OCTOBER 1993

The Institute of Petroleum

PETROLEUM REVIEW

UK onshore
Record reach at Wytch Farm

Offshore Europe
Cost reduction heralds a new era

Colombia
Taxes cloud oil industry future

Nigeria
Oil union steps into political arena

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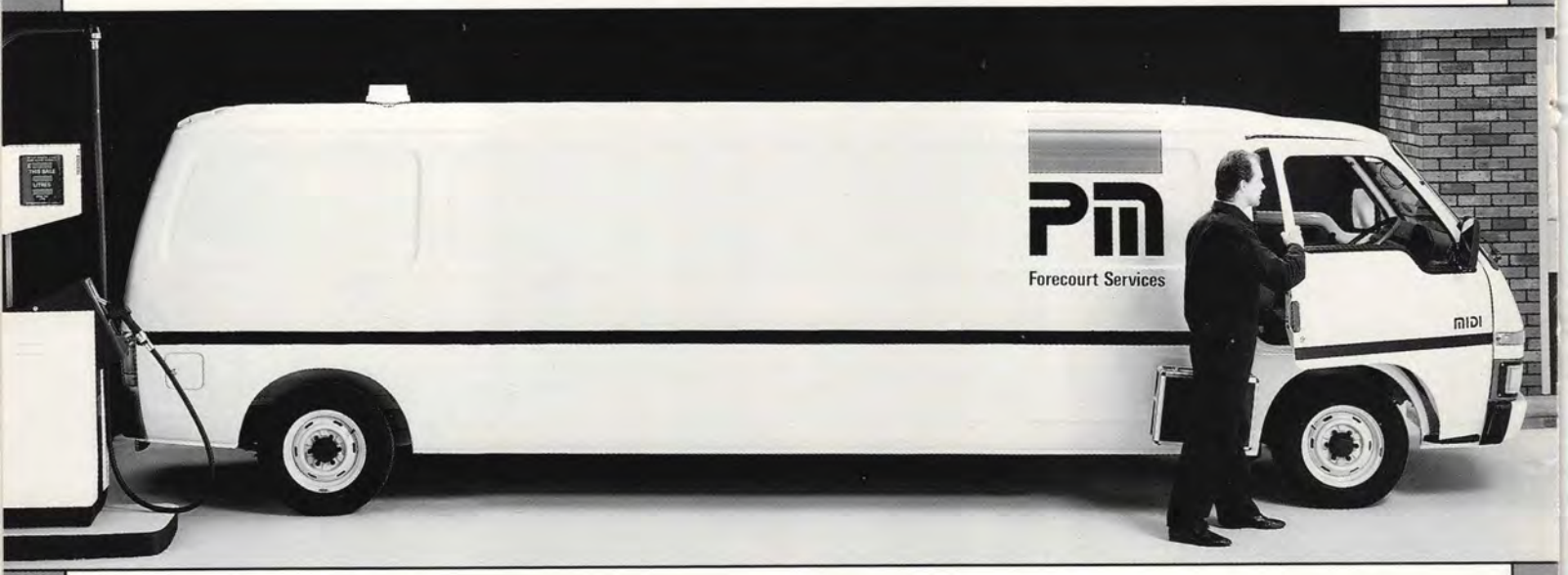

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Cover photo – Wytch Farm. Photograph by BP

. . . news in brief

23 August
Petrokemy announced the completion of seven million man-hours without lost-time injury. The Saudi firm, part of SABIC, claims this sets a new record in industrial safety.

24 August
Alaska's fishermen agreed to end their blockade of the Valdez oil terminal.

26 August
Shell has given £360,000 backing to a government scheme designed to help small and medium-sized firms improve their environmental performance. The initiative is the result of a recommendation from the Advisory Committee on Business and the Environment (ACBE).

31 August
Elf Aquitaine announced a slump in first-half profits of 59 percent.

JPK Expro has won a contract to develop the first offshore oil field in Dagestan, Russia.

Texaco has reported a gas discovery in the Black Sea, 19 miles off the port city of Varna.

The North Sea TAP Consortium, set up in October 1992 to develop marginal satellite fields, has been joined by the Schlumberger Oilfield Services Group.

1 September
The North Sea Scott field, operated by Amerada Hess, has come on stream four months ahead of schedule.

The Aberdeen oil service firm, Petroline, has clinched a deal with Vietnam. The contract, estimated at £20m, is for the supply of wellhead profiles for BHP Petroleum's Dai Hung field development.

2 September
Shell and Exxon have been excluded from Norway's 14th offshore licensing round. Ten companies were successful, almost half the licences being offered to Norwegian firms, Statoil, Norsk Hydro and Saga Petroleum.

3 September
Energy Minister Tim Eggar opened a four-day international forum in Buckinghamshire, in the UK, for top decision-makers from 10 emerging oil and gas provinces.

3 September
Arco British has announced completion of the appraisal well 44/18-2Z in the Southern North Sea.

5 September
Dr Safa al Habobi has been appointed as Iraq's new oil minister.

6 September
Nigeria's main oil workers' union, Nupeng, has suspended its political strike. The 'tactical withdrawal' was made to allow the interim government time to review its position on the 12 June presidential elections.

BP and Conoco have announced an asset swap in the North Sea. The exchange of interests will allow BP to increase its interest in Forties and provide Conoco with a larger stake in several of its operated blocks.

Burmah Castrol confirmed it is setting up a minerals trading unit in Thailand. The company, to be known as Foseco (Thailand), will be 74 percent owned by Burmah.

Japanese-owned South Eastern Oil (SEO), has ordered three 3,900 dwt Singapore bunker ships.

Volumes Two and Three of the two MMC reports on the gas industry have been published. Written representations on the conclusions of the Fair Trading Act report are invited by the end of October.

7 September

Neptune Orient Lines has entered a joint venture with China Aviation Oil Supply Corp and China National Foreign Trade Transportation Co to transport and distribute aviation oil within their country.

Chevron has contracted Honeywell to provide all the control and instrumentation maintenance for its Alba Northern platform. This is the first time a North Sea operator has out-sourced core maintenance activities.

8 September
The 1,500 Mtpd methanol plant at Point Lisas, Trinidad, has reached mechanical completion. Designed and engineered by Davy Process Technology, production is currently scheduled for mid-October, with final plant handover in November.

Kvaerner has been awarded a £46m contract to hook up and connect six modules at Conoco's Heidrun platform in Norway.

Kvaerner and Norske Shell began a legal dispute over a financial settlement involving a topside delivered by Kvaerner Rosenberg for Shell's Draugen field. Kvaerner is claiming an extra NKr480m.

9 September
The French government reduced its holding in Total from 8.17 percent to five percent.

All remaining grazing restrictions in the Shetlands have now been lifted, 10 months after the *Braer* disaster. The Scottish Office announced that the 25 hectares nearest the wrecked tanker were now 'free from the effects of the spill'.

HSC issued draft regulations covering response to offshore fire and explosion.

Total halted operations at East Shabwa, Yemen, in response to an unidentified armed attack against one of its installations. One soldier was said to have been killed and several others injured in the trouble.

10 September
Energy Minister Tim Eggar left for South East Asia with a team of British oil executives in a bid to encourage UK exports to Indonesia, Malaysia and Thailand.

HSE has issued safety advice to operators on the use of high voltage motors in potentially explosive atmospheres.

British Gas is to develop the Dolphin gas field, 55 miles off Trinidad's east coast, following an agreement with the National Gas Company of Trinidad and Tobago.

Energy Minister Tim Eggar gave his consent for the construction and operation of two new power stations – a 1,200 MW combined cycle gas turbine station at Seabank, Avonmouth and a 710 MW plant at Keadby, Humberside.

The Brent oil price fell to below $16 a barrel in London, the lowest since June 1990.

13 September
The Ukrainian cabinet of Ministers has given the green light to privatising the Lisichansk plant, according to the Ukrinform news agency. It will offer a 55 percent stake for auction. The oil refinery has a capacity of 34m tonnes a year.

The Robert Gordon University has teamed up with the Drilling and Production Training Centre (DPTC) to develop integrated engineering packages for the offshore industry.

14 September
Nigeria's interim government has dissolved the boards of the NNPC, removing the non-executive directors appointed by ex-President, Ibrahim Babangida.

15 September
Lasmos announced it was back in the black for the first half of 1993 with a net profit of £20m. This compares with a loss of £248m last year.

Italian and Norwegian judicial inquiries are underway into a series of North Sea deals involving ENI and Statoil.

Singapore's $4bn petrochemical complex is facing delays after Phillips Petroleum Singapore Chemicals (PPSC) failed to obtain final approval for expansion from its shareholders. PPSC is now hoping approval for a second high-density plant will be obtained by the end of the year.

The Spanish gas distribution company, Gas Natural, revealed it is to buy Enagas.

Ex-Matrix man becomes Iraq's new oil minister

The former head of Iraq's Arms Procurement Ring and the man responsible for the Matrix Churchill purchase has become Iraq's new oil minister.

Dr Safa al Habobi, 47, took over the post early last month. In Western circles, he is a somewhat controversial figure, closely associated with Mr Hussein Kamel, President Hussein's cousin and son-in-law, who has long been in charge of Iraq's military industrialisation programme.

Dr Habobi himself ran a major section of Iraq's procurement programme in the late 1980s. According to documents presented to the Scott inquiry into British arms exports to Iraq, he was involved in purchasing components for Iraq's nuclear weapons programme – including gas centrifuges.

Dr Habobi also headed the Technology and Development Group, the Iraqi company which took over Matrix Churchill, the British machine tool company which supplied equipment and expertise to Iraq. This was used for Iraq's arms development pro-gramme. Dr Habobi is understood to have organised the purchase of the company.

In recent years, the Iraqi Oil Ministry has become subordinate to what was once the Ministry of Mineral Industrialisation, now simply termed the Ministry of Industry and Minerals.

Scottish MP demands offshore pipeline watchdog

In a row over gas export routes from the Brittania field, Scottish National Party leader Alex Salmond has called for a regulatory body to oversee all offshore pipelines.

Angered at suggestions that the Brittania pipeline may not land at St Fergus, Mr Salmond has accused some of the minority partners in the Brittania field of having stakes in the Teesside pipeline. He has also called upon the Department of Trade and Industry to investigate the idea of an offshore tariff regime similar to the one currently in existence onshore.

'Whereas tariffs for offshore pipes are uncontrolled, onshore transportation costs are strictly regulated by Ofgas', he said. This had resulted in an artificial situation in which it was more attractive to transport gas an extra 150 miles to Teesside than directly to St Fergus.

No decision on gas export routes is expected before the end of the year, according to Conoco President, Constantine Nicandros, but all options are still open. The field is expected onstream by the end of 1997.

League table for downstream sector

A league table of Europe's top downstream companies is now available from Wood Mackenzie.

A team of 35 staff, based in Edinburgh, began work on the database in 1990.

The resulting 'European Downstream Oil Service' is a comprehensive reference source, designed to give in-depth information on national markets, company profiles, refineries, as well as on all the major oil products.

Dr Fay new Chairman of Shell UK

Dr Christopher Fay is to become the new Chairman and Chief Executive of Shell UK. He succeeds Sir John Collins on 1 November. Sir John will be resigning at the end of October to take up a new appointment as Chief Executive of the Vestey Group of Companies.

Dr Fay has been Managing Director of Shell UK and Managing Director of Shell UK Exploration and Production since 1989.

His career has included assignments in Holland, Nigeria, Sarawak, Denmark and Norway. From 1986 to 1989, he was General Manager and Chief Executive of the Shell companies in Turkey. During 1992 he served as President of UKOOA.

As *'Petroleum Review'* went to press, a successor for Dr Fay had not yet been announced.

Dr Chris Fay

Tougher safety rules to prevent offshore fire and explosion

Proposals for new, tougher safety regulations to prevent fire and explosion on offshore platforms have been unveiled by the Health and Safety Commission (HSC). The industry has until December to voice any opinions.

Speaking at 'Offshore Europe', HSC Chairman Sir John Cullen said the regulations would require operators and owners to 'take action to prevent fire and explosions, think through the consequences of all major incidents and structure their emergency response arrangements to deal effectively with ...these consequences'.

The main features of the proposals are:

- A general duty to make suitable and sufficient arrangements for control of fire and explosion hazards and for emergency response;
- A supporting general duty to achieve more specific safety goals in each of these two areas, and to maintain an emergency response plan;
- Requirements to undertake risk analyses of fire and explosion hazards and arrangements for evacuation, escape and rescue;
- Duties to consult, cooperate and conform with emergency response plans.

Introducing the proposals, Sir John said: 'The tragedy of Piper Alpha demonstrated in the most shocking way the need for effective arrangements for the prevention of fire and explosion, and for emergency response on offshore installations.

'We already have in place the safety case regime; these new regulations will complement the requirements of the Safety Case Regulations, in line with Lord Cullen's recommendations that goal-setting regulations were needed to "give the regime a solidity it would otherwise lack"'.

Any comments on the proposals should reach the Health and Safety Executive no later than 3 December.

Sir John Collins warns of 'acute strain' in downstream sector

Shell has urged the UK government and the EC to rethink their regulatory policy towards oil refining and marketing or risk the 'hitherto unthinkable prospect' of a Europe dependent upon cheap foreign imports.

Sir John Collins, Chairman and Chief Executive of Shell UK, has warned that 'the strains, particularly on refiners, are now acute.

'Handicapped by low margins, costly, prescriptive HSE investment and high manpower costs, European refiners would be hard put to compete against products from, say, Middle East refineries fuelled by cheap gas.'

Britain, he said, still has a 20 percent surplus refining capacity which, in a slow-growing market, serves to depress margins and encourage the entry of hypermarkets into the competitive arena.

He compared the different way in which the upstream and downstream sectors of the oil industry are treated by the UK government. The North Sea, he said, had benefited from a light regulatory hand and fiscal stability, but comparatively little attention had been given to Britain's refining and oil marketing sectors.

Speaking at the British Energy Association's Annual Energy Review, Sir John attacked the fact that Britain's major oil companies were still expected to act like public service undertakings. This, he said, was an 'untenable anachronism' in today's liberalised, intensively-competitive market.

Countrywide access to fuel at uniform prices, he said, was becoming increasingly difficult. 'There is a growing differential between the low volumes and high unit costs of rural sites and the converse for the hypermarkets who operate only prime sites.'

And he warned that prices generally are likely to rise. 'Consumers have enjoyed a prolonged buyers' market with strong downward pressure on prices, competition to offer better products and services, and comfortable supply security. This may not last.

'The mood of the UK oil industry – like those across Europe – is sombre and preoccupied with the management of structural changes which look more threatening than beneficial.'

Sir John reserved particularly strong criticism for the recent wave of EC environmental legislation which, he said, was costing European refiners £40 billionn. 'Too much of it is ill-considered, prescriptive and uncosted – as likely to have perverse effects as to achieve lasting improvement.

'Ultimately, consumers will bear the consequences, either in higher prices or in reduced security of supply as Europe becomes more dependent on imported oil products.'

While oil demand is predicted to double worldwide during the next 20 years, Sir John believes Europe is set to lose out. 'With fast-growing non-OECD oil markets offering relatively buoyant margins, Europe's refiners face the challenge of competing for international oil industry investment when their own outlook is for static markets, low margins, heavy health, safety and environmental investment and higher operating costs.'

He urged the UK government to take the upstream sector as a successful model and work with the oil industry to 'establish a healthy base for its operations'.

A spokesman for the Department of Trade and Industry (DTI) said the downstream sector of the industry was 'fine and fettle' and referred to DTI statistics put out in May this year which showed UK refinery plant to be 'amongst the most modern and efficient, with the highest level of upgrading, in Europe'.

BP to boost North Sea spending

BP is planning to spend an extra 10 percent in the North Sea over the next three years and to increase production by six percent by 1995.

BP managing director, John Browne, said the increased investment was 'in part a result of the extra cashflow arising from the reduction in petroleum revenue tax'.

Daily output of oil and gas from the UK North Sea as a whole, he said, could be maintained at the equivalent of well over two 2m barrels of oil until well into the next century.

The company plans to raise the total volume recoverable from the North Sea by 25 percent, from around 60bn to around 75bn barrels. This is based upon estimates of a further 30 percent reduction in capital costs and a 50 percent reduction in operating costs over the next 20 years.

Mr Browne predicted that advances in technology would radically increase the rate of recoverability.

'20 or 25 years ago it was common to talk of maximum oil recovery rates of 30 percent. Now the industry standard is around 45 percent, a 50 percent increase. I can well believe that within another 20 years we will have come to regard recovery rates of 60, even 70 percent, as normal.'

New chief for Conoco UK

Dr George Watkins has become the first Briton to head up Conoco's activities in the United Kingdom.

Dr Watkins, who took up the position on 15 September, succeeds Mr Bob Ireland as Managing Director of Conoco (UK). Mr Ireland is returning to the United States to lead an expanded exploration and production division in Midland, Texas.

Dr Watkins has taken on the additional title of Chief Executive Officer but a spokeswoman for Conoco stressed that this was a merely a result of restructuring and did not reflect any change in the nature of the job.

Dr George Watkins

Born in Nottingham, Mr Watkins has worked within Conoco for 20 years, after joining in London in 1973. In 1989, he moved to the company's headquarters in Houston, Texas, where, as Vice-President and General Manager, he was responsible for upstream activities in offshore North America and Alaska.

Now located in Aberdeen, Mr Watkins will remain a Vice-President of Conoco Inc.

The appointments stem from a major reorganisation within the company, said Conoco.

Onshore exploration licences awarded out-of-rounds

For the first time in Britain awards have been made for onshore exploration outside the formal licensing rounds.

Five new Landward Petroleum Exploration Licences have been issued to co-applicants, Eukan Energy and Altwood Petroleum. The areas to be explored are in Yorkshire on the Staffordshire and Cheshire border, in Surrey and Sussex between the North and South Downs, and in northwest Nottingham on the border with Derbyshire.

'The use of the out-of-round procedure in this case is another example of the flexibility of our licensing regime,' said Energy Minister Tim Eggar.'These awards demonstrate the enthusiasm of companies to explore onshore.'

Amoco wins Western Siberia bid

Amoco has announced it has been selected to develop the Priobskoye field in Western Siberia.

The firm estimates that the field, which is located about 65 miles west of Nefteyugansk, contains up to five billion barrels of recoverable oil. It plans to continue working jointly with the Russian Joint Stock Companies, Yuganskneftegaz and Yugraneft on agreements and approvals for the project.

'This project will result in substantial direct and indirect benefits to the local population and the overall economics of the Okrug and Russian Federation,' said Mr Robert Blanton, Chairman and President of Amoco Eurasia.

The company submitted its bid proposal in July this year.

Stena to set new pipelay record

Stena Offshore looks set to break its own world record depth for rigid steel pipelaying, with plans to reach down to 900 metres.

Stena, along with its Brazilian sister company, Stena Maritima, has been awarded a £25m pipeline installation and associated tie-ins contract by Petrobras.

The work, due to take three months, is to be carried out in the Marlin Field off the Brazilian coast from mid-November.

The reelship, Stena Apache, will be specially modified to undertake pipelay operations in water depths exceeding 1,000 metres. By laying rigid steel pipelines to depths of 900 metres, it will beat its own previous 1991 world record of 705 metres.

Enterprise/Repsol to explore Kazakhstan

Repsol and Enterprise are to explore for oil in Kazakhstan, after winning a tender for the Baiganinskiy Contract Area. The companies hold a 60/40 percent interest respectively.

The Technical Study Agreement gives exclusive right to re-process and interpret existing seismic data and information from wells drilled in the block to date. It also gives an option to negotiate a production sharing contract over the whole block.

Kahakhstan has also announced that the deadline for the submission of tenders for the Chinariovskiy and Kamenskiy Contract Areas in West Kazakhstan Oblast has been extended until 1 December 1993.

£100 million upgrade for Dunlin Alpha

Shell's North Sea Dunlin platform is to undergo a £100 million refurbishment, designed to extend its life expectancy and bring it in line with the Cullen requirements.

'It's an old platform', said a Shell spokesman, 'and the systems in place are no longer state-of-the-art'.

New living quarters, which will incorporate 33 two-man cabins and a Temporary Refuge, are to be constructed by Trafalgar House and installed by August next year. The existing accommodation is also to be upgraded, along with the fire and explosion protection systems.

Improvements in control and safety systems, which began last year with Foster Wheeler Wood Group as design contractor, will also continue.

Shell is still considering the possible installation of state-of-the-art equipment for cleaning produced water, together with upgrades to the heating, ventilation and air conditioning systems.

Dunlin, which started production in 1978, had been expected to end its economic life by the end of the century but the facelift should extend its span 'well into the next century'.

A platform shutdown of approximately two months is expected around the middle of next year. The timing has still to be finalised and is dependent on the extent of the final work programme.

Dunlin, which last year produced 27,000 b/d, has now yielded around 80 percent of its total estimated recoverable reserves of 384 million barrels. The satellite Osprey development has produced only around 20 percent of its total estimated recoverable reserves of 93 million barrels.

Both McDermott Engineering, the engineering services contractor for Dunlin, and AMEC, who are responsible for implementing the project offshore, are involved in the changes.

Dunlin is now expected to continue 'well into the next century'

Angling for oil at Wytch Farm

By Susannah Cardy

World records for extended reach drilling are being set thick and fast. Irene, in California, has achieved a 4.5km horizontal offset at a depth of just 1,600 metres, while Statfjord in the North Sea currently holds the overall Number One position with a reach of six km. But Wytch Farm is now snapping at their heels, threatening to break both records in its quest to achieve optimum recovery from under Poole Bay.

Advances in horizontal well drilling came just at the right time for the Wytch Farm developers. Two years ago, they were enmeshed in costly and environmentally-sensitive plans to exploit the offshore section of the Sherwood reservoir by means of an artificial drilling island. Today, with plans for Hook Island firmly scrapped, they are tapping the reserves via a series of extended reach wells instead, each of which looks set to outdo the last and become a record-breaker in its own right.

It is the shallowness of the reservoir, just 1,600m deep compared to 2,700m for record-holding Statfjord, that presents the challenge. The first well (F18), drilled to a depth of 4,530m and with a step-out of 3.8km, is a personal best for BP and its partners. Already producing 15,000 barrels of oil per day (b/d), it has effectively doubled the horizontal distance previously achieved at Wytch Farm.

The next two wells, one of which begins production in November (F19) and the other by the end of the year, will set new records on an international scale. The first measures 4.8km, the second will extend to at least five km. This should make it the longest extended reach well at such shallow reservoir depths anywhere in the world.

Wytch Farm intends to take things even further next year. A total of approximately 11 production wells are needed to maintain optimum recovery from the eastern section of the Sherwood reservoir. By late next year, Mr Roy Franklin, UK Managing Director of Clyde Petroleum, one of the partners in the oilfield development, predicts they will reach a horizontal offset of 6-7kms. This could create an overall new world drilling record.

Wellsite F on the Goathorn Peninsula

The reason for this state-of-the-art technology is the appraisal, back in 1989, of a 100-million barrel extension to the Sherwood reservoir beneath the waters of Poole Bay. Sherwood, located 1,600m underground and extending some eight km out to sea, is the larger of two reservoirs that make up the oilfield. The other, the Bridport reservoir, lies 900m below the surface.

The extension elevated Wytch Farm, already the largest onshore field in western Europe, to the sixth largest field, on or offshore, in the United Kingdom.

By the time plans for an artificial island were abandoned in 1991, BP, which holds a 50 percent stake in the oilfield, had already initiated a £1 million research and development programme into extended reach drilling. (The other partners are Arco,17.5 percent, Premier Consolidated Oilfields, 12.5 percent, Clyde Petroleum and Purbeck Exploration, 7.5 percent each, and Goal Petroleum, five percent.)

The German drilling company, Deutag, was then appointed to drill the first three wells from spare cellars at wellsite 'F', an existing operational site on the Goathorn peninsula.

The transition to extended reach drilling, a decision made only shortly before the Hook Island Parliamentary Private Bill was due its third reading in the Commons, is estimated to have slashed capital costs from £180 to £90 million, halved operating costs and brought production forward by three years.

According to Mr Franklin, the partners are still on a sharp learning curve. 'We are finding out more and more about how far we can drill with each well. Drilling time is expected to reduce from 95 days for F18 as we gain more knowledge.'

Production from each of the first three wells is expected to be between

12,000 and 15,000 b/d, maintaining the overall production rate of Wytch Farm in excess of 80,000 b/d.

An application for an additional four acre site adjacent to 'F' site from which to drill the remainder of the wells has already been submitted to Dorset County Council (DCC) and a decision is expected by the end of the year.

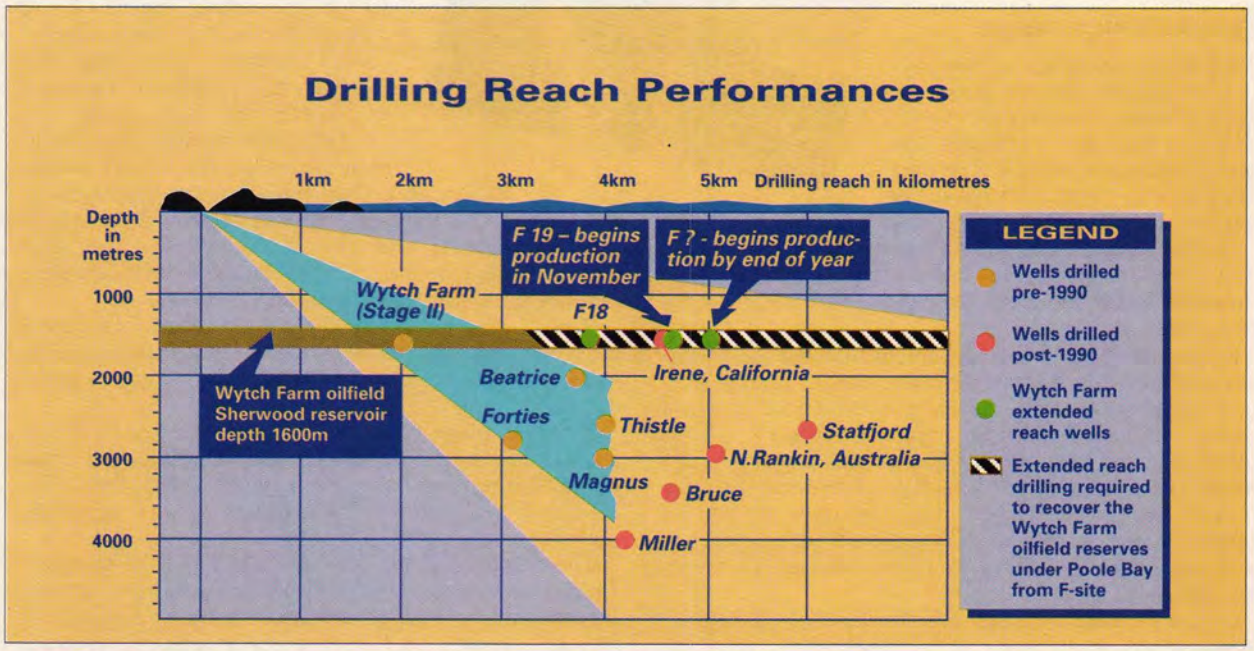
As part of the mitigation measures in the application, BP has agreed 'in principle' with DCC, English Nature and the landowners, Rempstone Estate, to take an additional 26 acres of land on Goathorn peninsula and manage it back to prime heathland habitat. It is a reminder of the added duties of oil companies operating in such environmentally-sensitive surroundings. Tree planting, screening and landscaping are all used to reduce the visual impact of the equipment. The oil leaving the gathering station is even cooled to avoid the vegetation directly above the Purbeck-Southampton pipeline growing at an accelerated rate.

The three initial extended reach wells start off in a vertical direction but the main sections are then skewed by angles of up to 80°. The existing rig at wellsite 'F' has been fitted with a high-torque top drive unit and high-stress drill pipes to give it the extra power needed to rotate the drill bit at such an angle and at such a distance away.

To monitor the position of each well, a giro-based navigational system and other electronics located just behind the drill bit transmit readings of inclination and direction back to the surface.

The longer wells will maintain a similar angle but will pass straight through the reservoir and then angle upwards to re-enter at a later point. Inverted Well Profile, as the process is known, has been used successfully in Alaska but not, as yet, at such an extended reach. Use of the technique by BP and its partners could add yet another first to the Wytch Farm programme. ■

The Wytch Farm developers plan to reach further out under Poole Bay.



Extended reach drilling performances across the world.

'I am encouraged by our experience in Russia'

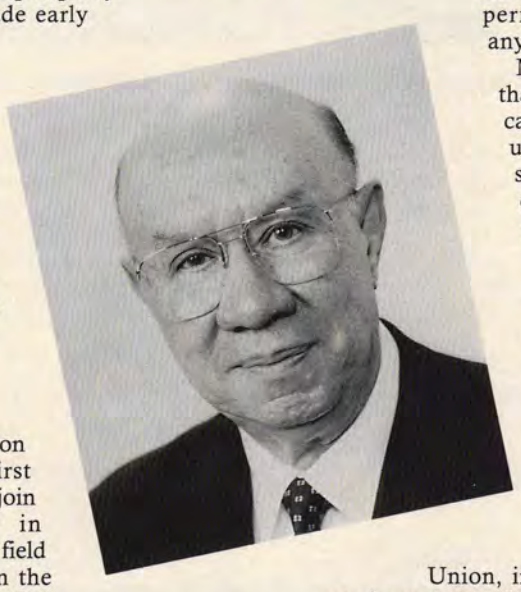
By Constantine S Nicandros, President and Chief Executive of Conoco Inc and Vice Chairman of DuPont

The recent decision by the G7 countries to commit some $3 billion to Russia's move toward a market-driven economy was, in my opinion, a wise one.

Russian President Boris Yeltsin said he expects his nation eventually to become a member of the economic power group, and I believe that Russia has the capabilities to do so. An economically strong Russia, accepting of Western investment and involved in worldwide trade, would play a major role in global prosperity.

As one whose company made early investment in Russia, I am satisfied our risk there is prudent and that the transformation of Russia into an economic power is underway.

To governments, however, I would advise (and have done so) a sensible approach that coordinates national funds with private investment to accelerate the transformation process.



Conoco's experience

I will use my company's situation as an example. We are the first major Western oil company to join with a Russian company in developing a new oilfield. The field lies above the Arctic Circle in the region around Arkhangelsk. Our work there, when mature, will result in a flow of benefits to surrounding communities. However, it will be four or five years before such benefits are manifest.

Government funds channelled to that region during this period could address pressing health, agricultural and social needs, while private commercial activity creates the foundations for long-term progress. Thus, government aid that complements private investment can create 'islands of success'. This type of grassroots success – more than all the words and promises uttered in defence of market capitalism and democratic pluralism – will encourage sustainability of reform and the grand Russian transformation.

Of course, there are major roles for the Russian peoples to play as well. Part of the risk of investing there is the lack of consistent tax regimes and legal procedures. These must be stabilised in order to attract significant investment.

Cultural and procedural barriers also must be overcome. In this regard, we have found that there is no substitute for pushing up our sleeves and going to work with our Russian partners. We are sharing responsibilities across the board – from construction and accounting to collective moaning about the heavy hand of government bureaucracy (a point of common ground from the beginning!).

As expected, we have found that the Russian labour force are quick learners. For example, 25 of 26 welders involved in building the project's pipeline passed American Petroleum Institute standards after modest training; their subsequent performance has been outstanding by any standard.

More unexpectedly, we have found that the existing Russian infrastructure can be used effectively with much less upgrading than once thought. Rail systems, barge systems and heavy equipment have performed well on our project.

Stimulus of oil

There is good reason, I think, to focus on the petroleum industry when addressing ways to bring about economic health in Russia. This industry, more than any other, is a potential engine of growth for stimulating the Russian economy. We should remember that the former Soviet Union, in a short period of time, brought its petroleum sector from ground zero to that of the largest producer of oil and gas in the world. Safe and environmentally-responsible restoration of this mammoth industry could lead Russia's economic revival.

While I am encouraged with our experience in Russia, I must state that the transformation of that nation into an economic power will not only be difficult but in many cases daunting.

However, progress can be made if all involved work in a spirit of common purpose and determination. The talent exists. The resources and raw materials are plentiful. The catalyst is a common will to succeed. This is within our power to provide if we so choose.

The G7 aid decision is a good start and the members should ensure that their funding amplifies private investments. A prosperous Russia in the community of nations – open to trade and foreign investment – is worth the effort. ■

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. . . DATES FOR YOUR DIARY

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Monday 18 October 1993
5.30 p.m. to 7.00 p.m.

'Promoting the Engineer as the Professional of the Next Century'

Professor Michael Laughton
Dean of Engineering, Univeristy of London
and
Professor Harold Baum
Head of the School of Life, Basic Medical and Health Sciences, King's College, London

Chaired by Mr Graham Able, *Headmaster, Hampton School*

Organised by Energy Economics and Personnel Education and Training Groups.

IP Contact: Pauline Ashby.

Thursday 21 October 1993
5.30 p.m. to 7.00 p.m.

'Winners and Losers in the British Gas Market'

The potential impact of implementing the MMC regulations

Speakers **Mr Gregor McGregor**
Director of Competition and Tariffs at OFGAS
and **Mr James Ball**
Senior Partner, Gas Strategies

Chairman **Dr Ian Thomson**
Managing Director, Oakwood Consultants

Organised by Energy Economics Group.

IP Contact: Pauline Ashby.

Monday 25 October 1993
5.00 p.m for 5.30 p.m.

Oil and Gas Ventures in the Former Soviet Union

By Chris Johns, *Senior Negotiator, British Gas Exploration and Production*

Organised by Exploration and Production Discussion Group

IP Contact: Sjoerd Schuyleman

Wednesday 27 October 1993
4.00 p.m. to 7.00 p.m.

'The Treatment of Oil Spills'

Three speakers from the International Tanker Owners Pollution Federation Ltd., the Marine Pollution Control Unit and the Joint Nature Conservation Council will present their organisations' approach to this problem.

Organised by Environment Discussion Group.

IP Contact: John Phipps.

FUTURE MEETINGS

Date	*Title*	*Group*	*Contact*
16 November	**UK government environment policy**	**Environment Discussion Group**	**John Phipps**
22 November	**Automotive fuels for Europe** *By Roger Hutcheson, CONCAWE*	**Energy Economics Group**	**Pauline Ashby**
8 December	**A discussion on industrial boiler technology** *By John Cheshire, Scientific Policy Research Unit, Sussex University*	**Energy Economics Group**	**Pauline Ashby**

All meetings are held at the Institute of Petroleum. Please tell the IP contact if you plan to attend any of these free meetings. Tel: (071) 636 1004. Fax: (071) 255 1472.

The United Kingdom's flagship oil and gas show

By Carol Reader

Offshore Europe 93 was bigger and better than ever; with 1,800 exhibiting companies from five continents, providing a mammoth showcase of equipment and services for the entire oil industry as well as a platform for over 100 conference speakers. Problems and recession were put aside so that the whole exhibition and conference glowed with an air of optimism, reflecting the theme of the show 'Managing Change in the New Era.'

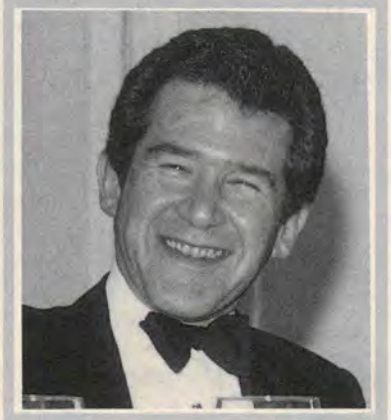
The show, held from 7 to 10 September, was expertly organised with nothing left to chance. Only the traffic arrangements on the surrounding roads proved a real bugbear, seriously holding up the thousands of exhibitors and visitors who converged on the Aberdeen Exhibition and Conference Centre at Bridge of Don on the northern edge of the city.

Managing Change in the New Era was indeed the theme of the whole event. Speaker after speaker cast aside any consideration of the maturity of the North Sea and dismissed any idea of the end/demise of the North Sea oil industry, emphasizing instead the prospects for the years to the turn of the century and beyond. The only debate concerned how rapid change would be.

'Our current calculation is that, given a further 30 percent reduction in capital costs and a 50 percent reduction in operating costs over the next 20 years, it is possible to raise the total volume recoverable from the North Sea by 25 percent – from around 60 billion barrels to around 75 billion barrels'.

This was the view of John Browne, Managing Director, the British Petroleum Co plc and Chief Executive Officer, BP Exploration as well as General Chairman of Offshore 93, who spoke at the opening session of the conference, extending a warm welcome to all the visitors to Aberdeen.

His mood of optimism for the future ran through his entire speech. He accepted that many North Sea fields were approaching maturity but not necessarily exhaustion and decline. His preferred description was 'enewal' and the opening of a new era with 'new vigour, new opportunity and new optimism'.



Mr John Browne, Managing Director, British Petroleum Co. plc; Chief Executive, BP Exploration and General Chairman, Offshore 93

He foresaw a future 'in which gas from the UKCS could keep the United Kingdom self-sufficient and both the UK and Norwegian sectors could become very significant sources of secure supply to the growing European gas market'.

He also saw a future 'in which the profit margins on both oil and gas development make the North Sea attractive to national and international investment through the next 20 years and beyond'.

There was a resource base of 144 fields producing or approved in the United Kingdom, with a further 500 discovery wells, while, according to Department of Trade and Industry estimates, between 4 and 25 billion barrels of oil and up to 45 trillion cubic feet of gas are still to be found.

Technology

Mr Browne stressed that the key to unlocking these potential resources lay in productivity, the use of more and more new technology, so that small fields could be developed and the maximum output obtained from fields already in production. He acknowledged that the future lay in the development of fields of 10 million barrels; he even believed it likely in future years that fields of under 10 million barrels would be viable.

Other limits were also likely to be extended – greater depths than at present and further offshore, particularly to the north and west.

Partnership

Mr Browne also touched on the vital subject of partnership, the means of achieving cost reductions without the pursuit of narrow self-interest. He envisaged partnerships in several circumstances:

- Within organisations
- Between owners
- Between companies and contractors.

He described partnership as 'a relationship in which companies share the benefit of successful cooperation', elaborating on his own company's experience of these arrangements in the Forth development, the Hyde gas field and the development of Andrew.

Tax system

Referring to the changes in Petroleum Revenue Tax (PRT) introduced in the United Kingdom earlier this year, Mr Browne said that the new system 'gives us all the incentive to reduce costs and to work for maximum efficiency. Over time I believe they (the budget changes) will be seen to have brought great benefits to the North Sea'.

Outlining his own company's plans following the PRT changes, he told delegates that BP was planning to increase its investment in the North Sea by nearly 10 percent over the next three years. He said, 'In part that is the result of the extra cash flow which results from the reduction in PRT. But it is also a reflection of the fact that the budget changes make some developments more commercially attractive. Our initial estimate is that the cumulative effect of the extra investment will be to raise our UK production by more than 6 percent by 1995 – 80 percent oil it oil'.

He added, 'If the fiscal regime remains supportive of investment, it will encourage comapnies to pursue the opportunities which remain in the North Sea'. Mr Browne summed up by emphasizing 'The industry can have a tremendous future and that future now lies within our grasp. It won't be easy but the prize is attainable'.

Mr Constantine S Nicandros, President and Chief Executive Officer, Conoco Inc., reiterated the message of Mr Browne, saying that the days of wine and roses were over in the North Sea and agreeing that his company expected no real improvement in oil prices, nor price stability.

He likewise stressed the need for productivity and the trend towards restructuring in the industry. Referring to managing change in the new era, he told delegates that this process had not been a pleasant experience but that the benefits have been 'truly amazing'.

He divided Conoco's efforts to manage change into four activities:

- Change from an intra-company perspective – such as outsourcing
- Change from the inter-company perspective – such as partnerships
- Change affecting third-party relationships
- Change from a personal perspective.

In order to reduce operating costs, for instance, Conoco was sharing

Energy Minister Tim Eggar with Mr George Beveridge on the stand of the Montrose Fire & Emergency Training Centre, the new name of the Offshore Fire Training Centre. Addressing a dinner given by the Lord Provost of Aberdeen during his two-day visit to Offshore Europe, the minister said that while the North Sea was now a mature province, it was not played out. Capital investment was at its highest since the early 1970s, while new fields are regularly being brought on stream. He quoted BP's Hyde gas field and the Scott oilfield, operated by Amerada Hess, as the two most recent starts making 13 so far this year. He went on to repeat the message from other speakers – 'If remaining North Sea reserves are to be exploited fully, then action is needed to reduce costs'. The minister looked forward to a continuing increase in exports, backed up by the technology and expertise gained in the UKCS. As assurance to the industry he promised that, 'We in government will do everything we can to create the right environment for the industry's export endeavours'.

The Western Renaissance was christened by Mrs Sheldon Erikson, wife of the President of the Western Co. of North America at Aberdeen. It is said to be the largest and most advanced offshore well stimulation vessel in the world.

supply boats, helicopters and warehouses both in the United Kingdom and in Norway (see Petroleum Review, September issue).

He detailed the shared operatorship, set up by Conoco and Chevron, for the Britannia field and the time and money saved. Mr Nicandros told his audience, 'We are seeing major cost efficiencies through the combination of the best ideas, resources and data bases of two companies...a treasure trove of learning experiences'.

All in all, he saw a great future for partnerships – 'We expect all our significant new ventures will involve even more creative partnerships'. These partnerships involved a big reduction in the number of support contractors employed, with the result of big cuts in costs.

On the changes in PRT he said, 'We believe that the new regime is probably in the best long-term interests of the industry'. He ended his address in optimistic mood confident that 'Our finest achievements are ahead'.

Novel contract terms

New types of relationship between companies was another constant theme at Offshore Europe. Ian Strecker, Executive Vice-President, Schlumberger Ltd., speaking of the service industry, said that in order to achieve cost reductions, 'There must be a willingness and flexibility in developing the new type of relationships increasingly desired by more and more oil companies'. Here he was referring to long-term partnerships, integrated services and incentive contracts.

Schlumberger's experience of integrated services is varied – for instance, at Wytch Farm and Draugen. It enables oil companies to concentrate on their core activities and to create a more efficient operation in which the contractor and operator work together rather than adversarially, as they seek via mutual trust to achieve common goals.

Mr Strecker believed that, 'This all spells progress; that integrated services provide a vital contribution to more efficient operations in the North Sea'. At the same time his company insisted that it must remain an independent contractor with no participation in joint ventures, no financing of clients and no equity stake in clients' business.

He concluded, 'The real leap forward will come from operator and contractor working together as a team with clearly defined, separate interests but common goals'. ■

The Offshore Europe Conference programme was extremely wide-ranging, taking up three and a half days, with three simultaneous sessions of technical papers. The subjects covered in the various sessions included safety, regulatory and environmental issues, well completions, multiphase flow and cuttings reinjection and many more.

Given the theme of the whole show, the theme of cost reduction was a constant message from many speakers. For instance, participants flocked in to hear M Spaven who drew these varying trends and innovations together in a paper entitled 'The CRINE Initiative'. This acronym, standing for Cost Reduction in the New Era, represents a high-powered inter-company working group, backed by the DTI and various organisations including the IP. Abandoning all competitive rivalry, they plan to share as much experience and knowledge as possible with the common aim of striving for meaningful cost reduction in the development of the UKCS. (see Petroleum Review, April 1993). A two-day conference will be held in London in December to report their findings (see page 453).

Sjoerd Schuyleman, IP Upstream Technical Manager, (right) with visitors to the IP stand at Offshore Europe.

Winner

The lucky person who won the draw for a year's free membership of the IP by leaving his business card at the IP stand at Offshore Europe is Christopher Dudgeon, Marketing & Technology Coordinator, Tecnomare UK.

U.K. Offshore Operators Association Ltd. and the Department of Trade and Industry – Two Day Conference

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Book Review

Oil Markets and Prices – The Brent Market and the Formation of World Oil Prices

By Paul Horsnell and Robert Mabro. Published by the Oxford University Press for the Oxford Institute for Energy Studies, 1993. pp334.

What, in practice, determines the price of internationally traded oil today? In the 1950s and 1960s there was a fairly simple answer to the question based on the dominance of the major oil multi-nationals and their close relationship with producer governments. In the 1970s there emerged a new, if superficial explanation based on the leverage exercised by OPEC. Since 1980 the answer has become much more complex.

The market price settles today on a multiplicity of separate supply and demand factors. Some parts of the market are now much more transparent than they used to be; others remain almost totally hidden. The paradox is that because of its worldwide character, the oil market is generally assumed to be open and free; yet, one of the major determinants of price is the intervention of governments, whether by fiscal, public sector ownership or other means. Such intervention is rarely immediately transparent and often covert.

This quite outstanding study sets out to unravel patiently and clearly the various strands and to identify the key players. Wisely, it turns first to the Brent market, which although representing a small fraction of the total volume of internationally traded oil, is nonetheless regarded, given the lack of other reliable market indicators, as a key reference price.

The Brent market, however, is not entirely transparent. It is not an easy market to understand. Just about half this book is devoted to a clear and rigorous description of Brent – the physical base of the Brent/Ninian blend, the way trading is conducted, the various commercial and legal instruments in use, the record of the very many changes in North Sea taxation and their effect. Then the full history and system of reporting Brent prices is analysed in detail and with considerable finesse.

The second half of the volume takes the reader into the broader global environment of oil pricing today – how Brent prices inter-relate with oil prices elsewhere. It describes other significant markets including Dubai crude, West Texas Intermediate (the principal basis for trading on Nymex, the New York Mercantile Exchange) and the various European products markets. A comprehensive review of oil trading worldwide reveals a heavy reliance on market-related formula prices. These formulae, where known, are described in detail.

The two authors conclude that there is much to be desired in the current mechanisms of oil price formation. Nonetheless, they claim, any deliberate attempt to improve this second-hand state of affairs is – on the evidence of the history of the market – likely to worsen affairs. To the extent that this is the usual coded message of the industry to governments – WE WILL DO THE JOB WELL BUT KEEP OFF OUR TURF – it is a fairly banal ending for an excellent book.

There is a government-orientated riposte to be made to these conclusions. Take the Brent market. A main concern in the early 1980s and again in the late 1980s was the financial weakness of some of the smaller players e.g. the risk of the lengthy 'daisy chains', constructed primarily to diminish UK tax liability, being broken by default. Under some pressure from a tightening up of Petroleum Revenue Tax the major companies tackled the problem with codes of conduct, new trading regulations and other controls to be accepted by all players. The UK government saw clearly the economic and financial benefits of a smooth development of North Sea oil and gas – although there were many mistakes, they proved flexible and sensitive to changing circumstances and deserve, in my view, more credit than they are given in this volume.

One final comment. The oil market is, as the authors argue, likely to continue to operate relatively freely. This is probable within some broad consensus of price parameters. Once the oil price moves outside these parameters – whether up as in the Iraqi invasion of Kuwait in 1990 or down as in 1986 – the security of supply alarm bells ring. Any fundamental threat to global oil supply or the global oil industry immediately transfers the issue to global politics. Throughout this century, the No. 1 determinant of the oil price in such circumstances is the political and strategic interests and intentions of the major governments involved, not the behaviour of companies or markets. There is little to indicate any change here in the foreseeable future and the most likely source of the next oil price discontinuity still looks as if it will again come from political turmoil in the Middle East. ■

Paul Tempest

The Institute of Petroleum

ANNUAL DINNER 1994

The 1994 Annual Dinner will be held at Grosvenor House, Park Lane, London, W.1. on Wednesday, 16 February at 6.45 for 7.30 p.m. Dress will be dinner jacket with decorations.

HOW TO APPLY FOR TICKETS

1. Applications must be made by completing the form below and sending it with remittance to, The Institute of Petroleum by **Friday, 22 October 1993**. (Applications received after this date will be considered separately).

2. Collective (Company) members may apply for one or more tables of ten seats or less than a complete table. Individual members may apply for a maximum of four tickets.
   *However, as demand for places usually exceeds capacity, it may not be possible to grant requests in full. It is therefore advisable not to invite guests until tickets have been allocated and this will be completed by **5 November 1993**.*

3. Allocation of tickets will depend on the degree of involvement in IP affairs.

4. Tickets will not be sold to persons or companies who are not members of The Institute of Petroleum.

5. **The price of a ticket is £110 (individual members) and £150 (non-members), plus 17.5% VAT**. It is the responsibility of applicants to establish whether or not their guests are individual members. Collective members should note that only the company's nominated representative to the IP is entitled to the reduced individual member rate, other employees or guests must be paid for at the non-member rate, unless they are individual members in their own right.

6. Successful applicants should submit by **Friday, 14 January 1994** a full list of guests (names only, not companies) including decorations. Names submitted after that time cannot be included in the Guest List.

7. Companies or individuals wishing to share tables must state this when requesting tickets, as **changes cannot be made after tickets have been allocated**.

8. **Orders for tickets cannot be accepted over the telephone.** The correct remittance must accompany the Application Form. Tickets cannot be allocated without payment.

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APPLICATION FORM – IP ANNUAL DINNER, 16TH FEBRUARY 1994

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'There are grounds for hope that a third major oil shock can be avoided'

By Paul Tempest, Director General of the World Petroleum Congresses

Rising foreign trade and investments

Over the last forty years, the expansion of foreign trade and the establishment of open global markets for goods and services have been principal factors in global economic growth and development. In the early-1980s, world trade flattened under the impact of global recession, part-induced by the second oil-price shock of 1979/80. In very many countries indebtedness and the flight of private capital reached a level which prevented further capital inflows. By the late 1980s, the world's export industries had learnt to surmount tariff, quota and payment barriers by investing in manufacturing capacity in the main target markets. The process was assisted by rising budgetary and external deficits in the United States and other major countries. As a result foreign direct investment shot up from $50bn to $195bn pa within four years and the value of goods and services produced worldwide by foreign companies began to exceed the total volume of world trade (now at about $4.2 trillion). The basic motivation of this new foreign investment was to penetrate protected domestic markets from within. It has only been fully realised quite recently that this new foreign investment, carrying the latest technology and seeking competitive advantage in terms of resource and labour cost, specialised skills and access to local capital, has in fact produced new centres of technical excellence and marketability of regional and global significance. A significant part of the new products and services, resulting from this foreign investment, have found markets far outside their own domestic markets. So a large boost in foreign direct investment has already had an important effect in causing the new expansion in world trade and looks like continuing to do so. These developments have proceeded at varying paces through the industrialised world, they are already clearly evident in some developing countries such as Chile and Mexico; and they look like accelerating in the nineties with the main source of expansion still in the Pacific Basin. Given the known linkages of foreign trade and global economic growth sustained by foreign investment and trade flows, we can begin to construct a buoyant global growth scenario for the 1990's. Indeed, for many countries, deregulation, privatisation and access to many new global markets are in their infancy. The message – that the benefits of such policies are immense – is spreading fast and the cumulative effect of the liberalisation of trade may produce many new opportunities for the flexible and mobile sectors of industry and many unpleasant surprises for those parts of industries which can only operate under government control through long-standing economic protection and financial subsidy.

Opportunity and constraints in the petroleum industry

The petroleum industry has played a very important role in these foreign trade and investment developments. Crude oil is still the largest single commodity in world trade. A relatively new international trade in natural gas has emerged in the last 10 - 15 years whether by pipeline or in the form of Liquified Natural Gas. The switch of the US industry from placing the bulk of their investment in the USA to investing elsewhere and the determined efforts of OPEC to invest in refining and marketing capacity downstream are good examples of the industry changing direction and stimulating foreign investment. The rapid development of trade in petrochemicals, in many oil and gas-based products, and in oil or gas generated electricity have also stimulated much broader international exchanges of goods and services. Indeed, petroleum can be justly regarded as remaining a key catalyst in the industrial economy of today.

For many governments and much of the traditional industries faced with strengthening international competition and possible extinction, the protection afforded by quotas, tariffs and other regulation of imports still appears a viable alternative to open-door policies. Difficulties in concluding the current GATT/UNCTAD round of liberalisation has encouraged the protectionist schools of thought, particulary where these predict outright trade war between the United States, Europe and Japan. Leading economists such as Lester Thurow* are recommending to President Clinton to spend much more on the public sector infrastructure, particularly education, and to challenge Europe and Japan head-on with item-by-item negotiation of access to each other's markets.

In the energy world, hemispheric solutions have been advanced as the solution to the increasing oil import dependence of the United States and continuing oil, gas and coal import dependence of European and Japanese energy supply. Thus, it is argued, the United States can rely on its new Free Trade Agreements with Canada and Mexico and closer ties

Paul Tempest has been Director-General of the World Petroleum Permanent Council and World Petroleum Congresses since October 1991. The 14th WPC Congress will be held in Stavanger, Norway on 29 May to 1 June 1994 and the 15th Congress in Beijing in 1997.

with Latin America to cure its increasing dependence on oil imports (of which a significant part comes from the Middle East). Under the same strain of thinking, Europe is encouraged to look first to North Africa and Norway for new supplies of oil and gas. Neither the United States nor Europe has the remotest chance of achieving these objectives of regional energy self-sufficiency, (although any progress might ease later pain).

* *'Head to Head: The Coming Economic Battle Among Japan Europe and America' by Lester Thurow published by Morrow, New York 1993 at $25.*

Global oil demand and supply: A fragile balance

It is highly likely, given the current low rates of return on most investment in energy and the 5-10 year investment/ production lag even when rates of return improve, that oil will remain for the next two decades the principal source of marginal energy supply. Gas development will be fast but will continue to be constrained by the huge cost of constructing new transportation and distribution systems.

On the supply side, oil supply from non-OPEC sources is likely to hold fairly flat with little chance of a sustained rise given the need to replace depleting supply from many areas including Alaska, Russia and the UK Continental Shelf. This leaves OPEC to meet incremental global demand estimated, depending on the level of global economic growth, at between 1-3 percent pa. OPEC is thus gradually and steadily regaining market share and leverage.

Within OPEC, almost all non-Gulf members are producing flat out and would require considerable incentive (eg a higher oil price) to justify the development of new high cost reserves of light oil as well as of heavier crudes and shales. Spare capacity in the global oil supply system is therefore located in those few Gulf states which also have very ample crude reserves : Iraq (once UN sanctions are lifted), Kuwait , Saudi Arabia, UAE and Iran can between them easily meet the expected increases in global demand. Indeed, the danger of the moment is an abrupt return of Iraq to the market and the consequent risk of a price collapse. A longer-term risk, however, is that the Gulf states will again join forces to restrain production and force up the price of oil. In any case the rise in demand worldwide may – particularly under strong economic growth – outstrip Gulf capacity with a similar upward effect on price.

Oil industry capital replacement

Meanwhile, the capital stock of the oil industry has been ageing steadily since the early eighties. The failure in the eighties to renew production capacities, refineries and transportation systems can be attributed to low rates of return based on assumptions of slack oil market conditions and much lower prices than in the seventies.

At the last (13th) WPC Congress in Buenos Aires in October 1991*, we concluded that the full capital replacement of the petroleum industry in the nineties necessary to keep pace with rising global demand would imply investment at a level 50 percent higher in real terms than in the eighties. Already, as we approach our next major assessment at the 14th Congress (in Stavanger, Norway starting 29th May 1994), we can measure clearly a continuing shortfall. Take, for example, the global stock of VLCC vessels; most of which were brought into service in the mid-seventies and whose average age will soon be approaching 20 years, their original design life. Whereas, in the early-eighties, most of the decade's investment had been based on expectations of a high oil price following the price surge of 1979/80, there has been no such price stimulus at all in the early-nineties. Such a deterioration of the capital stock of an industry cannot continue indefinitely. By the late-nineties, there will be intense commercial pressure from the industry, required to operate under increasingly stringent environmental and safety conditions, and rigorous cost-control, to be able to increase margins to permit an adequate rate of reinvestment.

* *Proceedings of the 13th WPC Congress, published by Wiley's Ltd, Chichester at UK £920 per set.*

A third oil shock?

The consumer of oil and oil products is therefore likely to be faced by the turn of the century with a double pressure on price – the imbalance of supply and demand caused by much diminished spare production capacities and the needs of the industry to replenish rapidly its capital stock. Both imply heavy increases in price to the consumer. Under such conditions, most parts of the petroleum industry are likely to consider seriously the possibility of a third oil price discontinuity, again triggered by political tumult in the Middle East. There are however some mitigating factors. In this paper, I would like to focus on three of them:

- new technology and the drive to cut costs
- the changing structure of the oil and gas industries with opportunities for natural gas and strains of over-capacity in base petrochemicals
- the new politics of the Middle East and the emergence of a new producer-consumer consensus

New technology – cutting costs

One of the most remarkable developments of the last few years has been the rapid acceleration of technology in the petroleum sector stimulated by strong competitive forces following the oil price collapse of 1986. Throughout the oil and gas business, the emphasis has been on cutting cost and on imposing rigorous financial control.

Take for example, the North Sea projects. In 1986, as the oil price fell below $10bl, the cost of inputs for drilling tumbled to very low levels; contracts were rapidly renegotiated. It has been estimated that, at this stage the savings to the companies still in business were of the order of 30 percent. At this point, under cost pressure, there were major changes in platform design reflecting automation (particularly in the gas fields of the Southern Basin) and the need in deeper water to move from fixed steel and concrete structures to tension leg and floating structures. The overall impact of this new technology in this second phase of cost-cutting might be put at a further 20-30 percent. Finally the development of subsea completions, directional and lateral drilling and further automation has prompted much field and regional rationalisation: in many projects it is no longer necessary to assume the costs of a complete new production platform and pipeline system to the shore terminal: hook-ins to existing platforms, pipelines and other infrastructures probably represent another phase of saving, perhaps 30 percent of the original project cost. The cumulative effect of these savings has permitted the industry to push

into deeper water, to exploit much smaller accumulations and more difficult geological structures, despite the disincentives of a steadily declining real price of oil in the market and little prospect of its improvement in the short-term.

Elsewhere, however, environmental and other regulatory constraints have imposed new costs in refining, transportation and marketing, all of which have had to be absorbed under tight competitive conditions.

The changing structure of the oil industry

Whereas the major national oil companies have also been faced with strong competitive forces since 1986, they have, for the most part, maintained a momentum of expansion. In the PIW ranking of January 93, covering reserves, production and turnover, NOC's have five of the ten leading places with Saudi ARAMCO taking first place ahead of Shell. Yet the global distribution of interest of the major oil multinationals still places them in the forefront in the process of technological change and the transfer of technology.

For each of the majors (as for the rest of the industry worldwide) the question is how to maintain corporate momentum and a cohesive strategy when privatisation and joint venture activity dictate a strong swing towards the local autonomy of operating companies. Most of the majors are, by global industry standards, still highly centralised in such key areas as finance, transfer of technology and the application of geological and exploration expertise. The process of cost-cutting since 1985 has progressively pared away central reserves of skill and experience, and lowered the ability of the industry to generate a large part of its investment capital from its own resources. As the pendulum swings back with the US majors switching exploration and development resources from the US domestic market to new overseas projects, it will be interesting to see how well they respond, if faced with opportunities for strong expansion in the late 90's.

The recipe for survival appears to be:

- ***Fitness.*** All parts of the business in all parts of the world have to measure up in terms of efficiency, profitability, return on capital.
- ***Flexibility.*** The corporate body has to retain sufficient standing and central authority to be able to adjust part of the business to the new opportunities and to act quickly as new and unacceptable risks emerge.
- ***Technical Excellence.*** Highly developed skills , experience and new technology will continue to make the majors attractive as joint venture partners.
- ***Overall Strategy.*** A broad distribution of risk and ability to absorb some high exploration risks with some balance between upstream, processing and downstream interests will always help to give the majors an edge on the smaller national oil companies.

Footnote: Gulf security of supply

The key to the politics of the Middle East and the security of oil supply lies in the relations with each other of the three lead players: Saudi Arabia, Iran and Iraq. The struggle between them for ascendency is likely to continue. Iran has the most people, Iraq has the most arms and most effective army; Saudi Arabia has the most oil. The US intervention to protect Kuwaiti tankers against Iran in 1986-88 and to restore Kuwaiti sovereignty in 1990/91 indicates a willingness to intervene a third time. This may become less easy given the resistance of other Arab and Middle Eastern countries and domestic US political pressures.

In the longer-term, however, the involvement of Iran in the newly opened frontiers to the North and the tumult of the Asian republics of the former USSR may make Iran less willing to impose outright pressure on its Gulf neighbours, while Iraq may continue to find it difficult to prosper under UN sanctions, leaving Saudi Arabia in a strong enough position to influence policy within OPEC by the periodic adjustment of Saudi oil production to smooth the price path.

Conclusions

Drawing these threads together, let me remind you of my starting point: the strong impetus to world trade and global economic growth provided by the sharp rise in foreign direct investment. If the nineties under such conditions provide global economic growth of more that 1-2 percent, the bulk of increased energy demand will have to be met by oil and gas, mostly oil in the short-term. Most of that oil will have to come from the Gulf countries which are faced with something like a doubling of crude production within 10/15 years; from 17 mbd at present to 35 mbd by 2005; and a tripling of production within 25/30 years; to 50 mbd by the year 2020. This prospect imposes considerable tension on the Gulf states:

- Where should they go to finance all the new investment in production capacity?
- Can they hope for alleviation by a rising oil price?
- Can they satisfy the political demands and resist the political pressure of less fortunate neighbours?

Simultaneously the petroleum industry is undergoing fundamental change as cost pressures and increasing competitivity eliminate the weaker elements. The need to re-equip the ageing capital stock of the industry will become urgent before the turn of the century. The history of the industries over the last 50 years has been a succession of major supply shocks. We do not know whether nuclear, coal, oil or gas will produce the next ones in the 20-30 year period ahead. As far as security of supply from the Gulf States is concerned, it is a reasonable assumption that tumult in the Asian republics of the former USSR may distract Iran and possibly Iraq and thereby permit Saudi Arabia to retain its leadership of OPEC – or share the leadership with Iran – on terms which are broadly acceptable to the consuming countries, whether industrialised or, as the most strongly growing demand sector, the developing world.

In my personal view, there are grounds for hope that a third major oil shock can be avoided. This is not to say that a third major oil shock will be avoided. Many governments and companies are unlikely to react until the crisis is upon them. Indeed the balance of current global opinion over the next 20/30 years horizon, as indicated by the behaviour of the markets and the investment intentions of the industry, would seem to indicate that some radical readjustment is expected and that the most likely instrument of such change will be, sooner or later, a rise in the price of oil which might be both abrupt and steep. ■

This article is based on a presentation to the Annual conference of the Australian Petroleum Exploration Association.

THE INSTITUTE
OF PETROLEUM

Practical Implementation of EC Gasoline Vapour Emission Control Directives

Thursday 25 November 1993

To be held at
The Cavendish Conference Centre, London

This one-day conference will focus on the requirements of the forthcoming EC Stage 1 and Stage 2 Directives. It will deal with the different options available to achieve compliance with these directives and the technical aspects of implementing them. The conference is being organised by the IP Vapour Recovery Committee and speakers will be experts from within the oil industry who have practical experience in their subjects. The conference is aimed at personnel both within the oil industry involved in the planning and practical implementation of control measures and authorities involved in the interpretation of legislation and checking compliance.

An Exhibition by Manufacturers will be run in parallel with the conference at The Institute of Petroleum on Wednesday 24 November from 16.00 to after lunch on Thursday 25 November 1993.

Presentations will be based on operational experience and will include:

1. A comparison of the options for control of emissions from above-ground storage tanks.
2. Road tanker vapour collection system design.
3. Vapour collection systems at road loading terminals – the options available.
4. Systems available to permit vapour collection for rail and marine loading.
5. Safety issues including ignition propagation within vapour piping systems.
6. Options for the design of Stage 1b installations.
7. The Stage 2 systems available and experience of their use in Europe and the United States.

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

THE INSTITUTE
OF PETROLEUM

THE FIFTH OIL MEASUREMENT CONFERENCE

New Developments in Tank Calibration & Meter Proving

Thursday 4 November 1993

To be held at
The Institute of Petroleum

Attention is increasingly focused on quality management and measurement accuracy in the drive to reduce oil loss and increase operating efficiency. It is therefore an appropriate time to hold a conference to review tank calibration and meter proving. Accurate tank calibration is a pre-requisite for the accuracy of all methods of tank gauging, including automatic tank gauging systems, while traceability in meter proving is fundamental to the relationship between readings obtained in proving and International standards of measurement.

This one day conference is divided into two sessions, with an introductory paper by the National Engineering Laboratory on measurement traceability.

Topics to be presented include:

- Measurement traceability from international standards of mass and length through to field equipment
- Review of tank calibration techniques, including new technologies and a comparison of the accuracy and cost of various methods, plus new moves to standardise tank recalibration frequency
- Latest developments in tank calibration, especially electro-optical methods and their various applications
- A tank operator's perspective of what is sought in tank calibration and calibration services
- Analysis of large data base of offshore and jetty meter provings and the lessons to be learned
- The role of a Weights and Measures Laboratory in meter calibration
- Norwegian methods of the calibration of small volume provers
- Central proving – used in many countries; why not in the United Kingdom?

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

'Nigeria at a crossroads'

After nine days of crippling, nationwide strikes, Nigeria entered a period of uneasy truce last month. Further action is threatened by the oil workers' union, NUPENG, however, unless the government hands over power to Mr Moshood Abiola, the man they claim is the 'clear winner' of June's annulled elections. Dr Taiwo Idemudia, General Manager at the Nigerian National Petroleum Corporation (NNPC) in London, talks to Susannah Cardy about what the future holds for his country.

Susannah Cardy: How much damage has this latest strike inflicted on the Nigerian oil industry?
Dr Taiwo Idemudia: I wouldn't say any fundamental impact was made on the oil industry – production and export were going on as normal; the refineries were operating, albeit Kaduna was limping; loading was regular. But one could say there was a psychological impact on the industry. For the first time, the downstream sector was adversely affected to the extent that it became a considerable irritation to citizens on a nationwide basis. Previously when we have had fuel shortages it has usually been localised, but on this particular occasion it was countrywide and people felt considerable hardship. Some had to wake up very early in the morning to go to queue at petrol stations; many had to walk long distances to work; many buses could not operate. This left a psychological 'bad taste' in the mouths of people. But things came back to normal almost as soon as the strike was called off.

What will happen if NUPENG's demands are not met and Mr Abiola doesn't come to power?
I don't know if they want Abiola in – one would hate to personalise. As a public servant, I can't say if it's the Social Democrats who won, or the National Republicans. I can't get involved in that. Everybody does say he won now, but all NUPENG are saying is whoever won on 12 June, they should be allowed to govern. My impression is that the internal government may have convinced the union that the right course is to give it the chance to do what it intends to do.

The NUPENG executive, I suppose, made its point, flexed its muscles and demonstrated that it does have the wherewithal to ask the country to listen and having done that, one would say to them – 'Look at how you can build, not how you can destroy, not how you can create more hardship'.

'All you have to do is to smuggle just once and you'd be a rich man all your life'

Were you surprised at how much power NUPENG wielded?
No, I was not surprised personally because I've always been in the system. Believe it or not, I was the Founding President of PENGAASAN, the senior staff union, and therefore I have always known the power a responsible union can wield in the petroleum sector in Nigeria because it is the wheel of the economy and the moment it halts, the economy grinds to a halt too. That is why one really must stress that irresponsible staff must never get to the executive or the leadership of those two unions.

Do you think that irresponsible staff have got into the executive of NUPENG?
I don't think so – else they would not have behaved in the way they did. They would then have capitalised on the apparent power they had demonstrated and really led the economy to ruin by prolonging the strike. I think they've behaved very responsibly.

Do they have the power to change the government?
No union has the power to change any government – no union should become political.

But NUPENG has done – their demands are political.
I'm saying that that's not right.

So are you critical of them?
I'm not critical of them. I'm very realistic and objective.

The unions alone cannot bring down the government; it has to be by consensus with the social critics, political class and military. Then the government really will have no choice, because Nigeria is one place where the people are vocal, articulate, well-informed and when they want something they pursue it with a common purpose and if they all say yes, the government will listen and let it happen – otherwise there will be a crisis. But if it is just the two unions in the petroleum sector, very soon they will begin to incur the wrath of other Nigerians. They must not see themselves as the vanguard for 12 June. Anyway, the government has clearly indicated that it will call elections within six months.

Haven't they said that before?
This is another government entirely – not the same as the Babangida regime at all. Shonekan's interim government

is made up of some members of the Social Democratic Party, some members of the National Republican Convention, some military and one or two other private citizens.

Have there been any reprisals against oil workers?
No. I understand a few who were arrested some two months ago when the Kaduna refinery caught fire are soon to be released.

How serious are the cash flow problems within the NNPC?
Yes, there are cash flow problems but the government has ensured in its wisdom that certain critical expenditures are not dependent on regular cash flow availability in the NNPC. For example, we have cash calls for joint venture operations, so we don't have to look through our operations to get money to pay for them. The same applies for top priority projects, but then there are all the regular routine operations and there is a serious cash flow problem there. It's really on this basis that the NNPC has argued strenuously in the last year for the government to revisit the issue of subsidy because if you sell a litre of gasoline for 2.5 cents, really the money just won't be there to run these projects.

But every time Nigeria attempts to put the price of gasoline up, it starts a riot.
That is a problem, but we have to try and convince all Nigerians that there is no other option. People in Lagos are buying gasoline on the black market for as much as N40 per litre.

Was the government's attempt to increase prices tenfold too ambitious?
If you increase prices by 300 percent (N2 and 10 kobo per litre), you have exactly the same problem as if you go to N7 and 50 as the government tried to do. You will not be addressing the real issue and you will still have a serious cash flow problem – so bite the bullet. The mistake we made really was not pursuing the UK policy, where at every Budget speech, a price is put on gasoline. We've waited so long in Nigeria that now it's time to do what is right.

Can the people afford it?
We're profligate because the gasoline is cheap – the cheapest in the whole world. We don't maintain our cars, and consequently fuel efficiency is low. When the price is high, habits will change.

How much oil is smuggled out of the country and how serious an offence is it?
Total domestic consumption is about 300,000 barrels a day – an estimated 60,000 barrels a day are smuggled out. Yes its a serious offence, bringing a jail sentence, but how many are caught? With a country of 357,669 square miles, to control smuggling totally would be a near-impossible task. The only way you can control smuggling is near-parity in pricing.

If you take a tanker load of 30,000 litres of gasoline from Nigeria, you pay N25,000. When you take it just across the border, you can sell it for half a million Naira – so the incentive is so great. All you have to do is to smuggle just once and you'd be a rich man all your life.

'The NUPENG executive, made its point, flexed its muscles and demonstrated that it does have the wherewithal to ask the country to listen'

How crippling is the foreign debt?
The problem of a large debt base becomes a determinate of your creditworthiness. When a creditor knows you pay up to 30 percent of your foreign exchange earnings just in debt servicing and that you have a population of close to 90 million people and infrastructure and social facilities that require attention and repair, they begin to wonder.

Beyond that, however, people see Nigeria as a country with an immense market potential, endowed with considerable resources and skilled manpower.

Will you ever get debt forgiveness?
Let's say debt management, as forgiveness is patronising. I don't know – I hope we do.

What are the credentials of the current Oil Minister, Chief Don Etiebet?
He's very well known in the country; his older brother was Senator in the Second Republic. He was very active in the business, computer and data services.

But not in oil?
Well, he has supplied computer hardware and software to many of the oil companies but, importantly, when he graduated from Imperial College, London and returned to Nigeria he worked as a geologist for one of the oil companies for a number of years.

Do you think OPEC will allow Nigeria to increase its quota to 2.5m barrels per day?
We are hoping to get 2.5 some time this year, but we will remain faithful to our OPEC quota because we are convinced it is the right thing to do.

Is privatisation or perhaps commercialisation on the cards for the NNPC?
It would be difficult to privatise a company like the NNPC – it's the goose that lays the golden egg, earning 93 percent of foreign exchange, and the government will not sell up. But I can see commercialisation as a possibility. Where you have a state-owned company like ENI or Elf or Total (until the current moves in France), running strictly as a private entity and at the end of the year simply paying dividends to the government, I can see that being the mode the NNPC will take.

What does the future hold for the NNPC and the Nigerian economy?
The NNPC is the wheel of the Nigerian economy – the future can only be bright. For the Nigerian economy in general, the potential is great. But we are at a crossroads; if we take the wrong turn, things will be terrible and catastrophic; if we take the right turn, we can only get to the top. There are going to be crucial factors - political stability, rationalisation of resources and the creation of enabling conditions in Nigeria. We need to develop resources that are abundant and available, but at the moment are being neglected.

'If we take the wrong turn, things will be terrible and catastrophic; if we take the right turn, we can only get to the top'

The world must treat Nigeria kindly. We could help all the other African countries – with the size of our market comes the potential for a continental common market centring on the Nigerian productive capacity and developing the local economics of the continent. The potential is so great but if the world does not understand this, Nigeria will founder and most of the other African countries will do so before us. The proper management of the Nigerian debt by creditors will go a long way towards solving these problems. You will then create a situation, believe me, where in no time the Nigerian economy will become the vanguard for development of the continent.

The world must not see personalities as the issue but begin to see Nigeria as a global entity. Good people will now be encouraged to go into leadership in Nigeria. Painfully it has not always been so because people have become so disaffected with the political situation that very good people have not shown interest. But if you create enabling conditions, good people will want to come in. These enabling conditions must be put in place – then the sky will be our limit. ■

After this interview took place, the interim government dissolved the boards of the NNPC. The aim was to remove non-executive directors appointed by ex-President Babangida. As *Petroleum Review* went to press there was no news as to how this would affect the structure of the London office.

'Algeria needs investment now – particularly in the energy field'

By John Roberts

In the midst of political and financial turmoil, Algeria is pressing ahead with ambitious plans to raise oil and gas output. The emphasis will continue to be on free market policies ensuring a significant role for international companies. In an interview with Petroleum Review, the Deputy Director General of Sonatrach, the state oil and gas company, set out Algeria's plans for the next few years. Algerian oil and gas production is currently running at around the equivalent of two million barrels a day. Of this, some 780,000 barrels a day (b/d) is crude oil, 500,000 b/d is condensate, and the balance is gas.

According to Sonatrach's Mohammad Rafaa Bababghayou, oil output should rise over the next three years to around 1.0 million b/d as a result of the first stage in a major expansion programme. After that, the aim is to take output to 1.2 million b/d.

'We hope to reach this target through enhanced oil recovery, and new oil discoveries, which are expected in the coming years as a result of the current effort by Sonatrach and its partners,' Mr Bababghayou told Petroleum Review. In addition to this, condensate output should rise over the next four years from a current level of around 500,000 b/d to around 600,000 b/d.

'Increased energy export earnings are vitally needed'

Such increases will essentially go to the domestic market. According to Algeria's official medium-term economic forecast, published in April, oil exports are slated to increase only marginally from 285,780 b/d in 1992 to 288,880 b/d in 1996, while condensate exports are actually set to fall from 407,750 b/d to 404,100 in 1996. However, 1997 should see the culmination of work on expanding condensate output, with exports surging to an estimated 440,960 b/d.

Mr Bababghayou, who toured Britain in September as part of an international oilmen's visit arranged by the Department of Trade and Industry, was enthusiastic about the way in which Algeria was revamping its oil prospects through increased foreign investment. 'There's been a big change now. More than 20 international companies have come in over the last two years. We now have 22 production sharing contracts signed and 19 foreign oil companies as operators. We are also engaged in a joint venture with Libya for exploration in one area. This is a new province which is opening up and which is now delivering discoveries – Ghadames, a triassic basin area in the Eastern Erg.

On the gas front, Mr Bababghayou says, Algeria's current production of 4.5 million tons per year (mt/y) is to be raised to 6.0 mt/y by 1996 and the following year to 8.0 mt/y. For gas, he said, 'We plan to reach the level of 60 billion cubic metres (bcm) a year exported by 1996 – although the expansion of capacity of the sub-Mediterranean pipeline and a revamping of the existing LNG plant and by construction of the new pipeline through Morocco, to Spain.'

Refining operations are also being expanded. 'The new refining capacity will be for condensate and crude. Instead of exporting condensate as such, at least part of the increase will be refined, and, if economically interesting, exported.' He added: 'We have refining capacity which covers two-thirds of production. We have 20.3 mt/y which are refined to feed the local market. The remainder goes for export'.

Indeed it does. Last year, Algeria exported 303,990 b/d in refined products, but here the problem is that capacity is not keeping pace with increased output of crude oil and condensate. In 1996, the expectation is that refined product export volumes will be down to 277,000 b/d.

Bright gas prospects

Prospects on the gas side are much brighter. At present, Algeria exports some 20 bcm of LNG and around 14 bcm of pipeline gas each year. The work in hand, says Mr Bababghayou, should take both LNG and pipeline gas exports up to 30 bcm apiece by 1996. This should secure a considerable increase in Algeria's foreign exchange earnings.

Overall, according to the medium-term forecast, Algeria earned a total of some $11 billion in hydrocarbons exports in 1992. If the government's expectations of prices prove accurate, then it can look forward to moderate declines in income in 1993 and 1994

before a gas-induced recovery to over $12 billion in 1995 and a welcome surge to $14 billion in 1996 and then to $15 billion the following year.

This interview took place against a background of considerable expansion in the Algerian energy industry – and of continued severe political and financial constraints. It is to overcome these constraints that Algeria needs investment now, particularly in the energy field which is still its best prospect if its modernising rulers are to revive the economy, promote broad-based economic development and thus combat the impact of Islamic fundamentalism.

Financial and...

Increased energy export earnings are vitally needed. Algeria has run up some $26 billion in foreign debt and faces an imminent need to reschedule this. For essentially political reasons, it has rejected doing this in the past but the new Finance Minister, Mourad Benhachenhou, who was appointed to the job on 4 September, strongly favours rescheduling.

Just before taking office, he summed up Algeria's financial dilemma by stating that 'Rescheduling becomes urgent, of little cost, if you compare it to the alternative of total economic collapse threatening our country if the self-imposed policy of strangulation continues.'

...political constraints

It is not just to pay its external creditors that Algeria needs a sharp increase in export earnings. The political situation remains on a knife edge. The Islamic fundamentalist parties which so nearly came to power in the January 1992 elections – before the Algerian establishment stepped in to appoint a reformist technocratic administration – has been driven underground but is still active and popular. The government needs to show that economic reform can yield positive benefits in terms of jobs and pay packets. But the high cost of debt repayments and the low level of energy prices means that it continues to face an uphill struggle.

'Rescheduling becomes urgent'

All this has an intimate bearing on energy development. Former Oil Minister Nordine Ait-Laoussine has observed that the challenge Algeria faces in mobilising its resources is neither reserves nor markets, but finance and technology. 'He added: 'With the severe financial crisis the country is facing, it is clear that if Algeria is going to be able to meet the growth in demand for natural gas, it must look to foreign investors to support the expansion of its activities.'

In the energy field, the government's ability to boost the economy and increase export earnings will depend on progress through joint ventures with foreign companies; expansion of LPG exports; and expansion of the original Mediterranean Gas Pipeline to Italy together with progress on building the new Western Gas Pipeline.

Although Sonatrach's income last year fell to $10.9 billion, as price falls cancelled out increased export volumes, Director-General Abelhaq Bouhafa announced earlier this year the state energy giant was still allocating $2.7 billion this year to development spending.

Oil sector activity

After the steady buildup of foreign company interest in Algeria in the early 1990s, this year has witnessed relatively little activity in terms of fresh oil exploration contracts. In early 1993, E & P contracts were agreed with BP and Germany's Veba, and negotiations were held with Exxon. However, in June, Sonatrach opened up nine new blocks totalling 38,900 square kilometres on a production sharing basis with a view to securing applications by 20 October and the signing of contracts before the end of the year.

Of equal interest is the fact that Algeria is expected to award its first enhanced oil recovery (EOR) contract to the foreign company before the end of the year. As far back as November 1992, Sonatrach invited bids for enhanced production from eight oilfields as well as two established gasfields. The aim was to raise output by around 200,000 b/d but investment costs projected from bids made on eight fields were quite high at $3.7-4.2 billion. One reason for the delay appears to have been the requirement laid down by former Algerian Prime Minister Belaid Abdessalem for large signature bonuses on EOR contracts.

One of the companies looking for EOR work was Petrocanada which in May signed a 10 year E & P agreement with Sonatrach covering an 8,195 square kilometre region at Tinrhert in the southeast. This is in the heart of the Illizi region which Mr Bababghayou has previously described as 'one of the most promising in the world.' Repsol Exploration Argella has found oil in the region at two of the six wells it is committed to drilling over a six-year period. The US Anadarko Corporation has also struck oil in the region. Companies seeking EOR work include groups headed by Total, Arco and AGIP.

'Western governments and oil companies face a dilemma'

At the end of July, Sonatrach awarded a $272 million contract to a Japanese consortium to build two LPG plants at Hassi Messaoud capable of producing 1.5 mt/y of LPG. Existing capacity at Hassi Mesaoud is put at 1.0 mt/y. The new plants should be operational by the start of 1997. In addition, the Mitsubishi group is expanding the gas treatment plant at Alrar West near the Libyan border to secure an increase in LPG output. This project also included increasing production of condensates.

In June, Turkey agreed to pruchase 2.0 mt/y of Algerian LPG over a five-year period starting in July. This is additional to existing 2 bcm/y supplies of LNG to Turkey.

Overall, as former Oil Minister Nordine Ait-Laoussina commented earlier this year, 'As a result of the sales contracts entered into recently, the country is virtually sold out. It is, indeed, close to the point of having committed as much gas as it can prudently contract with the existing and planned infrastructure.' This makes the construction of the new Western pipeline, and the expansion of the Trans-Med line, all the more important.

The Western pipeline

Algeria's ability to secure an increase in pipeline gas exports is not in doubt. By the end of 1995, the capacity of the Trans-Med gasline will have been increased from 1.5 to 2.5 bcm, with scope for a further increase to 3.0 bcm. The same year should also see the completion of a much bigger project, the Western Gas Pipeline to Morocco, Spain and Portugal. On 31 July, Sonatrach awarded Bechtel a

$305 million contract to build the Algerian section of the new $2.5 billion line, which is intended to carry an initial 7.2 bcm/y, rising eventually to 18.5 bcm/y.

On 13 May, Morocco held a ground-breaking ceremony for construction of the first two compressor stations in Morocco. Spain has agreed to purchase 6 bcm/y from October 1995 onwards and Morocco is expected to take a further one billion. On 1 July, Portugal agreed to purchase 2.5 bcm/y from the end of 1996 onwards. This will require construction of a spur to the main Western gas pipeline from Cordoba to Badajoa and thence into Portugal. Algeria has already secured an ECU2 million ($235.5 million) loan from the European Investment Bank which is also making arrangement to help fund the Moroccan section.

Although these loans have an obvious economic intent, they are also distinctly political. They are being made under the Community's 'horizontal financial cooperation' agreements with Mediterranean countries outside the EC. The purpose of such funding is, in practice, to boost development levels in Europe's poorer neighbour in order to reduce the risks of economic and social crises in those countries that might spill over into Europe in the form of increased legal or illegal immigration and racial tensions.

Development of Algeria's energy industries and exports is considered vital in this regard. Considerable foreign funding has been pledged specifically for the energy sector. Japan's Eximbank, together with Japanese commercial banks, have indicated they are prepared to provide as much as $900 million in financing for Sonatrach activities. Likewise Italy's SACE export credit agency in July approved $435 million in loans and loan guarantees – smaller than was once expected but a welcome relief at a time when Italy's external investments are under close scrutiny because of the governmental crisis in Rome, and in the wake of corruption allegations concerning the Italian end of the Trans-Med pipeline expansion project.

So far as general aid is concerned, France has agreed to provide$1.07 billion in aid and trade credits for 1993 alone, while Canada is providing $118 millon to the public sector on top of a current $140 million line of credit open to Sonatrach.

Algeria remains a crucial arena. The West wants to see Algeria develop successfully, fearing the implications of an Islamic fundamentalist takeover. Boosting energy exports are crucial to this but with the West no longer relying so much on official development aid, the Algerian authorities, in order to secure the private sector development required to ensure long-term development, have had to abandon their revolutionary socialist traditions of state control.

Horns of a dilemma

Western governments and oil companies face a dilemma regarding Algeria. There is a consensus that Algeria requires substantial investment if economic development is to reduce the threat posed by Islamic fundamentalism. But while private sector investment, particularly in the energy industry, remains vital for this, there is no denying that the continuing threat posed by Islamic fundamentalism makes it politically problematic for private sector investment. Matters will not have been helped Algeria's medium-term economic forecast which indicates that it will not be until 1995 at the earliest that conditions really start to improve for ordinary Algerians. Moreover, the forecast was based on a premise that oil prices in 1993 and 1994 would be substantially higher than they have been in recent months.

'The modernisers in Algeria remain locked in a race against time'

The modernisers in Algeria remain locked in a race against time but no-one yet knows whether, or when, they will cross the winning line. ■

FORTHCOMING EVENTS

October

3rd-6th
Houston: 1993 SPE Annual Technical Conference and Exhibition – 'Oil and Gas Strategies in the 21st Century'. Details: SPE Meeting and Exhibits Dept., PO Box 833836, Richardson, TX 75083-3836 USA.
Tel: (214) 952 9393.
Fax: (214) 952 9435.

4th-5th
London: 'Regulation & Marketing in the UK Gas Industry'. Details: AIC Conferences, Nestor House, Playhouse Yard, London EC4V 5EX.
Tel: (071) 779 8848.
Fax: (071) 779 8663.

4th-5th
London: 'Achieving Best Practice in Leak Detection & Prevention in Underground Storage Tanks & pipes'. Details: IIR Ltd., Industrial Division, 28th Floor, Centre Point, 103 New Oxford Street, London WC1A 1DD.
Tel: (071) 412 0141.
Fax: (071) 412 0145.

4th-5th
London: 'Inside Saudi Arabia: Society, Economy & Defence'. Details: The Conference Unit, Chatham House, 10 St James's Square, London SW1Y 4LE.
Tel: (071) 957 5700.
Fax: (071) 957 5710.

6th
Aberdeen: 'Subsea Support Vessels for the 1990s'. Details: Society for Underwater Technology, PSTI House, Exploration Drive, Offshore Technology Park, Bridge of Don, Aberdeen AB23 6GX.
Tel: (0224) 823637.
Fax: (0224) 820236.

7th-8th
London: 'Privatisation, Energy Utilities and the Law – The Impact of UK and International Law on the Development of the International Energy Market'. Details: Katie Furminger or Christine Rickards, IBC Legal Studies and Services Limited, Gilmoora House, 57-61 Mortimer Street, London W1N 7TD.
Tel: (071) 637 4383.
Fax: (071) 631 3214.

11th-12th
London: 'Opportunities for Trade and Investment in the Russian and CIS Gas Industry'. Details: The Conference Department, The Royal Institute of International Affairs, Chatham House, 10 St. James's Square, London SW1Y 4LE.
Tel: (071) 957 5700.
Fax: (071) 957 5710.

12th-16th
Brussels: 'THERMIE – Promotion of European Energy Technology'. Details: Commission of the European Communities, Directorate-General for Energy, THERMIE, 200 rue de la Loi. B-1049 Brussels.
Fax: 32-2-2950577.

12th-14th
Jakarta, Indonesia: '4th Annual Jakarta International Energy Conference'. Details: Conference Secretariat, Jalan Prof. Dr. Supomo 52, Jakarta 12870, Indonesia.
Tel: (62-21) 8304649.
Fax: (62-21) 8295032.

13th
Aberdeen: 'Limitations on Satellite Developments'. Details: Society for Underwater Technology, PSTI House, Exploration Drive, Offshore Technology Park, Bridge of Don, Aberdeen AB23 6GX.
Tel: (0224) 823637.
Fax: (0224) 820236.

13th-14th
Manchester: 'Engineers and Risk Issues', the Safety and Reliability Society Annual Conference.
Details: The Safety and Reliability Society, Clayton House, 59 Piccadilly, Manchester M1 2AQ.
Tel: (061) 228 7824.
Fax: (061) 236 6977.

13th-15th
Leipzig: 'Flowtech '93'.
Details: Mr Tony Blease, Intech Expo Ltd., PO Box 282, Watford, Herts. WD1 4EE.
Tel: (0923) 226210/245303.
Fax: (0923) 819761.

14th
London: 'Developments in Microbial Control in Metal-Working Fluids Conference'. Details: Caroline Little, The Institute of Petroleum.

14th-15th
London: 'The Future of Bills of Lading' – New Developments and Topical Issues. Details: Linda McKay, IBC Legal Studies and Services Limited, Gilmoora House, 57-61 Mortimer Street, London W1N 7TD.
Tel: (071) 637 4383.
Fax: (071) 631 3214.

14th-16th
Ho Chi Minh City, Vietnam: Vietnam's International Oil & Gas Exploration and Production Technology Trade Exhibition – 'Petro Vietnam '93'. Details: Peter Hebbourn, Reed Exhibition Companies, Oriel House, 26 The Quadrant, Richmond, Surrey, TW9 1DL.
Tel: (081) 940 3777.
Fax: (081) 332 1978.

15th
London: One-day Seminar – 'Flowmeter Selection'. Details: Short Course Administrator, Department of Fluid Engineering & Instrumentation, School of Mechanical Engineering, Cranfield Institute of Technology, Cranfield, Bedford MK43 0AL.
Tel: (0234) 754766.
Fax: (0234) 750728.

18th-19th
London: 'The Sixth Annual UKCS Oil and Gas Taxation Conference'. Details: Langham Oil Conferences Ltd., 37 Main Street, Queniborough, Leicester LE7 3DB.
Tel: (0664) 424776.
Fax: (0664) 424832.

19th
London: 'Gas Transmission in the 1990s: Examining the latest issues'. Details: Jane Giles, ICOM Group Conferences, 109 High Street, Dodworth, Barnsley, South Yorkshire S75 3RQ.
Tel & Fax: (0226) 299 072

19th
London: 'Economics of Refining Conference – What the Environment is Costing the European Refining Industry'. Details: Caroline Little, The Institute of Petroleum.

19th-21st
London: 'UK Corrosion '93 Asset Management'. Details: Jane Worman, IBC Technical Services Ltd., Gilmoora House, 57-61 Mortimer Street, London W1N 7TD.
Tel: (071) 637 4383.
Fax: (071) 631 3214.

20th
Birmingham: 'Effective Environmental Assessment'. Details: Jo Christmas, The Institute of Environmental Assessment, Fen Road, East Kirkby, Lincolnshire PE23 4DB.
Tel: 07903 613.
Fax: 07903 630.

FORTHCOMING EVENTS

21st
London: 'The Current Status of Horizontal Drilling and 'Horizontal' Subsea Trees'. Details: Society for Underwater Technology, PSTI House, Exploration Drive, Offshore Technology Park, Bridge of Don, Aberdeen AB23 6GX.
Tel: (0224) 823637.
Fax: (0224) 820236.

21st-22nd
London: 'A look at the Oil and Gas Potential of Seven New Republics: A Technical and Economic Perspective (and an update on Kazakhstan, Azerbaijan and Russia)'. Details: The University of Tulsa, Division of Continuing Engineering Education, 600 South College Avenue, Tulsa, OK 74104-3189 U.S.A.
Tel: (918) 631 2347.
Fax: (918) 631 2154.

25th-26th
London: 'Oil & Money – Shifting Oil Fortunes'. Details: Brenda Hagerty, International Herald Tribune, 63 Long Acre, London WC2E 9JH.
Tel: (071) 836 4802.
Fax: (071) 836 0717.

26th
London: 'The Carriage of Bulk Oil and Chemicals at Sea'. Details: Julie Morgan, IChemE Conference Section, 165-171 Railway Terrace, Rugby, Warwickshire CV21 3HQ.
Tel: (0788) 578214.
Fax: (0788) 577182.

26th-27th
London: 'Enhancing Safety & Quality through Focusing on the Human Factors in Shipping'. Details: Maria Coghlan, Customer Services Manager, IIR Ltd., Industrial Division, 28th Floor, Centre Point, 103 New Oxford Street, London WC1A 1DD.
Tel: (071) 412 0141.
Fax: (071) 412 0145.

26th-27th
London: 'After the Tunnel – The maritime and trade impact of the Cross-Channel link'. Details: Conference Division.
Tel: (071) 250 1500.
Fax: (071) 253 9907.

26th-27th
Aberdeen: 'Capitalise on Proven Strategies to Maximise Pump Performance & Reliability'. Details: IIR Ltd., Industrial Division, 28th Floor, Centre Point, 103 New Oxford Street, London WC1A 1DD.
Tel: (071) 412 0141.
Fax: (071) 412 0145.

27th
Aberdeen: 'Fire and Explosion – Current Research'. Details: The Safety and Reliability Society, North of Scotland Branch, Mr M P Turpin (UEOO/33), Shell UK Exploration & Production, 1 Altens Farm Road, Nigg, Aberdeen AB9 2HY.
Tel: (0224) 883 7982.
(Franc Sutcliffe)

28th-29th
Aberdeen: 'The Practicalities of Cost Effective Marginal Field Development'. Details: IIR Ltd., Industrial Division, 28th Floor, Centre Point, 103 New Oxford Street, London WC1A 1DD.
Tel: (071) 412 0141.
Fax: (071) 412 0145.

28th-29th
Stavanger: 'Floating Production Systems/Marginal Field Development' – Blueprints for the 90s. Details: The Conference Officer, OCS – Offshore Conference Services, 34-36 Apsley End Road, Shillington, Hitchin, Herts SG5 3LX.
Tel: (0462) 712049.
Fax: (0462) 711889

November

1st
London: '2nd Annual Negotiating Contracts in the 'New' UK Gas Industry'. Details: Helen Williamson, IBC Legal Studies and Services Limited, Gilmoora House, 57-61 Mortimer Street, London W1N 7TD.
Tel: (071) 637 4383.
Fax: (071) 631 3214.

2nd
London: 'Successful Contract Negotiations in the UK Electricity Industry' – Using the Law to your Advantage in the Competitive Market. Details: IBC Legal Studies and Services Limited, Gilmoora House, 57-61 Mortimer Street, London W1N 7TD.
Tel: (071) 637 4383.
Fax: (071) 631 3214.

2nd-3rd
London: 'Oil and Gas Agreements'. Details: Langham Oil Conferences Ltd., 37 Main Street, Queniborough, Leicester LE7 3DB.
Tel: (0664) 424776.
Fax: (0664) 424832.

2nd-4th
London: 'NAV 93' – The Tenth Annual Conference of the Royal Institute of Navigation. Details: Royal Institute of Navigation, 1 Kensington Gore, London SW7 2AT.
Tel: (071) 589 5021.
Fax: (071) 823 8671.

2nd-4th
Aberdeen: 'Subtech '93'. Details: SUT, PSTI House, Exploration Drive, Offshore Technology Park, Bridge of Don, Aberdeen AB23 8GX.
Tel: (0224) 823637.
Fax: (0224) 820236.

4th
London: 'New Developments in Tank Calibration and Meter Proving'. Details: Caroline Little, The Institute of Petroleum.

4th-5th
New Orleans: 'Offshore Applications of Dynamic Pile Measurements and Analysis' and 'Workshops on Wave Equation Analysis for Conductor and Jacket Pile Installations. Details: Jay Berger, 5398 Manhattan Circle, Suite 220, Boulder, Colorado 80303 U.S.A.
Tel: (303) 494 0702.
Fax: (303) 494 5027.

4th-5th
London: 'Oil Pollution – Claims, Liability & Environmental Concerns'. Details: Athina Peters, IBC Legal Studies and Services Ltd., Gilmoora House, 57-61 Mortimer Street, London W1N 7TD.
Tel: (071) 637 4383.
Fax: (071) 631 3214.

10th
London: 'Best Practices for Improved Oil Recovery'. Details: Nadia Ellis, IBC Technical Services Ltd., Gilmoora House, 57-61 Mortimer Street, London W1N 7TD.
Tel: (071) 637 4383.
Fax: (071) 631 3214.

11th
London: 'The Information Centre of the 1990s – Changes, Challenges and Choices '. Details: Caroline Little, The Institute of Petroleum.

Trials and tribulations for Iranian gas

By Colin Barraclough

Iran's gas industry stands at a crossroads. The country's credit problems have pushed most foreign investment beyond reach, yet President Rafsanjani stands by his pledge to develop the gas industry's potential for export. With limited cash, it appears the government can only develop gas at the expense of oil, leaving President Rafsanjani with a tough decision – can he afford to modernise the gas industry when 90 percent of the country's export earnings come from oil?

'We are looking for more export markets, in addition to developing the local market,' says Reza Rostami Sani, director for international affairs at the National Iranian Gas Company (NIGC). 'Exports could be part of our increased foreign exchange earnings. Bear in mind that under the shah we exported 10 billion cubic metres each year. We'd like to do that again.'

President Rafsanjani committed himself to the development of the gas industry in his 1989 Five-Year Plan. The government authorised borrowing up to $3.2 billion to invest in the development of the Pars and Southern Pars fields (the latter jointly with Qatar).

Yet observers have waited in vain for a big boost in the industry's resources. Severe credit problems – Iran is well behind in servicing its multi-billion dollar debt to European and Japanese banks – that mushroomed over the last six months have forced an effective clampdown on investment projects throughout the industry. The development of new fields, and improvements to the efficiency of established infrastructure, have been largely put on hold.

The only practicable way under present conditions to increase available gas is to divert the 25 billion cubic metres (bcm) used by the oil company annually for re-injection. Iran's total production stands at 54 bcm a year, says the NIGC, less than half of which, 25.5 bcm, goes to power plants or consumers in industry and homes.

'The Iranians' re-injection needs are so astronomical,' says Harold Burmeister, senior operations officer at the World Bank. 'At some point, they will have to decide whether to take it away from the oil company and use it for export. If so, their oil production will go down. The Iranians are already reducing their output.'

Export potential

In theory, Iran's gas reserves, at 20 trillion cubic metres the second largest in the world, are so great that the country should have enough gas to export and re-inject. Yet a significant increase in production would require huge investment of a kind that has slipped beyond Iran's reach for the foreseeable future.

To take Iran's gas to Europe, furthermore, would cost hundreds of millions of dollars. 'To export to Europe, they'd need a huge pipeline through Turkey,' says Mr Burmeister. 'They could do LNG, but both options are capital-intensive. At the moment, this is just beyond the reach of the Iranians.'

To be fair, Tehran has begun to export small quantities of gas recently. In late 1992, the NIGC resumed the supply of natural gas to the former Soviet republic of Azerbaijan, negotiating a 10-year contract to supply 250 million cubic metres (mcm) a year directly to Baku. The deliveries are pumped via IGAT-1, a pre-revolutionary pipeline stretching from Tehran to Baku through Astara on the Caspian Sea coast. Annual payment is approximately $25 million worth of gasoil, which the Azeris ship to the ports of Now Shahr and Bandar-e Anzali on the Caspian coast. 'We treat that as a form of cash,' says Mr Sani.

Before the 1978 Iranian revolution, the Soviet Union had accounted for the bulk of some 10 bcm of Iranian exports each year. Even as late as 1990, Tehran negotiated a deal worth 3 bcm a year over 15 years with Moscow but the collapse of the Soviet Union and subsequent payment difficulties forced Moscow to break off the contract in March 1992.

Iran has also supplied Pakistan with small quantities of LPG during 1993 and officials expect a natural gas network connection with Armenia to be announced shortly.

Longer-term export plans, though, appear to be based on Western Europe and Ukraine. Ukraine consumes some 125 bcm of natural gas each year, 80 percent of which is imported, at present mostly from Russia. The republic also annually transits 90 bcm of Russian gas, while producing 60-65 million tonnes of steel of its own. Eager to tap into this market, the Iranians have set up a London-based joint company with Ukraine and Azerbaijan to search for ways to exploit each other's resources.

Political problems

As with most deals involving former Soviet republics, it is fraught with political difficulties. The NIGC is already dubious about Ukraine's ability to pay. Moreover, a pipeline would have to pass through Russia, necessitating tariff discussions

between Ukraine and Russia that most expect to become bogged down in political rivalry.

Even the Azeris are cautious on the joint initiative. Tariel Husseinov, president of the Azerbaijan state gas company, says the company has made little progress so far towards any pipeline proposal. He is more concerned with riding out the uncertainty surrounding Azerbaijan's five-year undeclared war with Armenia and the change of government in Baku sparked off by June's military uprising. Azerbaijan's uncertain political position and its status as a net gas importer – it imports some 3.6 bcm annually from Turkmenistan – ensures it will simply transit Iranian gas.

At the moment, though, Iran could not approach the quantities needed to supply Ukraine. Not only does Iran re-inject half its gas but its internal trunk pipeline system is undergoing major work.

IGAT-1 from Tehran to Baku no longer has the 10bcm/year capacity of a decade ago, says the NIGC. Within a year, IGAT-1 should be connected to the Seraks-Nekar pipeline, a 30 inch east-west line stretching from the Caspian Sea to near the border with Turkmenistan. The Turkmens want this to connect with their own network.

Furthermore, IGAT-2, the trunk line from Kangan on the Gulf to Tehran, is still under construction. A 56 inch north-south pipeline, the pipe's planned capacity is 28bcm a year. The Iranians had wanted it to join IGAT-1 in mid-1993, yet contractor Saipem is still constructing a 320-kilometre stretch between Isfahan and Sarajeh near Tehran.

Shortage of funds

Most problematic to Tehran at the moment, though, is the 3.5 bcm flare wasted every year. The environmental damage caused by flare prompted the World Bank into funding discussions to provide extra compression stations. Discussions broke down six months ago, however, leaving the Iranians searching independently for $1.2 billion. 'All our budgets are allocated at the moment,' says Mr Burmeister. 'The Iranians might find bilateral credit somewhere, but it'll be difficult to get financing.'

If Iran's funding problems last for some time – and several senior Western diplomats in Tehran believe they will – then President Rafsanjani will have to decide whether to move some of his gas away from re-injection – and suffer a drop in oil output – or postpone once again his move to non-oil exports. At a time when world oil prices are low, he will find the decision a difficult one. Yet given the pressure he is under on the economy from conservative clergy, and the August departure of his economics minister Mohsen Nourbakhsh, it seems likely that he will fall back on the safer alternative of muddling through with little structural change. ■

Taxes cloud Colombian oil industry future

By Maria Kielmas, Editor, Latoil

Oil companies in Colombia have been pressurising the government to cut the country's high level of petroleum taxation. The debate has gathered momentum just as government studies on future earnings from production of the Cusiana and Cupiagua oil fields forecast a 'bonanza' for the country. But the same studies have shown that the Cusiana/Cupiagua project is marginal at best for the private sector companies involved.

Eastern Cordillera hills of Colombia

Facing decreasing revenues from its traditional exports of coffee and bananas, coupled with increased military spending to meet the insurgency threat, the Colombian government, now in its last year of office, will find it difficult to concede to the companies' demands. Exploration has slowed down while new discoveries are indicating that the country is far more gas-prone than previously thought. Although the government is releasing exploration acreage previously reserved for the state oil company, Ecopetrol, to private bidders and is considering lowering taxation on small fields, the radical overhaul which the Colombian oil sector needs will have to wait until a new government is elected next year.

A two-day seminar in July in Bogota on the economic effects of Cusiana oil production was the trigger for a national debate on future Colombian oil earnings and how to manage them. Government officials say they want to plan to avoid the inflationary effects of a sudden influx of capital, as happened during the 1975-80 coffee boom. A government study presented at the seminar estimated that earnings from these fields will represent 0.5 percent of GDP in 1994 and rise to 5 percent of GDP in 1997. The figures were based on reserves estimates in Cusiana and Cupiagua of 2 to 2.2 billion barrels and production in 1997 rising to 600,000 b/d. An Ecopetrol study based on reserves of 1.5 billion barrels in the fields estimated that on the assumption of a US$17/barrel oil price, some US$4.4/barrel will go towards capital investment in the project; US$3.29/barrel towards operating costs; US$7.86/barrel towards the state in taxes and royalties as well as Ecopetrol's share and US$1.42/barrel in profits to the private sector partner companies. Some government officials made a great issue of the fact that over 85 percent of the Cusiana revenues will accrue to Colombia and thus be of great social benefit. The reaction from the private sector, in contrast, was a confirmation of their fears that the project was only marginal economically for the private companies and that if the country's oil industry was to have a real future, oil taxes must be cut.

Radical overhaul?

The high public and political profile

of the Cusiana project has become detrimental to a realistic discussion on its true economic value to all sides. To date, the debate has been dominated by Cusiana's publicity value to the companies and to the government, rather than on hard facts. One long-term value of the discovery has been to re-awaken industry interest in the sub-thrust zones of the Andes mountains along the length of the South American continent, though geologically, the best Cusiana analogues lie in Ecuador and in the northern half of Peru. But the discovery has not prompted a 'gold rush' of industry interest either in Colombia or the South American region as a whole. Although the insurgency threat and political manoeuvring by governments are cited as reasons for this reluctance, in Colombia's case the problem is money.

Overall, the exploration drilling around the Cusiana and Cupiagua fields has been successful in terms of discovering hydrocarbons but the costs show little sign of falling. The Volcanera-1 well drilling by Maxus Energy in its Recetor contract area, to the northwest of Cusiana, is reported to have cost US$30 million and took nearly one year to drill. The discovery was largely gas and condensate, something which has led industry specialists to believe that this area becomes more gas-prone to the north. The Cupiagua well discovered lighter oil than Cusiana, the Volcanera well is largely gas/condensate and the BP-operated Piedmonte blocks further north are expected to be largely gas-prone too, should any discovery be made following the completion of a planned three-well programme.

Oil well – Beunos Aires

But estimating the gas reserves in the fields has been the constant subject of disagreement among the Cusiana partners – BP, Total and Triton Energy and Ecopetrol. The main problems have been in the time to depth conversion and in determining the petrophysical characteristics of the reservoirs. Reserves in the principal Mirador formation have been the main bone of contention, a problem made even more difficult given the low porosities in this reservoir. Ecopetrol delayed some months in declaring commerciality on the Cusiana fields, say Colombian sources, because of disagreement over the reserves estimate. The state company's initial estimate for Cusiana was 700 million barrels and there have been suggestions that the reserves here will be revised downwards by the partners. The Cretaceous Guadelupe formation, below the Mirador, is regarded as a better reservoir but lying at around 20,000 feet, oil recovery is likely to be very problematical given the continuing tectonic activity here. Earth movement below ground causes even heavy duty casing to collapse under pressure. This has been an ongoing problem from the outset and will be expensive to solve.

The average capital expenditure required for the Cusiana project has been estimated at US$5.9 billion, most of which will be spent before 1997. But the size of this investment is not commensurate with the lifetime of the association contract governing the project and which expires in 2010. The original 28-year association contract was signed by Triton Energy in 1982. The period up to 2010 is insufficient to drain the fields if reserves of about 2 billion barrels are a reality. If the reserves turn out to be half this amount, it could be done, industry executives say, and could even be an imperative in view of the mechanical difficulties and earth movements which are plaguing the development. But whatever the volume of oil in the ground an extension to the contract will be a political and not a technical matter.

The current oil taxation debate in Colombia has united the private sector companies, both national and foreign, as never before. Throughout this century successive Colombian governments have managed to attract investment into the oil sector by playing off one private company against another or more specifically, US companies versus British and French ones. With no real private oil sector lobby in Colombia, the result has been the most punitive fiscal terms for oil investors in Latin America contrasting curiously with a Colombian business class which has always been the most dynamic in the region.

Anti-kidnap law

The private sector oil industry has failed to make its voice heard on other important matters. In September last year the government introduced the so-called anti-kidnap law, which prohibited the payment of ransom to kidnappers. Kidnapping of rich individuals and company executives has become a major source of income for the various rebel groups operating in Colombia, although the overwhelming majority of victims are Colombian nationals. In an attempt to curb this source of income for rebels and to demonstrate to a sceptical public that it is doing something to curb terrorist violence, the government caved in to a pressure group pushing for anti-kidnap legislation. The anti-kidnap law, loosely based on similar legislation in Italy, stipulates that any private individual proved to have paid a ransom for the release of a kidnap victim would have his assets seized and any company which has paid ransom will have its contracts with the government terminated. The law also cast doubts over the legality of kidnap and ransom insurance, without which few expatriate oil executives would consider living in the country.

The real result of the law, and one which its opponents including the oil industry predicted, has been an increase in extortion, for which payments are difficult to prove and even more difficult to trace. Oil companies were vehemently opposed to the law which would have a huge effect on the way they organised their security in Colombia, but were unable to gather a large enough lobby

to make a mark on the issue. This law has now been declared unconstitutional by the Colombian constitutional court but anti-kidnap legislation of some kind will not disappear, however counter-productive its effects.

Financial constraints

Oil companies now are clamouring for the government not only to reduce taxes but to cut back on the participation of Ecopetrol in oil projects. At present the state company has the option to back in for 50 percent of a development, on payment of past costs. This participation rises on a sliding scale to 70 percent for larger fields. The Cusiana project has stretched Ecopetrol's budget to the limit even though company president, Juan Maria Rendón says that Ecopetrol has never delayed an agreement with a private company because of financial constraints. But he does admit that another Cusiana discovery will be financially unsupportable by the state company.

The first step in easing up on regulation has come with the release of some exploration acreage formerly reserved for Ecopetrol and which will be the subject of a bidding round later this year. The private sector wants the government to dispose of all of Ecopetrol's acreage. Some announcement on a reduction in taxation for small fields is expected later this year too but an overhaul of the whole system has to await the result of a study Ecopetrol has commissioned from the United Nations Development Programme. The study aims to compare Colombia's fiscal terms with other countries and was contracted out, Rendón says, for the sake of objectivity.

Further demands by the private sector include a deregulation of gas prices, a decrease or the abolition of remittance taxes, the ability to suspend operations in rebel-dominated areas and to extend contract period for longer than the current 28 years. Gas price deregulation will have to come if the government is to attract investment into its nascent gas industry and ambitious gasification programme. National gas reserves are estimated at some 3.5 trillion cubic feet (tcf) in the northern coastal and 3 tcf in the Cusiana complex. An accumulation in the Lower Magdalena Basin jointly explored by Lasmo and Ecopetrol has discovered close to another 1 tcf, while more and larger gas discoveries are expected in the Andean foothills region. But with less than one year remaining of its term in office, the government of President Cesar Gaviria will soon become a lame duck and radical oil policy change will have to wait for the next administration. The two front runners are Ernesto Samper Pizano of the governing Liberal Party. He is a former Colombian ambassador to Spain and scion of one of the most influential families in the country. The other leading candidate is Andrés Pastrana of the new democratic Force, an offshoot of the opposition Conservative Party. He is a former mayor of Bogota and the son of former President Misael Pastrana. Mr Samper's views on the economy are protectionist and statist while Mr Pastrana is a free marketeer, although traditionally in Colombia the Conservative Party has been more nationalist about oil matters.

Political tightrope

But future decisions on oil taxation, which are bound to affect the Cusiana project too, have to be balanced against the population's expectations that an oil bonanza is on its way. These expectations have been fuelled largely by the government since popular reactions on the streets of Bogota to the idea of future oil wealth is that most of population will not notice any change. The Colombian economy faces a further problem from lower prices for its traditional exports of coffee and bananas, the latter due primarily to protectionist policies of the European Community. The small percentage of money coming into Colombia from the illegal drugs trade, estimated by the central bank as between US$700 million to US$1.5 billion annually, comes in the form of contraband goods. Crisis in the agricultural sector will have a more immediate political effect in terms of jobs and the insurgency situation. The only way the Colombian government can compensate for this will be through an increase in oil revenues but this means that its ability to decrease oil taxes will be curbed significantly. If the private oil sector's demand for lower oil taxes is to be met, the government will have to walk a political tightrope to get there. ■

Malaysia's big pipeline

Malaysia's pipeline plans are the biggest industrial development in the country's history. The latest stage of the national pipeline grid, South East Asia's longest pipeline project, includes approximately 467 kilometre (km) of 900 millimetre (36 in) diameter natural gas pipeline from Meru to Padang Besar and approximately 100 km of laterals ranging in size from 300 mm (12 in) to 600 mm (24 in). Several major meter stations are included in the system.

Invitations to pre-qualify were issued by the Peninsular Gas Utilisation Board (PGSB) in March 1993 and closed on 27 April 1993. The award of the pipeline contract is tentatively set for mid-1994.

In Peninsular Malaysia, a revolution in gas utilisation is occurring with the abundant gas reserves in offshore Terengganu being used as an energy source and feedstock for the growing petrochemical industry.

The Peninsula Gas Utilisation (PGU) Project has been undertaken in three stages by PGSB.

The first stage, costing more than $US202 million, comprised an offshore gathering system, a gas processing plant (GPP) at Kerteh and an LPG export terminal at Tanjung Sulong, Kemaman, which was completed in 1984. Gas is piped onshore to the GPP which extracts propane and butane components for both export and domestic consumption. The residual gas or lean gas is delivered to the Paka power plant for electricity generation for fuel for the Perwaja steel mill in Telok Kalong and to households.

The second stage, or PGU-II, cost some $US 920 million. System 1 involved the laying of a 730 km trans-peninsular pipeline to transport processed gas to power stations, industries and households along the west coast and south of the Peninsula. The pipeline starts from Telok Kalong in Terengganu and stretches down to Segamat from where it branches westward to Port Dickson and Port Klang, and southwards to Johor Bahru and Singapore.

System 2 involved the expansion of the GPP from the 250 million standard cubic feet per day (mmscf/d) to 750 mmscf/d production capacity through the construction of two more trains which are equipped with facilities to recover ethane, propane and butane to provide feedstock for the petrochemical plants. This system was completed in 1992. The export terminal was expanded to accommodate the higher propane and butane production from the GPP.

The third stage, PGU III, involves the extension of the pipeline to the north of the Peninsula from Port Klang to Prai on the west coast and from Kerteh to Kota Bharu on the east coast. Bids have just been invited for the 496 km pipeline. There will be laterals to Bukit Kayu Hitam in Kedah, Prai in Penang and Lamut in Perak.

Rosy future

When fully completed, the PGU project will bring about a huge expansion in gas consumption in the Peninsula and a dramatic change in Malaysia's energy usage pattern. By the year 2000, dependence on oil will have fallen from 62 percent in 1990 to 47 percent, while natural gas will have increased from 17 percent in 1990 to 31 percent.

An indigenous petrochemical industry will also develop to serve as the basis and foundation for the development of the domestic plastic industry.

Petronas Gas SDN BHD (PGSB), a wholly-owned subsidiary of Petronas, the state-owned petroleum company, is implementing the Peninsular Gas Utilisation Project – Stage III.

The PGU I and II projects now in operation consist of onshore gas processing plants at Kertih and a 900mm/750mm (36″/30″) natural gas transmission system between Kertih, Singapore and Port Klang with laterals serving several customers on the east, south and west coasts of Peninsular Malaysia. In addition, propane and butane are transported to the export terminal at Tanjung Sulong and the MTBE plant at Gabeng, Kuantan.

The PGU IIIA project extends from the tie-in to the PGU II system near Meru, Selangor to deliver natural gas to major consumers on the west coast of Peninsular Malaysia up to Padang Besar, Perlis.

The natural gas pipeline work includes approximately 467 km of 750 mm (36″) diameter natural gas pipeline from Meru to Padang Besar and approximately 100 km of laterals ranging in size from 300 mm (12″) to 600 mm (24″) diameter. Several major meter stations are included in the system.

A meter station contract award is tentatively planned for late 1994 with completion of all facilities by mid-1996. ■

William A Scholes

Gas to goldfields project in Western Australia

By William A Scholes

A new natural gas pipeline is planned from the North West Shelf port of Dampier to Kalgoorlie, a distance of 2,000 kilometres (km), at a cost of $A300-500 million. Premier Richard Court has invited private sector interest to submit proposals for the construction and operation of the pipeline which will bring gas to the goldfields area of Western Australia (WA). The extent of financial assistance and government support for the pipeline has not yet been detailed but Mr Court said that the government would take small quantities of energy in Kalgoorlie, the gold mining centre.

The State Energy Commission of WA (SECWA) has 56 megawatts (MW) of gas turbine capacity at Kalgoorli but it is fired on distillate. The eastern goldfields are supplied by a transmission line from the Muja power station in the southwest of the state, while most of the northeastern goldfields generate their own power privately. Some towns have subsidised SECWA power stations.

However, Mr Court pointed out that preliminary analysis suggested gas could be delivered into the goldfields at $A4.50 a gigajoule, cheaper than fuel oil at $A6.50 a gigajoule and distillate at $A8 a gigajoule.

Mr Court said construction of the pipeline could begin within two years. The government estimated future energy demand in the region could reach 300 MW and the gas requirements could be 46.5 terajoules a day. Lower priced natural gas could encourage the development of potential mining projects.

The $A450 million nickel project proposed by Western Mining Corp Holdings Ltd and Outokumpu Oy at Mt Keith could be a likely customer. The Dominion Mining Ltd's Yakabundie nickel project, sidelined by weak markets and Ashton Mining Ltd's proposed rare earths project at Mt Weld were other potential customers.

Devex Ltd, which operates the Tubridgi gas field south of Onslow, has looked at a pipeline to the east and a spokesman said it was technically feasible and could be financially viable.

Court's father, Sir Charles Court, when he was Premier of WA, took a bold gamble to bid and own a pipeline to bring gas from the NW Shelf to southern markets in WA more than a decade ago.

The decision to publicly own the $A1 billion pipeline helped underwrite the $A12 billion North West Shelf natural gas project and fuel industrial growth in the south-west of the state. It also imposed a heavy burden on SECWA and ultimately the state's taxpayers.

WA is well endowed with both mineral and energy resources, thereby providing an ideal basis for industrial development.

However, the bulk of the state's gas reserves, which represent around 80 percent of Australia's proven economic reserves, are located in the northwest of the state and far from the existing major demand centres.

The challenge is to bring gas to the goldfields in order to provide energy that is priced at an internationally competitive level and to stimulate investment in mining and value-added processing.

The pipeline project will be economically beneficial to the whole state, with suppliers throughout the state servicing the construction of the pipeline and the subsequent new industries. The mining industry in the Goldfields already generates a wide range of activity in the metropolitan area and the south-west of the state, including metal fabrication, chemical supplies, engineering and analytical services.

There is no doubt that the development of the Goldfields, and particularly the north-eastern area, has been constrained by both the lack of supply and high cost of energy. The existing 220 KV power line connecting Kalgoorlie to the south-west grid is becoming overloaded , with losses approaching an estimated 25 percent

Energy Demand (electrictiy MW)

	Location	Existing	Possible	Gas requirement (TJ/d)
Major prospects	Meekatharra	10	-	2.9
	Leinster	25	-	7.2
	Yakabindie	-	30	8.6
	Mt Keith	-	30	8.6
	Wiluna	5	-	1.4
	Leonara	10	-	2.9
	Mt Windarra	10	-	2.9
	Granny Smith	7	-	2
	Kalgoorlie	-	-	10+
	Sub Total			46.5
Potential laterals	Mt Magnet	10	-	2.9
	Mt Whaleback	30	-	8.6
	Marandoo	-	?	?

NB: Assumes 24 hour operations at 30 percent efficiency

during transmission of maximum energy loads. This contributes to the high cost of power to private consumers and the mining industry. The problem will become even more accentuated if a number of prospective developments get under way.

For projects remote from the grid there has been no alternative but to rely on expensive diesel power plants. Even projects in close proximity to the grid have opted for their own power plants. Other more marginal projects have not proceeded because of problems of energy cost and availability.

The proposed pipeline will provide gas for both power generation and process heat for mineral processing. It will serve both existing and prospective projects.

The pipeline will be operated as a 'common carrier' so that all parties will have fair and open access.

The government has given a commitment to expedite the approval process and to do so without compromising standards on protecting Aboriginal heritage and the environment.

It is estimated that the existing and potential energy demand in the region is in the order of 300 MW.

Work to this stage has indicated two options for the gas pipeline route. The final choice will depend largely upon which existing projects emerge as gas customers, as well as on an assessment of the future potential for new projects along each of the routes.

The two alternative pipeline routes are shown below. Route A provides better access to the mid-west area, while Route B ties in with a related proposal to bring gas to Port Hedland and to major iron ore projects within the Pilbarra before heading south to the Goldfields.

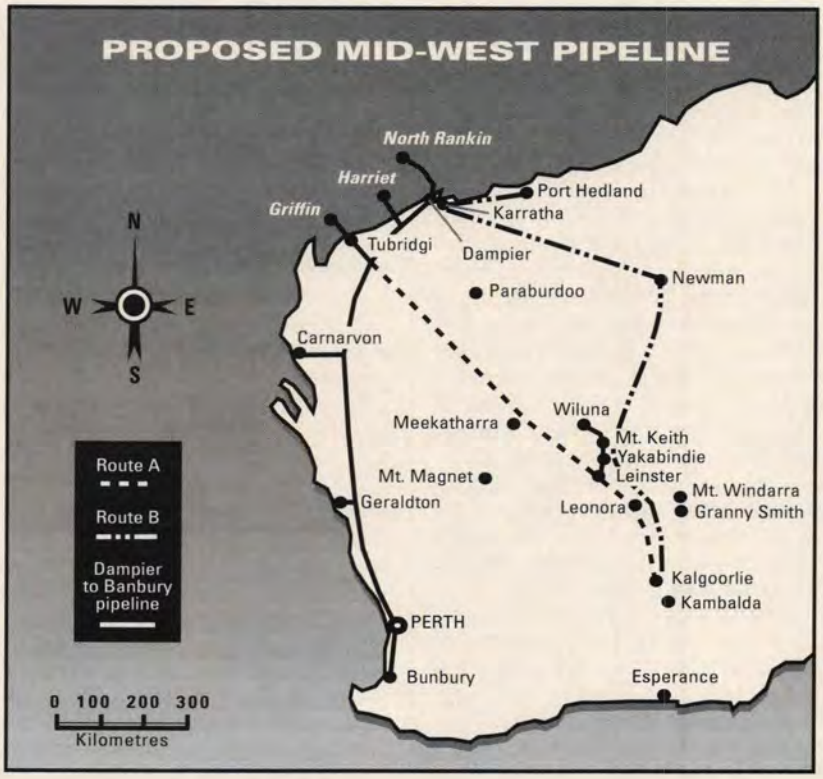
An important side benefit of this gas pipeline project is that it opens up the opportunity for competition in power generation and the development of an expanded Goldfields energy grid.

Already two leading companies are backing the government's proposed pipeline – Kalgoorlie Consolidated Gold Mines and Western Mining Corp (WMC).

The signing of WMC to take a big block of gas could overcome one of the major obstacles to the pipeline proposal. WMC could also have some upstream synergy with its Airlie oil and gas interest off the north-west coast of WA, although Managing Director Mr Hugh Morgan said this was not a prerequisite for WMC's involvement in the pipeline. The potential could be enhanced by a new gas and condensate discovery which is 30 percent owned by WMC.

Pipeline benefits

Delivered gas price	$4.50/GJ
Indicative alternative fuel prices: Fuel Oil	$6.50/GJ
Distillate	$8.00/GJ
Indicative savings: Meekatharra	$3.5m p.a.
Leinster	$9.0m p.a.
Mt Keith	$6.2m p.a. (c.f. fuel oil)



Plans for new Pilbara energy system

BHP Iron Ore plans to build a major energy system in the Pilbara consisting of a gas-fired power station at Port Hedland, supplied with gas via a pipeline 225 km long from Karratha to Port Hedland. A high voltage transmission line from Port Hedland to Newman, about 450 km, will be constructed to provide power for the Newman township and BHP Iron Ore's mining operations in the Newman area.

The project is a major step towards the development of future industry in Port Hedland, identified as one of the optimum sites for industrial development in WA. The establishment of a large supply of gas and availability of an easily-expanded power supply will mean that two of the substantial barriers to industry growth will be removed.

The WA government has indicated that this development will be an appropriate alternative to the remaining development obligations under the various Iron Ore Agreement Acts, to which BHP is a party. This under-taking will require ratification by State Parliament.

The power station will supply power for BHP Iron Ore's operations at Nelson Point, Finuncane Island, Yarrie and Newman. Additional capacity could be installed to meet existing and future industrial and domestic power demands at Port Hedland and Newman.

The $A300 million project is planned to start operations by end-1995. Its construction is conditional upon the negotiation of satisfactory gas prices and supplies, agreement with SECWA on the distribution of power in Port Hedland and a suitable State Agreement Act.

A preliminary survey of the routes for the pipeline and transmission line has been undertaken.The power station will consist of a number of simple cycle gas turbines with a combined capacity of 140 MW. ■

Financial incentives for the petroleum industry

By Tony Reid, Grants Consultants, Eurofi plc

Financial incentives may be in the form of grants, soft loans, fiscal concessions and contingent guarantees. They are made available by the European Communities, national governments and development agencies, generally to encourage investments in capital projects, research & development (R & D) and vocational training. This article concentrates on funding from the EC and the UK Government.

The history of government intervention in regional development has its roots in the 1930s Depression. The initiatives at that time were not in the form of direct funding to the private sector but rather for the creation of workshops and facilities. English Estates and the Highlands and Islands Development Board (now Highland Enterprise) both have their origins in the Special Areas Act (1934).

'Grants of up to 50 percent of eligible costs are available to companies investing in facilities such as loading and unloading equipment, buildings, rail infrastructure and haulage equipment'

Nowadays all forms of state aid are closely monitored by the EC Competition Directorate General (DG IV) who try to ensure that the Member States do not give unfair advantages to a particular national company or industrial sector.

Although the EC Commission makes funds available it is important to recognise that the principle of subsidiarity applies. This simply means that the Community does not generally support projects which would be more appropriately funded at national or even at regional level.

Capital incentives

The principal Department of Trade & Industry scheme for supporting capital projects is Regional Selective Assistance (RSA). This is a highly-discretionary grant which is closely linked to job creation or, at least, job safeguarding. Until 1984, funding for projects in designated areas was automatic irrespective of the job element. It was the award of large grants for the construction of the Sullem Voe oil terminal, and the Mossmoran petrochemical complex in Fife, neither of which created many permanent jobs, which led to the demise of the automatic grant scheme.

The capital intensive nature of most petroleum linked projects means that RSA is not generally an option for the industry. Furthermore, most refining and processing complexes are located in Non-Assisted Areas. The DTI are on the point of issuing a revised map which, for the first time, is likely to include some regions in the South-East with areas in Scotland and Wales, particularly, losing out.

There are countless other smaller capital grant schemes, perhaps the most relevant being the Rail Freight Facilities Grant. This has the objective of taking goods traffic off the roads. Grants of up to 50 percent of eligible costs are available to companies investing in facilities such as loading and unloading equipment, buildings, rail infrastructure and haulage equipment. Where it can be shown that there would be exceptional environmental benefits, the level of grant may be raised to 100 percent. One of the drawbacks at present is that transfer from motorways or non-urban dual-carriageways does not qualify for such grants. The Department of Transport have indicated that the scope of the grant will be broadened to embrace all types of roads as part of the forthcoming rail privatisation legislation.

'Where it can be shown that there would be exceptional environmental benefits, the level of grant may be raised to 100%'

It is only in very exceptional cases that the European Communities provide capital grants directly to the private sector. They do however provide soft loans. European Coal and Steel Community Conversion Loans, for example, can be an exceptionally attractive source of cheap finance for almost any job-creating capital project in designated coal and steel closure areas. Once again, because of the capital intensive nature of the petroleum sector, this scheme is perhaps of less relevance than it is to more labour-intensive industries. Another form of ECSC Loan incidently has the objective of

encouraging a switchover from oil to coal-firing.

The European Investment Bank (EIB) acts in many ways like a commercial bank. It raises finance on the international capital markets and offers project finance to the public and private sectors with a minimum of mark-up. Projects above about 25 million ECU are eligible provided that they are in line with overall Community objectives such as improved energy supply. In 1991, the Bank lent over 1.2 billion ECU to support the development of oil and natural gas deposits, and a further 140 million ECU for natural gas distribution. EIB loans are usually for up to 50% of project costs. Under the so-called Edinburgh facility this ceiling may be raised for improved infrastructure projects including transmission systems.

Research and development grants

The recent UK Government White Paper, 'Realising our Potential' and a subsequent announcement by the President of the Board of Trade underlines that there is going to be a shift in emphasis from direct R & D grants to technology transfer activity and that funding for promoting the concept of technology foresight will now be given priority. The bottom line is that R & D grants for companies employing more than 250 will be largely phased out. Table 1 summarises the current DTI schemes.

Of the LINK Programmes, the most relevant is the Hydrocarbon Reservoirs Programme which is administered by the Offshore Supplies Office and which covers the fundamental processes involved in exploiting oil and gas reservoirs. Another LINK Programme, New Catalysts and Catalytic Processes is unfortunately now closed for new applications. This applies also to Safety Critical Software Systems which is an ATP Programme of particular interest to the petroleum industry.

Contrary to popular belief, EUREKA is not an EC scheme. It is a framework for supporting near-market technological developments in the form of partnerships involving more than one Western European country. It is for the partners to apply to their respective national governments for funding. Five new hydrocarbon projects were approved in 1992, three of which are for developing new technologies for offshore exploitation. One concerns gas storage areas within lined rock caverns and another aims to improve computer modelling of seismic data. EUREKA is a very effective initiative and it is particularly unfortunate therefore that the DTI is cutting back on its support for British partners.

The Offshore Supplies Office scheme covers drilling technology, downhole operations, reservoir technologies, structures and facilities, pipelines and risers, underwater engineering and inspection maintenance and repair. It differs from all other schemes in that the grant is required to be paid back in the form of a levy on sales in the event of commercial exploitation.

Whereas DTI direct funding of industrial research is decreasing, the EC's budget continues to rise. The main system of support is by 'shared cost' research for which 50 percent grants are payable. A major difference from UK schemes is that there is no requirement to demonstrate financial need and the Commission makes no attempt to negotiate lower levels of grant. Because of the subsidiarity principle mentioned above, there is an absolute requirement for projects to involve partners from different Member States. All the programmes are heavily over-subscribed so it is advisable for several collaborating organisations to be involved as this is a source of extra 'brownie points' at the assessment stage.

'The bottom line is that R & D grants for companies employing more than 250 will be largely phased out'

The EC's Third Framework Programme is drawing to a close to be replaced from the beginning of 1994 by the Fourth Programme. This will not differ greatly from its predecessor. It will be divided into about 16 programmes, the topics for which will be specified in some detail. The petroleum sector does not figure highly in the Community's research policy. Within the Third Programme, BRITE/EURAM tends to be a catch-all for the basic technologies, one approved project for example concerned probabilistic methods for the design and operation of offshore structures.

The Non-Nuclear Energy (JOULE) Programmes includes such topics as:

- energy production from fossil fuels;
- reduction of CO2 emissions;
- security of supply of hydrocarbons;
- more effective and cleaner utilisation of hydrocarbons;
- analysis of strategies/modelling.

The Environment Programme also impinges on the petroleum sector.

For all of these programmes, the Commission announces 'calls for proposals' from time to time indicating specific deadlines, usually only about 12 weeks after publication. This doesn't give much time for applicants to get their act together so advance intelligence on the Commission's activities is essential.

Demonstration programmes

The concept behind demonstration projects is that organisations should be encouraged to employ newly-developed technologies in real-life situations and to demonstrate to a wider audience that the concepts work. The best known of the EC Demonstration programmes is THERMIE which, in a sense, is downstream of the JOULE research programme. The level of grant is 35 percent to 40 percent and it is not essential for the projects to be collaborative although this helps. THERMIE has, for example, helped to establish the EUROPA facility to calibrate instruments used to determine the potential of oil-or gas-bearing rock. It has also supported cost-effective methods for performing routine underwater maintenance operations. A more recent initiative is LIFE which, in effect, is the demonstration equivalent of the EC Environment research programme. It is very much concerned with recycling and with the use of new clean technologies.

Human development

Continuing Vocational Training (CVT) in the UK reflects the Government's free market policies, namely that this activity is primarily the responsibility of the employer. The Department of Employment sees its role as being to promote the necessary conditions for training to flourish. The roles of the Industry Training Organisations, the TECs and LECs fall outside the scope of this article.

The EC is becoming increasingly involved in human development activities. It has, for example, launched several 'flagship' programmes such as COMETT (technology training), ERASMUS (student and trainer

Table 1 – DTI R & D grant schemes

Title	*Restrictions*	*Ceiling/limit*
Regional Enterprise Grant (REG)	Less than 50 employees located in assisted areas.	50 percent up to max. of £25,000.
SMART	Less than 50 employees, anywhere.	**Stage 1:** 75 percent up to max. of £45,000. **Stage 2:** 50 percent up to max. of £60,000.
SPUR	Less than 500 employees, reducing to 250 in 1984.	30 percent up to max. of £150,000.
OSO R & D Development Programme	Any offshore-related research acitivity.	Up to 50 percent, but to be repaid if commercially exploited.
LINK	Minimum of 1 company and 1 university or other science-based partner. About 30 programmes.	Up to 50 percent of eligible costs No set ceiling but limitation imposed by overall programme budgets.
Advanced Technology Projects (ATP)	Minimum of 2 partners, at least 1 capable of commercial exploitation. About 20 programmes.	Up to 50 percent
EUREKA	Work to be in collaboration with another European organisation. No subject restrictions.	Up to 50 percent

mobility) and LINGUA (foreign language training). To give just one example, the Dundee Institute of Technology courses on management and decision-making in relation to technological hazards in the offshore and petrochemical industries is partly funded by COMETT. FORCE has the objective of developing training and qualifications programmes related to business needs and, in fact, the petroleum industry is one of the few sectors not to be involved in the 1991-1993 series of about 100 approved projects. A common thread running through most of these Community schemes is that they must have a European dimension.

The European Social Fund (ESF), one of the Structural Funds, remains the most important single source of EC funds for training. In 1992, about £800 million was allocated to the UK for all training programmes. Of this, about £380 million came from the ESF. For the most part the ESF is used to support the activities of the established training providers and it is only in exceptional circumstances that the funding is allocated to individual companies. This could change in 1994 if proposals to direct funds from the needs of the long-term unemployed to those in work are agreed.

Development aid

The EC supports a wide range of development activities. Within the Member States, the European Regional Development Fund (ERDF) is the main instrument of regional policy. The PHARE and TACIS Programmes have the objectives of helping Central and European Countries and the CIS, respectively. The European Development Fund supports a wide range of activities in the Third World. All of these funds can lead to opportunities to tender for the supply of goods, works or consultancy services.

The London-based European Bank for Reconstruction & Development (EBRD) has the objective of supporting privatisation in Central and Eastern Europe. It can operate as a merchant bank and, in this capacity, it has recently announced a loan of $40 million to a joint venture involving Anderman Smith Overseas Inc and a Russian company for exploiting the oil fields of Western Siberia.

Conclusions and advice

There are believed to be almost 500 separate grants schemes on offer although many of these are directed at small firms and run by local authorities and development organisations. Organisations should appraise carefully the incentive finance scene in relation to their medium-term plans. The guidelines and eligibility conditions of relevant schemes should be studied in detail. Where more than one scheme appears to be appropriate for a particular project, a choice should be made taking into account such factors as chances of success, timing, size of grant and other spin-off benefits.

Bearing in mind that all UK funding is discretionary, no formal commitment should be made to a project before the application is approved. The application itself and the negotiation of the funding package requires particular care and experience. This applies especially to those schemes where 'financial need' requires to be demonstrated. ■

. . . publications

Remediation Manual for Petroleum-Contaminated Sites. David L Russell (Technomic Publishing Company, Inc. 1992). ISBN 0-87762-876-9, pp 186, SFr 108.

Clean-up of petroleum-contaminated sites is an expensive process that may be costing more than is actually necessary.

This new book contains the information needed for cost and time effective petroleum-contaminated site cleanup.

Based on proven investigation into cleanup techniques, the material in this manual will provide engineers with a working knowledge of the field and a basis for making key decisions during the clean-up process.

Remedial Processes for Contaminated Land. Edited by Malcolm Pratt (Institution of Chemical Engineers, 1993). ISBN 0 85295 310 0. pp 140

The chapters in this book have been compiled from papers presented at a one-day symposium held by the Institution of Chemical Engineers in London on 31 March 1993. As a result there is inevitably some overlap between chapters but this generally serves to reinforce the subject matter. A good introduction to existing site remediation techniques and their potential applications.

Venezuela: The Political Economy of Oil. Juan Carlos Boué (Oxford University Press, 1993). ISBN 0-10-730012-X, pp 233, £29.50.

Venezuela occupies a central place in the world petroleum market. A founding member of OPEC, it remains the principal net exporter outside of the Gulf. In this book, Juan Carlos Boué gives a full and perceptive analysis of the Venezuelan oil industry within the context of the political economy of the country.

A section on the economy also brings out the tensions between economic and political objectives and tells of a significant missed opportunity in the management of oil wealth.

FT Guide to North Sea Operators and Participants. Meg Leitch (FT Business Enterprises Ltd., 1993). ISBN 1 85334 183 5, pp 478, £285.

This Guide combines two separate publications and for the first time includes parent companies, operators and participants.

The FT Guide to North Sea Operators has proved to be an indispensible reference tool for keeping track of who's who and who is doing what on the Northwest European Continental Shelf. As with previous editions of the separate titles, this new combined guide provides an alphabetical listing of all the companies holding licence interest on the Northwest European Continental Shelf.

Occasional Paper Nineteen: Indicators of Crude-Oil Production Costs: The Gulf Versus Non-Opec Sources. Thomas R Stauffer (International Research Center for Energy & Economic Development, 1993). ISBN 0-918714-36-2. pp 24, $10.

Occasional Paper Twenty: A New Source of Project Finance Captial through Energy Derivatives. Peter C Fusaro. (ICEED, 1993). ISBN 0-918714-37-0. pp 24, $10.

Occasional Paper Twenty-One: Exchange of Futures for Physicals: New Market Opportunities for North America. Jerry E Brown and J C Whorton Jr. (ICEED, 1993). ISBN 0-918714-38-9. pp 24, $10.

The ICEED's Occasional Papers and Reports are intended to address especially timely issues with either domestic and/or international content and implications. The opinions and views expressed in these publications are not necessarily those of the International Research Center for Energy and Economic Development.

Energy Watchers IV: Pacific Basin Demand and Downstream Activities and Energy, Economics and Environment. Dorothea H El Mallakh, Editor (ICEED, 1993). ISBN 0-918714-35-4. pp 204, $24.

Proceedings of the 13th International Conference and 19th International Energy Conference of the International Research Center for Energy and Economic Development (ICEED).

Oil Trade: Politics and Prospects. J E Hartshorn (Cambridge University Press, 1993). ISBN 0 521 33143 9. pp 306, £29.95.

This book gives a descriptive analysis of current influences upon the world oil trade. It is concerned with a central unchanged paradox of the industry – its tendency to maximise the production of high-cost rather than low-cost oil. It follows the rise and decay of OPEC monopoly power in the crude market, and shows how growth in the international oil business has almost ceased since the late 1970s, exploring reasons behind this slowdown – not all attributable to OPEC or the nationalisation of major oil companies.

The ENTEC Directory of Environmental Technology. Edited by J E G Larson (The Entec Press/Kogan Page Ltd, 1993). ISBN 0 7494 0853 7. pp 1,033.

Directory comprised of 20,000 companies offering 960 types of environmental technology product or service in 20 European countries. It covers pollution control equipment, monitoring devices and products associated with recycling and waste disposal. It also contains information on regulatory authorities and agencies, as well as the ever-growing band of environmental consultants.

Software Directory for the Offshore Industry. Compiled by Sharon J Clark. (The Marine Technology Directorate Limited. Registered Charity No. 29557, 1993). ISBN 1 870553 13 6. pp 414.

This directory provides a ready reference to PC software that has specific relevance to the offshore industry. Since the first edition was published, there have been many changes in the software market: new programs have arrived and old ones have been updated or integrated into new packages. Of the 950 programs listed, approximately half are in the directory for the first time.

Oil Exploration: Basin Analysis and Economics. Ian Lerche, Department of Geological Sciences, University of South Carolina. (Academic Press, Inc., 1992). ISBN 0-12-444175-0. pp 178, $65.

Oil Exploration presents quantitative procedures for assessing predictions of potential oil recovery (basin size, hydrocarbon content), and economic impact (exploration cost, production, transport, and refining). This is the first book to combine uncertainties in economics to provide quantitative risk assessments of oil accumulations. It will serve oil exploration personnel in industry, graduate students in economic geology and researchers in petroleum engineering.

The Biomarket Guide: Interpreting Molecular Fossils in Petroleum and Ancient Sediments. Kenneth E Peters and J Michael Moldowan. (Prentice Hall, Inc. 1993). ISBN 0-13-086752-7. pp 363, £59.90.

Comprehensive in scope, The Biomarket Guide covers saturated and aromatic compounds as well as porphyrins in one convenient source. In addition, the authors anticipate new developments in analytical instrumentation and methods and discuss how biomarkers may become important tools for understanding production and environmental problems in the future.

Institute News

New Collective Members

Black Sea Cargo Inspections Ltd
5 Ferdinandova Street, Bourgas 8000, Bulgaria.
IP Nominated Representative: Mr J T Cottell, Manager.

Black Sea Cargo Inspections Ltd offers expertise in the field of petroleum measurement and analysis, servicing oil companies, traders etc in the Black Sea area. The company also supplies measurement technology and equipment.

CW Energy Tax Consultants Ltd
Fleet House, 8-12 New Bridge Street, London EC4V 6AL.
IP Nominated Representative: Ms C Wheeler, F Inst Pet, Chairman.

CW Energy Tax Consultants, comprising individuals with over 80 years' combined experience in the oil and gas sector, specialises in the taxation of oil and gas companies. Particular expertise centres on financing arrangements, tariffing, structuring of JOAs, tax compliance, litigation support and tax systems.

Holman, Fenwick & Willan
Marlow House, Lloyds Avenue, London EC3N 3AL.
IP Nominated Representative: Mr Glenn Moore, Partner.

Holman, Fenwick & Willan is a major commercial law firm, specialising in maritime law and international trade. It offers advice on all aspects of oil transportation, trading and supply, especially on any admiralty, contractual, insurance or environmental claims. Amongst its clients in the industry are numerous shipowners, oil companies and various oil traders and brokers.

Motherwell Control Systems Limited
Neills Road, Bold, St Helen's, Merseyside WA9 4TN.
IP Nominated Representative: Mr Mark Price, Marketing Manager.

A subsidiary of Motherwell Bridge Holdings Limited, Motherwell Control Systems Limited specialises in the design, manufacture and support of Storage Tank Fittings, Land and Marine Contents Gauging Systems and Fuel Management Systems. Formerly Capper-Neill Controls Limited, formerly Neill-Varec Limited, MCS have a history of over 100 years' service to the petrochemical industry.

John Zink Co Ltd
77 Woodside Road, Amersham, Bucks, HP6 6AA.
IP Nominated Representative: Mr G M Dunk, Managing Director.

John Zink Co Ltd, a subsidiary of Koch Industries Inc, specialises in:

(1) Combustion engineering, supplying burners and flames to the refining, petrochemical and exploration markets; and
(2) The design & supply of gasoline vapour recovery systems and combustors.

Tramp Oil & Marine
Wells House, 15/17 Elmfield Road, Bromley, Kent, BR1 1LT.
IP Nominated Representative: Mr Jack Rudd.

Tramp Oil & Marine Limited, London, is one of the world's largest independent bunker traders, supplying in excess of 2.5 million tonnes of product a year in over 2,000 ports worldwide and is one of the few bunker suppliers to maintain its own technical department.

The company, a subsidiary of Tramp Group Ltd, maintains international representative offices in London, Aberdeen and Hull, Bremen, Limassol, Singapore and in the Canary Islands. The Group's network of overseas representatives covers such locations as Argentina, Brazil, India, Ivory Coast, Kenya, Malta, Mexico, Pakistan and Tanzania.

Besides the worldwide supply of bunkers, the company is also involved in the supply of marine lubricants, oil trading and the trading of base oils.

Benevolent Fund

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

Deaths

We regret to announce the deaths of the following members:-

	Born
A S Bridgwater, New Barnet, Herts	1907
J S Durham, Victoria, Australia	1914
C R Duthie, Edinburgh, Scotland	1920
E G Hancock, Moreton-in-Marsh, Gloucester	1909
G Purcell, Fratton, Portsmouth	1959
D H Tullis, Leigh-on-Sea, Essex	1911

Around the Branches

Aberdeen
12 October: 'Future of Helicopters (HUMS), Martin Kay.
9 November: 'Offshore Safety Regimes in Norway & Canada', Mr E C Brown.
26 November: Annual Dinner.
14 December: 'Policing the North Sea', Dr Ian Oliver, Chief Constable.

UK Deliveries into Consumption (tonnes)

Products	†July 1992	*July 1993	†Jan-July 1992	*Jan-July 1993	% Change
Naphtha/LDF	259,108.0	267,784.0	1,907,625.0	1,828,674.0	-4
ATF – Kerosene	672,455.0	706,915.0	3,859,705.0	3,986,017.0	3
Petrol	2,095,797.0	2,018,172.0	13,917,647.0	13,422,185.0	-4
of which unleaded	990,491.0	1,066,442.0	6,357,648.0	6,922,818.0	9
of which Super unleaded	127,049.0	125,228.0	799,186.0	827,813.0	4
Premium unleaded	863,442.0	941,214.0	5,558,462.0	6,095,005.0	10
Burning Oil	106,776.0	127,354.0	1,360,630.0	1,417,689.0	4
Derv Fuel	966,064.0	984,222.0	6,380,007.0	6,700,873.0	5
Gas/Diesel Oil	592,428.0	526,602.0	4,558,567.0	4,414,837.0	-3
Fuel Oil	937,450.0	890,828.0	6,629,049.0	6,155,061.0	-7
Lubricating Oil	68,285.0	64,958.0	452,595.0	448,492.0	-1
Other Products	590,836.0	640,806.0	4,002,850.0	4,180,890.0	4
Total above	**6,289,199.0**	**6,227,641.0**	**43,068,675.0**	**42,554,718.0**	**-1**
Refinery Consumption	509,473.0	538,807.0	3,485,306.0	3,631,527.0	4
Total all products	**6,798,672.0**	**6,766,448.0**	**46,553,981.0**	**46,186,245.0**	**-1**

*†Revised with adjustments *Preliminary*

Institute News

Edinburgh and SE Scotland
14 October: 'The Scottish Computer Industry', Mr J Perry, DEC. BP Oil Refinery, Grangemouth.
To be fixed (October): Young Students visit to BP Chemicals and BP Oil, Grangemouth.
23 November: Annual Student Lecture 'The Future of Oil Exploration', Mr C Gibson-Smith, BP Exploration, Heriot-Watt University.
9 December: 'Advances in Pipeline Design', Mr G T Harker, BP Engineering, Heriot-Watt University.

Essex
13 October: 'Essex County Fire and Rescue Service, and the Petro- Chemical Industry', by K M Hardingham of Essex Fire and Rescue Service.
10 November: Ladies Evening. 'Chocolate', Mrs C French of Thorntons Chocolates plc.

Humber
7 October: 'Furmanite Services to Industry'. Speaker: Mr Alan Petrie, Sales Manager, Furmanite Engineering Limited.
29 October: Annual Dinner and Dance. Beachcomber Club Humberston.
25 November: International Safety Rating System. Det Norske Veritas. Speaker to be confirmed.

Irish
6 October: Evening Meeting, IEI.
11 November: IP annual dinner.
25 November: Evening Meeting, IEI.

London
20 October: 'Managing London Underground Safety', D Brown, London Underground.
9 November: 'The Changing Requirements of the Petroleum Engineer', Ed Blair, President, Hamilton Oil Co. Ltd.

Malta
15 October: 'The E.C. Representative – How it Functions'.
9-11 November: 'Clean Seas 93'.
17 December: Christmas Function.

Midlands
13 October: 'The Structure and Aims of the Institute of Petroleum', by Mr Ian Ward – Director General of the Institute of Petroleum.
17 November: 'Manufacture of Lubricating Greases', Mr John Cliffe of Ironsides.

North-East
15 October: Social Dinner.
9 November: 'On the River Tees', speaker from the National Rivers Authority.

Northern
7 October: Golf Day, Dunham Forest.
12 October: 'Under Pressure Maintenance in the Oil Industry', by A Petrie – Furmanite.
17 November: 'Biodegradable Oils' by J Baggott – Shell Centre, Shell UK Ltd.
26 November: Annual Dinner Dance.

Shetland
12 October: 'British International Helicopters – Responding to Challenge', Capt A Veale, Base Manager Shetland.
5 November: Annual Dinner.

South Wales
21 October: 'New Bitumen Developments', speaker from BP Bitumen. BP Oil Llandarcy Refinery Limited.
16 November: 'Tanker Safety in UK Waters', Captain J Phillips – P & O Tankships. Gulf Oil Refinery, Milford.

Southern
September/October: Treasure Hunt around the New Forest.

Stanlow
6 October: 'The Alba Project in the North Sea'. By Dr. Alan Higgins.

West of Scotland
1994
10 March: Petroleum Dinner (change of date)

Yorkshire
12 October: 'Oil Industry Training Opportunities', guest speaker Mr J Dobson.

New Members

Mr K Abela, Owly Ville, Sir William Jervois Street, Naxxar, NXR 06 Malta
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Mr R G Barnett, 20 Lime Avenue, Upminster, Essex, RM14 2HY
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Mr E Booth, 23 Abbotsleigh Drive, Bramhall, Stockport, Cheshire, SK7 3PW
Mr A G Britt, BP Middle East, PO Box 92, Mina Al Fahal 116, Sultanate of Oman, Oman
Mr G Burns, 5 Dalmore Farm Cottages, Alness, Ross-shire, IV17 0UX
Mr J H W Chia, Credit Nomura Bank International plc, Nomura Hse., 1 St Martins-le-Grand, London, EC1A 4NP
Mr A L Douglas, Met.Office, Aberdeen Weather Centre, Seaforth Maritime Bldg., Lime St., Aberdeen, AB2 1BJ
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Mr D J Steer, 26 Leigh Rodd, Watford, Herts, WD1 5BJ
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Does information technology improve safety training?

By Georgina Slaven, Research Fellow, Offshore Management Research Group, The Robert Gordon University

Information technology (IT), an electronic means of information storage and retrieval, has revolutionised the office environment and is now making inroads into many business areas previously considered outside the grasp of IT applications. Just as computers are radically altering teaching methods in schools and universities, they are also making an increasing contribution to training methods in industry. But are these new IT applications better than a conventional instructor, and do they give value for money? These are some of the questions being considered by a research team at the Robert Gordon University, Aberdeen, which has been asked by the Offshore Safety Division to examine the application of information technology as a method of presenting safety training for offshore workers.

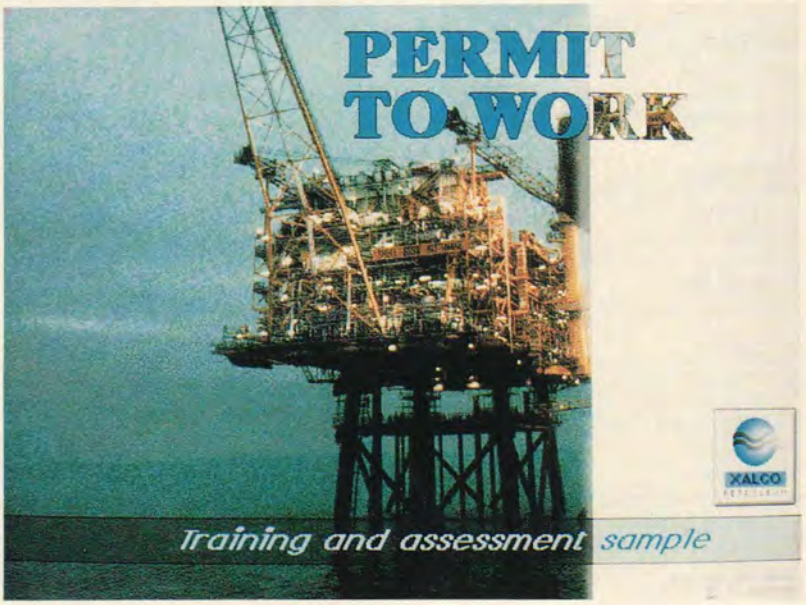
The project is being conducted in two phases:

1. An investigation of the current and likely future IT training products for offshore safety training.
2. A comparison of the effectiveness of the new and existing methods for trainees and the material presented.

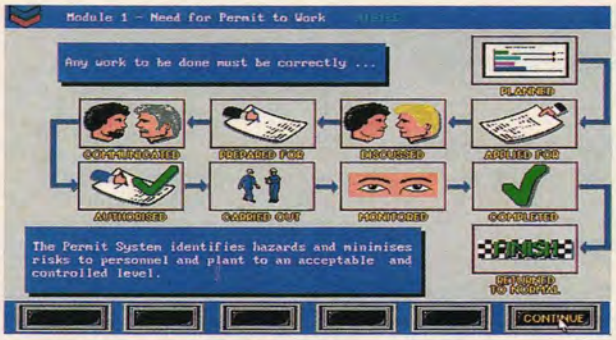
Initially, the project team interviewed 15 operating and drilling companies to identify the methods employed to present safety-related training. They established that IT was principally used within five operating companies to present Permit to Work training (PTW). As some companies contract out their training needs, the team also spoke to nine training providers. IT applications they provided included non-interactive laser disc training on personal safety equipment and interactive laser disc and computer-based training (CBT) packages on general safety, though the latter is not specifically aimed towards the offshore workforce.

The research team also spoke to 13 IT providers and identified three companies which have, or are developing, CBT products for PTW training. A summary of the services provided by each company is given on page 484.

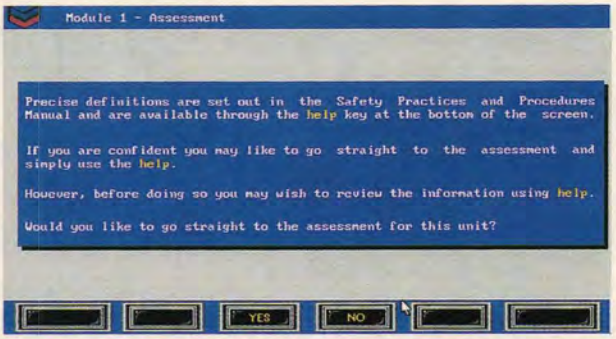
The training organisation, SPD Swan, have expertise in the development of competency-based CBT packages for offshore and onshore industries. They currently have CBT and assessment packages for PTW training installed in four offshore



Training package



Some of the training material from module 1 (introduction) element 1 (need for a permit to work).



The trainees are given the option of assessing themselves in the element or doing the training material before the assessment.

operating companies and are about to install CBT within a further two operating companies. Each package is designed to the individual client's specifications but can run on any IBM-compatible PC. The capability of each package varies but generally the interactive software presents information to the individual and subsequently a series of multiple choice/true or false type questions. The system has a facility to record whether each individual responds correctly, for competence audit purposes and performance review with the trainee. Other work includes competence assessment record-keeping and audit software.

Sanderson CBT is in the process of developing a CBT package for PTW, though a working demonstration version has yet to be completed. Although they do not currently have any clients for the package in the offshore industry, they are negotiating with a number of companies to provide a generic PTW training and assessment package, which could be modified to suit the individual needs of each client. They have also developed and sold an interactive computer-based learning (CBL) and assessment package on PTW, tailor-made for a large UK organisation. This is not currently available for general release.

Admiral Training is one of the largest UK IT and training services companies. They are currently developing a CBT package on PTW training for a North Sea operating company, which includes competence assessment. It can be loaded into any IBM-compatible PC, with 386 processor.

Another three companies were found to be developing simulation and virtual reality software to model buildings and installations. While this has potential applications for induction training, only one company has a fully functional demonstration package, at present used for training fire-fighters.

Keith Still (now with Colt International) has developed virtual reality software to simulate the behaviour of individuals escaping from a fire in a building. This has now been sold to an international company involved in fire, engineering and ventilation systems. The scenarios run in real-time, based on the work of psychologists who have studied actual human behaviour patterns while escaping from real fires (Canter, Sussex University). The software has not been developed specifically for the offshore oil industry but could have obvious applications in induction training and risk assessment.

The second organisation is working on simulation and virtual reality with respect to emergency evacuation offshore. They are exploring the possibility of transferring floor plans to 3D virtual reality walk-through graphics. They are not working with any industrial or offshore companies at present, though some organisations have expressed an interest in their ideas.

The third company works in the field of virtual reality producing authoring software. One of their customers (onshore engineering) is currently working on egress analysis, producing models of escape routes. This has obvious applications for the offshore industry, though demonstration software is not yet available.

Summary

This brief review of the IT applications currently in use and under development for offshore safety training has identified that IT is already making a contribution to the way training is presented to offshore workers. Whether these methods are an improvement over conventional means of instruction will be addressed by the second stage of the project. This is due for completion in the middle of next summer. Given the offshore industry's interest in the frontiers of new technology and the

financial investment required for CBT and virtual reality applications, readers will no doubt be keen to learn of the project's outcome. Some of the benefits claimed of CBT include:

1. Self-paced and can be done in slack periods when the worker is offshore.
2. No hotel or travelling costs.
3. Compared with the long-term costs of conventional training is very cost-effective.
4. Trainee can re-play any module of the course that he/she does not understand.
5. Provides a consistent, unbiased and auditable training presentation.
6. Offers flexibility of delivery location either at company offices onshore or offshore installations.
7. The programme can ensure trainees demonstrate an acceptable level of understanding in a given module before providing access to subsequent modules. ■

Useful definitions

VDU (Visual or Video Display Unit)
The screen monitor which displays the visual information from a computer.

PC (Personal Computer)

CD-ROM (Compact Disc-Read Only Memory)
An optical disc storing information (text and/or visual), which has a much greater storage capacity than conventional magnetic discs.

Multimedia
A system that combines moving video images, graphics, sound and still photographic images for presenting information or training materials. The amount of interactivity depends on the design of the courseware. The more sophisticated the software, the more interactive the package. (The following are examples of multimedia.)

CBL/CBT (Computer-Based Learning/CBT Computer-Based Training)
Systems that are built around an authoring 'language' which is the software that enables the lesson structure to be created and the lesson delivered to the student.

VR (Virtual Reality)
A three-dimensional computer model of a simulated interactive environment that is displayed in real time. The user's view of the environment is continuously calculated and updated, giving the individual control over his/her view of the environment.

Courseware
Training material presented on a VDU.

LNG fire-fighting foam

Angus Fire has won a £3 million export contract for the supply of its new Liquefied Natural Gas (LNG) Fixed Turbex System to Algeria's state-owned oil and gas company, Sonatrach.

One of the world's leading exporters of LNG, Sonatrach will install the system as part of a major modernisation and expansion programme at its liquefaction plant in Arzew/ Bethioua.

The system, which works by filling the bunded area with high-quality, high-expansion Expandol foam, suppresses flammable LNG vapours from storage spills or leaks. It complies with NFPA 11A and the technical specification issued by The Kellogg Company of Texas, the contractor appointed to upgrade the plant.

In the NFPA fire exposure test, says the manufacturer, the system's performance was unaffected even after exposure to temperatures of up to 1,000°C over a five minute period.

Developed by Angus Fire Research and Development Engineers, the system's special features are its ability to provide reliable operation even after being subjected for long periods to the searing heat of an LNG fire and its corrosion-resistance for withstanding the high saline, humidity and temperature conditions of the Algerian coast.

The hardware will be manufactured by Angus Fire in the United Kingdom, while the Expandol foam concentrate will be manufactured by SA Eau et Feu, the French company in the Angus Fire Group.

The Angus system heated to 1,000°C

New nut-splitting tools

'Like shelling peas' was the reaction of the plant manager at the Chemical Company in Texas after 1,000 seized nuts were removed using new tools from Hydra-Tight.

The tools provided the only safe method of removal, claims their manufacturer, and saved over 40 hours downtime during a 12-day shutdown.

A highly-flammable plastics additive used in the process system at the plant had leaked through the joints and around the studs to cause a serious fire hazard and prevented any form of arc-gouging or flame-cutting of the nuts.

The nuts had all been in place for between 15 and 20 years at operating temperatures ranging from 600°F to 800°F.

The Hydratight splitter utilises a powerful hydraulic cylinder to drive a patented cutting wedge into the flat of the nut. Designed for maximum usage and quick installation, the wedge has three cutting edges. Spring retraction of the hydraulic cylinder ensures a fast, effective cutting cycle without damage to the threads on the bolt or stud.

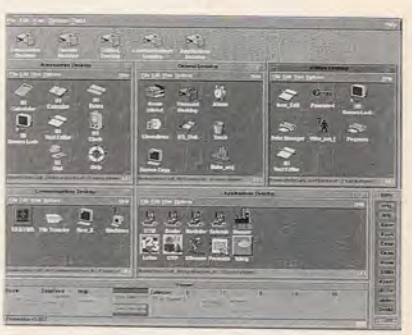
A compact hydraulic pump unit, capable of 20,000 psi (1360 BAR) and a high pressure hose are used to operate the tools, which will split nuts ranging in size from 1 3/4 inches to 5.38 inches AF in one minute or less.

To suit the needs of the Chemical Company, the manufacturer provided a package lease which included technical support training, eight hydraulic nut splitters, pumps and hoses.

Petroleum desktop

IBM is now supplying a standard Petroleum Desktop on its RISC System/6000 machines. Developed by Cambridge-based IXI, it is designed to provide a powerful graphical user environment customised especially for the oil and gas industry.

The desktop, designed originally for Shell Exploration and Production, can provide industry-specific 2D and 3D icons such as oil platforms and other exploration and production-specific symbols, to make it easy for non-technical users to access files and launch applications, communications, utilities and accessories. Shell has already deployed the desktop in over 20 of its international operating companies. Its aim is to 'reduce the time employees need to learn how to use computers and thereby increase their productivity and ability to take advantage of the Unix technology'.



Customised petroleum desktop

Heat tracing for BP Kinneil

More than 47 kilometres of Raychem heat tracing cable have been supplied by Electrothermal Ltd, of Aberdeen, as part of the massive BP Kinneil Terminal Expansion Project at Grangemouth.

Heat-traced dressed columns and processing units were constructed in module yards in Belgium and the United Kingdom and joined together on site in keeping with the project's modular build design.

BP's Kinneil terminal sits at the hub of Scotland's largest oil, gas and petrochemical production and processing system. The £300 million terminal expansion project will increase the terminal's processing capability from 600,000 to over one million b/d.

Electrothermal was awarded the £730,000 contract to design, supply and supervise the installation of the cable. A two-shift system was operated to meet a tight design deadline and over 1,000 trace heating isometrics were produced on an Auto-Cad system. A further 1,200 metres of pre-traced and insulated instrument tubing bundle were also installed.

The cables used were the BTV heater for frost protection of pipework, the XTV heater for medium temperature control and steam cleanable applications and the KTV heater for high temperature maintenance.

In all the Raychem self-regulating heating systems, when the surrounding temperature drops, numerous electrical paths are created in the polymer and electrical current passes through these gateways, thereby increasing the thermal output of the heater and maintaining the required temperature.

Monitoring wetstock levels

Accurate monitoring of wet stock levels and analysis of loss is an ongoing concern for all petrol forecourts. Analysis has shown that up to 20 percent of all sites have a wet stock reconciliation problem, claims Wetstock Products and Services.

Complying with the statutory HS(G)41 regulations can prove difficult for some forecourts but, as the penalty for non-compliance can be as severe as closure, it is vital that sites keep accurate records and solve any problems fast.

For many sites the cost of tank gauge or sophisticated inventory control systems is unaffordable. This means that in Britain there are 12,000 or so sites which are not fully automated.

So, at the majority of forecourts, staff have to fill in charts by hand and then go on to calculate the relevant percentages, averages and required data for the licensing authorities. This process can be time-consuming and the readings and the calculations are all liable to human error.

A new product, designed specifically to help forecourts comply with wet stock monitoring legislation, has been developed by forecourt equipment designer, Malcolm Dodd. His Wetstock Manager is a portable data capture unit paired with a small printer. All the necessary data, such as opening and closing pump and tank readings as well as deliveries, are entered directly into the handheld console. Then, a simple, prompted programme using the display and keyboard produces a range of printouts to comply with HS(G)41 regulations.

The product has been devised as a low-cost unit that can service between one and 16 tanks.

Low cost unit for monitoring wet stock levels

Underdeck scaffolding

Instant Offshore is launching a new, completely modular underdeck system designed to economically solve underdeck maintenance and repair problems.

The Instant Underdeck is based on an imaginative system using the Spandeck prefabricated aluminium walkway, along with a specifically-designed bracket and trolley which enables the system to cantilever over open space safely.

This system is lightweight and can withstand loading of up to 2KN/m2.

It provides longitudinal access beneath existing 'I' section beams and can be installed over existing fire-proofing. It can be cross-decked to provide spans of up to nine metres giving a 'secure, safe and uninterrupted access platform'.

Automatic emergency roll-call

Phillips Petroleum in Norway has ordered a Miris personnel-tracking system for 2,000 people, to be operative on Ekofisk by January 1994. The contract value is $2 million.

The system, supplied by the Norwegian firm, Miros, will provide 14 checkpoints or gates located on the bridges between the platforms. Each crew member will wear a necklace tag with an identifying code that is registered automatically whenever he or she passes a gate. Thus, claims the firm, a roll call can be completed in minutes.

Fully-automatic and hands-free, the system uses passive, no-contact, interference-proof tags. It is designed to identify a large number of individuals at the same time, even if they are running in groups past a gate in an emergency. The data is downloaded simultaneously to an onshore computer.

Aluminium accommodation

New accommodation units constructed exclusively in aluminium are available from Leirvik Sveis of Norway.

The use of aluminium has been made possible through the development of specialist extrusion technology that simplifies construction, thereby reducing costs while maintaining the same fire and safety requirements. Other advantages include a corrosion-resistant surface and favourable lifetime costs, as a result of lower maintenance costs.

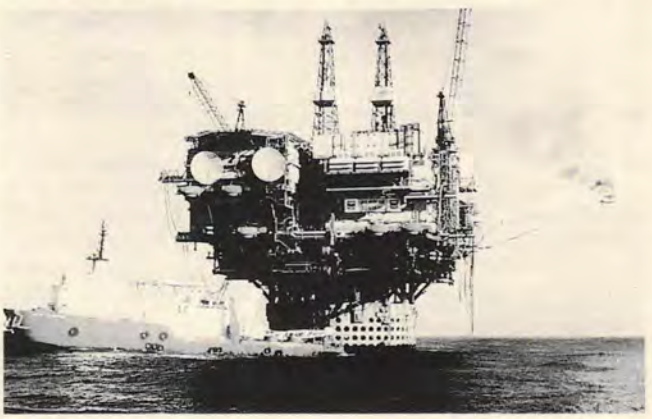
The first module of its kind and the largest aluminium structure ever constructed, says the firm, is the 5,200 square metre Snorre living quarters delivered in 1991. This was followed in 1992 by the delivery of an adjoining unit to the Statfjord C living quarters.

Extending life expectancy in the Gulf

Kopex's newest stainless steel conduit range has been specified for use on some of Aramco's in-shore oil rigs in the Gulf.

The extremely corrosive environmental conditions had been proving very expensive for Aramco. Relative humidity is at 98 percent most of the year and strong winds blow a constant stream of salt-laden sand. However, its new corrosion-resistant stainless steel conduit and nickel-plated brass fittings system has been predicted to add at least 10 years to the life expectancy of the electrical installations.

The firm's agent in Saudi Arabia, SESCO, will be responsible for supplying the conduit for a growing list of specifications throughout Aramco's 200 rigs.



Kopex stainless steel for Aramco's in-shore oil rigs in the Gulf

Upgraded video analyser

Launched in 1992, the Olympus IW-1 Industrial Video Analyser for remote visual inspection (RVI) image management offered users the facility to incorporate upgrades and additional functions through software. Now, those who selected the system will benefit from the new Version 2.0 software at no extra cost.

The anaylser now has a number of improved facilities. One is an advanced pipe measurement function, allowing automatic or manual set-up for measuring in almost any pipe.

Measurements can be made circumferentially or along the pipe surface – even protrusions and pit depth can now be measured accurately.

For rapid pipe inspections, a comparative measurement of protrusions can now be carried out during live inspections.

Other improved facilities include: better edge enhancement; a scope type selection list; a 3D graphics measurement system, capable of measuring overlapped items; and a communication function, specifically programmed for compatibility with the Microcom QX-4232 Bis+ modem.

Shared distribution service

Following delivery of a new fleet of 14 semi-trailers of a specialised design, Transfleet Services Ltd is offering a new, nationwide, shared distribution service to companies in the industrial and commercial sectors.

The hub of the service is a central distribution centre at Penkridge, Staffs, where consignments are pre-sorted and palletised before being delivered to controlled outbases in Weston-super-Mare, London, Kings Lynn, Shildon, and Stirlin g by means of overnight vehicles. At the outbase, a straightforward transfer of the consignment is made from the trunker vehicle to local delivery vehicles.

All the warehouse, administrative and driving staff are experienced in handling different products and all are Hazpak-trained.

The key benefits of this economical way of organising deliveries are that it provides: a complete audit trail of the delivery consignment with proof of delivery confirmation; immediate access to information regarding the status of individual deliveries; efficient vehicle scheduling; detailed monitoring of driver performance in both operation and service terms; and detailed analysis of distribution costs if required.

Named Rak-Pak I, the new Tidd Trailers' design allows maximum use to be made of available cubic space inside the trailer.

Rak-Pak I allows maximum use to be made of trailer space

Compact variable speed controller

A 12-pulse Electrospeed, Variable Speed Controller (VSC) is said to have set new standards in power capabilities from a compact package.

The system is currently undergoing electrical load tests at Centrilift's European Headquarters in Aberdeen before delivery to BP's Wytch Farm development, in Poole, Dorset.

With a 1,040 KVA power rating and a unit size of only 1,850 mm wide x 560 mm deep x 2350 mm high, this VSC is believed by the company to be the most powerful available for the footprint size. On site it will be used to drive Centrilift's 660 HP electric submersible pump (ESP) which has an 89-stage K15000 pumping assembly and a specially-formulated CL275 power supply cable – also manufactured by Centrilift.

Variable Speed Controllers are designed to enable the operator to achieve the best possible production from a particular pumping assembly. They have the added benefit of protecting the ESP from varying conditions and reducing the mechanical and electrical stresses seen during the starting period.

Mr William Milne, the firm's Area Engineer Europe, said: 'The contract presented a particular challenge.

'The entire system had to be tailor-made in terms of physical construction, communication and remote control for safe and efficient integration with BP's operating requirements at this location. Because the power supply comes directly from the National Grid, a 12-pulse VSC system has been specified. This reduces significantly electrical distortions reflecting back onto the incoming power supply.'

Mr William Milne of Centrilift inspects the 12-pulse VSC

Contacts

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Instant Zip-Up	*0952 825815*
Miros A/S	*+47 66 79 55 60*
Leirvik Sveis A/S	*+47 5 49 62 00*
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Olympus-KMI	*0702 616333*
Transfleet Services	*0785 715615*
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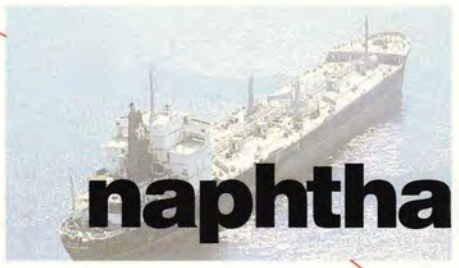
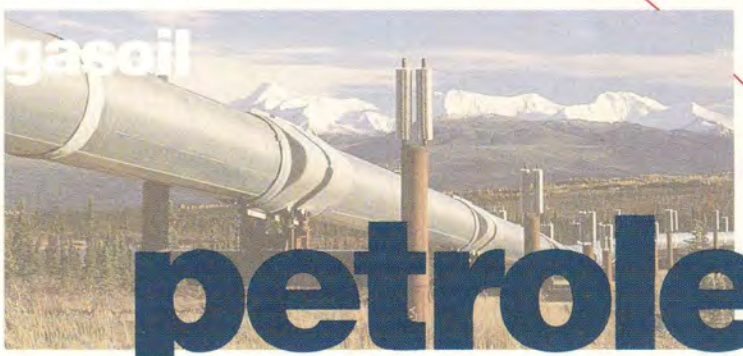
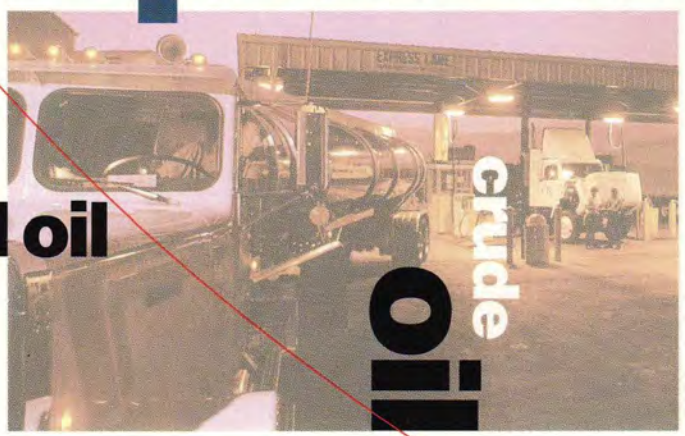
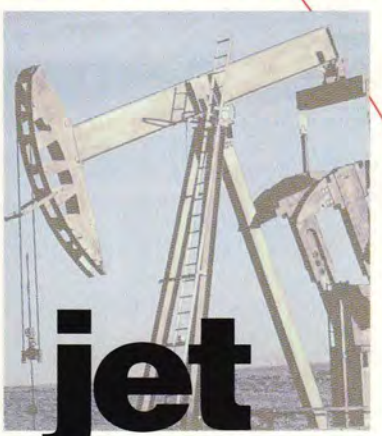




petroleum



fuel oil



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