK gas competition

President of the Board of Trade Ian Lang has outlined a proposal to speed up domestic gas competition in the United Kingdom.

He has laid in Parliament an Order which will allow gas competition to commence across the rest of the country in stages as soon as the Director General of Gas Supply considers that satisfactory preparations have been made. The Order proposes that competition should start next in Scotland and the northeast of England – possibly as early as October – and begin to roll southwards in five instalments in the rest of England and Wales in 1998.

Subject to the readiness of computer systems, this could start as soon as next January and run in monthly instalments.

'British Gas is already proposing selective price cuts of its own in the southwest where competition is open. I am keen that gas consumers everywhere should also benefit from the price reductions that competition can bring, so I am determined to press on with introducing competition,' said Mr Lang.

BP plans for sustained growth

British Petroleum could be producing some 2.5 million barrels of oil and gas a day within the next decade, an increase of a million barrels a day on current output, according to Chief Executive John Browne. Furthermore, the target that the company set last year to improve underlying annual income by $1.5 billion a year by the end of the decade could be delivered at least a year ahead of schedule.

Mr Browne also reported that the company is now confident it can expand production by 5 percent per year over the next decade and replace its higher output with annual additions of new reserves.

'As well as maintaining output from our two established provinces, the North Sea and Alaska, at approximately their current levels of half a million barrels a day each, we expect to boost daily production to 250,000 barrels in both the Gulf of Mexico and South America,' he said.

'Add to that new production from the Caspian, from North and West Africa and from Asia, and we can expect a total of around 2.5 million barrels – two thirds higher than our current level.'

Meanwhile, Exploration Chief Executive Rodney Chase reported that BP's oil and gas output rose by 5 percent in 1996 and the company had more than replaced production with discoveries and additions to booked reserves. Finding costs fell to $1.30 a barrel, 20 cents lower than the previous year.

He said BP and partners had made two major discoveries last year – the Perseus field in the North West Shelf of Australia which contains an estimated 9 trillion cubic feet of gas and the Girassol oilfield offshore Angola. Other new discoveries currently being appraised included those in the West of Shetland, Norway, Alaska, the Gulf of Mexico, Venezuela and Papua New Guinea.

Looking to the refining and marketing sector, BP Oil Chief Executive Rolf Stomberg reported that the joint venture with Mobil in Europe is expected to yield benefits of over $500 million a year, an increase on the original estimate. He also reported that the company had developed more than 300 service stations during 1996, including the company's first retail outlets in Russia and China.

Ofgas to look at BGT selective price cuts

Ofgas is currently investigating whether British Gas Trading (BGT) should be stopped from offering selective price cuts to its direct debit customers in the southwest of England.

Director General of Gas Supply Clare Spottiswoode said that she was concerned that the selective price cuts BGT was offering under its new 'ValuePlus' direct debit tariff 'could stifle competition' following a number of complaints from alternative gas suppliers. 'While BGT is free to offer general price reductions to all its customers throughout Great Britain, under licence conditions competition must be established before BGT can make selective cuts,' she added.

BGT is offering a 12 percent discount against its standard tariff for DirectPay customers.

Fulmar disposal

Shell UK Exploration and Production has announced plans for the disposal of the Fulmar SALM (single anchor leg mooring) buoy, the remaining part of the crude oil storage and offloading system which formerly served Fulmar and three other fields in the central North Sea.

The company is now finalising its decommissioning proposals which will be subject to government approval and the required consultation procedure.

Meanwhile, Shell Expro is to place a periodic indicative notice in the Official Journal of the European Communities inviting contractor interest in bringing the 5,000 tonne cylindrical steel structure ashore for re-use, recycling or disposal.

The buoy, together with Fulmar's floating storage unit, has been stored in Norwegian waters since their removal from the field in 1994.

Policing the offshore environment

By Kim Jackson

Environmental policing of oil and gas operations offshore the United Kingdom is the responsibility of the UK Department of Trade and Industry (DTI) which is also in charge of fostering and encouraging exploration and production activities. This 'poacher and gamekeeper' approach has come under considerable criticism from conservation bodies in recent months, with the main thrust of debate questioning whether the offshore environment is being adequately protected by the current administrative arrangements.

The DTI environmental role is intrinsically linked to its licensing responsibilities – discharge restrictions, emission limits and special environmental requirements for activities offshore typically set as part of the offshore exploration and production licences issued to operators. Monitoring and reporting requirements for permitted levels of oil in produced water, oil on cuttings, emissions and any hydrocarbon spills offshore are controlled by legislation. In addition, seasonal restrictions of seismic and drilling activities may be set within exploration licences in a bid to protect environmental sensitivities such as fish spawning areas or migrating wildlife, etc. Indeed, since the 14th licensing round, when sensitive nearshore and coastal blocks were first released for exploration, the DTI has required a more stringent environmental approach as part of its licence application requirements.

The Department maintains that the strict licensing regime, the statutory requirement for regular reporting of discharge data and occasional inspections – about 20 were carried out between November 1996 and January 1997 – enables it to fulfil its role as the offshore industry's environmental watchdog. It argues that the last 25 years of offshore oil and gas operations have produced little, if any, impact on the North Sea environment.

As testimony to the effectiveness of its measures, DTI points to reports on oil spills published in its annual 'Brown Book' which show a decrease in the quantity of oil spilled over the past few years. Furthermore, the Department states that out of some 3,336 aerial inspections carried out last year, only 5.67 tonnes of oil in total were detected. 'This gives us great confidence in both the lack of an oil spill "problem" and in the accuracy of the reports we receive', it says. It also points out that most oils produced in the UKCS are fingerprinted so that any sample obtained can be matched with records for identification. 'This means that should a serious unreported spill ever occur the guilty party should be easily traced.'

On the other hand...

However, the DTI's view of the limited impact of the offshore industry was rejected by the Marine Conservation Society (MCS) late last year. It described the environmental effect of exploration and production offshore as 'extensive and pervasive' and have identified the offshore oil and gas industry as a 'significant source of hydrocarbon pollution in the North Sea'. The group also condemned the Department as being 'toothless, blind and lame' in its approach to offshore environmental enforcement and accused it of:

- Shielding operators from public scrutiny on environmental issues by refusing to release collected monitoring data without imposing an 'unreasonable' fee;
- Not undertaking sufficient enforcement or auditing of the industry's environmental performance offshore;
- Being inadequately staffed to undertake its regulatory, enforcement and policy role.

The MCS accusations followed criticism earlier in 1996 from the National Environmental Resource Council of the Department's inappropriate handling of the Brent Spar decommissioning and a 1995 attack from Friends of the Earth on DTI's unwillingness to request environmental impact assessment (EIA) of offshore activities. Indeed, the latter issue remains unresolved and the long-promised piece of legislation enacting a requirement for offshore EIAs into UK law – promised to the European Commission in April 1995 after being threatened with legal action for failing to implement the 1985 EC Directive on environmental assessment – has still not materialised.

Conflict of interest

The conflict of interest inherent in DTI policing of the offshore environment is difficult to escape given the Department's responsibility in ensuring maximum revenues from the offshore industry's activities. These revenues are substantial – according to statistics from the UK Offshore Operators Association (UKOOA), the UK offshore oil and gas industry has paid the UK government some £140 billion (1996 money) in royalties and taxes to date.

Many argue that the environmental agencies which are currently responsible for onshore environmental policing, should extend their jurisdiction to cover offshore activities.

Indeed, according to Entec consultant

Peter Waite, the reasoning behind such a call is somewhat analogous to the recommendation by Lord Cullen, post Piper Alpha, that the Department of Energy, which was responsible for exploration and production licensing and developing resources, hand over regulatory control and the policing of safety issues to the UK Health and Safety Executive due to the potential, if not actual, conflict of interest regarding safety issues.

However, that said, some have voiced concern over any prospective change. Chevron Senior Environmental Advisor Alex Duff explained: 'The primary concern is that the appropriate balance is maintained between concern for the environment and the commercial exploitation of offshore hydrocarbons. The DTI understands the need to maintain this balance and reflects this in its current strategic and operational policies. Chevron believes that it could be potentially very damaging if separation of the two roles meant that two responsible bodies viewed the UKCS solely from their own perspective and the current balance was lost.'

Oil companies have targeted the prevention, mitigation and control of emissions to the environment, including a reduction in gas flaring over recent years. Photo courtesy of BP.

The Labour line

Following on from the above, recent criticism of the current offshore regulatory regime by the Labour party suggests that a change in government at the next general election may indeed lead to the environment agencies playing a greater role offshore.

In January, the party slammed as 'appalling' the present government's record on oil pollution in the North Sea. It argued that the operation of oil rigs in the UK sector of the North Sea had led to the dumping of some 1.5 million tonnes of oily waste on the sea bottom, in piles up to 30 metres high. The waste includes drilling muds, consisting largely of barium sulfate, contaminated with heavy metals such as barium and mercury. Of this 1.5 million tonnes, some 166,000 tonnes is believed to be oil – a level said to be 10 times greater than in waste material in the Norwegian sector.* Furthermore, it stated that an area of some 500 metres radius around each waste site is a 'biological desert', with serious damage observed to sea life up to several kilometres away.

The party also stated that the DTI has no record of breaches of environmental conditions specified in exploration licences or of unauthorised oil spills. 'It is impossible to monitor whether individual companies have met the environmental terms of their licences since the environmental policy statements from individual companies form part of their licence applications and are commercially confidential', it said. DTI explained, however, that records are kept, but were not available in the format that the MCS had originally requested.

It also stated that from 1990 to the end of 1994 there was only one part-time DTI inspector involved in visiting and monitoring oil rigs and although six people are now employed for this purpose, they 'combine their work with other activities'. Visits are announced in advance and no proper records of findings are kept. Furthermore, only five prosecutions have been made since the Prevention of Oil Pollution Act 1971 was implemented.

As a result of these findings, Labour's Shadow Environmental Protection Secretary Michael Meacher MP demanded that the government meet European law on environmental assessments during the next round (18th) of North Sea licensing. He also called for a review of the staffing of the environmental inspectorate of the offshore oil and gas industry, particularly within the DTI; a tightening of prosecution policy for offshore pollution offences; and environment policy statements produced by companies operating in the North Sea to be made public. (It is worth noting that Mr Meacher's call for routine unannounced inspections of oil rigs may well prove impracticable on the grounds of safety and logistics.)

It should also be noted that many of the oil companies have been striving to improve the dissemination of information to the general public. For example, some such as Shell have established impressive Web sites with a plethora of general and environmental information, while others such as Chevron and Total have published a number of public environmental reports, the latter including summary data with graphs illustrating the company's discharges to the sea and emissions to the atmosphere together with safety statistics and incident reports.

UKOOA answers back

Speaking on behalf of the UK operators, the UK Offshore Operators Association (UKOOA) was quick to respond to the Labour party's criticism of the industry's environmental record in the North Sea, issuing a number of statements that, it claimed, 'put the figures quoted into their proper context'.

It stated that the first oil produced from UK waters was in 1975, since when over 2,000 million tonnes has been brought ashore – nearly double the 1,300 million tonnes of oil which has so far been produced from Norwegian waters. Furthermore, the total amount of oil spilled and discharged from the vast quantity that has been produced to date represents only 0.008 percent of this figure.

According to UKOOA, all its member companies remain committed to ensuring

that potential environmental impacts are minimised by managing their activities in an environmentally responsible manner. 'To this end, all member companies have implemented environmental management systems and measures which target prevention, mitigation and control. Potentially harmful effects have been eliminated by good design and operating practice. Great efforts are also made to make staff fully aware of their individual responsibilities and roles in protecting the offshore environment.'

London-based environmental consultancy ERM echoes the above sentiment. It has conducted a number of environmental impact assessments for individual oil companies in recent years – summarised results of which have sometimes been put in the public domain – and developed various environmental management systems. 'The oil companies are very hot on environmental management systems,' it says. 'They have a sophisticated level of self-regulation and have rigorously implemented a chain of custody procedure trail to minimise the environmental effects of their operations.'

Commenting specifically on the issue of drilling cuttings, UKOOA said:

'The industry complies with all international regulations which strictly limit the discharge of oil drilling cuttings and from the beginning of January new regulations limited the oil content of discharged drilling cuttings to less than 1 percent. To achieve this many companies have stopped using oil-based drilling muds or are bringing all their cuttings to shore'.

The association also argued that at many well sites and for over half the installations, there are no accumulated piles of drilling cuttings underneath them, for the simple reason that seabed scour is so strong that cuttings have long since been wholly or partly dissipated, to no apparent environmental ill-effect. 'The industry has been proactive and open about dealing with the piles of drilling cuttings and has recently published the results of a study which it jointly commissioned with the DTI,' it said. 'In synopsis, the study found that:

- The majority of piles are less than two metres high
- Piles have formed beneath just over a quarter of all the offshore installations in UK waters, ie some 60 platforms
- Footprints of piles are typically less than 50 metres
- Modified biological communities extend to beyond the piles and these are characterised by invasion of opportunistic species
- There is little environmental impact beyond 2 km from the platform.'

Further studies to explore the practicality of removal options, essential with decommissioning of installations, are currently underway.

On the issue of produced water, UKOOA stated that in 1995 its member companies bettered the 40 parts per million by weight (ppm) legislative requirement, achieving on average an oil content of 30 ppm.

To conclude, UKOOA reported that: 'Contrary to common perception the offshore industry is proud of its good record in safeguarding the environment while seeking continuous improvement, supporting jobs and helping British contractors succeed in global markets'.

Resolving the issue

Accusations facing the DTI need to be resolved either by the production of more substantive proof of effective management by the Department itself or by changes to the current policies and approaches. Improvements could include:

- Increased openness towards the public through increased availability of database information;
- Release of a clear legislative instrument regarding environmental impact assessment offshore;
- Increased consultative role by the environment agencies in DTI's release of licence applications;
- More visible and more frequent inspections of offshore structures by DTI staff.

It seems unlikely that debate over this emotive issue will dissipate with time. Indeed, as environmental consultancy ERM points out, it is likely to become more heated over the next decade as the oil and gas industry increasingly looks to exploit reserves within sight of shore – for example, in areas off Wales and in the Irish Sea.

At such a time, the DTI will have to liaise with a large number of interested parties – both statutory onshore authorities and environmental bodies such as the Joint Nature Conservation Committee (JNCC), the Countryside Council for Wales and English Nature. (This contrasts the offshore situation whereby it liaises with the government fisheries laboratories (Ministry of Agriculture and Fisheries (MAFF) and Scottish Office Agriculture and Environment Fisheries Department (SOAEFD), JNCC and the Department of the Environment.) The question remains whether the Department has the manpower, resources and right image and approach to do this effectively.

** These figures have been disputed by the industry. According to findings of the UKOOA/DTI review of drill cuttings 1996; OLF study of disposal of oil based drill cuttings, 1996; and an assessment of the environmental impacts of decommissioning by UKOOA in 1995, of the 1.5 million tonnes of cuttings discharged, around 75,000 tonnes is believed to be oil. In the Norwegian sector around 1 million tonnes of cuttings with around 45,000 tonnes of oil have been discharged.*

Meeting US environmental standards

By Charles DiBona,
President, American Petroleum Insititute

The basic mood of those of us connected with the American Petroleum Institute is optimistic on the issues and challenges facing the petroleum industry. Like most others, it is caught up in the great revolutions of our time – the political revolution of the break-up of the old Soviet empire and the accelerating information revolution. The experience is a lot like going down a toboggan run. You keep wondering if this thing has any brakes but the speed and the exhilaration are incredible.

Energy use is 'a sin'

On the other hand, this optimism is tempered with some serious concerns. These are centred on the policies of the US government. Throughout his campaign, President Bill Clinton peddled the metaphor that he wants to provide 'a bridge to the 21st century' but he has delegated environmental policy to his Vice-President, Al Gore, who does not really believe in the 21st century. In fact, he does not believe in the 20th, and maybe not the 19th. One of the greatest divides in history is between the era before about 1800, when almost all energy was provided by animals or people, and thereafter, when the first steam engine and then the internal combustion engine harnessed the power of fossil fuels to the cause of human betterment.

The vice-president regards energy use as a sin, particularly when it powers automobiles. In his book *Earth in the Balance*, published in 1992, he called the automobile 'a mortal threat to the security of every nation that is more deadly than that of any military enemy we are ever again likely to confront.' He said, 'It ought to be possible to establish a co-ordinated global programme to ... completely eliminate the internal combustion engine over, say, a 25-year period.' He talked a little about other types of power but he made clear that his basic goal is to force people into denser cities and reliance on mass transit.[1]

The vice-president's statements remind me of a remark attributed to the Duke of Wellington. He disliked the development of the railroad in the 19th century because, he said: 'It will only encourage the common people to move about endlessly.' This aristocratic disdain sounds like something the vice-president and his fellow environmental elitists would say about the automobile – 'Just think of it; all those common people using energy and automobiles to do what they want and live as they choose. Something must be done!'

Pollution is wrong

Their stated reason for this hostility to fossil fuels and automobiles is that they cause pollution. In particular, Mr Gore and his allies have completely bought the theory that CO_2 emissions from the combustion of fossil fuels is causing world global warming or, as it has come to be called, climate change. Their position on this is worth looking at in detail, because it illustrates the trend that runs through all of the administration's environmental pronouncements. A theory is presented, then fundamental scientific data is ignored so the theory can be elevated into a first certainty, then a crisis. The next step is to ignore fundamental rules of economics so that destructive policies can be trumpeted as the definitive solution to the crisis.

The suggestion that combustion of fossil fuels might increase atmospheric concentration of carbon dioxide and cause a long-term warming trend is a theory that has been around for a century. As a theory, no one can quarrel with it. On the other hand, climate mechanisms are exceedingly intricate and while theories to support the possibility of a significant human effect on climate can be built, so can equally plausible counter-theories.

Climate change theories

The latest report of the International Panel on Climate Change has been characterised, erroneously, as confirming its reality and providing scientific justification for immediate action to reduce emissions. It does neither and it is carefully phrased to be ambiguous. At present, all we really know is that the models that predicted a warming trend are not working right because they are not confirmed by the data. Professor Richard Lindzen of the Massachusetts Institute of Technology, which is one of the top technical institutions in the United States, says the models are about as accurate as Ouija boards. They cannot deal with water vapour, clouds, heat transfer, solar activity, oceans or natural carbon sinks.

When you probe beneath the surface of the models, they are loaded with arbitrary adjustments needed to bring the models into accord with the real world. When you look at real data – which is the essence of science – you find very little support for the global warming hypothesis. Over the past century, the concentration of carbon dioxide in the atmosphere has increased by about one degree Fahrenheit. But most of the increase in temperature occurred before 1940 and most of the increase in CO_2 occurred after 1940. Comparing real

temperature data with the predictions of the models shows no correlation. This is especially true for the period after 1979, when satellite measurements began to make really good temperature data available for the first time.

This lack of scientific support for the global warming hypothesis has not deterred Mr Gore's legions. Once it became clear that the data was not co-operating with the dire predictions, they shifted to the more grandiose concept of 'climate change'. In this view, any climatic extreme is due to the increase in CO_2 and other greenhouse gases. Since climate is naturally variable, this is a sure winner. Bothered by hurricanes, floods, snowstorms, or droughts? Blame it on carbon dioxide. There is an obvious method to this approach. It reinforces the shaky science that underlies the theory of global warming because anything that happens is treated as a confirmation. It also constitutes an all-purpose rationale for increasing the power of government. As environmental writer Ronald Bailey put it, 'Their solutions remain the same. Freeze or fry, the problem is always industrial capitalism, and the solution is always international socialism.'[2] The government must control the market system and industrial activity.

A classic problem

Let me be clear about one point. This lack of empirical support for the proposition that climate change is taking place does not mean we can ignore it. The theory underlying the hypothesis is respectable and the consequences, should the theory turn out to be true, could be serious. Most of you, I am sure, have been exposed to decision theory at some time and you will recognise this situation as a classic problem in decision-making under conditions of uncertainty.

There are some well-established principles on how to approach such problems. The first rule is – stall for time. Make no irrevocable commitments until you must and use the time gained to improve knowledge about the problem and your options. This principle was not invented by modern decision theorists, by the way. The historian Garrett Mattingly is famous for his studies of the 16th century, espcially the Spanish Armada. He wrote: '"To enjoy the benefits of time" was one of the chief maxims of the statecraft of the age. Time untied so many knots, cancelled the necessity for so many desperate decisions, revealed so many unexpected shifts of pattern in a kaleidoscope world, that the shrewdest statesmen were glad to take refuge in a wise passivity, a cautious opportunism.'[3]

Long-term strategy

When you examine the technical data on CO_2 concentrations, one fact dominates. We are concerned with concentrations near the end of the next century, not next year nor even the next decade. Nothing we do to reduce emissions over the next 20 years will make a dime's worth of difference in concentrations during the period from 2050 on. The most expensive, least productive strategy is to engage in a crash programme of near-term reductions in emissions. Instead, we should be using the next 20 years to improve our climate science, to untie the knots of uncertainty. We should also be taking what are called 'no regrets' actions, steps that will be beneficial no matter what the science ultimately shows. These include, for example, promotion of energy conservation and energy efficiency. Energy efficiency is improving at a rate of about one-half percent per year and we expect this to continue and maybe increase.

There are other things we can do. Capital stock could be reduced on a normal schedule, not written off prematurely. Investments made a couple of decades down the road will be based on more efficient technologies. The magic of compound interest will multiply the funds available for investment in the future, as long as we are not forced to invest them prematurely. We could adopt a policy of joint implementation, under which emissions would be reduced in whatever part of the world presents the best opportunities, including the developing nations. API has given a list of suggestions to the US government and we will be happy to share it with anyone who wants it.[4]

Official US policy is the opposite of the course dictated by both decision theory and historic wisdom. It is to rush into short-term emissions reductions, despite their irrelevancy and high cost. Last July, Under Secretary of State Tim Wirth committed the United States to advocating 'an agreement that sets a realistic, verifiable and binding medium-term emissions target.'[5] The exact meaning of this is not clear but officials talk of returning emissions to 1990 levels, or even 20 percent below by 2010. The economic impact would be enormous.

'We should also be taking what are called 'no regrets' actions, steps that will be beneficial no matter what the science ultimately shows. These include, for example, promotion of energy conservation and energy efficiency'

A study by a highly respected research organisation indicates that such reductions would require a carbon tax of about $200 per tonne. The hit on the United States would be upwards of 4 percent of GDP, or about $370 billion, which is almost $5,000 for a family of four.[6] Economist Richard Schmalensee, a colleague of Prof Lindzen, observed that the result 'would feel like...a permanent oil shock (of the 1970s) endured along with a nasty hangover'.[7]

This requirement of emissions reduction would apply only to the developed nations, by the way. The developing

world – notably China and India – would get a pass. Western firms would rapidly find themselves at an increasing competitive disadvantage and would be under enormous pressure to move industrial operations to the third world.

This economic impact is unnecessary. Even if climate change turns out to be a real problem, the cost of reducing concentrations as of the middle and end of the next century can be reduced by 80 percent if we follow the ancient maxim 'to enjoy the benefits of time' and adopt the 'no regrets' steps I described.

Short-term alternative

The administration does not explain its determination to ignore both science and economics and to pursue its goal of drastic short-term emissions. Nor is this practice of ignoring available knowledge limited to the issue of climate change. Mr Gore and company are following the same course in their policy for reducing pollutants under the Clean Air Act.

Clean air for all

I do not want to get into the details of air pollution law in the United States, which is an indescribable jungle of federal and state commands and controls. Nevertheless, while it has involved tremendous waste and inefficiency, it has produced real results. Since the first Clean Air Act over 25 years ago, lead emissions in the United States have declined by 98 percent, even though the population grew by a third and total automobile miles driven more than doubled. During the past 10 years alone, level of carbon monoxide and sulfur dioxide have declined by 37 percent, particulates have declined by 22 percent and nitrogen dioxide by 14 percent.[8] The rules governing emissions of hydrocarbons – called the 'ozone standards' — have been among the most difficult and expensive for communities and businesses to meet but immense progress has been made on these as well.

The administration's response to this progress is to assert that science now shows that even more stringent and expensive standards are needed, supposedly to protect public health. In fact, the Environmental Protection Agency's (EPA) own Scientific Advisory Committee is sceptical. It said there would be no significant health benefit from reducing ozone levels. It noted the existence of 'many unanswered questions' about health issues presented by particulates and recommended more research. EPA is ignoring this advice and forging ahead. The committee chairman, when asked about this discontinuity, said, 'I don't think the standards that have been chosen reflect the advice that (our group) has given (EPA).'[9]

The costs of the EPA proposals would be enormous. For the single locale of Chicago and its suburbs, which have about eight million people, the new ozone standard would cost $2 to 7 billion per year. Benefits would be only $33 million, mostly in minor health improvements. There would be no effect on mortality.[10]

The analogy to the climate change issue is obvious. As I noted before, in each case a possibility is converted first to certainty, then to a crisis requiring immediate action. In each case, the goal is to stampede the public into uncritical acceptance of a crash programme that will cause significant economic damage. In each case, sceptics – a category that includes anyone who believes in taking a hard look at evidence – are sneered at. And in each case, a better strategy is available, one that involves collection of evidence and rational analysis instead of – to borrow a term from the language of the Cold War – 'spasm response'. The basic common factor is the one identified by Ron Bailey: hostility to industry and to free market capitalism, and a strong thirst to increase government power.

Conclusion

I started with general optimism about the tremendous political and technical revolutions driving our industry, and the world. Then I got decidedly downbeat, talking about the economic harm inherent in current government policies and their irrationality, given that better strategies are available. It all sounds sort of Manichaean, a struggle between the forces of light and the forces of darkness. Which will win? Am I an optimist or a pessimist?

The answer is, I am an optimist. I think these destructive proposals are the last gasps of an approach to regulation that will soon be gone. Everyone outside government understands that arbitrary command and control based on politically motivated science is no longer an acceptable way to run a modern economy. More important for the immediate future, many people inside government also understand this and a respectable number of these are members of the US Congress.

In the US system, the president is not a prime minister. He is not the leader of the Congress, even when that body is controlled by the same political party. When Congress is dominated by a different party, especially one that has deep philosophical differences with the president, then the gulf can be wide indeed. Whatever the administration negotiates in Kyoto this year, no climate change treaty is binding on the United States unless it is ratified by a two-thirds vote of the Senate.[11] There is simply no possibility that the Senate will approve a treaty that calls for the reductions in energy use required by current policy. Moreover, it will not approve anything that gives the developing nations a free ride while placing all the burdens, including the burdens of competitive disadvantage, on the United States, Europe and Japan. The scientific and economic facts that I have laid out are not secrets. The administration may not be interested in them but the Senate is not so wilfully ignorant.

Some statements by the US administration might lead you to believe that Congress agrees with its position and endorsed last summers' initiative in Geneva. This is not so. Officials misled Congress, quite deliberately, saying shortly before the meeting that no change in policy was contemplated. The administration claim of bipartisanship is like the ink emitted by a squid. It is intended to cloud the issue while letting the squid do whatever it pleases.

The president has some power under existing law to act without seeking congressional approval but certainly not enough to carry out the promised

changes. He might go so far as to assert that existing treaties give him the authority to take draconian steps without further endorsement by Congress, although I doubt it. Any attempt to use existing agreements in such cavalier fashion would be challenged in court – and the administration would almost certainly lose.

So, to repeat, I am an optimist. No one disputes the importance of environmental protection and we will indeed improve protection of the environment greatly in the years ahead. But the pressures of informed opinion and international competition will force governments to improve the rationality of their approach to this goal. It will no longer be enough to point to a possibility and proclaim it a crisis, and even the Clinton-Gore administration will be forced to begin to pay serious attention to the sceptics. As government policy rights itself, I am confident that the unparalleled ingenuity and technical acumen of the petroleum industry will continue to allow the world to enjoy the fruits of economic growth and personal mobility.

Acknowledgement

This paper was given first at Panorama, organised by l'Institut Francais du Pétrole in January.

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5. Timothy E. Wirth, Under Secretary of State for Global Affairs, Statement on Behalf of the United States at the Second Conference of the Parties, Framework Convention on Climate Change, Geneva, July 17, 1996. p4

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From waste to potential

By John Battle MP,
UK Shadow Minister for Energy

It was in 1964 that the first reports of North Sea oil came through with predictions that resources could last up to 30 years. With our 30 years now up, the UK oil and gas industry is still very much with us as a world leader with an international reputation for developing difficult fields in tough offshore conditions. I would like to suggest that the watchwords of this great age of transition on the brink of the 21st century are 'waste' and 'potential'. Our common aim must be to deliver economic prosperity in order to utilise fully the potential of people to make Britain prosper and to use its talents to the full.

Yet waste remains a recurring theme of our daily economic life. The waste of human potential through unemployment or through inadequate skills and training. The waste of a declining manufacturing base and of declining investment. The wasting of UK oil revenues, squandered on tax cuts for the privileged few instead of invested in the future of the many. Investment in manufacturing as a whole in the United Kingdom is less in real terms now than in 1979, less than its level in 1989 (before the last recession) and on the latest figures 16 percent less than it was a year ago. Total investment in the economy (Gross Domestic Fixed Capital Formation) actually fell (by 0.2 percent) in 1995 and latest figures show it continuing to decline. Lowering investment means lowering industrial growth, especially in manufacturing. Latest House of Commons figures show job insecurity in the United Kingdom has increased, with 10 million different people experiencing a spell of unemployment since 1992. At the same time we have fewer 16 and 17 year olds in full-time education than any other OECD country except Turkey. The cost to the taxpayer as a bill for youth unemployment is now at £10 billion.

The waste of not equipping Britain for our future

Amidst this waste we face a future filled with great challenges and changes, nowhere more so than in energy markets, liberalisation, takeovers, mergers, regulation, electricity companies selling gas and vice versa, integration of power petroleum markets, realignments of energy market players, which we already see in emerging energy spot and futures markets in gas and electricity.

In the downstream industries, the opening-up of gas and electricity to competition for all consumers in 1998 moves the debate about energy policy forward. We can no longer be engaged in the mid-century, 1945-65 debate on nationalisation versus privatisation as in the past. Labour supports the introduction of competition as potentially beneficial to all consumers. The future debate is about regulation and competition, and the relationship between them, to ensure that market failure such as social dumping and environmental concerns are taken into account and abusive market power is challenged.

The key challenge in seeking to turn waste into potential is to bring together the paradox of competition and cooperation, and knowing when to cooperate and when to compete.

For example, in the downstream electricity market we need together to face the challenges of the emerging market in the pool and the need to ensure that competition is introduced smoothly.

In the upstream oil industry the paradigm of CRINE has much to offer. As new hydrocarbon provinces open up around the world, we need to ensure that the UKCS retains a competitive edge. As CRINE moves into yet another new era, focusing on added value as well as cost reduction, the opportunities for the future remain open.

Indeed, encouragingly for the wider debate on standards at work, CRINE's emphasis on cost reduction not at the expense of safety has rather been seen as a positive contribution to competitive efficiency in harsh circumstances and as a model of competitive cooperation.

The UKCS today

The North Sea oil industry is often described as 'mature'. But although oil and gas cover 67 percent of our energy demand and we remain a net exporter, the image is often that the industry is all over and that all that remains is the question of clean-up and pollution.

We were told 30 years ago that the oil industry would soon be over. But surprise is the only certainty for 1997. A year ago when prices were low, who would have predicted the present price of oil? Having started 1996 with predictions of $15 a barrel, no-one would

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From left to right: Dr George Watkins, Chairman and Managing Director, Conoco (UK) Ltd; John Battle MP, UK Shadow Energy and Industry Minister; Professor John Archer, Principal & Vice-Chancellor, Heriot-Watt University

have believed it would reach $25. World economic growth will boost demand for gas and oil, exploration and drilling will expand, concentrating on untapped deep sea reserves and new investment in pipelines. The International Energy Agency expects the North Sea alone to lead a rise in non-OPEC supplies by pumping an additional 800,000 b/d of crude during the year. Internationally the demand for oil and gas is increasing, seeing higher oil prices, deeper water exploration, new technology and more drilling, new corporate structures and operating efficiencies.

The 25 year-old Brent field is getting a new lease of life in a major rebuilding programme that will help turn it from an oil to a gas field by the turn of the century. With the Foinaven, Captain, MacCulloch and J-Block fields all due on stream in the next few months and indeed with 19, generally small, fields worth an estimated 495,000 b/d ready to start production in the United Kingdom this year, the reality is that the UKCS is far from 'past it'.

Who would have predicted in 1996 that average well-head prices would be higher than at any time since 1985 (excluding the Gulf crisis prices peak) and without economical or political crisis in sight?

In particular, the impact of last year has been increased activity – not only driven by price but by technology. Even if prices drop back, it is unlikely now that the level of exploration and production will be slowed. Sustained worldwide exploration points to a strong couple of years for the drilling industry, as some analysts point to an increase in E&P budgets of nearly 10 percent this year.

Worldwide drilling activity picked up in 1996 and the industry disclosed shipyard contracts for the construction of 10 deep water ships and semi-submersibles.

In 1996 the Troll field in the Norwegian North Sea began supplying gas through a platform that is the largest structure ever moved by man. It will supply gas for the next 50 years.

Labour is keen to sustain what is proving to be a virtuous equation: investment is accessing more reserves which in turn generates sustained employment. Indeed our intention is to reinforce it and emphasise its impact through the whole supply chain.

In the first decade of development on the UKCS, most of the expertise and technology was supplied by US-based companies, yet by 1991 77 percent of all orders by value were being fulfilled by UK-based suppliers and contractors. It is now predicted that investment will continue at £8-10 billion per annum for years to come and production will exceed UK consumption for the next decade. Labour wants to ensure that happens.

Future potential

The current 'buzz' in the UKCS does not disguise the need to continue the drive towards cost reduction and international competitiveness.

I want to focus on new technologies and the positive future of offshore and onshore industries which generate 30,000 jobs offshore and 300,000 more in support onshore. Few people comprehend the full extent to which the supply industries create jobs and opportunities across Britain – from London to Lowestoft; Manchester to Glasgow; Aberdeen to Great Yarmouth.

Engineering, fabrication, heavy manufacturing, power generator turbines, high voltage distribution gear, pressure vessels, marine structures, power generators, turbines, pumps, valves, and pipe work and safety equipment, well-heads and subsea trees, valves and controls. Helicopters, boats, subsea operations, steel, cables, consumables and components. There are some 2,000 suppliers on the OSCAR database.

Nor should we forget the major contributions of the new information technologies. There have been great technological advances from the use of vertical instead of horizontal cable in acquiring 3D seismic. 3D seismic has allowed horizontal drilling to be applied more effectively, targeting new reservoirs and accessing updip traps and accumulations that previously could not

be reached. It is said that those explorations employing the most technology are three times more successful in finding large fields and overcoming barriers of faults and salt intrusions.

There have been great technological developments to ensure that the oil and gas industries continue to make that contribution. Conoco recently announced a project in the Gulf of Mexico to drill in up to 2,500 metres of water and joined up with Reading and Bates to build a double-hulled vessel. Here at home the developments on the Atlantic Margin continue to push at the boundaries of the possible.

Improved cooperation between companies sharing development risks is itself acceleration; technological development and application.

All these developments harness the powerful potential of science, engineering and technology to minimise waste in the oil industry. The development of the CRINE network spells out the positive contribution which that initiative will continue to make to opening up new opportunities through cost reduction.

The challenge of training

The greatest challenge to the industry is attracting, developing and retaining skilled people at all levels. In other words, the wider economic picture remains just as important. The waste of human potential through low skills impacts heavily on the oil industry – both because skills shortages cause costly bottlenecks in the supply chain and also because limited economic growth means limited growth in the energy sector.

The world economic growth which will boost demand for oil and gas is itself to an extent dependent on skills and training in non-oil sectors. The greatest challenge to industry at all levels is attracting, developing and retaining skilled and committed employees. A major problem in the next decade will be finding skilled workers for careers in engineering and the geosciences to replace retiring operators.

Often supply industries are not seen as directly relevant but if just one firm in your supply chain is struggling to recruit adequately trained and skilled employers, then the cost of that shortage will filter through to you in the long run. Many of the companies in the supply chain are of course small and medium sized enterprises (SMEs) and so we need to recognise that the heightened sensitivity of SMEs to the economic environment flows through even to the large multinationals they supply.

So whilst the record of the oil and gas industries on long-term investment and R & D is laudable, it is also exceptional and this impacts upon the sector. Overall UK investment in 1996 was still 10 percent below the 1989 level and remains lower than in 1979. Compared with Britain, investment per worker is 18 percent higher in Germany, 51 percent higher in France and 68 percent in the United States.

That is why Labour places such heavy emphasis upon these issues. The one tax we have said we will raise is the one-off levy on the excess profits of privatised utilities which will begin the task of getting our young people off benefit and into work. We have to tackle the pressing problems of our fractured society, not simply because unemployment or lack of skills and opportunity are bad in themselves, although of course they are, but because of the debilitating effect they have upon UK competitiveness in this sector as much as any other. It is a waste to have 250,000 young people left unemployed. They are productive potential that is actually needed.

The challenge of the environment

The challenges of the future remain large. Public perception of the oil industry is powerful as the Brent Spar episode illustrated. Environmental concerns will and should grow, as will global concerns related to human rights and local settlements in Colombia, Peru, Nigeria, Thailand, Burma and elsewhere.

Health and safety remain a constant challenge – last year the number of fatalities rose from one to five, and the number of serious accidents from 41 to 42, according to the Health and Safety Executive. No one would dispute the improvement brought about since Piper Alpha and the spirit of cooperation between managers and workers that has helped bring it about. But the latest figures are a sad reminder of the requirement for continued vigilance.

Environmentally, operators will have to exercise more diligence in monitoring discharges to ensure compliance with toughening standards. There remains a public perception of the debate on pollution which remains totally unconnected with the continued consumption of hydrocarbons in our daily lives. Transparency is the key to standard setting, measurement and implementation of decisions so that the public does not feel kept in the dark.

Internationally, there is a growing emphasis on tackling toxic pollutants such as arsenic, benzine, zinc and total phenols. Labour's approach is to put a high priority on regard to the environment, based on sound scientific approaches that are clearly explained.

There remains a need to tackle the issue of decommissioning, even though the industry has come a long way since Brent Spar. The industry faces a considerable bill for decommissioning over the coming decades. The Kvaerner/John Brown report for the European Commission quotes £13.6 billion across Europe. Whilst that is contested, it is clear that the report's discussion at OSPAR in June will be vital.

There are ways to reduce the costs of disposal and they need not rely upon cutting environmental corners but instead upon employing best practice and new technologies. If the nascent nuclear decommissioning programme proves to be a valid example, cost estimates can fall as well as rise. Let us work together to ensure that this is the case for oil platform decommissioning.

The government's policy is that shallow installations should be disposed of onshore and deep water abandonment according to UKOOA each on a case-by-case basis – within the international guidelines established by the Conventions at Oslo, London and Paris – and of course within the 1987 UK Petroleum Act.

The offshore oil industry actually has

a sensitive environmental record and approach, for example to marine life, but it needs to be communicated better if people are not to continue believing that environmental concerns are sacrificed to the industry's economic goals.

The environment threat from the hydrocarbons industry is not a new one. We should reflect on the progress already made in environmental improvement as we struggle together practically to make further improvements still. Operators will have to exercise more diligence in monitoring discharges in future and work to develop economical and dependable treatment technology. High tech companies should be helped with European funds to move into the clean technology involving zero emissions.

My vision is of economic efficiency and environmental standards going hand in hand and not offsetting each other. We must demonstrate that energy can be economically produced and consumed without wrecking the environment. These are the environmental technologies of the future and the oil industry could lead the field. Technological advances will allow oil and gas to be found, produced, transported, refined and consumed with diminishing environmental consequences.

Improving efficiency on the UKCS

There remains a challenge related to CRINE as well. There is a danger in constantly outsourcing contracts to subcontracts, if links in the supply chain are weakened, losing quality and even rubbing out 'corporate memory'.

Equally challenging is the issue of fallow fields. In 1996, 117 UKCS blocks were assigned fallow status, ie no seismic or drilling activities have taken place in them for five years. Sixteen of them contained underdeveloped discoveries.

It is important that acreage does not become 'frozen up' and I am happy to look at possibilities like acreage trading and opening up access to data after a year of licensing as in Canada. As bidders apply for new licences, it is important to ask what they have achieved – or at least attempted to achieve – in old ones.

Government could do better too. Red-tape delay in approval phases of projects can jeopardise marginal fields. Processes must be streamlined so that government is enabling rather than controlling and blocking. It is Labour's aim to assist with the opening-up of marginal fields, not to stifle them with bureaucratic delay.

A stable macro-economic framework

The Labour Party understands the importance of these factors. It also understands the importance of stability in the macro-economic environment and Gordon Brown has made it very clear that we will set tough rules for government spending and borrowing; set tough inflation targets and strengthen the economy so that interest rates are as low as possible. We understand the importance of stability for longer-term investment decisions in particularly difficult terrain.

We have no plans to introduce shock taxes on the oil sector – unlike the Conservative Party. At the 1996 Budget the Tories scrapped corporation tax deductions on intangible assets on most drilling activities, hoping to raise £150-200 million. UKOOA estimates the tax hike as being equivalent to the cost of drilling 15 to 25 wells offshore.

Labour's priorities on tax have now been clearly spelt out by Mr Brown and I would be misleading you if I hinted that Labour has plans to reverse this particular tax rise.

But let us nail once and for all the Tory lie that they are the party of low taxation – they simply are not, as we have all experienced as individuals since 1992 and the industry now faces. Indeed, the whole history of taxation of the UKCS since 1979 does not sustain the argument that the Tories are incontestably the party of business. By contrast, Labour's fundamental belief is that tax must be equitable for both industry and the public and that it should promote long-term productive investment. Stability is key so there is a fair balance in risk involved for the industry and a fair return on natural resources. We want to see operation with a stable framework into the next century.

Labour is the party of business now, because we want to work with industry to tackle our common problems as a nation and as an economy. Our aim is long-term industry investment and sustained competition.

A vision for the future

In government, there is a pressing need for more 'joined-up thinking' between departments, linking energy, environment, transport and trade and industry including education building on the work of the research councils and technological foresight. The paradigm of CRINE has real potential. The energy industries will never speak with one political voice but it is a national interest – despite the conflict, it is a wealth-creating activity that generates economic growth and produces quality work.

We don't fear change – we will work to enable our people and businesses to shape the tumultuous changes that lie ahead. What is more, as the great theologian Thomas Aquinas advised in the 13th century, the art of wisdom is translating the complex into the naturally clear and simple without reducing to naivety. In an age of sound bite we must all work at complexity.

We will lay the foundations for a mature, world-class, highly competitive offshore industry.

Our overall vision is laid out in our Statement of Aims and Values: 'a dynamic economy, serving the public interest, in which the enterprise of the market and the rigour of competition are joined with the forces of partnership and the co-operation to produce the wealth the nation needs.'

It is a positive vision for the UKCS in the next century, eliminating waste and realising potential.

Progress on the Armada field

By Neil Potter

The winning of the development of the Armada gas/condensate field was of crucial importance to British Gas. It is the first North Sea project of which it is operator on behalf of a number of partners. Colin Friedlander, Technical Director, BG Exploration & Production, says 'Prior to Armada we had only operated on behalf of ourselves, and it was important to demonstrate our capabilities if we were to succeed in the international arena and realise value.'

Neil Potter looks at progress on the development of the three fields which cover 31 square kilometres and span five blocks. Recoverable reserves are put at 1.2 trillion cubic feet (tncuft) of sales gas, 50 million barrels of condensate and 20 million barrels of natural gas liquids (NGL). First production is due in October with peak production put at 450 mncuft/day of gas and up to 26,000 barrels per day (b/d) of condensate.

It was in April 1992 that agreement was reached by the group of licensees to seek approval for the appointment of BG as operator designate for the newly named Armada project. This covered the three discoveries made in five licence blocks on the boundary of quadrants 16 and 22 in the central area of the North Sea, very close to the UK-Norwegian median line.

Fleming, Hawkins and Drake

A Palaeocene discovery, known as Maggie by Phillips and renamed Fleming in line with BG's Armada theme, was to be developed along with two Jurassic discoveries, Hawkins and Drake. A total of eight discovery and appraisal wells had been drilled between 1980 and 1988.

'Unitisation was difficult and took a year to finalise,' says Mr Friedlander. It is now on a fixed equity basis and no redetermination will be required. The equity is: BG E&P, 45.27 percent; Amoco, 18.20 percent; Fina, 12.53 percent; Phillips, 11.45 percent; Yorkshire Energy, 6.97 percent and Agip, 5.58 percent.

Development options

The first development plan in 1992-93 was for a two platform development but with a cost of £740 million this was rejected as too expensive. Another concept was for a single production, quarters and wellhead platform. A subsea facility would be required to complete the development of Fleming. This would be placed to the north of the platform and allow for the drilling of two or three wells. Subsea flowlines would connect them to the platform.

'We altered the project, put back the target gas date by a year, re-engineered it and came up with a much simpler, but technically more challenging solution,' says Mr Friedlander.

In December 1993 BG awarded an engineering contract to Amec, the first phase of which included conceptual definition of a single platform and associated pipelines. Detailed design and procurement of topside facilities were to be undertaken by Amec on project approval.

Cost reductions achieved

In June 1994, the plan for phase 1 was approved by the UK Department of Energy and the cost was put at £539 million. Cost savings have reduced this to £416 million with further reductions likely.

The overall project estimate for all phases, including future drilling, is £625 million, with the current estimate at £527 million. In around five years' time a further seven wells are due to be drilled from the platform.

There is a deeper Triassic reservoir, Seymour, which underlies the three fields, which will be developed in the future. The platform has 21 slots, so that with eight wells in the first phase, there will be six available for future potential satellites.

Platform manning has been reduced from the initial 38 to 29 and BG will use multi-skilled technicians. It aims at being the lowest cost producer in the North Sea with an opex target of below $3 per barrel of oil equivalent.

The complex nature of the reservoirs – the 19 km Fleming field overlays Hawkins and Drake – called for innovative solutions. The use of the latest extended reach drilling techniques meant that all three fields can be accessed from a single platform.

The gas and condensate will be separated on the platform. The gas will then go via a 20-inch, 24-km concrete-coated pipeline to the Everest riser platform and on to Teesside through the CATS pipeline.

The condensate will go through a 10-inch, 24-km pipeline to the riser platform and on into the Forties pipeline system to Cruden Bay and then to Grangemouth for processing. Tariffs will, of course, be payable for the use of both lines.

Pipelaying was carried out by EMC last summer. British Steel Tubes & Pipes produced 7,097 tonnes of its sour-resistant High Frequency Induction welded pipeline at its Hartlepool mill.

On Teesside, Amoco has invested, on behalf of the system owners, £80 million in expanding the Seal Sands reception and processing terminal.

In June 1994 BG awarded John Brown, then part of Trafalgar House, the contract for the detail design and procurement of the jacket and template.

The 6,000-tonne jacket was fabricated at Barmac's Ardersier yard and the 10,000-tonne integrated deck by Kvaerner Oil & Gas at Methil.

A 200-tonne subsea template, fabricated by Lewis Offshore of Stornoway, was installed in January 1995. Eight production wells have been pre-drilled utilising the semi-submersible *Santa Fe 135*. The last one, A8, completed in November last year, set a new world record of 23,905 feet as the longest well drilled from a semi-submersible. The extended reach well is inclined at an angle of 74.4° from vertical and reaches a vertical depth of 9,148 feet.

Cooperation rather than alliance

BG, unlike some operators, has not structured contracts into an alliance agreement. Armada Project Manager Colin Higgins says, 'We don't have an alliance as such, but we are working in a co-operative way, and the whole of this arrangement is held together by a memorandum of understanding.'

He cites the integrated deck fabricated at the Kvaerner Oil & Gas yard at Methil in Scotland as an example of the approach.

Three main engineering contracts were awarded: to Kvaerner for fabrication; to Amec for engineering services and to AOC for hook-up and commissioning. Each of these contracts is slightly different, with risk and reward elements built in.

'Each of these contractors has the opportunity to share with the Amerada partners in capex savings', says Mr Higgins. 'It's not the same way as one might see the alliances of, perhaps, BP or some of

the other operators, where everyone upfront agrees the capex target. Each of the contractors is actually working to a different bottom line number.'

A stretch target of 180 manhours per tonne (mh/t) was set at the time of the contract award, below the industry best to date of 200 mh/t. On completion the figure was 130 mh/t.

A key figure of all the Armada designs, says BG, was whole-life costing in order to get a correct balance between the cost of providing the facility and the ongoing cost of maintaining it.

An example of this with the jacket was the selection of 100-year design life for the bottom half. This resulted in a relatively small increase in steel requirements but does mean that regular, expensive diving inspection is avoided.

The hook-up and commissioning of the jacket and topsides, which were installed by Heeremac's *DB102* in March, is being carried out by AOC and the *Safe Lancia* flotel is being utilised.

Gas sales

Five of the co-venturers (Agip, Amoco, BG, Fina and Phillips) are to sell gas to BG at an average rate of 225 mncuft/d and to National Power at 100 mncuft/d over a five-year period.

The sixth Armada owner, Yorkshire Energy, which bought Amerada Hess' stake in 1994 for £27 million, will have a gas entitlement of up to 30 mncuft/d which will be marketed directly to gas consumers.

In November last year BG awarded five-year contracts worth £6 million to three Aberdeen companies for the maintenance of offshore equipment. Sulzer-Wood will be responsible for rotating equipment and pumps; Energy Services International for power generation and Atlantic Power & Gas for gas compression.

Risk and reward elements enable both the contractors and the field partners to benefit from cost reductions and improved efficiency.

Seaforth Maritime, a Brown & Root Energy Services company, has a five-year contract to provide logistic operations services. This includes the provision of dedicated and shared supply vessels, a computerised logistics control system, procurement, cargo handling and storage services.

Membership Survey yields mass of information

In the belief that information and personal details obtained elsewhere could be out of date, the Institute decided to carry out a detailed Membership Survey to discover answers to such questions as how many members were young (under 35), nearing 90 (a few), how many had degrees in anthropology (a handful), how many 'volunteered' to work for the IP and how many had joined for the sole purpose of socialising (or networking).

The survey, carried out at the end of last year, produced a very high level of response from members – some 2,445 replies were received, representing 30 percent of the total number of individual members. Not surprisingly, the sample closely matched the overall membership in terms of profession, age and membership grade. Market research consultants Prince Research Consultants Ltd, who helped the IP to draw up the 59 questions, confirmed that, by all usual statistical tests, the results are extremely reliable. A detailed analysis has been made of the basic responses, breaking down individual questions according to criteria such as job level, age, type of company, gender and special interests. The information in the replies, reflecting the disparity of the membership, is so detailed that all conceivable permutations can be worked out – questions such as how many blue-eyed geologists who are vegetarians work on Sakhalin Island.

The broad conclusions

Almost 90 percent of respondents believe that the Institute is making good progress towards its mission to be the most respected, independent, European-based centre for the advancement of knowledge in the oil and gas industry; 17 percent believe that we are already achieving it but 10 percent think we are failing to do so.

From the fact-filled treasure chest of statistics in the survey, many more vital statistics about our members can be pulled out by the avid statistician. For instance, some 15 percent of those responding to the questionnaire feel that the IP is making a significant contribution to their own area of technical interest, while another 62 percent said that some such contribution results from IP activities.

Asked to rank the importance of key IP activities, members emphasised the importance of the Institute as a source of information, whether it be direct access to technical data, material found in *Petroleum Review*, the use of the Library and Information Service or, to a lesser extent, through conferences, discussion groups and branch activities. On a personal level, members also rated highly the networking possibilities.

The vast majority believed that the IP work in their area of special interest was of 'some' or 'great' benefit to them, while some 14 percent felt that membership greatly benefited their career development and more than half said it had had 'some' benefit. Given the acknowledged low level of subscription charges, it came as no surprise that nearly everyone thought that individual membership as well as publications provided good value for money.

Contented lethargy

It is perhaps a reflection of the pressures on people's time today that, despite these high levels of satisfaction, the level of active involvement by members was more modest. While a fifth of members claimed to have attended a branch meeting in the last 12 months, only 8 percent had come forward to sit on a branch committee.

Similarly, although the Institute is dependent on volunteers to undertake much of its technical work, only 13 percent had served on technical committees, while a mere 10 percent had taken part in discussion group meetings. Conferences, however, were more popular/useful – nearly half of our members have attended an IP conference at some point during their careers.

'I am delighted to find that members appreciate *Petroleum Review* and pass each copy on to several colleagues. In planning future issues I shall find it helpful to have the comments of respondents on the topics they find most useful and would like in greater detail – news coverage, technology and features. Similarly, it is important that we know whether our readers are interested in upstream or downstream matters – or both. We are willing to publish Letters to the Editor on this, or any other issue.'

Carol Reader, Editor, *Petroleum Review*

'This survey shows that IP conferences are good value for money, topical and excellent for networking.'

Jane Hill,
Conference Manager

The Library and Information Service, frequently referred to as 'the jewel in the crown', received confirmation of its acknowledged status as an incomparable stack of information, with sources dating from the early days of the industry to the latest CD Rom. The survey showed that a third of members had made use of the library in the last 12 months – but not necessarily fought over a seat in the increasingly crowded room.

Further analysis

Facts and figures spew out of the survey in a never-ending stream – absolute joy for the dedicated statistician but for the rest of us... As yet, no-one has volunteered to undertake the detailed analysis of individual questions, cross-referenced by age, gender, employing organisation, type of job and specialist area of interest but it will be done.

Some interesting random facts, however, do jump out of the morass. Contrary to popular perceptions of the Institute's slant, those who describe their specialist interest as 'upstream', while exhibiting some variation in their appreciation of IP activities, nevertheless registered a high level of satisfaction, indicating that the IP is 'achieving' or 'making good progress towards achieving' our mission, nearly 90 percent feeling that the IP technical activities are of 'some' or 'great' benefit to them in their work and 70 percent viewing membership as beneficial to their career development.

Analysis by age group focused particularly on those between the ages of 26 and 45 who are under-represented in our overall membership but who represent the main working population within the industry. Amongst the younger category there was particular interest in the technical functions of the Institute and in access to technical information in specific areas. This is not surprising, since most people within this age group will be fulfilling 'specialist' roles. At the same time, they tended to have a lower opinion of technical materials in, for example, *Petroleum Review*, probably because it is not sufficiently specialised to meet their particular needs.

Questions designed to assess the interest of younger members in such issues as courses, a technical subscription service, distance learning, the award of technical qualifications and personal development or mentoring services produced a range of responses with nearly half favouring low-cost, locally delivered, short courses. While there was marginally higher interest in career development activities among younger groups, a similar pattern was evident for all groups in fulltime employment, confirming our perception that most people wish to take a more proactive role in managing their own careers.

The young members indicated that they were happy with the services offered by the IP and with the benefits of membership. It seems likely, therefore, that in order to identify more clearly what needs to be done to attract more young people (which is one of the main aims of the current IP management), there is a need to talk to non-members in the industry to discover what prevents or inhibits them from joining. However, it was assuring to find that existing young members do not perceive the IP as an 'old boys' club' or the 'Rotarians' of the industry!

'The survey has confirmed some things we knew already – for example, that consultants make good use of our services. Of the third of respondents who used the LIS, most were generally satisfied or better with the services offered and over half of all respondents ranked the Library as first or second in terms of importance, compared with other facilities on offer. But we are not complacent. We will aim to reach the members who do not use our services at present – especially those who mistakenly believe that they need to visit us in person. We can be reached by telephone, fax, e-mail and via our page on the World Wide Web.'

Catherine Cosgrove, Head of Library and Information Service

'Without wishing to sound complacent, the Membership Survey indicated a reasonably high level of satisfaction with what the Institute does, both technically and in terms of the other services it provides. Analysis identified some small differences in opinions and expectations amongst the young and women. We hope to get some guidance from the suggestions that have been made – everyone who responded provided some comments. We will be analysing these suggestions and, where appropriate, we will incorporate them into our future plans to improve our services and enhance the value of membership, though we may need to do some more research beyond our existing members to understand the reasons why young people remain under-represented in the IP.'

Ian Fotheringham,
Chairman of IP Membership Committee

The Institute of Petroleum

Parallel work done by a group investigating interest in continuous personal development has led to a series of projects being identified under the general heading of 'lifetime learning'. Outlined in an article 'A Learning Society' in the February issue of *Petroleum Review*, these reflect closely the career and employment related interests tested in the survey.

The survey results show that only 3 percent of the members are female – a fact easily confirmed by a glance round a typical IP conference, discussion group meeting or the Annual Dinner. What, one asks, happened to Opportunity 2000, the campaign which aims to boost equal opportunities?

These female members are generally younger than the average member. A high proportion work in the administrative, legal, academic, and information spheres, with specialist interests in marketing, retailing, distribution, the environment and microbiology, but only 9 percent are qualified engineers compared with nearly 47 percent of the total respondents. In fact this merely reflects the small number of female engineers who are graduating from university.

Responding to the survey

Thanks to the excellent response to the survey there is an enormous volume of data to evaluate. Further detailed analysis will provide the IP with a focus and pointers for the future within particular areas of IP activities. The comments and suggestions made on the questionnaires need to be categorised and incorporated into plans to develop and improve the services provided and the appeal of the Institute to the targeted groups (women and young people) identified. These will be incorporated into our future Business Plans for 1998 to 2000.

For those who, not satisfied with this brief overview, are inspired to carry out their own research into the minutiae of this survey, a reference copy is available in the Library. With a bit of luck it would appear that from the multitude of permutations and cross references on offer it should now be possible to discover how many members play golf every weekend, eat muesli for breakfast and moonlight in a jazz band!

Carol Reader

'The information we now have about our members' interests and their motivation for attending branch meetings will enable us to focus more accurately on delivering the benefits they wish to get from local IP programmes. The branches are an important part of what members get for their subscriptions and I would like to increase the number who take advantage of them. Only by taking part is it possible to get full advantage from your IP membership.'

Peter Johnson, Chairman, IP Branches Committee

Promise from Canada's east coast

By Gavin Will

The coming year promises to be one of significant activity for Canada's emerging east coast oil and gas industry, with first oil scheduled for Hibernia and later for Terra Nova.

Last December the Terra Nova consortium selected a fabrication group, named the Grand Banks Alliance, led by Brown and Root to build a floating production, storage and offtake unit (FPSO) for the 300-400 million barrel field. Brown and Root and AGRA Incorporated of Canada are responsible for engineering, construction and project management of the Terra Nova project, a contract worth Cdn$1.6 billion.

Other partners in the project are PCL Constructors and Concrete Products of Canada, Doris Engineering, Halliburton Energy Services, Coflexip Stena Offshore and FMC Corporation.

'This was the most difficult selection process I've ever been involved in, and each of the three consortia had very high quality people,' said Gary Bruce, Petro-Canada's Vice-President for offshore development and operations. 'We expected each of them would put in about 40,000 hours each, but I'd estimate they did double that. In the end, we felt that the Grand Banks Alliance concept would generate the greatest overall value at the lowest cost.'

The project is still contingent on a decision by the ownership group to proceed with Terra Nova but the go-ahead is expected to be issued in the third quarter of this year once the environmental assessment process is completed by an inter-governmental agency.

Petro-Canada, which holds a 34.2 percent share in the ownership group is the field's operator. Other shareholders are Mobil with 20.7 percent, Husky Oil 15.8 percent, Murphy Oil 10.7 percent, and Mosbacher Operating Ltd 3.6 percent. Norsk Hydro now owns 15 percent after an asset swap late last year with Petro-Canada.

Providing Terra Nova proceeds this year, the Grand Banks Alliance will be responsible for constructing a double-hulled FPSO, designed to process up to 125,000 barrels per day (b/d) with the capability of providing on-board storage of 850,000 barrels. The vessel will be built with sufficient deck space to allow production to be boosted to 150,000-160,000 b/d. While the hull will almost certainly be constructed in southeast Asia, many of the topsides fabricating and hook-up operations are expected to be completed in Canada.

To win the contract the Brown and Root group overcame two competing bids, one led by Aker and another by Maersk and Fluor Daniel. This victory for the Brown and Root alliance was a major setback for Aker, which paradoxically also lost the primary Hibernia contract in 1991 – only to be brought back by Mobil in 1994 to save the project from its near-death experience.

Strategic partnership

One of the keys to Brown and Root winning the Terra Nova contract is its strategic partnership with AGRA Incorporated of Canada – an arrangement which has resulted in the pair winning several major oil and gas related contracts along the Atlantic Canadian seaboard. In addition to steering the Terra Nova project to first oil in 1999, the alliance also won the project management contract last year for the Cdn$2 billion Sable Island natural gas project. The Sable Offshore Energy Project (SOEP) is currently in the environmental assessment stage and is set to begin producing gas for the eastern US and Canadian markets in 1999.

'We've had success, I think, because we believe in the shared risk and reward concept of alliances,' said David Patterson, Vice-President of AGRA.

In 1995 the Brown and Root-AGRA alliance – as well as partners AOC Canada and BFL Consultants – also won the operations and maintenance services contract for Hibernia's operating phase, which covers a five-year period and is worth $120 million.

Reserve base

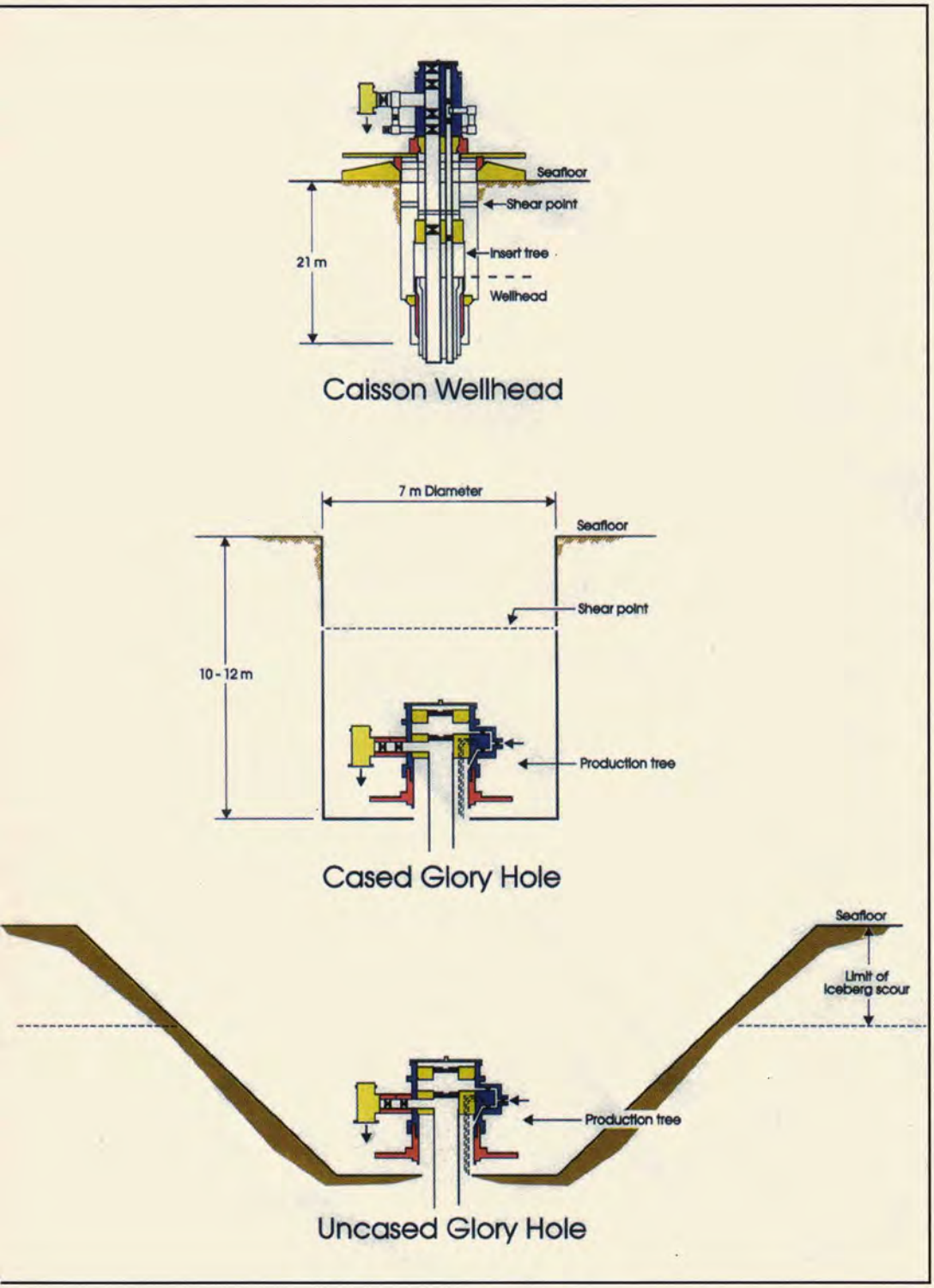
As for the Terra Nova reservoir itself, there is an estimated 300-400 million barrels of recoverable crude in the field, which was discovered by Petro-Canada in 1984. The field is located on the southeast limit of the Jeanne d'Arc Basin. Seismic mapping has determined that the field is bounded to the south by an up dip pinchout, to the north, east and west by major faults. The oil-bearing region covers an area of 67 square kilometres, with the reservoir located within 140 million year old rock in the Upper Jurassic zone. Rocks in this region are predominantly medium to course grained sandstone with minor conglomerate and interbedded mudstone. Net oil pay thicknesses range from 5 to 40 metres within the individual reservoir sandstones in wells which have been tested; and lie at a depth of 3,200 to 3,700 metres below the seabed.

The reservoir sandstones were deposited in a river-dominated to marginal-marine environment and are considered to be highly productive with good lateral continuity. The major sandstones are locally separated by thick mudstones or shales but are interpreted as being in vertical communication since they are stacked in various parts of the field.

Light gravity crude was emplaced into the reservoir sandstones from underlying Rankin Formation source rocks and the Terra Nova field is effectively sealed by overlying shales of the Fortune Formation.

The field is comprised of three distinct geologic structures, the Graben and East

Wellhead protection methods



Flank and Far East Flank. Six wells have been drilled, all of them in the Graben and East Flank, with further seismic set to be conducted this summer which will determine geographical placement of the wells. The existing exploration wells will be used during production.

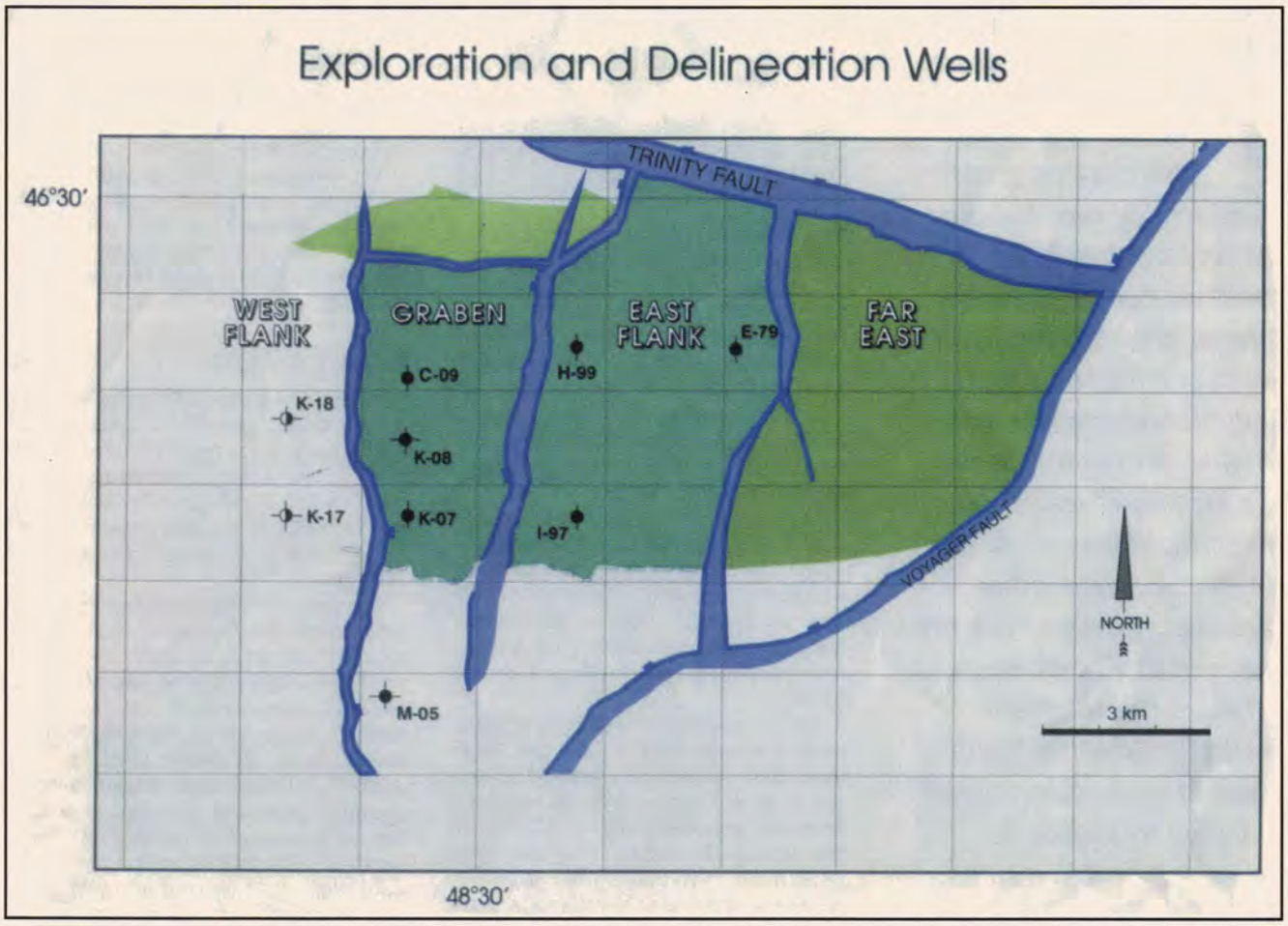
For the first four years production will centre on the Graben and East Flank, for which 20 production wells, 10 water injection wells and two gas injection wells are proposed. When these regions are partially depleted, production will begin in the Far East zone, bringing the total array to a forecast 44 wells. The expected production rates range from 10,000 to 25,000 barrels of oil per day per well.

Iceberg dangers

Protection against icebergs is a prime consideration in designing subsea systems, FPSO and shuttle tankers. Quick disconnect systems will be installed on the production vessel itself, which will allow the unit to be removed from the path of large icebergs, and both the FPSO and shuttle tankers will be double-hulled as protection against pack ice and collisions with small icebergs. In addition, iceberg towing will be possible using available supply vessels.

One of the biggest concerns is protection of subsea systems from damage and pollution from icebergs scour on the ocean floor. The standard wellhead system will be based on a 476 mm wellhead housing with 69 MPa pressure rating, with trees rated at 34.5 MPa. To protect against iceberg scour Petro-Canada will be using dredged glory holes on most of its wells, with the wellhead and master valves installed below the scour level at approximately 10 to 12 metres within the seabed. Icebergs are not expected to affect production equipment, which means remedial work should not be required.

Of the six delineation wells



drilled during the 1980s five are a modified caisson design, differing from conventional subsea production trees in that the caisson trees are divided into lower and upper tree assemblies. The lower assemblies include the tubing hangers and lower master block valves and are installed inside the caisson below the iceberg scour depth. Shear points are located between the caisson master valve blocks and seafloor. If a caisson well is damaged from iceberg impact, the upper section of the insert tree would incur damage but the remainder would be secure and may be reusable.

Joint cooperation

With the presence of Hibernia on the Grand Banks, Petro-Canada and its Terra Nova partners are looking to close cooperation for onshore and offshore support services and shipment of crude. Since Petro-Canada already owns one of two dedicated Hibernia shuttle tankers, Mr Bruce said it is possible the company will ship its share of Terra Nova oil using the same vessel.

He added that an oil transhipment facility currently under construction in Newfoundland for Hibernia could also be employed to handle Terra Nova production. 'It obviously makes sense to take advantage of economies of scale whenever possible,' he said. Alternatively, Petro-Canada may send its share of Terra Nova crude directly to market.

In addition to preparing Terra Nova for the construction stage, this spring will also mark the final countdown in bringing the 600 million barrel Hibernia oil project to fruition. Mating of the topsides facilities and the gravity based platform was scheduled for March and during the summer Maersk will tow the structure to its drill site. First oil is scheduled to flow in December.

Whiterose potential

While plans to develop Terra Nova and Hibernia are underway, activity is also heating up on the third largest known Grand Banks oil field – the 250 million barrel Whiterose property. The operator, Husky Oil, is planning a 10,000 b/d extended production test well for a 10-12 month period in 1998-99. If successful, Husky intends to begin full- scale production at 125,000 b/d between 2002 and 2004. Pre-production costs are currently estimated at Cdn$1.5 billion.

Australia may triple LNG output

The natural gas industry in Australia has grown considerably over the past 10 years. It has been concentrated in Western Australia, where the North West Shelf is the biggest liquefied natural gas project to date. Within this state are located massive gas fields that have yet to be developed, while other sizeable reserves have been found in the Timor Sea and offshore the Northern Territory. Now, the North West Shelf joint venture is planning to double its present production rates.

By William Scholes

Output from potential LNG developments could see Australia producing more than 25 million tonnes a year early next century.

According to the Western Australia Department of Resources Development, gas reserves in the Gorgon, North Gorgon, Spar, West Tyral Rocks and Chrysaor gas fields are estimated at over 15 trillion cubic feet (425bcm).

The Gorgon LNG project has been the subject of feasibility studies by WAPET participants – Chevron, Texaco, Ampolex (Mobil) and Shell.

The studies covered a staged development of three liquefaction trains, each capable of producing 3.5 million tonnes annually. Feedstock for the LNG plant would be supplied from the North Gorgon sector of the Gorgon fields, Gorgon South and Chrysaor.

The development concept incorporates an offshore manned platform supporting up to 30 wells in the North Gorgon field, with subsea connections to nearby gas reserves. The platform would include gas dehydration and, at a later stage, compression equipment. Gas would be sent via pipeline to an onshore processing plant.

The initial two liquefaction trains, with a total capacity of 7 million tonnes a year, could cost around A$10 billion. If justified by demand, a third train could add another 3.5 million tonnes per annum as early as 2005. First Gorgon LNG would be exported at the end of 2002.

Under consideration is a joint development between WAPET and the North West Shelf venture, which could involve the massive Gorgon gasfields supplying feedstock to an expanded LNG facility on the Burrup Peninsula. However, it is understood that the Western Australia government would prefer separate developments. A decision is expected shortly.

According to estimates, the successful implementation of these two projects could lift LNG exports to almost 25 million tonnes a year by 2010. In today's dollars, this trade would contribute around A$4 billion a year to the country's export earnings.

North West Shelf

The NWS joint venture plans to construct two more LNG trains on the Burrup Peninsula, each with a capacity of 3.4 million tonnes a year, bringing total production to about 15 million tonnes a year by 2003.

The venture partners, Woodside Petroleum, BP, Chevron, BHP Petroleum and Japan–Australia LNG, have already reached agreement with the eight Japanese buyers to supply additional volumes of LNG.

The expansion will cost A$7 billion, including shipping. Afterwards Australia would have 16-21 percent of world LNG trade which is estimated to grow to 117-151 million tonnes a year by 2010.

Export outlook

Prospects are considered good for continued strong growth in LNG exports, particularly into the Western Pacific Rim, where existing importers Japan, South Korea and Taiwan forecast hefty increases. There are also potential markets in Thailand, China, India and the Philippines.

Current contracts, reported letters of intent and memoranda of understanding indicate that by 2000, the world market for LNG could be as high as 109 million tonnes a year, of which existing Western Pacific Rim markets would represent almost 80 million tonnes a year. Australia already ranks fourth among the eight exporting countries. Its contribution through the North West Shelf reached 7.43 million tonnes in 1995, equivalent to 11 percent of world trade and 14 percent of regional demand in the Western Pacific Rim.

Northern Territory prospects

The next most likely LNG development to go ahead is the Bayu/Undan gas/condensate field in the offshore Bonaparte Gulf, located 450km northwest of Darwin, Northern Territory. The field straddles the boundary between ZOCA 91-12 and ZOCA 91-13 within area A of the Zone of Cooperation between Australia and Indonesia in the Timor Sea.

Bayu and Undan are located on the same structure, covering an area of some 160 square kilometres. The joint venturers estimate that about 60 percent of the Bayu-Undan field lies within ZOCA 91-12.

The Bayu field is being developed by Phillips Petroleum as operator with 60

North West Shelf LNG plant

percent equity, Oryx Energy Pty Ltd 25 percent and Hardy Timor Gap Petroleum Ltd 15 percent.

The Undan field is being developed by BHP Petroleum with 42.417 percent, Santos Ltd has 21.426 percent, Inpex Sahul Ltd 21.209 percent and Petroz NL 14.948 percent. Reserves in the Bayu-Undan field are estimated at about 5 trillion cubic feet of gas but with further appraisal drilling and a 3D seismic survey closer reservoir estimates will be available.

Phillips and BHP Petroleum are negotiating over the joint development of the field. Phillips favours a pipeline to the coast near Darwin where an LNG processing plant would be located. BHP Petroleum favours FPSO vessels or fixed platforms for combined condensate recovery and offshore LNG production.

Subject to final approvals, the production of condensate at rates of 30,000-50,000 b/d could start around the end of the century, while an LNG project producing around 2-3 million tonnes a year may be developed by 2002/2003.

More gas could be obtained from the Petrel/Tern gas field 250km west of Darwin and fed into the pipeline from Bayu-Undan to Darwin. Santos Ltd is the operator in both. Total reserves are put at 3 trillion cubic feet. Interest in the LNG potential here is shown by the involvement of Bonaparte Gas & Oil Pty Ltd – a consortium of Japanese trading gas and oil companies.

Another promising LNG development could be the huge Scarborough gas field in more than 900 metres of water, 270km northwest of Onslow in the Exmouth Plateau of the Carnarvon Basin.

The field is shared by Esso-BHP on a 50/50 basis in permit WA-1-R. Reserves of gas at Scarborough are estimated at 8 trillion cubic feet.

The Scarborough project would require facilities capable of operating in a deep water environment, such as a tension leg platform or an FPSO.

The Scott Reef and Brecknock gas discoveries in the Browse Basin, off the northwest Kimberley coast, also have estimated gas reserves of 20 trillion cubic feet.

CRINE Network gives priority to the export challenge

By Mike Wells

The new CRINE Network replaces the previous CRINE, which has had such a notable success in transforming the offshore industry's way of doing business in the UK Continental Shelf, including the reduction of costs by a third. Now CRINE Network is gaining momentum in redirecting its priorities to raising the level of UK exports of equipment, goods and services to the oil and gas upstream from the current meagre 1 percent of the £60 billion/year industry spend to a target of 5 percent share of the global market. This would bring it on a par with the overall UK export sales level. On a wider basis, the worldwide oil and gas and petrochemical manufacturing industry's overall spend amounts to £210 billion, including £150 billion on petrochemicals.

New mission

CRINE Network's new mission, as its Chairman Francis Gugen emphasized at its recent conference in Aberdeen, is 'people working together to make the UK oil and gas industry competitive anywhere in the world by 2000' – competitive both in attracting inward investment and in exporting oil and gas equipment and services.

Mr Gugen, also Amerada Hess UK's Managing Director, reminded the audience that in addition to the more obvious benefits for each section of the industry, such competitiveness would achieve a longer life for the UKCS as well as a life after the UKCS.

New regional markets will appear in the coming years, he said, which meant more opportunities. 'Our focus must now shift. We need to give value. The world market must want to buy from the UK as a matter of preference if we are to gain a larger share of it.' CRINE had already shown the way on cost reduction and now a winning culture had to be created from speed, competitiveness, relationships and people. 'We must look at life of field costs, not just developments; we find better value from investments in wells; we must radically improve the working of the supply chain; we must also make sure that skills and training are back on the industry's agenda. We need to sell ourselves to the world as leaders, using the UK base as a springboard.'

In taking the process forward, CRINE Network has its emphasis on added value, not just for capital projects, but

across the whole life of the field. Its new programme is involving the formation of new workgroups and volunteers are being sought to tackle the supply chain, training and education for the future, the use of CRINE deliverables, and for the first time – studying reducing well costs and increasing well values. Each workgroup is headed by a member of the executive committee.

CRINE Network now has an executive committee of eight, drawn from all sectors of the upstream business, working together with the OSO. An advisory committee of 20 senior industry executives is intended to keep CRINE Network on track and engage industry and business at large into the objectives.

Emphasis on exports

OSO Chief Executive Martin Stanley questioned why the level of UK upstream exports was so low. UK wage costs (including social and pension costs) are significantly lower than those of its competitors. It was therefore surprising if the United Kingdom lost any contracts where wage costs made up a high proportion of total costs. But they are lost and it was necessary to understand why this was happening.

At times there were failures to meet the reasonable needs of customers. British firms frequently overspecify products for less-demanding environments such as the Gulf of Mexico. There was a need to know more about how customers rated the United Kingdom against its competitors. Mr Gugen added that we need to get the facts on our weak areas. Mr Stanley said that CRINE Network offered the perfect vehicle for the industry to improve its competitiveness, while Energy Minister Lord Fraser had specifically offered all possible help.

'We need to work more efficiently with British-owned overseas operators such as BP, Shell and British Gas and get help and advice from others. We need to improve the performance of trade associations. We need greater industrial involvement in the planning of our attacks on overseas markets, which is why OSO has its special steering groups. And we may need to target our support activities on companies that seem to be especially committed to increasing their exports.'

Mr Stanley said that some suppliers are not competing in the international arena at all and showed little interest, even when on trade missions. OSO, therefore, has to consider whether its support and financing should not be more selective. He added, 'We give most of our attention to the big newsworthy studies. But much of the work is done by the smaller suppliers and service companies. OSO could fund a proper analysis of this in a neutral way and pass on the findings to CRINE Network.'

The OSO chief recalled, 'Sometimes British firms do not even bid; showing no response to interest or tender. But once they respond, they do as well as the other countries. Probably the weakness is in management and planning. There needs to be more thought in organisations where planning is held to be rather boring. Take advantage of skill sources; much is too anecdotal on what works and what doesn't in exporting.'

He feared that too few UK companies demonstrated the winning characteristics of being led by visionary, enthusiastic champions; companies which unlocked their peoples' potential, which delivered products and services that exceeded their customer expectations and continuously introduce differentiated products and services. 'I am particularly concerned that the industry is not attracting sufficient bright young talent, whether into its management or its workforce. There are too few business people willing to grow into world-class businesses,' he said. Prime responsibility for performance rests with managers and employees who have constantly to bear in mind the need to emulate the winning companies. But it made sense for UK industry to hunt as a pack, for it needs all the help it can get.

The newly strengthened OSO board under the chairmanship of Sir Ian Wood consists of senior industrialists from the contracting and supply industries, senior figures from major British oil companies, supported by OSO staff. They will be aiming to act as industry leaders in encouraging and co-ordinating efforts to win world markets.

Mike Curtis

Francis Gugen

Martin Stanley

Competitiveness

The UK offshore industry stands head and shoulders above other British postwar industrial success stories – in terms of achievement and in terms of profitability, declared Heinz Rothermund, UKOOA President and Managing Director of Shell Expro. But it should not be assumed that these successes guaranteed that it would remain competitive. The business environment is continuously evolving and becoming ever more demanding and complex. The advantages which have been developed must be seized whilst they exist and used as a base to develop an ever more sophisticated and wide ranging enterprise. Now, instead of just looking at output and revenue, the industry seeks to manage unit operating costs, while at the same time seeking growth, with the focus shifted to an outward-looking, more flexible approach.

The mutual dependency of operators, contractors and suppliers requires that all must improve all the time with 'all brains to the table,' Mr Rothermund said. But he added that, although rewards in the global market-place are even greater, it is a moving target. 'We have to keep on improving in order to stay ahead of competing regions which are themselves improving.'

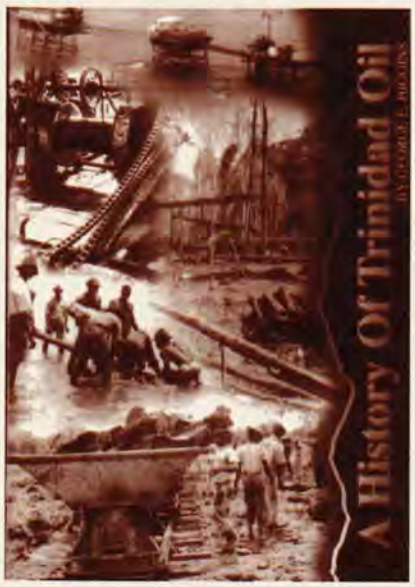
Training needs

The conference gave considerable attention to the newer problem of attracting, then educating and training, the best people for the oil business.

Ian Craig, Enterprise Oil's UK General Manager, in analysing the need to develop people for an international future, pointed to the reluctance of the industry as a whole to collaborate more effectively in training areas outside safety and emergency response. The industry's age profile was said to be ageing in more ways than one and it has not been sufficiently far-sighted in its recruiting policy through the 1980s. It was essential to train people in the export area.

Consideration should be given to the establishment of a pan-industry working group to review the industry's skills requirements; and employers of all types should consider cross training to facilitate staff movement for disciplines projected to be in surplus to those in short supply.

A History of Trinidad Oil



By George E Higgins

*Published by the Trinidad Express Newspapers. 498 pages. ISBN 976-8160-07-1. Price £40.00 or $55.00 (hardback) and £28.00 or $40.00 (softback) – including postage and packing**

If you think of Trinidad as a small island that produces fast bowlers and the occasional record-breaking batsman, which also had a brief burst of oil industry activity in the 1950s and 1960s, be prepared for an attitude adjustment and read this book.

The petroleum industry is well provided with people who once worked in Trinidad, who were born there or who grew up in its oilfield community. Field conditions, politics and logistics have always been challenging in Trinidad and operators around the world have valued the variety of experience to be gained there.

In 1969, the History Committee of the IP Trinidad Branch decided to record the history of Trinidad oil but it has taken until now for the task to be completed. Author George Higgins has been generous in his acknowledgement of the contributions of other committee members, individuals and companies who provided funds, material, maps and photographs.

The book is divided into three roughly equal parts; first a chronological overview, then individual histories of the more important companies and finally appendices.

This history starts with Sir Walter Raleigh's visit to the Pitch Lake in 1595 and Mr Higgins then takes us via the mining and distilling of manjack, early cable tool (1866) and rotary (1903) drilling, through several cycles of boom, recession and technical developments up to 1982. The major subsequent developments into the early 1990s are covered in a summary note to the second section.

Winston Churchill's 1911 decision to fuel the Royal Navy by oil rather than coal, boosted interest in the (then) colony and ensured that Trinidad's fields and refineries would be critical to the strategy of the Royal Navy in both World Wars and especially to the Royal Air Force in the 1940s as an essential source of 100 octane fuel. Both before and after Independence in 1961, they provided secure supplies to the United Kingdom. Even as late as 1956, their importance required an Act of Parliament at Westminster, before Texaco was allowed to acquire Trinidad Leaseholds' oilfields and the Pointe-a-Pierre refinery.

The middle section with 18 company histories starts with the second wave of drilling in 1906-07 and chronicles the fluctuations in oil refining capacity at Point Fortin and Pointe-a-Pierre (first shipments were in 1913 and 1917 respectively). Throughput peaked at a combined capacity of 424,000 barrels per day in 1973, the bulk of the crude then being imported and processed for export and declining to the 1990s when Pointe-a-Pierre was being yet again expanded by re-commissioning and upgrading units. Offshore oil production is traced from its start in the Gulf of Paria in 1955 and followed through to the oil discoveries off the Atlantic coast in the 1970s and 1980s.

Each company is treated chronologically and on the way we get to know the outstanding characters of the early UK oil industry – Randolph Rust, Sir John Cadman, VC Illing, Alexander Duckham and others who founded and served these companies.

The last appendix is a table of over 200 companies set up by 1978 to explore and produce in Trinidad. Not all succeeded and a few were less than respectable. Two of the pre-war operators, Premier Consolidated and Tricentrol, survived to become (with Burmah Oil) the first UK independents on the UKCS and Premier still has producing properties on the island.

Since the 1960s the close links with the United Kingdom have been transferred to the United States and now American companies dominate, operating alongside an active and technically competent government-owned sector. This transition is well covered in the individual company histories.

George Higgins is a field geologist and as expected includes descriptions of cable tools, early rotary rigs, well logging and completion techniques. It is revealing how soon after their introduction elsewhere these and other technical innovations were applied in Trinidad.

The academically inclined will find a comprehensive bibliography and a liberal supply of statistics throughout the text. But we also get glimpses of a multi-cultural colonial life in former years, which put these technical matters in a new context. There are hurricanes, mud volcanoes as well as union strikes, company takeovers and redundancies.

Any temptation to criticise the quality of the photographs in this book is dispelled by a glance at their dates and recognition that, at the time, remote oilfields did not provide ideal processing conditions. The same cannot be said for the more recent maps and tables for which the reproduction quality is poor. Considering that the publishers are one of Trinidad's major newspaper groups, it is unforgivable that Stark's 1896 map of Trinidad, which forms the frontispiece, should be upside down. The Errata sheet should not be necessary with modern typesetting. The content of this book, however, overcomes the shortcomings of its medium and every few pages bring hitherto unknown facts or an account of hardships endured by an earlier generation. Those of us who have been lucky enough to work in Trinidad will buy the book for its own sake. Those of you who are about to get involved with the island should buy it and learn what you have got into. For those who are unlucky enough to be in neither category, read the book and you will never again dismiss Trinidad as just beaches, cricket and carnival.

Tom Radford

*** Copies are available in the UK from 14 Bunting Close, Horsham, West Sussex RH13 5PA Tel: 01403 266708**

Occupational exposure limits for mixtures of hydrocarbon and non-hydrocarbon solvents

The main toxicological properties to be considered in assessing complex mixtures of solvents include effects on the central nervous system (anaesthetic), irritancy, carcinogenicity, reproductive toxicity, kidney and liver toxicity and cardiac sensitisation. In general only the effects on the central nervous system and irritancy have to be contemplated for most commercial solvents, although a few components such as n-hexane exhibit specific effects. However, it is assumed that the published Occupational Exposure Limits (OELs) for individual constituents 'protect' against all known effects.

For many years, the American Conference of Governmental Industrial Hygienists (ACGIH)[1] has proposed two approaches which may be adopted in assessing OELs for mixtures. One assumes *independent* effects of dissimilar components where the ratios of the concentration of each component to its respective OEL should not exceed unity. If this concept were applied to volatile solvents, it would mean that the maximum permissible airborne concentration of the mixture would be the sum of the individual OELs of the constituents, providing that the individual concentration/OEL ratios did not exceed 1. In practice, this maximum concentration could only be achieved when the components were present in quantities proportional to their OELs. More commonly, the maximum permissible concentration of the solvent mixture would be determined by one component.

Where there is no evidence to indicate that the constituents act independently and there is no synergism, potentiation or antagonism, it is prudent to assume that the components act *additively*. In proposing this approach, the ACGIH stipulates that the constituents of the mixture should have similar toxicological effects. Mathematically, the additive situation is described by the Reciprocal Calculation Procedure (RCP).

In applying this relationship to the composition of a solvent, the components should have similar volatilities as it is assumed that the vapour composition equates to the liquid composition. Where this is not the situation, the vapour composition should be employed in the equation. This approach has been employed for complex hydrocarbon solvents which contain numerous components [2,3,4]. An important property of the RCP is that, if the calculated OEL of the mixture is not exceeded, then the OEL of no single component can be exceeded provided that the vapour composition equates to the liquid composition.

This corollary is not immediately self-evident but may be demonstrated by considering a number of mixtures of four components A,B,C and D whose individual OELs are respectively 50mg/m^3, 200mg/m^3, 500mg/m^3 and 1,000mg/m^3. The results of this exercise are summarised in **Table 1.**

Table 1 illustrates that, in none of the examples, are the individual OELs for components A,B,C and D exceeded.

It is therefore suggested that, in the absence of relevant toxicological data, the RCP may be employed for the assignment of an OEL to any mixture of solvents of similar volatilities provided that the components do not exhibit synergism, potentiation or antagonism. When adopting this approach for mixtures of complex hydrocarbon

$$\frac{1}{\text{OEL mixt.}} = \frac{Fra}{OEL_a} + \frac{Frb}{OEL_b} + \frac{Frc}{OEL_c} \quad ..... \quad \frac{Frn}{OEL_n}$$

where OEL mixt. is the OEL of the complex solvent in mg/m^3
OEL_a, OEL_b, ...OEL_n are the OELs of components a, b....n in mg/m^3 and Fra, Frb....Frn are the mass fractions of components a, b....n.

Table 1

Component	A	B	C	D	Calcd. OEL for mixture mg/m³	Calcd. concn. of component in the air mg/m³			
OEL mg/m³	50	200	500	1,000		A	B	C	D
Fraction m/m	0.25	0.25	0.25	0.25	143	36	36	36	36
	0.95	0.02	0.02	0.01	52	49	1	1	1
	0.01	0.95	0.02	0.02	200	2	190	4	4
	0.02	0.01	0.95	0.02	422	8	4	402	8
	0.02	0.02	0.01	0.95	680	14	14	7	645

Relationships between the calculated OELs (RCP) for theoretical mixtures and the corresponding calculated concentrations of each component in air.

and non-hydrocarbon solvents, the previously calculated OEL for the hydrocarbon should be entered into the equation. Where the components do not have similar volatilities or non-ideal behaviour occurs, the vapour composition should be employed. Assuming that the above situation prevails, the toxicological properties of the individual components would not appear to be important as the respective OELs cannot be exceeded. However, should any constituent possess particularly toxic properties, eg it is a carcinogen, it would be prudent to monitor this component separately. Obviously, any monitoring apparatus would need to be calibrated against the solvent mixture employed.

Dr Tom Farmer

References

1. ACGIH, Threshold Limit Values and Biological Exposure Indices, 1994-95, ***40***.
2. T H Farmer, *Petroleum Review*, 1992, ***38***.
3. M K B Molyneux and T H Farmer, SCI Conference, April 1996
4. T H Farmer, Polymers, *Paint and Colour Journal*, May 1996, ***26***.

IP Library and Information Service News

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Reuters Business Briefing

This has been upgraded to an even more user-friendly interface and the service has added several new publications:

- *Disclosure* – Nearly 2,000 Disclosure Tearsheets have been loaded on Reuters Business Briefing, the service's first Adobe Acrobat source. A Tearsheet is a one-page Adobe document with textual and graphical information on a company's financial status. All this information is on one A4 sheet which can be saved and/or printed. A total of 10,000 reports will be loaded in the next four weeks, with quarterly updates.
- *Pelham Research* – Published three times a year, providing detailed analysis of UK government and constitutional issues.
- *Directory of European Public Affairs* – Over 2,000 addresses of European Public Affairs offices around the world.
- *Europe Environment* – a fortnightly English language source covering EU environmental issues, published by European Information Service in Brussels.

Visitors to the library can use Reuters Business Briefing for themselves, or LIS staff will carry out the required searches. Contact Raj Multani on 0171 467 7115 for more information.

IP Web Page

Web Page: <URL:http://www.petroleum.co.uk/petroleum/

Our web page continues to grow and is updated frequently.

Petroleum Review now has a *News in Brief Service* on our Web page. This is a brief synopsis of the latest developments, deals and contracts in the oil and gas industry around the globe, listed in chronological order and updated on a regular basis.

If you have any suggestions for what you would like to see on the IP Web page or any good sites for us to link to, please e-mail us at lis@petroleum.co.uk

Information for Energy Group

For just £15 for 1997 you could join a group interested in information relating to the energy industries. It is an excellent way to network with fellow professionals through meetings, visits, conferences and our annual directory – the latter is only available to IFEG members.

So far this year we have visited the Institute of Directors and held an Oil Price Seminar. In April we are holding a meeting concerned with Internet/Intranet concepts. Also planned are a summer social event, autumn conference and annual AGM followed by a wine and cheese party.

For further information or an application form, please call Catherine Pope on 0171-467 7112 or see our Web page.

New additions to library stock

These have all been published in 1996-97 and many can be borrowed by IP members.

- *Contract Chemical Analysis Laboratory Directory.* Analytical Solutions. 1st edition. Analytical Solutions
- *Automotive Lubricants Reference Book.* By: Caines A, Haycock R. 1st edition. MEP
- *Chemistry and Technology of Lubricants.* Edited by: Mortier R M. and Orszulik S T. 2nd edition. Blackie Academic & Professional
- *Standard Handbook of Petroleum & Natural Gas Engineering Volumes 1 and 2.* Edited by: Lyons W C. 1st edition. Gulf Publishing
- *Petrophysics Theory and Practice of Measuring Reservoir Rock and Fluid Transport Properties.* By: Tiab D, Donaldson E C. 1st edition. Gulf Publishing
- *The Market and the Economics of Large Oil Tankers.* Oxford Institute of Energy Studies (OIES). By: Golomer O. 1st edition. OIES
- *Paying for the Piper: Capital and Labour in Britain's Offshore Oil Industry.* By: Woolfson C, Foster J, Beck M. 1st edition. Employment and Work Relations in Context, Mansell

Remember

You do not have to *visit* the Library in order to *use* the Library

Education and Training

Meeting science teachers

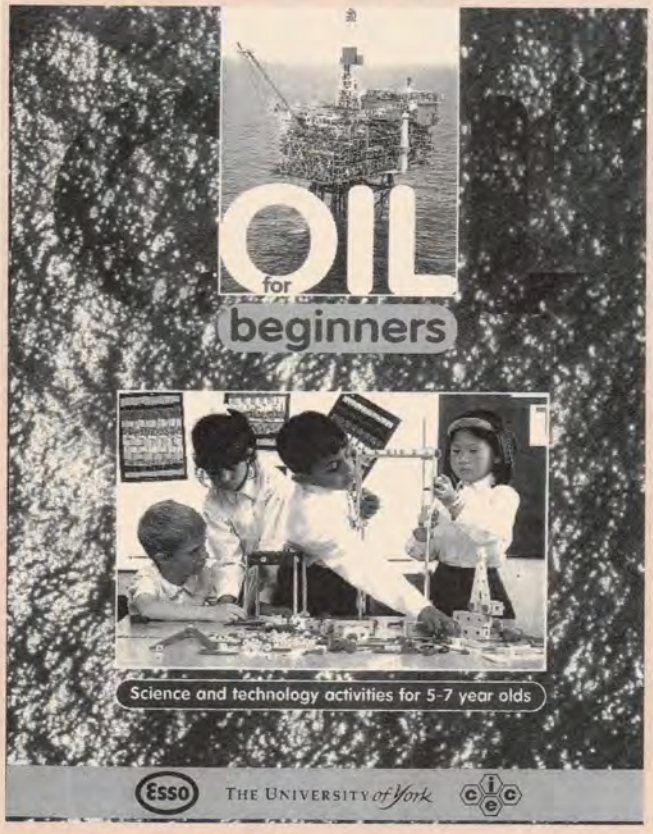
There are over 5,000 secondary schools in the United Kingdom, as well as over 20,000 primary schools, so it is a mammoth task to tell all their pupils about the activities and opportunities within any industry.

All pupils must study science, at least up to the age of 16. For the oil industry, which depends on scientists and engineers, it is important that a strong group of pupils continues to study science at school or college. The importance of science teachers and their ability to inspire and interest pupils in science has been discussed widely in the media.

The Association for Science Education, the largest association of science teachers in this country, holds an annual meeting lasting three days at different universities. These meetings, attended by up to 5,000 science teachers and educationalists, provide a wide programme of in-service training, lectures, talks, discussions, exhibitions and workshops. This year's meeting was held over a snowy weekend at the University of Birmingham campus. The IP exhibition stand was visited by many teachers, both from home and overseas.

There continues to be great interest in our own publications *Oil, A Natural Resource* and *A Young Person's Guide to Oil and Gas*, as well as materials available from several oil companies. This year also saw the launch of a range of science and technology activities for 5 to 7 year olds, *Oil for Beginners*. Produced by the University of York's Education Unit, with support from Esso UK, the book, along with teachers' notes, helps to introduce young people at primary schools to the practical activities related particularly to the offshore oil industry.

These meetings enable teachers to see what is available from industry to assist them in their work in the classroom and to enable them to obtain a better understanding of the actual activities in commerce and industry.



The training industry wants

To some it may appear that the establishment of National Training Organisations (NTOs) to supersede Industry Training Organisations and lead bodies, is like re-arranging the deckchairs on the Titanic but the reality is far different.

The initiative by the Department for Education and Employment (DfEE) – endorsed by all political parties, trades unions and industry – will see revitalised organisations established to support the development of people and skills which meet the needs of specific sectors of industry. They will also be an important channel for government funding for initiatives related to people. Organisations have been invited to bid to the DfEE for NTO status on behalf of a specific sector of industry.

The Engineering Construction Industry Training Board is one of the two remaining statutory training boards funded by a payroll levy. It has submitted a bid on behalf of the industry which includes engineering contractors in the petroleum industry.

The Offshore Petroleum Industry Training Organisation has submitted a bid for the oil and gas extraction industry, while the Petroleum Employers Skills Council is preparing a bid on behalf of the downstream oil industry.

The new NTOs are expected to be operational by the end of the year. They will be a partnership between industry and government, and will promote a strategic approach to the way sectors influence education and training. They will support employers in the development of occupational standards in education, training and vocational qualifications, to improve competitiveness.

NTOs will have solid senior-level employer support. So employers, including those who criticise N/SVQs, for example, for being too bureaucratic and rigid, and the people who are products of our educational system, will have a direct participation in the feedback to the system through their NTO.

The NTOs' role will be to:

- promote investment in people as central to competitive business performance
- assess and respond to the education, training and development needs of employers and employees in their sectors
- represent to government and others their sector's training and education interests and respond to national initiatives
- ensure the development, review and implementation of national occupational standards, especially through NVQs and SVQs.

Safety management on tankers

The Centre for Advanced Maritime Studies is now helping many shipowners to implement the International Safety Management (ISM) code on tankers. This service includes support in the development of ISM/ISO9000 documentation for on-board implementation, as well as other work on education and training.

The centre's work, in association with the University of Strathclyde's Continuing Education Programme, offers over 80 courses and is an approved college for the International Maritime Association. Its hazardous cargo handling unit provides courses related to management of safety, liquid cargo loss control, pollution prevention and abatement, management of ships operations etc. Other courses include petroleum tanker safety and jetty operations.

Vocational qualifications recognised

UK vocational qualifications can now be used to get jobs in Europe. The United Kingdom has signed a European directive which gives recognition for all National Vocational Qualifications and their Scottish equivalents in all EU countries.

Education and Training

Making time to learn

Ask staff how important it is to continue to update their knowledge and skills and they rate it highly; ask the same staff whether they were going to do anything about it themselves, and the responses will be quieter.

An investigation into the factors that determine the frequency and type of engineers' updating activities were the subject of a recent study by Raymond Glennon, a psychology lecturer at Queen's University, Belfast.

Using a group of 136 engineers working in various organisations in Northern Ireland, the study attempted to work out why some felt motivated to seek constant professional development while others remained suspiciously reticent. It also tried to put an influential value on personal factors such as career stage and years of professional experience, comparing these with external factors such as organisational climate, job involvement and role stress.

Among a number of significant findings, the study urges engineering companies to play a greater role in their employees' pursuit of occupational knowledge and offers some explanation as to why there is some resistance to schemes such as continuing professional development (CPD).

The subject group were asked to outline the type of professional updating activities they were most likely to undertake. These methods of learning fell into two distinct categories: informal, such as reading literature, on-the-job problem solving and discussions with colleagues; and formal, which included attending courses, lectures and conferences.

The study revealed a strong preference for unstructured informal learning methods, with 72 percent of respondents citing on-the-job problem solving as being in their top three most effective ways of picking up new information and ideas. This was followed by conversation with peers and supervisory guidance. The least popular informal method of updating was library reading.

The survey results showed that formal methods scored disappointingly and were not regarded as particularly good ways of keeping up to date. In particular, attending courses came low down on the respondents' priority list, being viewed as time-consuming and expensive. 'Formal ways of updating are unpopular because they often involve a rigid structure requiring engineers to set aside valuable time in advance,' said Mr Glennon. 'Many companies dislike their employees taking time off, even if it is to attend seminars and conferences.'

Mr Glennon's study progressed to investigate the key motivators and deterrents for engaging in professional development activities. He attempted to discover why some engineers were prepared to work hard at keeping occupationally up to date, while others faced obsolescence through a lack of activity. 'I just don't have the time' was by far the most common excuse, with 50 percent of respondents citing it as the primary reason for failing to keep professionally up to date. This was followed by 'There are no incentives' and 'Required in my current job.'

Those respondents who endeavoured to keep up to date with developments in their field were asked to rank the factors that motivated them. Again, there was a clear leading factor, with 'It will broaden my professional competence' claiming 42.6 percent of the votes. 'It will improve my current performance' (17.6 percent) came second, while 'It will prepare me for future assignments' (11 percent) finished third.

In previous studies of this kind, the age of the respondent and the length of professional experience were important factors. On this basis it has been suggested that as an experienced engineer takes on a more managerial role, then knowledge begins to decrease because that individual is no longer engaging in on-the-job problem solving.

It was something of a surprise, then, that Mr Glennon uncovered very little link between age or experience and obsolescence but instead found that organisational characteristics played a far greater role in determining the development of the sample group. The type of job, its skill variety and the chance to take a project from completion to end, all emerged as important factors that encourage engineers to update their skills.

The opportunity to use and disseminate technical knowledge was also seen as an important driving force because it seemed to put a high value on just the kind of information picked up through updating.

The study warned engineering companies about stifling their employees with 'quantitative overload'. This occurs when an engineer is faced by a heavy workload, much of which could be handled by more junior staff and results in a lack of time or motivation to take up professional development.

Drawing a conclusion from this part of the study, Mr Glennon said, 'Whether people get involved in updating has a good deal to do with the characteristics of their jobs and with organisational policies that encourage and appreciate new skills. Furthermore, employees have to be provided with the opportunities to use these skills.'

Improving graduate prospects

One in eight graduates starting work last year had a salary of more than £17,000, according to the 1996-97 *Annual Graduate Review* from the Institute for Employment Studies. These high salaries were found among the largest recruiters; starting salaries among smaller companies were often significantly less. However, a separate report indicates that growing financial benefits will be brought by a degree.

The Association of Graduate Recruiters (AGR) has predicted that job vacancies for graduates in 1997 will be the best this decade and that graduate starting salaries, already rising, will grow further this year. The good news is contained in its annual Graduate Salaries and Vacancies survey, analysing 1996 and forecasting for 1997.

Most new graduates in 1995 received starting salaries in the £13,000-16,000 range. The AGR survey found that 6 percent more graduates were recruited in the first 10 months of 1996 than in the whole of 1995. The AGR predicts that the number of vacancies will continue to grow in 1997, with a further increase of 11.5 percent. It also found that graduate starting salaries increased faster than average earnings. The 1996 graduate starting salary increased 5.4 percent to £14,750 and the average starting salary in 1997 is expected to rise by a further 4.4 percent to £15,325.

Graduate salaries were also said to increase at a 'considerably faster rate than average earnings.' The salaries of 1995 graduates had increased by 12 percent compared with an average of only 3.7 percent. The salaries of 1993 graduates had increased by 54 percent compared with an average of only 10 percent.

Possession of a degree is, however, no guarantee of a job. Six months after completing their course, only 58 percent of first-degree graduates in 1995 were in full-time employment. A further 6 percent were in other forms of employment, such as part-time or voluntary work, more than one-fifth was undertaking further studies, and 9 percent were unemployed.

Forthcoming Events

April

7th-10th
Moscow: '4th Moscow International Oil & Gas Exhibition'.
Details: International Trade & Exhibitions (JV) Ltd, Byron House, 112A Shirland Road, London W9 2EQ.
Tel: 0171 286 9720
Fax: 0171 286 0177

7th-10th
Florida: '1997 International Oil Spill Conference'.
Details: 1997 International Oil Spill Conference, 655 15th Street, NW, Suite 300, Washington, DC 20005, USA.
Tel: +1 202 639 4202
Fax: +1 202 347 6109

8th-9th
Rome: '6th Annual Mediterranean Gas Markets Conference'.
Details: Overview Gas Conferences, 82 Rivington Street, London EC2A 3AY.
Tel: 0171 613 0087
Fax: 0171 613 0094

8th-10th
Aberdeen: 'Underwater Technology International '97'.
Details: Evann Venues, 52 Queens Road, Aberdeen, Scotland AB15 4YE.
Tel: 01224 209901
Fax: 01224 209902

8th-10th
Birmingham: 'Environmental Regulation Update Seminars'.
Details: CIWEM Events, 15 John Street, London WC1N 2EB.
Tel: 0171 831 3110
Fax: 0171 405 4967

9th-10th
Aberdeen: 'Progress in HP/HT Fields'.
Details: The Bookings Department, IBC Technical Services, 57-61 Mortimer Street, London W1N 8JX.
Tel: 0171 453 2058
Fax: 0171 631 3214

10th
London: 'International Conference on the Impact of Improved Catalytic Processes on Refinery Economics' Details: Pauline Ashby, The Institute of Petroleum.

10th-12th
Cyprus: 'The European Retail Petroleum Engineering Convention (ERPEC '97)'.
Details: McLean Events Ltd, 1 The Bank House, The Green, Datchet, Berkshire SL3 9JH.
Tel: 01753 594813
Fax: 01753 595727

11th
London: 'Trade and Environment'.
Details: Sharon Moore, The Conference Unit, The Royal Institute of International Affairs, Chatham House, 10 St James's Square, London SW1Y 4LE.
Tel: 0171 957 5700
Fax: 0171 321 2045

15th
London: 'IGD Forecourt Conference: The Ultimate Fill-Up'.
Details: Institute of Grocery Distribution, Letchmore Heath, Watford, Herts WD2 8DQ
Tel: 01923 857141
Fax: 01923 852531

17th
London: 'Pipeline Protection and European Standards'.
Details: John Buekett, Pipeline Protection Association, Harcourt, The Common, Kings Langley, Herts WD4 8BL.
Tel: 01923 264314
Fax: 01923 270778

17th-18th
Middlesborough: 'Underwater Wet Welding and Cutting'.
Details: Rachel Wall, TWI, Abington Hall, Abington, Cambridge CB1 6AL.
Tel: 01223 891162
Fax: 01223 894363

20th-22nd
Singapore: 'Industrial Fire Journal Conference'.
Details: Industrial Fire Journal, 8 The Old Yarn Mills, Sherborne, Dorset DT9 3RQ.
Tel: 01935 816030
Fax: 01935 817200

21st-22nd
London: 'Oil & Gas in Latin America: The Challenges Ahead'.
Details: Centaur Conferences, St Giles House, 50 Poland Street, London W1V 4AX.
Tel: 0171 434 3711
Fax: 0171 287 8706

21st-22nd
London: 'Oil & Gas Project Finance'.
Details: IBC Financial Focus, 57-61 Mortimer Street, London W1N 8JX.
Tel: 0171 637 4393
Fax: 0171 323 4298

21st-23rd
Bali: 'Asian Oil & Minerals'.
Details: EEE Conferences Ltd, 3 Hayne Street, London EC1A 9HH.
Tel: 0171 600 6660
Fax: 0171 600 4044

21st-25th
Paris: 'The Oil Industry in 1997 and its Economic Aspects'.
Details: ENSPM Formation Industrie Economie et Gestion, 232, avenue Napoléon Bonaparte, 92852 Rueil-Malmaison, Cedex, France.
Tel: +33 1 47 52 72 93
Fax: +33 1 47 52 70 66

22nd
London: 'National Pipeline & Cable Protection'.
Details: Pipeline Industries Guild, 14/15 Belgrave Square, London SW1X 8PS.

22nd-23rd
London: 'Change Management in R&D'.
Details: Learning in Business Ltd, 14a Smiths Tard, Summerley Street, London SW18 4HR.
Tel: 0181 944 9030
Fax: 0181 944 0434

22nd-24th
Aberdeen: 'Alliances in Oil and Gas'.
Details: IQPC, 1st Floor, West Wing, Chancery House, 53-64 Chancery Lane, London WC2A 1QU.
Tel: 0171 421 3500
Fax: 0171 831 9249

27th-29th
Bath: 'Field Reactivation for the 21st Century'.
Details: The Conference Department, The Petroleum Group, The Geological Society, Burlington House, Piccadilly, London W1V 0JU
Tel: 0171 434 9944
Fax: 0171 439 8975

28th-29th
Aberdeen: 'Offshore Legislation Practical Case Studies'.
Details: The Bookings Department, IBC Technical Services, 57-61 Mortimer Street, London W1N 8JX.
Tel: 0171 453 2712
Fax: 0171 453 2058

28th-29th
Aberdeen: 'Offshore Asset Integrity Management'.
Details: Customer Services Manager, IIR Ltd, 6th Floor, 29 Bressenden Place, London SW1E 5DR.
Tel: 0171 915 5055
Fax: 0171 915 5056

29th
London: 'Cadman Memorial Lecture' Details: Pauline Ashby, The Institute of Petroleum.

30th-1st May
London: 'Laser II Conference, Exhibition and Log Analysis Software Evaluation Review'.
Details: Joanne Kuriyan, McQuillan Young Communications, 5 Arlington Street, London SW1A 1RA.
Tel: 0171 355 1161
Fax: 0171 355 1171

Technology News

New above ground storage tank system introduced to UK and European market

Breton Precast recently launched its 'Convault' above ground storage tank system for petroleum-based products and other hazardous substances onto the UK and European market.

Already well established in the US and Canadian markets, the system has a number of environmental benefits including full visual inspection of the tank at all times which ensures that, should a leak occur, it is detected at the earliest opportunity thereby minimising the risk of soil and ground water contamination, states the manufacturer.

The system comprises a steel tank insulated and wrapped in a poly membrane liner, all of which is encased in a 150 mm reinforced concrete shell. The complete unit provides full primary and secondary containment and a certified two-hour fire wall and is equipped with leak detection and spill/overspill protection. It is also certified for Stage I and II vapour recovery.

Above ground storage tank system

The unit also features a simple leak detector tube located within the secondary containment area which enables the owner to monitor the unit manually for the first signs of leakage from the primary tank.

The above ground storage tank is also said to provide a number of financial benefits including the elimination of expensive monitoring equipment, periodic testing costs and pollution liability insurance.

Available in 4,500 to 18,000 litre capacities, the tanks can be tailored to meet individual customer requirements. For example, it may be subdivided into separate storage compartments.

Keeping water clean in a nut shell

A new £4.5 million water treatment system at Phillips Petroleum's Seal Sands oil terminal is using some five tonnes of walnut shells to clean 7,000 tonnes of effluent per day before release into the River Tees. The oily water originates primarily from the ballast tanks of tankers arriving at the terminal, although some is derived from the significant amounts of water in the oil that is piped from the Ekofisk complex in the Norwegian North Sea.

The new system – due onstream later this year – uses induced air flotation (IAF) technology to separate the oil and water in 'settling ponds'. Each IAF unit has four individual flotation cells into which air is introduced to create a dense mixture of bubbles in the effluent. The oily water becomes progressively cleaner as it passes through each chamber.

The water is then further filtered in a large vertical vessel filled with finely ground walnut shells which have a very high adsorbent rate for oily water. It is believed to be the first time that this particular enviro-friendly solution to the cleaning of effluent has been utilised in the United Kingdom.

Flammable gas detection

Precision Light Measurement Systems' new GD4014 and GD4024 open path flammable gas detection systems are designed for use in confined spaces such as those found with offshore installations, while sister models GD4012 and GD4022 are designed to maximise area coverage, and hence distances, found with onshore installations.

The detectors measure the amount of infrared energy absorbed by a gas as its beam traverses the open air of the space to be monitored between transmitter and receiver.

Open path gas detector

Heat detection reduces rig fire risk

Elf Petroleum Norge, Autronica AS, provider of fire detection systems, and UK fibre optic sensing specialist York Sensors, have joined forces with funding from the European Commission to develop a new heat detection system that aims to reduce the risk of fire on offshore rigs.

The system, based on York's distributed temperature sensing (DTS) system, is currently undergoing a year's trial on Elf's Heimdal North Sea platform. Final evaluation is due this November.

The DTS-based system works by linking fibre optic cable to an opto-electronic processing unit and a PC. It measures actual temperatures as well as the rate of temperature rise at multiple sampling points along the entire length of the DTS fibre optic cable. Configured in a loop, the sensor functions even in the event of a break in the cable.

Because temperature readings are displayed continuously, the DTS detects variation patterns outside acceptable levels, pinpointing potential problems and enabling action to be taken to help to prevent a fire occurring.

Findings from the project, which is aimed primarily at assessing the system in offshore platforms, are also expected to prove valuable for future land-based applications.

Technology News

Differential GPS corrections by satellite

With the launch of its OmniSTAR differential GPS service in Europe, Fugro can now provide positioning to within one metre over 75 percent of the world's land mass.

OmniSTAR delivers DGPS corrections by satellite rather than by often unreliable and range-limited radio systems, an arrangement which allows the user to travel thousands of miles and to receive accurate positioning without having to adjust equipment.

The mobile unit and antenna are compact and portable and the system is backed by quality assured network monitoring and a 24-hour help desk.

OmniSTAR is available in a number of configurations including a standard, stand-alone unit; an integrated GPS unit complete with integral GPS receiver; or OEM card set without user interface for integration into a customer's own system.

OmniSTAR receiver

Flameproof boot for emergency services

A new boot specifically designed for use by fire and other emergency responders has been developed by Sweden Boots.

Manufactured from a flame retardant material with heat resistant outer sole in order to meet new CE regulations, the boot also features a rugged tread and reinforced supports at the front and back in contrast to 'traditional' boot designs which feature just steel toe caps and nail penetration protection.

A specially designed rubber lip at the top of the boot serves as a 'puller' making it easy to put on and take off.

New flameproof boot

New energy trading system modules

Saladin has unveiled two new modular enhancements for EnergySaver, its information repository designed specifically for the energy supply and trading industry.

ESLink provides integration of EnergySaver information into Microsoft Exel™ spreadsheets to allow a large amount of different data, including crude and product prices, supply/demand statistics, freight rates and derivatives data, to be retrieved easily from a single source and in a consistent format.

Meanwhile, Curve Manager provides the ability to build, manage and access views of the forward market, enabling a mechanism to be set up so that companies can offer forward prices for delivery at several locations.

New polyurethane formulation for pigs

A new selection of specially formulated Omnithane® polyurethane elastomers for pigging equipment applications has been developed by Pipeline Engineering.

The standard formulation is a high integrity material with the wear and tear and chemical resistance properties required for standard pigging applications while Super Omnithane® has been developed for more rigorous or long run applications. Meanwhile, Hyper Omnithane® is particularly suited to high stress applications such as multibore pigging.

Fire protection from solid curtain of water

The new Targe Nozzle from Sword (Aberdeen) Ltd allows fire protection systems to produce a solid curtain of water which is impervious to heat, smoke and fumes, even in high winds, to provide protection for personnel just inches from a fire.

Fire protection systems using the new nozzle have been installed on the Clyde platform and on three oil tankers currently being built in Korea.

Space age coating on general release

Temp-Coat – the water-based, fire and heat resistant ceramic coating developed in the United States with funding from NASA for use in the space exploration programme – has been released for general use and is available in the United Kingdom from CCS Scotseal.

The coating system's insulating properties make it suitable for use in most applications where protection against the extremes of hot and cold are required, such as in fuel storage tanks, valves and boilers.

Furthermore, the thin film coating physically adheres to the surface that it is insulating helping to significantly reduce corrosion and rust formation.

Wash and brush up

Ryko International has released a number of new vehicle wash systems on the UK market. For example, as an alternative to brush and touch free systems, its soft cloth wash incorporates strips of soft cloth that gently rotate to remove dirt while polishing to achieve a 'bloom' finish.

The company has also unveiled new Velvet Touch lightweight brushes guaranteed to last some 70,000 cycle washes.

Heading for safety in the oil industry

The new Centurion rigger safety helmet from Centurion Safety Products has been designed specifically for use in the oil and related industries. The robust design incorporates a reinforced rim, side impact protection and angled rain gutter.

Injection moulded from polyethylene with a terylene cradle and a fitted sweatband, the helmet includes a large badging area for a company logo.

Rigger safety helmet

Steel coiled tubing

A range of seamless stainless steel coiled tubing for downhole and subsea oil and gas applications is now available from Sandvik Steel.

Offered in long lengths, either in single coils or multiple coils orbitally welded together, the tubing comes in a range of diameters and a variety of grades, including duplex and super duplex stainless steels.

Technology News

New riser clamp destined for Schiehallion

Emerson & Cuming Composite Materials Inc of Canton, Massachusetts has a patent pending on its new composite/titanium riser clamp designed for use with the company's 874 Eccofloat flexible riser buoyancy modules.

The Eccogrip clamp's simple hinged 'clamshell' design fits around a riser and is simply bolted in place – a more speedy operation than found with conventional clamps which utilise straps threaded through clamp components. Made of a thick section fibreglass/epoxy composite and secured with titanium hardware, the clamp maintains grip on the riser while permitting it to expand and contract during changes in stress or temperature.

After the clamp is positioned on the riser, the buoyancy module is fitted to the clamp and secured. Keys protruding from the clamp transfer buoyant force to the riser at the same time allowing the buoyancy module to rotate.

Designed for a 20-year lifetime, the clamp, together with buoyancy unit, was recently qualified by Coflexip Stena Offshore for use with the 15 risers associated with BP Exploration's Schiehallion project west of Shetland.

Clamp mounted on a section of riser undergoes tests

New and improved low flow meter

Flotech Solutions, independent distributor of the Brooks Instrument flow metering products, has announced a new version of the Brooks' Model 9800 oval gear positive displacement meter for low flow liquids from 0.5 to to 2,000 litres per hour.

A new rotor tooth profile coupled with abrasion resistant bearings which lead to more efficient operation of the gears provides the meter with a 10-fold increase in rangeability and much lower pressure drop than any previous meter using oval gear technology, reports the company. The pressure drop to 3 psi has also resulted in lower system costs in terms of smaller pumps and lowered energy requirements.

Designed to withstand three years' operations at maximum flow rate, the new meter also exhibits an improved accuracy of ±0.5 percent for better fluid control and reduced waste and an improved temperature range of -29°C to 120°C.

Low flow meter

ASME certification for dampers

Flowguard's range of pulsation dampers, surge absorbers, thermal expansion compensators and pressure vessels designed primarily for use in the oil, gas and petrochemicals sectors and manufactured to ASME 8 Division 1 requirements has been authorised to carry the ASME 'U' or 'UM' stamp.

Calculating pipeline failure criteria

A new, inexpensive and quick method of calculating pipeline failure criteria on a PC using standard software has been unveiled by Pegasus Pipeline Engineering Group. The technique also allows changes in failure probability to be observed for changes in operating conditions, such as pressure ratings, of the pipeline.

At the core of the technique is a constrained optimisation formulation that can be easily implemented in standard math-analysis software and has the ability to assign uncertainty (that is, statistical distributions from a selection of standard and non-standard distributions) to any of the quantities within the failure criteria, such as pipeline material properties, physical dimension and operating conditions.

Refinery feedstock filter system

A new generation of refinery feedstock filter systems has been developed by Ronningen-Petter.

The Reactogard®IV clean-in-place, backwashing filter system applies new design concepts in filtration media to increase filtration area by up to 300 percent while reducing the number of valves and headers in the system by as much as 40 percent. Such refinements reduce installation costs, lower maintenance requirements and provide greater filtration capacity for catalyst bed protection, says the manufacturer.

A multi-bank control strategy allows one bank of filters to be cleaned while parallel banks continuously filter feedstocks for the reactor, thereby enabling refinery operations to continue uninterrupted.

Tubular wedge-wire media filters feedstocks

Contacts

Breton Precast	01232 351711
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Saladin	01932 243233
Sword (Aberdeen)	01224 896125
Pipeline Engineering	01748 818341
CCS Scotseal	01505 324262
Ryko International	01403 240364
Centurion	01842 754266
Sandvik Steel	0121 505 5100
Emerson & Cuming	+1 617 821 4250
Flotech Solutions	01345 776356
Flowguard	01663 745976
Pegasus Pipeline Engineering	0191 289 5858
Ronningen-Petter	+1 616 323 1313

People

Mr Roger Lane-Nott has been appointed Chief Executive of the newly established Centre for Marine and Petroleum Technology (CMPT). His previous post was the Formula One Race Director and Safety delegate with worldwide responsibility for Formula One Grand Prix on-track activity.

Mr James D Woods has been appointed to the Board of Directors of Union Texas Petroleum Holdings, Inc. Mr Woods replaces **Mr Saul A Fox** of Kohlberg Kravis Roberts & Co who resigned from the Board in January this year.

Mr Alan Wilson has been appointed as Business Development Director at Kvaerner Oil & Gas Ltd, part of Kvaerner Asa. Mr Wilson's previous post was as Divisional Director Aker Oil & Gas Technology.

Mr Bruce Petter, Director of the Petrol Retailers Association (PRA) has resigned with effect from 1 March. Mr Petter, who has suffered from recent ill-health, has been the PRA Director for over 10 years.

Mr R Casey Olson has been named Senior Vice President — Acquisitions of the new Occidental Oil & Gas Corporation acquisition group. Mr Olson joins Occidental from CIBCV Wood Gundy Securities Corporation where he was Managing Director, Global Energy.

Mr John Farrell has joined UK forecourt equipment manufacturer Wayne Dresser UK Ltd in the role of Managing Director. Mr Farrell's previous position was as manufacturing director with Mono Pumps (Australia) Pty. Ltd, a sister division of Wayne.

Sir Michael Perry has become Deputy Chairman of Centrica plc, following its demerger from British Gas plc. Prior to the demerger Sir Michael was a non-executive director of British Gas plc and took up his new role after the British Gas Extraordinary Meeting in February. With effect from 1 July he will succeed **Mr Richard Giordano** as non-executive Chairman of Centrica. Mr Giordano will resign from the board of Centrica on 30 June and will remain as non-executive Chairman of British Gas plc.

Mr Anthony Fagan has become Managing Director for the Ethyl Corporations European activities. He will be responsible for Ethyl's petroleum additives business in Western and Eastern Europe, the Middle East and Africa.

President of Fountain Oil **Mr Oistein Nyberg** has been appointed Chairman of the company: his previous title and Chief Executive duties will be assumed by **Mr Nils Trulsvik.** Mr Trulsvik is currently Chief Operating Officer and the current Chairman **Mr Robert Halpin** will become Vice-Chairman.

Three new directors have been appointed to the board of international shipbrokers H Clarkson & Company Ltd, part of Horace Clarkson plc. They are **Ms Pia Andersson** of the Tanker Division and **Mr Mark Mitchell** and **Mr Paul Smeaton** of the Dry Cargo Division. Ms Andersson is the first woman to be appointed to the board in the company's 145 year history.

BJ Services Company has appointed *Mr John Adams*, Manager of the company's recently created BJ Process and Pipeline Services Division. Prior to joining the company Mr Adams served for five years with Nowsco where he was District Manager of the Pipeline Process and Industrial Division.

Chevron Corporation has announced that **Dr Chang-Lin Tien**, Chancellor of the University of California, Berkeley has been elected to Chevron's Board of Directors. Chancellor Tien is an active member of the Pacific Council on International Policy, the US committee for Economic Development and the Council on Foreign Relations, and is on the Board of the Asia Foundation.

Mr Kevin Jackson has been appointed Managing Director of Fisher-Rosemount Ltd, the sales arm of the Fisher-Rosemount Group. Mr Jackson joins from Siebe Control Valves, a recently formed division of Siebe plc where he was Vice President of Sales and Marketing for Europe.

Mr Lasse Petterson has taken over as Managing Director of Aker Oil and Gas Technology UK (AOGT UK) in Aberdeen and Newcastle-upon-Tyne. He has previously headed Aker Maritime's commitment in Vietnam.

Mr Lasse Torkildsen has become Senior Vice president for finance at Aker Maritime. Mr Torkildsen's duties will include a responsibility for investor relations.

Mr Geir Arne Drangeid has been appointed head of public affairs at Aker Maritime. Mr Drangeid was previously a corporate communications manager for Aker ASA.

The Expro Group has appointed *Mr Bob Walsh* as its new regional Vice President based in Houston. His prior position was as Director of the Americas region at Faure Herman Meter Inc.

Institute News

NEW MEMBERS

Mr A Ajami, Daiwa Europe Limited
Mr H Akram, Hawker Siddeley PT
Mr S E Allotey, Ghana
Mr T H Andrew, Applied Industrial Materials UK Limited
Mr T E Bennett, Muse Stancil & Company
Ms A R Berry, Hampton Wick
Mr R Beszant, Stanford-le-Hope
Dr P M Blair-Fish, Harpenden
Ms S Bond, London
Mr K J Bresson, Seychelles
Mr J M Butcher, Basildon
Mr M F Byrne, Co Dublin
Mr M M Caddaan, London
Miss D Camus, NationsBank NA
Mr A Collier, Hayes
Mr A Connerty, Berkhamsted
Mr R Crowson, Shepperton
Mr L J Dainton, Heathrow Hydrant Operating Company
Mr B J Davey, Cultus Petroleum (UK) Limited
Mr P Davies, Vapa Sava Limited
Mr R G J Dodd, Lowther Rolton International Limited
Mr G Drozdowski, Dorset
Mr G J Evans, Benfleet
Mr A R Gore, Rolls Royce Industrial Power Group
Dr M I Hill, Countryside Council For Wales
Mr W Hoy, Benfleet
Mr M S D Hunnybun, London
Dr T John, Hydropec Eng Services Limited
Miss L J Johnson, Herts
Mr B R King, Reading
Mr P Lyall, Saudi Arabia
Mr F Macklin, GATX Terminal Limited
Mr J G Martin, Aberdeen
Mr J N W May, London
Mr R McDonald, OILC
Mrs M Monier Melin, Sweden
Dr M Moody-Stuart, Royal Dutch/Shell Group of Companies
Mr N Munro, Rigblast Group Limited
Dr M C Notheisen, Monitor Company Limited
Mr P J O'Keefe, TDG Pinnacle Storage
Mr V C Osuji, London
Mr S J Radley, AMEC Process and Energy Limited
Mr L S A Rasor, Leigh-on-Sea
Mr E W Rockefeller Jones, London
Mr R D Rowe, Marakon Associates
Mr D Salt, Oil Spill Response Limited
Mr J Seager, Kleinwort Benson
Mr P Shenton, Stoke-on-Trent
Professor G S Simpson, University of Aberdeen
Mr T Soteriou, Colchester
Mr N C Thomas, Inco Alloys Limited
Mr R K Thompson, Crowthorne
Mr M Williams, Herzog-Varlen Instruments UK
Dr N H Wright, Environmental Acumen International Limited

STUDENTS

Mr S Uddin, London
Mr N L Usman, University of Dundee
Mr N Zarroug, London

NEW FELLOWS

Mr A S Karim
Mr Karim graduated in 1985 from Liverpool University. He is currently the Terminal Manager for TDG Pinnacle Limited with full responsibility for the terminal and the management of petroleum and petrochemical storage and processing. He is an active member of the Institute and the Essex Branch.

Mr D C Twinn
Mr Twinn has been employed within the oil industry throughout his working life. He is currently the Terminal Manager for GATX Grays oil terminal with responsibilities for all operations. He is an active member of the Institute and the Essex Branch.

Mr A R A Simpson
Mr Simpson's career within the industry has been with the Merchant Navy, oil industry supply boats and operational drilling.

Mr P I Crane
Mr Crane is currently Manager of the Van Ommeren Tank Terminal in London, one of a number of independent terminals owned by Van Ommeren in the United Kingdom. He has responsibility for all aspects of a busy oil and chemical distribution terminal, ensuring an efficient service is provided to customers.

If you have recently moved please can you inform The Membership Department of your new address.

NEW CORPORATE MEMBERS

Lloyd's Register of Shipping,
100 Leadenhall Street,
London EC3A 3BP
Representative: Mr P C K O'Ferrall OBE
Founded in 1760, Lloyd's Register today provides safety, quality and environmental inspection and protection and certification services from more than 260 offices worldwide to offshore and land-based clients. As the world's leading offshore certification body, LR has certified some 800 offshore installations. It also provides certification for all types of fixed and mobile structures and associated equipment, as well as undertaking safety assessments. It provides asset integrity management services and supplies software to support inspection and corrosion management. It carries out independent technical appraisal, inspection, testing and certification to a wide range of land-based industries including oil, chemical, container and civil engineering.

Pemex Services Europe Limited,
5th Floor,
4 Grosvenor Place,
London SW1X 7HB
Representative: Mr P Espresate
Pemex Services Europe Limited are involved in marketing oil services and market intelligence.

Hart Publications Inc,
Rosemount House,
Rosemount Avenue,
West Byfleet,
Surrey KT14 6NP
Representative: Miss L Franzoni
With headquarters in Houston and sister company Hart Europe in London, Stavanger and Aberdeen, Hart provides information to the international petroleum industry and organises conferences. Publications include Hart's *Euroil, European Offshore Newsletter, European Petroleum Finance Week, Oil and Gas Investor* and *Petroleum Engineer International.*

Institute News

NEW CORPORATE MEMBERS

ADDAX BV,
PO Box 2050,
Rue de Lausanne 82,
1202 Geneva,
Switzerland
Representative: Mr P Lehner
ADDAX BV is an oil marketing and trading company mainly active in the African continent. It trades in crude and petroleum products including bitumen but also runs an important in- and offshore bunkering operation. Addax BV is a member of the private and independent Addax & Oryx Group Limited (AOG) which has established offices in Africa, Europe and the Caribbean over the past 10 years. AOG and its affiliates are investors in the African mining and oil industries (production and distribution).

DEATHS

We have been notified of the deaths of the following members:

	Born
H W M Armstrong	1910
J F M Auld	1942
R S Burgess	1917
A Cadenasso	1943
S Elliman	1908
C C Fitchen	1946
W Fox	1933
D P J Holbrook	1919
J W Ingham	1947
Dr W L B Leese	1919
C A Martakis	1929
I T Pritchard	1930
H W Rocke	1901
E C Skidmore	1918
C Staal	1925
P D Swann	1912
A A Whipp	1940
Dr R B Whyte	1924

AWARDS

Award of the IP Certificates of Appreciation
Certificates of Appreciation have recently been awarded to the following:

Paul Cook
Paul has been an active member of ASTM for over 20 years and has worked solidly to promote the ASTM/IP partnership, ensuring a good working relationship between grease committees of ASTM and the IP. He is currently working as a Product Line Manager for the Caltex Petroleum Corporation in Texas.

Judith Scarlett
Judith, formerly of DRA Cobham, joined the physico-chemical tests panel in 1981 and acted as Secretary for the period of 1981-94. During this time there were many changes, including several chairmen. In her role as secretary, she ensured the continuity of the panel's work. She is now happily retired.

Tim Hutchings
As well as being an active Secretary of the IP Lubricants, Wax & Grease Sub-committee ST-C/D, Tim also represented the IP on several BSI Working Groups and is the project leader for the International Standard ISO 11007, Rust prevention characteristics of lubricating greases. He is currently working for SKF in the Netherlands.

AROUND THE BRANCHES

Essex
4 April: Annual Dinner/Dance

Northern
7 April: Hot Pot Supper

Aberdeen
8 April: *Advances in extended reach drilling,* Mr David Adams, Baker Hughes

East Anglia
10 April: *The European Auto Oil Programme,* Mr Ian Sanderson, DIrector of Logistics and Strategy, Phillips Petroleum Products Ltd

Shetland
15 April: *BP Wytch Farm oil development,* Mr Peter Johnson

Midlands
16 April: *Special waste regulations 1996,* Mr Martin Millward, Orcol Garage Services

Humber
17 April: *Ladies Night*

South Wales
24 April: *Biological refining,* BMB/DTI

Stanlow
29 April: *The Environmental Agency,* Speaker to be confirmed

Copies of the 1996 Index for Petroleum Review are now available from the Library free of charge.

Obituary

Fraser H Allen of Boulder died on 18 January 1997. He was 78. He worked for Amoco Corp for 41 years and was president of Amoco Argentina and Amoco Canada. He retired from Amoco in 1981 and moved to Evergreen, where he was on the lecturing staff of Oil and Gas Consultants International of Tulsa, Oklahoma. He earned a bachelor's degree at the University of Toronto. He then earned a master's degree and the first doctorate in petroleum engineering awarded by the University of Texas at Austin in 1943. Mr Allen served as a naval lieutenant in the Naval Research Lab during World War II.

IP THE INSTITUTE OF PETROLEUM

'Petroanalysis '97'

Wednesday 21 May

BP Oil and Technology Centre, Sunbury-on-Thames

The conference, which is being jointly organised by the Royal Society of Chemistry and the Institute of Petroleum, is a follow-up to the successful Petroanalysis Conference held in 1988. The aim of Petroanalysis '97 is to bring analysis in the oil, petrochemical and related industries up-to-date.
A series of presentations will address automation, on-line analysis, modern analytical techniques and the problems associated with the 'downsizing' of analytical facilities.

For further details and registration forms please contact:
Dr R Narayanaswamy
DIAS
UMIST
PO Box 88
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M60 1QD
Tel: 0161 200 4891
Fax: 0161 200 4881

IP THE INSTITUTE OF PETROLEUM

organised in association with the DTI

International Seminar on

'Equipping the Forecourt – Opportunities in Central Europe'

Tuesday 3 June, at the NEC, Birmingham

International Conference on

'Revolution on the Forecourt – or Just Evolution?'

Wednesday 4 June, at the NEC, Birmingham

The IP European Retailing Conference and associated Seminar will be held in association with the Forecourt 97 International Exhibition, organised by Blenheim Exhibitions.

For a copy of the programme and registration form, please contact:
Pauline Ashby,
The Institute of Petroleum,
61 New Cavendish Street,
London W1M 8AR
Tel: 0171 467 7100
Fax: 0171 255 1472

UK Deliveries into Consumption (tonnes)

Products	†Jan 1996	*Jan 1997	†Jan-Dec 1995	*Jan-Dec 1996	% Change
Naphtha/LDF	266,993	173,616	2,884,587	3,010,343	4
ATF – Kerosene	591,907	598,461	7,660,358	8,049,168	5
Petrol	1,675,784	1,691,223	21,854,806	22,187,531	2
of which unleaded	1,136,724	1,181,211	13,831,149	15,002,598	8
of which Super unleaded	64,323	40,766	942,388	700,690	-26
Premium unleaded	1,072,401	1,140,445	12,888,761	14,301,908	11
Burning Oil	371,512	429,797	2,769,032	3,326,498	20
Derv Fuel	1,103,764	1,185,952	13,456,809	14,379,781	7
Gas/Diesel Oil	735,449	854,830	7,227,246	7,631,407	6
Fuel Oil	599,641	522,803	7,975,198	6,853,770	-14
Lubricating Oil	70,926	74,435	895,439	864,309	-3
Other Products	729,709	697,510	8,961,329	8,786,269	-2
Total above	6,145,685	6,228,627	73,684,804	75,089,076	2
Refinery Consumption	573,270	565,266	6,481,172	6,623,132	2
Total all products	6,718,955	6,793,893	80,165,976	81,712,208	2

† Revised with adjustments *preliminary

IP

THE INSTITUTE OF PETROLEUM

Annual IP Introduction Courses 1997

The Institute of Petroleum's annual three day non-residential general introduction courses to the oil industry have proved very successful and will be repeated again this June. Each course is self-contained but many participants will find it advantageous to attend both courses, in which case a special combined registration fee is available at a reduced rate.

The courses are particularly valuable for:

- Participants from within the oil industry who require a broader perspective of the industry's activities and the economic factors affecting its development
- Participants from financial and commercial companies, supply and service sectors and government organisations who require an informed and concise introduction to the economic and commercial background of the oil industry.

Introduction to Oil Industry Operations Course

London: Wednesday 18 – Friday 20 June 1997

This course provides a concise and informed introduction to operations, from the search for oil and gas to the delivery of products to different customers. Participants will gain an appreciation of the principal activities in the international upstream and downstream petroleum industry and an understanding of how these interrelate, as well as an appreciation of the impact of external influences and the ways in which the industry is adapting to increase its competitiveness and to meet the many new challenges.

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

Introduction to Petroleum Economics Course

London: Monday 23 - Wednesday 25 June 1997

This course is designed as an informed introduction to petroleum economics, concentrating on the structure of the oil industry, the geopolitics of oil and the working of the principal markets. The course is presented by a team of lecturers all of whom have considerable recent experience of the industry and are practised in teaching and lecturing on these subjects.

For copies of the programme and registration form, please contact:
Pauline Ashby,
The Institute of Petroleum,
London W1M 8AR
TEl: 0171 467 7100
Fax: 0171 255 1472

15th World Petroleum Congress
Beijing, China
12th-16th October 1997

Technology and Globalisation Leading the Petroleum Industry into the 21st Century

Within this theme, the Congress will address itself to scientific and technical subjects, economics, safety, environmental matters and managerial issues. Acknowledging recent achievements, the Congress will deal with the challenges of the next decade.

The **Plenary Addresses** by world renowned speakers will give strategic overview of developments and prospects in technical and managerial fields of interest to the industry as a whole and will include **Wang Tao, President of China National Petroleum Corporation, L R Raymond, Chairman of Board and CEO Exxon Corporation, P H Jaffré, Chairman of Board and CEO Elf Aquitaine, Rilwanu Lukman, Secretary General of OPEC, A E Putilov, Chairman Rosneft, and K T Derr, Chairman of Board of Chevron Corporation (Dewhurst Lecture).**

- The Opening Ceremony and Welcome Reception will be held in the Great Hall of the People, Beijing, the Congress and Closing Ceremony at the China World Trade Center.
- **21 forums** will consider, in the context of the Congress theme, particular areas of the petroleum industry in which there are significant current activities and in which important new developments are envisaged. At each forum four or five major papers will be presented, as a basis for discussion on the platform and with the audience.
- **10 review and forecast papers** will review progress and summarise state of the art technology, current research and future trends in specific areas of high interest.
- **250 posters** on technical topics will lend themselves to visual presentation and individual discussion with the presenters.
- **A Ministerial Panel** of two hours will offer Ministers an opportunity to discuss issues of concern to them.
- A full social programme with daily sightseeing for accompanying persons; an extensive programme of site visits and post-congress tours has been arranged.
- The International Petroleum and Petrochemical Exhibition 1997 will run concurrently. Entry and transfers will be free to WPC participants.
- An additional optional 1-day programme on the Chinese petroleum sector will follow the Congress on Friday 17th October 1997.

Copies of the free technical programme, congress programme and registration form can be obtained from any WPC national committee or:

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