SEPTEMBER 1992

The Institute of Petroleum

PETROLEUM REVIEW

Survey

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Energy labelling

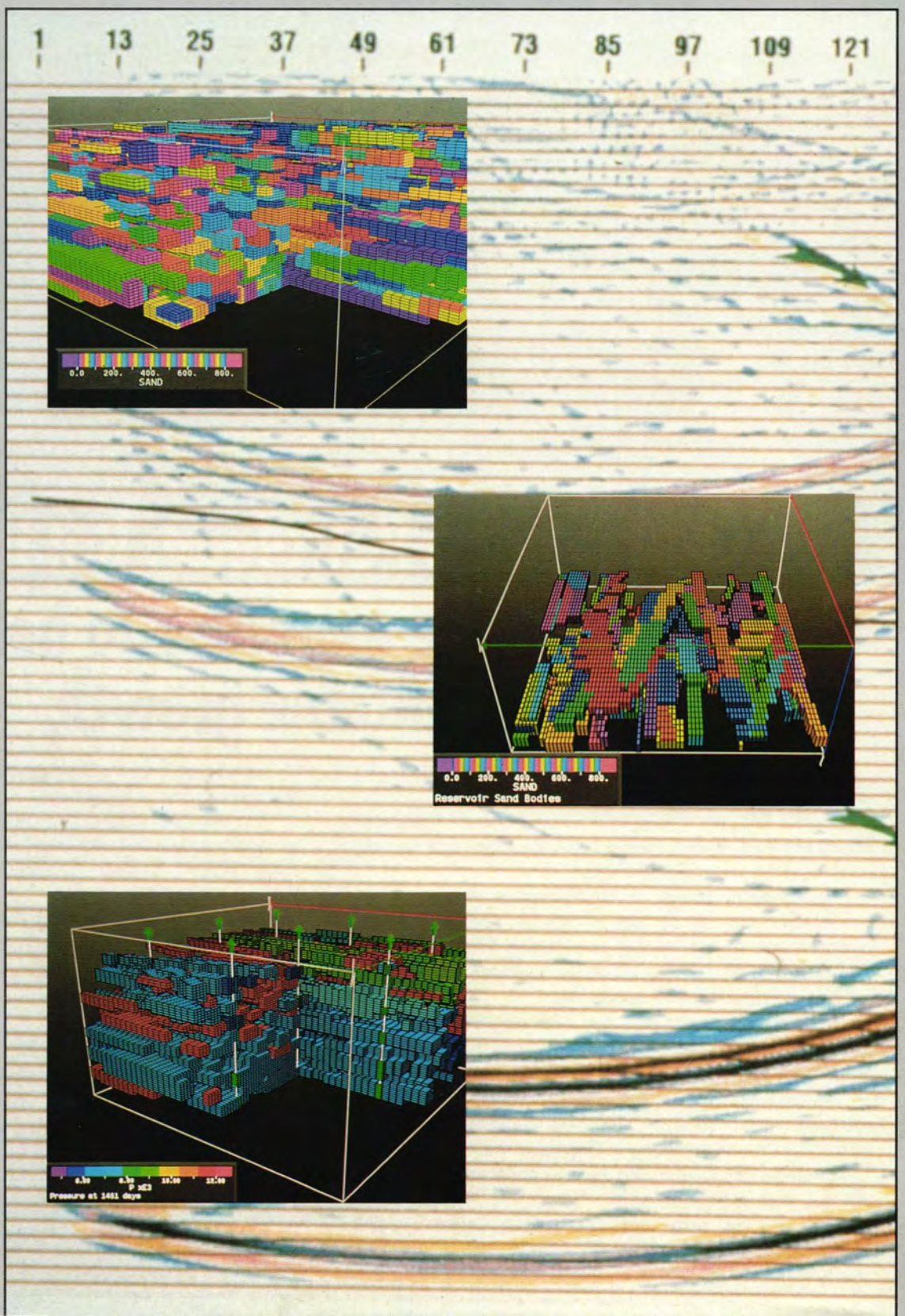
How to assess if your home is energy efficient

Colombia

Power crisis gives boost to oil and gas

Benzene

Health aspects of benzene and petrol



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Contents

Cover photo of reservoir simulation graphics produced by BP

. . . news in brief

19 July

UK building materials group Tarmac has sold its Briggs Oil unit to Sweden's AB Nyas for £70m cash.

Ownership of the world tanker fleet has become increasingly concentrated in the hands of independent owners, according to a report from Drewry Shipping Consultants.

21 July

Dutch oil storage operator Van Ommeren has set up a new subsidiary Van Ommeren Tank Terminal Asia to spearhead its investments in the region, including new projects in Singapore and China.

22 July

Output from the BP Exploration-operated Clyde field is staging a recovery following a study and strategic drilling programme designed to boost production.

Bunker sales in the Singapore area are not expected to hit last year's record of 12.4m tonnes due to the current recession in the shipping industry.

23 July

Canadian Federal Energy Minister Mr Tom Epp is offering Texaco a $200 million carrot to persuade the company to participate in the Hibernia offshore project.

Venezuela is aiming to increase its crude oil production capacity to 3.3m barrels a day by 1996, compared with 2.83m b/d at the end of 1991 — a rise of 16 percent.

24 July

Marathon has reached an agreement with Amoco which provides that both companies will share in an exploration programme in the Celtic Sea offshore Ireland.

Mr Charles Donovan, one of British Gas's two senior managing directors, has resigned. Mr Cedric Brown, his fellow senior managing director, becomes chief executive of the privatised gas exploration, production and distribution group.

25 July

Aircraft contribute eight times as much to the greenhouse effect as cars and 22 times as much as electric inter-city trains, according to figures from the Energy Technology Support Group.

Russia has agreed to join the pipeline mega-project designed to bring oil from the Caspian region to world markets.

27 July

Kuwait has signed a contract with British Petroleum under which the UK company will provide consultancy services for the reconstruction of the emirate's oil industry.

28 July

BP has committed £90 million and expects to spend another £150 million on its next phase of exploration in Vietnam, according to BP exploration director and chief executive, Mr John Browne.

29 July

Iran has increased investment on oil, gas and petrochemical industries this year by a quarter to $1bn (at the floating exchange rate), according to oil minister, Mr Gholamreza Aqazadeh.

Texaco is switching the management of its European operations from New York to London. The US group has appointed Mr Glenn Tilton, currently chairman of Texaco's UK subsidiary, as president of Texaco Europe.

30 July

Average UK oil offshore pro-duction in June fell to 1.496m barrels per day, the sector's lowest output rate for a year.

31 July

Stena Offshore has strengthened its position in Norway with the award of an important contract by Elf for subsea tie-ins on the Lille Frigg project.

UK Energy Minister Tim Eggar launched the second stage of Britain's 14th round of offshore oil and gas licensing, with the offer of acreage on the fringes of the country's main producing areas.

Work on the second phase of the North Sea Dan field extension is now going ahead following the installation of the second Star platform, the West Sigma.

3 August

The European Commission is stepping up its legal action over the planned development of British Petroleum's liquid petroleum gas project near Falkirk because of the project's effect on the environment.

UK employees of Texaco will be required to submit themselves to random drug-testing in a substance-abuse programme which will cover alcohol unlike its counterpart in the United States.

4 August

Royal Dutch/Shell has warned the government of the Commonwealth of Independent States against making arbitrary changes in taxes or remittance regulations since the geological, technical and business risks in the oil industry are already too great to accept the added risks of sudden arbitrary changes.

Amoco announced that the 255 mile Central Area Transmission System pipeline from the central North Sea to Teesside has been installed.

Peterhead Power Station has begun to burn gas from the Miller field.

Midland and Scottish Resources has bought out Finland's state oil company Neste from the Emerald field in the UK North Sea and taken over as operator of the much-delayed project.

6 August

Shell has discovered a potentially significant oilfield off Southern Thailand. Production could begin next year and yield up to 10,000 barrels a day.

7 August

Kuwait's Oil Minister, Hamud Abdullah el Rakabah, said his country hoped to raise production from 1.2 million to 1.5 million barrels a day by year-end.

10 August

The deck for the riser platform on Amoco's North Everest field has been successfully installed.

Japan's Tohoku Electric Power has confirmed its intention to buy 500,000 tonnes of liquefied natural gas a year from Malaysia for 20 years starting in 1996.

11 August

Oil production from Singleton onshore field is set to rise fourfold after the completion of a new development phase.

12 August

Creditors of US oil trader and refiner, Arochem Corp, has moved to liquidate the company's assets, including its 80,000 barrel a day refinery in Puerto Rico, under Chapter 7 of the US bankruptcy code.

Norwegian bulk shipping giant IM Skaugen is to abandon all activities except gas shipping in a bid to stave off financial collapse.

Geophysical supercomputers

The use of computing power has revolutionised the search for and development of oil and gas reserves. For complex operations, the time taken by some of the most powerful computers to interpret the data can be measured in hundreds of hours occupying valuable computing time and delaying decision-making.

Consequently, major computer manufacturers — as much motivated by technical desire as customer demand — research, design and build ever more powerful supercomputers capable of billions of floating point operations per second.

A widely-known name in supercomputers is Cray Research which has been supplying the oil industry with ever more advanced supercomputers since 1981 when ARCO became their first oil industry customer.

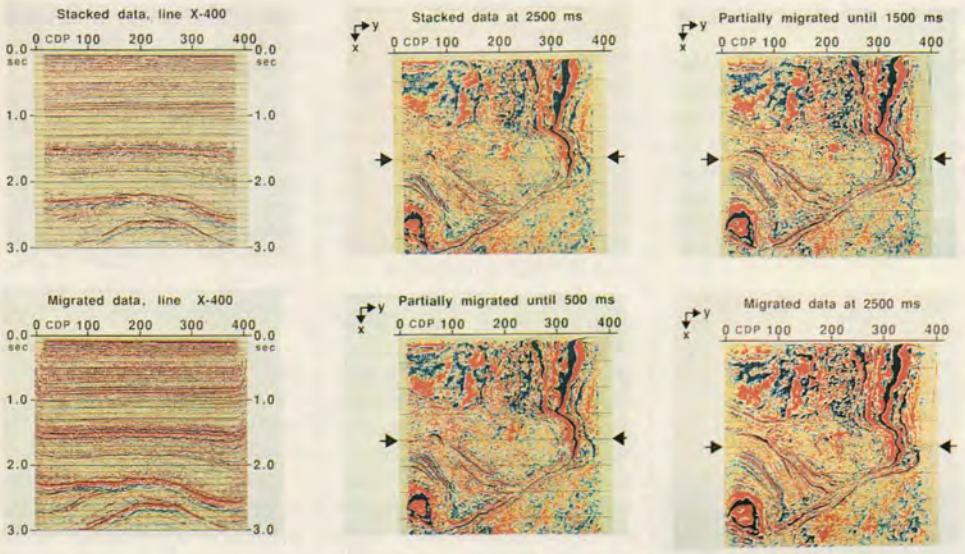
The company has demonstrated sustained 6, 8 and 10 gigaflops (one billion floating-point operations per second) performance on three popular 3-D post- and pre-stack seismic migration codes. These codes are used for processing and analysing field data to image the earth's subsurface for the purpose of more easily and readily locating oil. This application is the most important computer problem for geophysicists and petroleum engineers.

The CRAY Y-MP C90 system is the company's latest supercomputer. With 16 central processing units (CPUs), this system is also the most parallel scalar/vector system available. The system features an all-new CPU with a peak performance of one billion floating-point operations per second (gigaflops). With 16 of these powerful CPUs and 256 megawords (2 gigabytes) of central memory, it has a peak performance of 16 gigaflops. On actual customer problems, this high-end system operates at approximately four to six times the speed of Cray Research's previous fastest supercomputers.

The production-scale problems demonstrated at the European Association of Exploration Geophysicists Exposition in Paris involved segments of land approximately 10 by 10 kilometres and five kilometres deep, as well as 15 by 7.5 kilometres and three kilometres deep.

'The architecture and performance of the new C90 has a great impact on getting these large computational problems done quickly which helps us better understand complex geology,' said Dr Stoffa, professor of geological sciences at the University of Texas. 'These kinds of seismic calculations are highly parallel and as such they can take advantage of the parallel architecture of the CRAY Y-MP C90. For years geophysicists have done seismic time migration but seismic depth migration is even more important because it extrapolates the sonograms taken in the field into an image of the earth's structure, showing the impedance contrasts as a function of depth and spatial position. These are complex problems that require the power of a supercomputer.'

With companies seeking to contain exploration and production costs, the availability of powerful supercomputers can help them to predict both reservoir position and condition.



3-D Seismic Time Migration

1. Stacked vertical slice
2. Migrated vertical slice

This sequence shows migration of a horizontal slice.

1. Initial stacked data at 2500 milliseconds
2. Partially migrated data up to 500 milliseconds
3. Partially migrated data at 1500 milliseconds
4. Migrated data at 2500 milliseconds

Reservoir Modelling

British Petroleum Exploration Inc. (BPX) engineers recently conducted a case study to predict the ultimate recovery from a reservoir, the rate of production, and the impact of operating decision on recovery and economics. They modelled a reservoir involving channel fill sequences of hydrocarbon productive sands mixed with nonproductive shales.

Cover photos
Top: **One realisation of stochastic sand body distributions for total study area.** *Centre:* **Aerial view of one realisation of stochastic sand body distribution near base of structure.** *Bottom:* **Pressure distribution at 1401 days.**

Profit drop brings BP dividend cut

BP announced last month that it has been forced to cut its second quarter dividend and make more of its staff redundant. The group showed a deficit in its net income of £711 million in the first half, compared with a profit of £253 million in the first half of last year (based on historical cost).

The poor results arose after taking exceptional charges of £919 million after tax, reflecting an accelerated drive to reduce costs and reassess the company's asset portfolio. These exceptional charges consisted of £399 million for the cost of redundancy programmes and £520 million principally for asset write-downs.

The dividend cut followed the sudden resignation of former Chairman and Chief Executive Robert Horton at the end of June. The latest results were presented by David Simon, the new Group Chief Executive, and Lord Ashburton, the new Chairman.

The BP Board concluded that the previous level of dividend could not be maintained given current market conditions and the mediocre medium-term outlook. This year capital expenditure has been cut by 20 percent; in 1993 and 1994 it will be trimmed further. At the same time the company intends to reduce borrowings and pay down some debt.

Further staff reductions were announced, totalling 11,500, of which nearly 80 percent will be in Europe.

More divestment was forecast, particularly in chemicals and nutrition. Already BP Chemicals has announced the sale of its low density polyethylene plant at Antwerp to Neste Chemicals.

Storage expansion

Oiltanking Houston and Oiltanking Singapore, both wholly owned subsidiaries of Hamburg based Oiltanking GmbH, have completed expansions to their terminals for storage of light distillate petroleum products, components and feedstocks.

Oiltanking Singapore's 120,000 cubic metre expansion brings total storage capacity on Pulau Seraya to 527,500 cubic metres. This tankage is complemented by two deepwater jetties capable of handling vessels up to 133,000 DWT and three jetties for coasters and barges.

With Oiltanking Houston adding another 179,000 cubic metres to its terminal on the Houston Ship Channel, storage capacity totals 743,000 cubic metres. The terminal offers a flexible redelivery utility with three to five deep water ship docks for tankers up to 132,000 DWT and pipeline connections to major refining and processing complexes along the Gulf Coast. Recently, Oiltanking added state-of-the-art facilities for collection and destruction of marine loading vapours.

Diesel smuggling blockade

Domestic petroleum and diesel distributors have met a month long blockade of cheap Iraqi imports by the outlawed Kurdish Workers' Party (PKK) with apprehension. Although the blockade has cut into the highly lucrative smuggling operations boosting retail sales, it points to a weakening of government control on this crucial oil-rich area.

The blockade is a result of a feud arising after the killing of an Iraqi Kurdish clan leader who had switched support from Massoud Barzani's Kurdish Democratic Party (KDP), one of many Iraqi Kurdish parties, to the PKK. Northern Iraq, which is suffering under a blockade imposed by Saddam Hussein, was dependent on cheap produce from Turkey brought in by truck drivers eager to buy cheap Iraqi oil in exchange.

Prior to the blockade lorries were importing up to 10,000 litres of diesel fuel into Turkey by strapping illegal tanks to the underside of truck carriages. Up to 1,000 trucks were waiting every day to pass through the Habur border crossing where considerable amounts of money exchanged hands, according to Turkish press reports. The diesel fuel was purchased from Mosul refineries at a mere 60 fils per litre (16,000 fils = $1.00). The oil was taxed heavily at 250 fils per litre on the Iraqi Kurdish side of the border providing an important income for the nascent Kurdish government.

A foreign petroleum company estimates that 60,000 tons of oil were being smuggled into Turkey per month from Iraq as well as smaller amounts from Bulgaria, Rumania and Russia. The oil, predominantly diesel fuel, typically ends up at independent stations in all parts of the country. Because most affiliated stations are owned and operated by a dealer. 'It is not possible to ensure they don't take cheap diesel' said one executive.

Low-tech leak detection

Researchers in Canada, examining methods for detecting pinhole leaks in underground or underwater pipelines, have hit upon a device capable of detecting chemical leak concentrations 'a billion times less than the best machines you can buy', according to a report in *New Scientist*.

Scientists tried, with dogged determination, a number of methods including 'smart pigs' and detectors built into the pipelines but these were sometimes enormously costly, could not operate adequately in small-diameter pipes and often failed to detect small leaks.

Mr Ron Quaife, an environmental scientist with Imperial Oil Resources, tried injecting 'smelly chemicals' into the pipeline that would escape and signal the leak's location.

The chemical would need to mix totally with the fluid in the pipeline and remain totally insoluble so that when it escapes from the pipe it vaporises and percolates through the soil to the surface. A detector would then be needed that was both sensitive enough to pick up traces of the chemical as well as portable.

Hounded by these requirements, Mr Quaife settled on a mixture of chemicals, known as an azeotrope, called Tekscent, for the injection substance and after extensive tests discovered that the best solution for a detector was a Labrador Retriever.

It takes about 14 weeks to train the dogs and so far they have been on almost 80 assignments in North America with a success rate of 97 percent.

Their toughest assignment to date was to find a leak in a pipeline in the alligator-ridden swamps of Louisiana buried in about 1.5 metres of mud with 1.5 metres of water on top. Evidently they succeeded, working from a shallow-draught swamp boat.

Romanian exploration

Exploration activity in eastern Europe is set to increase with announcements from Enterprise and Amoco of exploration agreements with the Romanian government.

Enterprise Oil has signed an exploration and production sharing agreement with the state oil company Rompetrol for two offshore blocks in the Black Sea.

The company will have a 65 percent interest in blocks 13 and 15 with its partner CanadianOxy (Romania) holding the rest. Total coverage is 7,000 square kilometres.

The agreement is for an initial exploration period of five years with the possibility of further extensions and permits production for 25 years. The company's obligations include seismic surveys and exploration wells.

Enterprise holds existing licences in the Bulgarian and Turkish sectors of the Black Sea.

Amoco has signed an agreement to drill at least two wells onshore, 60 kilometres northeast of Bucharest.

The permit for block 7, a 750 kilometre area in the Carpathian mountains, was awarded after competitive bidding last year.

Clair appraisal continues

The appraisal of the Clair field west of the Shetland Islands continues with the announcement from the co-venturers of the results of the most recent well.

Well 206/8–9z, located in the central area of the discovery tested 7,300 barrels of oil per day (bopd) at a wellhead flowing pressure (whfp) of 524 pounds per square inch (psi). An extended test at a restricted rate of 5,200 bopd at 590 psi was achieved without stimulation.

Although the results of recent appraisal wells have been encouraging to the co-venturers there remains much to be achieved before it can be considered for commercial development. One senior executive of a major oil company recently remarked — before the latest results were announced — that an oil price of $40–$50 per barrel would be needed to justify the project.

Elf and Amerada in assets deal

Amerada Hess Limited (AHL) and Elf Petroleum UK have reached an agreement whereby the two companies will acquire assets in the Central and Southern North Sea.

AHL will acquire Elf's 16.46 percent share in licence P.128 which contains the Anglia gas field in blocks 48/18b and 48/19b and Elf will purchase AHL's 12.5 percent stake in licence P.362 containing the Franklin gas/condensate discovery in block 29/5b.

Elf's stake in the company-operated P.362 is now 48.75 percent while AHL now holds 29.29 percent of the Ranger-operated Anglia licence.

The Franklin discovery was made in October 1986 and appraisal work has just been completed although the company has not published the results. A spokesman for Elf said, however, that it is potentially a 'major gas/condensate field' and providing the appraisal of the adjacent Elgin field currently being undertaken is successful, the development could be the next major operated project for the company.

He added that development would be along a 'broadly similar approach' to that of Piper Saltire. Application for Annex B would be made in 1994 with first production from the deep, high pressure-high temperature field in 1998.

Expansion for North West Shelf

The North West Shelf partners are likely to commit a further $A7 billion (£3 billion) for development in the next few years to double production to 12 million tonnes a year of LNG from five production trains by 2000.

Two LNG trains, at least four new ships, and a minimum of one new offshore gas production platform will cost the six partners around $A7 billion in new investment on top of the nearly $A12 billion already committed to the project.

The project, operated by Woodside Petroleum, is building its third LNG production train with three new LNG ships under construction to bring the fleet to eight vessels.

Shell Australia, a one-sixth partner in the project, and a 40 percent shareholder in Woodside, based its forecast on winning an expanded share of the burgeoning Asian LNG market.

Demand for clean burning LNG is growing rapidly in Japan with a forecast supply shortfall around the year 2000 providing developers of large gas reserves with a substantial opportunity to win major new contracts.

Morecambe Bay prospects

Premier Consolidated Oilfields, as operator, has identified a prospect five miles west of Blackpool pier and is finalising preparations for an exploratory well drilling programme.

The environmental sensitivity of the region meant that Premier, in consultation with partners Chevron (45 percent) and Repsol (20 percent), underwent extensive consultations with Blackpool, Sefton and Fylde Borough Councils, Lancashire County Council and English Nature before approval for the drilling programme was obtained.

The well is expected to take up to 40 days to be completed by the jack-up rig Penrod 80. The site is just north of the recent Hamilton discovery in block 110/15–6 which tested oil and gas over two separate zones.

Drilling mud makes what must surely be its first appearance as a theatrical prop in the Royal National Theatre's current production of 'A Midsummer Night's Dream'.

It takes the form of a low black bank to a round pond, which constitutes the entire set throughout the play. Production manager Annie Gosney was given the brief of finding a 'mud' that was easy to mix, kept its shape, didn't float on the water, was very black and yet washed out of the costumes. It also had to be clean and not be a health risk to actors with scratches or cuts. The natural material fails on most of these counts, but drilling mud is just the job, coming as a convenient powder for mixing on site.

Jim Gregory of International Drilling Fluids, Aberdeen supplied the formula — a mixture of bentonite to make it nice and thick and lignite for dark colour. As they only needed a few tonnes, it was donated to the production.

Colombian power crisis gives boost to oil and gas

By Maria Kielmas, Editor, Latoil

In a year when most Colombians have been enduring daily power cuts, labour union protests are stalling government economic liberalisation measures and the war against insurgency is at its fiercest for 30 years, the oil and gas sector is functioning as a relative paragon of stability. This apparent contradiction has come about as a result of Colombia's legalistic tradition which has enabled the association contract, which governs foreign oil investment, to exist with minimal alteration over more than 25 years. It has not compensated for the effect terrorism has had on keeping away foreign oil investment but the emergence of private Colombian groups in the oil sector is seen as an encouraging sign.

Major oil discoveries in the Llanos Orientales, such as Caño Limón in 1986 and Cusiana in 1991, have boosted exploration in a region where drilling costs have been the real setback. Government attempts to accelerate the gas development programme in the wake of this year's power crisis will finally produce a domestic market for new gas discoveries. But exploration activity has now flattened as oil prices remain low. Control of development costs, especially in the all-important Cusiana field, rather than the insurgency problem, will be the decisive factor in Colombia's oil future.

Despite being a major oil and coal producer, 78 percent of Colombia's electricity generation is from hydro power. Officially, a severe drought caused by the erratic effects of the seven-yearly El Niño warm Pacific current reduced water levels in reservoirs and hence hydro generating capacity. Thermal plants have been out of action due to poor maintenance or because transmission lines were blown up by insurgents. But charts compiled by the Ministry of Energy clearly indicate that a distinct decrease in rainfall could have been expected over one year ago and even the El Niño effects were predictable. Reservoirs were deliberately allowed to run down to 16 percent of capacity, in a country where 35 percent is critical, until March this year. Power and water rationing began once Colombia's first ever gubernatorial elections were over in March.

The electricity utilities, all of which belong to the state sector, do not have the financial clout to cope with the crisis. Their total debt is $5.2 billion, one-third of the total national foreign debt, contracted mostly for hydro projects which are four years behind schedule in a country where only 60 percent of the population is connected to the national grid. The government has begun a belated corruption investigation into the power sector.

Meanwhile, the state oil company Ecopetrol is speeding up its $750 million investment in planned new gas infrastructure. The government's aim is to encourage gas exploration and production and its use in power generation. Ecopetrol will finance all gas trunklines as part of the national gas plan. Companies, if they wish, may participate in distribution networks but are under no obligation to do so. Ecopetrol will also buy gas from private sector companies at about $0.70 per thousand cubic feet to feed into the gas grid. Lasmo has emerged as the first foreign company slated to become a gas producer with its Guepaje-1 gas discovery well on the Mayangue association contract area in the Lower Magdalena.

Eastern Cordillera hills

Cusiana discovery

The Cusiana discovery, when it comes on stream, is expected to be a major gas as well as oil producer. Gas production from Cusiana will be reinjected for the first four or five years of the field's life. BP says that all of the gas will be reinjected while Ecopetrol believes there will be some remaining to sell either directly to consumers or for electricity generation.

However, the question of finance has been most prominent in the appraisal of the Cusiana discovery where well costs are averaging $25 million for the current partners, British Petroleum (operator with 40 percent), Total (40 percent) and Triton Energy (20 percent). Ecopetrol which, on declaration of commerciality for Cusiana, has the right to back in for 50 percent on payment of pro rata back costs, has been watching BP's drilling programme with increasing concern and would like to see well costs cut by half. Speculation about Cusiana development costs indicates the project could exceed $3 billion.

Buenos Aires 1 well Photos by Laurie Sparham courtesy of BP

Though now heralded as a BP discovery in a supposedly 'frontier region', Cusiana exploration has a long history. Indian legend from Casanare province, where Cusiana is located, frequently tells of 'balls of fire,' now known to be the spontaneous combustion of gas seeping from the ground. Casanare was a strategic stronghold of Simon Bolivar's forces during Colombia's independence struggle and the town of Santiago de las Atalayas, after which the BP/Triton/Total association contract area is named, was the major centre. It was obliterated in the last century by a natural gas explosion.

The Llanos foothills have always been a difficult area in which to drill and always acknowledged as such by Ecopetrol and other foreign companies. The Cusiana structure, a simple anticline, is bound to the east by a sealing thrust fault which is still active, increasing pressures in an already high-pressure area. Drilling tools are constantly getting stuck requiring numerous fishing operations which have tended to erode even heavy duty casing, which then collapses under pressure.

Ecopetrol's inability to finance drilling here led to Triton Energy's signing of the present association contract in 1982. All potential leads and prospects, which are still valid today, were worked up by the then Triton team of geologists, most notably Jim Edwards, who now runs the Dallas-based Global Exploration. Triton had the prospects on the market for two years before a Union Texas-operated consortium was formed, which drilled two wells, one dry and one with shows, in the plains east of the present Cusiana field. By the time BP farmed in, the only location left in which to drill was the Cusiana anticline in the thrust belt, previously rejected because of expense.

Wild speculation over Cusiana reserves has had little basis in fact, since only three wells have been completed while another six are drilling this year. Simple volumetric calculations based on 'back-of-envelope' assumptions have indicated reserves of between two and three billion barrels. But the Cusiana superstructure's areal extent, now taken to be between 75 and 100 sq kms, is still not completely defined. This itself is traversed by two or more tear faults and, given the tectonic history of the region, the fragmentation could be considerably greater. In addition, the main reservoirs of the field are all separate structures. BP has said that a first estimate of reserves cannot be expected before early next year. In October this year the Buenos Aires-1 well is due to go on long-term test producing between 5,000 and 10,000 b/d.

At present no-one in Colombia is thinking seriously about a major oil pipeline from Cusiana. If initial production rates are low, they can be accommodated by a 14–24 inch spur to the Central Llanos system. Ecopetrol calculates that transportation costs for Central Llanos crude are $0.0007 per barrel-kilometre. The belief is that Cusiana transportation costs should be less.

'Essentially, the Colombian terrorist risk is well-documented and manageable'

Refining plans

Cusiana is one of two locations proposed for a scheduled new 100,000 b/d refinery. The other is at Puert Truifo in the Middle Magdalena region, next to the Cocorna heavy oil field. Costs for this refinery are estimated by Ecopetrol to be around $1.2 billion. But the ultimate decision on a refinery location is political and depends on the relative strength of the municipal authorities in the areas under consideration. The purely rational view is that a refinery of this size should produce enough for export and its optimal location would be on the coast rather than inland. But in this case political expenditure will be decisive.

Security problems

Security and the relationship of insurgency groups with the municipal authorities will also have a crucial influence on this refinery's location. The refining town of Barrancabermeja is a major recruiting centre for the insurgents, arms procurement supply and financing. The Colombian insurgents are most grouped in the umbrella organisation, Coordinadora Nacional Guerrillera Simon Bolivar (CNGSB) comprising three main groups, the Fuerzas Armadas Revolucionarias Colombianas (FARC), the oldest and largest group, the Ejercito de Liberacion Nacional (ELM) and a faction of the Ejercito Popular de Liberacion (EPL), which demobilised in May 1991 to enter mainstream politics. The total number of fighters is thought to be 6,000–7,000.

Figures from the security services leaked to the Bogota press estimated the CNGSB income to be $250 million annually from kidnapping, extortion, robbery and drugs, making it Colombia's 10th largest business. Ideology is irrelevant since terrorism in Colombia, as elsewhere, has become a business. The rebels' business also overlaps with similar pursuits conducted by their sworn enemies among the military, para-military, cattle-ranchers and drugs trade. The dividing line between all of these and the rebels are increasingly blurred. The rebels are very well-informed about all aspects of the oil industry and employ foreign consultants for the purpose, as well as having informers within Ecopetrol. They are able to mount road blocks preventing repair to oil facilities which they have sabotaged. But the CNGSB is now split on whether to demobilise and join mainstream politics or whether to carry on fighting, and also various factions have been embezzling funds.

Deeply unpopular because of its mishandling of the power crisis, the government ordered the military to launch a massive offensive against the rebels at the end of May. The result has been an unprecedented mutual battering as the various sides demonstrate their fire power to their own dissidents as well as their supposed foes, while at the same time protecting 'business' interests. This combination of factors lead to the rebels declaring 'total war' on the government and all institutions, national and foreign companies which co-operate with its economic policy, and the press.

In the oil sector Ecopetrol is their real target because it represents the state. Foreign oil companies have learnt to handle Colombian terrorism through a combination of a low profile and helping isolated communities near their operations through building clinics and schools, as well as obvious high-tech security measures on site. Essentially, the Colombian terrorist risk is well-documented and manageable. Only with sites as large as Cusiana do these costs become significant. Here the security costs $24 million annually and also involves a battalion of Colombian troops, 600 men, on constant mobile patrol in the area. The Casanare region, however, does not have a great insurgency problem. This is far worse in the north of the country. Since the beginning of the military offensive and the rebels' 'total war' some oil companies have found it impossible to send personnel to operational sites and have totally forbidden road travel until the offensive is over. Others are having to delay seismic programmes if the crew cannot be assured of military protection.

Colombian private sector oil companies cannot entirely replace lost foreign interest because of the terrorism problem but are slowly becoming significant. Petroleos de Colombia (Petrocol), founded by Luis German Morales, the grand old man of Colombian geology, is actively exploring in the Middle Magdalana. Caribbean Oil and Services, which includes a number of former Ecopetrol officials, has just acquired a high-risk block in the Cauca basin, southwest of Cali. Ecopetrol president Andres Restrepo believes that service contracts for reviving old oilfields, usually frowned upon by foreign companies, could be used as a way of building up local private sector expertise. Persuading Colombians to invest their own money in their own country's oil industry will be the real measure of success. ■

'Wild speculation over Cusiana reserves has had little basis in fact'

Onshore's precarious future

By Robert McLeod

The government is committed to two onshore licensing rounds each year to stimulate the search for oil and gas. Yet despite three rounds announced in the last 18 months, drilling activity in the United Kingdom is at a new low and companies can see little scope for improvement.

Earlier this year the government announced the results of the fifth landward licensing round and the grant of 26 onshore drilling licences in the United Kingdom. It also proposes to hold a sixth landward licensing round later this year. However, no exploration boom has so far materialised. Indeed, drilling contractors point out that there is little evidence of drilling from the fourth round and describe the current state of onshore exploration as 'dire' and 'dismal'.

The importance of onshore exploration and development may not be readily apparent in a country whose reserves are concentrated offshore in the North Sea. Nevertheless, onshore production has contributed more than 7.5 million tonnes of crude oil and 337 million cubic metres of gas to the UK economy since 1987 as well as orders for goods and services in support of onshore activity for £40 million a year.

Despite a reasonably upbeat from County Natwest WoodMac on the onshore oil industry which reported record production levels, the application of horizontal drilling techniques and the opening-up of the gas market, the future of the onshore industry outside of existing developments is far from secure.

The prolonged recession and low oil prices have led to the near-collapse of exploration and development work. Onshore drilling has slumped from a high of 68 exploration, appraisal and production wells in 1986 to just 14 in 1991 although a number of companies are planning to make modest increases or at least to maintain their drilling activity over the next two years.

The problems experienced by the industry, however, cannot all be laid at the door of the current recession. Mr Jim Ward, Exploration Director, Edinburgh Oil and Gas, underlines a point made by executives of other companies: 'The removal of PRT relief from onshore developments in the mid-1980s had the effect of removing the majors from the exploration scene and leaving generally smaller independent companies to continue the work. These companies are having difficulties in raising the necessary finance for many of the projects without a major partner.'

Few larger companies are at present willing to invest their exploration budgets in UK-onshore wells though recent successes in Morecambe Bay — most notably the Hamilton oil and gas discovery in block 110/15–6 — has rekindled interest in certain areas such as the Cheshire Basin.

In order to develop and maintain momentum for onshore activity the government decided to increase the frequency of licensing rounds from once every few years to twice a year. Although a Department of Trade and Industry (DTI) spokesman described the move as a 'response to industry demands', industry sources remain sceptical as to the long-term future of the industry unless radical changes are implemented.

Development drilling at BP's Welton field *Photo: Kenting Drilling*

Production

Hydrocarbon production, which increased between two and three times from 1990 to 1991 could tail off significantly if further exploration is not carried out. The bulk of this increase has been achieved through the development of Wytch Farm which accounts for nearly 90 per cent of onshore production — a level which will increase when extended reach

drilling is completed into the offshore extension of the Sherwood reservoir. Only one discovery (oil at Beckering 1 operated by British Gas) was announced in 1990, none in 1991 and one by Kelt UK Ltd earlier this year.

One of the most active of the onshore independents, Kelt drilled two wells in 1990 (Singleton X2, appraisal; and Horndean X2Z, production) and only one (Pickering 1, exploration) in the United Kingdom and two (Ales 1 and Ales 2, operated by Kelt Energie France) in France in 1991. This year the company has drilled two wells at UK sites (X3Z and X4Z in Singleton, both production) and a further well in Poland (VK2 operated by Vikelt). The company plans to drill three wells in the United Kingdom in 1993. In addition to the work being carried out by the European subsidiaries, Kelt has also announced that it is buying Amoco's entire Gabonese exploration and production operations, tripling its daily production.

The move away from onshore Britain is typical of many of the independents and could have long-term repercussions for the oil industry as the absence of an indigenous oil exploration industry will hamper further development. It is unlikely that the major oil companies will again get involved onshore and the enthusiasm and new ideas of the independent sector could be lost abroad.

A major factor affecting exploration is that the United Kingdom has been extensively explored. Despite this, the government, in the DTI's 1992 Brown Book (on the development of the oil and gas resources of the United Kingdom), estimates that there remains between 15 and 70 million tonnes of oil reserves undiscovered onshore.

Two of the major UK onshore drilling companies, Kenting Drilling and British Drilling and Freezing, have reported a marked lack of activity with a number of stacked rigs and both are looking to Europe, particularly the eastern countries, for oil and gas exploration work.

Unless the government can 'dangle some financial carrot' before the oil companies, neither sees much scope for short-term improvement in the local market.

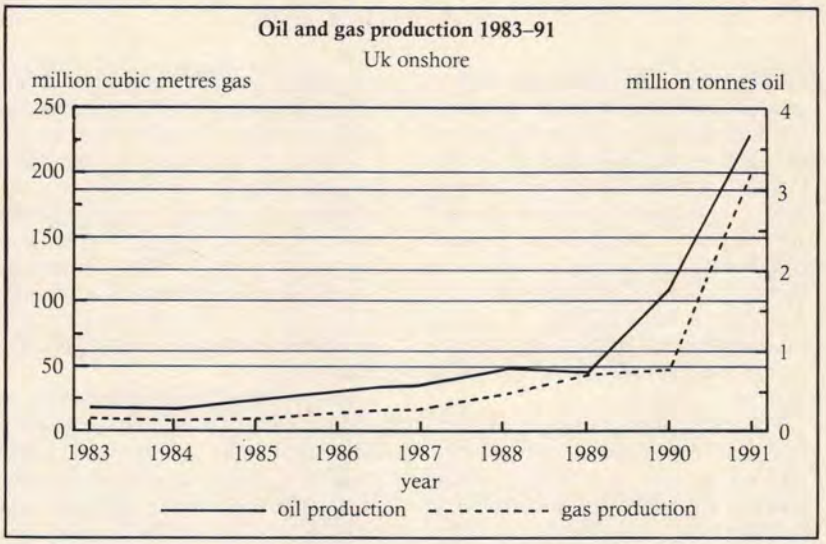
Major coal-bed methane development is viewed with some scepticism particularly with the forthcoming availability of Norwegian gas. The record in the United States where extensive drilling has been carried out has been supported by the application of tax incentives.

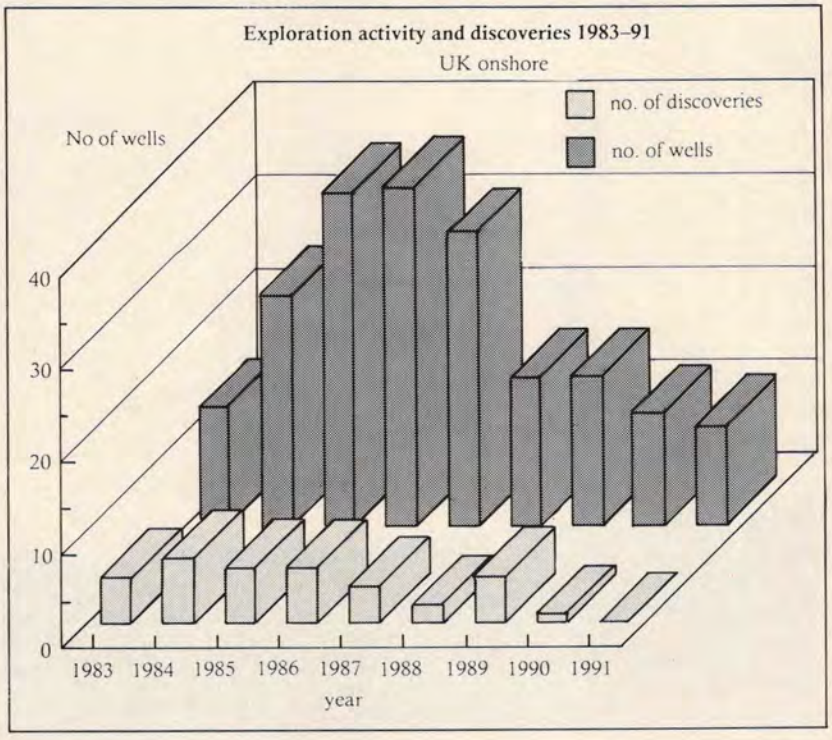
Similarly with the development of onshore gas reserves, much will depend on the availability of offshore gas. The North Yorkshire Power Project which will involve the development of the Malton, Kirby Misperton, Marishes and Pickering fields is currently delayed by a public inquiry.

Strategies

A number of strategies have been suggested to *Petroleum Review* in order to improve the situation, although opinion varies across the industry as to the likelihood of positive action from the government. The proposals include:

- The re-introduction of PRT relief. As this was abolished during a period of high oil prices, current prices and a need for stimulation could warrant its return.
- A reduction in licence rentals, particularly from marginal fields.
- A more streamlined procedure for gaining planning permission.
- Overhauling the licensing system. At present, according to one source, companies can convert Production Licences to Exploration Licences





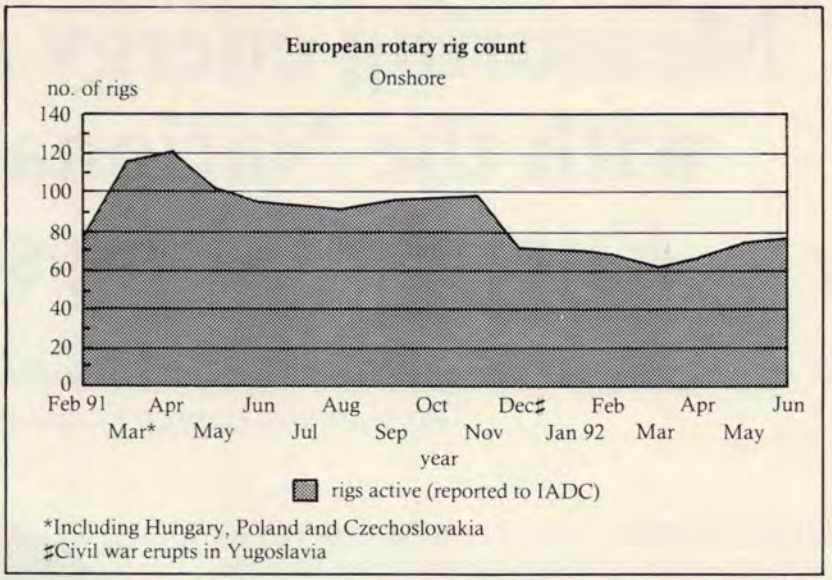
on existing plays and save upwards of £30,000 a year.

Officials at DTI say that they have had no direct approach requesting changes to the fiscal regime. Any comments or proposals would, however, be circulated to the relevant offices and given consideration.

Although the market remains seriously depressed, some companies have provisional plans to carry out drilling over the next two years. No indication has been given as to whether the wells are part of companies' permit obligations or represent a real willingness and financial ability to reinvigorate onshore exploration, although the authorities are said to be 'flexible' with regard to insisting on drilling taking place when a satisfactory case for not doing so can be made. This is usually dependent on the extent of seismic and other exploration completed on the licence.

In a survey carried out by *Petroleum Review*, only five companies indicated their intention to carry out drilling in the United Kingdom. In addition to Kelt's intentions:

- Evergreen Resources plans two exploratory wells in 1992 and one in 1993 (The company is primarily concerned with the search for coal-bed methane).
- Kirkland Resources, which drilled one exploration well in 1990 and none since, says it plans to drill 'up to three' exploration wells in 1993.
- Tullow Oil, which drilled two exploration wells in the same period, plans one production well in 1992 and another in 1993.



- Edinburgh Oil and Gas drilled one exploratory well in both 1990 and 1991. Although no wells are planned for 1992, the company plans 'at least one well, possibly two' for next year.

Onshore exploration and production in Europe as a whole, however, remains marginally more consistent as countries without access to offshore reserves to the extent of those in the North Sea seek to build up their capacities.

In June, according to the International Association of Drilling Contractors (IADC), a total of 76 drilling rigs were reported active onshore in Europe with the majority of the work taking place in Poland (24 rigs), Turkey (17) and Italy (16). No rigs were reported active in the United Kingdom.

Applications for the sixth licensing round in Britain in respect of unlicensed areas and certain near-shore waters must be made by 21 October. A number of companies have indicated an intention to apply for acreage — particularly for coal-bed methane. However it remains to be seen whether another round will be sufficient to stimulate domestic activity. ■

Measuring energy efficiency with the National Home Energy Rating scheme

By I W Byrne, Director of Finance and Administration,
The National Energy Foundation

Energy efficiency is back in fashion, largely as a result of the publicity surrounding possible global warming. In the domestic sector this can now be measured by the National Home Energy Rating (NHER) scheme. What does it entail and what are the implications for the downstream oil industry?

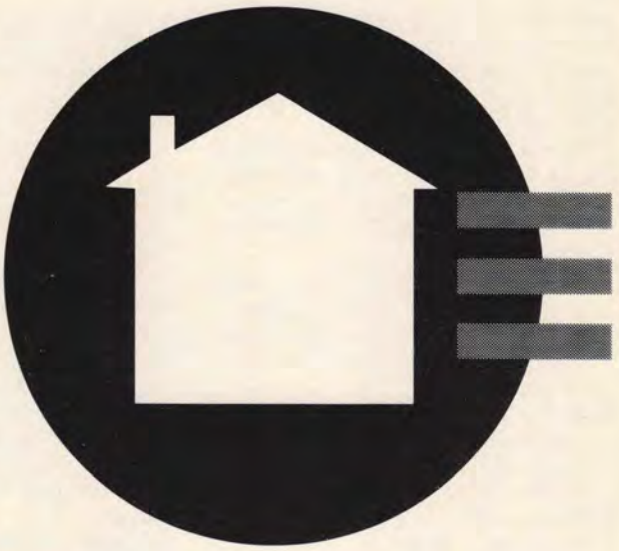
The Earth Summit in Rio may not have produced all that the environmentalists wanted but it did serve to underline the growing awareness of energy efficiency. Global warming is now on the agenda and the British government is actively looking for cost-effective and voluntary ways of reducing CO_2 emissions. One key area that it will concentrate on is the domestic use of energy, which currently accounts for an estimated 27 percent of total UK energy demand.

By Scandinavian or German standards, British homes are real gas-guzzlers with poor levels of insulation and inefficient heating systems. Recognising this, the government started a campaign before the General Election based around the slogan 'Helping the Earth begins at Home' which concentrated on improving domestic energy efficiency. This identified energy labelling as one of the practical ways in which householders could save energy, cut their fuel bills and reduce CO_2 emissions.

Home energy labelling

A home energy label is a simple means of comparing the efficiency of two homes even though they may vary in size, location, age and form. In practice this is done by considering all the factors affecting energy use and entering them into a computer program based upon the UK Building Research Establishment's domestic energy model (known as BREDEM). The total energy requirement is then converted into a running cost per square metre of floor area under certain standard occupancy conditions. This running cost relates directly to a rating on a scale of 0 to 10 where higher numbers represent more energy efficient homes.

The first working domestic energy label in Europe was produced in Milton Keynes in 1986 for the Energy World housing exhibition. The underlying computer programs have since been tested on several hundred homes in normal occupation and, following extensive consultation, were developed into the National Home Energy Rating software. There are now five variants catering for different situations including low-cost energy audits, rating new homes from plans and mass ratings on public sector housing stock.



NATIONAL
HOME ENERGY
RATING

The National Home Energy Rating scheme

To encourage the widespread use of energy labelling, the National Energy Foundation, an educational charity, has set up a scheme around the NHER. The use of the computer software and associated know-how is licensed to organisations known as 'Full Members'. They are entitled to issue certificates showing the rating and to give advice on improvement measures on existing homes to their owners or occupiers. Full members in the energy distribution sector currently include British Gas, British Coal and most of the regional electricity companies; other full members include architects, housebuilders, surveyors and fuel poverty groups.

Only fully trained and examined individuals (known as 'assessors') are permitted to carry out the rating process. A consistent standard of service is maintained by a comprehensive quality assurance scheme which monitors the ratings issued by assessors; this is currently operated in conjunction

ANNUAL RUNNING COSTS (under standard occupancy)

NHER	Dwelling Floor Area (m^2) 60	120	180
1	£930	£1700	£2470
4	£540	£920	£1300
7	£390	£620	£850
10	£285	£400	£520

Annual running costs are total fuel bills including all heating, lights and appliances, as well as standing charges. These figures are independent of location or form of dwelling (e.g. house, flat) but will vary with actual occupancy patterns.

Sample houses with ratings.

with the Building Research Establishment but will shortly be subject to BS5750. A less highly qualified group of people — NHER surveyors — have also been trained to collect data on existing homes that can then be used by assessors to issue certificates and improvement advice.

The scheme also caters for organisations that wish to issue certificates without training their own assessors or surveyors and purchasing the software. These are known as 'streamlined members' and they rely on full members to carry out the actual rating process. This low-cost route is particularly popular with housebuilders as, in addition to the range of fuel utilities, both the NHBC and Foundation 15 are members. It is also often used by local authorities and housing associations

'Helping the Earth begins at Home'

who can buy in a complete package of advice from consultants. The scheme has made particularly rapid progress in the public sector, as it was specified as a means of obtaining additional government funding under the 'Greenhouse Programme' aimed at reducing CO_2 emissions from local authority housing.

A third route into the scheme allows sympathetic organisations to join as corporate members; they are permitted to use the NHER logo and to participate in promotional events.

Certificates and advice

The principal way in which ratings are made known is through certificates which, as well as the rating, include an estimate of annual CO_2 emissions and the government's standard assessment procedure figure. These are all based upon the standard occupancy pattern used for BREDEM. However, the computer programs provide much more information than this. They also produce an estimate of the annual running cost based upon actual occupancy patterns (as indicated by the home's occupants). This is analysed between space heating, hot water, appliance use, cooking and lighting which helps explain the total fuel bills to the occupant as well as providing a check on the accuracy of the data input into the computer programs. Heat losses are shown graphically, split between the different building elements and the heating and control systems.

One program, NHER HomeRater, also suggests a range of possible energy efficiency improvement measures. Choices include adding extra loft or wall insulation, draught-stripping and glazing options, and improving the heating and control systems. An independent estimate of the cost of each measure is included together with the typical annual energy cost saving (based on actual living patterns). Fuel switching is not permitted in these choices as it is rarely possible to carry out a simple substitution without requiring many other changes.

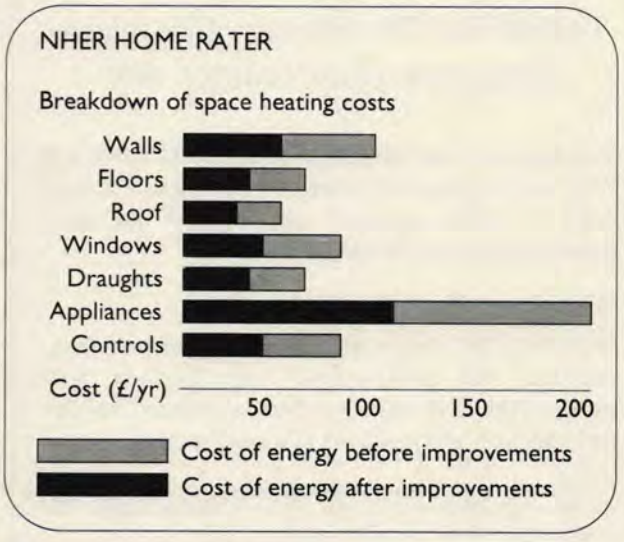
How do oil systems rate?

In general oil-based systems come out competitively with other fossil fuel-based systems. The NHER Rating algorithms are based upon a number of years rolling average fuel prices to eliminate sharp year-on-year changes. As one might expect, central heating systems based on modern boilers (in particular oil or gas condensing boilers) rate highly, providing they are matched to good controls. Coupled with a high level of insulation, extremely good results may be obtained. For example, the Custom Homes oil-fuelled house in 'Green Street' at the Ebbw Vale garden festival scored 9.7 out of a maximum 10.

Use of the NHER programs can also demonstrate independently that many common ideas about energy use in homes are wrong. In many cases the best and most cost-effective improvements that should be made are relatively simple and cheap — typically measures such as increasing the loft insulation to 150 mm or adding draught stripping to doors and windows. Householders are often unaware that adding a thicker jacket to the hot water tank or draught stripping the loft hatch could pay for itself in a few weeks. The NHER also proves that there is no one fuel source that automatically generates the cheapest heating bills!

Action for heating oil distributors

As noted above, energy efficiency is moving back into the public eye after a decade of low energy costs. Consumers are increasingly keen to feel that they are acting in a responsible manner, as well as wanting to be sure that they are getting the best value for money from their fuel supplier. Oil and LPG distributors would be unwise to ignore these trends as there are currently substantial amounts of public money being spent to bring this message home. If they are to retain a long-term position in the marketplace they have to be able to demonstrate that their fuels can be a sensible and economical choice, particularly when used in a well insulated and controlled environment.



NHER audits could be offered at the time that homeowners are considering replacing their heating systems. There should also be a natural response if occupants complain about the cost of keeping their home warm and comfortable. The NHER can often be used to identify the cause of high fuel bills and indicate the most appropriate action.

Of course, it is unlikely to be possible for all liquid fuel distributors to train people to act as NHER assessors. Smaller firms in particular may lack the manpower necessary and there are inevitably costs associated with training and the quality control process. Here, the fuel company may be able to link up with one of the numerous independent firms capable of offering energy ratings or, if it is an authorised distributor for a major, may be able to utilise the services of its supplier. However, even smaller distributors should consider training one of their personnel as an NHER surveyor and issuing ratings and advice through a full scheme member.

Finally it is worth noting that energy labelling appears to be here to stay. With several hundred trained individuals ranging from Cornwall to Northern Ireland (where the scheme has been particularly welcomed) and the active support of the Department of the Environment, the infrastructure is already in place. The European Commission is also keenly following developments in the United Kingdom, and earlier this year issued a discussion draft of a Directive that would make energy labelling mandatory whenever homes change hands. Potential homebuyers, especially of new homes, are beginning to ask for the National Home Energy Rating Certificate as they become aware there is more to a dwelling's energy use than just the heating fuel. A high rating can show them that they are getting a good deal for their money and helping the environment at the same time. ■

Trinidad pins its energy hopes on gas

In December 1991, the Trinidad electorate voted in a new government. Among the first actions of the People's National Movement regime was a hard look at just where the oil and gas industry was going. For, under the previous National Alliance for Reconstruction administration, the industry had long been seen as grinding to a halt. Urgently needed decisions, covering upstream development, downstream processing policy and whether or not to export raw materials or process them locally were all put to one side. The new government is headed by a Prime Minister, Mr Patrick Manning, with an energy background. He is backed up by an Energy Minister, Mr Barry Barnes, who has oil marketing in his blood. Rapid changes now seem certain.

The need for a review of Trinidad's oil and gas industry is becoming urgent. Basically, the problem resolves into one of steeply-falling oil production. From a peak of 229,500 barrels a day (b/d) in 1978, output fell sharply to 158,205 b/d in 1983, rising to 169,000 b/d a year later. But the respite was only temporary and output continued to fall: last year it averaged only about 145,000 b/d. At the same time, the one-time refining capacity of 450,000 b/d — partly used to refine local crude but mostly to handle Mideast crude, with products heading for the United States has been radically slashed. Utilisation had been only some 25–30 percent of capacity for years, with the inevitable result that capacity itself has been severely cut. To that can be added the problem of operating two refineries built in the 1940s and 1950s and designed for the conditions then obtaining. Today, both plants are in urgent need of modernisation.

Falling oil production combined with a marked drop in oil prices has had a devastating effect on Trinidad's economy. A decade ago, oil accounted for 90 percent of foreign earnings and 65 percent of government income. Today, the oil industry contributes well under half the country's foreign earnings, while the government has built up a loan burden of $1.8 billion as it strives to replace oil income. Not surprisingly, the economy, now slightly on the mend, declined throughout the 1980s by some 4.5 percent annually, halving Gross Domestic Product as well as average per capita income. Unemployment is now well over 20 percent.

Huge potential

While this gloom was settling over the country, it was all the time sitting on a vast untapped bonanza. For, although oil reserves have fallen to just 524 million bbl, having peaked at around 650 million bbl in the late 1970s, gas reserves have tripled. Today, some 18 trillion cubic feet (Tcf) has been found, with only a minute proportion of that being exploited. Instead, further money was put into onshore oilfields, with secondary and tertiary recovery adding a little to output but a great deal to costs. The 1985 slump in oil prices meant that, for a while, most onshore fields were producing at a loss. Matters have improved of late but large numbers of onshore wells remain shut in, partly because the world is glutted with the sort of crude that is best suited to fuel oil and asphalt production, and partly because — even if a buyer can be found — the cost of production is still too close to the selling price to make the venture worth the effort.

Trinidad's asphalt lake.

Luckily, offshore the scene is very different. Light oil has been found to the southeast, by Amoco and others, while a number of fields occur to the west. But gas has been found in abundance, both to the southeast and to the north. In fact, so much gas has been found that successive governments have spent the last decade arguing about just how to use it and that is what has caused problems.

On the one hand, there are those who feel that LNG export would be best. On the other hand are those who say that it makes more sense to use gas to feed downstream industries to make value-added products for export. Such a route would also markedly reduce local unemployment.

The second option has made some progress, drawing on the skilled workforce that has been left high and dry as the oil industry has shrunk. But two problems remain. One is finding investors but the local taxation rules have not always helped in that direction. The other is finding markets for products (and deciding which are the best products to make, given that world markets are so fickle). As a result, procrastination has tended to over-ride the need to make firm decisions. Now

the new government hopes to sort things out once and for all.

Matching developments

So far, downstream development based on gas has concentrated on ammonia and methanol. At present, four ammonia plants turn out 5,500 tons per day (t/d), with only 1,400 t/d of urea being produced, in one plant, downstream. The balance is exported. Currently, just one 1,300-t/d methanol plant operates. These five absorb some 266 MMcfd of gas as feedstock. A further 119 MMcfd goes for power generation, giving a total demand of 447 MMcfd in 1990. This comes mostly from Amoco's Cassia gas/condensate, Poui and Teak oilfields off the southeast coast.

Before any marked expansion was possible downstream, further gasfields had to be developed. Because Amoco had a virtual monopoly of supply, the government of the day chose to develop the Pelican field. The position was not actually this simple, for Amoco's fields were starting to decline and, although the company had a firm contract to supply 200 MMcfd to the state-owned National Gas Co (NGC), deliveries above that were essential but were subject to a pricing mechanism that seemed to upset everybody. Pelican, however, is on state-held acreage. So the three state firms — Trinidad & Tobago Oil Co (Trintoc), Trinidad & Tobago Petroleum Co (Trintopec) and NGC — got together to form Trinidad & Tobago Marine Petroleum Co (Trintomar), which would develop Pelican. Contracted to supply 130 MMcfd to NGC by 1991, Pelican is a near-disaster. Cost was $150 million to develop an estimated 740 Bcf gas and 21 million bbl condensate but the reservoir proved to be far more complex than expected. Some wells have produced better than expected; others failed to hit even one of the 10 known pays. As a result Pelican output is now just 20 MMcfd, cashflow is negative and the company has to service the $120 million loan raised from Nissho Iwai Bank.

To extricate itself from this mess the former government, in one of its last actions before the December elections, signed up with Amoco for enhanced gas supply. The original deal for 200 MMcfd was due to expire in 1999 but has been replaced by a 350-MMcfd deal expiring in 2010. Pricing is also improved. Now Amoco is to spend $60 million immediately, to boost 1993 output capacity.

Initial production boost will come late this year, when the Flambouyant (ex-East Queen's Beach West) field comes on stream. A two-well platform will feed 80 MMcfd into the existing network based on Cassia. By the end of next year, a second field — Immortelle (ex-South East Galeota North) — will come on stream. This is a much bigger affair, a 15-slot platform being required with output targeted at 400 MMcfd. All together, with pipeline links, the two-field development will cost $300 million, investment that would not have been viable without the new supply deal.

Long-term development

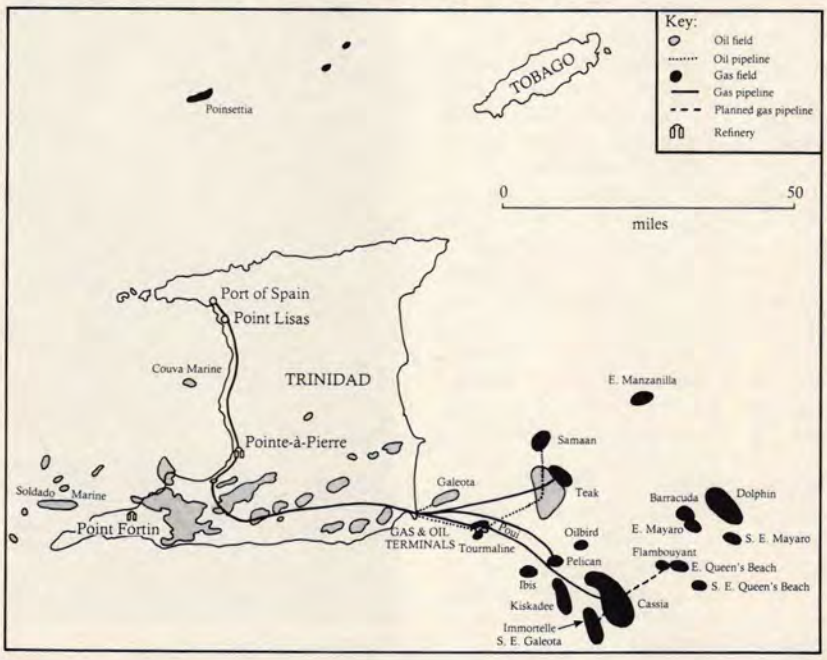
This deal secures gas for the immediate future. But it has long been clear that the reserve base could sustain some 1 Bcfd. A long-term development plan was essential, however, if this was to be achieved. Now the government has put forward a priority list to follow on from Amoco's initial two-field scheme. Earmarked next are: East Manzanilla (Amoco); Dolphin (British Gas *et al*); East Mayaro (Amoco); Ibis (Trintomar); Oilbird (Trintomar); and Kiskadee (Trintomar). Since East Manzanilla is remote from existing infrastructure, Dolphin is most likely to come first, with development starting in the mid-90s.

In the main, consecutive gasfield development off the southeast coast will provide ample fuel for infrastructure and feed for petrochemicals. But the sheer volume of gas available has once more raised the possibility of LNG export. Most likely candidate for such treatment is British Gas' Poinsettia field off the north coast. Its location dictates isolated development but the problem is competition. Earlier schemes — a project to supply Puerto Rico was the latest — came to grief on economic grounds. Likewise a non-starter was a plan to pipe Trinidad gas to other Caribbean states. The United States remains the most likely market but Venezuela's huge Cristobal Colon LNG scheme — though stalled at present — remains a powerful competitor.

If LNG export cannot get off the ground, further petrochemical development remains an option. But a third possibility exists. Already Amoco is using sizeable volumes of gas to boost offshore oil production. And most onshore fields are in dire need of further enhanced-recovery techniques. So further gas could find a use there. For the government aims to

'A vast untapped bonanza'

Trinidad production moves from onshore oil to offshore gas



keep oil production at around 150,000 b/d. And it also hopes to process more at home. The Trintoc refinery at Pointe-à-Pierre is thus undergoing a $200-million upgrading. This, overseen by M.W. Kellog, includes the installation of a new hydrogenation plant, sulphur-recovery plant and visbreaker, plus the conversion of a hydro-treater to a hydrocracker and revamp of the cat-reformer and FCC units. Completion is set for 1994. Since local/light crude is not processed within Trinidad, utilisation will be boosted by importing heavy Venezuelan crude. Eventually, the 250,000 b/d of current primary distillation spread over two refineries will be backed up by 160,000 b/d of upgrading capacity, more than enough for local heavy-crude output and allowing for 60,000 b/d of imports.

Matching this modernisation will be a revamp of the complex web of state-owned companies. Trintoc and Trintopec upstream activities will be merged, though Trintoc's refining and sales operations will remain separate. Also staying as at present will be NGC and the republic's sole marketer National Petroleum Marketing Co. But the plethora of government interests in petro-chemicals — all currently separate companies — will be merged, with one body being responsible for both the wholly-owned plants and the various joint ventures. With luck, therefore, the mid-1990s should see Trinidad once more the possessor of a thoroughly up-to-date oil industry, both technologically and organisationally. That is, of course, if the procrastination of the 1980s does not once more rear its ugly head. ■

Pointe-à-Pierre refinery is being upgraded to allow it to compete on heavy-crude processing.

John Cranfield

Health aspects of benzene and petrol

This article has been produced by the IP Advisory Committee on Health as a guide and to increase general understanding of the health aspects of benzene and petrol

Benzene in petrol

Over the past 50 years benzene levels in petroleum-derived gasoline have varied considerably, depending on the refining processes used. In the 1940s, 1950s and 1960s, the benzene content of marketed petrols has ranged from 0.5 percent to 30 percent by volume but since the 1970s has averaged 2–3 percent.

For a number of years, both before and after World War II, benzene-containing hydrocarbons derived from coal gas production (benzole) were included in some petrols in brands like National Benzole. Such blends could have consistently high benzene contents which, in the extreme, could reach 30 percent by volume.

In the 1960s, the lead content of petrol was by present standards also quite high, being up to 0.84 grammes per litre. Since then, the progressive reduction of lead in petrol has meant that more intensive refining has become necessary to maintain the high octane quality previously obtained from the lead anti-knock additives. Consequently, as lead content was reduced, various refining processes were developed to maintain octane rating, some of which had the effect of increasing slightly the benzene content of petrol.

In 1985 an EEC Directive was introduced which limited the benzene content of gasoline to a maximum of 5.0 percent volume. Currently the average benzene content of petrol in the United Kingdom is 3 percent volume.

Contrary to some statements on this subject, benzene is *not* now added to petrol; it is a natural component of crude oil and its concentration may be increased by the additional processing at the refinery necessitated by the reduction or elimination of lead.

Health effects of benzene

Benzene is rapidly absorbed into the body when swallowed, as might occur if petrol is siphoned by mouth out of a car, for example, or if inhaled as a vapour. Some 50 percent is exhaled unchanged in the breath and the remainder is mainly converted by the liver into phenol and other metabolic compounds which are excreted in the urine. It is one or more of these products of metabolism which appear to be responsible for the recognised adverse effects on health described below.

As with other hydrocarbon solvents, extremely high short-term exposures may lead rapidly to symptoms of sleepiness, with loss of consciousness and ultimately death if exposure continues.

In practice, of much more concern is the ability of benzene, following repeated or prolonged over-exposure, to affect the blood-forming tissues in the bone marrow, producing anaemia, reduction of circulating white cells in the blood, and very occasionally cancer in the form of leukaemia and perhaps other related conditions such as lymphoma and myeloma. This sequence of events has been observed historically in a few groups of workers where exposures to benzene were uncontrolled, extremely high, and greatly in excess of the occupational exposure level currently permitted. Examples of such groups have included printers and workers involved in the manufacture of rubber-coated cloth and shoes, using benzene as a solvent. Prolonged and repeated exposure levels well in excess of 100 parts per million (ppm) were apparently not uncommon compared with the current Maximum Exposure Level (MEL) in the United Kingdom of 5 ppm.

Benzene exposure and types of leukaemia

The development of a variety of leukaemias has been ascribed to benzene, the most consistent being acute myeloid leukaemia (AML). Cases of AML in the United Kingdom do not appear to be increasing, despite increased facilities for diagnosis and quadrupled sales of gasoline over the last 40 years. In the United Kingdom there are about 3.9 cases each year per 100,000 of the male population and about 2.8 for females. The condition is somewhat more common in the first five years of life, after which its natural incidence declines until starting to rise again in the fourth decade of life.

There are wide variations in the incidence of leukaemias between different geographical areas in the United Kingdom, and it is notable that these do not correspond with urban, rural or industrial populations. Significantly, there is a lack of correlation between clusters of leukaemias on the recently published United Kingdom map of leukaemias and the location of petroleum refineries.

There is also wide international variation in incidence. The highest European rates are found in parts of Scotland, Denmark, Italy and Switzerland and are in no way linked to the volume of gasoline used in these countries.

Exposure levels and types of effect

It is generally accepted, within the scientific community, that established cases of leukaemia in workers associated with benzene exposure have only been found where frequent exposures in excess of approximately 100 ppm have occurred over prolonged periods of time, usually years, and adverse effects on the bone marrow have been found only following exposures exceeding around 25 ppm. The latter effects are reversible.

Effects on chromosomes have been claimed at lower levels of exposure but such data as exist are conflicting, and the relationship, if any, between chromosome damage and leukaemia has not been demonstrated. It is now considered that short-term peak exposures may play a greater part in the

sequence of events leading to the development of leukaemia than had previously been assumed.

Evidence of excess leukaemia cases among groups of workers exposed to benzene at low levels around or below the current MEL is contentious and subject to rigorous examination by oil industry health scientists. If such a risk exists it must be extremely low. Further epidemiological studies involving much larger groups and having a high statistical power of resolution would be needed to investigate the existence of such low risks. Some researchers have attempted to predict risks at low exposures but invariably these predictions are flawed by use of limited data, inappropriate models and gross underestimates of exposure of the cases. The shape of any dose response curve is entirely unknown, though current evidence suggests it is essentially flat at low level exposures. This implies the existence of a threshold of no effect below which adverse health effects do not occur. Finally, and perhaps most importantly, the way(s) in which excessive exposure to benzene may give rise to leukaemia remain unknown and such explanations as have been advanced are purely speculative.

Risk effects and proposed exposure standards

Particular interest and concern has been generated by the decision of the American Conference of Governmental Industrial Hygienists (ACGIH) in 1990 to propose a reduction in the Threshold Limit Value (TLV) for benzene from 10 to 0.1 ppm, eight-hour time-weighted average exposure. This is substantially on the basis of an epidemiological risk assessment by Rinsky *et al*, dealing with rubber workers employed between 1940 and 1965, and utilising a total of only 14 cases of a variety of leukaemias. Rinsky assumed a straight-line extrapolation to zero dose and zero risk. Serious doubt exists over the exposures in these cases, which may well have been much higher than reported, meaning that the health risk at the much lower exposure levels encountered in industry today is much reduced.

The levels of risk implied by Rinsky's assessment are indeed unprecedented, even by the standards of other known and very potent carcinogens. One might expect, therefore, that cases would occur when even quite small numbers of individuals are over-exposed to benzene. However, numerous investigations have failed to demonstrate such excess cases in various industrial populations. For example, the International Agency for Research on Cancer (IARC) review of 1989 found only two out of 13 studies showed an excess of cases of leukaemia and a review by Wong and Raabe published in the same year, comprising 19 studies of petroleum industry workers, found excess cases in only three (and these included a variety of types of leukaemia not usually associated with benzene exposure).

The ACGIH documentation, regrettably, omits reference to other recent papers reporting alternative risk assessments based on epidemiological data which are significantly different from Rinsky's.

Leukaemia and smoking

Links between smoking and leukaemia, in particular those of the myeloid variety, have long been suggested, although not all the studies have been able to demonstrate a clear and significant rise in this particular risk compared with non-smokers. However, a more recent study designed to investigate previous smoking history and leukaemia incidence among Seventh-Day Adventists in the United States appears to demonstrate a doubling of leukaemia risk for former smokers and strengthens the case for a causal relationship between smoking and this form of cancer, in addition to smoking's established links with many other cancers.

Cigarette smoke contains benzene and some estimates put the proportion of total leukaemia risk that may be attributed to smoking at 20 to 30 percent. Since leukaemia is an uncommon disease, this would make smoking a major causative factor in excess of any conjectural risk from possible environmental benzene exposures.

Control of exposure — benzene and volatile organic compounds

Volatile organic compounds

Because petrol is specifically formulated to evaporate readily in air, petrol vapour and car exhaust gases contain what are termed volatile organic compounds (VOCs).

In the presence of sunlight, VOCs nitrogen dioxide, also found in exhaust gases, react to form the gas, ozone. Ozone in excess is harmful to all living tissue. Thus a major aspect of EEC air quality legislation is concerned with limiting emissions of VOCs (including benzene) and nitrogen oxides from internal combustion engines and other sources in an effort to limit ozone formation. Since petrol is the source of about 40 percent of total man-made VOC emissions, emerging European legislation will require the provision of closed systems for storage, distribution, retail sale and use, so that vapour emissions are greatly reduced. As a result, the release of benzene vapour will also be further reduced.

The following measures to contain VOCs are being proposed, or have already been incorporated into legislation:

(i) Stage I Vapour Recovery — the collection and recovery of petrol vapour normally vented to atmosphere when a road tanker is filled at the distribution terminal and discharged at the retail site. Provisions for marine and rail transport are also included.

(ii) Stage II Vapour Recovery — the collection of petrol vapour which is displaced from the vehicle's petrol tank when it is being filled at the pump and the return of this vapour to the underground petrol storage tank, where it replaces the petrol pumped into the vehicle.

(iii) Catalyst cars — from 1993 all new petrol-engined cars will be fitted with catalytic converters which will reduce by 80–90 percent the quantity of VOCs emitted from vehicle exhausts by converting them to carbon dioxide and water. The legislation, the Consolidated Emissions Directive, also introduces the requirement for the fitting of small carbon canisters on cars to trap and later use the vapour given off by a hot engine when the vehicle is stationary or when subject to diurnal changes in temperature. Future legislation may increase the capacity of carbon canisters to make the capture of petrol vapour an even more efficient process.

Petrol volatility reductions

If petrol volatility is lowered, in addition to beneficially affecting VOC emissions, benzene evaporation will also be reduced as less will be co-evaporated with the smaller, more volatile molecules. Last year the British Standards for petrol were changed to reduce petrol volatility in the winter, spring and autumn periods.

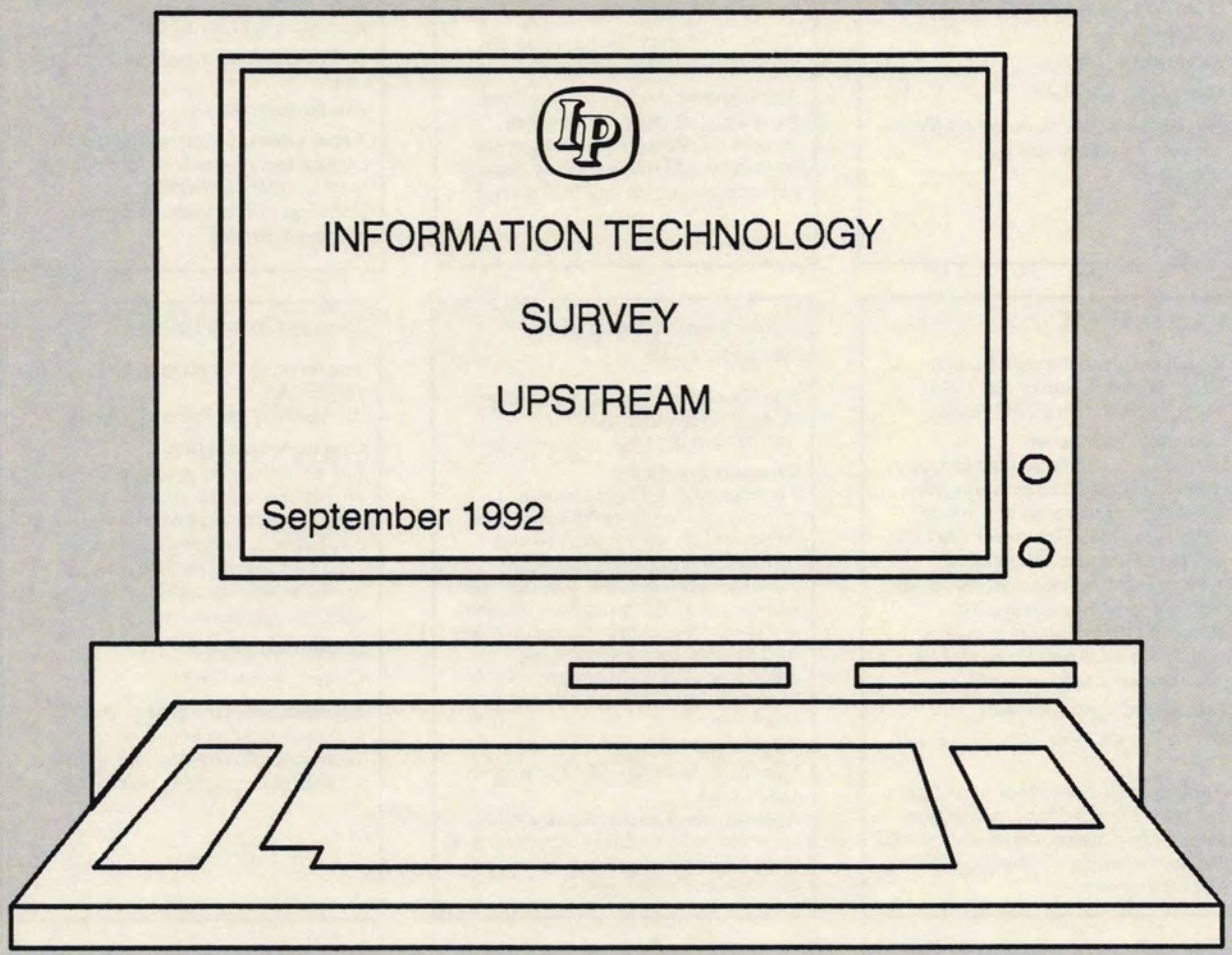
In January 1993 the volatility will be further reduced for all seasons of the year when the new CEN standards are introduced for petrol in Europe.

Reduction in pollutants

These far-reaching measures will reduce dramatically the level of air pollution from petrol-derived volatile hydrocarbons and hence the extent of ground level ozone creation, particularly in areas of high traffic density. Concurrently, benzene emissions will be reduced as a result of these technological improvements to both vehicles and petrol distribution systems.

Conclusions

- Benzene is a natural component of both crude oil and petrol. Contrary to press statements, benzene is not added to petrol.
- By law its concentration in petrol is limited to a maximum of 5 percent by volume. In practice the average benzene content of petrol in the United Kingdom is about 3 percent volume.
- Benzene is a known carcinogen which, at repeated, excessive and prolonged exposure levels, may cause leukaemia, particularly AML.
- Despite the four-fold increase in the use of petrol over the last 40 years, the incidence of AML is not increasing. The incidence of AML does not correspond with urban, rural or industrial areas, or with the locations of petroleum refineries.
- A causal link between low (non-occupational) levels of exposure to benzene and the incidence of leukaemia has not been established.
- Very serious doubts exist as to the validity of the levels of epidemiological risk assessed by Rinsky *et al* which form the basis for a proposal by the US ACGIH to reduce the maximum exposure limits for benzene.
- Although smoking adds to the aspirated intake of benzene, the increased risk of leukaemia is far in excess of any conjectured risk from benzene. Smoking therefore serves to distort adversely the results of epidemiological surveys.
- Measures to limit the emissions of volatile organic compounds from both vehicles and petrol distribution systems will also reduce by up to 90 percent any incidental exposure of the general public to petroleum-derived benzene. ■



INFORMATION TECHNOLOGY SURVEY-UPSTREAM

INFORMATION TECHNOLOGY SURVEY-UPSTREAM

FEA Ltd

Forge House, 66 High Street, Kingston, Surrey KT1 1HN
Tel: 081 541 1999 Fax: 081 549 9399

Company description
FEA provides a consultancy service for finite element analysis and simulation. Recent projects include: ultimate load analysis of complex offshore platform nodes; and vibration analysis of a centrifugal oil/water separation plant. FEA Ltd also develops Lusas — a leading UK finite element system, so access to high quality stress engineers is guaranteed.

Established: 1982

Users: UK, EC, Asia.

Applications: Stress analysis, failure analysis, heat flow analysis, simultation.

Andersen Consulting

2 Arundel Street, London WC2R 3LT
Tel: 071 438 5000 Fax: 071 831 1133

Company description
Andersen Consulting is a leading business and technology consultancy helping organisations to achieve success through linking strategy with technology, processes and people. The oil and gas industry is a major part of the practice with significant experience, both in the UK and worldwide, in the provision of advisory services and systems implementation.

Users: 100 energy clients worldwide including all of the oil majors.

Applications: Andersen Consulting provides a full range of consulting services for clients in exploration and production. Oil transportation, natural gas transmission and oil-field services.

Petroleum Info

4605 Post Oak Place, Houston, Texas, 77027 USA
Tel: 7138509295 Fax: 7138608769

Company description
Worldwide information services and technologies including data collection; database management; geological, geo-economic, and geophysical studies; mapping; PC, Unix workstation and mainframe software; training and seminars. Databases include seismic, land leasing, production, logs, drilling well activity and well completion histories. Delivery media includes print on-line CD-Rom diskette and magnetic tape.

Established: 1928

Applications: Geophysical land exploration, production/development reservoir management, strategic planning, information management training, mapping.

Diagonal PLC

Diagonal House, Lion and Lamb Yard, Farnham, Surrey GU9 7LL
Tel: 0252 733711 Fax: 0252 733825

Company description
Diagonal is an international firm of computer consultants providing all levels of computer staff to work on client sites around the world. Services include strategy studies, project management, systems analysis, design, programming, implementation, planning quality assurance system support teams. Application package selection and implementation.

Established: 1988. 300 staff.

Users: Europe, Mid East, Africa, Far East.

Applications: Experience in surface and sub-surface systems, production data, drilling materials and commercial systems including accounting software and MIS systems.

Infochem Computer Services Ltd

Southbank Technopark, 90 London Road, London SE1 6LN
Tel: 071 922 8852 Fax: 071 620 0732

Company description
Consultancy R & D and customised software in all aspects of physical properties from data acquisition and mathematical modelling to process simulation and fluid flow. Typical projects include: calculating multiphase equilibria and chemical equilibria; prediction of gas hydrate formation and inhibition; application of physical property models to process optimisation and dynamic simulation.

Established: 1987

Users: UK, Germany, The Netherlands, Japan, USA.

Applications: Thermodynamics for oil gas and chemical industry. Application of thermodynamics to process simulation, fluid flow and safety studies.

Lamp Consultants

The Grange, Thrumpton, Nottingham NG11 0AX
Tel: 0602 831196 Fax: 0602 831001

Company description
Lamp Consultants specialise in the provision of advice, training and consultancy associated with the use of computers in technical applications.

Lamp Consultants also develop specialist bespoke technical software to client specifications.

Established: 1988

Users: UK, Holland

Applications: Consultancy in CAD system evaluation and selection. Technical software development for solution of engineering problems.

Petroleum Info Corp

4100 East Dry Crock Road, Littleton CO 80122, USA
Tel: 303 740-7100 Fax: 303 694-1754

Company description
For more than 60 years, Petroleum Information has been a leader in the petroleum industry — gathering, processing, verifying, and integrating petroleum data. Our services include, drilling activity information, seismic data, current and historical well data, logs, production information, digital mapping, drilling statistics, land lease information, and etc.

Marex Technology Ltd

Cowes, Isle of Wight PO3I 7AW
Tel: 0983 296011 Fax: 0983 291776

Company description
Consultancy specialising in E&P computing systems. Our key expertise is in information management. Our recent projects include: inventory management rationalisation, data base strategy, formulation and PT strategy formulation.

Users: Norsk Hydro, Arco, Lasmo.

PPDS, NEL

East Kilbride, Glasgow
Tel: 03552 20222 Fax: 03552 63398

Company description
The physical property section at NEL handles all aspects related to thermodynamic and transport properties of fluids from data measurement, data provision, analysis and fitting to formal quality assurance.

Established: 1949

Users: UK, Europe.

Applications: Process simulation, heat transfer equipment design.

INFORMATION TECHNOLOGY SURVEY-UPSTREAM

JBF Associates, Inc.

1000 Technology Drive, Knoxville, TN, USA 37932-3353
Tel: 615-966-5232 Fax: 615-966-5287

Company description
Engineering services for reliability, availability, maintainability analysis, hazard evaluation; safety engineering; human factors analysis; quantitative risk assessment; and process safety management for improving, reliability, safety, environmental and economic aspects of engineered systems. Training courses for various process hazard analysis techniques. Methods and database development for qualitative and quantitative safety assessment techniques.

Established: 1977

Users: USA, Canada, Europe

Applications: Offshore platforms and onshore oil/gas production facilities; gas processing and treating plants.

EDS-Scicon

62 Queens Road, Aberdeen AB1 6YE
Tel: 0224 312002 Fax: 0224 312015

Company description
IT consultancy, computer software, systems design/implementation and systems integration for the upstream oil and gas industry. Skills include mathematical modelling, realtime software applications, database design and analysis, Full software and hardware facilities. Management services, project management and BS5750 quality assurance.

Users: Oil companies worldwide

Applications: Exploration and production applications, including: process monitoring, well information, production allocation, materials management, permit to work and gas marketing.

Fluid Flow Consultants

8004 S. Juniper Ave, Broken Arrow, Oklahoma 74011, USA
Tel: (918) 451-1024 Fax: (918) 451-3365

Company description
Fluid Flow Consultants (FFC) is a consulting firm that specialises in the development and support of pipeline and production engineering applications software. FFC's main thrust is the production of advanced, accessible and affordable personal computer simulation models for the study of multiphase flow and fluid transients.

Established: September 1986

Users: Our clients include those in: United States of America, Canada, Norway, Scotland, Spain, England, Italy, Australia, Venezuela, Indonesia, Saudi Arabia, United Arab Emirates.

Applications: Development of software, fluid flow engineering, hydraulic analysis of pipelines and wells, multiphase flow design analysis of pipeline, surge analysis of offshore pipeline, etc.

Strucom Consulting Engineers

Strucom House, 188–196 Canterbury Road, Croydon, Surrey CR0 3HF
Tel: 081-683 3999 Fax: 081-683 3933

Company description
Strucom Consulting Engineers (SCE) carries out advanced computer-aided engineering analysis using highly qualified engineers, state-of-the-art engineering analysis programs and extensive computer facilities. SCE consultants have experience in analysis, experimental testing, research and design. They work in a multi-discipline environment on stress analysis, dynamics, heat transfer, fluid flow and modal testing.

Logica Industry Ltd

2 Queen's Gardens, Aberdeen AB1 6YD
Tel: 0224 643575 Fax: 0224 632089

Company description
Logica is a leading international computer software systems and consultancy company. Services include: IT consultancy and strategy studies, requirements and systems analysis, design, custom built systems, systems integration, turnkey implementation, project management and application facilities management. All work is undertaken using strong project management and a quality system accredited to ISO 9001.

Established: 1969

Users: Major companies worldwide

Applications: Production reporting, SCADA, leak detection, pipeline monitoring, personnel tracking, materials and purchasing, office automation, EDI, GIS, and palaeontological database.

Baker Jardine & Assoc

19 Heathmans Road, Parsons Green, London SW6 4TJ
Tel: 071 371 5644 Fax: 071 371 5182

Company description
System effectiveness studies. Dynamic simulation of process and control systems, multi-phase systems design, transient pipeline analysis, thermal transient modelling of wellbores and flowlines, gas lift system design and optimisation.

Established: 1985

Users: Worldwide

Applications: Subsea and platform production systems. Oil and gas production facilities and safety analysis. Multiphase flow pipeline design. Pigging studies. Field optimisation.

Civil and Structural Computer Services

One Circular Road, Newtownabbey, County Antrim, Northern Ireland BT37 0RA
Tel: 0232 365950 Fax: 0232 365102

Company description
Development of computer software for civil and structural engineers. Integrated analysis and design suite to BS5950 and BS8110. Consultancy and training. Bureau service.

Established: 1985

Life Cycle Engineering

One Poston Road, Suite 300, Charleston, SC 29407, USA
Tel: 803 5567110 Fax: 803 5562621

Company description
Life cycle engineering is a professional consulting firm providing engineered solutions to maintenance and maintenance management issues.

Established: 1976

Atkins Oil & Gas

Woodcote Grove, Ashley Road, Epsom, Surrey KT18 5BW, UK
Tel: 0372-726140 Fax: 0372-726140

Company description
Design engineering, analysis, safety assessment, planning, project management, quality assurance and computer programs for the oil and gas industry.

Applications: Offshore industry, marine and structural technology.

*A division of WS Atkins Consultants Ltd.

INFORMATION TECHNOLOGY SURVEY-UPSTREAM

Sodeco

18 Rue de Moresville, 28800 Flacey, France
Tel: (1+33) 37.47.51.63 Fax: (1+33) 37.47.44.63

Company description
Engineering software for PC.
● B-Jac heat exchangers; ● Caesar-II piping analysis; ● Chemcad-II process simulation; ● Staad-III structural analysis; ● Network hydraulic calculation; ● Sigma sprinkler system; ● ESI process design; ● Provessel pressure vessels; ● Cosmos/M finite element; ● FE/pipe finite element engineering services.

Established: 1983

Users: France, Belgium, United States.

Applications: 900 Licences worldwide.

Quantitative Technology Corp

9360 SW Gemini Drive, Beaverton, Oregon 97005, USA
Tel: 503 626308 Fax: 503 6416012

Company description
Quantitative Technology Corporation provides computer consulting, custom software development, and system integration for customers that utilise hardware architectures containing RISC processors, DSPs, array processors, parallel processors, and supercomputers. QTC's expertise is in writing, porting, and optimising scientific/engineering floating-point applications in signal processing, image processing, seismic processing, simulation; to maximise the hardware performance of computer-intensive applications.

Established: 1981

Applications: Signal processing, image processing, simulation, petroleum exploration industry.

Granherne Limited

Chester House, 76–86 Chertsey Road, Woking, Surrey GU21 5BJ
Tel: 0483 729661 Fax: 0483 726577

Company description
System design and development consultancy. Development of tailored systems to meet specifications of international companies including oil majors. Business areas cover operations, engineering, financial, marketing. Mainly data and spreadsheet applications. Lotus authorised consultant.

Established: 1984

Users: Major international oil companies

Applications: Lotus 123, Excel, Paradox object vision, Lotus notes, "C", Fortran.

SOFTWARE

PIPENET-Halon/CO_2 Module

Sunrise Systems Ltd
Flint Bridge Business Centre, Ely Road, Waterbeach, Cambridge CB5 9PG
Tel: 0223 441311 Fax: 0223 441297

Description
This module of PIPENET is for the design and analysis of fire protection systems using CO_2 or Halon and complying with NFPA12 and NFPA12A rules. The network can have a large number of pipes, cylinders and nozzles. Given the nozzle port sizes it can work out, the flowrates or the port sizes may be given.

Hardware: IBM-PC, Compatibles.

Users: 20.

FACTOR

SGS Redwood Ltd
Rosscliffe Road, Ellesmere Port, South Wirral, L65 3AS
Tel: 051 356 5870 Fax: 051 356 0259

Description
FACTOR: Flow Accuracy Calculator, is a practical tool which allows the proper determination of accuracy, repeatability and rangeability of complete flow measurement systems and helps the user to make more informed decisions on questions of equipment selection and loop design.

Hardware: IBM PC, or compatible with CGA.

Drilling Expert Sys

Prentice Training Co
PO Box 30228, Lafayette, Louisiana, 705930228 USA
Tel: 3189899740 Fax: 3189898416

Description
Seven modules consisting of directional drilling, drilling expert systems, drilling optimisation, drillstring design, hydraulics and cementing, mud engineering and well control and abnormal pressure detection which resides on separate diskettes but can be run from a main menu.

Hardware: IBM PC minimum 256 K.

Users: Drilling engineers, toolpushers.

ESI

Sodeco
18 Rue de Moresville 28800, Flacey, France
Tel: (+33) 37.47.51.63 Fax: (+33) 37.47.44.63

Description
Process calculations.
- Heat transfer.
- Fluid flow.
- Equipment evaluation.

Hardware: PC 386/486, DOS 5.0, 2 MB, RAM, Math co-processor MB HD.

Users: 2400 licences worldwide.

TVD Utility

The Logic Group
PO Box 50499, Austin, Texas 78763, USA
Tel: 512-451-5707 Fax: 512-451-2300

Description
Computes wellbore locations based upon survey data from horizontal or vertical wells. Displays the wellbore for top and side view and generates the (x, y, z) location for each survey point. Projections at any plane can be displayed including dip angles. TVD, TST, and TVT can be computed and saved for depth ranges.

Hardware: IBM-PC compatible.

Users: New program 20 users.

NETWORK

Sodeco
18 Rue de Moresville 28800, Flacey, France
Tel: (+33) 37.47.51.63 Fax: (+33) 37.47.44.63

Description
Hydraulic design (Darcy) working under window S3.1. Fluid data bank. Pipe data bank. Autocad interface.

Hardware: PC 386/486, DOS 5.0, 2 MB, RAM, Math co-processor MB HD.

Users: 1200 licences worldwide.

INFORMATION TECHNOLOGY SURVEY-SOFTWARE

MAPS

Logica Industry Ltd
2 Queen's Gardens, Aberdeen
AB1 6YD
Tel: 0224 643575 Fax: 0224 632089

Description
MAPS, the successor to Logica's TRACE product, is an offshore personnel tracking and logistics support application, recording quickly and accurately information on location of personnel. Features include data acquisition through badge reading, resilience through distributed intelligence, comprehensive flight management, offshore administration encompassing bed and lifeboat allocation, recording and validating training details.

Hardware: VAX, most Unix platforms.

Users: Shell, Expro, BP Exploration, Total, Amerada Hess, Chevron, Lasmo.

Sysdrill-Ideas

Sysdrill Ltd
Wood Offshore Centre, Greenbank Crescent, Aberdeen AB1 4BG
Tel: 0224 872582 Fax: 0224 899714

Description
Package is a full spectrum solution for drilling engineering support. Available in both workstation and portable systems it facilitates the design, analysis and monitoring of drilling projects of any size and complexity. Modules include directional drilling, BHA modelling, torque/drag analysis, drillstring dynamics and a comprehensive drilling engineering database and information system.

Hardware: HP 700, IBM RS 6000, Sun Sparc, DEC 5000, DEC Open VMS, Silicon Graphics, PC 386/486.

Users: Over 400 users worldwide.

Math Advantage

Quantitative Technology Corp.
9360 SW Gemini Drive, Beaverton, Oregon, 97005 USA
Tel: 503 6263081 Fax: 503 6416012

Description
Math Advantage is a comprehensive library of frequently used algorithms in signal, image, and seismic processing. These 600 + fully tested and documented subroutines speed the development and modification of technical analysis applications. The library consists of routines for: operations on real and integer arrays; matrix operations and solutions; and the industry standard BLAS-I, II, and III (Basic Linear Algebra Subprograms).

Hardware: Over 40 systems: Cray, Sun, IBM, Hewlett Packard, DEC.

Users: 18,000 installations worldwide.

PIPENET-Spray Module

Sunrise Systems Ltd
Flint Bridge Business Centre, Ely Road, Waterbeach, Cambridge
CB5 9PG
Tel: 0223 441311 Fax: 0223 441297

Description
This module of PIPENET is for the design of fixed fire protection systems using water and complying with NFPA13, NFPA15 and FOC rules. It can be used in the design of deluge systems, ringmains and sprinkler systems. Several lined and unlined pipe types may be used and pumps can be in series or parallel.

Hardware: IBM-PC, Compatibles, VAX Interpro, Apollo.

Users: 150.

OPUS

Price Waterhouse
Milton Gate, One Moor Lane, London EC2Y 9PB
Tel: 071 939 6255 Fax: 071 638 1358

Description
OPUS is a multi-field, multi-user production allocation and reporting system, designed to be flexible enough to fit the configurations of new and existing production environments. OPUS was developed using client server architecture and the sybase tool set under Unix, and it is also running on a Vax under Vms.

Hardware: Sun/Unix, Vax/VMS.

Users: BP Exploration, Miller and Bruce Fields.

ADHOC

Atkins Oil & Gas
Woodcote Grove, Ashley Road, Epsom, Surrey KT18 5BW, UK
Tel: 0372-726140 Fax: 0372-740055

Description
Global F.E. package for casing and tubing design.

Hardware: Most mainframes, IBM-Compatible PC's.

Users: Arco, BP, Conoco, Lasmo, Ranger, Statoil, Texaco.

PROPACS

Prentice Training Co
PO Box 30228, Lafayette, Louisiana, 705930228 USA
Tel: 3189899740 Fax: 3189898416

Description
Four modules consisting of Hydraulics I, Hydraulics II, drilling mechanics and well control can be run in metric or English units.

Hardware: IBM PC min 256 K.

Users: Drilling engineers.

MacDigi

The Logic Group
PO Box 50499, Austin, Texas 78763, USA
Tel: 512-451-5707 Fax: 512-451-2300

Description
Provides a quick and accurate means to digitise paper logs creating ASCii data files. Log curves placed upon a digitising tablet are traced by the digitiser's cursor or stylus. While digitising the curve is displayed upon the screen with sample coordinates. Linear or logarithmic scales with off-scale portions can easily be digitised.

Hardware: Macintosh.

Users: Over 50.

Log Interpret!

The Logic Group
PO Box 50499, Austin, Texas 78763, USA
Tel: 512-451-5707 Fax: 512-451-2300

Description
A low-cost well log analysis program designed to provide users with a tool to quickly compute formation parameters. Dialog boxes prompt the user for needed inputs for a selected method. Results are displayed in graphs and tables. Different methods or inputs can easily be compared in the program.

Hardware: Macintosh.

Users: Over 50.

The Institute of Petroleum

OFFSHORE SUPPLY VESSELS:
Regulatory, Commercial & Operational Issues

Thursday 22 October 1992

To be held at

The Cavendish Conference Centre, London

The Opening Address will be given by Lord Caithness, Minister for Aviation and Shipping, Department of Transport

Other presentations will include:

UKOOA/BOSVA Code of Practice for Support Vessel Operations
Captain J Middleton, Marathon Oil, Aberdeen

The Supply Vessel Market — An Overview
Mr R Shepherd, Managing Director, Petrodata Ltd, Aberdeen

The Supply Vessel Market — An Owner's View
Captain RDM Lenthall, Executive Chairman, Marine Services Sector, Ocean Group plc

Supplytime Charter
Mr J Hojer, Deputy Secretary General, BUMCO, Denmark

Cargo Handling
Captain VR Gibson, Notac Ltd

Anchor Handling
Captain M Negus, Operations Manager, Noble Denton Marine Services Ltd

Modern Supply Ship Design
Mr R Emblem, Maritime Engineering AS, Norway

Development in Anchor Handling and Deck Equipment
Mr T Gjosund, Ulstein Brattvag AS, Norway

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

IP MEMBERSHIP

STILL GROWING

Individual membership of the IP is growing for the third successive year in spite of the continuing recession and major reductions in the workforce of many sectors of the oil and gas industry.

More and more people involved in the industry — which includes the oil and gas companies, the many businesses that trade with them, and the range of organisations that need financial and economic data relating to the industry — see the Institute as a vital source of knowledge, information and business contacts. They recognise that their involvement with the Institute can help them do a better job for their company, enhance their reputation and progress their career and the popularity of our new Consultant List demonstrates this point.

You, as a member of the IP, are one of those people. Our proposition is that if you read Petroleum Review and our other publications, attend IP conferences and discussion groups, use our library and information service, and participate in the wide range of IP events at both national and branch level, you will be better informed on a wide variety of current scientific, technical, economic and financial topics directly relevant to the industry — upstream and downstream — onshore and offshore. This has never been more important than today.

PERSONAL RECOMMENDATION

The Institute exists to serve its members. New members mainly come to us through personal recommendation from our existing membership. Current growth in a shrinking market is encouraging. More members and new ideas enable us to enhance our services. More importantly, they increase the scope, depth and value of the knowledge and contacts that you can gain through membership of the Institute. We therefore once again seek your help in achieving our objective to expand our membership.

RECRUIT A MEMBER

Please help us to recruit new members who will both benefit from membership of the Institute and bring to it new strengths and skills that will enhance the value of your own membership. They could be colleagues in your own company, or other important business contacts and friends – at home and abroad.

If they join before the end of September, they will automatically receive 15 months' membership for the price of 12!

FREE DIARY

If you propose an applicant for membership before the end of October, we will send you a gift of a leatherbound 1993 IP diary as a token of our appreciation. The diary, bound in Forest Green with the IP crest in gold, is packed full of valuable information about the oil industry and makes an ideal seasonal gift.

Why not pass the application form opposite to a friend or colleague and propose them for membership?

INSTITUTE OF PETROLEUM

61 New Cavendish Street, London W1M 8AR

(Registered Office)

A Company Limited by guarantee. Registered No. 135273, England

Notice to Members

Nominations for Council 1993

Article 29 of the Articles of Association states, inter alia, that the Council of the Institute shall consist of:

(a) A President and three Honorary Officers.

(b) The President-Elect or the Past President.

(c) Fifteen ordinary members of Council of whom no fewer than three shall be in the class of Member and no fewer than three (whether Fellows, Members or Student members) shall be under the age of 35 on their most recent election.

(d) Three Branches Committee/Council nominees.

(e) Up to six additional members as may be nominated by Council.

Members of Council referred to in (c), (d) and (e) above are elected for three years, after which they retire at the Annual General Meeting and are eligible for re-election. No such member may remain on Council for a continuous period of more than six years.

There are vacancies for ordinary members (see (c) above) for the election in 1993. Some of these vacancies are caused by the retirement of members of the Council as listed below.

Nomination forms can be obtained from me and *must be returned to me by 31 December 1992.* The nomination form must be signed by a proposer, six other members, and the nominee. No member may sign more than one nomination paper as a proposer or supporter.

Should the number of nominations exceed the number of vacancies, a ballot will be held and further details will be issued to members.

Name	*Company*	*Field of Activity*	*Class of Membership*
G. B. Crump	Consultant	Standardization	Fellow
L. C. W. Rea	Smith Rea Energy Associates Ltd	Director	Fellow
D. Watts	Conoco Ltd	Managing Director Supply & Trading	Member
*P. L. Barlow	Shell UK Ltd Downstream Oil	Manager, Environment Development	Fellow

* Eligible for re-election.

A vacancy exists for an Under 35 Member.

August 1992

I. Ward

Director General

(Articles 29-31 and By-Laws 52-57 cover the election of Council Members.)

THE INSTITUTE OF PETROLEUM

Building on a History of Achievement

For more than 75 years, the Institute of Petroleum (IP) has been one of Europe's principal independent bodies concerned with the advancement of knowledge in the science, technology and economics of the oil and gas industry.
Its objectives are to ensure that its members are informed about the industry in which they work and are satisfied that the standards and codes which affect their commerce and operations are based on good industry practice and science. IP Committees and Panels – professionals from the oil and service industries, supported by its qualified Secretariat – pool their technical experience on international issues of concern such as health, safety and the environment, maintaining close liaison with common interest organisations in the UK, continental Europe and worldwide.
Additionally, through its comprehensive programme of conferences, courses and seminars, the IP seeks to foster and improve the professional knowledge, skills and standing of its members. In these matters the IP has earned an international reputation as a centre for information and as a respected forum for expert discussion and analysis on a wide spectrum of energy interests.

CAN I JOIN?

If you have an active professional interest in sharing and developing your knowledge of the oil, natural gas, or energy industries, then you are eligible to apply to join the Institute of Petroleum.

You may apply for membership wherever you are based in the world and whether you are employed within the petroleum industry or in any of the many industries or services associated with it.

The Institute has over 7,000 members and the number of successful new applicants grows each year. IP members are drawn from the whole spectrum of petroleum-related sectors, including:

- Exploration and Production
- Refining and Manufacturing
- Marketing
- Storage and Distribution
- Supply and Trading
- Fuels and Lubricants
- Petrochemicals
- Information Technology
- Accountancy and Financial Services
- Engineering
- Project Management
- Planning
- Economics
- Health, Safety and Environmental Affairs
- Education and Training
- Research and Development
- Consultancy

THE BENEFITS OF MEMBERSHIP

Information

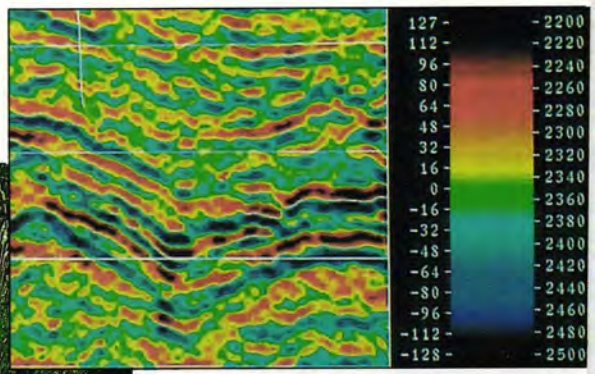
The increasing number of industry professionals seeking membership of the Institute do so because they recognise that fast and direct access to specialist advice or information when it is needed is now, more than ever, an essential requirement for staying ahead in business.

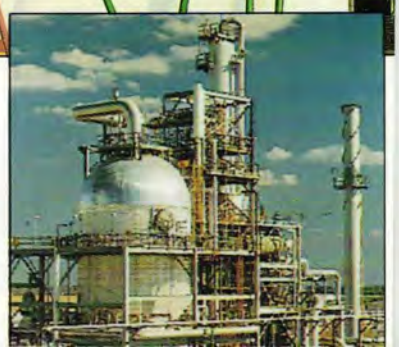
The Institute of Petroleum, as a centre of scientific, technical, economic and marketing data and expertise, has the resources to help you.

Its expert **Technical Department and Library and Information Service** answer around 15,000 enquiries each year, accessing an unrivalled range of information sources, including some 20,000 publications. The Service also accesses hundreds of external on-line databases in the USA and Europe, in addition to its own internal databoses.

Petroleum Review, the Institute's respected international magazine, issued free to members, provides you with a regular and authoritative source of information to ensure that you are in a position to take advantage of important developments impacting the industry.

Attending **IP Conferences** enables you to take an in-depth look at areas of topical concern, to hear the views of prominent industry figures and to meet your opposite numbers across the industry.





The Institute's strength is derived from the diversity of skills and enthusiasm of its membership.

Pictures courtesy of BP, Enterprise Oil and Shell

PROFESSIONAL DEVELOPMENT

Upon election you can, as an individual member of the institute, use the designation **"M.Inst.Pet."** after your name. Candidates of suitable standing may, after five years' membership, apply for **Fellowship** of the Institute, with the professional status that this prestigious award would confer.

In addition, you may take advantage of any of the Institute's **Professional and Career Development Courses.** The Institute recognises the diversity and importance of the technical and management skills represented in the petroleum industry and is currently developing additional courses designed to help its members to perform their jobs more effectively and to assist them in their future careers.

BUSINESS CONTACTS

Getting involved in the activities of the IP, centred on its elegant Central London headquarters, offers members the chance to establish valuable contacts throughout the industry.

The meetings of the Institute's **Special Interest Groups** — *Energy Economics, Exploration & Production, Environment, Personnel, Education and Training, Information for Energy* — provide a forum for lively discussion and debate. Recent meetings have given members the opportunity of meeting with government ministers, EC officials, MPs, leading economists, industry Chief Executives and other experts.

You may join, free of charge, any of the Institute's active **Branches** in the UK, Ireland and overseas, which organise their own programmes of professional and social events with the aim of promoting members' interests in the region.

Attending the Institute's many **social functions,** special **Lunches** or **events** gives you the chance to meet the "Who's Who" of the oil industry and make new contacts, as well as keep up with old friends. Industry CEOs and OPEC Ministers have spoken at recent Institute Lunches and the famous **IP Annual Dinner,** the highlight of what has come to be known as "IP Week", is one of the most important social occasions on the international oil calendar.

AFFINITY BENEFITS

The Institute has negotiated, on behalf of its members, valuable personal benefits, which include preferential rates on:

- **Membership of the Royal Over-Seas League,** amounting to a **discount** of up to **£80.00** on the first year's membership. The Royal Over-Seas League has attractive Clubhouses in St James's, at the heart of London's Clubland, and in Edinburgh's Princes Street, as well as a network of reciprocal clubs around the world.
- **Motor and Household Insurance**
- **Medical Insurance**
- **Professional Indemnity Insurance**
- **Other Financial Services**

Conferences, Publications and Information are popular membership benefits.

SUMMARY OF BENEFITS

Membership of the Institute entitles you to:

- Use the designation "M.Inst.Pet" after your name and apply for Fellowship ("F.Inst.Pet.") after five years;
- Wear an Institute Members' or Fellows' tie or scarf;
- A free monthly copy of the Institute's magazine, Petroleum Review;
- Full use of all the IP's Technical, Library and Information Services, including access to computerised databases;
- Privileged access to and large discounts on the Institute's comprehensive conference programme and publications and its professional and career development courses;
- Apply for inclusion in the Institute's Register of Consultants;
- Membership of any of the Institute's Special Interest Groups or Branches;
- Attend and invite guests to the Institute's calendar of social events;
- A range of useful personal affinity benefits.

At only £38 (and only £11 if you are aged under 25), the cost of membership can easily be recouped by taking advantage of any of the discounts available to members and is tax deductible.

HOW DO I APPLY?

Simply complete the attached application form and send it, with your remittance, to:

Caroline Nutt
Membership Secretary
The Institute of Petroleum
61 New Cavendish Street
London W1M 8AR
Telephone: 071-636 1004

If you do not know an existing IP member to propose your application, we will consider a letter of reference from someone who knows you well and is in a senior position to yourself at your place of employment. We will let you know the outcome of your application within four weeks of receipt.

We consider Membership of the Institute to be excellent value. We hope that you will agree and that you will wish to take advantage of all that the Institute has to offer its members and apply today.

Nearly 400 COMPANIES have taken advantage of the benefits of membership of the Institute. If you would like to learn more, please call Caroline Nutt, who will be happy to talk to you about the benefits to your company.

The Institute of Petroleum

A Charitable Company Limited by Guarantee No. 135273 England
61 NEW CAVENDISH STREET, LONDON W1M 8AR
Tel: 071-636 1004 Telex: 264380G Fax: 071-255 1472

APPLICATION FOR ELECTION TO MEMBERSHIP

FOR OFFICIAL USE ONLY	Acknowledged:	Elected to Fellowship: Date
	Membership No:	Resigned/Lapsed: Date Owing
	Date of Joining:	Reinstated: Date Grade

Surname				Job Title (if applicable)	
First Names				Employer's Name (if applicable)	
Mr. Mrs. Miss. Ms. Dr. etc.		Decorations		Business Address	
Date of Birth		Age	Yrs.		
How were you introduced to the Institute?				UK Postcode or Country	Tel: / Fax:
				Home Address	
Have you previously been a member of the Institute? ☐ Yes ☐ No					
If so, please state: Grade ..... Date Joined ☐☐☐☐☐☐ Date Lapsed ☐☐☐☐☐☐				UK Postcode or Country	Tel: / Fax:
Employment Status	☐ Employed ☐ Self-Employed ☐ Retired ☐ Student ☐ Other			Preferred mailing address	☐ Home ☐ Business

ACADEMIC OR PROFESSIONAL QUALIFICATIONS & SUBJECTS (Higher First)

Qualification	College/University	Year	Subject

MEMBERSHIP OF PROFESSIONAL BODIES (e.g. Institution of Mechanical Engineers)

Professional Body	Grade of Membership	Chartered Status (e.g. C.Eng.)

TYPE OF ORGANISATION

Tick type of organisation by which you are currently, or were most recently, employed. Please tick one box only.

☐ 00	major international integrated oil co.	☐ 11	transport industry & retail services
☐ 01	other integrated oil co.	☐ 12	information technology/computing/publishing
☐ 02	independent oil co. upstream	☐ 13	traders/brokers
☐ 03	independent oil co. downstream	☐ 14	investment/finance/banking/legal
☐ 04	supply/distribution/storage	☐ 15	educational/training establishment
☐ 05	other energy industry (gas/coal etc.)	☐ 16	government/military/local authority
☐ 06	engineering contractors/manufacturers or suppliers of equipment	☐ 17	consultancy
☐ 07	shipping	☐ 18	industry association
☐ 08	E & P services	☐ 19	research establishment
☐ 09	inspection/laboratory service co.	☐ 20	geophysical/seismic company
☐ 10	chemical/additive co.	☐ 21	other (please specify) .....

JOB FUNCTION

Please tick the function(s) (2 maximum) which mostly describe(s) your current or most recent job.

☐ 00	director/general manager	☐ 10	transport/pipelines/shipping
☐ 01	planning/economics	☐ 11	refining/manufacturing
☐ 02	finance/computer services/information technology	☐ 12	marketing/sales/distribution
☐ 03	personnel/industrial relations/training	☐ 13	quality assurance/analysis/testing/measurement
☐ 04	administration/legal/public affairs	☐ 14	engineering/project management/design/construction
☐ 05	product & process research & development	☐ 15	medical/health & safety
☐ 06	exploration & geophysical	☐ 16	environment
☐ 07	E & P services	☐ 17	academic
☐ 08	drilling & production	☐ 18	other (please specify).....
☐ 09	supply & trading		.....

INTERESTS

1. Please indicate, using the code numbers above, the three subject areas which most interest you: ☐ ☐ ☐
2. Is/was your work primarily ☐ Upstream? ☐ Downstream? ☐ Both?
3. What are the particular benefits you hope to derive from membership? .....

.....

PROPOSER

I, being an individual member (member no. .....) or nominated representative of a Collective Member

(name of company: .....) and having known the candidate personally

for ..... years, propose and recommend the candidate in accordance with the Bye-Laws as a fit and proper person to belong to the Institute.

Signature: .....

Name: ..... Date: .....

APPLICANT

I, the undersigned, declare that the statements made herein are correct to the best of my knowledge and belief. I agree, if admitted to membership, to be governed by the rules and regulations of the Institute of Petroleum as they now exist and as they may hereinafter be altered. I agree that, if elected, the information provided above, and other relevant personal details, may be held on computer at the Institute of Petroleum and its branches and that my name and address may be published in the New Members' Section of Petroleum Review.

Signature of Applicant: ..... Date: .....

PAYMENT

Applications for the year commencing 1st January 1993 must be accompanied by payment, as follows:
— Applicants of 25 years of age or more £38.00
— Applicants under 25 years of age £11.00

Payment by cheque — Please make your cheque payable to the Institute of Petroleum. If you have no bank account in the UK, please pay by sterling bank draft drawn on a London Bank. Alternatively, payment may be made by credit card, as below. Please do not send cheques drawn on a bank outside the UK, as bank charges can be as high as £25.00 sterling.

Payment by Credit Card — Please complete details below, using any one of:

☐ VISA ☐ MASTERCARD ☐ ACCESS ☐ EUROCARD (please tick as appropriate)

Expiry Date m/yr ..... Credit Card Holder's Name .....

Registered Address .....

Please charge to my/our card no ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ the sum of £ .....

Credit Card Holder's Signature .....

INFORMATION TECHNOLOGY SURVEY-SOFTWARE

B-JAC

Sodeco
18 Rue de Moresville, 28800 Flacey, France
Tel: (1 + 33) 37.47.51.63 Fax: (1 + 33) 37.47.44.63

Description
Design of shell and tube exchangers (thermal design, mechanical design, cost estimating, drawings, Autocad interface). Fabrication drawings. Load on nozzles (WRC 107-HEI) support analysis (Zick) different codes (Asme-Tema-Codap 90-ADM). Material data bank. Fluid data bank.

Hardware: PC 386/486. DOS 5.0. 2MB RAM. Math Co-processor 20 MB Hard disk.

Users: USA, France, Germany, Asia, Canada.

Magellan On-Line Ser.

Petroleum Info. Corp.
4100 East Dry Creek Road, Littleton, Colorado 80122, USA
Tel: 303 740-7100 Fax: 303 694-1754

Description
Petroleum Information's Magellan On-line Service is a complete easy-to-use menu driven software package that gives you immediate access to the most comprehensive oil and gas database commercially available. PI's database contains detailed information on over 2.2 million well completions, and over 1 million producing entities.

Hardware: IBM PC/XT/AT/PS2 or compatible w/512 KB, 1 floppy, 1 hard drive, monitor, Hayes or compatible modem, dedicated phone line.

NAOMI

Fluid Flow Consultants
8004 S. Juniper Ave, Broken Arrow, Oklahoma 74011, USA
Tel: (918) 451-1024 Fax: (918) 451-3365

Description
NAOMI is a personal computer program that calculates pressures, temperatures, liquid holdup and flow patterns in a gathering system network with up to 1000 pipes and wells carrying oil, gas, water and condensate in any combination.

Hardware: IBM PC or compatible with 512K RAM, DOS 3.3 +, 1 floppy, 1 hard drive.

Users: Aramco, Chevron, AMAX Oil & Gas, Union Pacific, Unical, Williams Brothers Eng., Lasmo Oil, Abu Dhabi Oil, Occidental, Energy Production.

Teroman

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

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

Hardware: IBM 43XX, 30XX, 9370, AS400, HP3000, HP9XX, DEC, Microvax, Vax.

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

Pipephase ®

SimSci International
Highbank House, Exchange Street, Stockport, Cheshire SK3 0ET
Tel: 061 4296744 Fax: 061 4809063

Description
Most comprehensive package available for simulating multi-phase production and pipeline systems. Fast, accurate solutions for design, optimisation and debottlenecking problems. Quality service back-up. 950 + pure component library; 12 + thermodynamic methods; 28 + pressure drop correlations; several equipment models; looped networks; rigorous heat transfer; line sizer, gas lift; sensitivity analysis; GUI.

Hardware: Most platforms, PC's, Mini's mainframes and workstations.

Users: 60 + major petroleum production and engineering companies worldwide.

TSweet/Prosim

Bryan Research & Engineering
PO Box 3403, Bryan, Texas 77805, USA
Tel: (409) 776-5220 Fax: (409) 776-4818

Description
Interactive flowsheet simulator for use in designing and optimising gas and/or liquid amine sweetening plants, sulphur recovery units and tail gas clean-up units all on a single run. Prepares mass and energy balances and produces Lotus and AutoCAD compatible files. PROSIM includes dehydration and crude characterisation packages.

Hardware: 386 computer, 3072 KB Ram, math coprocessor, graphical interface requires mouse.

Users: BR&E software has numerous users in Europe, Canada and United States.

agX/CGM+

Uniras Limited
Ambassador House, Farnham Road, Slough, Berkshire SL1 4XP
Tel: 0753 579293 Fax: 0753 821231

Description
agX/CGM + (Computer Graphics Metafiles) is a file format for storage and retrieval of geophysical and seismic information. The file format consists of an ordered set of elements that can be used to describe a picture in a completely device independent way. One or more pictures can be stored independently in a CGM + file.

Hardware: Sun, HP, IBM, DEC, Silicon Graphics, Convex, CRAY.

Users: UNIRAS is widely used throughout the petroleum industry.

Sciconic

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

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

Hardware: Vax, Unix, IBM, Sun.

Users: 150 sites

SIMPL

Fluid Flow Consultants
8004 S. Juniper Ave, Broken Arrow, Oklahoma 74011, USA
Tel: (918) 451-1024 Fax: (918) 451-3365

Description
SIMPL is a personal computer program that calculates flowing pressures, temperatures, liquid holdup, velocities and flow patterns for any gas, oil, water or multiphase fluids that flow in wells or pipes.

Hardware: IBM PC or compatible with 256K RAM, DOS 3.3 +, 1 floppy, 1 hard drive.

Users: Amerada Hess, Petroval, British Gas, Champion Technologies, Conoco, Creare, Exxon, Occidental, Union Oil, Getty Oil.

INFORMATION TECHNOLOGY SURVEY - SOFTWARE

Trident Management System

Strata Systems (UK) Ltd
Levington Research Station, Ipswich, Suffolk IP10 0LU
Tel: 0473 270048 Fax: 0473 770371

Description
Developed in conjunction with Petronas Malaysia, Trident is a comprehensive maintenance and materials management system suitable for both upstream and downstream facilities management. Trident is designed to accommodate different operating methodologies, is easily customisable, can be readily interfaced to other systems, and features latest advances in maintenance technology.

Hardware: HP MEEV, MPE/IX, HF-UX, DEC VMS, DEC Ultrix, DG/UX.

Users: 50+ major installations worldwide in petroleum and petrochemical industries.

IMPALA

EDS-Scicon
62 Queens Road, Aberdeen AB1 6YE
Tel: 0224 312002 Fax: 0224 312015

Description
A fully integrated materials management system specifically designed for the upstream oil and gas industry, IMPALA handles industry requirements such as JOA's, multiple warehousing and HM Customs and Excise. It covers all necessary functions for effective materials management: purchasing, stock control, stock movement, logistics, warehousing, requisitioning, expediting, cost control and comprehensive reporting.

Hardware: DEC VAX, DG Aviion.

Users: Sun, Enterprise, Lasmo, Ultramar.

PIPESIM HEATUP

Baker Jardine & Assoc
19 Heathmans Road, Parsons Green, London SW6 4TJ
Tel: 071 371 5644 Fax: 071 371 5182

Description
PIPESIM-HEATUP: a standalone dynamic thermal model for predicting transient temperature profiles in wells and flowlines. The model uses finite difference techniques to model the transient heatup and cooldown of the production fluids and their surroundings. It will also model countercurrent flow in drilling and cementing operations.

Hardware: 386/486 PC.

Users: 4.

Master Control

Logica Industry Ltd
2 Queen's Gardens, Aberdeen AB1 6YD
Tel: 0224 643575 Fax: 0224 632089

Description
Master Control is an operations management Scada kernel which is independent of particular telemetry. It can operate as a single, dual, or two tier system, providing an open communications hierarchy to pipeline models, corporate level systems, and relational databases. The system provides an X windows user interface via colour graphic workstations.

Hardware: VAX.

Users: Shell, British Gas (national and several regions), Gasunie, Nova, Teikoku, Oil, ICI.

PRODIS

Logica Industry Ltd
2 Queen's Gardens, Aberdeen AB1 6YD
Tel: 0224 643575 Fax: 0224 632089

Description
PRODIS is a comprehensive offshore production information system. Developed for Amerada Hess, PRODIS has been tailored for a number of other operators. Functionality includes automatic and manual data acquisition, allocation and reconciliation of production to fields and wells, and a full range of reports to meet management, partners', and government requirements.

Hardware: VAX.

Users: (Of PRODIS or derivative) Amerada Hess, Chevron, Lasmo.

PROSPECTOR II

Granherne Limited
Chester House, 76–86 Chertsey Road, Woking, Surrey GU21 5BJ
Tel: 0483 729661 Fax: 0483 726577

Description
Design and cost estimating system for offshore oil and gas developments covering fixed platforms and floaters (TLPs semi-subs and tankers). The system allows viable development schemes to be defined and the capital, operating, and abandonment cost calculated on a consistent and reliable basis. PROSPECTOR II covers thirteen worldwide producing areas.

Hardware: IBM or compatible PC 386 level with 4 Mbyte RAM, Sun workstation Lotus 123.

Users: Approximately 90 users worldwide.

OPD Europe

Douglas-Westwood Ltd
Whitebeams, Pett Bottom, Canterbury CT4 6EH
Tel. 0227 831879 Fax: 0227 832092

Description
OPD Europe is the on-disk directory of vendors of products and services to the upstream oil and gas industry. The current (third) edition contains details of over 2,000 companies. Suppliers can be located by product or company name. OPD Europe is supplied free to qualified users.

Hardware: PC compatible.

Users: 86 oil and gas companies in 22 countries.

agX/TOOLMASTER

Uniras Limited
Ambassador House, Farnham Road, Slough, Berkshire SL1 4XP
Tel: 0753 579293 Fax: 0753 821231

Description
agX/Toolmaster's C programming tools have been developed specifically for the X Window environment. Application programmers, can combine the high-level contouring and seismic functions of agX/Toolmaster with the best X features such as multiple windows and event handling for interactivity, pixmap generation for animation, and client/server technique for network computing.

Hardware: Sun, HP, IBM, DEC, Silicon Graphics, Convex, CRAY.

Users: UNIRAS is widely used throughout the petroleum industry.

STRATS/PC STRATS

Logica Industry Ltd
2 Queen's Gardens, Aberdeen AB1 6YD
Tel: 0224 643575 Fax: 0224 632089

Description
Jointly marketed with Halliburton Geodata, STRATS is a palaeontological database and stratigraphical analysis tool, automating collection and display of species distribution data. Features include touch keypad, interpretation aids, and chart plotting. PC STRATS provides similar functionality, for use either stand alone or as a remote node of a corporate STRATS database.

Hardware: STRATS, VAX. PC STRATS: IBM compatible PC.

Users: Norsk Hydro, Statoil, Saga, Shell, PDO. Over 15 PC users.

INFORMATION TECHNOLOGY SURVEY-SOFTWARE

PetroRom

Petroleum Information
4605 Post Oak Place, Houston, Texas 77027 USA
Tel: 7138509295 Fax: 7138608769

Description
PetroRom is a system combining PI's comprehensive production data on CO-ROM and applications software; specialised features include: geological age and formation data for formation trend analyses; seamless interface to PT's decline plotting software; well test data for well life projections; monthly updates delivered monthly or quarterly and summing capabilities for any entity selected plus API links to well databases.

Hardware: PC, DOS environment.

Users: Engineers, geologists, information management, acquisition, planning, reservoir management.

RESTRAN

READ U.K. Limited
Unit 6, South Wellheads Industrial Centre, Wellheads Crescent, Dyce, Aberdeen
Tel: 0224-725501 Fax: 0224-725512

Description
PC based reservoir analysis program. Unlimited ASCII import/export. User defined and standard correlation calculation of PVT parameters. Cartesian, semilog (MDH, Horner, superposition etc). Log-Log plus derivative plots. Rate normalised, pseudo pressure, Agarwal etc time and pressure functions. Simulation of entire test provides model verification. Horizontal well model recently added.

Hardware: 286 Based machine, maths co-processor, 475kB Free RAM, graphics screen.

Users: Phillips, Premier, European Logging, Wood Group, Imperial College, Scientific Drilling.

VIP

Western Atlas Software
455 London Road, Isleworth, Middlesex TW7 5AB
Tel: (081) 560 3160 Fax: (081) 847 5711

Description
Comprehensive unified black oil and compositional reservoir simulator based on modular design. Options available for thermal, polymer and dual-porosity/permeability reservoir conditions. Building of input models can be done interactively using geolink, and visualisation of output via 3D view programs.

Hardware: Most computers including PCs, Unix, Workstations and Vector super-computers.

Users: Major oil companies.

OASIIS

Western Atlas Software
455 London Road, Isleworth, Middlesex TW7 5AB
Tel: (081) 560 3160 Fax: (081) 847 5711

Description
Integrated seismic interpretation and modelling workstation, providing single platform for seismic-log calibration, seismic interpretation of 2D and 3D surveys, and 1D and 2D modelling, plus powerful interactive post-stack processing tools.

Hardware: Unix, workstations including Sun, IBM, DEC and SGI.

Users: Product to be released shortly.

AMSIM

DB Robinson & Associates Ltd.
9419 20 Avenue, Edmonton, Alberta, T6N 1E5
Tel: (403) 463-8638 Fax: (403) 450-1668

Description
AMSIM is a specialised, steady-state simulation program which employs a rigorous non-equilibrium stage model to simulate alkanolamine based process systems used to remove CO_2 and H2S from hydrocarbon gas streams.

Hardware: IBM PC's or compatible machines, 512 kB of RAM, MS-DOS Version 2.0 or greater, Intel 8087/ 80287 Math Coprocessor, One 360 kB Floppy Disk Drive with 10 MB Hard Disk, Monochrome, CGA, EGA or VGA monitor. Printer (optional).

EQUI-PHASE EOR

DB Robinson & Associates Ltd.
9419 20 Avenue, Edmonton, Alberta, T6N 1E5
Tel: (403) 463-8638 Fax: (403) 450-1668

Description
EQUI-PHASE EOR offers reservoir engineers a means of evaluating hydrocarbon miscibility during condensing and vapourising gas drive enhanced oil recovery schemes as well as the ability to predict the basic properties of petroleum reservoir fluids.

Hardware: IBM PC's or compatible machines, 512 kB of RAM, MS-DOS Version 2.0 or greater, Intel 8087/ 80287 Math Coprocessor, One 360 kB Floppy Disk Drive with 10 MB Hard Disk, Monochrome, CGA, EGA, or VGA monitor. Printer (optional).

INTEGRITY

Nucleus Software
5 Kingfisher Court, Newbury, Berkshire RG14 5SJ
Tel: 0635 37373 Fax: 0635 521726

Description
Dual hot-standby Scada software for high security monitoring and control applications. Software runs under VMS and Unix on wide range of computers. British designed and supported.

Hardware: DEC VAX, 486 PC, Modcomp

Users: Cegelec Pic, Mobil

Qikdraw

Lamp Computer Systems
The Grange, Thrumpton, Nottingham NG11 0AX
Tel: 0602 831196 Fax: 0602 831001

Description
Qikdraw Micro is a fully functioned 2D and 3D CAD package suitable for a range of engineering drawing applications. In addition to the usual drawing and geometric functionality, Qikdraw includes macro symbols, an extensive symbol library and its own drawing database manager.

Hardware: IBM PC, Compatibles, Sun, Sparc.

Users: UK 250, world 4500.

Dexterity

Nucleus Software
5 Kingfisher Court, Newbury, Berkshire RG14 5SJ
Tel: 0635 37373 Fax: 0635 521726

Description
Scada software for industrial monitoring and control applications which runs under VMS and Unix on a wide range of computers. British designed and supported. In use world wide by many major companies.

Hardware: DEC VAX, 486PC, IBM RS6000, Modcomp, Sun, HP, Bull.

Users: Mobil, Hydril, Logica, Unilever, British Steel, Thames Water.

INFORMATION TECHNOLOGY SURVEY-SOFTWARE

EQUI-PHASE EQUI90

DB Robinson & Associates Ltd.
9419 20 Avenue, Edmonton, Alberta, T6N 1E5
Tel: (403) 463-8638 Fax: (403) 450-1668

Description
EQUI-PHASE EQUI90 is able to predict the phase behaviour and thermophysical properties of hydrocarbon and related compounds in the single or multi phase regions.

Hardware: IBM 386 PC or compatible machines, Intel 8087/80287 Math Coprocessor, MS-DOS Version 2.0 or greater, One High Density Floppy Disk Drive and a Hard Disk Drive, 3.5–4 MB of hard disk space, 1 MB of Extended Memory Monochrome, CGA, EGA, or VGA monitor. Printer (optional).

WRAP

Atkins Oil & Gas
Regent Centre, Regent Road, Aberdeen AB9 8UQ
Tel: 0224 581720 Fax: 0224 213466

Description
WRAP is a PC based software package for the analysis of complete drilling systems, conductors, subsea wellheads, BOP's, risers, and marine conductors can be analysed. Time and frequency domain analyses are available., Automatic unity checks can also be performed. It features a database input, graphical outputs and automatic data file generation.

Hardware: IBM PC, and compatibles (386/486).

Users: WS Atkins, Mobil North Sea, Texaco UK.

DRAGON/ips Image Processing System

Goldin-Rudahl Systems, Inc.
Six University Drive, Suite 213, Amherst MA 01002, USA
Tel: 413-253-7340 Fax: 413-549-6401

Description:
DRAGON Image Processing System is a software package that makes remote sensing and other image processing applications possible on commonly-available microcomputers. DRAGON's user-friendliness, comprehensive documentation, flexible hardware requirements and low cost make it ideal for educational organisations and research projects, exploring digital image processing on a limited budget.

Hardware: IBM-PC or equivalent with hard disk and VGA or better graphics.

Users: More than 400 systems in 37 countries on six continents.

Managery System

Boffin Inc.
PO Box 1619, 6859 Main Street, Frisco, TX, 75034 USA
Tel: 214-377-9771 Fax: 214-377-3557

Description
Features of Managery System include data interface and data entry methods, data base capabilities, reserve determination capabilities, plotting, economic evaluation and system features. Comprehensive tool for economics and reserve analysis. Interactive decline curve analysis program which provides quick review of production history. Powerful self-contained graphics package. Data-base management program.

Hardware: IBM XT-AT-PS/2 or compatible, 512 kb RAM, PC/MS DOS 3.0+, Hard Disk.

Users: Petroleum engineers, reservoir engineers, production engineers.

Gaswat & Oilwat

Boffin Inc.
PO Box 1619, 6859 Main Street, Frisco, TX, 75034 USA
Tel: 214-377-9771 Fax: 214-377-3557

Description
Comprehensive suite of material balance software covering both oil-water and gas-water systems originally authored by Texaco. The software has been enhanced over the past several years through a cooperative program with many multi-nationals. Every aquifier characterisation has been included, along with wide range of analytical methods. Pre- and post-processing graphics are exceptional.

Hardware: IBM XT-AT-PS/2 or compatible, 512 kb RAM, PC/MS DOS 3.0+, Hard Disk.

Users: Petroleum engineers, reservoir engineers, production engineers.

Kingdom II

Seismic Micro-Technology, Inc.
9525 Katy Freeway, Suite 306, Houston, Texas 77024, USA
Tel: 713 464 6188 Fax: 713 464 6440

Description
Fully integrated system for evaluating seismic and well log data for exploration and reservoir appraisal. Offers log and cross plot interpretation, dual fluid analysis, section picking, statistical wavelets, synthetic seismograms, splicing, synthetics into seismics, Gassmanns fluid modelling of reservoirs, AVO modelling and analysis, thin bed analysis, geoseismic modelling and much more.

Hardware: SUN and 386 or 486 PCs. Many printers, plotters, metafiles.

Users: World wide distribution.

Miriam

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

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

Hardware: IBM Compatible 486 PC.

Users: 20 users mainly Norwegian oil and gas platforms.

Production Data Mgr

Petroleum Information
4605 Post Oak Place, Houston, Texas 77027 USA
Tel: 7138509295 Fax: 7138608769

Description
Production Data Manager (PDM) features forecasting decline curve and PTZ plotting plus data reports. PDM is designed for import and analysis of production information from PI's Magellan® On-line and Data-on-Diskette and PetroRom®. PDM also accommodates customer proprietary data. PDM supports various PC configurations and output devices and can be used in a LAN environment.

Hardware: PC DOS environment.

Well Data Manager

Petroleum Information
4605 Post Oak Place, Houston, Texas 77027 USA
Tel: 7138509295 Fax: 7138608769

Description
Well Data Manager is an ORACLE® based software application that manages PI's international well information. Information can be exported to ARC/ORACLE for use with PI's Voyager GIS data management and mapping software. Also, a data model incorporating worldwide well and production information is underway which will accommodate a multiplicity of sources.

INFORMATION TECHNOLOGY SURVEY-SOFTWARE

FLOTRAN

Structures and Computers Ltd
Strucom House, 188–196 Canterbury Road, Croydon, Surrey CR0 3HF
Tel: 081 683 3999 Fax: 081 683 3933

Description:
FLOTRAN is a computationally efficient finite element analysis program for fluid flow and heat transfer analysis. Solution features include: 2 and 3D steady state or transient; laminar or turbulent flow and/or heat transfer; forced, free or mixed convection; conduction; conjugate heat transfer; distributed flow resistances; porous media; and incompressible or compressible flow. Standard pre and post processors include ANSYS, PATRAN and I-DEAS.

Hardware: Minimum of 8 Mb RAM, 200 Mb hard disk (PC's and workstations up to super-computers).

Users: 300+.

WELLPLAN

DRD Corporation
5506 South Lewis Avenue, Tulsa, Oklahoma, 74105 USA
Tel: 918 743-3013 Fax: 918 745-9037

Description
DRD's premier drilling engineering system, WELLPLAN, is a seamlessly integrated drilling database, data analysis, and engineering software system for rig-site and office utilisation, in which data is shared by all modules, minimising changes or error and optimising data entry. WELLPLAN is available as a complete system or as separate modules

Hardware: WELLPLAN operates in DOS and UNIX environments.

Users: DRD supports WELLPLAN clients in over 20 countries worldwide.

PPDS

Infochem
Southbank Technopark, 90 London Road, London SE1 6LN
Tel: 071 922 8832 Fax: 071 620 0732

Description
Thermodynamic and transport properties of single and multi-component streams, including phase equilibria.

Special packages include petroleum fractions, steam, refrigerants and aqueous solutions.

Data are quality assured.

Hardware: PC, Unix (HP, Sun), Vax, Prime IBM.

Users: Over 45 global licences plus use with application software.

Pro-Series

4 Front Applications
Hyde Park House, Cartwright Street, Hyde, Cheshire SK14 4EH
Tel: 061 367 9080 Fax: 061 367 9703

Description
The Pro-Series is a powerful range of piping software for autocad. Pro-Pipe is a spec-driven orthographic piping application. Producing 2D, 2½D or 3D drawings, automatic isometrics, sections and BOM's. Pro-ISO creates unscaled isometric piping drawings. Pro-Flow creates intelligent P & ID's and PFD's and Pro-Plant creates 2D or 3D steelwork and equipment layouts.

Hardware: PC, SUN, Apollo, DEC and Silicon graphics workstations.

Users: There are over 6000 modules now installed worldwide.

AQWA

Atkins Oil & Gas
Woodcote Grove, Ashley Road, Epsom, Surrey KT18 5BW
Tel: 0372-726140 Fax: 0372-740055

Description
AQWA comprises a suite of 11 individual programs for performing hydrodynamic analyses on floating structures and fixed large body structures. AQWA handles drift and breaking wave effects. Applications include heavy lift cranes, floating production systems, subsea template installation, fishing vessels, mooring systems, gravity based platforms, semisubmersibles, flexible and rigid risers.

Hardware: Sun Sparc, Silicon Graphics, Apollo Domain, VAX, HP900, IBM Risc.

Users: Thirty five, including major oil companies, design contractors and consultants.

OFFOP

Baker Jardine & Assoc
19 Heathmans Road, Parsons Green, London SW6 4TJ
Tel: 071 371 5644 Fax: 071 371 5182

Description
OFFOP: a general purpose offshore operations simulation package which permits analysis of weather affected operations.

Hardware: 386/486 PC.

Users: 10.

TODAL

Fluid Flow Consultants
8004 S. Juniper Ave, Broken Arrow, Oklahoma 74011, USA
Tel: (918) 451-1024 Fax: (918) 451-3365

Description
TODAL performs nodal system analysis calculations employing inflow/outflow parameters (eg. perforation penetration, shot density, wellhead pressure, line size, . . .) for a gas, oil or multiphase fluids well and/or pipeline. The user may input PI, Vogel/Standing, Fetkovich or Gas IPR, . . . or let the program calculate the inflow performance using its detailed open-hole, perforated or gravel-packed completion model. TODAL has selectable pressure-drop/holdup correlations (eg. Beggs & Brill, Orkizewski, Hagedorn & Brown, . . .) and heat-transfer correlations for geothermal gradients, buried, above-ground and submerged pipe.

Hardware: IBM PC or compatible with 640 RAM, DOS 3.3+, 1 floppy, 1 hard drive.

Users: New product.

FraPS

Philip E. Lewis, P.E.
7006 South Jamestown Avenue, Tulsa, OK 74136, USA
Tel: 918-481-3107 Fax: 918-481-3130

Description
FraPS is a full-featured reservoir simulator specifically designed for predicting and history-matching hydraulically fractured oil and gas wells. Input is optionally screen-oriented, output is text and device-independent graphics.

Hardware: IBM, PC compatibles.

Users: Royal Dutch Shell, Amoco, Oryx, ACME Proppants, Norton-Alcoa, Pan Canadian, Chevron, BJ-Titan, Unocal, Petro-Canada.

SysCAD

Baker Jardine & Assoc
19 Heathmans Road, Parsons Green, London SW6 4TJ
Tel: 071 371 5644 Fax: 071 371 5182

Description
SysCAD: a PC-based dynamic process and control simulator, used in transient process design, control systems design and testing, safety systems testing and operator training. Features include desktop functionality, active user influence, automatic control, DCS/PLC interface and variable trends.

Hardware: 386/486 PC.

Users: 45.

INFORMATION TECHNOLOGY SURVEY-SOFTWARE

ASAS-OFFSHORE

Atkins Oil & Gas
Woodcote Grove, Ashley Road, Epsom, Surrey KT18 5BW
Tel: 0372-726140 Fax: 0372-740055

Description
ASAS-Offshore is a structural analysis program designed to meet all the structural assessment criteria for 'jacket' type structures. ASAS-Offshore performs wave loading and added mass calculations, soil pile structure interaction, fatigue analysis and cone checking to standard codes of practice. Comprehensive finite element capabilities are built into the program.

Hardware: IBM PC-DOS, IBM PC-Xenix, Sun, Apollo, HP-9000, IBM RS6000, VAX, Dec Station, Silicon Graphics, Cray.

Users: BP, British Gas, Mobil NS, John Brown E + C, Kvaerner E + W, Phillips Pet, Amec, Technomare, Sofresid, MSL.

DYNALOG

READ U.K. Limited
Unit 6, South Wellheads Industrial Centre, Wellheads Crescent, Dyce, Aberdeen
Tel: 0224 725501 Fax: 0224 725512

Description
PC based production logging analysis program. Quantitative analysis of log data. Quality control of logging operations. Fluid properties from PVT data and correlations. Single and multi-phase flow analysis.
Reads data from LIS ASCII etc. Database structure handles both depth/time logs. Tool response corrections. Statistical uncertainty.

Hardware: 286 Based machine, Maths Co-processor, 640 kB Free RAM, Graphics Screen.

Users: Phillips Petroleum, Norsk Hydro, Statoil, Saga Petroleum, Read Well Services.

Steel-Designer

Lamp Computer Systems
The Grange, Thrumpton, Nottingham NG1 0AX
Tel: 0602 831196 Fax: 0602 831001

Description
Steel Designer is an analysis and design CAD package for two and three dimensional structures. It includes a database of UK steel section sizes. Design calculations are produced and printed on A4 size sheets. Drawings of the structure can also be plotted and an Autocad interface is included.

Hardware: IBM PC compatibles.

Users: 230

OGRE

DPC & A
6510 Abrams Road, Suite 410, Dallas, Texas, 75231 USA
Tel: 214-349-6900 Fax: 214-343-9699

Description
The OGRE system for oil and gas reserve evaluations is a comprehensive, computerised management tool for modelling and analysing the profitability of petroleum properties. OGRE is currently used to produce more than a million evaluation studies each year for oil and gas companies, engineering and consulting firms, commercial banking and investment institutions and other energy-oriented clients.

Hardware: IBM PC compatible; DEC system 20, IBM 30xx and 43xx mainframes; DEC/VAX, PRIME, and HP-9000 mini-computers.

Users: 500 plus client companies.

Petroleum GIS

Intergraph UK Ltd
Delta Business Park, Great Western Way, Swindon, Wiltshire, SN5 7XP
Tel: 0793 619999 Fax: 0793 618508

Description
A suite of layered software products based on a common graphics system that link digital maps to exploration data and cover: petroleum geographic information; base mapping 2D/3D; map scanning and vectorisation; seismic data capture, digitising, editing, analysis, mapping; well-log analysis; spatial analysis; geological analysis; petrophysical modelling and analysis; exploration drafting.

Hardware: Intergraph, Unix, Workstations.

Users: Major oil companies.

QSE-SPACE

QSE
51 Broad Street, Chipping Sodbury, Bristol BS17 6AD
Tel: 0454 323955 Fax: 0454 322685

Description
2/3D frame analysis package with links to RC and steel designs to 8110, 5950 and eurocodes and further links to detailing.

Hardware: PC or compatible.

Users: Structural Eng, fabricator, local authority industry.

Network 3000

Bristol Babcock Ltd
Vale Industrial Estate, Stourport Road, Kidderminster, Worcestershire DY11 7QP
Tel: 0562 820001 Fax: 0562 515722

Description
Offshore software product portfolio. Well test reporting, archiving and networking. ESD logger. Fire pump control. Well dedication. TCS controller interface. Gas compressor control. Expert system interface. Production management data base interface. Active historical spreadsheets. Daily production reporting. Audit trailing. Subsea emergency shutdown valve control.

Hardware: DPC 3330, DPC 3335, RIO 3331, CFE 3385, RDC 3350.

Users: Chevron UK: Ninian–North/Central/Southern, Shell UK: Cormorant Alpha.

Voyager

Petroleum Information
4605 Post Oak Place, Houston, Texas 77027 USA
Tel: 7138509295 Fax: 7138608769

Description
Petroleum industry specific GIS applications software which interfaces with ARC/INFO software. Voyager automates GIS applications through built-in programming features and menu-driven functions. ARC/INFO software provides the programming environment and Voyager system automates retrieving, analysing, managing and mapping multiple databases.

Hardware: Unix workstation.

Users: Geographic information systems.

GEOLINK

Western Atlas Software
455 London Road, Isleworth, Middlesex TW7 5AB
Tel: (081) 560 3160 Fax: (081) 847 5711

Description
Interactive building of reservoir simulation models using 3D graphical displays of geological parameters. Interfaces with Stratamodel SGM geological modelling software.

Hardware: Silicon Graphics and IBM RS/6000 workstations.

Users: Numerous oil companies.

Parallel processing technology and its applications in geophysical exploration

By John Makin MA, Operations Director, Ensign Geophysics

The use of a parallel architecture for mainstream seismic data processing means that all steps in a processing scheme — including data reading, writing and sorting — are executed concurrently. The benefits are turnaround times unaffected by the complexity of the processing and the implementation of sophisticated processing schemes that were previously considered impractical.

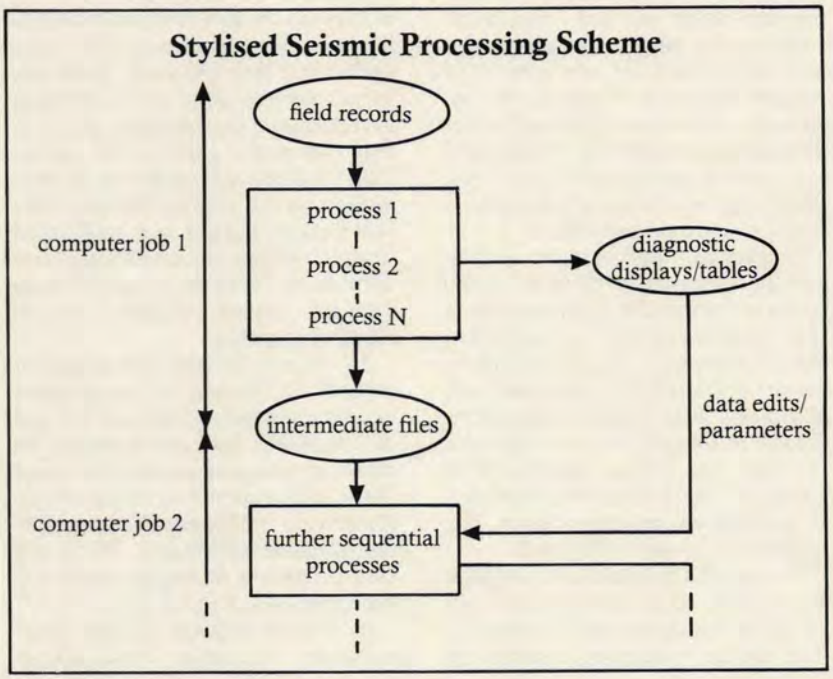


Figure 1

Commercial seismic data processing has traditionally been at the leading edge of computer developments. The industry's hunger for computing power resulted in the early and widespread use of processing accelerators and vector supercomputers but the demands of data transfer have always posed major problems. The data volumes involved in processing even a single seismic line make the use of archival media essential for the storage of intermediate data. **Table 1** illustrates some typical figures.

Strategies that are basically very similar are used for routine processing of 2D and 3D seismic surveys throughout the industry. Geophysicists have access to a suite of a hundred or more data-enhancement techniques designed to improve the resolution of primary reflections, to attenuate unwanted coherent energy or random noise and to manipulate amplitude levels. Using the conventional hardware/software combinations that have been available up until now, techniques are selected and applied sequentially as dictated by the seismic response of the particular geology that has been surveyed.

Figure 1 outlines such a processing scheme, consisting of a series of data enhancement and sorting modules, the output from one module being passed into the next. For quality control and process parameter selection purposes, intermediate results are written to reel or tape at several points in the processing scheme resulting in multiple passes of the data through the computer.

These and commercial considerations dictate three basic requirements for any commercial seismic processing system:

- The software framework must allow the flexible use of processing modules with highly different demands.
- The hardware configuration must balance performance between computational speed and realis-

able input/output bandwidth.

- Ease of data exchange and general software compatibility is vital between any new system and the system it is replacing. To take the earliest advantage of computing advances, it is likely that the most used compute-intensive processing modules are transferred onto any new system whilst the older system's mature applications base continues in use for more specialised modules.

An analysis of these requirements has led to developments based on a multiple-instruction, multiple-data (MIMD) architecture machine in the form of an expandable heterogeneous array of processors. A coarse-grain parallelism and distributed memory architecture allows initial simple process-level parallelism to be implemented using existing algorithms, reducing the need to redesign codes and use parallelising compilers. The parallel hardware supports the coexistence of both Intel i860 and Inmos T800 transputer processors with varying memory configurations providing up to eight bi-directional communications links to other processors.

In practice, a desk-side cabinet supporting combinations of up to 18 i860 nodes is connected to a standard Unix host computer in the form of a Sun Sparc workstation. The host provides a mature development environment and access to a wide range of high performance peripherals such as disc and cartridge tape drives. Together these units form a relatively low-cost processing module called a *BatchStation*. The layout is illustrated in **Figure 2.**

The use of a standard Unix platform has enabled initial development to be based on standard DISCO software. The routine processing systems are compatible with this package and it provides the geophysical analysts with a consistent user interface across all in-house processing systems. Similarly, data output from existing systems can be read on the new machines without the need for reformatting. The large application base and established data in/out facilities allowed development to concentrate on optimising the computer-intensive applications rather than the associated support tasks such as tape i/o and plotting facilities. The host package enables new application modules written to standard specifications to be linked and executed with standard release modules in an arbitrary sequence.

3D seismic surveys now represent around 75 percent of geophysical expenditures and that figure is rising as oil companies (and governments) increasingly recognise the effectiveness of 3D in exploration and development. However, it is still possible that despite the technical advantages, 3D is not used because it is thought to be too expensive and takes too long.

Dr Woody Nestvold of Shell Internationale Petroleum Maatschappij B.V. said during a keynote address delivered at the Annual Meeting of the International Association of Geophysical Contractors in Houston on 19 May 1992, 'What is my vision of a successful geophysical contractor of the 1990s? I think he will be an entrepreneurial businessman with planning skills to match his technological expertise, providing state-of-the-art 3D seismic services to the industry with fast turnaround and operating to the highest safety and environmental standards. A true partner for the oil company of the nineties, who sees possible low oil prices as a challenge, not a threat'. He also said, 'We have no alternative but to cut our unit costs'.

His vision is shared by many oil companies, now facing difficult economic conditions. It is clear that many of them cannot afford in this environment to invest in projects which are not economically viable. On the other hand, it is still necessary for the industry to replace production with reserves.

For the past 25 years, the leading edge of exploration geophysics has advanced only as fast as digital computer availability would allow. Now, in the era of extended-area, detailed 3D prospects, each of which can produce terrabytes of raw data, comes the *BatchStation:* a system for the 1990s. ■

Typical Seismic Data Volumes

Shot record (192 traces, 3000 samples)	2.3 Mbytes	< 1 6250 bpi tapes
Seismic line (15 km, 40 shots/km)	1.4 Gbytes	9 ,,
3D survey (10,000 line km)	920 Gbytes	6100 ,,

Table 1

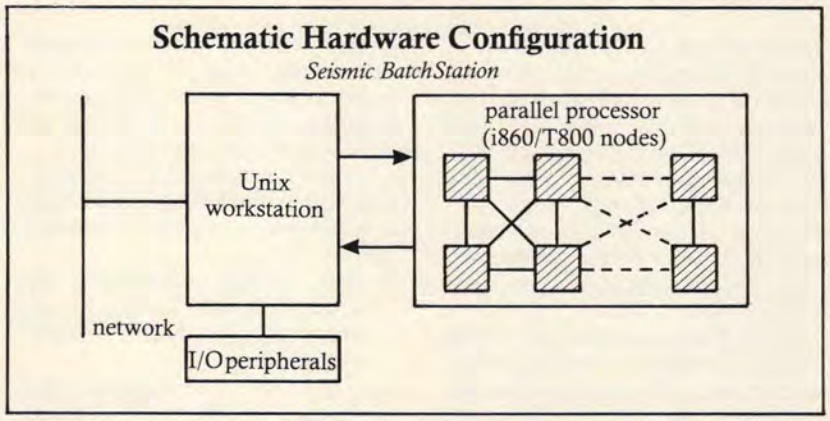


Figure 2

Helped by joint funding from the Offshore Supplies Office (OSO) and industry, Ensign Geophysics is the first geophysical contractor to convert to using parallel computers for mainstream seismic data processing. The company now has four systems installed which together provide a computing capacity of over 2.5 Gflops (ie. 2.5×10^9 floating point operations per second).

The hidden assets behind a SCADA system

By John C Baldwin, Consultant, SD-Scicon UK (Ltd)

SCADA (Supervisory Control and Data Acquisition) systems are traditionally thought of as being confined to areas of plant monitoring and control but they can take on a higher profile as key contributors to overall business effectiveness.

SCADA, sometimes called Computer Assisted Operations (CAO) systems in the oil and gas production business, are often regarded as mere extensions of an instrumentation system to be used only by plant operational staff in a stand-alone role, reminiscent of the generation of steel framed, wall to wall panels with permanently engraved plant mimics.

Control rooms of the present generation, with their consoles of computer terminal screens, windows technology and other sophisticated software, are much more than just glass equivalents of their rigid panel ancestors.

A wealth of data is collected and stored by SCADA systems which can be of benefit to many activities within the organisation and yet it frequently remains inaccessible to all except the 'hands-on' operations staff in the control room; it remains behind the screens, as a hidden asset.

Releasing this information, in a manner determined by an Information Strategy for the business, enables the organisation as a whole to realise its asset value. Such a strategy may also identify additional data items to be collected by the SCADA system on behalf of various departments.

These benefits are not all one way: an information strategy also identifies the additional information required by plant operations staff which cannot be collected by the SCADA system but can be obtained from other systems elsewhere in the organisation.

The conventional image

SCADA does not always enjoy the visibility and popular acclaim of other Information Technology (IT) systems. Ask anyone in your head office what a DP centre, mainframe or PC is and they will probably be able to tell you; mention SCADA to the same people and all you will get is a puzzled frown.

Strategic information resource

SCADA should be viewed as a key resource because it collects information from the entire plant, process or production facilities on which the core business depends; it is fundamental to process oriented operations.

The process plant and other equipment is a prerequisite at the heart of the operation in order to carry out the core business. This is enveloped by several layers of supporting business activities and their associated computer system services, as represented by **Figure 1.** The SCADA system, through an instrumentation infrastructure, is in close contact with the core process in order to monitor and control the plant.

Viewed this way, the SCADA system is very much in charge of the core business activity; it knows what is going on, can respond to events and can initiate control actions either automatically or with the interaction of the operators.

The SCADA system deals with information about the processes at the core of the business in real time: that is, at the instant it is happening, second by second.

The operations staff deal with information at this level, taking the minute-by-minute decisions in order to keep production and other processes on track. The data should be made available, in a form determined by an overall information strategy, to various user groups involved in the supporting business activities and, ultimately, consolidated for senior management level reports.

Senior managers (other than operations managers) and other user groups (technical, financial, etc) are not involved in the minutiae of plant operation: of importance to them, is the impact of sub-optimal plant performance, potential for better quality, improved planning, responsiveness to changing demands, ability to distribute accurate information in a timely manner to a wider audience and hence interact with the data to make

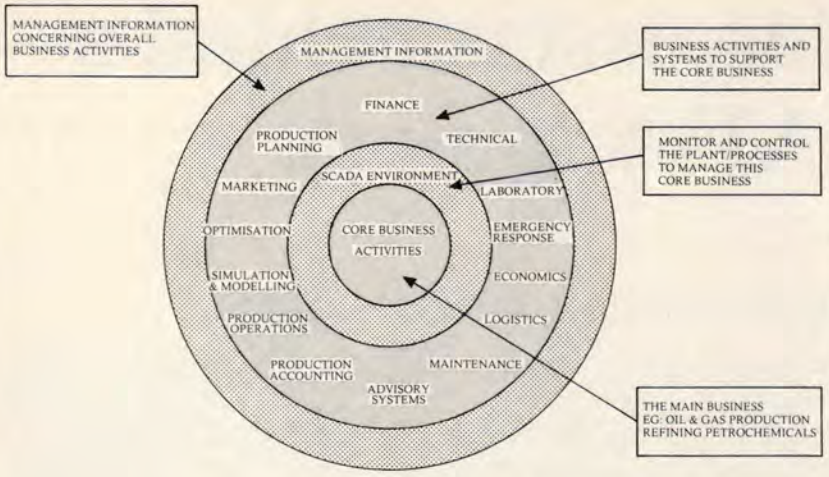


Figure 1: SCADA at the core

better informed decisions or provide advice to the operations team.

It follows that the information asset of a SCADA system is a key contributor to the effective running of the organisation; it is important to include it within the scope of all strategic information systems planning in order to facilitate its integration with other systems and hence to maximise the benefits which Information Technology can bring, such as efficiency and effectiveness of the business as a whole, competitive edge, improved safety and environmental control.

This is a paradigm shift away from the outmoded image of SCADA as a mere adjunct to the plant, towards recognition of its key role in the mainsteam of a business-driven Information Strategy.

Information systems strategy planning

Technical literature and the media provide constant reminders that we are living in the Information Age; society and businesses must adapt to obtain maximum benefit from it, or even, in some cases, to survive. The technology to store, manage and distribute information seems to be stampeding into the future; it needs to be harnessed to the business to enable organisations to achieve their best results.

Bringing the technology into effective harness can be achieved through an Information Systems Strategy Plan which focuses on the business or organisational objectives. These plans are widely applicable to industrial and commercial enterprises, government departments, in upstream and downstream petroleum companies, petrochemicals, pipeline operations, utilities and other organisations.

To ensure the success of the method, it is applied by experienced consultants who are able to relate to board level managers, departmental managers, process operators, technical and other users at all levels. In this manner, it is assured that the overall business is understood and taken into account; in the case of the process-related industries, this ranges from the real time activities controlled by SCADA through to Management Information Systems.

The way in which information is used by all the activities within an organisation and its relationships with outside parties such as governments, partners, the market and service companies, can be represented by an Information Model, which is usually produced during the course of an Information Strategy Planning project.

Information model

An information model is concerned with the sources, destinations (users) and flow of all the information needed to support the organisation's business objectives. Such a model has many uses; for instance, it shows, in a rational manner, who would benefit through having access to particular sets of information. In the petroleum industry, a SCADA system can provide and use information covering a range of business activities to produce the representative benefits indicated in **Table 1.**

Information models also show that although data may form clusters around particular groups of people, no one group should normally have absolute possession of any cluster; information needs to flow if it is to do any good. Information is a corporate asset not a personal or departmental reserve.

Unfortunately, traditional organisational boundaries tend to create and perpetuate the belief that data collected by one division is theirs alone, stored in their own departmental computer format. When information is passed to others, it is frequently only along conventional lines defined by organisational hierarchy. At each departmental boundary, computer printout and spreadsheets are handed over, only to be re-keyed as input to other departmental systems.

What is required, is that information be shared across the organisation, to be made available to workgroups or project teams. Conventional departmental boundaries and other artificial barriers, such as the threshold between SCADA and general purpose computer systems can restrict the free flow of information.

A useful spin-off from the method employed for IS strategy planning is that an information model can reveal how best to organise people around information flows; it may also be seen that there is a better way of constructing business activities, given the enabling power of current technology. There is a potential overlap here with current thinking on the subject of re-engineering.

Generic information models

Observations based on the results of a number of IS strategy planning projects demonstrate that different companies engaged in the same core business exhibit essentially the same fundamental information needs, which could be represented by generic models for an industry.

This indicates opportunities for combining the collected wisdom of the industry and for standardisation in certain areas.

In the upstream petroleum business, for instance, one such opportunity has been seized by POSC (Petrotechnical Open Software Corporation), a not-for-profit organisation working on open software standards, including standard data models for petrotechnical data.

Information strategy planning should take into account the availability of any applicable public domain

BUSINESS PROCESS	*BENEFITS*
Operations	When SCADA is implemented within an overall corporate information strategy (not merely as an adjunct to the plant) it can access useful data from elsewhere in the organisation, can integrate knowledge-based advisory systems, etc, to assist operations staff in decision making. Information is readily available to other users, without imposing on operations staff; verbal requests for data and discussion of reports will be dramatically reduced. Consistent supply of quality data for process optimisation models, etc, potentially increases profitability.
Safety and Environmental	SCADA is not primarily a safety system but it can improve safety by alerting operators to all relevant data, deteriorating conditions, integrating with work permit systems, knowledge-based alarm filtering, etc.
Incident Response	Incidents requiring evacuation of control room areas, or in extreme cases when loss of the control room occurs, can be managed and supported better if the incident response centre has the latest plant, process status data.
Maintenance	Equipment condition can be monitored, failure statistics collected and analysed to predict optimum maintenance schedules and minimise unplanned shutdowns to achieve peak production performance.
Production Planning	Production scheduling improved because maintenance shutdowns more predictable; production unit performance can be monitored closely, trends detected early and corrective action taken. More overall visibility of production status and trends. Responsive to short term changes in delivery schedules (eg when tankers are delayed by bad weather, etc) is improved because access to all relevant information is possible.
Production Accounting	Accurate, timely production data available for input to daily production reports; weekly, monthly and annual consolidations and historic trends being produced on other systems.
Finance	Accurate, timely, production data available for input to accounting function. Improved invoicing, etc.
Management Information	Automatic transfer of data to higher level systems for further analysis, planning, etc; input to MIS system; timely reporting of relevant, business-sensitive issues to senior management. Improved management control of the processes such as oil and gas extraction, distribution, refining etc.
E & P	In the upstream oil sector, reservoir engineers and production geologists benefit from reliable well performance data, history and trends.
Tank Farm	Improved management and reduction of losses in tank farms through integration of knowledge-based systems such as SD-Scicon's 'Think Tank'.

Table 1: Representative benefits of SCADA

data models in order to maximise the benefits of standardisation and open systems policies.

At the present time, there is no standard data model in the public domain for oil and gas production operations to cover the processes normally handled by SCADA systems.

Databases, for storage of real time plant data, are usually proprietary designs; general purpose relational databases being considered too slow for the task. Applications software frequently has to be written specially for each system because there is no common applications environment to ensure portability between different vendors' proprietary systems.

This situation can be alleviated by choosing one of the more open, configurable SCADA packages which can be readily integrated with other systems within an information strategy. For example, SD-Scicon has supplied configurable SCADA systems based on DEC VAX and microVAX computers using the SETCON *1,4 software package for oil production, refining, pipeline and other operations and SETCIM *1, which is designed for manufacturing companies who wish to incorporate plant data into their overall computer integration strategy. The company is also offering integrated solutions based on RTAP[2] (Real Time Applications Platform), a SCADA package from Hewlett Packard, which is based on open systems philosophies.

Implementing SCADA

Successful SCADA implementations follow from having first established a correct functional specification within a business-driven Information Systems Strategy, supported by teamwork of the appropriate disciplines.

Although SCADA is not a core business for the end-user, some large organisations make sufficient use of the technology to justify having their own specialist SCADA group. Others employ appropriately qualified consultants with the necessary breadth of experience to specify and manage their SCADA implementation projects; in smaller organisations, this approach is probably more cost effective than recruiting permanent staff with the specialised knowledge and skills.

Some organisations have followed a second best course of action in assigning the design and procurement responsibility for SCADA to one of their existing technical departments. Most DP departments decline to get involved in SCADA because none of the technology is sufficiently familiar to them. Probably, in most organisations, there is no one existing department able to cover the multiplicity of technologies involved in SCADA.

Other organisations are tempted to push the responsibility for SCADA right away, out of sight. For instance, consider this scenario: a vendor is awarded a fixed price contract to build a new offshore production platform, with all topsides facilities including a SCADA system. The contractor's responsibility does not include the client company's overall IS strategy; decisions about SCADA are taken unilaterally in the context of the plant. As a consequence, the SCADA system ends up as a misfit in the corporate IS plan with its information assets locked away.

The successful integration of SCADA systems can only be achieved in the environment of a planned infor-

WHAT IS SCADA?

SCADA — Supervisory Control and Data Acquisition systems, as the title suggests, collect data and provide supervisory control functions for process and manufacturing industries. A typical SCADA system in an oilfield, refinery or pipeline network for example, monitors thousands of instruments installed around the plant, including simple digital signals from contact breakers, analogues of temperature and pressure, and more elaborate devices such as laboratory instruments. The SCADA system also integrates data from sub-systems such as flow computers and programmable controllers, safety and environmental systems. Distributed Control Systems (DCS) may also be integrated, so that the SCADA system provides overall monitoring and supervision of an entire plant.

SCADA systems often collect data from wide geographic areas such as a group of remote wellheads, groups of offshore platforms, pipeline networks, tank farms, etc, and bring information and control facilities to a central control room.

SCADA technology is sometimes difficult to identify and understand because it depends on so many other technologies:

—real time computing
—databases and software for real time environments
—data communications (radio, satellite, cable, fibre-optic)
—local and wide area networking
—human interfacing (graphics, windows, etc)
—telemetry electronics for interfacing plant instrumentation and control (ie the real time input/output infrastructure)
—systems integration

To complicate matters further, some parts of the system (the telemetry for instance) may be installed in hazardous areas; they may be subject to electrical interference; some electrical equipment is installed outside, exposed to rain, sun and thunderstorms; all this demands a high calibre of design and engineering competence. The SCADA system designer must be able to command a working knowledge of all these technologies in order to produce a satisfactory architecture which meets the requirements of the business concerned.

mation systems strategy and with the availability of the appropriate skills, including: computer systems design and specification, software development, real time database configuration, communications, networking, interfacing to plant instrumentation and managing complex information technology development projects.

In view of the strategic importance of the information asset handled by the SCADA system, the risks of assigning systems responsibility to a supplier or internal company department unable to field all of the appropriate skills, or with inappropriate terms of reference, must be assessed carefully.

Wide benefits

When the information assets behind a SCADA system are released, in accordance with an information strategy plan, both operational and business effectiveness are impacted favourably; how these benefits are actually measured depends on the organisation in question.

If SCADA remains a stand-alone system, instead of being fully (strategically) integrated with other interacting parts of the business, the full benefits of even the SCADA system will not be realised. For example, gradual degradation in the medium term performance of plant, or of a production well is of importance to process engineers and production planners; if they do not have ready access to the data — which are collected by the SCADA system — subtle loss of performance may be undetected for quite some time; as a consequence, production may run at below optimal performance with resultant loss of revenue. SCADA systems incorporating metering data from pipelines or tanker loading terminals are, in effect, the cash registers of the business; the data collected by SCADA is of importance to people inside and outside the organisation.

Some representative benefits are indicated in **Table 1**; particular organisations will need to examine their own business cases individually to evaluate all the issues relevant to their case.

Conclusions

A SCADA system impacts both operational and business effectiveness through the valuable data asset it collects and distributes.

An overall IS strategy planning project will identify the corporate-wide demand for information which originates at the plant level, and the operations room demand for information and facilities available elsewhere in the organisation.

A front-end SCADA study is recommended to identify the business benefits to be gained by all departments as well as the technical aspects such as instrumentation interfaces, telecommunications infrastructure and integration with other on-line systems. The Functional Specification for the SCADA system can then be written to address all the apropriate issues, in line with the overall IS strategy.

The traditional boundaries of SCADA systems need to be re-defined to reflect the enlarged scope of their contribution to the overall business. It is no longer confined to plant monitoring and control, although that is its primary purpose. It is also a business tool because it can impact many activities in the organisation.

Replacing an existing SCADA system or designing a system for a greenfield site presents an opportunity to re-engineer the approach, to re-define roles and foster a change of attitudes to maximise business benefits.

The implementation of SCADA systems remains a somewhat specialised multi-disciplined task. It is not the exclusive domain of any one engineering group; all the disciplines need to work together to provide the best technical solution and they must be co-ordinated by somebody with sufficient grasp of the technologies and the overall strategic business issues to ensure that the asset value of the information is realised throughout the organisation. ■

References:
1. SETCON and SETCIM are registered trade marks of Setpoint Inc.
2. RTAP is a registered trade mark of Hewlett Packard.
3. SD-Scicon THINK TANK is a product from SD-Scicon UK Limited.
4. An Integrated Off-the-shelf SCADA System by Mark Scruton, *Petroleum Review*, Nov 1991.

Midlands Branch

Although the Midlands Branch, until recently, held the distinction of being the youngest branch of the Institute of Petroleum, links between the IP and the Birmingham area extend back almost to the beginnings of the Institute itself.

The first manifestation of the formation of branches within the IP started with the establishment of a Student Section; the London Section was inaugurated in 1923. It was subsequently decided that the Student Section should be divided into two branches known respectively as the London and Birmingham Branches.

During World War II, the activities of the Student Section lapsed but links with the Birmingham area were consolidated when it was decided to re-locate the Institute to Birmingham University in order to reduce the possibility of damage by enemy action. The Journal of the Institute for the years 1939–41 refers to the 'war address' of the Institute as The University Birmingham, Edgbaston, Birmingham 15. By this time, however, a number of other branches had come into being:

Burma Branch
Iranian Branch
Northern Branch
Romanian Branch
Scottish Branch
South Wales Branch
Trinidad Branch
United States Branch
Students Section: Birmingham Branch
London Branch

The building and rooms still exist which contained the library, archives and records, also the skeleton staff which consisted almost entirely of one George Sell, a veritable factotum. At this time, the building was known as the Department of Oil Engineering but it was in fact part of the School of Chemical Engineering.

The Students Branches reflected the fact that only the London and Birmingham Universities had courses which specialised in oil engineering. It is no surprise that the 1940 IP President was the Birmingham Professor A W Nash.

The Birmingham Branch became inactive in about 1962 when the Petroleum Production Course was discontinued.

We then move forward in time to 1983, when Robin Keir-Watson, Chairman of William McKeogh & Co. Ltd. and an active member of the West of Scotland Branch, became interested in establishing a Midlands Branch, his own company being active in the Midlands area. He charged his Midlands Managing Director, Douglas Clegg, with the responsibility of forming a Midlands Branch. Notifications were sent out to all companies likely to have an interest in the branch and a large gathering from local industry was addressed by Alan Gregory, a director of BP, and by Professor Jeffries, of the University of Aston, on 22 June 1983. At the meeting, it was decided that sufficient interest was evident to justify the formation of a new branch and a steering committee was formed. With the exception of the Chairman, it was significant that the other members of this committee were all drawn from within the lubricants industry.

Founder Member and first Chairman of the Midlands Branch Douglas Clegg (left) is pictured in 1984 with some of the other members of the committee — David Neadle, David Atherton and Bill Peacock.

On 26 September, a letter was received from the IP which indicated their approval to go ahead with the branch and a further meeting was held on 17 November, at which a 12-strong committee was appointed. A meeting of the elected members was held the same evening and the officers were chosen; work commenced on the Constitution and Branch Rules. The next formal meeting of the committee then took place on 1 December, and the first Annual General Meeting took place on 15 February 1984.

It was becoming evident that the mainstay of the support of the branch was emanating from the lubricants blenders, of which there were a considerable number in the Birmingham area. Many of these companies pre-dated the oil industry as we now know it, since industrial lubricants produced from naturally derived products, such as tallow, were in high demand in the industrial regions during the 19th century. Although a number of engineering and lubrication companies, many of whom were supplying components to the North Sea industry, showed an interest during the formative stages of the branch, this initial involvement was not sustained.

The programme of events for the branch developed into the normal format, which consisted of six technical presentations during the winter months, together with a winter social evening and a mid-summer event. In the latter years, a series of January dinner-dances has been held in conjunction with the Midlands Branch of the British Lubricants Federation, an organisation which has close links with the IP Midlands Branch.

Interestingly, the branch meetings reverted back to the earlier home of the IP, the Department of Chemical Engineering at Birmingham University, before moving to the current venue, the Campanile Hotel in the centre of Birmingham. Although the circulated branch membership is some 200, in common with other branches only about 10 percent of this membership actively supports branch activities. However, unlike most of the other branches, the Midlands Branch is not favoured by the proximity of an oil major. Excitingly, this situation is about to change, as Conoco is in the process of transferring its head office from London to Warwick and has already expressed a keen interest in supporting the 'local' branch. As a result, the Midlands Branch looks to the future with even greater optimism. ■

D J Margaroni
Chairman Midlands Branch

National Vocational Qualifications

A revolution is occurring in the UK approach to vocational training which has the potential to prove more fundamental than any other initiative in the last 50 years. Its power lies in the fact that the movement is towards a system based on **competence**. In other words, the trainee is required to show that he or she can perform tasks to the level required, either in the work situation or under simulated conditions. How he or she acquires the learning, whether through a formal course, on-the-job or self-teaching, becomes of secondary importance. The result is a system of training which puts the focus on performance rather than the delivery of training.

National Vocational Qualifications (NVQs) will not go away. Since they were first mooted in the government White Paper 'Competence and Competition' in 1986, total investment in NVQs has been £100 million. It is a cornerstone of government training policy and the initiative has the full backing of the CBI and the TUC.

Initiatives such as 'World Class Britian' and 'Investors in People', both of which Prime Minister John Major has personally endorsed, depend heavily for success on a vastly increased take-up of NVQs throughout British industry.

As a financial inducement, tax relief is available to individuals for fees spent on courses leading to NVQs. In addition, Training and Enterprise Councils are increasingly giving funds only to training leading to NVQs.

How an NVQ comes into being

NVQs, and their Scottish equivalent, SVQs, are based upon a set of competence standards for an occupation or profession. The standards are developed by a group of people who are expert in that occupation or profession, usually assisted by a consultant who is skilled in the methodology of formulating standards.

In some cases, the NVQ may cover an occupation found only in one industry, such as a refinery process operator in the petroleum industry; in others, the occupation may be 'generic', in other words, found in many industries, such as a salesperson or warehouseperson. 'Lead Bodies' are responsible for developing the sets of standards on which NVQs are based and they, also, can be generic (e.g. The National Wholesale Training Council) or industry-specific. The Petroleum Employers' Skills Council is the lead body for the downstream petroleum industry, while the Offshore Petroleum Industry Training Organisation looks after the upstream industry.

There are, in practice, many possible permutations between an entirely industry-specific NVQ and a completely generic NVQ.

Once a set of competence standards has been developed, together with the criteria by which they should be assessed, the lead body submits them for approval to the National Council for Vocational Qualifications or, in Scotland, the Scottish Vocational Education Council. These bodies check that the methodology is sound and that the standards are complete and determine the level of the NVQ. Currently, there are five levels, from 1 for the simplest jobs to 5 which covers senior management and professional level qualifications.

After accredition, organisations apply to the awarding body (the ILB plus a body such as C&GLI or BTEC), for approval to operate the scheme. Assessment of a candidiate's ability takes place on site. When a workplace assessor agrees the candidate has met the NVQ requirements, he or she is awarded a national certificate of competence.

The case for NVQs

Industry-agreed job competence standards will raise industry standards generally and improve workforce efficiency and, therefore, profitability in individual companies.

Specific benefits are:

- ability to recruit against industry standards;
- knowledge of what to aim for and assess against when planning training;
- ability to assess the labour force competence against an industry standard;
- quality — job competence is a major factor in any quality programme;
- safety — a competent worker is a safer worker;
- morale — being job competent and recognised as such has a positive effect on staff morale;
- staff development — precise knowledge of what an individual can do is valuable for promotion/development/mobility of labour.

The case against NVQs

Several arguments can be advanced against a company investing in NVQs for employees:

- NVQs are more likely to be backward-looking that forward-looking because they are founded on standards reflecting current practice rather than future developments;
- there are clear signs already that they offer a way of settling clear and measurable national targets (e.g. by 2000, 50 percent of the workforce qualified to at least NVQ level 3). However, the danger is that the real goal — industrial efficiency and company profitability — is forgotten. The risk is that the means become the end;
- companies' training budgets are limited. Investment in NVQs can divert funds from training activities which are more closely geared to the company's needs, strategies and business plans.

Conclusion

Ultimately, it will fall to each employer to decide what support to give employees in the acquisition of NVQs or, indeed, whether to make the NVQ system a central plank of company training policy.

Currently, few people are aware of NVQs and what they mean. But the marketing of them will increase and improve and when this becomes aimed at the individual employee, employers will find themselves under increasing pressure to respond positively.

A briefing and discussion on NVQs will form a major part of the Institute's Conference on Standards of Competence in Practice for the Oil Industry on 1 December.

This article was prepared by Richard Ayres, General Manager Petroleum Employers Council, and John Fuller, Standards Manager Petroleum Employers Skills Council, following their presentation 'Understanding NVQs' at the Personnel Education and Training discussion group meeting at the Institute in June.

Engineering occupations in the oil industry

The introduction of vocational qualifications

Kelvin Appleton (pictured at work) was recently appointed Project Manager of PISC, the Process Industry Standing Conference. He describes below his first tasks leading to the introduction of independent assessment of engineers' abilities to do their jobs.

What is PISC? It is no more, because its first decision was to change its name to SCEP — Standing Conference for Extraction and Processing — more accurate if less fun. It is one of four groups — the others covering construction, engineering manufacture and services — which are brought together in the Engineering Occupations Standards Group to develop occupational standards for higher and professional level engineering jobs in the United Kingdom, which will be the basis of National Vocational Qualifications at the two top levels, four and five. SCEP is the 'lead body' for the industrial sector which includes the food, mining, steel, oil, gas and chemical industries. It is funded by the government to develop these standards. This takes the form of a contract between the Employment Department and the Institution of Chemical Engineers, who are hosting the project in their headquarters at Rugby. SCEP is equivalent to the Offshore Petroleum Industry Training Organisation and the Petroleum Employers Skills Council in this respect.

SCEP consists of representatives (including Bob Edmondson from the Institute of Petroleum) of industrial associations, engineering institutions and industry. It meets only quarterly but its members are at the heart of the network for the project.

In the jungle of jargon — fruitful indeed for consultants — it is necessary to understand what is a **standard**. An **element** of competence with its **performance criteria** and **range statement** constitutes **a standard.**

An **element** is a precise description of what someone should be able to do. It is arrived at by a process of functional analysis progressively breaking down the overall function of the industrial sector into **units** (eg ensuring protection of people, property and process against abnormal process conditions), and then analysing the key elements required for the unit (eg design and specification of process relief for a section of plant).

Several **performance criteria** may apply to an element. They describe as objectively as possible characteristics of competent performance of the element.

The **range statement** defines the contexts and circumstances to which the standard applies.

Each **unit** will have a number of **elements** and a **qualification** would be based on a grouping of units appropriate to a job.

The first stage of the project is the functional mapping of the industrial sector, starting with an overall key purpose which for SCEP is:

> 'Satisfy customers' needs and generate wealth by the safe and environmentally responsible extraction, upgrading and manufacture of products by continuous or batch processing, trading in products, processes and related services.'

This has been divided into key areas and by progressive breakdown. Kelvin Appleton has produced a preliminary functional map to unit level. The next stage is the formation of three working parties consisting of senior engineers from various industries to cover operations and maintenance, projects and design and research and technology. He would welcome volunteers for these working parties and any comment either directly or via Bob Edmondson at the IP.

Student prizes

Alan Higgins, Chairman of the IP Aberdeen Branch has recently presented Institute of Petroleum Student Prizes for outstanding performance on courses related to the oil industry at two Universities in Aberdeen. Pictured is Tim Goodall (second from right) receiving his prize for his work on the MSc course in Petroleum Geology at the University of Aberdeen flanked by Dr Jeremy Prosser from the University of Aberdeen and on the right of the photograph Philipe Amand, Elf Enterprise Caledonian Ltd, speaker at the branch meeting when the presentation was made.

Neil Cummine was presented with his Institute of Petroleum Student Prize by Alan at a presentation ceremony at Robert Gordon Institute of Technology for his work on the written examination on the MSc course in Offshore Engineering in the academic year 1991/92.

As well as an inscribed certificate and a cheque the Student Prize includes free membership of the Institute for three years.

Around the Branches

Edinburgh and SE Scotland

Dr RJ Hutchison, Polyetheylene Group Offices, BP Chemicals Ltd, PO Box 21, Bo'ness Road, Grangemouth, Stirlingshire FK3 9XH. Tel: (0234) 493339.

5 October: 'Batch Control — the way ahead', J Houston, Fischer Control.

5 November: 'The THORP Project', M Bullock, Chief Engineer, THORP Division, BNFL.

8 December: 'Pipe Freezing Techniques', M Jepp, CCT.

1993

21 January: 'Impact of SOx/NOx on Fuel Oil Sales', speaker from BP Oil.

23 February: 'Fluidics', M Bowe, AEA.

March: 'Oil Exploration — The Future', speaker from BP Oil. (Annual Student Lecture).

May: Visit to Edinburgh Zoo on 'Endangered Species'.

Essex

Mr AL Carlson, 471 Kents Hill Road North, Thundersley, Benfleet, Essex SS7 4AD. Tel: (0268) 794615.

14 October: 'Integrated pollution control', A Whitfield, HM Inspector of Pollution, Eastern Region.

11 November: Ladies evening 'Bread and cake making'. J Scott, Bakery Manager, ASDA Stores Ltd.

1993

13 January: 'The safety consultant — a necessary evil or an evil necessity', R Turner, Consultant, RT (Health and Safety) Associates.

10 February: AGM followed by 'The role of the haulier in the bulk liquid transport industry', J Chapman, Divisional Director, P & O Roadtanks Ltd.

10 March: 'Future trends in automotive fuels and lubricants', N Tilling, Exxon Chemicals, Paramins Division.

19 March: Dinner dance.

Humber

Secretary: Mr G Stratford, LES Engineering Ltd, Armstrong Street, West Marsh Industrial Estate Grimsby, South Humberside DN31 1XD. Tel: (0472) 359993.

8 October: 'Downstream future of LPG in the 1990's', WB Ronson, Chairman, ALGED (UK).

30 October: Annual Dinner Dance.

26 November: 'Installation of the living quarters on Conoco's BA platform'. J Tonge, Conoco UK Limited.

1993

18 February: AGM and meeting on 'Integrated pollution control', IM Rickell, HM Principal Inspector of Pollution.

22 February: Annual Dinner.

1 April: Ladies Night.

12 May: 'Blast and fire research for offshore structures', Dr M Mihsien and Dr Vasey, Engineering Research Station, British Gas Plc.

Irish

Secretary: Mr PD Gorman, Aran Energy plc, Clanwilliam Court, Lower Mount Street, Dublin 2, Ireland. Tel: (01) 760 696.

29 September: Golf Outing.

1 October: Seminar on 'Gas Link Ireland/Scotland — Why and How'.

29 October: Evening meeting 'Bitumen — What is new?'

12 November: Annual Dinner.

London

Secretary: Mrs E Walker, Conoco Limited, Conoco House, 230 Blackfriars Road, London SE1 8NR. Tel: (071) 408 6257.

22 September: 'Kuwait — extinguishing the oil well fires and restoring production', J Newman, Bechtel.

22 October: 'Control of gasoline vapour emissions: an alternative approach to vapour recovery', DS Rulison, BP Oil.

10 November: 'I am/was a graduate'. P Gaffney, Gaffney Cline and Associates.

1993

19 January: 'European unity — a time for change and challenge', J Dean, Shell UK Downstream Oil.

16 February: 'Environmental management systems — an update', M Gilbert, BSI.

March: 'Energy policy and the environment', I Fells, Professor of Energy Conversion, Newcastle University.

27 April: AGM and 'Current tax issues — the UK North Sea', PM Naylor, Arthur Andersen and Company.

18 May: 'The application of horizontal wells and oil and gas development', JM Peden, Heriot-Watt University.

June: Annual visit.

Midlands

Secretary: Mr D Johnson, Houghton Vaughan plc, Legge Street, Birmingham, West Midlands B4 7EU. Tel: (021) 359 6100.

16 September: 'Drum Recycling — Duty and UN Markings', G Russell, Blagden Packaging. Joint meeting with Midlands Branch of BLF.

14 October: 'Total Quality Management', T Chandler, Quality Consultant.

11 November: 'Background and Implementation of BS7750 Environmental Standard', presentation by BSI.

9 December: Social Event.

1993

13 January: 'Waste Minimisation — A Novel Technology', P Howard, Leigh Environmental.

17 February: AGM.

17 March: 'Diesel Fuels v Synthetic Lubricants', M Redgard, Esso Research.

21 April: 'Electricity at Work Act — Sparks Us Into Action', speaker from CA Sothers Ltd, Electrical Contractors.

13 May: 'Fire Prevention' presentation and tour by the Fire Department at Birmingham Airport.

North-East

Secretary: Mr JM Sparke, Phillips Petroleum Co UK Ltd, Seal Sands, Middlesbrough, Cleveland TS2 1UH. Tel: (0642) 546411.

23 September: 'All you wanted to know about Environmental Legislation, but were afraid to ask', J Downs, Cremer and Warner Ltd.

2 October: Branch Dinner.

20 October: 'Ground water remediation beneath petroleum and chemical plants', K Tierney, Hydrotechnica Ltd.

3 November: 'Tank calibration by laser techniques', T Denver, SGS Redwood Ltd.

2 December: Presentation by Halliburton Ltd.

1993

26 January: 'Cleveland County Emergency Plan', P Taylor, County Emergency Planning Officer.

9 February: AGM.

23 March: 'Hazard analysis in the oil industry', P Waite, Cremer and Warner Ltd.

23 April: Annual Dinner/Dance.

11 May: Short Paper Evening.

Shetland

Secretary: Mr PN Guy, BP Petroleum Development Ltd, Sullom Voe Terminal, Mossbank, Shetland ZE2 9TU. Tel: (0806) 243437.

15 September: 'Ladies Night'.

13 October: 'Training for a Changing World', R Edmondson, Institute of Petroleum.

13 November: Annual Dinner.

1993

9 February: AGM.

South Wales

Secretary: Mr IJ Thomas, BP Oil Llandarcy Refinery Ltd, Britannic House, Llandarcy, Neath, West Glamorgan SA10 6HJ. Tel: (0792) 322269.

22 September: 'Virtual reality — a vision of the future', J Huff, Virtual Presence Limited.

20 October: 'Removal of sub-surface hydrocarbon pollution', G Licence, Miller Environmental.

19 November: 'Explosives awareness', K Callaghan, Ministry of Defence.

1993

19 January: 'Lube oil developments in the future', T Stribley, BP.
18 February: AGM and 'Medieval dyes', D Redpath.
18 March: 'Oil spill response', D Salt, OSR.
26/28 March: Visit to York Minster.
22 April: 'Real time route planning', J Abbott, General Logistics plc.

Southern

Secretary: Mr RL Shaw, Esso Petroleum Co Ltd, Esso Refinery, Fawley, Southampton SO4 1TX. Tel: 0703 896870.
21 September: Charles Smith, President, The Institute of Petroleum.

Yorkshire

Secretary: Mr PD Osler, Spring Bank, Station Lane, Hampsthwaite, Harrogate, North Yorkshire HG3 3AB. Tel: (0423) 771726.
13 October: 'The Institute of Petroleum — The Way Forward', I Ward, Director General, The Institute of Petroleum.
10 November: 'Environmentally Friendly Lubricants', RJC Biggin and AR Barber, Lubrizol Ltd.
1 December: Ladies Evening — A visit to Nostell Priory.

1993

12 January: 'Health and Safety the Environment and Industry', DW Brown, BP Oil Europe.
9 February: AGM with guest speaker followed by Hot Pot Supper.
9 March: Joint meeting with guest speaker provided by The Institute of Energy.
19 March: Dinner Dance.
16 June: Golf Tournament.

New Collective Members

Transtech (Europe) Limited

Dolphin Court, Embassy Way, Ta'Xbiex, Malta. Telephone: Malta 319948/9.
IP Nominated Representative: Mr A Foden, Managing Director.

Transtech (Europe) Limited, a contractor to the oil, gas and petrochemical industries, undertakes 'turnkey projects' involving civil, mechanical and electrical engineering and instrumentation and control, incorporating design and detail engineering, supply, construction, commissioning and training.

The Quality Assurance Division offers NDT services to the industry.

The company is the major shareholder in International Inspection & Oilfield Services, Ltd, Malta.

Kennedy & Donkin Systems Control Ltd (KDSC)

Chatsworth House, 19 Lever Street, Manchester M1 3LT. Telephone: 061 228 6282.
IP Nominated Representative: Mr D E Firkins, Business Development Director.

KDSC, part of the well established Kennedy & Donkin Group, specialise in providing engineering solutions to industry in the fields of control, instrumentation, computer and electrical systems.

These services are provided on an international basis with a particular emphasis on re-instrumentation and safety systems elements together with a complete package of activity in the utility, off-sites and jetty refurbishment programmes.

LGS Co Ltd — Piraeus

15 Gounari Street, 185 31 Piraeus, Greece.
IP Nominated Representative: Mr L Linardatos, General Director.

The company is an associate of Seaexpress Navigation Limited, Nicosia, Cyprus and its areas of operation cover the supervision of loading and discharge operations, as well as shore tank inspections.

Global Canopies Ltd

Cannon Lane, Tonbridge, Kent TN9 1PP. Tel: 0732 351358.
IP Nominated Representative: Mr A Galanis, Director.

Global Canopies is a subsidiary of Milayglen Securities Limited. The company designs, manufactures and installs petrol filling station canopies.

New Fellow

Dr John Miles

Dr Miles joined SGS Moore Barrett & Redwood in 1980 and is currently Group Technical Director for SGS United Kingdom Ltd, responsible for the technical performance of all the companies within the SGS (UK) Group, with particular responsibility for SGS Redwood. He is also responsible for introducing new technology and new developments.

Dr Miles has served on several of the Institute's Petroleum Measurement Panels and on organising committees. He has presented papers at Oil Loss Conferences.

Benevolent Fund

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

New Members

Mr T Bahig, 411 El Glym Av, Sarwat, Alexandria, Egypt.
Dr CHB Binns, Mead Lodge, Courtmead Road, Cuckfield, Haywards Heath, Sussex RH17 5LR
Mr JG Bolt, 5 Grange Crescent, West Cross, Swansea SA3 5ET
Mr C Bradley, 1 Gardner Avenue, Corringham, Stanford-le-Hope, Essex SS17 7SE
Mr J Brouw, Brouw SA, Au Du Por 49, 1210 Brussels, Belgium
Mr JS Clark, Mobil Oil Co Ltd, Coryton Refinery, Stanford-le-Hope, Essex SS17 9LL
Mr MS Collins, Andrew Palmer and Associates Ltd, Artillery House, Artillery Row, London SW1P 1RT
Mr PS Collomosse, CMG (Information Consultancy Services) Ltd, Telford House, Tothill Street, London SW1H 9NB
Mr J Cooper, Sun Microsystems Ltd, Watchmoor Park, Riverside Way, Camberley, Surrey GU15 3YL
Mr J J S Daniel, Jeremy Daniel & Co Ltd, Chappetts Farm House, West Meon, Petersfield, Hants GU32 1NB
Miss S D Davies, Richbell House, 77 St John's Street, London EC1M 4AN
Mr P Depledge, Applied Contracts Management Ltd, Kloo it, 47 Avocet Way, Langford Village, Bicester, Oxfordshire OX6 0YN
Mr AC De Winton, Clifford Chance, Blackfriars House, 19 New Bridge Street, London EC4V 5BY
Mr JS Dronfield, 68 Sterndale Road, West Kensington, London W14 0HU
Mr M Dytor, Thomas Howell Group, Tech & Specialist Services Division, Lloyds Court, 1 Goodmans Yard, London E1 8AT
Mr E S Ekong, 55B Woodstock Road, Finsbury Park, London N4 3ET
Mr RT Evans, 34 Nursery Lane, Stubbington, Fareham, Hants PO14 2NZ
Mr AJ Gillespie, 24 Westman Road, Canvey Island, Essex SS8 8NA
Mr TAP Hamilton, 15 Bowers Way, Harpenden, Herts AL5 4EP
Mr DW Heal, Cae Gwair Bach, Llanon, Dyfed SY23 5LZ
Mr CA Hill, 43 Wheeler Street, Maidstone, Kent ME14 1UA
Mr PG Hogan, Mettler-Toledo Ltd, 64 Boston Road, Beaumont Leys, Leicester LE4 1AW

Institute News

Mr SA Holme, 57 Froxhill Crescent, Brixworth Green, Brixworth, Northampton NN6 9LN
Mr NJ Hopkins, Erico Petroleum Information Ltd, 93–99 Upper Richmond Road, London SW15 2TG
Mr VA Hubbert, 35 Hamberts Road, South Woodham Ferrers, Chelmsford, Essex CM3 5TP
Mr R Illsley, Tankmaster Ltd, 47 The Avenue, Starbeck, Harrogate, N Yorkshire HG1 4QB
Mr CR Jones, 110 Sutherland Road, Cheslyn Hay, Walsall WS6 7BS
Mr S King, 31 Leicester Road, Failsworth, Manchester M35 0GW
Mr A Macdonald, 8 Larnach Road, London W6 9NX
Mr A G Martin, Dickson Minto WS, 22/25 Finsbury Square, London EC2A 1QS
Mr MJ Martin, Apt 5, The Fairway, Westella, Hull, N Humberside HU10 7SA
Mr CRL Meyjes, MGA Consultancy Services, Bridge House, 1/2 Riverside Drive, Aberdeen AB1 2LH
Mr C Morfitt, 28 Oak Avenue, Withernsea, North Humberside HU19 2PE
Mr PF Owen, 38 Russell Green Close, Purley, Surrey CR8 2NR
Mr SE Parker, Novomace Ltd, 4 Hamilton Close, Park Gate, South Wirral L64 6RH
Miss HV Peace, Societe Generale, 60 Gracechurch Street, London EC3V 0HD
Dr JC Philp, Napier University, Dept Biological Sciences, 10 Colington Road, Edinburgh EH10 5DT
Mr DP Poland, MSI Mech Construction Ltd, The Old Bank House, 1 High Street, Arundel, West Sussex BN18 9AD.
Mr PR Povey, 73 Norfolk Road, Maldon, Essex CM9 6AT
Mr PM Pullan, Gill Pullan Associates, 123 Mid Street, South Nutfield, Redhill RH1 5RY.
Eur-Ing RA Radevsky, South Cottage, Whites Lane Beenham, Reading, Berkshire RG7 5LW
Mr P Rasmussen, Esdoornstraat 72, Waalwyck, 5143 AW, Netherlands
Mr AL Riach, 3rd Party Inspection Ltd, 4 Howemoss Drive, Kirkhill Industrial Estate, Dyce, Aberdeen AB2 0GL
Mr JF Rick, Ellesmere, 78 Hogg Lane, Grays, Essex RM17 5QT
Mr S Rigby, 7 Clitheroe Road, Weaverham, Northwich, Cheshire CW8 3LW.
Mr GB Roberts, College of Petroleum & Energy Studies, Sun Alliance House, New Inn Hall Street, Oxford OX1 2QD.
Mr NA Robinson, Villa Barnarac, Le Rooret Alpes, Alpes Maritimes 06650, France.
Mr JD Sasserath, CMG Information, Consultancy Services Ltd, Telford House, Tothill Street, London SW1H 9NB
Dr EYS Soo, Edward Alandale Associates Ltd, PO Box 20, Nuneaton, Warwickshire CV10 8RW.
Mr PA Stock, 7 Bow Street, Edgeley, Stockport, Cheshire SK3 0LG
Miss PL Sutton, 17A Martell Road, West Dulwich, London SE21 8ED.
Mr CM Talbot, Loonse Jaart, 8 5171 LK, Kaatsheuvel, Netherlands
Miss C Taylor, 27A West Road, Shoeburyness, Southend-on-Sea, Essex SS3 9DR.
Miss G Thakorial, 17 Westholm, Hampstead Garden Suburb, London NW11 6LH.
Mr TR Thompson, Drumelzier, Inchmarlo Road, Banchory, Kincardineshire AB31 4AA.
SJ Thurlow, Lynton, 12 Murrays Close, Bishop's Cleeve, Cheltenham, Gloucestershire GL20 4XE.
Mr P Torr, Mobil Oil Co Ltd, 54/60 Victoria Street, London SW1E 6QB.
Mr RW Treeby, 31 Mallory Crescent, Fareham, Hampshire PO16 7QA.
Dr GL Turner, Deijlerweg 37, 2241 AA Wassenaar, The Netherlands.
Eur Ing CJ Vallely, Corner Cottage, Chapel Street, Hinxworth, Baldock, Hertfordshire SG7 5HN.
Mr OFM Van Voorst, ABB Global Engineering BV, PO Box 2194, 2301 CD Leiden, The Netherlands.
Mr GL Wagner, Woodlands, The Common, Naphill, High Wycombe, Buckinghamshire HP14 4SZ.
Mr NP Wagstaff, Shipham & Co Ltd, Hawthorne Avenue, Hull HU3 5JX.
Mr J Watson, 29 Layton Crescent, Brampton, Huntingdon, Cambs PE18 8TS
Mr JC Wellemeyer, Morgan Stanley International, 25 Cabot Square, Canary Wharf, London E14 4QA
Mr M Whittall, Flat 4, 85 Holland Park, London W11 3RZ
Mr HM Williams, Heereme Eng Services UK, 5 Compton Road, Wimbledon, London SW19 7QE.
Mr VM Williams, Byways, Church Road, Wadingburn, Lasswade, Midlothian EH18 1HB.

Student

Mr D Broughton, 10 Sterling Place, South Ealing, London W5 4RB
Mr N Hamon, 24 San Remo Road, Aspley Guise, Milton Keynes MK17 8JY.
Mr N Ireland, 12 Wood Dale, Great Baddow, Chelmsford, Essex CM2 8GZ
Miss A Tsakounaki, Imperial College, Department of Chem Engineering, 7 Prince Consort Road, London SW7 2BY

Student Prize

Mr NA Cummine, 30 Albert Gardens, Inverurie, Aberdeenshire AB51 9WP

UK Deliveries into Consumption

June 1992 — Tonnes

Products	*June 1991†*	*June 1992**	*Jan–June 1991†*	*Jan–June 1992**	*% change*
Naphtha/LDF	261,622	214,037	1,750,135	1,648,517	−6
ATF—Kerosine	550,139	599,963	2,750,386	3,151,398	15
Motor Spirit	1,924,008	2,022,715	11,732,627	11,822,401	1
of which unleaded	791,309	945,312	4,655,944	5,367,415	15
Super unleaded	94,015	119,927	543,974	672,222	24
Premium unleaded	697,294	825,385	4,111,970	4,695,193	14
Burning Oil	134,484	94,149	1,253,449	1,251,344	0
Derv Fuel	854,157	931,690	5,252,698	5,413,877	3
Gas/Diesel Oil	522,299	545,654	4,162,243	3,966,323	−5
Fuel Oil	1,095,095	799,590	6,249,395	5,707,672	−9
Lubricating Oil	64,908	73,904	380,661	400,248	5
Other Products	587,380	552,158	3,427,674	3,379,378	−1
Total above	5,994,092	5,833,860	36,959,268	36,741,158	−1
Refinery Consumption	477,940	505,209	2,975,277	2,988,656	0
Total all products	6,472,032	6,339,069	39,934,545	39,729,814	−1

†Revised with adjustments *Preliminary

The Institute of Petroleum

LIFE CYCLE ANALYSIS AND ECO-ASSESSMENT IN THE OIL INDUSTRY

Thursday 26 November 1992

A one-day Conference to be held at The Cavendish Conference Centre, London

The oil industry is accustomed to paying great attention to the energy balances of both new and existing processes since refinery energy has always been a key element of a downstream company's cost structures. Now, however, it is not merely consumed energy which is at issue but the pollution and waste created during the integrated activities from well-head to final use and/or disposal of the oil product.

The use of Life Cycle Analysis (LCA) or Cradle-to-Grave Analysis to assess the total environmental impact of products or activities is still in its infancy. Nevertheless, LCA is an essential tool in the investigation of products seeking an 'eco-label'. Although some oil products are held as too dangerous to be considered for eco-labelling as such, the LCA techniques for assessment and comparison of the different oil products are of critical importance in guiding the decision-making processes both at the energy/environment interface and in the product formulation.

This conference will examine the general status of LCA and its relevance and application in the oil industry both in the context of the European Commission's Eco-labelling Directive proposals and the environmental impact of automotive fuels and lubricants.

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

IMPLICATIONS OF BIOCIDE USE WITHIN THE PETROLEUM INDUSTRY

12 November 1992

To be held at

The Institute of Petroleum, London

Chairman: Mr PJ Ruane, Castrol Technology Centre

Presentations will include:

Overview — Biocides Boon or Bane?
Mr EC Hill, ECHA Microbiology Ltd

Industrial Applications
Dr BN Herbert, Shell Biosciences Laboratory, Sittingbourne Research Centre

Three manufacturers will give papers on the use of their products:
Mr W Siegert, Schulke and Mayr GmbH
Dr M Wooder, Rohm and Haas UK Ltd
Dr B Backhouse, SHE Department, ICI Specialty Chemicals

Biofilms
Ms S Kinnimet, School of Pure and Applied Biology, University of Wales

Environmental Impact of Biocides
(Speaker to be confirmed)

Toxicology of Biocides and Regulations
Dr S Fairhurst, Health and Safety Executive

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

FORTHCOMING EVENTS

September

7th–9th
Birmingham : 'Distillation and Absorption '92'. Details: IChemE Conference Section, 165–171 Railway Terrace, Rugby CV21 3HQ. Tel: (0788) 578214. Fax: (0788) 577182.

9th–11th
London: Course on 'Offshore Pipeline Engineering'. Details: Nadia Ellis, IBC Technical Services, 57–67 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 631 3214.

10th
London: Conference on 'The Petrol Station Market — on the edge of turmoil'. Details: Nova Herbert, Henry Stewart Conference Studies, 2–3 Cornwall Terrace, Regent's Park, London NW1 4QP. Tel: (071) 935 2382. Fax: (071) 486 7083.

13th–25th
France: 'International Petroleum Executive Seminar'. Details: Dr RL Gale, Seminar Manager, Petroleum Economics Limited, Piercy House, 7 Copthall Avenue, London EC2R 7BU. Tel: (071) 638 3758. Fax: (071) 638 3708.

15th–17th
Maastricht, The Netherlands: 'Energy Economy 1992'. Details: Energy Economy 1992, RAI Gebouw bv, Europaplein, 1078 GZ Amsterdam, The Netherlands. Tel: 31 (0) 205491212. Fax: 31 (0) 206464469.

16th
London: Accounting seminar on 'Taxation: an introduction'. Details: Mrs P Ashby, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR. Tel: (071) 636 1004. Fax: (071) 255 1472.

16th–18th
Brussels: Conference on 'Lubricants of the Future and Environment'. Details: BfB Consultant, DPT Congress, 23 Rue Haigneaux, 5300 Nameche, Belgium. Tel: 32 (0) 81581177. Fax: 32 (0)81581179.

20th
Moreton-in-Marsh: Course on 'Handling of Emergencies in the Petroleum Industry'. Details: Mr R Cameron, Marketing Manager, The Fire Service College, Moreton-in-Marsh, Gloucestershire GL56 0RH. Tel: (0608) 52156. Fax: (0608) 51788.

21st–22nd
Aberdeen: Conference on 'Practical Approaches to Implementing Successful Quality Management Systems for Offshore Contractors and Suppliers'. Details: IIR Industrial Ltd, 28th Floor, Centre Point, 103 New Oxford Street, London WC1A 1DD. Tel: (071) 412 0141. Fax: (071) 412 0145.

21st–23rd
Cambridge: 'Oil and Gas Tariffing Workshop'. Details: Langham Oil Conferences Ltd, 37 Main Street, Queniborough, Leicester LE7 8DB. Tel: (0664) 424776. Fax: (0664) 424832.

21st–25th
Glasgow: Course on 'Advanced Design for Ships and Offshore Floating Systems'. Details: Mr JAT Grant, The Marine Technology Directorate Limited, 19 Buckingham Street, London WC2N 6EF. Tel: (071) 321 0674. Fax: (071) 930 4323.

22nd–23rd
London: Conference 'Tanker 92 — Elusive Profitability Amidst Quality Constraints'. Details: Susan Coulston, IBC Legal Studies and Services Limited, 57–61 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 631 3214.

22nd–23rd
London: Conference on 'Risk Analysis and Crisis Management — The interface'. Details: Robert Gibbins, BPP Technical Services Limited, 2 Tavistock Place, London WC1H 9RA. Tel: (071) 837 6362. Fax: (071) 837 0822.

22nd–24th
London: Conference on 'Offshore Site Investigation and Foundation Behaviour'. Details: Society for Underwater Technology, PSTI House, Exploration Drive, Bridge of Don, Aberdeen AB23 8GX. Tel: (0224) 823637. Fax: (0224) 820236.

23rd
Leeds: Meeting on 'Fundamentals of Combustion in Reciprocating Engines'. Details: Professor D Bradley, Department of Mechanical Engineering, The University, Leeds LS2 9JT. Tel: (0532) 332117. Fax: (0532) 424611.

23rd–25th
Southampton: '4th International Conference on Hydrocyclones'. Details: Mrs K Stones, Conference Organiser, Hydrocyclones, Cranfield, Bedford MK43 0AJ. Tel: (0234) 750422. Fax: (0234) 750074.

27th–29th
Course on 'Introduction to Petroleum Exploration for Non-Geologists'. Details: The Administrative Secretary, JAPEC, c/o The Geological Society, Burlington House, Piccadilly, London W1V 0JU. Tel: (071) 434 9944. Fax: (071) 439 8975.

28th–29th
London: Conference on 'The Business Implications of Public Access to Environmental Information'. Details: IBC Technical Services Ltd, 57–61 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 631 3214.

28th–30th
Nicosia: '6th Annual APS conference — Middle East Strategy to the Year 2005'. Details: APS Group, PO Box 3896, Nicosia, Cyprus. Tel: 02 351778. Fax: 02 350265.

30th–1st October
Aberdeen: Conference on 'Cost Effective Topside Maintenance'. Details: IIR Industrial Ltd, 28th Floor, Centre Point, 103 New Oxford Street, London WC1A 1DD. Tel: (071) 412 0141. Fax: (071) 412 0145.

30th–1st October
Aberdeen: Conference on 'The Practicalities and Realities of Human Factors in Offshore Safety'. Details: Business Seminars International Ltd, 56–60 St John Street, London EC1M 4DT. Tel: (071) 490 3774. Fax: (071) 490 2296.

30th–1st October
Plymouth: 'Operational Diving Acquaintance Course'. Details: Society for Underwater Technology, 76 Mark Lane, London EC3R 7JN. Tel: (071) 481 0750. Fax: (071) 481 4001.

October

1st
Aberdeen: Conference on 'Subsea Standardisation — 1992 Update'. Details Knighton Enterprises Limited, 2 Marlborough Street, Faringdon, Oxon SN7 7JP. Tel: (0367) 242525. Fax: (0367) 241125.

1st–2nd
London: Conference on 'Advances in Reservoir Technology'. Details: Nadia Ellis, IBC Technical Services

FORTHCOMING EVENTS

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

4th–7th
Washington DC: Conference and exhibition: 'Celebrating Legacies — Forging the Future'. Details: Society of Petroleum Engineers, PO Box 833836, Richardson, TX 75083–3836, USA. Tel: 214/952 9393. Fax: 214/952 9435.

6th–8th
London: 'Interspill '92'. Details: Xponent Ltd, The Courtyard, 98 High Street, Bedford MK40 1NN. Tel: (0234) 212988. Fax: (0234) 271157.

7th
London: Accounting seminar on 'An oil company's balance sheet'. Details: Mrs P Ashby, The Institute of Petroleum.

7th–8th
Kinross: Course on 'Selling the Virtues of Oil'. Details: Petroleum Training Federation, Room 326, 162–168 Regent Street, London W1R 5TB. Tel: (071) 287 5483.

7th–8th
Aberdeen: Conference on 'Advances in Solving Oilfield Scaling Problems'. Details: Sarah Peace, IBC Technical Services Ltd, Gilmoora House, 57–61 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 631 3214.

8th
London: Conference on 'Exploration, Appraisal and Development Farm-ins and Swaps'. Details: Langham Oil Conferences Ltd, 37 Main Street, Queniborough, Leicester LE7 3DB.

8th–9th
Oslo: Conference on 'Floating Production Systems'. Details: Conference Officer, OCS, 34–36 Apsley End Road, Shillington, Hitchin, Herts SG5 3LX. Tel: (0462) 712049. Fax: (0462) 711889.

8th–9th
London: Conference on 'Assessing your opportunities in the developing UK gas market'. Details: IIR Industrial Ltd, 28th Floor, Centre Point, 103 New Oxford Street, London WC1A 1DD. Tel: (071) 412 0141. Fax: (071) 412 0145.

9th
Teddington: Middlesex: Open day at the National Weights and Measures Laboratory. Details: National Weights and Measures Laboratory, Stanton Avenue, Teddington, Middlesex TW11 0JZ. Tel: (081) 943 7272. Fax: (081) 943 7270.

12th–16th
Rome: 'Energy, Environment and Technological Innovation'. Details: Studio EGA, Viale Tiziano, 19–00196 Rome, Italy. Tel: 39 6 3221806. Fax: 39 6 3222006.

13th
London: Conference on 'Natural Gas Vehicles — The way ahead to a cleaner environment'. Details: David Suthers, Director, The Combustion Engineering Association. PO Box 15, Farm Road, Aberaman, Aberdare, Mid Glamorgan CF88 6YZ. Tel & Fax: (0685) 879119/874201.

13th–15th
Manchester: Course on 'Incineration Technology: Equipment Selection and Operation'. Details: Liz Hide, IBC Technical Services Ltd, Gilmoora House, 57–61 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 631 3214.

13th–16th
Aberdeen: 'International Offshore Contracting and Subsea Engineering Exhibition and Conference'. Details: Spearhead Exhibitions Ltd, Rowe House, 55–59 Fife Road, Kingston upon Thames, Surrey KT1 1TA. Tel: (081) 549 5831. Fax: (081) 541 5657.

14th–16th
Athens: Conference on 'Natural Gas Policies and Technologies Part II: Technologies'. Details: LDK Consultants, 7, Sp. Triantafyllou Str, GR 113 61 Athens. Tel: 30 1 8629660. Fax: 30 1 8617681.

15th
London: 'UK Coat '92'. Details: Institute of Energy Conferences Department, 18 Devonshire Street, London W1N 2AU. Tel: (071) 580 0008. Fax: (071) 580 4420.

15th–16th
Lisbon, Portugal: 'First European Oil and Gas EDI Group Conference'. Details: Tessa Berry, Bellatrix Associates, Brooke House, Market Square, Aylesbury, Bucks HP20 1SN. Tel: (0296) 89911. Fax: (0296) 641726.

15th–20th
Perm/Ural: Trade Fair 'Energy and Ecology 92'. Details: Glahe International KG, Herler Strasse 103, D-5000 Köln 80, Germany. Tel: 0221 62 43 00. Fax: 0221 62 56 90.

18th–27th November
Moreton-in-Marsh: 'International Fire Prevention'. Details: The International Courses Office, The Fire Service College, Moreton-in-Marsh, Gloucestershire GL56 0RH. Tel: (0608) 50831. Fax: (0608) 51788.

18th–23rd
Rio de Janeiro, Brazil: Rio Oil and Gas Expo '92, and 5th Brazilian Petrochemical Congress'. Details: Goal Promocoes E Feiras, Rua Conde de Lages, 44 -s/1301, CEP 20241, Rio de Janeiro, Brazil. Tel: 55 21 221 8086. Fax: 55 21 221 3804.

20th
London: Conference on 'Business Information Services in the Oil Industry — Working for Success'. Details: Miss C Little, The Institute of Petroleum.

20th–22nd
Manchester: Symposium and exhibition on 'Major Hazards Onshore and Offshore'. Details: T Thompson, Symposium Organiser, 7 The Serpentine, Liverpool L19 9DT. Tel: (051) 427 1596.

20th–22nd
Antwerp: 'Tank Europe 92'. Details: Mr P Payne, Conference Co-ordinator, Baltic Conventions, The Baltic Centre, Great West Road, Brentford, TW8 9BU. Tel: (081) 847 2446. Fax: (081) 569 8688.

21st–23rd
Lisbon: 'Offshore Iberica'. Details: Conference Officer, OCS, 34–36 Apsley End Road, Shillington, Hitchin, Herts. SG5 3LX. Tel: (0462) 712049. Fax: (0462) 711889.

22nd–23rd
Prague: Conference on 'Oil and Gas in Czechoslovakia'. Details: Enerfinance Consulting Services, 69 Rue d'Hauteville, 75010 Paris, France. Tel: (1) 47 70 29 00. Fax: (1) 47 70 27 37/47.

28th–30th
Edinburgh: 'Oil Industry Nurses Symposium'. Details: Miss C Little, The Institute of Petroleum.

Measuring sulphur content

The Trondheim-based geochemical company, Geolab Nor, has developed a compact instrument which, in a single analytical run, measures the sulphur content of small, untreated samples of rock and coal and dried samples of sediments or soil. The instrument reduces the detection time for both organic and mineral-bound sulphur to about 15 minutes, in contrast to today's most conventional laboratory methods which take several hours.

The 'GEOelf Sulphur Analyzer' (GSA) instrument analyses the individual content of pure sulphur, inorganic sulphur, and organically bound sulphur in hydrocarbons, other organic compounds and kerogen. The minimum sample weight required is 10 milligrams of the common types of rock, or five milligrams of organically rich materials such as coal. The instrument also measures the free hydrocarbons in the specimen, together with those generated by pyrolysis.

Analysis takes place in a single operation, compared with the several operations required previously. The instrument can be installed in an ordinary laboratory, or can be installed in a semi-permanent field laboratory having a power supply.

Measurements of the sulphur content of rocks and sediments are of particular interest to the oil industry. The sulphur content of kerogen in source rocks has been shown to affect the possibility of discovering petroleum in sedimentary basins. The reason for this is that sulphur-rich kerogen is more easily transformed into hydrocarbons than kerogen with a low sulphur content. Sulphur content measurements of drill samples thus constitute valuable supplementary data when modelling the oil and gas potential of a sedimentary basin.

Geolab Nor has devoted about two years to the development of this new instrument for sulphur analysis in a joint project with the ELF Aquitaine oil company.

Low-noise chemical pump

While conventional chemical pumps in operation have a sound pressure level of 70 to 75 dB measured at a distance of one metre, KSB's Exachem with its 55 to 58 dB is hardly noticeable (a reduction of about 20 dB means a subjective noise reduction to a quarter of the original value).

Equipped with ceramic plain bearings instead of antifriction bearings and not requiring any motor fan, Exachem has an extremely low noise level.

The maintenance-free Exachem was designed for leak-free handling of aggressive, caustic or other problematic media in the chemical and petrochemical industries. KSB's engineers have achieved these advantages by using a canned motor ensuring double safety. The Hastelloy can and the cast casing designed for the maximum pump discharge pressure are two safe barriers to protect the environment.

The well-proven hydraulic system is combined with an explosion-protected canned motor fully encapsulated in a flameproof enclosure.

18-track data support

For what is claimed to be the first time energy exploration companies can move from nine to 18-track magnetic tape recording of seismic data — while retaining the capability to review data in real time as it is recorded.

European tape drives supplier M4 Data has announced the addition of a read-after-write capability for the IBM3480 compatible 4280/4220 family of 18-track cartridge sub-systems.

Now seismic specialists are able to combine the facility for immediate interpretation and quality assurance check of the entire data collection system with a higher capacity, lower cost-per-megabyte storage option.

The 4280 (rack-mountable) and lower cost 4220 (rack mountable and table top) subsystems consist of a controller and tape transport with universal power supplies, plus a variety of standard host interfaces, including SCSI, for easy integration.

Transfer rates of up to three megabytes per second are offered by the 4280 (two megabytes in the case of the 4220), full IBM compatible 200 Mb capacity, and a range of other features including a reliability of 22,000 hours MTBF.

Each model has a simplified tape path with air bearings to provide sensitive, accurate tape handling and maximum data integrity. The drives have optional improved cartridge recording capability to provide increased capacity up to one GByte per cartridge, while maintaining full compatibility with ANSI standards.

Digital petroleum data

Simon Petroleum Technology (SPT), in association with Norsk Hydro a.s. and Saga Petroleum a.s. has begun a major new project to produce modern digital data from oil and gas wells on the Norwegian Continental Shelf.

Utilising technology from its state-of-the-art 'Tigress' software system, SPT will produce complete geometrically and/or environmentally corrected wireline log suites for all released wells on the Norwegian Continental Shelf. Through existing computer and workstation technology, users will now be able to access high quality digital data to assist exploration and appraisal programmes. The quality assured datasets will be produced in paperless form by utilising the latest scanning and data manipulation systems.

New MTBE feedstock process

BP Oil Company, Ohio, and Mobil Corporation have announced that they are jointly developing a new proprietary process, Isofin, for cost effectively producing feedstocks for oxygenates like methyl tertiary butyl ether (MTBE). Oxygenates are mandated by the US Clean Air Act for reformulated gasoline.

The process involves converting a common linear hydrocarbon like normal butenes to a more reactive form, using a proprietary Mobil zeolite catalyst.

BP Research Director, Professor Sir John Cadogan, said, 'The new technology is expected to increase substantially the production of MTBE from refinery sources of butenes.'

Mobil and BP have agreed to offer the technology for licence upon completion of commercial development.

Fracture mechanics fatigue tool

Zentech International has been working in the area of fracture mechanics for over 10 years and has developed the ZENCRACK program. The program is for use by engineers working in safety critical markets such as the aerospace, nuclear and offshore industries. By using this program analysts are able to predict both the fatigue life of structures and the possible development of cracks in any area of a component or structure.

The company claims the program represents a major advance in predicting fatigue crack growth of 3-D cracks under generalised and complex states of stress. The program uses energy methods to predict the magnitude and direction of crack growth and has the ability to calculate non-planar crack growth.

Starting from a finite element model of an intact component, ZENCRACK remeshes the model to include a user-specified crack geometry. The subsequent prediction process includes finite element analysis and updating the mesh to simulate crack growth. This has been automated to save both time and resources.

Rotary control valves

The oil, refining, petrochemical and power industries are among those likely to benefit from the international launch this year of a new rotary control valve.

Developed by Neles-Jamesbury Oy, Helsinki, the FINETROL® valve has been designed to provide precise flow control over a broader range whilst offering a greater degree of dynamic stability, fire- and shaft-blowout safety as well as of noise reduction than is commonly available to operators in these fields.

The standard working temperature range is −80°C to +400°C and the flanged valves, which conform fully with ANSI, DIN and ISO standards appropriate to type, are available in valve-body sizes of one to six inches (25–150 mm). The new rotary control valve is also characterised by durability and ease of servicing or part-replacement where necessary.

As a function of valve-plug shape — also eliminating any dynamic imbalance-valve flow is distributed over a 90° operating angle against an average of 50° for many comparable valves. Inherent and installed flow-characteristics demonstrate the control advantage this offers to the user.

New reference station

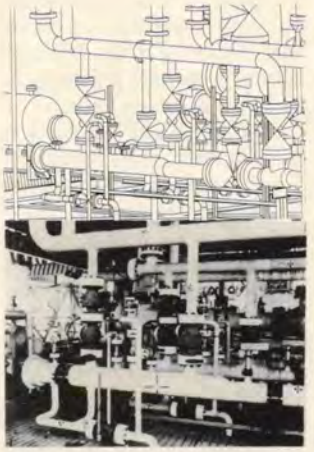
Racal Survey has opened a new SkyFix Differential GPS reference station in Gabon, West Africa. The new facility provides a Differential GPS service in a key area of oil and gas exploration and brings the total of SkyFix reference stations established worldwide to 28 — available to users over a large part of the earth's surface including all of the principal areas of offshore exploration.

The Gabon station is the first SkyFix facility to be opened in equatorial Africa and provides satellite positioning which extensive trials have confirmed as being accurate to better than 5 metres at ranges up to 2000 km from the reference station. By locating the new station in Gabon, Racal Survey has made the service available to users operating in the Gulf of Guinea and beyond.

The Gabon station has been opened following the recent award of a contract for the provision of DGPS services to a major seismic contractor.

Racal expects the extended SkyFix coverage to be welcomed by a wide variety of users with vessels equipped with SkyFix receiving equipment who will appreciate the range and accuracy of the new service.

Engineering drawings by photogrammetry



By utilising the speed and accuracy of photography, Blom A/S of Sandnes, Norway, can present a rapid method for creating databases of plant drawings with near-perfect precision. Large cost-savings are projected.

The new programme, called BAsIs for Blom's As-Is Data Acquisition, is said to be suitable even for the largest plants, such as refineries and nuclear power stations.

An 'as is' drawing is reproduced from a construction as it is. It thus provides a true and accurate picture completely free from the usual divergencies between blueprints and the actual structure.

The method combines photogrammetric data acquisition with ICI's measuring system CAMS and software able to transfer measurement data to an engineering database.

The creation of a database starts with a field survey and a systematic photographing of the plant. The photos are processed by Blom operators in a stereo comparator, and when all details fit, the information is converted into geometrical input for database loading.

Time and costs are saved in all phases of a project. As a specific example of initial savings, the creation of the CAD database for an oil platform, estimated to take two years by conventional means, was completed in three months with BAsIs. The 10 days of field work included did not require plant shut-down or hamper the production in any way. The fast data acquisition will also reduce the safety risks of surveying in hazardous areas.

Further down the line the elimination of sources of error in the basic drawings and the documentation from which maintenance and operations are planned and executed will lead to more savings. The largest long-range cost-cutting potential, however, is claimed to stem from the complete dimensional and quantitative accuracy and the consistency of the drawings when constructional replacements or additions are required.

Graphics software architecture

Data visualisation, analysis and presentation software vendor UNIRAS, has embarked on a major project with leading companies within the oil industry to develop standard graphics applications as part of an open software architecture for use by petroleum organisations throughout the world.

The primary objective of the working party is to develop a multi-vendor scientific graphics architecture specific to the needs of the petrochemical industry, to provide output graphics which has a consistent appearance, regardless of the hardware, system, application, output software or country of origin.

The project, spearheaded by British Petroleum, Chevron and Mobil, is commonly known as the Petroleum Industry Profile for Computer Graphics Metafile (CGM-*PIP). It aims to further define and standardise the format of CGM between both oil exploration and production companies and their hardware and software vendors.

Subsea controls ensure platform safety

Safety legislation, drafted in the wake of the Piper Alpha disaster, requires operators to ensure the rapid and efficient closure of supply pipelines in the event of an emergency.

Now, Shell UK Exploration & Production, FSSL and Fawcett Christie Hydraulics (FCH) Limited have combined their knowledge of subsea technology to provide a highly sophisticated facility on North Sea installations.

The Brent, North Cormorant and Cormorant oil fields and the Leman gas field will be among the first to benefit from the system which will give platform operators a subsea pipeline controlled shut-down facility.

For the installations, hydraulics engineers FCH were called upon to supply 33 54-litre and 12 37-litre subsea bladder accumulators. FSSL then built the accumulators into a system which provides operators with control over supply pipelines between the well head and the platform itself.

The accumulators were set up to provide sufficient energy for emergency testing drills, and in addition three 54-litre accumulators were also mounted on hydraulic power packs on the topside of each platform.

Developed for use in hostile undersea environments, FCH accumulators offered a solution which combined safety and reliability with a virtually maintenance-free working life.

Crack and fracture repair

METALOCK is a patented method for the repair of castings, in iron, steel and aluminium, which has been fractured or cracked. The repair consists of peening into prepared apertures, layers of Metalock Keys.

The keys, formed into a multi-dumbell shape from special highly ductile alloys, can be peened into a metal-to-metal condition and become almost integral with the parent metal of the component under repair. Metalock Keys are manufactured in a variety of sizes, their selection, after a survey of the damage, depending on the nature and depth of fracture, size of component and stresses involved. Their high tensile strength ensures the return of a large percentage of the original lost strength of the equipment.

Some of the claimed advantages of the process are that it dampens and absorbs compression stresses, provides a good 'expansion joint' for such castings as cylinder liners, diesel heads, or any vessel subject to thermal stresses, distributes the tension load away from fatigue points and maintains relieved conditions of inherent internal stresses where rupture occurred.

Alignment of original surfaces can usually be maintained without matching, since lack of heat produces no distortion. The vast majority of repairs can be done in-situ, with consequent saving in time with little or no dismantling.

Gas detector

GMI announce the release of the Oxygas 2 gas detector, designed and manufactured at their plant in Renfrew. The unit has been designed in co-operation with customers to be used in the purging of gas from pipelines, in manned entry and other safety-critical situations.

The instrument has three measuring ranges — 0 to 100 percent Volume Methane (in air or nitrogen or a combination of both gases), 0 to 100 percent L.E.L. (Lower Explosive Limit), and 0 to 25 percent oxygen.

A typical application would be in the repair of gas distribution systems. In these situations, the pipe is closed at both ends and a nitrogen based mixture is introduced to exhaust the combustible gas. Work can then be safely carried out on the pipe. It is thus crucial that the levels of combustible gas and oxygen are checked to ensure that the nitrogen compound has exhausted the gas, and that no potentially flammable air mixture has been introduced in the process. The GMI Oxygas 2 allows the user to check both levels with a certified intrinsically safe intrument.

The Oxygas 2 can operate in two modes — purge mode and measure mode.

In purging applications, the purge mode allows the user to switch between the volume gas and oxygen ranges ensuring that no erroneous L.E.L. readings are allowed when oxygen levels may be low.

Vegetable-based marine lubricant

Sally Line will be the first UK shipping company to use a new vegetable oil-based lubricant which has been developed by Mobil as part of the company's overall strategy of using environmentally friendly products.

The contract represents the first time that this oil has been used in the United Kingdom and a complete first for a marine application.

The oil, Mobil EAL 224H (Environmentally Aware Lubricant), is derived from rape seed. Because of its biodegradability it is particularly suitable for use on or near rivers and the sea but can also be used in agriculture, forestry and sewage treatment.

Mobil EAL is more than 95 percent biodegradable, taking around 30 days to degrade, about half the time of mineral oils. Its additive pack has been carefully formulated to have a low toxicity, making it less harmful to fish in the event of a leakage or accidental spillage.

Sally Line will use Mobil EAL 224H as a hydraulic fluid in the steering gears of the freight ferry, *mv Sally Sun*, which operates from Ramsgate to Dunkirk and Ostend. Mobil is investigating possible applications of the oil to stabilisers, deck equipment and bow and cargo doors. 'I am sure that environmentally aware lubricants have a major role to play in the future and before long we will see a significant increase in their use' said Nick Barrett, Marine Sales Engineer.

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FCH Ltd.	0224 535515

. . . people

Mobil has reorganised its marketing responsibilities with the following appointments: **Mr M Churn** has been appointed Director, Fuels Marketing for Mobil Oil Company Limited and will add aviation and commercial fuels marketing to his existing retail marketing portfolio; **Mr G Ellis** has been appointed General Manager, Lubricants and Special Products Marketing. **Mr J Banfield**, previously Director, Lubes and Commercial Marketing with responsibility for aviation and commercial fuels and for lubricant sales has been appointed General Manager, Mobil Oil BV based in Rotterdam.

Mobil have also elected **Mr R Dodd** to the Board of Mobil Oil Company Limited as Director, Personnel. He will have responsibility for the company's Employee Relations, Public Affairs and Medical Departments as well as Mobil's General Services Department.

Integrated Drilling Services Limited has announced three appointments to its Aberdeen management team — **Mr Jean Buytaert, Mr Paul Petrey** and **Mr John Mullenger** join the company as Executive Directors. With Managing Director, **Mr Roland Wessel,** they assume responsibility for supervising day to day activities, drilling services operations and equipment development and testing. From left to right: Roland Wessel, Paul Petrey, John Mullenger and Jean Buytaert.

Mr Patrick Weatherilt has been appointed to the new post of Head of Environment for British Gas. This post has been established to assist in ensuring that British Gas's environmental policies and practices are at least equal to those of the best companies. Mr Weatherilt will report to **Mr Mike Arnold,** the Group Director of Safety and Environment in Corporate Services, and will be the focal point for environmental policy for the company worldwide.

The American Society for Testing and Materials has appointed **Mr James Thomas** as President of the Society. Mr Thomas has spent his entire career at ASTM, where he has served in various positions. In 1983 he was promoted to vice-president of Standards Development and he received his current title of Executive Vice President in 1987.

Mr Tony Reid, above, has been appointed Director and General Manager, business development, for Conoco (UK) Limited. Mr Reid moves to London from The Netherlands where he was President and Managing Director of Continental Netherlands Oil Company. He replaces **Mr Ian Gray** who has transferred to Dubai and been appointed President of the Dubai Petroleum Company.

Professor Roy Halliwell has been appointed Director of the Institute of Offshore Engineering at Heriot-Watt University, succeeding **Professor Cliff Johnston** who becomes Director of the restructured Institute of Offshore Engineering Group.

The Chairman of Lloyd's Register **Sir Roderick McLeod** will retire in June 1993. His replacement will be **Mr Patrick O'Ferrall** OBE who joined Lloyd's Register as Deputy Chairman in January 1991.

Mr Alan Stokes, below, former Head of Structures and Marine Technology with BP Exploration, London has joined MTD Ltd. He will head MTD's new Aberdeen office and concentrate initially on developing MTD's joint industry projects.

Mr Terry Coleman has been promoted to the new position of Service Director by Wilcomatic Ltd. Mr Coleman joined the company in 1971 as a service engineer and rose to become Northern Regional Service Manager based in Warrington.

Fina plc have appointed a new Retail Manager. **Mr Brian Handley**, below, takes over from **Mr Guy-Loup Motte** who is moving to Brussels to head Fina's European retail marketing operation. Before his appointment as UK Retail Manager, Mr Handley held the position of Commercial Manager responsible for Fina's non-network business including distributor, industrial, marine, aviation and bitumen operations.

The Lubricants Division of Total Oil Great Britain Limited has appointed **Mr Andy Knox**, above, as Marketing Services Coordinator, based at the Division's offices in West Yorkshire. Mr Knox has a wide range of lubricants experience built up in the UK oil industry, working in research and development, refining, customer services and marketing.

Mr Warwick Waugh has been appointed a Director of Foster Wheeler Energy Limited. His main responsibility will continue to be the company's Pacific Rim operations, where he has been closely involved since 1980.

Mr Andrew Chambers has joined Intercat Europe bv as Senior Technical Service Engineer. Before joining Intercat, Mr Chambers was a Process Engineer for Elf Oil Limited at Milford Haven.

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