

PETROLEUM REVIEW



THE INSTITUTE
OF PETROLEUM

November 1995

Azerbaijan

Pipeline route for early oil
decided

Brent Spar

Independent survey of
inventory clears Shell

Germany

New interest upstream

Venezuela

First licensing round
since nationalisation



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COVER PHOTO

Brent Spar in Erftjord, Norway. Photo by Shell UK

NEWS IN BRIEF

20 September

Q8 Petroleum has established a 50/50 joint venture with Agip Petroli that will own and manage Agip's Milazzo refinery in Italy.

22 September

Repsol Exploration has discovered a new gas field in the Khada Concession in the Western Desert of Egypt. Some 45 mscf of gas and 2,700 barrels of concentrate were produced per day during production testing.

The Troll field has started oil production three months ahead of schedule.

Fortune Oil reports that turnover has fallen from £34.9m to £26.7m in the six months to June 30 following the company's shift from crude oil to products trading. However, the increase in agency earning has more than offset the difference.

British Gas is to remerge the business and domestic supply arms it split into separate businesses in a corporate restructuring two years ago.

23 September

The Qadirpur field in Pakistan has flowed first gas. Production is expected to reach 200 mmsc/d by year end, a figure forecast to rise to over 340 mmsc/d following plant expansion in 1996. Operated by OGD (75 percent), the field's other partners are Premier Oil (9.5 percent), Bone (8.5 percent) and PPL (7 percent).

Lukoil, the Kazakhstan government and a number of Russian and foreign firms are to establish a joint venture to build a \$1.5bn oil refinery in southern Russia.

26 September

Petrobras' first half results show a loss of \$399m in revenues as a result of the month-long oil workers strike earlier this year.

The Statoil/BP alliance, Socar and Turkish Petroleum have agreed principles for sharing production from the Shak Deniz area of the Caspian Sea, according to Lloyd's List.

27 September

AOC International has been awarded a £20m operations and

maintenance support contract for Texaco's Tartan platform.

A new joint venture between Gulfstream Resources Canada (40 percent) and PT Radiant Ramok Senabing (60 percent) is to redevelop the Ramok and Senabing oilfields in South Sumatra, Indonesia, which were abandoned at the beginning of World War II. Production is planned for the first half of 1996 at an initial rate of over 5,000 b/d.

28 September

Aberdeen is set to become the nerve centre for all oil-related North Sea air traffic following the installation of £1.4m worth of new radar equipment in the city airport's control tower.

Total has signed a \$3bn deal for a liquefied natural gas (LNG) project with Yemen's General Gas Corp (GGC). The 5mmt/yr capacity LNG plant is the single largest energy project to be undertaken in Yemen to date.

China National Petroleum (CNPC) reports that it has borrowed some \$600m from the World Bank to finance energy project-related infrastructure developments in Sichuan.

Exxon is to invest some \$600m on the development of three large underground natural gas storage facilities in Germany and the Netherlands. Partially depleted gas producing fields will provide some 120 bncf of gas storage capacity with over 6 bncf/d of withdrawal capacity available to help meet seasonal swings in demand.

29 September

Esso Norway has made a significant oil discovery in Block 25/8, just off the Norwegian coast. The 2,343-metre well showed oil at 6,700 b/d and 2.7 mscf of gas.

Statoil has awarded Aker a Nkr260m contract for the tie-in of the Norfra gas pipeline to the 16/11-E riser platform in the Norwegian North Sea.

According to a Royal Bank of Scotland analysis, Britain's North Sea oil output fell 2.4 percent in August to just below 2.5 mb/d. Gas output continued its seasonal slide, falling by 5 percent to average some 3,775 mscf/d.

Wintershall has become the biggest western European Russian gas importer following the award of an additional supply contract to Gazprom. The 20-year contract is for the supply of an additional 10 bncf of gas per annum and is worth a total of Dm18bn.

Aran Energy is to form a joint venture with Statoil (UK) in order to exploit Aran's Connemara field off the west coast of Ireland.

1 October

Conoco's Jupiter development has come onstream. The Ganymede and Callisto fields are reported to be producing gas at a combined rate of 300 mscf/d. Both fields are remotely controlled and operated from the Lincolnshire Offshore Gas Gathering System (LOGGS) central complex.

2 October

The Gawain gas field, operated by Arco British Ltd on behalf of itself and Superior Oil (UK), has produced first gas just 18 months after development approval. The field is estimated to have some 130-190 bncf of gas reserves and a life expectancy of 10 years.

United Transport (UK) has been awarded a £3m per annum contract by Fina plc to take over the management of 120 of the oil company's road tanker drivers and five terminal operators. Some six depots are affected by the transfer of employment.

Amerada Hess' South Scott field has produced first oil at an initial flow rate of 20,000 b/d.

3 October

A recent Gas Consumers' Council report has revealed that complaints against British Gas are at an all-time high. Some 30,000 people have complained of poor service and falling standards so far this year, double the figure recorded in the same period in 1994.

China National Petroleum Corporation, China's main oil producer, is restructuring to become a holding corporation in order to break the oil refinery monopoly currently held by Sinopec, according to Lloyd's List. The State Planning Commission is

encouraging the move.

Mobil is to sell its Mobil Chemical Company's plastics division to Tenneco's Packaging Corporation for \$1.27bn. Net earnings in excess of \$500m will help fund growth in Mobil's core oil, gas and petrochemicals businesses.

4 October

Texaco has been granted a £190m loan by the European Investment Bank to fund a £500m development of the Captain field.

Dragon Oil is to pay up to \$35m for a 30 percent interest in the Larmag Cheleken joint venture in the Caspian Sea. The Turkmenistan field has estimated remaining recoverable developed reserves of 320m barrels of oil and 700 bncf of gas. Additional undeveloped and probable non-associated gas reserves are estimated at 1.9 tcf.

5 October

Saga Petroleum reports a 14 percent fall in pre-tax profit from Nkr1.37bn to Nkr1.2bn for the eight months to August 31. Profit after tax fell 32 percent to Nkr352m from Nkr521m despite a rise in operating profits from Nkr1.02bn to Nkr1.3bn.

6 October

Elf Aquitaine has made a new offshore gas discovery in the Dutch sector of the North Sea. A deviated well drilled in block J3a from the nearby Markham field platform produced a daily flow rate of 56 mscf. Production from the new field, which is to be called J3 Charlie, is expected to begin within the next three months.

9 October

British Petroleum Exploration reports that its first year 4D seismic survey of the Foinaven field has been completed on time.

The International Energy Agency has revised up its fourth quarter estimates for supplies from non-OPEC oil producers to 43.7 mb/d. It has also increased estimates for supplies next year by 200,000 b/d to 43.9 mb/d.

10 October

McDermott-ETPM West and Aker Engineering have entered

into an exclusive co-operation agreement that is to provide 'optimised technical and cost-effective solutions' to Statoil's 2000 flowline projects.

11 October

Woodside Petroleum's half yearly financial figures show a 78.8 percent rise in consolidated operating profit before abnormal items from \$35.4m to \$63.3m.

Lasmo's HBNS-2 appraisal well in Block 404 in the Ghadames Basin, Algeria flowed first oil at a stabilised rate of 3,631 b/d and produced gas at 3.9 mscf/d. The field has estimated gross reserves of 1.5bn barrels of oil and initial production of some 40,000 b/d is expected by early 1997.

Oil companies around the world face a £14m levy as a result of a continued growth in claims from the Braer spill off the Shetland Islands, reports *Lloyd's List*.

Iran's oil minister Gholamreza Aqazadeh says that 123 foreign companies, including a number of US firms, have submitted bids for 10 key oil and gas projects in Iran worth \$7bn.

The State Statistics Committee reports that Russian oil production fell 2 percent in the first nine months of this year to 230 mnt.

Burmah Castrol is to open a regional headquarters for its core lubricants business in Hong Kong next January, says the *Financial Times*.

12 October

A consortium comprising Norsk MVS, Brown & Root Energy Services and Bjorge has secured a five-year, NOK700m maintenance and technical support contract with BP Norge. The agreement covers the operator's assets in the Ula and Gyda fields.

Chevron's second quarter \$611m operating results are the highest recorded since the fourth quarter of 1990. The company reports that higher prices for crude oil, refined products and chemicals led to total revenues increasing 9 percent over 1994's first-half revenues to \$18.6bn, a rise partly offset by decreased sales volumes and lower prices for natural gas.

Greece has announced its first international licensing round will

officially open at the end of this month. Six areas will be on offer, three onshore and three offshore. Tenders must be submitted by the end of May 1996.

Energy Capital Investment Company, which provides project finance for the oil and gas industry, has returned a first-half pre-tax profit of £424,000 against a £29,000 loss.

13 October

Taiwan's Ministry of Economic Affairs has announced that Chinese Petroleum is to be privatised over the next five years, reports the *Financial Times*. Privatisation will start with the release of a 10 percent tranche in 1997 and will complete by June 2000.

United Energy has made a post-tax profit of \$35,000 in the first half of the year against a £193,000 loss in the same period in 1994.

A fire on a pipeline linking Saudi Arabia's Ras Tanura refinery to its terminals has forced the company to suspend product flows to the north and south piers, reports *Lloyd's List*. The refinery and the Sea Island crude terminal were also briefly closed but are now running normally.

The Shetland Islands Council has offered BP and other oil companies a cut-price deal to continue operations at the Sullom Voe terminal and head off plans for offshore loading in order to safeguard jobs.

Babcock King-Wilkinson has been awarded a contract by Jannah Hunt Oil Company for a grass roots oilfield facility in the Halebah Field in Yemen. The San'aa plant will receive and process oil from new wells and transport it to existing CPU facilities with reinjection of residual water and gas.

Honeywell Control Systems is to supply integrated process controls and safety systems as an alliance partner in a £70m project to add a new gas compression platform to the Caister Murdoch System operated by Conoco.

J P Kenny has won a preliminary engineering design contract for a regional gas transportation and processing system

in Vietnam. The contract, awarded by BP on behalf of a consortium that includes PetroVietnam, Statoil, BHP and Mobil, is part of a feasibility study for a system to transport gas from a number of fields in the Nam Con Son basin offshore southern Vietnam to a planned gas consuming industry complex in Phu My, south of Ho Chi Minh City.

16 October

Shell Overseas Investments has announced that it plans to invest \$30-40m in an LPG terminal and pipeline in Sri Lanka. The move follows Shell's acquisition of a 51 percent holding of shares of Colombo Gas Company.

British Gas is the latest company to freeze a North Sea project as gas prices plummet. The Olympus gas finds in the southern sector of the North Sea were to have been developed at a cost of £190m with first gas expected next year.

Phillips Petroleum's Alison field has produced first gas. Located in Block 49/11a of the North Sea and controlled from Phillips' Audrey B platform, Alison's tri-axial well and subsea wellhead is expected to produce at a peak rate of 40 mscf/d.

17 October

Amoco and Shell Oil are to form a limited 65/35 partnership combining the companies' exploration and production assets in the greater Permian Basin area of west Texas and southeast New Mexico. The plan is contingent on the successful completion of discussions regarding the design, management and operation of the venture.

Global Marine reports that worldwide offshore drilling markets strengthened slightly in September, the month's summary of current offshore rig economics (SCORE) rising to 44.3 percent of new construction rates as the southeast Asia drilling market showed solid improvement. The North Sea and US Gulf of Mexico markets, however, showed little change from August's figures.

South China Petrochemical Joint Co is to build an oil terminal, the first capable of handling medium size tankers, in the Zhuhai Economic Zone in the southern Guangdong province, says *Lloyd's List*.

Russia and Cuba have completed a series of protocols which represent a new stage in trade and financial relations between the two countries, reports *Reuter* in Havana. Cuba will supply Russia with 1.5m metric tons of sugar in 1996 and receive in return some 4.5m tons of oil under one protocol while closer collaboration on tourism, transport and light industry are addressed by the others.

18 October

Amoco has announced the start-up of two new North Sea gas fields - Davy and Bessemer - just 18 months after development began. The fields are expected to produce up to 220 mscf of gas per day and use an innovative Amoco platform design which, the operator claims, not only minimises weight and improves the construction schedule but also helps reduce capital and operating costs.

Arco has abandoned its hostile takeover bid for Aran Energy following Statoil's £203m offer.

Oman Oil company has received a 'letter of no objection' from the Sultanate of Oman for the Oman-India Fertiliser Plant project. The plant is part of a long-term plan to provide outlets for Oman's growing natural gas reserves. It is expected to consume 0.9 tcf of gas over the project lifetime, representing some 5 percent of Oman's gas reserves which exceed 20 tcf.

Qatar's Ras Laffan Liquefied Gas Co and the South Korean Gas Corporation have signed a final purchase agreement for the supply of 2.4m tpy of LNG to South Korea beginning in 1999, reports *Lloyd's List*.

19 October

The Heidrun field, which contains some 750m barrels of recoverable oil and 46 bncum of gas, has produced first oil after a three-month delay. Statoil estimates 14m barrels of oil have been lost as a result of the delay.

British Gas E&P is to drill an exploration well in Block 97/19, 20km offshore Portland Bill in Dorset. A jack-up drilling rig will drill to a depth of approximately 2,300 metres in January 1996.

World horizontal drilling record for Wyth Farm

BP Exploration has achieved the world's longest ever horizontal step-out with the drilling of well M05 at Wyth Farm off the Dorset coast. Taking some 115 days to drill and case, the well broke the 8km barrier with a step-out of 8,035 metres.

When Wyth Farm began Stage III of the field's development programme in 1993,

the maximum step-out achieved by industry at shallow depths was 4,500m.

M05 is the fourth and most recent extended reach development well to be drilled into the Sherwood reservoir from 'M' site on the Goathorn peninsula. Not only does its 8,035m step-out break Wyth Farm's previous world record reach of 6,818m at 1,611m reservoir depth achieved with

M03, but also the world record at any reservoir depth. Previous holders of this title were Norsk Hydro and Statoil wells in the Norwegian sector of the North Sea with a total vertical depth of approximately 2,770m and maximum step-out of 7,869m.

'This is a remarkable achievement,' says Drilling Manager Mike Hazell. The team set itself a 6km target in 1993 which was considered to represent a significant technological breakthrough. Instead, they have delivered a simply exceptional performance which has beaten their original goal by 30 percent. Such a demonstration of the benefits of extended reach drilling will help both us and other operators to find better, more efficient ways of developing the oilfields of the future.'

Wyth Farm's Bridport and Sherwood reservoirs have estimated initial recoverable reserves of around 400 million barrels of oil. The development currently produces some 100,000 b/d.



Wyth Farm's 'M' site (left) and 'F' site (right) on the Goathorn Peninsula, Poole Harbour

Russian licensing round

Some 20 companies have shown interest in 10 blocks offered by the Yamal-Nenets Autonomous Okrug.

The blocks on offer consist of seven field development and three exploration blocks. The licence includes all geological horizons with the exception of the Taz and Beregovy blocks where specific gas reservoirs are reserved for Gazprom. Three of the development projects are primarily oilfields and are at a semi-appraised stage. The gas fields would also need further appraisal work.

Seismic data is available but very little drilling has been carried out. The exploration blocks are reasonably close to existing or planned facilities. The Yamal Nenets Okrug currently produces 93 percent of Russian gas.

Present annual production from the area is 540 billion cubic metres of gas and 35 million tonnes of liquids. Existing pipelines have the corresponding capacity but future depletion is likely to create spare capacity, while new pipelines are also being constructed.

Agreements can be made under existing legislation or as profit sharing agreements – the relevant legislation was scheduled to become law last month, according to SG Shlykov, Deputy Director General, Rosvneshego.

Potential applicants must submit a statement of interest and prequalify by 16 November. Applications for the exploration blocks should be submitted by the end of the year and those for the development blocks by 1 March next year.

Testing times

Lloyd's Register has authorised a fourth laboratory for its Fuel Oil Bunker Analysis and Advisory Service (FOBAS). Based in Fujairah in the United Arab Emirates, the Caleb Brett laboratory will provide fuel testing services for pre-delivery and routine analysis.

'The Fujairah laboratory will help reduce sample turnaround times and provide localised support for customers in the fast growing Middle East bunkering sector,' says Trevor Jackson, Principal Surveyor and Manager of FOBAS.

Previously, fuel samples from this region were sent by courier to LR's UK laboratory at West Thurrock. Other FOBAS laboratories are based in Houston and Singapore.

Offshore order roundup

A number of orders were placed and contracts signed during the Offshore Europe 95 oil and gas exhibition held in Aberdeen this September. They are summarised as follows:

- Brown & Root McDermott Fabricators won an £11 million contract for the Armada field jacket.
- AMEC Process and Energy were awarded an £80 million order for the module support frame and process module for the Ekofisk field.
- North Star Shipping won a three-year contract from ASCO to provide three standby vessels, one for the Montrose and Arbroath platforms, the other two for Everest and Lomond.
- Ferguson Seacabs secured a contract to supply accommodation modules designed for use as emergency shelters on the Arco British Trent and Tyne gas fields.
- The University of Aberdeen announced it is to set up an Oil and Gas Institute to bring together a range of existing activities.
- Vortoil Separation Systems and Transocean Engineering and Construction entered into a strategic alliance to work together in Norway.
- Orbit Valve won a £1.1 million order for a range of 97 ball valves in chrome duplex and low carbon steel for Saga's Vigdis development.
- A letter of intent was signed by Survival Systems and AJS Transport Training to lay the foundations for a joint training venture.
- Sigma signed a distributor arrangement with Pegler and Loudon.
- Hunting Oilfield Services and Big Inch Marine Systems signed an oil industry connector co-operation agreement.

Lloyd's Register prepares for new offshore safety regime

New regulations governing the design and construction of offshore installations and wells are to come into force in the United Kingdom next year. Issued as a consultative document by the UK Health and Safety Commission (HSC) in July, the regulations represent the final stage of the HSC's review of offshore legislation following Lord Cullen's recommendations in the wake of the Piper Alpha disaster.

An investigation into the present system of certification was conducted in parallel with the legislative review and concluded that there remains a requirement for a statutory scheme of

independent verification for safety critical elements. As a result, the new regulations include sections on a proposed verification regime which will be phased in to replace certification over a two-year period.

Four elements are covered by the draft regulations: integrity of offshore regulations; safety of on and offshore wells; onshore workplace environment; and verification of safety critical elements of offshore installations and wells.

According to Walter Winkworth, Deputy Manager of LR's Offshore Division, while the new verification arrangements appear, at first

sight, to be similar to the existing certification regime, there are in fact fundamental differences.

'The new regulations are goal setting rather than prescriptive, in keeping with the modern approach to health and safety at work,' he says. 'Furthermore, they take a holistic approach to safety, for the first time covering all safety critical items. At present statutory legislation is more fragmented with some specific systems, eg fire fighting equipment and life saving appliances, not part of the certification regime.'

'Under the existing scheme, the certifying authority formally reports to

the regulator, ie the HSE. This will not be the case in the future. Instead, the verification body will report its findings to the duty holder who is responsible for the verification scheme within the safety case.'

In addition, the verification bodies will no longer be appointed by the HSE under the new regime. The HSE, together with industry, is developing standards for independence and competence which will be used in accrediting verification bodies. Lloyd's Register reports that while the accreditation procedure has yet to be resolved, it is 'actively preparing' for the process.

Competitive domestic gas market

The UK Department of Trade and Industry has published a consultative document outlining proposals for how companies can apply for licences to supply the domestic gas market and the fees they will incur following the passage of the Gas Bill expected this Autumn.

'This is another stage on

the road towards full competition in the domestic gas market,' says Tim Eggar, Minister for Industry and Energy. 'Domestic bills have already fallen by about 23 percent since privatisation and more savings are on the way.' Indeed, independent suppliers are expected to cut bills by a further 10 percent.

Contract first for Britannia

European Marine Contractors (EMC) has won a multi-million pound contract for the laying of two export pipelines from the jointly operated Chevron/Conoco Britannia platform.

The first pipeline, measuring some 185km in length and 26 inches in diameter, will export gas to the St Fergus terminal in north east Scotland. The second 44km, 12-inch line will carry condensate to BP's Unity platform for export through the Forties-Cruden Bay pipeline to the Kinnell processing facility near Grangemouth.

EMC joins an alliance of the field operators and J.P. Kenny & Partners Ltd who won the contract for the design and engineering of the pipelines earlier this year.

'This particular alliance-style contract is the first of its

kind in the North Sea,' says Rod Myers, Britannia Export Pipeline Manager. 'Alliance agreements have traditionally revolved around a complete field development project. In contrast, this alliance concerns just the pipeline division.'

'The arrangement eliminates all duplication of resources, time, effort and costs and ensures that everyone works together to produce a low-cost solution whilst maintaining the highest levels of quality and safety required.'

Manufacture of the export pipelines is scheduled to begin mid-1996. EMC's Castoro Sei pipelaying barge will install the lines between March and June 1997.

The lines will handle 740 million cubic feet of gas and 70,000 barrels of condensate per day.

London buses going green



The first London bus to have its Cummins diesel engine converted to LPG is carrying tourists from Buckingham Palace to Tower Bridge and back. Within 18 months bus operator London Pride intends to have 20 similarly fuelled buses in service.

With refuelling from a central gas storage facility necessary every one or two days, the LPG bus is expected to have roughly the same running costs as a

diesel-fuelled one.

John Harris, Managing Director of Calor Gas which supplies the 'green' fuel to London Pride, stresses that LPG is the cleanest fuel for buses, adding that a 100 percent cut in particulate emissions and a 30 percent reduction in noise levels is possible. 'This switch is a move which we hope to see copied by many other companies up and down the country,' he says.

Statoil buys Conoco Ireland

Statoil has bought Conoco's retail marketing and commercial business in Ireland. The agreement includes Conoco's network of 257 Jet service stations which will be rebranded and join the 180 stations already operated by Statoil

in this region.

Conoco stress that the deal does not represent any fundamental change in direction for its expanding refining and marketing activities in Europe.

The sale does not affect Conoco's Northern Ireland operation.

Operators set to test troubled waters of the Falklands

The Falkland Islands government (FIG) unveiled its long-awaited first offshore licensing round on 3 October. A total of 19 tranches, covering some 44,000km², are being offered for competitive bidding in the round. Twelve of the tranches lie to the north of the islands, the remaining seven situated to the south and south-east.

'Seismic studies indicate that there are a number of potential oil and gas-bearing structures around the Islands,' says John Martin, Oil Administrator for the FIG. 'However, it is too soon to talk of an oil bonanza until exploration drilling has taken place and well data is available.'

Oil companies bidding for blocks within the tranches will be required to meet similar licensing conditions to those imposed in the UK's 16th offshore round. An escalating scale of acreage rentals will be imposed by FIG during the three explo-

ration phases of five, seven and 10 years, followed by a 9 percent royalty fee on production with a corporation tax levied at 32.5 percent. Invitations to bid in the round are to be submitted by July 1996 with licences expected to be awarded two months later.

Over 35 oil companies have expressed an interest in the round, including Shell, British Petroleum, British Gas, Enterprise, Union Texas, Japan National Oil Corporation and Petrofina. Argentine companies have been invited to take part in the round too but will not be allowed to exercise a majority interest or act as an operator.

Despite the potential of rich rewards, many of the oil companies remain cautious about exploration in this region in view of possible future political problems associated with the Islands' sovereignty.

Indeed, there is already concern over news that Argentina proposes to charge

companies a levy of up to 3 percent of any oil revenues resulting from production. There is also talk of an exploration fee based on the size of individual blocks awarded in the round. According to Andrew Gurr, Chief Executive of FIG, while the



Andrew Gurr

United Kingdom does not recognise Argentina's right to tax companies operating around the Falklands, there is nothing FIG can do to stop the country from imposing a levy on those companies with operations based on the Argentine mainland.

The tranches offered in the licensing round are separate from the 'special area' of co-operation which was agreed by the UK and Argentine governments in September. A joint Anglo-Argentine Commission is to be established that will co-ordinate exploration and exploitation operations in an 18,000km² area south-west of the Islands. The issue of sovereignty has not been addressed by the agreement and remains an emotive subject.

Speaking at the round's launch meeting, Andrew Gurr said, 'Over the last few years we have been careful to put in place the necessary procedures for our emerging oil business. The Islands have enjoyed substantial economic growth since 1982 and we are confident that the opening of the licensing round will provide further momentum to economic development.' It is also understood that oil revenues may be used to fund the Islands' military garrison.

Revised health and safety syllabus

The National Examination Board in Occupational Safety and Health has published a consultative document on the revised syllabus for its Certificate in Occupational Safety and Health for the Offshore Oil and Gas Industry.

Comments on the draft syllabus are invited for receipt by 1 December.

Hot contract in the pipeline

Texaco and BP have awarded McDermott ETPM a £30 million contract to design, procure and install what is said to be the longest hot multi-phase pipeline in the North Sea.

The pipeline will transport multi-phase gas condensates at temperatures up to 150°C from the unmanned Erskine platform to Amoco's Lomond platform for processing, separation and delivery into the CATS and Forties systems.

Measuring some 30km in length, the 16-inch diameter pipeline will be fully insulated to ensure no build-up of wax and hydrates takes place inside the line during the field's lifetime.

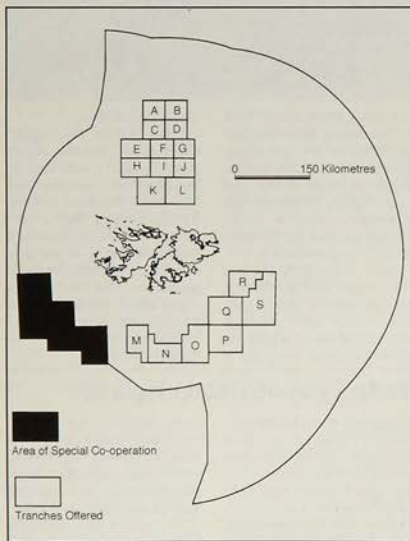
The pipeline is scheduled for installation next year with tie-ins to platforms planned for mid-1997.

Simon Storage safety awards

Simon Storage's Inmingham East and West terminals have each won Royal Society for the Prevention of Accidents gold safety awards.

The bulk liquids and gases terminals have lowered their accident rates to a level 60 percent better than the industry national average.

It is the second time that Simon Storage's East Terminal has won the award.



Areas on offer in the first Falkland Islands offshore licensing round

World oil and gas production in the next decade

World production of crude oil is forecast to reach 75,266 million barrels per day (mb/d) by 2004, according to Petroconsultants' 'Worldwide Crude Oil 10-Year Production Forecast'. Of this total, some 32 percent will come from the offshore sector with the Middle East leading the field.

Crude oil output rose to 62,046 mb/d in 1994. The Middle East, led by Saudi Arabia, Iran and Kuwait, retained its dominance in this sector, while production in North America and Eastern Europe/Central Eurasia continued its recent

trend of decline.

Field discoveries in Algeria, Colombia, Uzbekistan, the United Kingdom, Norway and a few other countries over the past few years have taken world proven crude oil reserves to the 1993 total of 998.6 billion barrels.

Meanwhile, sister publication 'Worldwide Natural Gas 10-Year Production Forecast' reports that worldwide gas production will continue to grow strongly, reaching 303,698 million cubic feet per day (mcf/d) by 2004. Of this total, some 25 percent will be derived from

offshore reservoirs.

Output is forecast to increase in all regions over this time period, with Russia, the United States, Canada, Algeria, Turkmenistan and Iran being the largest producers.

Gas is also expected to gain significant market share at the expense of oil due to its 'advantages in combustion and chemical properties and cost'. Indeed, when converted to oil equivalence values, gas production is predicted to reach a full 67 percent of oil output by 2004.

Worldwide gas produc-

tion levels have continued to rise since World War II and reached some 222,479 mcf/d at the close of 1994. Sharp drops in output in several Former Soviet Union republics allowed North America to regain, for the time-being, its leading position in the gas producing sector.

A number of major field discoveries in Iran, Malaysia, Canada, Egypt and Colombia amongst others over the past few years have pushed world proven gas reserves to their record 1993 total of 4,997.3 trillion cubic feet.

Service station clean-up

MEL Ltd has won a contract from a major oil company for the cleaning of polluted soil and groundwater at one of its larger petrol stations prior to redevelopment of the site.

The deal follows the signing of an exclusive collaborative agreement between MEL and Recycling Nederlands this September.

A 'medium temperature soil air extraction' clean-up technique which combines vapour extraction with groundwater treatment is to be used. 'This is the first time Recycling Nederlands' technology has been applied in the UK,' says MEL.

The system cleans soil and

groundwater simultaneously. A series of filters installed under the forecourt remove contaminated groundwater while others extract soil vapours. The filters are connected to a treatment unit on the surface where the vapours are passed through a biologically active filter prior to discharge to the atmosphere. The groundwater is cleaned by a combination of phase separation and stripping and clean water is recirculated or discharged to the sewers.

Heat from the diesel generator speeds up the extraction process and stimulates the bacteria degrading the pollutants.

Orimulsion-fired power plant to close

PowerGen has announced its Richborough, Kent power station will close next March.

Originally built as a coal-fired power station in 1962, the 360 MW plant was converted to oil in 1971 but mothballed during the 1980s. Finally in 1990 it was converted to Orimulsion, a bitumen-in-water emulsion supplied by a subsidiary of Petroleos de Venezuela. Its current supply contract runs out in December and will not now be renewed.

The company attributes the closure to increasing competition and excess

generating capacity in the United Kingdom. Mr David Dance, General Manager, UK Electricity, PowerGen, said 'We have reluctantly concluded that there is no possibility of Richborough being profitable in the future.'

PowerGen continues to burn Orimulsion at another UK power station, Ince in Merseyside.

Bitor Europe, which markets Orimulsion, hopes to finalise a contract to sell 5 million tonnes annually to National Power for its Pembroke plant in Wales.

BP No 1 in UKCS

British Petroleum once again leads the field in the UK oil and gas arena in terms of both total value and commercial reserves, according to Wood Mackenzie's recently published 1995 UK top 20 league table.

The oil giant retained its position as undisputed leader in the upstream sector with 15 percent of the total value of oil and gas assets in the UKCS. As in last year's lineup, British Gas took second place, Shell third and Exxon fourth position. All have distanced themselves from the rest of the pack over the past year.

Revised reserve estimates for the Elgin gas condensate field and Elf's increased stake in the project allowed the company to climb from last year's tenth position to fifth this year.

BP also dominates the player lineup in terms of commercial reserves. The positions of Shell (second), Exxon (third) and British Gas (fourth) remain unchanged from last year.

Elf, meanwhile, rose one place, from sixth to fifth, at the expense of Texaco, while Amerada Hess rose from ninth to eighth position at the expense of Conoco.

Current expenditure on the Harding, Andrew and Foinaven field developments enabled British Gas to

replace BP in poll position when ranked by net cashflow. According to Wood Mackenzie, BP is expected to 'reinvest nearly 60 percent of its UK free net cash flow over the period 1995-97'.

Shell reappears in the top 10 rankings by net cash flow and is forecast to plough some 80 percent of its UK free net cashflow in the short term on projects including those west of Shetland, the Eastern Trough Area Project east of Aberdeen and the ongoing £1.3 billion Brent redevelopment project.

Looking ahead to the next five years, the current top five players are expected to maintain their positions given their stakes in the majority of forthcoming major UK field developments (Armada, Elgin, ETAP, Foinaven, Franklin and Schiehallion) while Texaco (Captain, Erskine and Strathspey) and Chevron (Britannia) are forecast to make 'significant' advances. Enterprise, Marathon and Fina are set to fall given the absence of sizeable field developments in their current portfolios.

Finally, Wood Mackenzie reports that Philips (J-Block) and Union Texas (Alba and Britannia) could be in the running for next years top 20 lineup.



Caspian pipeline decision

By John Roberts

The decision by the Azerbaijan International Operating Company (AIOC) to proceed with two pipeline routes for the export of early oil from Azerbaijan's Caspian oilfields represents a triumph for political pragmatism. Before the decision was taken, AIOC Chairman Terry Adams said that whatever route was chosen would have to be viable commercially. He and his colleagues in the multinational consortium were, in fact, offered two commercially viable options. And since they were under considerable pressure to keep both in play as potential forebears for a brand new, full-scale pipeline, it is scarcely surprising that they chose to keep their long-term options open (see *Petroleum Review*, April 1995).



AIOC's 9 October decision provided for full contractual arrangements to be concluded by 1 November with both the Russian and Georgian governments to transport oil to the Black Sea. But it is a third country, Turkey, which for the time being looks to have secured most from the two pipeline compromise.

At one stage it looked as if the Georgian option would be ignored. Estimates for repairing whichever pipeline is used in Georgia, and of building 140-kilometres of new line, total around \$200 million. AIOC officials say that the Russian line is in much better condition and although it apparently requires some 27-km of new line, total costs to bring it into service are estimated at around \$50 million.

The consortium's Russian and Turkish members, Lukoil and Turkish Petroleum, have both offered to carry out work on pipelines that they favour. Lukoil, with a 10 percent stake in AIOC, has naturally pushed for a line to Novorossiysk, Russia's main Black Sea oil terminal. Turkish Petroleum favours the line to the Georgian port of Supsa, since it believes this will be the precursor to a full-scale pipeline to Ceyhan.

Mr Adams accompanied the announcement of the two pipeline solution with a comment that, 'As we see it now, Ceyhan will be the eventual exit point for the main pipeline.' But in practice Mr Adams and his colleagues do not have to take a decision on a full-scale pipeline route until mid-1997. Meanwhile, much can change. Neither the Novorossiysk nor the Supsa routes can be considered particularly secure; indeed, while Mr Adams was announcing that there would be a pipeline to Novorossiysk, Russian officials were disclosing that their troops in Chechnya, through which the Novorossiysk pipeline passes, would no longer abide by their 30 July peace agreement with Chechen separatist forces. Likewise, the recent assassination attempt on Georgian President Eduard Shevardnadze illustrates the instability of the country through which the Supsa pipeline largely passes.

Early oil

The announcement only covered the export of some 80,000 b/d of initial oil production. Eventually, production is expected to build to around 700,000 b/d and AIOC's \$8 billion contract with Azerbaijan requires the consortium to be able to export at least 500,000 b/d by mid-1999. So far, AIOC's costs under its Minimum Obligatory Work Programme have been comparatively modest. The consortium estimates that by the end of the year it will have spent approximately \$100 million over what is, in effect, a 13-

14 month period, whilst a further \$100 million will be spent on the programme in 1996. This work has focused on upgrading and refurbishing the existing Chirag-1 platform, which will be used to produce the early oil. The consortium says that contracts for laying pipelines to take gas from Chirag-1 to Neft Dashlari and crude oil to a new onshore terminal to be constructed south of Baku are currently being evaluated.

Because the volume of early oil is so low, it will not pose any problems in terms of onward transport to European or Mediterranean markets. Turkey, a major oil consumer in its own right, has offered to purchase all the oil that reaches Supsa. Internal Black Sea markets could easily utilise whatever oil is made available at Novorossiysk. Nonetheless, it is expected that the occasional tanker-load will reach the Mediterranean, simply to show that Caspian oil can be brought successfully to major consumer markets.

Turkey has no objections to this. So long as a fully commercial oil market can be established in the Black Sea, the emergence of a moderate amount of crude oil, even if some of it comes via Russian terminals, is, in fact, beneficial to Turkey, since it would help reduce the current flow of oil into the Black Sea via the Bosphorus bound for markets in the Ukraine, Romania and Bulgaria. Turkey's long-term concerns are that major oil exports would result in heavy use of the Bosphorus by oil tanker traffic, a development which Turkish Prime Minister Tansu Ciller has vowed to fight, even though the Bosphorus is an international waterway, open to all kinds of peaceful civilian traffic.

Ultimate options

In practice, both Russia and Turkey are working separately to avert such a possibility. Turkey obviously wants the Georgian pipeline to be followed by a full-scale line to Ceyhan, either using the same route as the Supsa line, or else, if political conditions improve, taking a shorter route across Armenia. Russia, however, is still pushing for construction of a by-pass pipeline from Burgas in Bulgaria to Greece's Aegean port of Alexandroupolis. Industry sources say there is serious interest in this proposal, and that financing for it may not be the problem it once appeared to be. In sum, AIOC's decision to opt for two pipelines means there is still life in both the idea of a Caspian-Mediterranean pipeline via Turkey, and in Russia's alternative proposals for a pipeline-tanker-pipeline system from the Caspian to the Mediterranean via Novorossiysk.

Bio-fuel production plant inauguration

By Stuart Todd



The recent inauguration of a state-of-the-art 'green diesel' production plant near Rouen by Prime Minister Alain Juppé further demonstrated France's ongoing commitment to the development of bio-fuels.

The FF155 million plant, which entered service in July 1995, produces the bio-fuel, Diester, made from rape seed methyl esters and has an annual capacity of 150,000 tonnes.

'Bio-fuels constitute one of the major challenges facing Europe at the beginning of the 21st century,' Mr Juppé said, adding that production of Diester would contribute to reducing energy bills and restraining certain forms of pollution. 'With support from Germany, France intends to pursue a policy in favour of bio-fuels at European Union (EU) level.'

The plant is run by Saipol, a joint venture company whose major shareholder is Belgian group, Vamo Mills (51 percent) and Sofiprotéol (49 percent), a financial holding company representing France's oil-seed producers and stockists.

Sofiprotéol is also behind a project to build another Diester production plant at Nogent-sur-Seine in the Champagne-Ardenne region. With an annual production capacity of 100,000 tonnes, the plant is scheduled to open at the end of 1996.

Potential market

Sofiprotéol estimates at around one million tonnes a year the potential French market for Diester in the form of a 5 percent additive in diesel sold at the pump.

However, the company reckons that from a technical and ecological point of view, the optimal usage of Diester is as a 30 percent additive with a key market being vehicle fleets run by municipal authorities and firms which could generate annual demand of 300,000 tonnes.

Several thousands of vehicles in the fleet category are already running on diesel incorporating Diester, including the Ville de Paris.

Another outlet for Diester, according to Sofiprotéol, is in the form of a 5 percent additive in domestic and industrial heating oils and in fuel which powers plant and equipment used in agriculture and construction. These energy sectors could create additional annual demand for Diester of 800,000 tonnes.

Diester currently accounts for around 75 percent

of rape seed methyl ester production in France.

At present, 80 percent of Diester production is destined to be used as a 5 percent additive in diesel with less than 20 percent incorporated as 30 percent additive. The remainder of production is supplied to the chemical industry.

Retail sales of Diester totalled 100,000 tonnes from the 1994/95 rape seed crop and this is expected to rise to just over 250,000 tonnes for the 1995/96 crop.

Government help

One of the major factors in the development of bio-fuels in France has been the degree of State support. France has made bio-fuels exempt from excise tax levied on petroleum products in order to render them more competitive in relation to mainstream automotive fuels although, for the moment at least, the price gap is still significant.

The French state also subsidises the production of rape seed and beet crops for energy purposes on fallow land as a measure to help farmers cope with the restrictions imposed by the Common Agricultural Policy.

Moreover, bio-fuel producers benefit from an agreement signed with the government and oil companies, Elf and Total, guaranteeing the volume of bio-fuel additives to be incorporated in diesel oil production over the next few years.

Continuing research

On the R&D front, the French Agriculture Ministry announced earlier this year the creation of a scientific body, Agriculture pour la Chimie et l'Energie (AGRICE), whose mission is to develop bio-fuels.

AGRICE brings together state agro-research body, the Institut National de la Recherche Agronomique, the Institut Français du Pétrole and crop growers associations as well as Total, Elf and chemicals group Rhône Poulenc.

Both Elf and Total are committing resources to 'green' fuels development with their efforts centring on the integration of sugar-beet origin ethanol as ETBE additives in petrol.

Total, in association with several groups representing beet growers, is to invest FF150 million in an ethyl tertiary butyl ether (ETBE) production unit on the site of its refinery complex at Gonfreville, in Normandy. The unit, scheduled to be operational late next year, will consume 300,000 hectolitres of ethanol in producing 50,000 tonnes/year of ETBE.

DATES FOR YOUR DIARY



THE INSTITUTE
OF PETROLEUM

EEG Discussion Group

'Falklands Oil: The Key to Political Stability in the South West Atlantic?'

Monday 13 November 1995, 17.00
for 17.30 - 19.00

Speaker: Lewis Clifton, Founder,
Byron Marine Ltd., and former rep-
resentative to London of the
Falklands Island Government

IP contact: Jenny Sandrock



THE INSTITUTE
OF PETROLEUM

EEG Discussion Group

'Development of UK Gas Markets'

Wednesday 22 November 1995,
17.00 for 17.30 - 19.00

Speaker: Steve Esau, Energy
Research Analyst, International
Petroleum Exchange

IP contact: Jenny Sandrock



THE INSTITUTE
OF PETROLEUM

EEG Discussion Group

'Sparring with the Greens'

Thursday 30 November 1995,
17.00 for 17.30 - 19.00

Speaker: Philip Algar, freelance
journalist and crisis consultant
Mike Register, Register & Larkin
Ltd, crisis management expert

IP contact: Jenny Sandrock

IFEG

Information for Energy Group

AGM and Wine & Cheese Party

Thursday 7 December 1995,
18.00

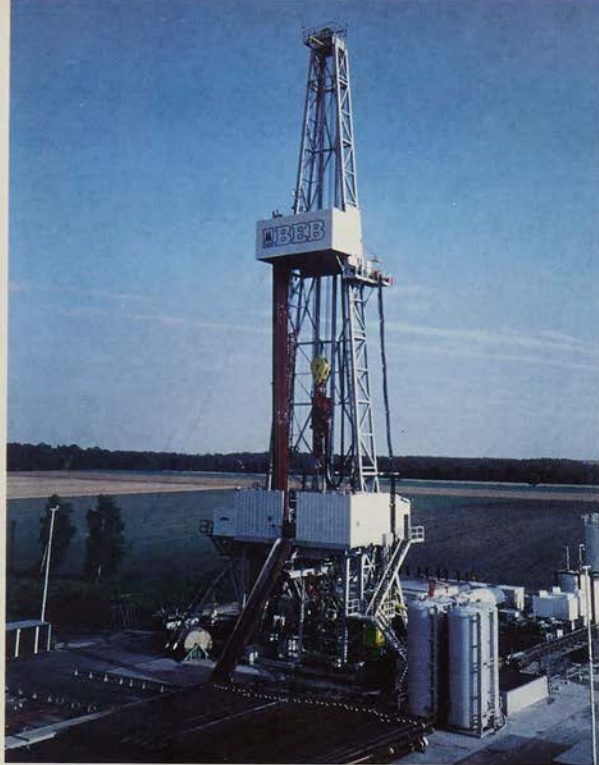
Our ten minute AGM will be
followed, as usual, by our free
annual Wine & Cheese Party
which all IFEG members and
prospective members are wel-
come to attend.

IP contact: Catherine Cosgrove

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: 0171 467 7100 Fax: 0171 255 1472

German upstream creeps out of the doldrums

By John Cranfield



Until the mid-1970s, Germany was Europe's largest oil producer. In the gas sector it came second only to The Netherlands but still managed to supply most of its own needs. The North Sea changed all that, but through most of the 1960s Germany had produced a steady 155,000 barrels per day (b/d) from a large number of small oilfields spread across the North European Plain that runs from The Netherlands into Russia. The advent of North Sea oil and gas and the rapid growth of Russian gas exports put a damper on the search for more indigenous supplies. However, the industry is still active – and innovative. Costs are now being tackled by the use of new technology but the main block on greater activity is the strength of the deutschmark against the US dollar. Now, with the high price of re-integration causing concern in government circles, the attractions of home-produced energy could lead to a rethink and an upsurge in exploration and production.

Today, Germany produces just over 58,000 b/d of oil, enough to meet just 2 percent of demand. Gas, on the other hand, meets 23 percent of local demand, last year's output being 15.57 billion cubic metres (Bcm) compared with demand of 67.94 Bcm. Back in 1979, gas met 35 percent of demand, while oil's best in recent years was 6 percent in 1969. A decade or more earlier, indigenous oil had met up to 16 percent of demand, as Germany pulled itself out of the mess left by World War II. The need to save imports may not be very marked these days but the sheer cost of re-integrating the old communist east means that much of the ethos of the 1950s has been re-asserting itself. The question is: can the local upstream oil and gas industry once more play an important role?

The answer to that must be qualified. Indigenous gas is still very important, given the size of its contribution towards meeting demand. But oil is a different matter. Oil was the first target in the post-war years and many of the fields found then have been depleted or have ceased to be economically viable. But that's not to say that oil is finished. Today, the emphasis has moved north to the margins of the North and Baltic seas and here some success has been met. In fact the bulk of German oil now comes from fields in the shallow waters just offshore. That poses problems and more could probably be achieved were it not for the environmental considerations that must be faced.

BEB's topdrive rig

Offshore boost

For instance, the Mittelplatte field, just off the North Sea coast of Schleswig-Holstein, is to be expanded at a cost of \$43.5 million. The inshore location means that offloading of oil is only allowed on 320-330 days each year. But the field is one of Germany's most profitable and holds over 30 percent of the country's proven reserves of 46.4 million tons. Now the field owners – RWE-DEA and Wintershall – are installing process equipment that will be able to handle output hiked from the current 5,800 b/d to almost 13,000 b/d. Allowing for downtime when offloading is not allowed, the producers hope to average just over 11,000 b/d from January 1996. At that rate, the field should keep going until 2030, although the licence is due to expire in 2011.

As long as a field is profitable, investment is clearly worthwhile. And it is of note that Mittelplatte comes under the jurisdiction of Schleswig-Holstein *Land*. Other *länder* are less amenable. In presenting production data for 1994, the producers' association Wirtschaftverband Erdöl-und Erdgasgewinnung (WEG) directed yet another blast against the high royalties levied by Niedersachsen *Land*, where 94 percent of indigenous oil and gas production is located. From 1 January 1994, the royalty on gas had been cut from 16 percent to 14 percent. WEG wants something under 10 percent. It is also displeased with the change in royalty-rebate payments. This had been set at 50 percent on new gasfields and on marginal gas production. Under the new rules, the 50 percent rebate is available only for fields producing less than 50 MMcmcy. On those producing 50-100 MMcmcy, the rebate is now 35 percent on fields producing 100-150 MMcmcy it is 20 percent, with just 10 percent royalty reduction on fields turning out 150-200 MMcmcy. This flow would probably qualify as marginal in most places. Now BEB (Shell-Esso), despite finding two new gasfields this year and still drilling onshore, is mulling over the closure of several of its smaller gas fields.

Royalties paid in 1992 totalled \$126.1 million. A year later they were \$121 million and last year slumped to \$108 million, despite a 4.8 percent rise in gas production. The royalty slide came as a result of a 17 percent fall in gas prices, on which the levy is based. According to WEG, the gas industry remains profitable, but only just. Oil production, however, has long been unprofitable in all but the



BEB is developing the Manslagt field

largest fields. Hence the steady shutdown of recent years. Late in 1992, Wintershall said it would close 12 of its 15 oilfields by the end of 1994, leaving just Emlichheim, Landau and Aitingen. And that's despite Niedersachsen's abolition of oil royalties in 1992. Early in 1993, WEG chairman Gerhard Eichorn reckoned that seven fields would close that year, with 32 more to end production by 1997. As a result, output slid from 70,287 b/d in 1991 to 62,253 b/d in 1993, with a forecast 40,160 b/d by 1997. According to BEB, most closures resulted from the strong growth of the Deutschmark against the US dollar, in which oil is priced.

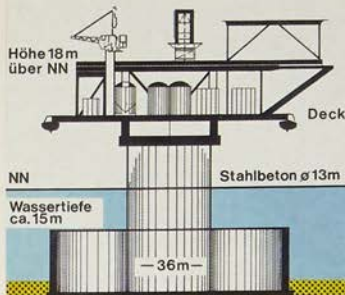
Economic ups and downs

Some indication of the marginality of most fields can be gleaned from a study of 1993 field data. Biggest operator BEB produced from 703 wells on 34 fields, the 23,051 b/d average working out at 678 b/d per field and 32 b/d per well. Deilmann's 23 fields produced 14,104 b/d, giving a field average of 613 b/d and a well average for the 359 wells of 39 b/d. Faring better was RWE-DEA with 178 wells on 14 fields producing 13,454 b/d. This led to average field output of 959 b/d and a well average of 75 b/d. Wintershall's decision to close most of its fields is not surprising given that, in 1993, 18 fields with 364 wells produced just 7,794 b/d, averaging 433 b/d per field and 21 b/d per well. Worst performance came from Mobil, whose seven fields, with 214 wells, produced just 1,415 b/d. That converts to 202 b/d per field and just 6 b/d per well.

Closer analysis shows that matters are not that bad. Much of Mobil's liquids output is condensate, a by-product of its prolific gas production. Of the fields being kept open by Wintershall, Emlichheim's 80 wells average 33 b/d each, while Deilmann's Bramberge field averages 70 b/d from each of 67 wells.

RWE-DEA is probably in the best position since its two offshore fields markedly swing the average. Mittelplatte's five wells currently average 1,077 b/d each while, on the Baltic coast of Schleswig-Holstein, Schwedenecke-See averages 233 b/d from each of 15 wells.

Many of the smallest fields survived because operating costs are so low. Those found back in the 1930s have long seen capital cost written off; they are mostly shallow and maintenance costs are mini-



mal. But as soon as anything vital needs replacing, they veer from being marginal to uneconomic. At present oil prices, money for new investment simply cannot be justified. The bigger fields will doubtless survive for some years, but the only significant development of late has been on those such as Mittelplatte where productivity is high and the reserve base is such that further investment can be justified. And it is significant that the most recent oil finds date back to the mid-1980s, just as previously high oil prices were cut in half. Since then, oil has not been a worthwhile exploration target.

Gas important

While exploration for oil has come to a virtual halt, that for gas continues. Earlier this year, Mobil used a combination of horizontal completion and hydraulic

of funds under the old regime. So, in 1993, EEG entered into a joint venture with RWE-DEA and Ireland's Bula to explore the Wolgast and Stralsund blocks. These surround existing fields but have themselves scarcely been touched. Most production is from the Zechstein, but the Rotliegendes – deep but prolific elsewhere across northern Germany – has rarely been penetrated. According to Bula, operator RWE-DEA has identified several prospects after running initial seismic. The company is now conducting further geophysical and geological work before any commitment is made to drill.

Despite the gloomy outlook, several companies continue to pursue gas targets. Mobil's 1995 development at Söhligen has already been mentioned, while BEB continues to supply around 50 percent of Germany's indigenous gas. And there is little doubt that potential remains. Late in 1992, RWE-DEA

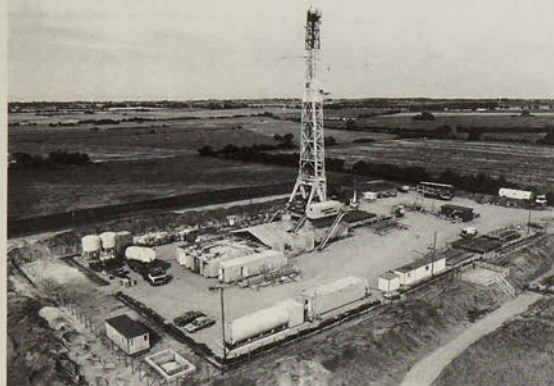
found new gas with its Völkersen Z-1 wildcat in Niedersachsen. Lower Permian sandstones at almost 16,400 feet flowed up to 35.8 MMcfid with a wellhead pressure of 4,350 psi, fully up to similar finds across the southern North Sea. Since the geology is identical this could be expected. The company followed up with appraisal through 1993 and field start-up in 1994. Last year, BEB also put its inshore Manslagt field on stream, using a small platform. Output runs at around 30 MMcfid.

The advent of new seismic techniques could help. Most fields are related to salt domes, tending to hide in smallish structures against the sides of the intrusion. Pressures tend to be high, making for sizeable reserves even in small structures. It is just that finding the things is very hard work. That the German industry has persisted for so long and profitably suggests that, with the latest techniques, there is a lot more to be found. Surprisingly, the active plays developed in other parts of Europe by

the smaller independents have yet to take off in Germany. But with their lower overheads and adventurous ideas, they could be just what this play needs.

Offshore disappointment

Given the similarities between gas finds on the North German Plain and in the North Sea, it might be expected that the German sector of the latter would prove to be equally prolific. To some extent this has proved to be true. BEB has two sizeable gas/condensate finds, in structures spreading across blocks H/15 and H/18 and across A/6 and B/4. With typical flows around 37 MMcfid per well, such finds might be considered worth developing. But, like Groningen gas, nitrogen content is high – in these cases very high. BEB has investigated various use options, such as generating electricity offshore or feeding gas into the Norderpolder gasline to Emden. Earlier this year, a further study was completed, based on a pipeline to Denmark, but the company sees viability coming only if oil prices top \$20/bbl. So nothing firm has emerged. Instead, for the present, activity is being concentrated inshore and onshore, where flows are as good but high nitrogen levels do not throw the economics into chaos. 



Activity in the North European Plain

fracturing to prove up further reserves in the Söhligen field southwest of Hamburg. Söhligen Z10 broke several world records, say Mobil, in proving up an extra 1 Bcm of reserves to bring the field's total to 17 Bcm. Total well depth was 5,749 metres, the combination of a 630-metre horizontal section and fracturing opening up a pay in the Rotliegendes that, here, is of extremely low permeability. Mobil, BEB and RWE-DEA each hold 30 percent in the field, with Wintershall having 10 percent.

Early in the summer, the economics minister for Mecklenburg-Vorpommern *Land*, Harald Ringstöff claimed that Gaz de France subsidiary Erdol-Erdgas Gommern (the old GDR state producer) was putting together plans to produce gas from two small fields off the Baltic island of Usedom. The main field is reckoned to hold 9-11 Bcm, the smaller 5 Bcm. EEG has not so far proceeded further, possibly preferring to line up partners before it does. The GDR had produced from the fields years ago but, with no proper market for natural gas at the time, the development lapsed. Known collectively as the Heringsdorf field, this is one of a string of small fields along the Baltic coast around Stralsund, EEG producing small volumes of oil and gas from several of them.

Further exploration was, however, stilled by lack

with International Maritime Organisation guidelines. The UK government approval was given back in February – causing very little comment at the time.

Mr Rothermund said, 'Since mooring the Spar in a Norwegian fjord in late June, we have continued to work on developing an acceptable alternative. The Spar remains under our duty of care and is our responsibility – and we will find a solution. In doing so we will conduct the process constructively and openly.'

Both the industry and the public have already turned their minds to this problem – between June and October Shell received over 200 alternative suggestions for the buoy's ultimate fate, ranging from disposal on land, to re-use as an artificial fishing reef or transformation into a casino. Shell's management have been impressed by the ingenuity of these unsolicited suggestions which have come from all over the world, with roughly half from the United Kingdom. Mr Rothermund said, 'These contributions have inspired us to devise a process which will enable us to tap such ingenuity to the full.'

The aim of the latest initiative is to produce a new disposal plan for Brent Spar that is acceptable to the public at large, the regulatory authorities and conservation bodies. From those suggestions already received and now coming in, Shell proposes to identify a Best Practicable Environmental Option (BPEO) which satisfies as many health, safety and environmental criteria as possible. To achieve the most satisfactory outcome, Shell is prepared to act as marriage broker, matching innovative ideas with contractors who are able to do the work.

Mr Eric Faulds, Manager of the Brent Spar Decommissioning Project, Shell Expro, pointed out that this is a major civil engineering project. 'It will

require a large, capable contractor with experience in on and offshore construction, structural engineering, dismantling and waste management as well as the ability to manage large projects with a high degree of public visibility,' he said. For this reason he expected that the final choice of contractor was likely to be a consortia or partnership.

It is planned to draw up a short-list of six project proposals which will include all the necessary information to evaluate the Best Practicable Environmental

Option. As well as being judged on the usual environmental, health, safety, technological and economic considerations, the projects will be assessed for their 'widespread acceptability', according to Shell.

Given the earlier hostile reaction from many quarters to the plan to sink Brent Spar in deep water in the Atlantic, this is going to be a vital factor.



Ole-Andreas Hafnor, Vice President DNV

DNV clears Shell

The Norwegian verification company, Det Norske Veritas (DNV), has carried out an independent inventory of the Brent Spar which for the most part confirms the figures given by Shell in the summer. On the quantity of oil on board, Shell's figure is slightly below that of DNV but the environmental organisation Greenpeace is shown to have exaggerated greatly.

The investigation that DNV was asked to do comprised an evaluation of the methods and data used by Shell and by Greenpeace, an investigation into allegations of toxic materials being hidden on board and a thorough independent measurement and analysis.

Because very specific estimates were difficult to obtain, DNV gave a range of figures. It estimated that the total amount of oil on board was 75-100 tonnes, compared with Shell's figure of 53 tonnes and Greenpeace's estimate of 5,000 tonnes. According to Mr Ole-Andreas Hafnor, Senior Vice President of DNV, Shell was 'reasonably in line' but underestimated the figure by omitting oil still remaining in the piping.

It was discovered that the estimate of Greenpeace was inaccurate because the environmental organisation's representatives had taken samples in a 6-inch diameter vent pipe, thinking that they were sampling the tanks.

On metals and chemicals, DNV found that Shell was 'more or less in line'.

A larger amount of sludge was found in the storage tanks than Shell had indicated – 300 tonnes compared with 100

tonnes. This was almost entirely in two tanks that were damaged during operation some years ago and consequently open to the sea. The other tanks were virtually empty – the sludge was only 8 cm deep. In Shell's view the sludge had built up in the two damaged tanks since decommissioning in 1991, perhaps as a result of a build-up of decaying marine growth.

Confirming the original Shell claim, the report stated that only natural radioactivity was found in the sludge and that the concentration was so low that it was below the European definition of radioactivity.

On the allegations of hidden toxic waste on board, the investigators discovered no evidence to prove such claims and concluded that the individual responsible for them was unreliable.

Speaking in London, Mr Hafnor emphasised that DNV was asked only to carry out this independent inventory and had no comment to make on the best disposal option for the installation.

Shell Expro subsequently welcomed the DNV report. Mr Rothermund said, 'DNV's report will form another valuable input to the new way forward for the Spar. With this satisfactory conclusion to the DNV audit, we can now concentrate our efforts on finding the best solution to the Spar disposal.'

For its part, Greenpeace also welcomed the report, stating that figures were not important, while emphasising that its campaign in the summer had been against all dumping at sea.

Guidelines for the Identification and Control of Hazards during the Proving of Road Loading Gantry Meters

These new safety guidelines, published by the Institute of Petroleum, have been produced by an IP cross-committee working group drawn from measurement, safety, electrical, conveyance and operations engineering committees to consider safety aspects of meter proving.

The need arose from three incidents involving meter proving operations during the period 1991-94. Investigations into each incident by the HSE and the companies concerned established common areas and the possibility of static electricity being a major contributory factor.

Members of the Commercial Measurement Committee (PM-D-4), representing both oil companies and proving contractors, confirmed the need for a joint industry investigation, the drafting of agreed safety procedures to be observed by all concerned and a detailed response to the HSE.

This immediately led to the setting-up of an oil company consortium research project, known as Project Thor, to review and update previous research and field measurement work carried out on the generation of static electricity during truck-loading operations and to study the meter proving operation in detail.

At the same time

the Institute set up the meter proving safety working group and gave it the following scope of work:

- Review and implementation of the recommendations of Project Thor
- A confidential review of existing industry procedures and operating methods for meter proving
- Conduct an overall review of the meter proving operation and carry a detailed risk assessment study
- Produce a guidance check-list covering areas of technical and operational responsibility
- Prepare industry guidelines on safe practices for meter proving, applying the principles of risk assessment at each stage
- Recommendations for communication and training and consideration of a common 'standard' for meter proving technicians and operating staff assessment

In October 1994 the findings of Project Thor were presented to the HSE and immediately followed on 1 November by a one-day Open Forum held at the Institute. The conclusions and recommendations from Project Thor were presented together with work on the development of industry guidelines to ensure that consistent safe standards are applied to meter proving operations in the United Kingdom. The forum was well attended, welcomed by delegates from both the oil industry and HSE, and generated much useful discussion.

Liaison was maintained with the HSE during finalisation of the Safety Guidelines prior to their publication.

The outcome of the proposals for communication and training has been extremely positive. The Meter Proving Association has been formed by the contractors who carry out this specialist work and through the Petroleum Employers Skills Council (PESC) it has prepared and submitted a specification and proposal for a Meter Proving Technician's NVQ. Final approval and funding is now awaited from the Central Advisory and Training Services of the Department for Education and Employment.

In order to update knowledge on this important subject, the Institute has formed an Electrostatic Hazards working group, which also has a cross committee membership strengthened by experts from research establishments. Consultation will take place with the HSE and all associations and authorities involved with the oil industry. The fundamental terms of reference are to draft a comprehensive document on the origins and control of electrostatic hazards in the downstream petroleum industry, using terms readily understood by persons managing operations in that sector. Publication of this document is scheduled for early 1996.

J D Snook, Chairman,
PM D-4 Commercial Measurement Committee



London Branch

Offshore Oil & Gas Field Development Planning

Tuesday 7 November 1995, at the Royal School of Mines, Imperial College, Prince Consort Road (near the Royal Albert Hall) at 17.30.

By Russ Huddleston, The Huddleston Energy Consultancy Ltd

Cost is a major factor in the development of offshore fields. The presentation will focus on the cost centres and cost drivers – the 'macro variables' – for offshore development. Capital expenditure for various technical options for reservoir pressure support, drilling and hydrocarbon export will be discussed. The logic behind the optimisation of those macro variables in a field development plan will be discussed.

The meeting is preceded by tea and biscuits at 17.00 and is followed by light refreshments.

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



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16 November 1995

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This conference is being organised by the IP in conjunction with the Standby Ship Operators Association and the NPF.

For further information and a copy of the registration form, please contact Conference Department, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR UK

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*For further information, please contact:
Lisa Tompkins, Blenheim Exhibitions
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'The most salient feature of the market is its profound uncertainty'

By Cedric Brown F Eng, Chief Executive,
British Gas plc

Last month Mr Cedric Brown addressed members of the Institute of Management and the Institute of Petroleum. The joint meeting was chaired by Lord Ezra MBE.



At the end of last year, I spoke to the Westminster Branch of the Institute of Management on the subject of refocusing the organisation, in order to achieve corporate renewal and transformation. My theme was the intensity of focus needed to cope with competition in the market-place, and how the whole character of a company and its management must shift to face the evolving challenges. I would now like to develop that theme. I will consider how natural gas markets evolve through time in cycles, from their beginnings to maturity, and discuss the critical management issues which arise at every stage.

Natural gas markets across the world will not, of course, follow an identical path; geography, geology, politics and economics will all modify the pace and direction of development. But we can perceive a common progression, which I see passing through three identifiable phases.

The first phase – which I call the natural monopoly – is the emerging national gas market with little or no infrastructure but high potential for growth. Phase two represents a maturing market and the breakdown of this natural monopoly by the introduction of competition. And the third phase begins when national gas companies move beyond their own borders to participate in a competitive global market for gas.

Natural monopoly

To begin, then, let us look at the earliest days in this life-cycle. A comparison with other hydrocarbons is interesting. The development of coal fuelled the industrial revolution; the development of oil supported 20th century industrialisation and the huge expansion of motor vehicles. The development of a natural gas market, however, is usually based on more refined criteria than just the need for raw energy. It is generally chosen as an alternative to other fuels for its economic and environmental qualities, and in order to achieve fuel diversity.

So the common features of a new natural gas market will not only be a foundation of economic growth requiring increased power. There will also be a desire

on the part of governments to obtain the benefits distinctive to gas – particularly in power generation, and a need to limit dependence on oil or other fuels, particularly where they have to be imported. Furthermore, gas is distinguished from other hydrocarbons because it will always depend on a reasonably high degree of geographical coincidence between source and market.

This is not the only way in which natural gas requires a closer relationship between supply and demand than any other hydrocarbon. Before gas can flow from a new field, it needs an identified destination and a large amount of investment in the physical system to get it there – you simply do not have the same flexibility as with oil supply and demand. With gas, the development of both the market and the source of supply must be closely synchronised from the outset.

This applies equally to the United Kingdom in the 1960s, converting from old town gas, to the Philippines in the 1990s, developing a greenfield gas industry. Managing the early stages of a gas market is therefore an exercise in integration to ensure that all the facilities offshore and onshore – develop in parallel.

The management challenges

There are three major challenges in developing a new gas market anywhere.

Most obviously, there is the technical challenge of building an infrastructure to bring the gas from its point of production to the user. In the early years of a gas market a great deal of management resource will be dedicated to developing the pipeline system. Here in the United Kingdom most of us take the gas transmission system for granted. We rarely stop to think that its reach and sophistication probably equals or exceeds any other network in the world. Its creation, essentially within 20 years, was a triumph of engineering and logistical expertise.

Inseparable from developing the transmission system is the challenge of ensuring safety – something else we tend to take for granted here in the United Kingdom. Outsiders see safety in terms of inspection, maintenance and operating guidelines, but in fact it is

a much more complex issue. Safety is essentially about investment in systems and technology which minimise the risk of hazard; in training and organisation which guard against human error; and in adequate resources to respond if an emergency should arise. One of the reasons we have the world's safest gas system is because commitment to safety has always taken priority over any other management issue.

The provision of an efficient and safe gas infrastructure is costly. The assets, once developed, are immovable. So the third great challenge for a young gas industry is to ensure that the system generates an adequate return to earn its funding.

The United Kingdom is of course a model for development within the public sector. But in the case of most developing nations today this will not be appropriate, and the private sector is almost always involved. A successful development therefore becomes a delicate tightrope walk between achieving the government's economic and social aims, and ensuring an acceptable return for investors.

I have described this first phase as a 'natural monopoly'. Dick Giordano spoke at some length on this topic at the World Energy Congress in Tokyo recently. The essence of his argument was that, in the early years of a start-up industry, the law must shield the investor from competition. Regulation must allow the developer to earn their returns through operating the infrastructure and selling its services, just as a power-station developer will need to recoup their investment by operating the plant and selling the electricity.

Countries such as Chile, which are allowing free rein to competitive forces in driving a gas pipeline across the Andes from Argentina, risk either having no gas industry at all, or a geographically patchy one, or duplicated systems which double the cost. The United Kingdom got it right when it launched the natural gas market as a monopoly and kept it that way until the major investments in infrastructure had been funded.

National competition

There is always going to be debate about whether this country moved at the right time to alter the status quo, and I think we will have to leave it to history to show whether or not the timing has been right. Certainly over the past five years we have experienced an astonishing transformation in the gas industry here in the United Kingdom, as we have moved from total monopoly to a competitive market-place.

Many people regard competition as the inevitable result of privatisation but in fact that is not so. Privatisation represents only a change of ownership and the acquisition of shareholders. It does not necessarily alter the character of the market.

It is interesting to note that the government's privatisation programme has in fact meant something very different for various industries and utilities. Some, such as British Airways, were already operating in highly competitive markets and continued to do so under private ownership. Others, such as the water companies, were monopolies before privatisation and still hold that status. Others again, like British Telecom, started out with a limited number of competitors, although this is now changing.

Gas is different. British Gas was privatised as a monopoly – with a 25-year continuation in prospect – but the government quickly changed its policy. Within half a dozen years we were competing with

over 30 other suppliers to serve the industrial and commercial market. Next April, less than 10 years after privatisation, we will see the same competitors extending their franchise into the domestic gas market as well. It is this degree of open competition which distinguishes the UK gas market from its counterparts and which defines its entry into a new phase.

This stage in the evolution of the gas market requires very complex regulation to support it. If you take just the industrial and commercial part of the market, British Gas's share has shifted from 100 percent in 1990 to just 35 percent today. This was effected through unusual regulatory mechanisms which forced the company to relinquish market publishing price schedules to give new entrants a competitive advantage. In the tariff market, prices have been stringently regulated, as have the rates which can be charged by the gas transportation business, TransCo.

The management challenges

The accelerated exposure to competitive forces, combined with onerous regulation, presents the industry's management with quite an array of new challenges. It has certainly produced the government's intended effect of driving up efficiency and productivity and driving down costs. No-one in British Gas would argue that we are not a leaner, more competitive company as a result.

But this is not the only result. Introducing competition to an integrated monopoly drives a wedge between its constituent parts, which have hitherto operated in the mutual interests of the business and its customers. Each discrete business must now compete on the terms of its own market segment. This unbundling is reinforced by the need to separate the transportation business – which serves all competing suppliers – from the trading businesses. So we find now that the great national utility, still known to many customers as 'the Gas Board' is in truth something quite different – a federation of sharply focused business units.

Within this new structure, management has to foster a competitive culture – quite alien from the previous service-oriented mentality – to drive the business forward. The phrase 'changing the corporate culture' is perhaps rather glib for such a difficult and lengthy task. It is never easy to change the fundamental beliefs and behaviours of people, and that is as true for customers, politicians, consumer groups, caring agencies and other bodies, as it is for employees.

Competition alters the whole relationship with the market and although there will clearly be gains, both staff and customers may also feel a sense of loss as things change. The task of management is to maintain the values of the old monopoly utility while meeting the new demands of competition. Customer service, social obligations, safety and security of supply are the traditional values at stake. Competitiveness, profitability, shareholder value and growth are the new values for survival. Few other companies today face the challenge of balancing such an array of different stakeholder interests while at the same time absorbing such sustained pressure for change.

The omnipresent nature of regulation distinguishes the gas industry in the United Kingdom from both the nationalised utility it used to be and the private sector where it now belongs. Managing the uncertainties of the market, the regulatory environment and government policy is in my view a unique challenge. Indeed, the move forward to a completely free market in the domestic gas sector is unprecedented

anywhere in the world. The potential benefits and problems remain extremely finely balanced and it will take the collective efforts of all concerned to ensure that the experiment is a success.

International competition

Completion of the move to a fully competitive market in 1998 is by no means the end of the story. We are now entering a further phase in the market life-cycle, which moves us on to the international stage.

Gas has not in the past been a 'global' fuel like oil. It has been consumed mainly by countries with their own reserves, and has been used primarily as a domestic, commercial and industrial heat source. But recently this scenario has altered. Several factors are combining to change the whole nature of the global gas market.

Firstly, many countries are eager to reduce their dependence on oil imports in order to contain energy expenditure and to minimise the risk of becoming hostage to oil crises. This has intensified international efforts to discover and develop new gas fields. The search has been successful and, based on proven global reserves, there is sufficient gas for nearly 70 years of current production, compared with only 45 years estimated for oil.

Political geography is in many ways as important as physical. Indeed the political changes which have taken place over the past five years or so have opened up the international gas industry dramatically. On the supply side we see this particularly in the former Soviet Union. We also see markets around the world liberalising rapidly in order to attract international investment in their industrial and economic programmes.

At the same time there have been significant advances in gas transportation technology. Long-distance LNG routes are well established, and in many parts of the world gas is already being moved by pipeline across national borders.

It is now quite possible to view gas as an internationally tradeable commodity – many more countries are now importing gas to make up for deficits in their indigenous production.

The management challenges

This emerging global gas market is a battleground for international companies attempting to establish and dominate energy networks. We are talking here of an entirely different challenge from that involved in a national gas supply business, even within a fully competitive market.

For a start, the operating environment conforms to that of any international commodity trade, with issues of over- and under-supply and corresponding price volatility coming to the fore. We have already had a taste of this here in the United Kingdom, as the current oversupply has driven down spot gas prices to very low levels. We might perhaps be tempted to regard this as a 'little local difficulty' except for the fact that in three years' time the United Kingdom will no longer be a physically isolated market for gas.

With the completion of the Interconnector pipeline, linking Bacton in Norfolk with Zeebrugge, there will be the facility for gas to flow between the United Kingdom and the continent. The volume and direction of that flow will depend on a number of factors which even a year ago were far from clear. They include relative beach and border prices at each end of the pipeline, how effectively Britain fights to export its surplus against Russia, Algeria and other countries which sup-

ply continental Europe and how quickly the protectionist policies of some EC countries can be broken down under pressure from customers and suppliers.

We are talking here just of the European gas network, where the industry is well established. How much more intense, then, is competition in the developing world, where international players are vying with each other to develop greenfield gas industries? To be a credible contender in these markets a company must be resourced, managed and organised in an entirely different way from that of a traditional utility. The international operations of British Gas are therefore now organised as a matrix comprising key geographical regions and business units.

Because gas infrastructure projects are very large and capital intensive, they are almost always run by an alliance of international investors, host governments and other parties. They pass through many and complex stages of negotiation and agreement before the deal is done. Managers now need the commercial skills to identify opportunities, negotiate terms, attract financing, form partnerships and strike deals if they are to win this kind of business against aggressive international competition.

British Gas made it clear in announcing our strategy a year ago that we see our long-term growth coming exclusively from our overseas activities. This is the only viable route if we are to reward shareholders effectively in the future.

To be successful, we will have to exercise considerable long-term judgement in the search for and development of gas reserves which are geopolitically compatible with future market opportunities. The distribution of natural gas across the world is particularly uneven. The CIS contains virtually half the world's probable natural gas resources, and the Middle East nearly 40 percent – whereas growth in demand is centred on the developing economies of South East Asia and Latin America. Despite the advances in gas transportation I have described, the supply and demand equation will not come out easily. It will be a tremendous challenge to our strategic vision and tactical ingenuity to reconcile gas sources and markets over the next quarter of a century.

Conclusion

The three distinct phases in the gas market life-cycle which I have described represent a wholesale shift in the status of the natural gas industry – from national utility to international enterprise. This in turn radically alters the role and responsibilities of management. British Gas must manage itself like any other plc engaged in the development of major overseas projects and in the supply and sale of an internationally traded commodity.

We retain a heavy burden of regulation in our home market which continues to consume a good deal of management time and effort. I trust that this will wane as market forces come into full and proper play and artificial regulatory measures are abandoned. This, together with the completion of our restructuring, will free us to concentrate on our long-term strategy.

But perhaps the most salient feature of the market at this moment is quite simply its profound uncertainty. This has been created on the one hand by changing government and regulatory policies, and on the other by commercial pressures and volatilities. Managing that uncertainty to emerge successfully into the next century is the greatest challenge facing our industry. Success will represent a great triumph which I hope will deserve a place in the management textbooks of the future. 

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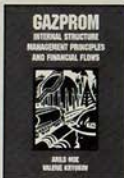
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European gas supply during the next 10 to 15 years

By Andrew Wright, MAI Consultants Ltd

Over the past 15 years energy demand in EFTA and the EU has increased from 855 million tonnes of oil equivalent (toe) to 894 million toe, while East European energy demand has decreased from 260 million toe to 189 million toe. At the same time there has been a significant change in the fuel mix in all the European economies away from solid fuels and oils to gas and electricity driven by structural changes in industry. EU and EFTA gas consumption increased from 145 billion cubic metres (bcm) in 1974 to 284 bcm in 1993, an annual increase of 4.8 percent, while Eastern and Central European gas production rose from 33 bcm to a peak of 80 bcm in 1987, falling to 66.6 bcm by 1993. Indigenous production over the period increased from 164 bcm to 239 bcm in 1993, requiring imports of about 38 percent of consumption from outside Europe.

The cost of gas varies considerably throughout the European Union. EU average gas prices are closely related to the cost of oil and steam fuel, although a recent study by Professor Peter Odell shows that gas trades at a small premium to other fuels. Gas prices to consumers in 1993 were highest in Ireland, Spain and Portugal, which rely on expensive sources of indigenous gas or LNG and cheapest in the Netherlands, Belgium and the United Kingdom. The Netherlands and the United Kingdom are largely reliant on domestic production and Belgium on relatively cheap imports from the Netherlands and Norway. The cost of gas to consumers in Italy which imports from Algeria, the Netherlands and the FSU and Germany which imports from Norway, the Netherlands and FSU are 4 to 10 pence per therm higher.

The more mature gas markets in Germany, France, the United Kingdom, Italy, Netherlands and Belgium are all undergoing significant change through deregulation and increasing competition. Southern European countries such as Spain,

Portugal, Greece and Turkey are increasing their gas distribution networks and contracting new sources of pipeline gas from North Africa and Russia and LNG, while in Central Europe gas authorities are being reformed and in some cases privatised.

Future demand

Numerous estimates of future gas demand to 2010 have been published, all of which show an increase in gas consumption from 350 bcm in 1993 to 470 or as much as 630 bcm in 2010, an increase of 120 to 280 bcm. Gas practitioners may take heart from these estimates but it is salient to remember that US gas consumption fell by 8.5 percent from 1973 to 1986, while reserves were essentially unchanged at 13 to 17 years supply and overall energy demand increased by 5.7 percent. This fall in gas consumption was driven at least in part by fiscal and legislative uncertainty and increased gas-to-gas competition, two conditions which can be said to exist in the European gas market today.

If industrial growth were 2 percent over the period and the fuel mix were to remain unchanged, gas demand would be 455 bcm by 2010. Householders currently use more than 50 percent of gas, industry 35 percent and power generation 15 percent of gas. A recent paper by Shell predicted a 30 percent increase in use by householders, a 50 percent increase by industry and 300 percent increase in power generation to 2010.

This predicted change in the fuel mix is driven by a number of factors. Householders do not switch fuels often, so planned extensions of the gas distribution system, particularly in Southern Europe, will be a strong driver of new demand. Gas is low in dust and particulates, low in nitrogen dioxide and sulphur emissions and is perceived as an environmentally more acceptable fuel in power generation than coal, oil or orisulmation. This perceived environmental benefit coupled with combined cycle gas turbine power generation technology which is cheap and quick to build and highly efficient will increase the penetration of gas in the power sector.

Future supply

Future gas supplies will depend on future levels of demand, a decline from reserves currently under production, development of gas in discovered pools, new field exploration, existing sources of pipeline gas and LNG and new sources of supply.

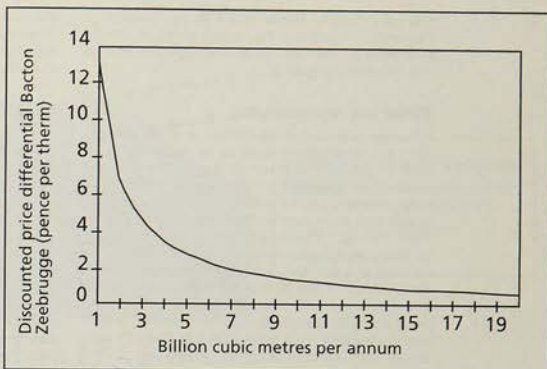
Reserves under production or in development

European gas reserves were 6,000 bcm in 1993, more than 24 years supply at 1993 production levels of 239 bcm. More than 75 percent of Europe's reserves are in three countries – the United Kingdom (10 percent), the Netherlands (32 percent) and Norway (33 percent). These countries will dominate indigenous production to 2010.

The Netherlands and Norway are the only significant exporters to the rest of Europe at present, with annual exports of 43 bcm and 24.5 bcm respectively. Dutch reserves are dominated by the mature Groningen field and production is unlikely to increase significantly. Developed Norwegian reserves are approximately 1,950 bcm with delivery obligations of more than 54 bcm from the year 2000, compared with 1993 production of 29 bcm but could be increased to 65 to 70 bcm from existing and planned developments, when new export infrastructure to France and the second Zeepipe to Zeebrugge are complete. UK developed field gas reserves of 1,275 bcm are dominated by second generation gas fields and associated gas production which will go into decline from the end of the century to 2005.

Undeveloped discoveries

In Norway there are 512 bcm of reserves awaiting development, including 250 bcm of largely associated gas in mid Norway and a further 350 bcm in the Barents Sea including the Snøhvit field which has been considered as a possible LNG development. In the United Kingdom undeveloped reserves are estimated at 640 bcm. Estimates of field Capex and Opex using MAI's QUESTOR™ project costing and cost optimisation software suggest that UK offshore discounted field development and operating costs are between 2.5 and 6 pence per therm. Offshore tariffs are in the region of 2 to 3 pence per therm for most developments. New Southern North Sea developments can therefore deliver gas to Bacton at 4.5 to 9 pence per therm plus finding and appraisal costs with new Central North Sea gas developments delivering gas to Bacton at 6.5 to 11 pence per therm plus finding and appraisal costs, including onshore transport costs from St Fergus.



Whether these developments proceed will be a function of:

- Demand in the UK, which is unlikely to require new sources of gas before 2005,
- The cost of moving gas to Europe and
- The price of UK gas compared with competing gas in Europe.

The Interconnector which will connect Bacton to the European gas grid at Zeebrugge is expected to be completed in 1998 and will be capable of exporting 20 bcm and importing 10 bcm. The cost of moving gas through the Interconnector can be calculated from the capital and operating costs using a simple set of financial assumptions, such as cost of capital and project payback period, the difference in gas price between the United Kingdom and Europe and gas throughput. To break even over seven years, the Interconnector would need to sell 1 bcm per annum at 13 pence per therm more than the cost of gas at Bacton, 5 bcm at about 2.6 pence per therm and 10 bcm at about 1.3 pence per therm (Figure 1).

Average UK finding costs over the past 10 years, including reserves growth, were 4 pence per therm giving a cost of UK gas in Zeebrugge, before taxes, of 13.1 to 17.6 pence per therm for new sources of Central North Sea gas and 11.1 to 17.6 pence per therm for Southern North Sea gas (Table 1). At these prices Southern North Sea and some Central North

Figure 1
Interconnector - Gas price difference between the UK and Europe and flows of gas required for break even in seven years

Table 1 - Cost of new gas UK gas in Europe before taxes

	Southern Gas Basin (pence per therm)		Central North Sea (pence per therm)	
Finding cost	4.0		4.0	
Development costs	2.5	6.0	2.5	6.0
Offshore tariffs	2.0	3.0	2.0	3.0
Onshore transportation			2.0	
Interconnector, (5 bcm per annum throughput)	2.6		2.6	
Cost of gas before taxes in Europe	11.1	15.6	13.1	17.6

Sea gas should be competitive with new sources of Norwegian supply and the United Kingdom should become a gas exporter when the Interconnector is commissioned (Figure 2).

Reserves replacement

If Europe is to sustain production at existing levels then gas reserves will need to be replaced. More than 75 percent of reserves are in Norway, the Netherlands and the United Kingdom and finding costs in these countries will be key to future levels of production from new indigenous sources of gas. Over the past 10 years offshore reserves, including currently uneconomic reserves, have remained fairly constant at 5,500 bcm, while onshore reserves have declined from 3,800 bcm to 2,700 bcm. Exploration and appraisal well success rates offshore have remained fairly constant at 45 percent, while onshore success rates have improved over the past decade from about 30 percent to 40 percent.

Average finding costs, including reserves revisions, from 1985 to 1994 were 2.8 pence per therm offshore Europe and 6.7 pence per therm onshore Europe, compared with 1 pence per therm onshore North Africa and in the CIS. Finding costs in the North Sea varied from 1 to 6 pence per therm suggesting that future exploration is likely to be a paying game. Onshore the Netherlands, Germany, Romania and Italy finding costs were 1, 3, 5 and 7 pence per therm and all these areas are likely to see future exploration. In other areas of Europe such as the eastern Adriatic, Central Europe, France, Spain, onshore United Kingdom and Ireland, which contain between 10 and 12 percent of European reserves, the cost of finding new gas ranged from 22 to 108 pence per therm and further gas exploration is unlikely to be economic in these countries. Perhaps a more important conclusion is that if finding costs can be maintained at current levels it will be economic to replace nearly 90 percent of Europe's indigenous gas resources.

A comparison of exploration success rates and cost of gas between the UK Southern North Sea and offshore the Netherlands suggests that operators in the Netherlands found and appraised new pools with fewer wells than UK operators. With new technologies such as 3D seismic and best practice from

the Netherlands offshore, it is quite possible that reserves in the major producing areas will be replaced over the next decade at a similar or lower real cost than in the past 10 years.

Existing sources of external gas

In 1993 Europe imported 134 bcm of gas, approximately 38 percent of consumption. There were three principal sources of external gas – the FSU provided 75 percent of external gas supplies, Algeria pipeline gas and LNG 23 percent with minor quantities of Libyan and West Australian LNG.

Gas reserves in Algeria and Libya are over 4,900 bcm, more than sufficient to sustain annual production of 90 bcm per annum. Gas reserves in the three gas exporting states of the CIS – Turkmenistan, Uzbekistan and Russia – are in excess of 53,000 bcm, of which 31,700 bcm is under production and should be able to sustain current production of just over 700 bcm, of which 100 bcm is exported to Europe, given some investment in bringing new fields on stream and pipeline maintenance.

New sources of pipeline gas

There are five alternative sources of new pipeline gas into Europe – Algeria, Libya, Central Asia, Russia and the Middle East – which could deliver well in excess of 400 bcm per annum (Table 2).

Which external sources of pipeline gas that Europe contracts for the next century will be greatly dependent on political stability in Algeria and market development in Russia:

- In 1994 Russia produced 706 bcm of which 597 bcm entered the transmission system. 317 bcm was supplied to Russian customers and 90.4 bcm to the CIS, with 100 bcm exported to Europe. The remainder was used in increasing storage gas and as pipeline fuel.
- Gazprom was only paid for deliveries of 205 bcm in 1994 against deliveries of 517 bcm. This 205 bcm could be switched to paying customers in the west.
- The average May 1995 delivered price of gas in Russia was 6.7 pence per therm, yielding a well head netback price of gas of 0.5 pence per therm. Gazprom could improve the

Table 2: Cost of new sources of European pipeline gas before taxes and transit tariffs

Source of pipeline gas	Cost in NW Europe (pence per therm)	Cost in S. Europe (pence per therm)
UK-SNS and CNS	11.1 to 17.6	15.1-22.6
Norway-North Sea	17.0	22.0
Algeria/Libya	17.7	12.7
Russia- energy savings and switching customers including \$10 billion on refurbishment	11.7	12.5-19.0
Russia-Yammal	17.6	18.5-24.9
Kazakhstan-Karachaganak		22.4
Azerbaijan/Turkmenistan via Turkey		10.8-31.0

netback wellhead price of gas by selling as much gas in Europe as possible at the expense of both paying and non paying customers in the CIS even after construction and repair of the necessary export infrastructure.

● Russian production is down 30 bcm on peak production in 1990 due to contraction in the domestic market which could, if the export capacity was available and the lost production was restored, be exported to Europe.

● Russia uses eight people to achieve the same production as one person in North America and Mexico and seven times the amount of energy. If the CIS were to achieve the same levels of energy efficiency as NAFTA, CIS gas consumption would fall to about 70 bcm.

A further consideration is Gazprom's capital and operating costs. A 1993 Russian oil and gas equipment survey, conducted by MAI Consultants, suggested that some of Gazprom's equipment costs are as little as 25 percent of western costs, largely because the opportunity costs of labour, plant and some inputs such as energy are small. If these 'real' costs and the opportunity cost of selling to CIS customers are taken into account when estimating the cost of Russian gas in Europe, it is doubtful if other pipeline sources can compete at least in North West, Central and Eastern Europe.

LNG

Algerian, Libyan and small quantities of West Australian LNG provide about 5.6 percent of total European gas demand. There are currently three LNG projects approaching commitment in Nigeria, Qatar and Oman which have capacity for exports of 4.3, 16.9 and 5.0 mty respectively. Of this potential 26.2 mty, 7.74 mty or 10.5 bcm has been contracted for Europe. In addition there are more than 13 LNG projects under consideration worldwide with a total export capacity of 139 bcm. Six of these schemes – Abu Dhabi, Qatar, Yemen, Norway, Trinidad and Venezuela – could supply 60 bcm of gas to Europe. With increased pressure to liberalise European gas markets and negotiated third-party access to transmission systems, the cost of pipeline gas in Europe is likely to decline. Against this background and minimum prices of at least \$3.5/MMBtu or 22 pence per therm for LNG, it is unlikely that liquefied gas will increase or even maintain its current 5.6 percent share of the market.

Market development

There is more than 500 bcm per annum of indigenous, pipeline and LNG gas supplies that could be delivered to Europe in the next 10-15 years. Which gas reaches

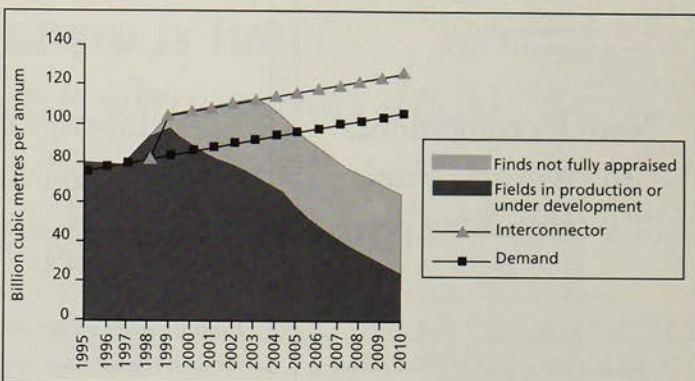


Figure 2: UK production, 1995-2010

the market will be a function of cost of gas, security of supply and the ability to finance new field developments and infrastructure.

Risks within the gas market are changing with market deregulation and negotiated third-party access. Transmission companies will be increasingly reluctant to enter long-term take-or-pay contracts when gas-to-gas competition may lead to customer switching. Producers who currently face reservoir and price risk will also be faced with volume or revenue risk. The consequent cash flow uncertainties for transmission and production companies will make new infrastructure and field developments more difficult to finance.

In addition there are considerable sovereign risks in bringing on stream new sources of pipeline gas from countries like Algeria, Libya and Russia. However, in a mature market where much of the infrastructure is already amortised, demand is strong and driven by householders and power generation projects, the need for transmission companies to retain monopolies and prevent gas-to-gas competition is greatly reduced. Strong end-user demand may be sufficient to overcome the traditional conservatism of banks, gas monopolies and some producers, with imaginative projects like the Interconnector becoming the norm rather than the exception. Industry in countries such as France and Germany faced with higher energy prices than competitors in the United Kingdom and Benelux countries will force the necessary structural changes in their gas markets simply to remain competitive.

Existing producing areas within Europe will continue to be important with new field exploration and new developments in the North Sea, onshore the Netherlands, Germany, Italy and Romania. Other areas such as the Adriatic and Western Black sea are more marginal and no exploration is likely in much of Central and Southwest Europe. New sources of gas are likely to be pipeline gas either from Algeria, Libya or Russia. Likely winners include Libya, which has huge untapped gas and a stable energy sector, and Gazprom, which has the option to switch existing production to paying customers in Europe and the possibility of bringing new projects such as Yamal on stream at a fraction of the cost which could be achieved by western companies operating in the CIS.



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The future is now? Recent hydrocarbon deals reveal dynamics of emerging world oil order

By Peter S Adam

A spate of recent link-ups (and one reportedly under discussion) between different major global oil companies and smaller, relatively speaking, regional outfits have been keeping denizens of the US oil patch and a number of international financiers busy this year. These arrangements include: YPF's acquisition of, and merger with, US-based Maxus Energy; Shell's joint venture with Amoco and a separate joint venture with US producer Tejas Gas; Mobil's joint venture with a Russian retail outlet that will establish a marketing operation in the Moscow area and its (Mobil's) possible acquisition of a share of the Kazakhstan government's participation in the Caspian Pipeline Consortium. These deals reveal both the array of forces currently driving the hydrocarbon industry and the strategies different players are adopting to deal with the dynamics of the international oil and gas enterprise as the 21st century approaches.

Upstream... downstream

Upstream it seems that the industry's major players have largely abandoned the hunt for new elephants. Instead, companies intend to develop major fields that were discovered decades ago and smaller ones where the geological prospects are less favourable, an effort that advances in technology is making increasingly feasible. And downstream, having uncoupled profit performance from the vagaries of crude markets – driven as they are by a hard-to-predict combination of OPEC moves and Middle East petro-politics, seasonal factors and inventory requirements, the weather, as well as the elusive ebb and flow of trading-floor sentiment – major

companies, at least, have become less pre-occupied with global guesstimates of the direction of crude prices medium- to long-term. And having 'right-sized' in gushers of pink slips over the past few years, these companies have now adopted strategies which emphasise establishing niches in markets they can dominate or in which they can at least manage risks.

Don't cry for cash, Argentina

Last summer YPF SA, the former state-owned Argentine oil company, purchased US-based Maxus Energy for \$750 million, in cash, acquiring reserves in the United States, Venezuela, Ecuador, Bolivia and Indonesia. It then merged with Maxus. This was a major step in the transformation of YPF from a regional entity into an international player with top tier prospects. In terms of reserves YPF can class itself among the major international oil companies. But that is only one aspect of the company's growing strength and increasingly global presence.

The Maxus merger/acquisition followed significant progress YPF had made in unshackling itself from the control of the Argentine government and entering onto the world stage. In the run up to its 1993 privatisation YPF shed \$2 billion of its \$6 billion in assets and let go of an astounding 80 percent of its workforce. Its financiers then engineered, in the words of one investment banker, 'one of the monster equity deals of the decade,' the third largest non-US share offering ever. International investors, who could pick up Argentine reserves for somewhere between \$1.80 and \$2.00/boc, flocked to the IPO. The offering set the stage for changing YPF from a state-owned quasi-utility which created employment for politician's relatives and cronies and supplied a protected domestic market into a profit-driven international contender.

And as it goes about bolstering its international presence, YPF has something that its most adept, experienced and well-heeled competitors don't – a virtual lock on its home market. While the Argentine oil and gas sector is deregulated, with over 100 different entities competing there, YPF looms particularly large on the Argentine horizon. Everywhere it is pre-eminent, having arrived first with the most. YPF owns or is responsible for refining or marketing about half the oil and gas in the country. And overall demand for hydrocarbons is expected to grow by 75 percent by 2010. Though smaller and still regional in orientation, YPF is fully integrated and far more balanced than many of its potential world-class competitors. And given the prospects for its operation in Argentina, lending officers and investors are likely to remain enthusiastic about bankrolling YPF's global expansion.

Economies of scale in production

In a deal only somewhat less dramatic than the YPF Maxus acquisition-merger, Shell Oil Corporation

and US-based Amoco have announced plans to form a limited partnership which will combine their exploration and production assets in one of the United States' most prolific areas – the greater Permian Basin area of west Texas and southeast New Mexico. This is the first time that two major oil companies have attempted to form a new company that merges assets covering an entire US geological basin. The plan calls for ownership in the new company to be based on the relative value of assets contributed: 65 percent Amoco, 35 percent Shell. Start-up of the partnership operation is expected by the middle of next year.

The economics of such an arrangement are compelling. It will allow both companies to increase profits and ultimate recovery by boosting production and lowering costs. The partners stand to generate several hundred million dollars in additional cash flow over the life of the assets by maximising equipment utilisation, applying better production practices, minimising infrastructure and overhead redundancies – which means, of course, more pink slips.

Currently the combined entities produce 210,000 barrels of oil, 245 mmmcf of natural gas, 22,000 bbl of natural gas liquids a day all from 12,000 wells. The Permian Basin operations of Shell and Amoco now employ 1,300 people, and soon probably a lot fewer.

Deep in the heart of Tejas

In another US-based deal, Shell Oil has joined with Tejas Gas in establishing an entity known as Coral Energy Resources Limited Partnership that starts business 1 November as an independently managed company headquartered in Houston. Coral Energy will consolidate the natural gas marketing activities of Tejas Gas and Shell. It will offer customers the reliability of Shell's large gas reserves and production with the swing capacity and flexible delivery options of Tejas Gas' pipelines and storage.

The two entities fit well. Shell is the fourth largest US gas producer with a tremendous amount of new production coming onstream over the next few years. Tejas Gas has 130 billion cubic feet of storage capacity and pipelines which can carry an additional two billion cubic feet a day into the US market through major pipeline connections. The partnership will be able to utilise the strengths of both companies.

Coral will immediately become one of the top five gas marketers in the United States and will move approximately 3.7 billion cubic feet per day. It has ambitious expansion plans and intends to expand into other energy businesses including electricity.

The financial aspect of the arrangement is particularly noteworthy. The entity will provide financing services for energy sector projects, the financial stability provided by the parent companies. The company has retained Bankers Trust to provide specially tailored risk-management services.

Mobil on the move

Mobil Oil Corp is also engaged in international deal-making in Russia with a well-conceived retail marketing approach, and in Kazakhstan with its possible involvement in the Caspian Pipeline Consortium which may need a steady hand to build, as well

as closer to home in the countries of Latin America.

With regard to Russian downstream activity, Mobil has recently entered into a joint venture with a local company, Balcar, to set up retail outlets in the Moscow area that will sell Mobil fuels and lubricants to the region's 10 million inhabitants. The deal gives Mobil quality control over fuel throughput which it will buy from a nearby refinery. And the outlets will meet Mobil's most recent retail outlet standards.

Although the venture will start operating in 1996, there is no certainty as to how fast it will develop. The venture plans eventually to have 30 to 50 sites and estimates throughput at 10 million litres per year per outlet. But there is no rush, and Mobil is prepared to build its Russian marketing operation gradually and prudently.

A company representative explained that the investment will be completely 50:50; the joint venture will lease, not buy, the land for the outlets. She acknowledged that it is sometimes difficult to decide exactly whom to deal with regarding land and legal jurisdictions – and neither partner will risk getting involved in such disputes.

The stakes are high. The market in Moscow – and in all of Russia – is huge, deregulated and business conditions often chaotic. But the only major foreign competitor is Agip. The Italian company has only one large experimental retail outlet in the area. Mobil has entered the market at an early stage.

In the Republic of Kazakhstan, for example, the government is reportedly offering to sell Mobil half of its stake in the Caspian Pipeline Consortium, CPC. Here the Kazakhs and Chevron had planned to move 700,000 bbls of crude per day from the giant Tengiz field (proven crude oil reserves: six billion barrels). They have thus far only been able to reach 60,000 bbls/day because of a dispute over the construction of the pipeline from Tengiz to the west.

It will be interesting to see whether Mobil does become involved in the consortium and, if it does, the terms it negotiates.

In addition, Mobil has been establishing marketing and production arrangements in Latin America, its own back yard so to speak. With the establishment of a new production affiliate in Venezuela and a lubricant marketing venture in Argentina, entry into Peru's fuels market, and its capture of the largest share of the private fuels market in Colombia, Mobil is successfully augmenting its downstream marketing activities in Mexico, Brazil, Chile and Ecuador, as well as throughout the Caribbean.

Hammering out the future

In an increasingly fragmented and in many ways less stratified industry, where competition is open and success is determined daily by a combination of petropolitics and bare knuckle market free-for-alls in the trading pits, those who prosper are likely to be those who most successfully follow the approach of doing risky things very cautiously.

Those who bet the ranch may earn fortunes. Most publicly-held oil companies will continue to prosper, win, lose or draw, with a cautious approach to risk, regardless of what happens to the speculators, bulls and bears alike, who at the end of the day risk getting hammered.

Venezuela opens up to explorers

By Maria Kielmas, Editor, Latoil

The opening of Venezuela's first exploration bidding round since oil nationalisation in 1976 was a turning-point in the country's energy policy. The state oil company, *Petroleos de Venezuela (PdVSA)*, has said that the bidding round could generate investment of some \$11 billion eventually in development investment and that over the next 10 years, nearly 20 percent of a planned \$55 billion, 10-year state oil company investment programme could also come from foreign or private sector oil investment. Should this optimistic prediction materialise, Venezuela, whose 2.75 million b/d oil production in October was some 400,000 b/d over its Opec quota, will remain both the dominant oil producer in Latin America and the top-ranking oil exporter to the US market. In May this year, Venezuelan oil exports topped 1.43 million b/d, or some 16.8 percent of the US market, compared with Saudi Arabia's 15.7 percent.

Curing the crisis

But Venezuela has just endured the most crisis-ridden few years since its return to democracy in 1958. This crisis is in contrast to other Latin American countries where political destabilisation marked the end of military dictatorships, the transition to civilian governments, attempts to consolidate a democratic change-over of power and profound economic reform. The crisis in Venezuela centres around the decomposition of an established democratic government and its institutions, and where oil export revenues, rather than general taxation, have provided all social welfare benefits and infrastructure development. Although the second administration of President Carlos Andres Perez, who in his first term nationalised the oil industry, came to office in 1989 and tried to introduce a more market-based economic system, these measures were designed only as a short-term solution, and did not attempt to tackle a much needed reform of the state. Following two failed military coups, Mr Perez was removed from office in 1993 on the basis of allegations about the embezzlement of state funds. After a transition government headed by the former presi-

dent of the national congress, Ramon Velasquez, a new president was elected in December 1993, taking office in February 1994.

The current government of President Rafael Caldera has attempted to solve the country's problems by returning to the interventionist policies of the past. Some 15 percent of GDP has been spent in bailing out almost half of the national banking system and nationalising the other half. This was triggered by the collapse of the country's second largest bank, Banco Latino, in 1994. The result has been the introduction of draconian price and exchange controls – though the government stresses that the oil sector is exempted – a worsening crisis and an ever-growing sense of political and economic disintegration. Although talks with multilateral lenders, including the IMF, are underway, the government's only real answer so far has been to encourage further foreign investment in the oil sector. Although they have not shirked from criticising the punitive legal and fiscal terms which govern the present exploration bidding round, interest from international oil companies has flooded in.

PdVSA announced that some 75 companies have pre-qualified to bid. But reliance on foreign oil investment alone to resolve Venezuela's crisis may result in it deepening further, since other economic sectors tend to be ignored.

Exploration round

The exploration round which was launched in late July was the culmination of a four-year process of gradually opening the oil sector to private sector investors. The first stage was to promote so-called 'strategic associations' between PdVSA and oil companies in high-cost, high-risk investments such as the development of heavy crude reserves. This was followed by bidding rounds aimed at enhancing oil production in marginal fields. The exploration opening was the most politically controversial. The national congress spent more than a year debating the model contract, with approval only being finalised at the end of the congressional session in July this year.

The round is offering 10 exploration areas, each of which is divided into 16 blocks comprising about 126.5 square kilometres. The 10 areas are located in the Maracaibo (Catatumbo and La Ceiba areas), Barinas-Apure (Guanare and San Carlos areas) and Eastern Venezuela (El Sombrero, Guarapiche, Gulf of Paria East, Gulf of Paria West, Punta Pescador and Delta Centro areas) basins. The easternmost areas are regarded as the most prospective, while two central areas, San Carlos and El Sombrero, are thought to be both gas prone and far from a convenient infrastructure. The terms of the round specify an initial exploration period of three to five years (phase I) which may run to an extension of a further three to four years (phase II). On approval of a com-

mercial discovery the operations period (development and production) is for 20 years, extendable for a further 10 years. PdVSA has the right to back into a commercial development for an interest of between 1 percent and 35 percent. The state company will pay for exploration back costs in proportion to its share. But this repayment will be only for that drilling which has been conducted in a discovery area under development, and not in an original exploration area. The original private sector investors in any block will be obliged to finance PdVSA's back-in by lending the funds to the state company at a rate of six-month LIBOR plus 1 percent per annum, payable from the state company's post-tax cash flow.

Licence terms

The fiscal regime stipulates a state take of between 71 percent and 88 percent. This comprises a royalty of 16 percent, subject to reduction in the case if fields whose rate of return is less than 20 percent. According to PdVSA officials, this royalty will fall to 1 percent at a rate of return of 12 percent, though the sliding-scale in between has not been defined precisely. The royalty is payable in Venezuelan currency (bolivars) and is based on a well-head price calculated with reference to export prices for a basket of Venezuelan crudes and formula-based transportation costs. Corporate income tax for oil companies falls at 67.7 percent. There is an additional profits tax called the *participación del estado en las ganancias* or PEG, which acts as a super-royalty. This is the only variable stipulated in the bidding round and will be fixed, at the percentage specified by the investors in the winning bid, for the first \$1 billion of production from a given development area. The PEG will be calculated and paid in bolivars unless the Venezuelan congress approves the use of US dollar accounting for income tax purposes, in which case it will be calculated in dollars. In addition, the PEG is deductible for tax purposes. PdVSA officials said that post-tax PEG will be about 30 percent of the original amount.

The winning bidders sign a contract, the association agreement, with a PdVSA affiliate, *Corporación Venezolana de Petróleo* (CVP), the original name of the state oil company. The contract in turn must be approved by congress. Management and supervision of the operations will be conducted through a two-tier system: the control committee and the management committee. The control committee will be composed of an equal number of members chosen by the investors and CVP. It will be presided over by members selected from CVP, whose presence and consent will be required for all of its decisions. Such decisions will include approval and amendments to a minimum work programme, extension of exploration periods, evaluation of exploration and development plans, and the adoption of any production cuts should these be required through international obligations such as OPEC quotas. The committee president, a CVP nominee, will have the casting vote and will be expected to vote in line with the 'national interest.'

The management committee will be a Venezuelan stock company in which 35 percent of the shares will be held by CVP and the remainder by the investors. Its purpose will be the direction, co-ordination and supervision of exploration, development, production and transport from the development area. All decisions in this committee will be approved by a simple majority vote. The exploration contract will be governed by Venezuelan law. International arbitration as such does

not exist. Only the management committee's rulings may be challenged under international procedures but governed by Venezuelan law. The control committee's decisions are not open to any arbitration whatsoever.

Company categories

Under the original bidding regime, PdVSA drew up five categories of companies which may participate in the round. The distinctions depended on financial and technical merits, with the operator of any group holding at least a 30 percent interest in any area, while the minimum participation is no less than 10 percent. This classification effectively barred small foreign independents from participating. The same was expected to hold for Venezuelan national companies, most of which do not have a large enough capital base and which also lost a large part of their deposits during the banking crisis. However, PdVSA changed the rules as it was adjudicating applications for pre-qualification, downgrading some applicants into a sixth bidding category, excluding them from the most prospective blocks, but proposing an option for them to include a Venezuelan national partner. The foreign companies would be expected to finance the Venezuelan partner's exploration obligations, receiving reimbursements in an as yet unclarified manner. An attempt to make the inclusion of a Venezuelan partner mandatory in the exploration contracts was defeated during the congressional debates but now many potential investors see the new rules as a back-door way of achieving the same.

Foreign company worries

This rule change has added to existing foreign oil company qualms about the round, such as the high tax levels and the lack of operator control. Its attraction was the possibility of finding significant oil reserves which would balance in part the high tax load. PdVSA asserted that the blocks on offer hold 7-23 billion barrels but countered pessimistic views of the fiscal terms by asserting that discoveries of between 50 million and 100 million barrels would be profitable. Oil company executives doubted the more optimistic PdVSA view, believing that discoveries of at least 300 million barrels would be the minimum profitable field size. But they admitted that the booking of reserves on company balance sheets rather than short-term cash flow was the principal motivating factor behind the investor interest.

While both the government and PdVSA have stressed publicly that the oil sector is exempt from foreign exchange controls, first imposed in June 1994, in private some officials are worried. Local subsidiaries of foreign manufacturers are already either considering closing their Caracas offices or moving them to Bogotá in Colombia, because of the lack of foreign exchange in Venezuela. Despite the controls, the foreign exchange outlook has not improved. Foreign reserves were down to \$9.2 billion in October, precluding a lifting of exchange controls which in turn could wipe out the reserves. Meanwhile the government is creating a system of import priorities, in which some goods will have a greater priority than others. While oil industry equipment may be categorised by all sides as top priority, this will have to compete with food imports, which provide 60 percent of Venezuelan needs.

Although the exchange rate was fixed at 170 bolivars to the US dollar when the controls were

imposed, the black market rate then was close to 225. The government opened a legal parallel foreign exchange market when it permitted international trading in Brady bonds (rescheduled government debt). These may be bought in Venezuela at the official exchange rate and sold abroad for dollars, at an early October rate of 285 bolivars to the dollar. Rumours of an imminent devaluation are rife, even though the government has denied such a step. The government is moving ahead in talks with multilateral lenders to raise some \$7 billion in debt and bonds on the foreign markets. The funds are needed for both the troubled banking sector as well as government spending. The fiscal deficit this year is expected to be between \$5.5 and \$8.5 billion, while debt repayment in 1996 will be at least 35 percent of government spending. The problem in achieving this is that, in addition to a devaluation and its inflationary aspects, the government has to change its economic policies from controls and interventions, to a more free market base, and it has to provide collateral for the loans.

Petrol price hike

One step forward has been that domestic petrol prices, some of the lowest in the world, were increased in September. But this was little more than a confidence trick. Optimum petrol, between 85 and 95 octane, doubled in price to 9 US cents per litre, compared with a PdVSA production cost of 12 US cents per litre. But this was balanced by a decrease in the price of lower

octane petrol, while diesel, the main fuel for public transport, remained unchanged. Simultaneously, the government lowered electricity tariffs by 20 percent for low-income earners. The net result was the world was fooled into thinking that the government was moving towards market policies, while the state oil company continues to make a loss on internal fuel sales and the electricity privatisation programme is thrown up in the air by the lack of any firm tariff policy.

Future prospects

Whatever way the government chooses to extract itself from the present crisis will backfire politically and, in the short term, on the oil sector. Multilateral lenders will stipulate matters such as privatisation and social security and labour reform as conditions for their loans. Unlike other Latin American countries, Venezuela has not even considered reforming its corrupt and poorly administered social security system. Any reform will be opposed by the labour unions, unless those reforms are accompanied by greater employee benefits. This prospects of labour conflict and labour unrest has been cited by many potential oil investors as their greatest worry about the country, overriding even that of foreign exchange controls. PdVSA was hit by two widespread strikes earlier this year. The exploration contract does not specify whether unionised or non-unionised labour may be employed at the new exploration sites. The investors think that the unions could force this issue on the government as their price for economic reform.



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Reduced acid volatility process for HF alkylation units

Two refining companies have developed a catalyst additive process to reduce HF (hydrofluoric acid) aerosol formation significantly without reducing catalyst effectiveness or alkylate quality. This process can reduce HF aerosol by as much as 60 to 90 percent in the event of accidental release.

ReVAP (Reduced Volatility Alkylation Process), developed jointly by Phillips Petroleum Company and Mobil Research and Development Corporation, uses a non-volatile, odourless, low-toxicity additive to reduce HF volatility.

ReVAP is a 'drop-in' replacement acid system which can be added to existing HF alkylation units, according to Larry Shoemaker, Refining Technologies Manager for Phillips Licensing Division.

Development

Phillips and Mobil began combined ReVAP research in 1992 by screening several acid and additive combinations as potential catalyst replacements for the HF alkylation process.

During an 11-month study, researchers operated a 15 barrels per day demonstration unit at Mobil's

refinery at Paulsboro, New Jersey. The demonstration proved:

- The ReVAP process is easily controlled
- The ReVAP acid system can be handled safely
- Acid Soluble Oils (ASO) can be separated from the additive with a simple unit operation
- Alkylate can be made under a wide range of processing and feedstock conditions
- Carbon steel and Monel alloy used in conventional HF units is compatible with ReVAP.

ReVAP was designed to be compatible with all conventional HF alkylation systems. The vapour pressure suppression additive is completely miscible in the acid phase but has very limited affinity to other hydrocarbons, including conjunct polymers (ASO), Mr Shoemaker said.

"These useful physical properties allow the additive to be recovered from the alkylate product and from ASO byproducts with simple, inexpensive unit operations," he added.

Alkylate octane from the demonstration unit was similar to that of alkylate from a standard HF alkylation unit, with slight improvements of 0.3 RON-C to 0.5 RON-C (Research Octane Number-Clear).

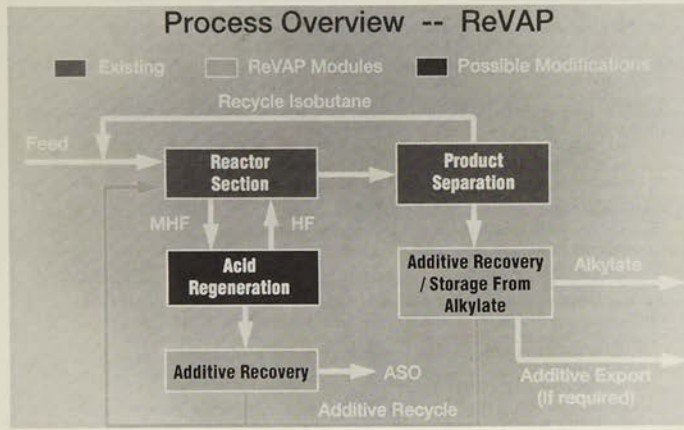
Improving HF alkylation safety

ReVAP development is just another step in continuing Phillips Petroleum's efforts to ensure safe operation of its licensed HF alkylation technology.

Other physical risk reduction features designed into the HF Alkylation units include a self-circulating reactor, remote operating isolation valves, reactor acid compartmentalization, rapid gravity acid transfer and reduced acid inventory requirements.

HF alkylation catalytically combines light olefins with isobutane to produce a premium gasoline blending component which increases octane in unleaded gasolines.

ReVAP
(Reduced
Volatility
Alkylation
Process)





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- ▲ Petrochemicals
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- ▲ Training
- ▲ Valuation/Management of Retail Outlets

Anyone interested should contact Jo Howard-Buxton at the IP, or send a request for the handbook, together with a cheque for £15 to:

Technical Department,
Institute of Petroleum,
61 New Cavendish Street,
London W1M 8AR
Tel: 0171 467 7126
Fax: 0171 255 1472

Chromatography in the Petroleum Industry

Editor: E R Adlard (Elsevier Science, PO Box 1991, 1000 BZ Amsterdam, The Netherlands) 452 pages. ISBN 0 444 89776 3. Price: Dfl435/\$248.50.

Numerous advances have been made in chromatographic methods of petroleum analysis in the past 15 years, including developments in liquid and supercritical fluid chromatography, the advent of silica capillary columns with bonded stationary phases and the commercial availability of new selective detectors. This book covers the latest developments in this field and, while specifically aimed at the petroleum analyst, there is much information of general interest that will be of benefit to a wider readership.

Oil and Gas Equities: Evaluation and Trading

Nick Antill and Robert Arnott (Woodhead Publishing Ltd, Abington Hall, Abington, Cambridge CB1 6AH) 258 pages. ISBN 1 85573 119 3. Price: £75.

This book covers all aspects of oil company evaluation and sets out to bridge the gap between investment theory and practice. It is of use to those with an interest in pricing oil companies, members of the investment industry, bank energy lenders, economic and business school students, and anyone with a professional interest in energy-related matters.

Rebuilding Romania: Energy, Efficiency and the Economic Transition

Walt Patterson (Royal Institute of International Affairs, Chatham House, 10 St James's Square, London SW1Y 4LE) 240 pages. ISBN 1 85383 207 3. Price: £12.95 (paperback).

Prepared in co-operation with a team of senior Romanian energy specialists, this publication provides a unique study of an 'economy in transition' as seen through the eyes of those involved.

Benthic Biodiversity in the Southern Irish Sea

Studies in Marine Biodiversity and Systematics from the National Museum of Wales, BIOMOR Reports, 1.

Andrew S Y Mackie, P Graham Oliver and E Ivor S Rees. (National Museum of Wales, Cathays Park, Cardiff CF1 3NP) 263 pages. ISBN 0 7200 0427 6. Price: £25 (paperback).

The National Museum of Wales carried out two research cruises in the summers of 1989 and 1991 studying the bottom-living animals of the southern Irish Sea, the results of which are published in this report. While the primary objective was to obtain specimens of invertebrates for taxonomic and biogeographic purposes, the subsequent licensing of hydrocarbon exploration blocks off southwest Wales makes the ecological aspects of the study of particular interest.

Handbook of Analytical Methods for Fatty Acid Methyl Esters Used as Diesel Fuel Substitutes

(Research Institute for Chemistry and Technology of Petroleum Products, University of Technology, Geteidemarkt 9, 1060 Vienna, Austria) 71 pages. ISBN 3 9014 5700 3. Price: ATS450.

This handbook discusses both standardised and specialised methods of testing fatty acid methyl esters used as diesel fuel substitutes.

Crisis Management in the Power Industry: An Inside Story

Frank Ledger and Howard Sallis (Routledge, 11 New Fetter Lane, London EC4B 4FH) 341 pages. ISBN 0 415 11876 X. Price: £35.

This book is a study of crisis management in the electricity supply industry over the last 70 years. The full implications of the vulnerability of the industry are examined with reference to past industrial action.

Flame and Combustion

J F Griffiths and J A Barnard (Blackie Academic & Professional, 2-6 Boundary Row, London SE1 8HN) 309 pages. ISBN 0 7514 0199 4. Price: £27.50 (paperback)

Now in its third edition, this publication covers all aspects of combustion phenomena including the latest understanding and concerns of combustion scientists and engineers. Each chapter concludes with extensive recommended reading lists and problems (with numerical solutions) to aid understanding of the material. Postgraduate and undergraduate students of chemistry, chemical and mechanical engineering, fuel technology and environmental science will find the book of use, as will workers in combustion-related areas.

Elements of Petroleum Processing

D S J Jones (John Wiley & Sons Ltd, Baffins Lane, Chichester, West Sussex PO19 1UD) 408 pages. ISBN 0 471 95254 0. Price: £75.

Citing real life scenarios and actual problems, this practical guide provides the reader with an insight into the day-to-day operations of the petroleum industry. With detailed description of the nature of crude oil and its refining by distillation, thermal and catalytic cracking and gas recovery, the book also outlines 'rules of thumb' for refinery design, plant operation and process trouble-shooting.

GAZPROM: Internal Structure, Management Principles and Financial Flows

Anil Moe and Valery Kryukov (Royal Institute of International Affairs, Chatham House, 10 St James's Square, London SW1Y 4LE). ISBN 1 899658 13 0. Price: £120.

This book looks at the evolution of the administrative structure of the Russian gas industry and the transformation of Gazprom into a joint stock company. Other topics covered include the development of the pricing system for gas in Russia, internal transfer prices in the gas industry and the main mechanisms of financing.

Foams: Fundamentals and Applications in the Petroleum Industry

Editor: Laurier L Schramm (American Chemical Society, Distribution Office, Department 225, 1155 16th Street, NW Washington, DC 20036, USA) 555 pages. ISBN 0 8412 2719 5. Price: \$129.95.

This publication provides an introduction to the nature, formation, propagation, stability, properties, and uses of foams in the petroleum industry. The primary focus is on the applications of the principles of foams and includes attention to practical foam processes and problems. The book will be of interest to scientists and engineers involved in almost any aspect of the petroleum industry, especially those involved in enhanced oil recovery and foam research.

INSTITUTE NEWS

NEW MEMBERS

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Have you moved?

**If so, please give your
new address to
Membership Department**

Embryonic East Anglia Branch

Plans to establish an IP branch in East Anglia are progressing following a preliminary meeting of 25 interested members, in June, addressed by the IP Director General and the Chairmen of adjacent IP branches. In September a Branch committee was established to manage the initial stages and develop a programme – they plan an inaugural meeting in January 1996. There are currently about 140 known members in the area and possibly many more who commute to Greater London workplaces. The region has many additional sources of potential members both 'upstream' – located on the coast – and more widely spread in distribution and marketing. If anyone is interested in the planned branch, please contact:

The Secretary, David Mills, on (Tel/Fax) 01473 827872.

AROUND THE BRANCHES

- 14 November: ABERDEEN**
Magnus: Developing a Mature Asset
Ian Cook, Development Team Leader, BP
Exploration, and Will Banks, Project Manager,
Asset Engineering Alliance.
- 30 November: EDINBURGH & SOUTH EAST SCOTLAND**
A Layman's Guide to Vacuum Drying
Warren Johnson, Managing Director,
Hydrotesting Consultants Ltd (Joint Meeting
with Pipeline Industries Guild).
- 8 November: ESSEX**
Ladies Evening: Garden Topics.
Neville Fisher of Tomlins Nurseries.
- 23 November: HUMBER**
Grimsby's Information Superhighway
Communications
Steve Boon of Diamond Cable.
- 15 November: MIDLANDS BRANCH**
Bioremediation Technology: Environmentally
Compatible Solution for Contaminated Land,
Ground Water and Industrial Effluents
A presentation by Dr Paul Jackson of
International Bioremediation Services Ltd at
Houghton Vaughan plc, Legge Street,
Birmingham.

- 23 November: NETHERLANDS**
Quality management systems applied to the
Petroleum Industry
Social visit by one of the local breweries followed
by a gathering at a 'Dutch Cafe'.
- 3 November: NORTH EAST**
IP/PITANE Social and Quiz, Hallgarth Manor
Hotel, Durham.
- 21 November: NORTHERN**
Environmental Lubricants
Dr Stephanie Harrold, Lubrizol (UK) Ltd, Belfry
Hotel Handforth.
Annual Dinner/Dance, Belfry Hotel, Handforth.
- 10 November: STANLOW**
Annual Branch Dinner/Dance
Fibre Optics
Professor G Jones of Liverpool University, Village
Hotel, Bromborough.
- 4 November: SOUTHERN**
IP Ball
- 23 November: SOUTH WALES**
Business and the Environment
Dr Clive Morgan, Ridgeway Environmental
Management, Texaco Refinery, Pembroke.
- 14 November: YORKSHIRE**
Volvo Engines and the Future
MT McAleary, Production Information Manager

UK Deliveries into Consumption (tonnes)

Products	†Aug 1994	*Aug 1995	†Jan-Aug 1994	*Jan-Aug 1995	% Change
Naphtha/LDF	200,954	187,960	1,887,067	1,912,952	1
ATF – Kerosene	725,218	772,579	4,892,635	5,035,143	3
Petrol	1,987,224	1,916,928	15,125,434	14,413,475	-5
of which unleaded	1,156,763	1,204,607	8,583,588	8,900,338	4
of which Super unleaded	123,124	81,870	941,973	644,742	-32
Premium unleaded	1,033,639	1,122,737	7,641,615	8,255,596	8
Burning Oil	124,271	114,049	1,698,929	1,691,000	0
Derv Fuel	1,081,335	1,128,281	8,319,102	8,771,344	5
Gas/Diesel Oil	591,146	557,089	5,027,311	4,809,221	-4
Fuel Oil	530,951	669,771	6,107,025	5,489,058	-10
Lubricating Oil	67,569	77,483	531,772	600,619	13
Other Products	700,306	697,998	5,642,804	5,868,857	4
Total above	6,008,974	6,122,138	49,232,079	48,591,669	-1
Refinery Consumption	486,490	545,699	4,182,757	4,217,344	1
Total all products	6,495,464	6,667,837	53,414,836	52,809,013	-1

† Revised with adjustments *preliminary NB: The 1995 figures for lubricating oil are significantly higher than those reported in 1994. This is the result of the introduction of a new reporting format, which aims to achieve greater accuracy.

High performance compact flange

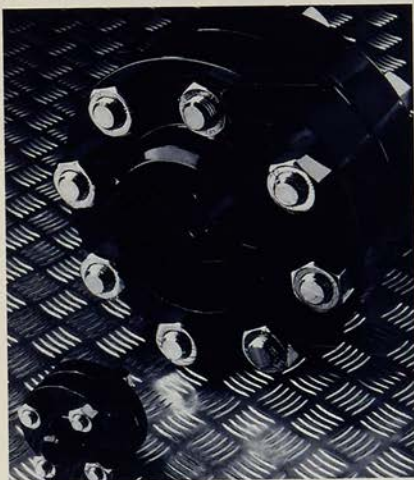
A new compact flange, Flangelok, has been launched by Vector International (formerly Techlok Ltd).

The new flange provides significant size and weight savings, thereby offering associated cost benefits, while maintaining the high performance provided by standard flanges.

Other advantages include higher resistance to external bending and an elimination of mismatch problems encountered with spigoted flanges. It cannot be overstressed by excessive

tightening and, unlike flanges using 'gap' technology to limit tensioning stress, it eliminates corrosion while the sealing system endures minimum fluid seal diameter and a smooth bore throughout the flange for full flow integrity.

Designed with the subsea market in mind, topside and other requirements have also been taken into consideration, and the flange is suitable for widespread use throughout the international piping and pressure vessel industry.



New flange has Bureau Veritas Type Approval

Portable thermographic systems for industry and research

C.Z. Scientific Instruments has launched a new series of portable thermographic systems. Applications include quality assurance and preventative maintenance in the energy industry and detecting emissions from petrochemical plants and pollution in rivers.

The system is compact, easy to operate and provides high quality images through strong geometric and thermal resolution. It is battery powered so it can be used anywhere and

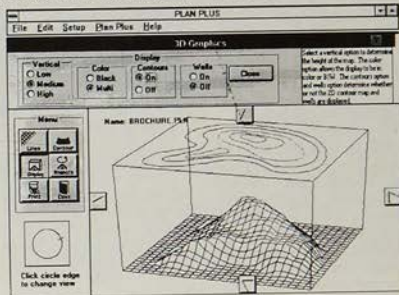
is controlled by a notebook PC in the field or interfaced directly to a desktop PC.

Varioscan 2011, the most sophisticated in the range, measures temperature at -40/+1200°C, and has a working temperature of -10/+50°C. Thermal resolution power at 30°C subject temperature is <0.1K. The scale of reproduction can be changed to a ratio of 6:1. For shots of thermal profiles with a relatively high time resolution, a line scanner function is built in as standard.

Compute contour areas with DOS-based planimetry package

A new comprehensive planimetry program has been launched by The Logic Group. Plan Plus, which runs under Windows™, allows users to digitise isopach or pore volume maps and compute contour areas, map volumes and reserves. Top structure maps can

also be used with bottom structure maps, an average thickness value, or an isopach map to create oil or gas isopachs based upon fluid contact depths. All maps can be viewed in three dimensions which can be rotated or turned to view the structure at different angles.



Prevent spillage with non-toxic clay-based mats

Designed for emergency use to prevent spilled or leaking pollutants flowing into drainage systems, Dammit Mats introduced by Darcy Products Ltd seal drains of all shapes and sizes against oils, hydrocarbons, alkalis, solvents, most acids and the majority of other industrial chemicals.

The mats are sheets of a non-toxic, clay-based compound backed with a reinforcing membrane and are light enough to be carried in road tanker cabs and

emergency vehicles.

Deployment involves tearing off the backing and treading the mat into position over the drain cover. Biodegradable and easily disposable unless heavily contaminated with spilled product, the mats come in three sizes: 45 x 65 cm, 45 x 45 cm and 20 x 22 cm.

The clay-based compound used in the mats is also produced in paste form for sealing tears or punctures in tanks and storage drums.



Mats can be bent to seal vertical drain inlets

Steam conditioning valve to optimise control accuracy and operating flexibility

BTG's Speciality Valves division introduces a new steam conditioning valve designed for process industries where the slightest variation in temperature is unacceptable. The company claims that the VST-SE combines the best rangeability on the market with low noise levels at high pressure ratios.

The valve is a single seat, angle type, combined pressure reducing/desuperheating valve for simultaneous pressure and temperature control. Its steam atomised water injection technology not only provides the rangeability but also simplifies the arrangement of downstream piping. A built-in feed forward feature provides maximum plant flexibility by ensuring high control accuracy under the fastest load changes, with improved steam quality and minimum energy losses.

The valve's diffuser arrangement distributes pressure levels throughout the valve to minimise noise generation whilst the forged, fully machined body ensures operating safety. The smooth contouring avoids stress concentrations and guards against thermal fatigue.

VST-SE



The VST-SE Speciality Valve

Ship-to-shore fuel transfer system

A new dracone discharge system has been delivered to the British Army. The system from Alan Cobham Engineering is used primarily to off-load fuel from ships for transport inshore, but can also be used for ship-to-ship transfer and in emergencies for oil recovery.

With a dracone anchored offshore the system can be used to provide initial bulk storage of fuel for forces directly onto the beach. As it floats low in the water it is considerably less vulnerable

than land-based tanks and can be brought into operation much faster. The system also has sufficient pressure to refuel aircraft and helicopters, as well as armoured and logistics vehicles.

The pump is hydraulically driven and therefore can be used in hazardous areas, whilst a diesel driven power pack is located outside the danger zone. The system using 350 tonne dracones can discharge fuel at 100 tonnes/hour via a 220 metre 6" flexible hose.



Dracone discharge system now used by the British Army

Third-generation fire detection technology

Autronica Industrial has introduced a system for early warning fire detection to the UK offshore engineering industry. Based on a new generation of optical point detectors, it provides the particle detection sensitivity necessary to dispense with the requirement for gaseous extinguishants in electrical equipment rooms without incurring the running costs associated with aspirating systems.

The intrinsically safe product is a combination of the third-generation of the BS-100 control panel, with its intelligent fire detection algorithms, and the company's highly-sensitive BH-31 optical smoke detectors which can detect obscuration levels as low as 0.5 percent per metre.

The system provides the means to meet the stringent cost-reduction objectives of today's offshore project designers, by substantially reducing the overheads involved in installing and maintaining fire detection systems.

On-the-spot data received from new microprocessor

The latest addition to the Metereader range of instruments designed and manufactured by DTS Systems is the model R10A, a compact, microprocessor-based indicator that can easily be fitted between any pulse-head flowmeter and data logger to provide localised readout of flows, both current and historical. A major advantage is that it provides a repeat pulse output which enhances its capability by supporting one or two logging devices, thus increasing the user's scope for data collection.

The microprocessor enables inspectors, leakage engineers and maintenance engineers to obtain on-the-spot data from individual



Localised flow totaliser

flowmeters without the need for additional technology to interrogate the logger or to

make contact with a central control station to obtain information.

Latest upgrade to petrol station management system

The latest version of ICL Edacom's Petrol Station Management System has been launched. Version 4.0 works in conjunction with with E90/10 point of sale (POS) terminals. The software is designed for easy POS reconciliation, wet and dry stock control, purchase order processing, and reporting, on screen and in print. A key feature is the new stock reporting system whereby daily and cumulative sales of any item can be reviewed at any time, and compared with daily or weekly stock records for the previous 42 days. This is complemented by a new programmable, automatic ordering system based on past sales, with up to 30 main product groups for each supplier.

Reports of product changes can now be printed

out before transmission to POS terminals, and all reports are much more readable as they are now printed in a neat tabular format.

Furthermore, a new export function allows users to download information taken from PSMS into other software programs to produce statistics and reports in alternative formats.

A flexible mark-down facility allows separate stock control of a line of dry goods which are being sold off, while still being linked to the main product line.

Wet stock reconciliation procedures have also been improved and made easier to use. New screens have been added for site reconciliation, including pay-ins by cash or cheque, losses, pay-outs and cash paid to the bank.



Petrol Station Management System Version 4.0

At-a-glance guide to hazardous areas

A wall poster, published by Sira Test & Certification details the various definitions, codes and classifications which apply in the United Kingdom, throughout Europe and North America, describing hazardous areas and the regulations which govern them.

Designed to provide at-a-glance information

exactly where it is most needed - in the workplace - the poster covers European & IEC classification zones, apparatus groups and protection concepts. Temperature classes for flammable materials are listed together with details of certification codes and document requirements.

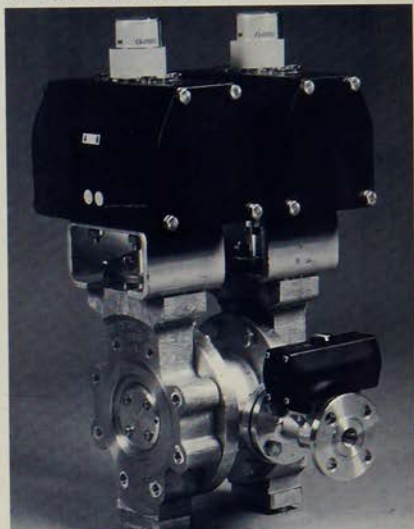
Double isolation benefits for oil and gas industry

Process applications in the oil industry requiring double insulation can now benefit from a new double block and bleed (DB&B) valve from flow control company Keystone. The Vanessa DB&B range is designed to suit existing face-to-face dimensions, replacing single ball, gate, globe or plug valves.

The new range offers metal-to-metal sealing, non-rubbing action and proven

bi-directional zero leakage. The valve, which is claimed to be inherently firesafe to API 607, provides additional safety through its all metal construction and eliminates seat deformation due to abrasion or cold flow.

To complement the new range, the company has developed a range of actuators specifically for the arduous conditions found offshore.



Vanessa double block and bleed valve

CONTACTS

Vector International	01639 822555
C.Z. Scientific Instruments	0181 953 1688
The Logic Group	001 512 451 5707
Darcy Products Ltd	01732 843131
BTG UK Ltd	0181 954 2030
Alan Cobham Engineering Ltd	01258 451441
Autronica Industrial Ltd	01923 233768
DTS Systems	01705 697321
ICL Edacom	01279 647000
Sira Test & Certification	0181 467 2636
Keystone Flow Control	0141 810 3121

FORTHCOMING EVENTS

November

2nd-3rd

London: 'Regulation and The Regulators'. Details: Catherine Carpenter, AIC Conferences Ltd, 2nd Floor, 100 Hatton Garden, London EC1N 8NX.
Tel: 0171 242 2324
Fax: 0171 242 2320

2nd-3rd

Oslo: 'Petroleum Tax Conference 1995'. Details: Gerd Gaeger, Norwegian Petroleum Society, PO Box 95, N-5049 Sandli, Norway.

2nd-3rd

London: 'Oil & Money Politics and Profits'. Details: Brenda Erdmann Hagerty, International Herald Tribune, 63 Long Acre, London WC2E 9JH.
Tel: 0171 836 4802
Fax: 0171 836 0717

6th-7th

Teesside: 'Terminal Operation and Static Measurement'. Details: Abacus International, 214 Inchbonnie Road, South Woodham Ferrers, Essex CM3 5WU.
Tel: 01245 328340
Fax: 01245 323429

6th-9th

Oslo: 'Preventing Mechanical Failure and Electrical Hazards'. Details: Tony Watkins, iChemE, Davis Building, 165-189 Railway Terrace, Rugby CV21 3HQ.
Tel: 01788 578214
Fax: 01788 560833

7th-9th

Aberdeen: 'Subtech '95 - Addressing the Subsea Challenge'. Details: Society for Underwater Technology, PSTI House, Exploration Drive, Offshore Technology Park, Bridge of Don, Aberdeen AB23 8GX.
Tel: 01224 823637
Fax: 01224 820236

8th-9th

Teesside: 'Flow Metering and Meter Proving'. Details: Abacus International, 214 Inchbonnie Road, South Woodham Ferrers, Essex CM3 5WU.
Tel: 01245 328340
Fax: 01245 323429

9th

London: 'The Energy World at your Finger Tips - Exploiting Electronic Information Seminar (IFEI)'. Details: Caroline Little, The Institute of Petroleum.

13th

London: 'The Politics of Sanctions'. Details: Julia Thomas, The Royal Institute of International Affairs, Chatham House, 10 St James's Square, London SW1Y 4LE.
Tel: 0171 957 5700
Fax: 0171 321 2045

13th-14th

London: 'Managing Commercial and Industrial Waste'. Details: International Conference Group, Suite C, Ground Floor, Long Island House, 1-4 Warple Way, London W3 0RG.
Tel: 0181 743 8787
Fax: 0181 740 1717

14th

London: 'Iran: Partner or Pariah?'. Details: Julia Thomas, The Royal Institute of International Affairs, Chatham House, 10 St James's Square, London SW1Y 4LE.
Tel: 0171 957 5700
Fax: 0171 321 2045

14th

Aberdeen: 'Supplier Performance: The National View'. Details: Commercial Seminars, Orange House, 14 Orange Street, Uppingham, Leicestershire LE15 9SQ.
Tel: 01572 821290
Fax: 01572 821873

14th

London: 'Gibraltar Submarine Gas Pipeline'. Details: IBC Technical Services Ltd, 57-61 Mortimer Street, London W1N 8JX.
Tel: 0171 637 4383
Fax: 0171 631 3214

15th

London: '4th Parker Seminar on Technical Innovation in Energy'. Details: British Institute of Energy Economics, 37 Woodville Gardens, Ealing, London W5 2LL.
Tel: 0181 997 3707
Fax: 0181 566 7674

15th

London: 'Timewatch GCC: Economic Restructuring and Business Prospects'. Details: The Conference Unit, The Royal Institute of International Affairs, Chatham House, 10 St James's Square, London SW1Y 4LE.
Tel: 0171 957 5700
Fax: 0171 321 2045/
0171 957 5710

15th-16th

London: 'Petroleum Trading and International Law'. Details: Abacus International, 214 Inchbonnie Road, South Woodham Ferrers, Essex CM3 5WU.
Tel: 01245 328340
Fax: 01245 323429

15th-16th

London: 'Expo Software'. Details: Kate Hunnisett, Expo Software 95, Themedata Ltd, P.O. Box 2, Chipping Norton, Oxon OX7 5XQ.
Tel: 01608 684700/684888
Fax: 01608 684796

16th

London: 'Standby Vessel Conference'. Details: Caroline Little, The Institute of Petroleum.

16th-17th

London: 'The Safe Handling of Pressure Liquefied Flammable Gases'. Details: Sarah Ashmore, IBC Technical Services Ltd, Gilmoora House, 57-61 Mortimer Street, London W1N 7TD.
Tel: 0171 637 4383
Fax: 0171 631 3214

16th-17th

London: 'South East Asia - Oil and Gas Activity'. Details: IBC Technical Services Ltd, Gilmoora House, 57-61 Mortimer Street, London W1N 8JX.
Tel: 0171 453 2128
Fax: 0171 631 3214

20th

London: 'Personal Environmental Liability'. Details: Owain Jenkins, International Conference Group, Suite C, Ground Floor, Long Island House, 1-4 Warple Way, London W3 0RG.
Tel: 0181 743 8787
Fax: 0181 740 1717

20th-21st

London: 'Advances in Solving Oilfield Scaling'. Details: Helen Smith, IBC Technical Services Ltd, Gilmoora House, 57-61 Mortimer Street, London W1N 8JX.
Tel: 0171 453 2128
Fax: 0171 631 3214

20th-21st

London: 'Marineflex 95 on Flexible Pipes, Umbilicals and Marine Cables - Structural Mechanics and Testing'. Details: Conference Secretariat, Dilke House, Malet Street, London WC2E 7JN.
Tel: 0171 436 7500
Fax: 0171 436 2112

21st-22nd

Norway: 'ONS Advanced Projects Conference - From Cost Reduction to Evaluation'. Details: ONS 95, Norwegian Petroleum Society, PO Box 175, 4001 Stavanger, Norway.
Tel: 47 51 53 55 45/46
Fax: 47 51 55 22 70

FORTHCOMING EVENTS

21st-22nd

London: 'Emergency Planning and Management'. Details: Uloma Otuonye, Department C507, Institution of Mechanical Engineers, 1 Birdcage Walk, London W1H 9JJ. Tel: 0171 973 1249 Fax: 0171 222 9881

21st-22nd

London: 'Integrated Environmental, Safety and Business Management'. Details: International Conference Group, Suite C, Ground Floor, Long Island House, 1-4 Warple Way, London W3 0RG. Tel: 0181 743 8787 Fax: 0181 740 1717

21st-22nd

London: 'The Petrochemical Industry - Towards the Year 2000'. Details: Financial Times Conferences, PO Box 3651, London SW12 8PH. Tel: 0181 673 9000 Fax: 0181 673 1335

22nd

Manchester: 'Flow Measurement for Industry'. Details: IBC Technical Services Ltd, 57-61 Mortimer Street, London W1N 8JX. Tel: 0171 637 4383 Fax: 0171 631 3214

22nd-23rd

Aberdeen: 'Offshore Drilling Technology'. Details: Helen Smith, IBC Technical Services, 57-61 Mortimer Street, London W1N 8JX. Tel: 0171 637 4383 Fax: 0171 631 3214

22nd-23rd

London: 'Gasification: An Alternative to Natural Gas'. Details: Conferences and Courses Department, IChemE, 165-189 Railway Terrace, Rugby CV21 3HQ. Tel: 01788 578214 Fax: 01788 560833

23rd

London: 'How Energy Conscious is Your Home?' Details: The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG. Tel: 0171 839 5561 Fax: 0171 930 2170

25th-28th

Saudi Arabia: 'SOPEC '95'. Details: Adla Moukharzel, ITE Press Office, Byron House, 112A Shirland Road, London W9 2EQ. Tel: 0171 286 9720 Fax: 0171 286 0177

27th-28th

London: 'Strategy & Economics in the North Sea Oil & Gas Industry'. Details: IIR Ltd, 6th Floor, 29 Bressenden Place, London SW1E 5DR. Tel: 0171 915 5055 Fax: 0171 915 5056

27th-1st

Leeds: 'Spark Ignition Engine Emissions'. Details: Julie Charlton, Department of Fuel & Energy, University of Leeds, Leeds LS2 9JT. Tel: 0113 233 2494 Fax: 0113 233 2511

28th

London: 'New Developments in Aviation Fuel Handling Conference and Exhibition'. Details: Caroline Little, The Institute of Petroleum.

28th

East Midlands: 'Advanced Control Seminar'. Details: Kevin Stringer, Fisher-Rosemount Systems, East Meridian, Leicester LE3 2WU. Tel: 0116 282 2654 Fax: 0116 265 0036

28th-30th

Cologne: 'MARICHEM '95'. Details: MARICHEM '95, RAI, Gelsen House, 200/208 Tottenham Court Road, London W1P 9LA. Tel: 0171 436 9774 Fax: 0171 436 5694

29th-30th

London: 'Advances in Multiphase Operations Offshore'. Details: IBC Technical Services, 57-61 Mortimer Street, London W1N 8JX. Tel: 0171 637 4383 Fax: 0171 631 3214

30th-1st

London: 'Creating Value Through Improved Strategic Decision Making in Upstream Oil & Gas'. Details: IBC Technical Services, 57-61 Mortimer Street, London W1N 8JX. Tel: 0171 637 4383 Fax: 0171 631 3214

30th-1st

Vienna: 'Transmission and Distribution of Gas in the Emerging Markets of Central and Eastern Europe'. Details: IBC Financial Focus, 57-61 Mortimer Street, London W1N 8JX. Tel: 0171 637 4383 Fax: 0171 323 4298

December

1st-4th

Buckinghamshire: 'The Mechanics and Operations of Oil Trading'. Details: Petroleum Economist, Export House, 25/31 Ironmonger Row, London EC1V 3PN. Tel: 0171 251 3501 Fax: 0171 253 1224

3rd-5th

London: 'Combustion and Emissions Control'. Details: Conference Administrator, The Institute of Energy, Davis Building, 165-189 Railway Terrace, Rugby CV21 3HQ. Tel: 01788 578214 Fax: 01788 577182

4th

London: 'Oil Loss Accounting Workshop'. Details: Caroline Little, The Institute of Petroleum.

4th-5th

London: 'The Changing Politics of International Energy Investment'. Details: The Royal Institute of International Affairs, Chatham House, 10 St James's Square, London SW1Y 4LE. Tel: 0171 957 5700 Fax: 0171 321 2045

5th-6th

London: 'Floating Production Systems'. Details: IBC Technical Services, 57-61 Mortimer Street, London W1N 8JX. Tel: 0171 453 2128 Fax: 0171 631 3214

5th-6th

Rome: 'The Refining Industry in the Former Soviet Union'. Details: Business Seminars International, Sussex House, High Street, Battle, East Sussex TN33 0AL. Tel: 0171 490 3774 Fax: 01424 77334

7th-8th

London: 'Managing Liabilities in the Offshore Oil and Gas Industry'. Details: IBC Legal Studies and Services Ltd, 57-61 Mortimer Street, London W1N 8JX. Tel: 0171 637 4383 Fax: 0171 631 3214

10th-11th

Tehran: 'Oil and Gas Prospects in the Caspian Region'. Details: The Institute for International Energy Studies, PO Box 19395, Tehran, Iran. Tel: 98 21 225 76 33 Fax: 98 21 222 01 49

11th-13th

Paris: 'The Deepwater Pipeline Technology Congress '95'. Details: C.I. Communications, 14 Bowden Street, London SE11 4DS. Tel: 0171 582 2423 Fax: 0171 793 8544

12-13th

London: 'Subsea '95'. Details: Themedia Ltd, PO Box 2, Chipping Norton, Oxon OX7 5QX. Tel: 01608 684888 Fax: 01608 684796



Mr Colin Harvey has joined the Board of Shell UK Ltd and become Managing Director, responsible for all Shell UK's downstream activities. Mr Harvey succeeds IP President **Mr David Varney**, who is appointed to the Oil Products Business Committee of the Royal Dutch/Shell Group of Companies new central office structure, with responsibility for Europe. He is now based at Shell Centre in London.

NFC has appointed **Robert D Lake** as its first Chief Executive, North America with operating responsibility for the Group's North American-based businesses. Mr Lake will join the Board of NFC and will report to **Mr Gerry Murphy**, Group Chief Executive. The position was created when NFC reorganised its corporate structure to three regional operating units (UK & Ireland, Continental Europe and North America) in July this year.

Brisco Engineering Ltd of Great Yarmouth have announced two key overseas appointments. **Mr David Wylie**, formerly with Kvaerner National and Multiflex, has been appointed as Vice President - Brisco Sales, western hemisphere, and will be based in Houston at the offices of sister company, ICS Inc. The second appointment is that of **Mr Alan Jones** to the newly-created post of Regional Sales Manager - South East Asia. He will be based in Kuala Lumpur at the offices of sister company, ICS Asia.

Mr Pierre Godec has been appointed Managing Director of Elf Petroleum plc, the holding company for Elf Aquitaine's hydrocarbons interest in the United Kingdom. Mr Godec replaces **Mr Michel Romieu** who has been appointed Senior Vice President, Natural Gas for Elf Aquitaine in Paris. Mr Romieu was elected President of the UK Offshore Operators' Association (UKOOA) for 1995 and will remain in this position until the end of the year.

Mr Anner A Eggink has been appointed Business Development Director for the western hemisphere at Van Ommen Tank Terminals. In addition to business development, Mr Eggink will be responsible for market analysis and research and marketing co-ordination for chemicals in the western hemisphere.



Philip Rankin (above) and **Captain John Dalby** have announced the incorporation in Norway of **Marine Risk Management AS**, the Scandinavian representative office of The Marine Risk Management Group (The MRM Group). The MRM group was founded in 1986 by Captain Dalby. The Group's core business is marine superintendence and cargo loss control and has developed specialised skills in identifying and eliminating cargo losses, whether caused by accident, bad practice or fraud. The Group has customers from cargo owners, charterers, shipowners, insurers and banks involved in carriage of goods at sea.

Mr Paul Sykes, Managing Director of Shaw Petroleum Ltd, has been elected President of the Petrol Retailers Association (PRA). Mr Sykes, a member of the Institute of Petroleum, has worked for Shaw Petroleum since 1978.

Mr Robert H Pinchbeck has been appointed Managing Director of Atlantic Power and Gas. Mr Pinchbeck joins the APG Group from BP where he has been Technology Director, Reservoir Performance, and before that, Magnus Asset Manager. He was with BP for 21 years in the United Kingdom, US, Australia and the Middle East.

Clyde Petroleum plc announces that **Professor John Archer** Feng has been appointed a non-executive Director. Professor Archer is Deputy Rector, Pro Rector (Resources) and Professor of Petroleum Engineering at Imperial College, London.

Dr Anthony N Eva received an ASEAN 1995/96 Best Executive Award at a ceremony timed to coincide with Indonesia's 50th anniversary celebrations. Formerly working for BP in International New Ventures he is presently an exploration consultant with Enterprise Oil Indonesia Ltd.

After six years at the Army Petroleum Centre at West Moors, **Mr Peter Brice** has taken up running the newly created Fuel Management Cell at HQ Land Command. The Cell is responsible for the supply of automotive fuel to 800 Army units.

Dr David France has been appointed Managing Director, Golder Associates (UK) Ltd and Head of European Operations. Dr France was formerly Executive Vice President of Enviro-Science Inc., New Jersey and Director of Environmental Affairs, Texas Eastern Corporation, Houston. He is located at the Maidenhead office of Golder Associates (UK) Ltd.

Total has appointed new board members and senior managers. **Mr Roy Dantzic** has been appointed a non-executive Director of Total Oil Holdings Ltd and its principal subsidiary, Total Oil Marine plc. **Mr Alain Irissou** has replaced **Mr Edward Robellaz** on the board of Total Oil Holdings and **Mr Daniel Valot** has taken up the position of Executive Director of Total Oil Marine, replacing **Mr Thierry Desmarest**. In management, **Mr Yves Grosjean** has been appointed Business Development and Exploration Manager of Total Oil Marine, replacing **Mr Jean-Michel Salvadori** who has taken up a new post in the Strategic Planning and Development Division of Total, Paris. **Ms Mary Dwyer**, formerly head of corporate communications, has been appointed Corporate Communications Manager at Total Oil Marine's Aberdeen head office, replacing **Mr Peter Gavan** who has joined the National Grid Company.

Ms Jenny Kirkpatrick has been appointed Chair of the Gas Consumers' Council for a four-year term. Ms Kirkpatrick, a former Director of the Electricity Consumers' Council, is a Director of LS Research, investigating the economics of environmental regulation. She is also Chair of Oxfordshire Community Health NHS Trust.



Oceanscan, which specialises in the supply of survey and ROV sensors to the offshore oil and gas industry has appointed **Mr Guthrie Robertson** as Equipment Hire Sales Manager.



THE INSTITUTE
OF PETROLEUM

New Guidelines for the identification and control of hazards during the proving of road loading gantry meters

The proving of road loading gantry flowmeters, using reference meters or volumetric vessels, involves product handling and vehicle loading procedures which differ from the normal vehicle loading practice. Experience has shown that significant additional hazards may be introduced. In order to ensure the safety of personnel and to safeguard equipment and property during meter proving, the hazards should be fully understood by those engaged in operation. These Guidelines have been developed based on the experience of several oil companies and meter proving contractors.

They incorporate the results of a risk assessment of the gantry meter proving procedures used by the principal UK oil companies, contractors and terminal organisations. This enabled the critical hazards and key controls for a safe system of work during meter proving to be identified. Another input has been the results of a major programme of research work into electrostatic hazards associated with meter proving that was conducted by a consortium of oil companies.

The Guidelines describe the potential safety hazards associated with the proving of meters at both top and bottom loading gantries. Means of controlling the hazards are considered. The Guidelines are recommended to those responsible for meter proving operations in oil companies, terminal operators and meter proving contractors, to assist in developing safe work procedures for the proving of road loading gantry meters.

ISBN-0-85293-158-1 £28.00 (Overseas £30.00)
25% discount given to IP Members.

This publication is available from the Library, The Institute of Petroleum



THE INSTITUTE
OF PETROLEUM

Oil Loss Accounting Workshop

4 December 1995

To be held at the Institute of Petroleum

Although accounting for hydrocarbon loss in the oil industry received much attention in the aftermath of the oil price explosion some two decades ago, experience today shows that major misunderstandings of the subject still exist, even within leading oil companies. Inconsistencies of approach are rife, not just between companies, but frequently occur within different parts of the same organisation. This results in a lack of direct comparability of inter-company data, a failure to recognise certain elements of loss and the disappearance of loss data in the 'cracks' between different parts of the same company. This workshop will assist in correcting this situation.

Topics to be presented will include: _____

- The Material Balance
- The Corporate Material Balance
- Stocks Held by Third Parties/Exchanges
- Special Problems: Water, volume shrinkage, vapour recovery, difficult products, derived balances
- Control – Is it in place? Is it necessary?
- Monitoring Results: How effective?

*For further information and a copy of the registration form, please contact Conference Department,
The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR UK
Telephone: 0171 467 7100 Fax: 0171 255 1472*

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