<section-header> Image: Dependence of the second depende

New Zealand Shortage of gas imminent

North Sea Contracts – choice of formats Abandonment – set to become big business CRINE – what progress?

Exploration Survey of exploration hotspots worldwide

4



GOVERNMENT OF INDIA

EIGHTH ROUND OF BIDDING Invitation to Bid for Exploration for Oil & Natural Gas

As part of the continuous round-the-year bidding scheme for exploration acreages, the Government of India announces the Eighth Round of Bidding for exploration in India. Companies are invited to bid for the exploration blocks on offer. A total of 34 blocks are on offer, with 19 of them being onshore and 15 offshore. Companies may bid for one or more block, singly or in association with other companies.

CONTRACT FEATURES

Production-sharing contracts would be entered into by the Government of India and Oil and Natural Gas Corporation Limited or Oil India Limited with successful companies, with a number of attractive features, the more prominent of which are as follows:

- □ The possibility of a seismic option in the first phase of the exploration period
- □ No minimum expenditure commitment during the exploration period
- □ No signature or production bonus
- Progressive fiscal regime with sharing of profit oil/profit gas being tied to the post-tax profitability of the venture for the companies
- □ No ring fencing of blocks for corporate tax purposes
- □ Provisions for encouraging the production and marketing of gas □ Purchase of company's share of oil at international market price
- D Provision for assignment
- □ Provision for international arbitration

BID ITEMS

- Companies would be required to bid for:
- □ Profit oil and profit gas shares expected by the contractor at various levels of rate of return or multiples of investment recovered
- Percentage of annual production expected to be allocated towards cost recovery
 Total length of exploration period, number of phases in exploration period and minimum work commitment in each of the phases

INFORMATION AVAILABILITY

A brochure giving details of the blocks offered, their geographical location on a map of India and the contract terms will be made available free of cost to companies. To enable companies to assess the geological prospects of the blocks on offer, information dockets and data packages are available on sale. Separate information dockets on each basin are available, containing information on regional and local geology and the current status of exploratory activities in the blocks in each basin. The data packages contain seismic sections, gravity and magnetic anomaly maps, wireline logs and structure contour maps etc. and have been prepared for most of the blocks.

CATCHERS

EVE

Companies interested in inspection and purchase of information dockets and data packages and in obtaining further details regarding the offer may contact:

Mr. R.N. Desai Head, EXCOM Group Oil and Natural Gas Corporation Limited Upper Ground Floor, GAIL Building, 16 Bhikaiji Cama Place, New Delhi-110066, INDIA

Telephone: 602703, 602351 Telex: 031-65184, 031-66262 Facsimile: 6882798, 3316413 Bids should be submitted in sealed envelopes

superscribed "Confidential" "Eighth Round of Bids (1994)" not later than 1500 hours IST on 30th December, 1994, to: Joint Secretary (Exploration), Ministry of Petroleum & Natural Gas, 2nd Floor, Shastri Bhavan, Dr. Rajendra Prasad Marg, New Delhi-110001, INDIA

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EDITORIAL

Editor: Carol Reader Deputy Editor: Susannah Cardy Production Editor: Emma Parsons 61 New Cavendish Street, London W1M 8AR Telephone: (071) 467 7100 Fax: (071) 255 1472

ADVERTISING

Advertisement Director: Colin Pegley Advertisement Manager: Jim Slater Jackson Rudd & Associates Ltd., 2 Luke Street, London EC2A 4NT. Telephone: (071) 613 0717 Fax: (071) 613 1108

APPOINTMENTS AND RECRUITMENT

Advertisement Manager: John Pughe 2 Luke Street, London EC2A 4NT Telephone: (0689) 872500

PUBLISHERS

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Director General: Ian Ward

61 New Cavendish Street, London W1M 8AR Telephone: (071) 467 7100 Fax: (071) 255 1472



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COVER PHOTO Methanex gas to gasoline plant in New Zealand

NEWS IN BRIEF

26 July

25 applications, involving 44 companies, were received in the UK's 15th round of offshore licensing. The applications covered just 34 of the 81 blocks on offer in the Southern Basin and Central North Sea areas.

The South African mining group, Gencor, has acquired the majority of Shell's Billiton mining and metal assets for \$1.2bn. The deal grants Gencor operation and exploration rights in 15 countries.

27 July

Stirling Resources of Australia has finally purchased a 16 percent interest in the Camar oil and gas field, offshore Indonesia. The acquisition followed lengthy negotiations after an earlier attempt to buy a stake was preempted by one of the joint venture parties (see Petroleum Review, August issue).

Saga Petroleum has agreed to acquire a 25 percent stake in the Libyan Marbuk oilfield from Total.

29 July

Denmark has significantly eased the offshore licensing terms for its fourth round. Abolition of royalty payments and curbs over the power of state oil company, Dansk Olie og Naturgas, are amongst the changes.

31 July

Investigations are underway after a major gas leak took place on Statoil's Gullfaks A platform with 324 people on board. Statoil has said it is very concerned that it took 50 minutes to shut down the main gas export pipeline linking Gullfaks C to the A platform.

Kuwaiti oil minister, Abdel Mohsen Midaj, has abandoned plans to open his country's oil sector up to international competition.

1 August

SABIC has established a marketing affiliate in India in order to 'forge more direct and closer links with customers'.

Fortune Oil has entered into a conditional agreement to finance the construction of a residual fluid catalytic cracker at a refinery in Maoming, China.

BP has topped the UK energy rankings once again, according to Wood Mackenzie, with 14 percent of the value of Britain's total oil and gas assets. British Gas took second place, followed by Shell.

Gas and oil exploration in the US has dropped by over 20 percent from last year, according to the American Petroleum Institute.

British Gas has taken over operatorship of the Hood block in Yemen following the withdrawal of Lasmo.

1 August

Massive capital reductions, amounting to £250m, have been sliced from the estimated development costs of Britannia, according to Chevron.

3 August

Shell and BP have awarded a pre-sanction contract to a consortium of McDermott International and Golar-Nor Offshore for first-phase development of the Foinaven oilfield, West of Shetland.

Engen has formed the South

African Petroleum Industry Association (SAPIA) with the five largest foreign oil companies operating in the country. The Association has been set up to promote their common interests.

5 August

Gazprom has appointed Kleinwort Benson as adviser for the sale of nine percent of its shares. The move indicates that Russia is serious about selling a stake in the gas company to international investors.

8 August

329 blocks were nominated by nearly 30 companies in the UK's 16th round of offshore licensing. The most popular area by far was West of Shetlands.

Dutch contractor Heerema

Havenbedrijf BV has clinched the engineering, procurement, fabrication and installation work for the southern North Sea Schooner field. The contract, awarded by Shell and Esso, is worth approximately £35m.

Chevron has signed a three-anda-half year agreement with the Kuwait Oil Company to provide technical assistance in the development and transportation of crude oil from Kuwait's Burgan field.

9 August

Apollo Shipping Maritime of Panama has conceded that its bulk carrier *Apollo Sea* was probably responsible for last June's mystery oil spill off South Africa's Cape coast. The 131,250 dwt vessel went missing with a crew of 36 on board at the same time as the spill.

Three workers died and eight were injured in an explosion at the Singaporean shipyard, Sembawang Bethlehem.

A tough new 'polluter pays' régime for offshore bunker spills in UK waters will be in force by 1 October. The new legislation, signed by shipping minister Lord Goschen, sets no upper limit on compensation and applies regardless of fault.

BP has been given DTI approval for the development of the

£370m North Sea Andrew field and its satellite, Cyrus.

Ranger Oil has taken full control of the small UK exploration company, Union Jack Oil, for £16.5m.

10 August

China is planning a large-scale geological survey in the hope of boosting badly-needed reserves of oil, gas and other key minerals. 2m sq kms will be surveyed before the year 2000, according to the Ministry of Geology and Mineral Resources, followed by another 1m sq kms by the year 2010.

A significant oil and gas find has been made in blocks 30/9 and 30/12 of the Norwegian sector of the North Sea, south of the Oseberg field. Operator Norsk Hydro said it was optimistic about the discovery.

12 August

Lasmo has awarded an EPIC contract for the North Sea Markham compression module to Trafalgar House Engineering.

Shell has entered into exclusive negotiations with Texaco over acquiring its world-wide lubricants additives businesses. Aker and Norwegian Contractors have agreed to allow the insurers of the Sleipner A platform, which sank in the Gands Fjord three years ago, a further six months in which to decide whether to continue with their \$330m claim against the two companies. The fabricators believe there is no evidence against them but say further assessment can only strengthen their case.

Alaskan fishermen have been awarded nearly \$287m for damages caused by the *Exxon Valdez* disaster. However, the ruling amounted to less than a third of the compensation sought by the fishermen and actually resulted in the lifting of Exxon shares.

13 August

Socar has signed an exploration and development deal with the US company, BMB Oil, which covers two oilfields west of Baku. BMB will invest \$4m in the initial exploration phase.

15 August

A consortium consisting of British Gas, Tenneco Gas and BHP has been selected to develop a \$2bn, 2,000-mile natural gas pipeline from the Bolivian gas fields to the markets of southern and eastern Brazil. A feasibility study is due to be presented to Petrobras by June 1995.

16th August

Seaforth Maritime has won a £3.5m contract to provide logistics services to Total Oil Marine.

Exports of Russian crude outside the former Soviet Union are up 12 percent on last year, according to the State Statistics Committee.

17 August

HMIP has announced the serving of an Enforcement Notice under EPA90 on Shell UK's Shell Haven refinery at Stanford-le-Hope in Essex. The Notice requires the company to carry out a monitoring programme for NOx emissions.

Lasmo has confirmed a fourth new field discovery of 'potentially significant oil reserves ' in its Algerian venture.

Amerada Hess has announced a further oil discovery on block 21/16 of the Central Graben in the UK North Sea

DATES FOR YOUR DIARY IP THE INSTITUTE OF PETROLEUM

29 September 1994 5.30 pm for 6.00 pm – 7.30 pm

Alternative Energy

By David Lindley, Chairman, British Wind Energy Associates;

John Harford, Planning Manager of BP Solar Ltd;

Michael Grubb, Head of Energy &

Environmental Section, RIIA

Organised by Energy Economics Group and Information for Energy Group

IP Contact: Lyn Nevin

17 October 1994 5.00 pm for 5.30 pm – 7.00 pm

Coal Bed Methane – A New Opportunity

J Craig Creel, Executive Vice President, Cawley Gillespie & Associates Inc., will speak on:

'The Potential for Development'

Ian M Thomson, Director, Evergreen Resources UK Ltd., and Director of ANGI Ltd, will speak on:

'How the UK Situation Is Different'

Chaired by Malcolm Butler, Managing Director of Brabant Petroleum Ltd. and Chairman of UKOOG

Organised by Energy Economics Group IP Contact: Jenny Sandrock 14 September 1994 5.00 pm for 5.30 pm

Middle East exploration and production – can it meet future demands

By Dr Manouchehr Takin, Centre for Global Energy Studies, London

Organised by Exploration & Production Discussion Group

IP Contact: Sjoerd Schuyleman

12 October 1994 5.00 pm for 5.30 pm – 7.00 pm

The Liverpool Bay Development

By Mr Roger Pearson, Project Director, Hamilton Oil Company Ltd

Organised by the Exploration and Production Discussion Group

IP Contact: Sjoerd Schuyleman

'The future of the interruptible gas market', scheduled for 22 September has been postponed

All meetings are held at the Institute of Petroleum. Please tell the IP contact if you plan to attend any of these free meetings. Tel: (071) 467 7100 Fax: (071) 255 1472.

NEWSDESK

Yemen lacks funds for reconstruction

President Ali Abdullah Saleh has restored Yemeni unity, allowing the process of reconstruction to begin at last. But the troubled country now faces a new problem – lack of funds.

President Saleh has publicly offered an olive branch to the Aden-based Yemen Socialist Party (YSP) of the south, which is still regarded as the southern partner in government although its leader, the defeated Vice President Ali Salem al-Baidh, is now in exile in Oman and will not be forgiven for starting the rebellion. Since it was the split between the two, coupled with the rising power of Islamist forces in the north, that prompted the crisis, the emergence of a clear winner ought to mean that the country can now start to undertake long-overdue economic reforms. In practice this is unlikely. The reform package unveiled a year ago is likely to remain a dream.

This is because the government has no money and little control beyond the admittedly considerable power of its armed forces. The YSP may have been brought to heel but the country is still a largely tribal society and was poor before the discovery of oil a decade ago. In 1994, it is still largely paying the price for President Saleh's perceived tilt towards Baghdad during the Kuwait crisis which prompted the expulsion of some 840,000 Yemeni workers from Saudi Arabia and the Gulf and the loss of some \$600-800 million in expatriate remittances. The new oil revenues from the south do not yet cover lost remittance income.

Most of the war damage was done in Aden where the refinery was shelled, although some reconstruction work will also be required in the capital of Sanaa, which was hit during bombing raids by rebel planes belonging to the southern secessionist forces. The Aden refinery came back on stream before the end of July at a rate of 80,000 b/d, while further repairs were expected to raise capacity to 110,000 b/d as *Petroleum Review* went to press. Although southern forces also fought a sharp engagement at Mukalla, the port serving the new oilfields in the south, the oil installations themselves were not reported to have sustained significant damage, aside from theft of equipment.

Overall reconstruction costs range from a Yemeni private sector estimate of \$4 billion to President's Sahel's assertion that the country needs a \$7.5 billion reconstruction programme. (Ironically, oil production had hit a record level of 350,000 b/d on 7 July, the eve of the northern entry into Aden.)

Another problem still faced by Yemen is relations with Saudi Arabia, which provided financial and possibly logistical support for the secessionist forces. Saudi subventions to local tribes have brought much of the Hadhramaut into the Saudi economic orbit and therefore the region's stability cannot be assured, despite the north's unexpectedly thorough triumph. Yemeni-Saudi tensions will remain high and a fresh re-statement of Saudi claims to territory in which oil companies are now operating under concessions issued by Aden or Sanaa is to be expected.

The most significant news to emerge on the oil front since the war is that Nimr Petroleum now appears intent on focusing as least as much on its concession near the Omani border, close to Can-Oxy's major field at Masilah, as on Shabwa. For the time being at least it looks as if Block 4, once regarded as the likely centre of a major field and on which both Soviet developers and Nimr spent hundreds of millions of dollars in development, may now be abandoned after being shut in during the war.

Texaco requested to tone down ads

Texaco has been asked to modify its multi-million pound advertising campaign for new *CleanSystem*³ by an independent advertising watchdog in the United States.

The request follows a complaint from Chevron, which also urged the major American networks to review the Texaco commercials. Some ads have subsequently been withdrawn from network TV and changes have been made to others.

Chevron has accused Texaco of making 'sweeping superiority claims' in connection with the new fuel, by using such phrases as 'breakthrough in technology', 'highest performance' and 'improved mileage'.

'Our tests comparing our own gasolines to Texaco's quickly showed that many of their campaign's key claims weren't true,' said Mr Dave Smith, Vice President of Marketing for Chevron USA Products Co.

NAD, the advertising watchdog which made the request, has no powers to enforce its rulings but can refers cases on to the US Federal Trade Commission.

Shell has lodged a similar complaint against Texaco's advertising campaign in Britain but no ruling has been made as yet.

CAM Shipping under threat

The debt-ridden North Sea standby vessel company, CAM Shipping, is under threat after being placed in administration.

The company, which operates 19 vessels in the North Sea, has been in financial crisis ever since its Italian parent group, Tripcovich, entered formal insolvency in July.

CAM is now in the hands of Arthur Andersen, which plans to keep the company in operation.

As Petroleum Review went to press, the administrators were reviewing the group's position and holding discussions with vessel owners and other relevant parties. The aim is to sell the business as a going concern.

There is no indication as yet over the length of time it will take to find a buyer (if one is found at all) but industry sources suggest it could take well over a year and may even involve a Monopolies and Mergers Commission inquiry.

The crisis at CAM threatens the jobs of 350 crew members and another 40 administrative staff.

Nine of the firm's vessels are currently on operational duty in the North Sea.

Q8 stations to offer second-hand cars

Kuwait Petroleum (GB) claims to have become the first oil company to offer customers in the UK the chance to buy second-hand cars.

In what is believed to be a unique scheme, Q8 has joined forces with secondhand car dealer, Phoenix Group Holdings, in order to sell low-mileage vehicles (between 8,000 and 11,000 miles) to the public at trade prices.

The service, which will initially be available at 12 Q8 dealerships, will offer a range of off-the-shelf cars but will also allow customers to order a specific make of car, right down to the upholstery. 'Finding an exotic Texan jeep might be tricky but in most cases the company should be able to deliver the goods,' said a spokesman.

Cars will not be available on site and the deal does not involve any capital outlay on the part of the garages. Instead, customers will be offered brochures and will then deal direct with Phoenix.

The scheme, which earns the garages commission, could be extended to other dealer sites and selected company-owned sites if it is a success.

NEWSDESK

Gas regulator faces tough new opponent

Britain's beleagured gas regulator, Clare Spottiswoode, faces further clashes with the government following the appointment of one of her most outspoken critics to a key role in energy conservation.

Mr Robert Jones, who chaired the environment select committee at the time of Ms Spottiswoode's gruelling twohour hearing last May, has now given up his chairmanship and has taken on responsibility for energy conservation at the Department of the Environment. The Energy Savings Trust, which was the main source of controversy last May, will now be under the Conservative MP's direct remit.

Ms Spottiswoode was subjected to fierce questioning from several committee members on a range of issues, including her earlier allegations that the former gas regulator, Sir James McKinnon, had acted illegally in passing the cost of energy efficiency projects on to the gas consumer. Forced to withdraw the statement by the committee, she is still believed to be opposed to the £125 million scheme, which is designed to help insulate homes for the disabled and pensioners.

Mr Jones, on the other hand, is a strong supporter of the Energy Savings Trust and has said he is looking forward to an official meeting with Ms Spottiswoode to discuss the issue again.



New post for Robert Jones MP

New challenge for Ofgas chief Clare Spottiswoode

Repsol links up with Forte

Repsol is planning a network of service areas along the principal Spanish highways in an agreement with the British hotel chain, Forte.

The first Spanish 'Little Chef' has already been inaugurated on the Madrid-Seville superhighway and a further nine such restaurants are planned along the Repsol network of stations.

The agreement also paves the way for the inauguration of six 'Travelodge' hotels.

IP member honoured

Mr John Harvey, who served on the IP Council from 1978-87 and as Vice-Chairman of the British National Committee of the World Petroleum Congresses from 1978-84, has been appointed a CBE for political and public services.

European legislation threatens gas supply

Future environmental legislation could launch Europe into a gas supply crisis on a par with the oil scares of the 1970s, according to a new report.

Excessive rigidity in the curbing of either sulphur or CO_2 emissions would force Europe to use rapidly rising quantities of gas, says economic consultancy WEFA, which could result in an increase of up to 15 percent of current consumption by 2020.

This in turn would mean relying on increasingly remote regions of the Middle East, central Africa and the southern CIS states for gas at progressively higher prices.

The resurgency of Islamic Fundamentalism in Algeria is already causing supply problems for the major importing countries of Europe, warns the report. 'It is therefore vital to avoid compounding the problem.'

A huge hike in gas usage would also stretch the European gas infrastructure to its limits.

A further effect of austere legislation would be the closure of a number of smaller European refineries. This would be a mixed blessing, creating a greater dependency upon oil product imports but also paving the way for some of the larger refineries to start making more satisfactory returns. 'It is therefore likely that the larger oil companies will not oppose severe environmental measures,' says the report.

The WEFA study concludes that, unless the European Commission is careful in the development of future environmental legislation, it could jeopardise some of the other vital goals of energy policy.

No OPEC reaction to Nigerian crisis

The chaotic situation in Nigeria could send oil prices to a high of \$25 a barrel by the first quarter of 1995 unless other OPEC members respond by raising output.

According to forecasts by the Centre for Global Energy Studies (CGES), a prolonged strike could lead to an average OPEC basket price of \$19 by the fourth quarter of this year and \$21.5 per barrel by the first quarter of next, which would culminate in peaks of up to \$25.

So far the market appears to have decided that it can cope with a temporary shortfall in Nigerian output but a growing gap between supply and demand could leave stock cover dangerously low by the start of winter. 'Prices could rise sharply if the weather is colder than normal,' says the CGES.

Key members of OPEC appear to be delaying their response for as long as possible in order to maximise their profit gains. 'OPEC is not planning to meet until November and there have been no calls for an emergency meeting in response to the crisis,' says the Centre's latest oil report. 'Only Saudi Arabia, Kuwait, Venezuela and the United Arab Emirates have spare capacity to replace lost Nigerian output and none is likely to boost output without common consent.'

These countries are generally expected to expand production, however, if the Nigerian situation gets completely out of hand. A spokesman for the CGES predicted that an average OPEC basket price of \$19 would probably be enough to provoke a reaction.

Meanwhile, there is no indication of an early resolution to the crisis, which cut onshore production in Nigeria by more than 0.5m b/d in August.

Last month the military government 'sacked' the leadership of the country's two oil unions, Pengassan and Nupeng, along with the heads of the Nigeria Labour Congress – an action expected only to heighten the tension. All three organisations have now been placed under governmentappointed administrators.

The unions have been conducting a prodemocracy strike since mid-July.

CRINE gaining ground

By Neil Potter

CRINE – Cost Reduction Initiative in the New Era – was launched at a two-day conference in London last December. A report on progress so far will be given at a conference to be held in Aberdeen on 24 November. Meanwhile Neil Potter looks at what has so far been achieved.

> To the outsider, this year might seem a quiet one with little new to report, but it is when the really hard work will be done in getting everyone to sign up to the new concept.' That was how Jack Criswell, President of UKOOA and Managing Director of Amoco (UK) Exploration described the situation in June.

> This is a fair assessment. But then it was never intended that there would be anything spectacular to report. This was no instant panacea for the ills of the industry. Everyone connected with the initiative knew full well that it was going to necessitate a considerable amount of hard, behind-the-scenes work to really get it functioning.

> After all, a cultural change – a totally new way of doing things – was required in an industry which has over the years not exactly been noted for working closely together.

'CRINE is a blueprint for change on a scale and a

'One of the biggest hurdles to be overcome is not in getting acceptance of the ideals at senior level' for change on a scale and a depth that the oil and gas industry has never experienced before – and may never again,' said Mr Criswell.

In April Vic Tuft was seconded for one year from Enterprise Oil, where he was Corporate Engineering Manager, to be Director of the CRINE Secretariat. He says, 'We must work at the relationships between operators, contractors and suppliers which, in the past, have been dominated by suspicion

and mistrust.We must exit what I call the cycle of revenge and recognise we all need each other and must be prepared to let each other make reasonable returns on our endeavours.

'It will mean changes in attitude and the breaking down of what I call our "industrial class society." Some of us will have to change attitudes and practices which we have followed for most of our working lives and, as we know, old habits die hard – but die they must.'

Acceptance hurdle

One of the biggest hurdles to be overcome is not, as might have been suspected, in getting acceptance of the ideals at senior level. The majority, fully aware of the problems facing the industry, have welcomed them. As Mr Tuft puts it, 'Senior managements can see the economic drivers. The key question which needs to be addressed is how do CEOs ensure that these objectives are not only fully understood but vigorously and objectively pursued within their companies.'

Certainly it has not been a quiet year for him. His offices are on the floor below those of UKOOA, which, in a way, is appropriate. For CRINE has a budget underwritten by UKOOA but already has pledges of further contributions from industry. Every member of the various committees and working groups gives his time voluntarily, with the backing of his company.

But it is essential that CRINE does not seem too closely associated with UKOOA alone. Its success depends on it being an essential part of fabricators, designers, sellers – an integrated part of the whole of the offshore industry.

Aims and objectives

It is worth recalling that the CRINE targets are a 30 percent reduction in capital costs and a 50 percent reduction in operating costs. These objectives are to be achieved in three years.

A great deal of the new Director's time, when he is not persuading people to join working groups and committees or organising the conference and news letter, is devoted to explaining to groups and organisations both the short-term and the long-term objectives.

'This cost reduction', he tells them, 'will, without prejudicing safety or protection of the environment in any way, continue to maximise the remaining recoverable reserves, and improve the construction industry's competitiveness in the international arena.'

There are three main elements to the overall programme:

- Discuss/share/publicise and educate everyone on the advantages of individual cost reduction initiatives such as partnering/alliancing and the numerous non-adversarial approaches presently being adopted as a result of the cultural changes which is beginning to sweep through the industry and needs constant reinforcement.
- 2. The preparation and adoption of simple functional specifications for key items of equipment as well as a rationalised/simplified and harmonised set of common recommended working practices across the total range of activities used in the business, ranging from engineering through to general business practices, all of which will be consistent with international standards and open competition regulations.

The purpose of this will be to enable future fields to be developed with safe, simple fit-for-purpose facilities and with the added benefit of demonstrating a unified approach to the construction industry. It is the present lack of such a unified approach which the construction industry claims adds significantly to present-day costs.

This approach will also encourage innovation in the

many varied ways of identifying basic field development plans by removing most of the expensive cost drivers during the implementation phase.

 A continuing education/training programme to consolidate the growing cultural change in the industry and to sustain the growth at the maximum level possible.

He adds, 'Whilst the adoption of any or all of the three main thrusts will always be an individual company decision, it is essential that we all make resources available and take part in the preparation of the necessary tools to enable the benefits of the full CRINE Vision to be realised. If not, then we will not achieve the desired results.'

He is quick to attack those who have been claiming that the results will simply be to cut back on jobs. 'It is', he points out, 'safeguarding and creating jobs that otherwise would not be there.'

CRINE's achievements

A. Organisation

'We have dramatically streamlined the organisation to give it the necessary drive and direction. Whilst we still have a 20-member, industry-wide steering committee, we have formed a much smaller Executive Committee whose 10 members represent all interests and are led by BP's Mike Curtis', says Mr Criswell.

'Secondly, the industry groups have been reduced and re-aligned so that they more fully represent all the interested parties, including operators, vendors, design contractors and fabricators.

'Much of the work of CRINE will be taken on by existing groups within UKOOA itself in conjunction with design contractors and suppliers' representatives because that is where the expertise lies. Where gaps exist, then the secretariat will ensure that these are filled by new work groups.'

B. Action

Eight main committees are now functioning:

- 1. Engineering and Design
- 2. Documentation
- 3. Quality Management
- 4. Subsea Engineering
- 5. Certification & Regulations
- 6. Contractual and Commercial
- 7. Cultural change
- 8. CAD/CAM/IT

The Engineering and Design Committee is looking at design, materials and construction. 'The most fundamental changes will come with the standardisation of equipment The work group has identified 25 separate packages of equipment suitable for standardisation,' says Mr Criswell.'Functional specifications are linked to this work. It is here that we expect to see most of the benefits of change. In this area alone we could achieve a significant portion of the projected savings.'

New specifications

The first specification to be produced by the committee is for the procurement of gas turbine driven main power generation for offshore facilities. This may well be adopted by an operator for a major current project. The essence of CRINE's acceptance in the industry is, perhaps, indicated by the input from an eight-man working group made up of representatives from BP, Shell, Brown & Root, EGT, Texaco and British Gas.

The philosophy of the functional specification is stated. 'The intent is to present the purchaser's requirements in such a way that the supplier can offer his standard package. Also this standard package can be evaluated in a straightforward manner and that both parties are satisfied that the package offered is fit for duty. For this to result in effective cost-reduction demands that all parties to the bargain, including the engineer, understand and accept their obligations.

'The purchaser has to make clear his operating and maintenance philosophy and also his development strategy in so far as it affects the package in question. The engineer has to ensure that the purchaser's requirements are succinctly encapsulated in the data sheets and drawings. The purchaser and the engineer should jointly analyse the criticality of the package, assessing factors such as safety, production, maintainability and life-cycle costs before including "must haves" in the fundamental specification.

'The supplier, in offering his standard package, must recognise that the purchaser is looking for significant improvement in cost and delivery. The supplier must understand also that the freedom this may give him can only be sustained if the design, quality and safety of the package acceptability meets international standards and national legislative requirements.'

It is pointed out that when evaluating the tender the purchaser will be looking not just at the bottom line package capital expenditure but the on-costs relating to design, installation and commissioning capex; operation, maintenance, spare parts and vendor service; opex and replacement and/or decommissioning costs.

A second functional specification has been issued for power transformers. Here the input was from British Gas, AMEC, Texaco and Bush Power Transformers.

Four more specifications are underway. These are for pedestal cranes, emergency power, fire water pumps and compressors.

Mr Tuft explains that the object is to get feedback information from all concerned so that, in 12 months time, the comments will be considered and definitive specifications issued.

Successful start

'I am very encouraged with what we have achieved so far,' he says. 'We have, for the first time, got the construction industry, design houses, engineers and trade bodies to work together to come up with a set of common practices. The response has been tremendous.

'Design houses and the yards are coming up with sets of standards for materials and construction which we will put to the oil companies for their response and comment.

'We are not trying to re-write the rule book or develop new standards. We are certainly not aiming to create "CRINE standards". We are trying to come up with common working practices which use national and international standards.'

But there is a danger. 'We must be very careful', he points out 'that we don't throw out all the good, hardearned experience gained over the years with the bad. We must ensure that we don't kill off innovative design.'

The majority of operators have taken on-board the

CRINE principles; indeed BP, Shell, Amerada Hess, Enterprise, Kerr-McGee, Chevron, Amoco, to name but a few, had all embarked on projects employing some CRINE principles and philosophy even before the initiative was first proposed in June 1992.

Cutting back on the mass of paper which used to be generated is one of the simplest methods of achieving

'The response has

been tremendous'

cost-savings. Lloyd's Register Offshore Division, which has certified over 80 percent of the fixed platforms in the UK North Sea, has had input. Deputy general manager of the division Walter Winkworth said, 'We consider there are several areas where we can work with

operators and contractors to reduce costs. However, the fees charged by the CAs are limited by law and are normally around 0.2 percent of total installed costs, dependent on the size of the project. Thus there is little opportunity for significant impact on the CRINE reduction target via the CAs fees.

'But we do believe there are associated costs where the industry permits unnecessary expenditure in seeking to meet certification requirements.'

He cited documentation, material traceability and equipment supply. 'We need to have very little of the documentation that is generated - rather we need to know that it exists and where it is archived'.

Lloyd's Register is putting the CRINE approach into practice, requiring only one copy of drawings for certification on current projects such as BP's Andrew and Conoco's Jupiter developments.

Another pointer to the way ahead is indicated by Phillips. It says that, working with Kvaerner, Humphreys & Glasgow and fabricators AMEC, the specific objective for the Judy integrated deck was to produce 'a fabrication-friendly' design.

'Nowadays, with CRINE very much the industry watchword and oil and gas prices so low, we have worked together to put some of the initiative into practice,' says Dave Blenkinsop, Phillips' site manager at AMEC's yard on Tyneside.

The 25-strong Phillips site management team is organised to 'overlap' with the contractors' people rather than duplicate jobs on a one-to-one basis. 'AMEC is an experienced contractor and we let them get on with the job without unnecessary interference. They also give us a very good input on any problems we might have, based on different ways they've seen other companies do things. Just because we've always done it one particular way doesn't mean that's the optimum solution,' says Mr Blenkinsop.

As Mr Tuft, highlighting past mistakes, tells his audiences, 'The client must accept his share of the blame for his part in the way the UKCS developed. We insisted on telling contractors and suppliers how to do it and frankly we did not do it very well.

'It is against this background that CRINE has to compete and succeed. We must work at the relationships between operators, contractors and suppliers which, in the past, have been dominated by suspicion and mistrust.

IP W THE INSTITUTE OF PETROLEUM

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This Code of Practice has been prepared by the United Kingdom Petroleum Industry Association in consultation with LACOTS (local authorities coordinating body on food and trading standards), and published by the Institute of Petroleum to provide a safe and practical operating framework under which driver controlled deliveries (DCD) can be carried out and guidance to persons concerned with driver controlled delivery operations. Driver controlled deliveries are permitted under 'The Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations 1992'. (Schedule 4).

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ISBN-0-85293-141-7 £16.00 (Overseas £18). 25% discount is given to IP Members. This code can be obtained from The Library, Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR. Telephone 071-467 7100

Decision making and mature fields

Gary Howorth of the Arthur Andersen Petroleum Services Group discusses economic options and attitudes in relation to the approaching end of production of a number of North Sea fields in an interview with *Petroleum Review*.

Geoffrey Mayhew: Are decisions of this kind a constant activity?

Gary Howorth: We are noticing that North Sea production companies are beginning to think more about the options available to them for their 'mature' oil and gas fields in the North Sea. Such consideration is by no means premature or a waste of time. There are some 60 fields in the UK sector which are within a decade of their end of production. So decisions on the economic options that may be available to the owners are becoming increasingly more important.

Can you give a breakdown?

We estimate there are nine fields with three years life to run; four to five with five years left; and about 30 with 10 years more production. It is also the case that more than half of the UK fields presently in production have used up more than 50 percent of their recoverable reserves.

Is the range of economic options wide?

Potentially yes. There are probably broadly 10 options or strategies that operators can follow. However, some of these are mutually exclusive in that choice of some options will preclude the development of other options. For example, aggressive cost cutting is unlikely to be a sensible option if the

field has numerous investment opportunities. But we have found from work performed on mature assets that the further away the field is to abandonment the more economic options are open to it. The timing of these strategies or options is therefore important.

What is the essential object of such options?

Primarily, to increase value (or NPV). However, producing companies have generally concentrated on cost cutting and delaying abandonment.

Can you categorise the options?

We can look on them broadly as aggressive, defensive or neutral options or strategies, although the neutral option, 'do nothing', is not considered acceptable in today's business environment. However, in a situation where there is great uncertainty it may be wise to wait for more information before making a decision. This 'holding option', when made proactively is perfectly acceptable.

Defensive options generally consist of techniques such as cost cutting and divestments. Aggressive options include investing more heavily in a field possibly to buy more of the field from other participants.

Historically, defensive and neutral options have been used more commonly than aggressive options.

Considering the end of a field's life cannot be an attractive proposition?

If you go back 20 years, the emphasis on the development of the North Sea was to find oil and gas and get production up as soon as possible. That has continued to the benefit of the companies and the UK. Generally,

companies have only recently started to address their mature assets and decline. With oil personnel having a strong cultural background based mainly on growth (production and development) it may be difficult for some to adjust to a mature regime.

Historically, not a great amount of thought has been given to decision making as fields move to their maturity, nor to the many economic factors which begin to arise at that time. This has simply been because the moment seemed so far away. Now we have a situation where a number of fields are reaching the end of life and people are having to look at the options that may be available to them.

As our work has indicated, the decision relating to some of the options available should be taken many years before the end of field life – possibly as many as 10 years.





Are people reluctant to make early decisions or plans about the end of production?

One of the problems is cultural. Certainly, there has been more kudos associated with new developments than mature ones. Growth is seen as more positive than decline and the companies' internal reward systems have also been geared in this way. Yet dealing with the prospect of abandonment can be positive and exciting as well as economically useful if adequate and timely thought is given to it. It can be much more challenging managing an asset in decline than a new development project. Decisions taken now on a mature asset are likely to affect the business in the short term, whereas on a development project it is likely to affect it in the long term. The possibility of interesting innovations will also arise as the field matures. Each case will be unique and require the most careful analysis.



Are there examples to show how to cope with the end of an offshore field?

Not many. Although at the present time some 140 fields are being built or planned for production in the UK sector, it is now the case that many fields are going through their life-cycle quickly.

Oil production began in 1974 and now we are not far way from the first large abandonment. Norway started at the same time but the time-scale for maturity there is not comparable. Norway does not have our problems at present. Perhaps we could possibly learn some lessons from other industries, in which the difficulties of dealing with change as the asset declines has often been faced, as there is nothing extraordinary about the end of an asset's life.

But comparisons may not be practical because you cannot, as with a shop or factory onshore, easily make the site available for a completely different purpose. Offshore platforms have their own specific problems. At the end of the day a production platform cannot easily be closed down whereas with a normal onshore business the machines can be removed and used elsewhere.

Can you give some examples of options?

As I said earlier there are, in our opinion, 10 generic options but there may be a myriad of sub-options derived from these. Some of the widely used options are:-

- cost cutting
- divestment
- acquisitions
- enhanced oil recovery (EOR)

In this context some companies may feel they could get better financial results from using their own infrastructure or may be able to better utilise new technology. They would therefore be interested in acquiring interests in fields to take advantage of these synergies. It is also likely that new players, for example Japanese companies, may enter the arena. Although companies have tended to concentrate on the cost side of the equation, EOR technology could potentially boost profits dramatically. At the moment, these techniques are somewhat marginal.

Could an option include the replacement of a mature platform with a new unmanned platform?

Generally, the main elements of the cost of operation is established by the design of the production system. Radically changing the production system design could reduce costs dramatically e.g. remove platforms and use subsea templates. To achieve this economically, however, we have found that this decision must be made many years before abandonment.

At the end of the day, are there innovative economic solutions given, for example, that a platform can accommodate 100 people and withstand a harsh environment?

In theory, without the weight on top, a platform might well be able to accommodate more people. Indeed, some suggestions have been made that they could become prisons - but I doubt the economic

viability and the social acceptability of that.

One other more innovative scheme that has been given consideration is the use of a platform for geothermal recovery. Steam raised deep down in the field would be used to generate electricity.

In relation to the decline and eventual end of fields the call is for a greater economic and management judgement. Some managers will get it wrong, some right but the decisions have to be faced. In the past, with relatively high oil prices and an oilfield with, say, 400 million barrels, the problem of maturity was not a pressing one. When 3 million barrels are left and the profits are small, the margin for error is dramatically reduced. That is why mature assets are difficult to manage and why decisions on the strategic value of the asset are becoming more important.

The issue is a commercial one. I think a declining industry is not an environment that the oil companies feel comfortable with yet. But if that attitude can be turned round then, from a management point of view, the situation will become more demanding and exciting for the operator than ever before. Unfortunately, financial returns are not likely to be as great as those seen in the more profitable years.

New Zealand faces gas shortage

By William A Scholes

"Wanted: explorers to search for natural gas in New Zealand." As reserves from the Maui field continue to deplete and with only one other offshore field awaiting development, New Zealand is under increasing pressure to discover new sources of natural gas. The government must now woo the international community or face a shortage in the very near future.

> Methanex New Zealand Ltd, wholly-owned subsidiary of Canadian-based Methanex Corp., the world's largest methanol company, wants to talk to explorers who will search for natural gas in New Zealand. With the Maui field depleting and only the Kupe offshore gas field still awaiting development, the country is threatened with a gas shortage by early next century (see *table 1* and *figure 1*).

> The company has already prepared a comprehensive package detailing prospects for gas explorers who might comtemplate trying their luck in New Zealand. At the same time, the government is planning to introduce an enhanced and internationally-competitive fiscal package, followed by new licensing opportunities, both on- and offshore.

> Despite the fact that there is a clear over-supply of gas in the short term, the approaching shortfall is also resulting in unserved demand today. New gas-fired, combined-cycle generating capacity would have been built by now if sufficient long-term gas supplies were assured. Therefore, in order to allow unconstrained gas use and market growth, additional reserves must be found and developed within the next several years.

> Methanex has a strong vested interest in encouraging exploration. Its base load feedstock requirements are 85 bcf of gas per annum. It owns and operates two petrochemical plants in the Taranaki province of New Zealand on the west coast of the North Island. Taranaki is the country's major energy province. At Motonui, Methanex operates the world's first gas-to-gasoline plant.

> Gas from three fields - Maui, offshore Taranaki, and onshore Kapuni and McKee - is piped to the 80 hectare Motonui plant. Its giant twin methanol units, the world's largest, convert the gas into crude methanol at a rate of 5000 tonnes per day.

Methanol exported

The state-of-the-art plant also has the facility to produce methanol for the export market. Up to 25 percent of the crude methanol made at the gas-to-gasoline plant can be piped to its sister plant, located 3 km away in the Waitara Valley, for distillation. Using this swing capacity, an additional 450,000 tonnes of chemical grade methanol can be supplied to the world market each year. Whereas the bulk of the company's synthetic gasoline production is for the local market, almost all its methanol is exported.

Starting up in 1983, the Methanex methanol plant in the Waitara Valley converts natural gas from the Maui and Kapuni fields to methanol. It has a production capacity of 520,000 tonnes of chemical grade methanol a year.

A \$NZ90 million addition to the Methanex gas-togasoline plant in North Taranaki is now under construction. Managing Director John Linton has confirmed that the project to build an additional methanol distillation unit will be on stream in January 1995.

The company's Waitara Valley plant has two distillation units and manufactures high quality chemical grade methanol, predominantly for the export market. Although its gas-to-gasoline plant at Motunui has the largest methanol making units in the world, it has no capacity at present to distill methanol.

However, Methanex stresses that the methanol to gasoline plant at Motunui will continue to operate and between 50 to 100 percent of the crude methanol made on site will be converted to petrol.

The extra distillation unit will provide a greater flexibility between products so that Methanex is better equipped to meet market demand, whether for chemical grade methanol or unleaded petrol.

Table 1 shows current producing gas fields, revealing New Zealand's dependency on Maui. As deliverability from this field declines, a supply shortfall will occur.

Gas Field	Production		
Kapuni	21 bcf		
McKee	5 bcf		
Waihapa/Ngaere	6 bcf		
Maui	153-178 bcf		
Total	185-210 bcf		

Figure 1 shows the expected deliverability of known New Zealand gas fields and the growth in gas demand that would occur if there were no supply constraints. In reality, if no further reserves are found, demand will fall rather than rise because, as gas became more valuable, ECNZ will switch to coal and other fuel alternatives. This will prolong supplies to the premium users, like the retail sector.





The additional unit will also provide more work outside the Motunui plant. A distilled methanol pipeline will be built between the Motunui and Waitara Valley plants, extra methanol storage tanks will be needed at the Omata Tank Farm and there will be an increase in the supply of methanol flowing through Port Taranaki, which will require additional methanol carriers.

The projected completion date is December 1994, with the plant coming on stream January 1995.

To accommodate the additional methanol from DIII, two 25,000 tonne storage tanks are being built at the Omata Tank Farm in New Plymouth. This doubles storage capacity. Two chemical methanol storage tanks are already in place at Port Taranaki. Earth moving for the new tanks is underway and and the projected completion date is December 1994.

Knowing that the major source of gas to its petrochemical plants in Taranaki had a finite life did not stop Methanex from investing in New Zealand. Instead the company regarded it as a challenge to encourage new gas exploration to replace Maui.

Intense competition

It is already talking to prospective explorers about its future gas requirements and what it has to offer them and claims it is only too aware that international competition for the exploration dollar is intense and that petrochemical gas users need to be flexible.

The company also recognises that new large gasfield developments will require a spread of offtake profiles

Table 2

	Annual Load	Load Factor (%)
Methanol, gasoline	85bcf	96
Electricity generation	55-70 bcf	41
Retail gas market	40 bcf	67
Ammonia-urea	5 bcf	90
Total	185-210 bcf	

Figure 2

ranging from large constant-demand base loaders to premium rate retail customers.

The package Methanex is issuing for potential explorers has been produced with the co-operation of two other major gas players, Electricity the Corporation of New Zealand (ECNZ) and Natural Gas Corporation Holdings (NGC). Put together by Arthur D Little, it outlines what the three companies need and forecasts gas market conditions.

The early development of the Kapuni and Maui fields was with the direct participation of the New Zealand Government. The establishment of NGC in 1970 was followed by Petrocorp in 1978. Over

the ensuing years, Petrocorp was the vehicle for the bulk of the government's gas and petrochemical investments.

Petrocorp was partly listed on the New Zealand Stock Exchange in 1987. The government sold its remaining 70 per cent to Fletcher Challenge Limited (FCL) in 1988, as part of its privatisation programME. The Government's 75 percent stake in the synthetic gasoline plant was sold to FCL in 1990. Recently, FCL has spun off both NGC and its methanol/gasoline business, though it still retains a substantial shareholding in NGC.

NGC is now a separate public company and is listed on the New Zealand Stock Exchange. It owns and/or operates the entire high-pressure gas transmission system in New Zealand and sells gas both directly to the retail gas market and to local distribution companies.

NGC's share of the retail market is approximately 40 percent. The other significant retail market player is Enerco, a public listed company, which owns the low-pressure distribution systems in Auckland, Wellington and Hawkes Bay. It too has approximately 40 percent of the retail market. The remaining 20 percent is accounted for by smaller gas companies, mostly owned by local municipalities.

Gas demand

Aside from Methanex, New Zealand's other petrochemical gas user is Petrochem, which uses 5 bcf and is a wholly-owned subsidiary of the Bay of Plenty Fertiliser Company (see *figure 2*). Most of the output from the ammonia-urea plant is used locally, as a fertiliser or as a raw material for formaldehyde resin manufacture.

The ECNZ is the country's major electricity generator, accounting for about 95 percent of electricity production. It is the only generator with gas-fired capacity, burning between 55 and 70 bcf of gas per annum. A state-owned enterprise, the corporation is currently being reorganised internally, with the intention of establishing several generating businesses which will compete in an internal market. This reorganisation may prove to be the prelude to one or more of the new generating businesses being spun off into public ownership.

ECNZ's gas demand varies according to demand fluc-Figure 3



In addition to gas use, some six to seven bcf of gas liquids are produced, mostly for the domestic market but with the surplus exported.

The Maui field owners have constructed a 30 inch pipeline from the Oaonui Production Station in Taranaki, 300 kilometres north to the Huntly Power Station. The NGC has also expanded its pipeline network in Northland, the Bay of Plenty, Gisborne and Hawkes Bay, completing the transmission system to the majority of large urban centres in the North Island.

Future prices of gas in New Zealand will be driven by the cost of alternative fuels for the electricity and natural gas retail markets, and by international methanol and gasoline prices for the petrochemical plants. Arthur D Little estimates that the future price of new gas to be produced into the supply shortfall could average about \$USI.90 per mcf in 1993 terms.

The current gas market in New Zealand is around 285-210 bcf a year (see *table 2* and *figure 3*).

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PETROLEUM REVIEW SEPTEMBER 1994



Twelve tips for the top

By John Cranfield and David Buckman

The Caspian Sea is a clear winner in Petroleum Review's worldwide survey of exploration hotspots, but watch out for new plays in some surprising places as the search for oil spreads ever further.

> The exploration sector is always on the watch for new plays. Lately, this has been given added impetus by the declining attraction of several established areas, such as the North Sea and the US Gulf. Among the more seductive upcoming plays offshore, the Caspian Sea emerges as the frontrunner. The waters are generally shallow enough for existing western technology to develop oil economically, but too deep for ex-Soviet techniques. And oil and gas are known to exist in large quantities.

Azerbaijan

Russia is only a small player at present, but the giant fields off Azerbaijan - proved but undeveloped - are another matter. Hopefully, a final development deal will be in place this year, with US, UK, Norwegian, Russian and Turkish firms involved in the \$7-10 billion project. Signs are that 1995 should see work begin. Two or three deep-water fields are expected to produce 600,000 b/d. State firm Socar has also done deals with western companies to rehabilitate smaller offshore fields, such as Mashal, in production for 40 years but badly in need of modern technology.

North Sea technology is seen as the answer to most Caspian development. The Azeri and Chirag fields would require several drilling/production platforms each, plus central gathering/processing/export structures. This would also apply to the Guneshli field if it were included in the deal. Guneshli, partly developed by Socar, is typical of the different way of thinking. At present 14 platforms are in place in the field. North Sea practice would require just one, many times larger than each of the 14 but, by using high-angle directional drilling, able to drain the same area.

Turkmenistan

Much the same applies off Turkmenistan. The Apsheron Sill, that houses Azeri, Chirag and Guneshli, also extends across the Caspian to the Turkmen coast. However, major development is still awaited. Three blocks were offered last November, but so far only one has been taken up, by Turkish/US interests. The question of how oil is to be exported is delaying matters, as it has throughout the region. All concerned want to get away from reliance on the Russian pipeline system, but negotiations on alternative routes have been slow. When that is settled, Turkmenistan will be able to boost output from the current 100,000 b/d to 560,000 b/d by 2000 and 1.6m b/d by 2010, much of it from offshore fields.

Kazakhstan

Kazakhstan poses a different challenge. So far most activity centres on the giant onshore fields. The offshore is largely unexplored, despite the fact that it is expected to yield 3.5bn bbl of oil and 2 trillion cubic metres (tcf) of gas. However, interest is expected to spill over from Azeri and Turkmen waters. More immediate, however, will be the introduction of western technology to the problem of coastal fields in the northern Caspian. The sea is rising at a rate that has already left over 1,400 wells submerged. Some leak and all are likely to be damaged by ice floes grounding along the shallows during winter. Old-style Soviet trestles could handle the problem and bring these fields back into production. But the cost would be uneconomic. Instead, watch for western-style swamp barges and hover rigs to be called in for well workovers, possibly with recompletions as subsea producers.

Iran

Gas has reportedly been found off Iran's Caspian coast. But this is taking second place to the giant fallow gasfields awaiting development in the Gulf. There, plans are building up towards a contractors' bonanza. Leading the way is the South Pars gasfield, an extension of Qatar's North field. Development involves six platforms, 20 wells and twin pipelines to shore handling 1 billion cubic feet a day (bcfd) of gas and 50,000 b/d condensate. Italy's Saipem and TPL won the \$1.7 billion contract but this was then cancelled early this year because the Italian authorities would not guarantee export-credit financing. A new contract is still awaited, but cannot be long delayed, given that Qatari development is well advanced. The field is estimated to hold 100 tcf of gas and up to 4bn bbl of condensate.

Initial South Pars development is now being handled locally, but Oil Minister Gholamreza Aqazadeh says that Japanese and South Korean firms have been approached to deal with full-scale exploitation. Whether this will involve an equity partnership remains to be seen, but this is one option being mulled over for North Pars, found by Shell in the mid-1970s and on which development was stalled by the 1979 revolution. End-1994 should see a decision, says Mr Aqazadeh, and a feasibility study should then follow. The plan is to use an eventual 3.6 bcfd of North Pars' gas to boost production from onshore oilfields.

Further gas is being recovered from small fields around Kharg Island, with 400 mmcfd the end-1994 target. This is just part of an ongoing programme of reconstruction and expansion offshore following the war with Iraq. At the beginning of 1994, for example, a Lavan Export crude-oil blend was introduced after the rebuilding of Lavan Island terminal, which now handles 150,000 b/d of crude from the Rakhsh, Resalat and Salman fields. The next stage is to develop the 490m bbl Sirri A and E structures and the 90m bbl Balal field. The Aburaz platform is also in line for upgrading, from 80,000 b/d to 150,000 b/d. And exploration continues. Five rigs are running, one picking up another gasfield in January. Some 50km from South Pars, the new field is estimated to hold over 20 tcf of gas and 1bn bbl of condensate. mingle with those of South Africa. Here there was one big attraction, the Kudu gas field, found by Chevron in 1973-74 and confirmed by South West African Oil Exploration Corporation (Swakor) drilling in 1986-87. This is clearly a huge field in world terms – in-place

Italy

In Europe, Italy offshore is throwing up some surprises, giving impetus to the long-established play. And the tax regime makes it attractive. Agip has just begun its Upper Adriatic offshore gasfield development, 17 fields having 18 platforms installed to handle 140 mmcfd. Lightweight platforms, shallow water, nearness to coast and favourable tax treatment combine to make this a profitable operation. And another 15 potentially gasbearing structures have been identified in the area by seismic. Drilling is all set to take off again.

Further south, the deep-water Aquila discovery has shown 10,000 b/d potential, something new for the Adriatic. Further wells are on their way, with development options being mulled. Initial output of 30,000 b/d is mooted, from reserves put at a minimum of 220m

bbl. Now Enterprise is running seismic on two nearby blocks and further wildcatting can be expected across the area.

Croatia

Aquila has also sparked renewed interest across the median line, off Croatia. Civil war effectively scuppered both the search and offshore development four year ago. Now the creeping peace has led Aquila operator, Agip, to approach its Croat counterpart, INA-Naftaplin, about possible joint ventures. Agip is also interested in resurrecting the stalled Ivana gasfield development. Amoco has three search blocks awaiting the drill and INA-Naftaplin may resume drilling this year. Croat waters are not for the faint-hearted, but a settlement in Bosnia would nevertheless improve matters hugely overnight.

Namibia

There are so many countries with reserves in the African and Asia/Pacific offshore theatres that are known to be waiting for development that less obviously illustrious ones find it hard to compete for the oil companies' dollars. However, Namibia, Equatorial Guinea, Sudan, Bangladesh, Burma and Cambodia are all countries that are emerging or could suddenly emerge from the shadows.

Of these six, Namibia is most likely to make exploration news in the next few years. Its potential was long overshadowed by the South African political connection, but independence early in 1990 eased the situation so that in 1991 Namibia was able to open a first offshore round and publish a Model Petroleum Agreement. Up to this time there had been a commercially unsuccessful search onshore in the north and a little drilling in extreme southern waters where they



reserves range from about 12-60 tcf – and is now under examination by a Shell/Engen combine under an April 1993 licence award.

Five groups or companies gained acreage under the first round, other winners being Norsk Hydro, Ranger and Chevron groups and South Africa's Sasol working alone. Norsk Hydro began drilling its block 1911 late last year, a tight, three-hole programme. The Ministry of Mines and Energy reported that the first hole was dry, but the geology was encouraging. Within the next 12 months several more companies should drill. Meanwhile, the National Petroleum Corporation of Namibia (NAMCOR) will officially launch a second round on 1 October this year.

Equatorial Guinea

Equatorial Guinea threw open its first licence round last year, all unlicensed acreage being available. British firm EMS Ltd won the job of organising it. The West African state became a producer at the end of 1991 when the US independent, Walter International, began tapping the Alba gas-condensate field about 30km offshore. Initial output was 1,200 b/d of condensate, to be stored on Bioko Island, until sufficient volumes were available to move by tanker to market, with gas at 20 mmcfd. Walter said it would try to find a commercial use for the gas.

Since then additional drilling has been carried out and production facilities expanded. Recently Walter's partner, Noble Affiliates, said that these had 'allowed gross production to increase to 7,200 b/d'. Exploration drilling has taken place about 10km northwest of Alba and leads in the rest of the 500,000-acre tract are being examined for a possible hole in 1994. Meanwhile, the Equatorial Guinea search has received a lift with the news that Mobil will participate in a well on United Meridian Corporation's (UMC) offshore Submerged oilfield in the northern Caspian



block B. UMC will operate, Mobil will earn 65 percent and the well, Delta 1, will begin in the fourth quarter. UMC's search had been set back last year when Statoil, BP Exploration and Conoco declined to drill after completing surveys over blocks A and B, which cover almost 1 million acres.

Sudan

Sudan has petroleum potential on- and offshore, but civil war has hindered Chevron from developing land-based crude finds for development. Attention has lately been focused on Arakis Energy Corporation's deal with the government which should eventually see 200,000 b/d produced and this has overshadowed offshore gas potential. International Petroleum Corporation holds two big onshore/offshore tracts: Halaib, in the north, where a dispute with Egypt has overshadowed work; and Delta Tokar, in the south, which has more immediate interest.

This holds the Suakin gas-condensate field, found by Chevron in 1976 with Suakin 1. It yielded 1,158 b/d of 52° API condensate and 6.9 mmcfd of gas from one sandstone reservoir, while a deeper, thicker sandstone had to remain untested. No obvious market existed for the gas. However, after Chevron left, the government and several companies studied prospects, with fertiliser manufacture and power generation the likely outlets. One company reckoned that Suakin held 864 bcf of gas and 123m bbl of condensate.

IPC now plans a further Suakin well 'as soon as a joint venture group is formed'. It feels that 'this project is a good candidate for an early production system (EPS) which would enable the field to go on stream within 18 months'. IPC earlier commissioned a feasibility study towards an EPS 'designed to bring the field on stream at an initial rate of 10,000 b/d of condensate and 75mmcfd of gas', although new seismic has indicated higher rates could be attained.

Bangladesh

In Asia, Bangladesh is worth watching for its offshore gas potential. The country has substantial onshore reserves,

Azeri offshore production

with 17 fields found, and the government is keen to boost output of 580 mmcfd of gas, 1,000 b/d of condensates and 150 b/d of oil from the five gas fields and one oilfield brought on stream. The offshore has been badly neglected but last year the authorites began to prepare a 17-block tender of mainly offshore acreage and petroleum policy was liberalised.

Cairn Energy and Holland Sea Search (HSS) recently signed a memorandum of understanding for the most obviously interesting marine block, 16, where Union Oil found gas in the mid-1970s. Union was seeking oil, however, not gas, and a sustained test was not run at the Kutubdia find. Even so, on a proved plus probable basis a conjectured reserve of 1 tcf is reasonable. Much of block 16 is unexplored and Cairn and HSS have been keen to run more seismic.

Myanmar

The government of Myanmar (Burma) is hoping to attract new explorers offshore, following an exit by several major firms from the onshore search, who were said to be dissatisfied with

poor results and harsh conditions. The country remains a minimal onshore hydrocarbons producer with substantial offshore gas potential if infrastructure for exploiting it and markets can be cultivated.

Total beat off keen competition to obtain rights to develop gas earlier found in blocks M5 and M6 in the Gulf of Martaban. This had been proved after sporadic drilling in the 1970s and 1980s, Japan helping to fund Myanmar's effort. A hard-line socialist government has made western companies cautious about participating in the Myanmar search over the years. However, early in 1993, Unocal, a company greatly experienced in gas production in the Gulf of Thailand, joined Total in the Martaban Gulf, and since then efforts have been made to firm up a gas export scheme to Thailand. Total appears to have 3-4 tcf of reserves, enough to provide an initial piped flow to Thailand of 250 mmcfd from 1998, eventually rising to 600 mmcfd.

The Petroleum Authority of Thailand has also talked with Texaco/Premier/Nippon about importing gas from the Yetagun find in M13. Several successful wells have indicated a field comparable in volume to Total's.

Cambodia

In October 1991 Enterprise Oil became the first oil company in nearly 20 years to sign a contract for exploration in Cambodia. The last drilling had been done by Elf and Esso early in the 1970s, but commercial finds were not made. A first bidding round in 1991, covering onshore and offshore acreage, was followed by a second in 1992. Some of Cambodia's marine acreage is disputed with Vietnam, some with Thailand, although there have been moves towards a joint Cambodia-Thai search.

The East-West Center in Hawaii has conservatively put Cambodia's gas potential at 1.5 tcf with up to 180m bbl of recoverable oil. Enterprise's Angkor 1 well this year tested four reservoir intervals, the most succesful yielding 4.7 mmcfd of gas and 180 b/d of condensate. Another well to watch is Premier's Kaoh Tang 1, spudded in May in the block adjacent to where Japan's Campex drilled a dry hole recently, Devada 1.

Signing on the dotted line

By Susannah Cardy

Offshore operators and contractors have been waxing lyrical of late about the joys of 'alliancing', 'risk and reward' and 'teamwork'. They insist that at long last a win-win scenario is developing in the North Sea. But can both sides really turn their backs on a 30-year tradition of 'them and us' and develop the one essential ingredient for this new cooperative era — trust?

> Ask most project managers what their favourite type of contract is and they'll reply: 'the one that stays locked in a drawer'. Traditionally, the relationship between operators and contractors in the North Sea has been dominated by adversarial claim and counterclaim in which the contract plays centre-stage. The slightest deviation from original terms and conditions would be considered an 'extra' by the contractor, who in turn often felt resentful at the rockbottom price struck with the client. 'We'd take the lowest possible bid, spend the entire two years arguing and end up with an absolutely rotten service,' said one operator. 'I've witnessed change orders that have taken six months to negotiate.' If the contractor failed to comply with his side of the bargain, the operator's main come-

'We'd take the lowest possible bid, spend the entire two years arguing and end up with an absolutely rotten service.'

back would be via Liquidated Damages which provide leverage to ensure timely delivery. But the general verdict is that these are rarely applied successfully, not least because they are virtually impossible to prove in a court of law. 'Contractors can always claim that the client frustrated them in their work,' said project manager Tim Kieft of Amerada Hess. The client also bore the brunt of bad relations between the various contractors. 'Operators often ended up playing piggy-in-the-middle between the designer and the fabricator,' according to Mr John Weedon, Marketing Director at Trafalgar House Engineering Contractors (THEC). The erection of a second design office in the

construction yard on the fabricator's insistence, for example, was commonplace. Delays at these various project interfaces meant further expense for the client. But the 1970s and early 1980s were halcyon days when the general prosperity of the North Sea more than absorbed the time and money wasted in combative relations. It took the historically low oil prices of recent years and the maturing of the North Sea to force new ideas into play.

BP leads the way

It is BP who has led the way with the southern North Sea gas field, Hyde. 'We decided to throw away the

rule book, keep the lawyers out and form a capped risk and reward alliance with all our contractors,' said a spokesman. 'Instead of Liquidated Damages we simply listed conditions of satisfaction on one side of a sheet of A4 and financial rewards were tied firmly to the final cost of the project.' All the contractors were brought in at the earliest stage both to foster trust and to incorporate the requirements of the different parties in the initial design. To further emphasise the importance of trust, only five BP engineers were assigned to the entire million project. Hyde came in £20 million under budget and is now held up as a showcase platform for alliancing. 'The cost-savings amounted to 20 percent of the original budget and are largely attributable to the new way of working,' said the spokesman. BP now hopes to repeat its success on an altogether grander and more complex project - the Andrew field in the central North Sea. An alliance has already been signed between BP, Brown & Root, Highland Fabricators, Trafalgar House, Emtunga, Saipem, Santa Fe and Allseas and first oil is expected in late 1996. Any profit on the £370 million project will be split 60:40 between the contractors and BP. The flip side for the contractors is that they share the risk, although this is capped at £410 million.

Test case

Meanwhile, the rest of the industry watches closely. Andrew is the first major capital expenditure (capex) project to be developed via an alliance and as such is viewed as the first true test case. Some of the other operators remain sceptical about such an ambitious approach. 'BP waxes lyrical over Hyde but that was an alliance simply waiting to happen', said one project manager. 'They were virtually repeating two platforms previously built for Amythest. They used the same designer, the same fabricator, the soil conditions were similar ... so the contractors were happy because they knew exactly where the risks lay and where they could make a profit.' He believes Andrew will pose a far greater challenge. 'Look at the time it has taken to get that alliance off the ground - they got there in the end but it took a long, long while to bring the contractors on board. That's because they were faced with a blue sea field, with bespoke design and they weren't in a position to assess the risk.' (BP has denied that there has been any serious delay in the project schedule.) Some believe that involving the contractual community in risk-taking will simply result in duplication of effort. 'For a contractor to move into that side of the business, he needs to understand the reservoir and so he'll start taking reservoir engineers on who will repeat the work already carried out by the operator,' said one industry source. Shell, which has yet to jump on the risk and reward bandwagon, is concerned that too much is being expected too soon. 'Our policy is to adopt whichever contract is the most relevant and available to get the job done,' said Prospect Development Manager Alan Hunt. 'We're keeping an

open mind to alliancing but we're aware that it may be the flavour of the month. The potential danger then is that as soon as a contract backfires, the industry will



£26 million contract for Lasmo's Markham Satellite Platform STwhich 1, was completed by THEC three weeks ahead of schedule, within budand get

move on to a new flavour of the month.' Others point out that alliancing demands a far more sophisticated service from contractors. 'They have got to understand and I believe they are beginning to understand that if they want to get away from the old style of contracting, they will have to be held accountable,' said Mr Vic Tuft, Secretariat Director of the Cost Reduction

Initiative in the New Era (CRINE). 'It won't be enough any longer to say "well we only did it that way because you told us to"'.

'Companies on both sides have 30 years of bureaucracy and baggage built into them'

Maturity

There can be no doubt, however, that the contractual community has matured out of all recognition over the past 25 years. 'In 1972, your average contractor tended to be the rough-necked, stand 'em up and knock 'em down type - it was rare, for example, to meet a project manager with a degree,' said one operator. 'Nowadays we're dealing

with highly-intelligent management, experienced at handling uncertainty and risk.' This experience has been developed partly in the southern North Sea where the operators have adopted a far more hands-off

approach to projects. The relatively shallow waters allow for smaller, less complex structures than those of the northern North Sea, which in turn has encouraged the use of Engineering, Procurement, Installation and Commission (EPIC) contracts in which the client is provided with a complete service. These contracts tend to be lumpsum and offer the operator a 'onestop shopping' facility. One recent EPIC success story is the



without any change orders. The contractual community is no stranger to innovative schemes on the larger-scale projects of the North Sea either. The other operators may be tiptoeing behind BP when it comes to full-scale alliancing but most now have contractual experiments of their own on the go. British Gas, for example, recently negotiated a traditional reimbursable engineering contract with AMEC for the giant £600 million Armada gas project. Incorporated in a side letter to the contract, however, is an incentive arrangement to encourage cost reductions in capex and operational expenditure (opex). The plan is to set up a similar type of arrangement with the fabrication and hook-up and commissioning contractors. There are also radical moves afoot in the North Sea to link contractual profit with downstream performance. 'You can drive capex down and build an installation incredibly cheaply only to find that it costs a fortune to operate because it isn't really fit for purpose,' said one operator. BP has adopted this new 'life of field' approach on the Cleeton gas field, where payment for the design, construction and installation of a new compression module will be based partly upon operability. Specifications are another area undergoing change. The operators are coming to the realisation that requesting which functions they require a piece of equipment to perform may be more valuable than stipulating how they wish

it to be built. This allows the contractor more freedom to innovate and guarantees that the equipment will be 'fit purpose'. for British Gas plans to try out functional specifications for the first time on transformers for the Armada project. And what of the ultimate accolade of all for the contractual community - full-blown partnership? Again, although many operators continue to baulk at the idea, others say they are already venturing



down this road. BP, for example, claims to have a partnering agreement with Brown & Root, which provides engineering support for Forties. 'Remuneration is tied to field performance,' said a spokesman. 'We've' had open accounting for the past three years and there really is no difference between their personnel and ours.' The contractors certainly believe they are ready for more responsibility. They point out that, whilst they now have 25 years of North Sea experience behind them, the operators have downsized in recent years, releasing some of their technical expertise. 'We need to get one or two of the southern North Sea contracts successfully under our belts,' said one major contractor, 'and then we should be in a position to progress to providing EPICs for larger North Sea platforms'. Most contractors still do not have the in-house skills required to mastermind an entire project but this hurdle is being overcome by the formation of consortiums. THEC, for example, combines the engineering and design capabilities of John Brown with the onshore and offshore construction expertise of Trafalgar House Offshore Fabricators.

Suspicion

All the ingredients are in place, therefore, for a new era of co-operation in the North Sea but both sides are agreed that one major stumbling-block still remains - lack of trust. Alba field Manager Alan Higgins spent a great deal of time and energy when setting up the project in making sure each interested party understood the roles and responsibilities of the others. 'At one particular meeting a contractor came up to me afterwards and said, "This is the first time I've ever seen where I fit into an operator's business plan".' In many of the oil companies, enthusiastic individuals are still being held back by lack of commitment and suspicion from top management and joint venture partners concerned solely with the bottom line. 'It's going to take a lot of time and work to change attitudes,' said one project manager. 'Both the operators and the contractors have 30 years of bureaucracy and baggage built into them.

Cultural change

Yet there can be no doubt that a cultural change is sweeping through the North Sea. Both sides know that attitudes must change if the relatively high-cost UKCS is to compete for global funding in the future. Hence the establishment of CRINE, which has its own contracts committee. 'Never before have we got all sides together and in the mood they're in

now,' said Secretariat Director Vic Tuft. This committee will be considering all aspects of contracts, including the introduction of simpler langusge and standardisation. Reaching a common contract will be no easy task, given all the different indemnities, insurance policies and parent company guarantees that exist at present, but the hope is to achieve eventually a standard document which still allows room for the insertion of individual requirements. Previous

'We decided to throw away the rule book and keep the lawyers out'

attempts by the Offshore Manufacturers and Constructors Association (OMCA) to introduce a standard contract have failed but the industry viewpoint has changed radically since then. 'The Institution of Civil Engineers and the Institution of Mechanical Engineers have had standard conditions for ages, said one operator. 'There's no reason why the OMCA can't have a standard set of conditions too.' The contractors in particular know that co-operation is now vital if their livelihood is to be preserved. Whereas once they were faced with an excess of business, which allowed them to pick and choose between work in the Gulf of Mexico and work in the North Sea, in more recent times some have gone to the wall. 'It's difficult to believe that operators will continue to invest in the North Sea for more than 10 or 20 years unless we bring costs down,' warned one major contractor. 'However, by improving productivity at no extra expense we could extend the life of the area by another 20 years again.'

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MALTA BRANCH

Because of its distance from European oil centres, this branch experiences some difficulty in arranging speakers for its meetings. It therefore asks that if anyone is passing through Malta on the way to North Africa or spending holidays in Malta and would be prepared to give up a few hours of their time to address this thriving branch, he or she should contact the branch chairman or secretary. Anyone volunteering is guaranteed a warm welcome!

> Chairman: F H Said Secretary: M Degiorgio MEDSERV, Manoel Island, Malta

> > Tel: 010 356 314666 Fax: 010 356 339511

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Education & Training Group conference

Life after Re-engineering

Key challenges of managing human resources in the oil and gas industry

3 November 1994 To be held at the Institute of Petroleum

Delegates will examine how some companies are successfully developing their staff in restructured organisations with the help of their managers, personnel and training support systems. The conference will be of interest to human resources and line managers involved in making restructured organisations work.

For 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 Tel: 071 467 7105/6 (direct lines) Fax: 071 255 1472



INFORMATION FOR ENERGY GROUP

Beyond the Bookshelf

New technology for information workers in the energy industries

Thursday 10 November 1994 To be held at the Institute of Petroleum

Developments in electronic information exchange now happen so rapidly that it is very difficult for the professional providers and users of information to keep up with them. Yet with the current emphasis on providing value through services, it is vital that information provision should be as cost-effective as all other market activities.

Topics included in this conference will be:

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Interactive video

Teleworking

The Internet

For a copy of the registration form, which will be available soon please contact: Pauline Ashby, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR. Tel: 071 467 7105/6 Fax: 071-255 1472

Abandonment – the North Sea's newest industry

By David Buckman

Some have suggested converting them into luxury hotels or casinos, others that they be used to house top-security prisoners. The reality is, however, that the removal of redundant rigs is set to become big business in the North Sea and the pressure is now on to develop better and more cost-effective ways of doing the job.

> With the need to abandon more and more production installations looming offshore, Britain's Department of Trade and Industry (DTI) is carrying out an inter-governmental review of how the task might be tackled. It was hoped that guidance notes on decommissioning would be ready this summer, but now they will probably be in circulation towards the end of the year. Although it has long been realised that platforms, pipelines and wellheads will eventually become redundant and will have to be wholly or partly removed, there is still much vagueness about approaches to tackling the job. The guidance notes should help, especially with technical aspects.

> The 1994 Brown Book reminds operators that, under the Petroleum Act 1987, the government requires them to submit abandonment programmes for approval 'following full consultation with all relevant interested parties'. During 1993, programmes were approved for the Angus field, a disused section of the Staffa-Ninian pipeline and for the Forbes installation. The DTI says that at the end of last year 'eight draft abandonment programmes were under discussion...and initial discussions were under way in respect of another six'.

New industry

For the north-west European Continental Shelf, where it is estimated that between 250-275 platforms will have to be wholly or partly removed, decommissioning will mean the emergence of a huge new industry. In a report

'Significant numbers of installations will be abandoned from 2003 onwards' entitled Abandonment — a Reassessment, published earlier this year, Smith Rea Energy Analysts said it was generally accepted that costs of removal will be borne by government and operators. The UK government's share, paid through tax rebates, will probably be 50-70 percent where petroleum revenue tax is paid, and 30 percent or less where it is not. The total cost of abandoning UK

fields so far under development is likely to be between ± 3.7 billion and ± 6.2 billion.

Systems of funding removal vary, for whereas Britain allows removal costs to be deducted for tax purposes, Norway has chosen to pay part of the cost, depending on the amount of tax income the state has gleaned from a field. A recent study by Professor Alexander Kemp and Mr Bruce MacDonald of Aberdeen University noted that the British system operates erratically. Whereas on big North Sea fields effective abandonment relief can exceed tax take, on many small and medium fields relief can be much less than the effective take. One concern for the oil companies is that, where partial removal of hardware occurs, claims for damages can be made in perpetuity. The British government does not wish to assume liability even if companies contribute to an insurance fund. One possibility would be for licensees to form some sort of protection and indemnity club, but so far there appears to be no interest in the idea.

One way in which the UK abandonment industry could evolve is illustrated by the experience of the Gulf of Mexico. In 1992 a 30-year trend of installations exceeding removals was reversed in this veteran production area, according to *Offshore International Newsletter*, with 85 removals compared to just 59 installations. The Minerals Management Services expects removals to average 120 a year for the next five years. With over 3,800 platforms in the Gulf, a third of which are at least 20 years old, the removal market is estimated at \$3 billion.

Although the UK Continental Shelf is now a mature petroleum province, abandonments have so far been limited. North Sea waters and hardware will present removal challenges far outweighing those off the United States. According to Professor Kemp, the number of UK abandonments 'will grow in the second half of the 1990s, but it will not be until the next century that the numbers will become large.... significant numbers of installations will be abandoned from about 2003 onwards.'

There are now around 6,500 fixed offshore installations in the world and indications are that, even with some units falling out of use, the number will grow in the foreseeable future. Although certain laws and proposals have appeared regarding their removal, there is still much room for discretion by the various governments.

The Geneva Convention of 1958, the Law of the Sea of 1982 and guidelines issued in 1988 by the Londonbased International Maritime Organisation (IMO) are of key importance. The Convention says that all installations which have been abandoned or closed down shall be completely removed. The Law of the Sea, however, does not contain any such firm requirement. An installation can remain as long as it is not a risk to fishing and shipping.

IMO guidelines

Under IMO guidelines, all installations in under 75 metres of water, with a jacket weight of under 4,000 tons excluding topsides and installed before the end of 1997 must be wholly removed. For post-1997 structures, the depth qualification is raised to 100 metres with the same jacket weight. Installations falling outside these descriptions – that is, heavy structures in shallower water and all structures in deeper water – can remain in place.

Abandonment at Forbes field

An escape clause allows platforms which would otherwise have to be removed to remain where entire removal involves 'extreme cost', unacceptable risk to personnel or the environment or is not technically feasible. In such cases partial removal is allowed, but there must be a depth of at least 55 metres over the remaining portion of the structure to ensure safe ship navigation. The IMO requires all structures in shipping lanes, routing schemes and areas frequented by ships to be removed entirely, without exception. In the autumn of 1989 IMO's assembly approved the guidelines, after which it was open to states to adopt its provisions or set their own more onerous ones. In addition, the assembly decided that from January 1988 all offshore installations built must be completely removed when no longer needed.

The British government has been holding the middle ground between the oil industry, concerned about meeting IMO's stipulations, and the fishing industry, which has lobbied for total removal of structures. Fishermen have also pressed for a compensation fund and debris removal so that their equipment is not damaged.

Overall, however, Britain is a supporter of the IMO guidelines. The non-removal of steel platforms is not an option as they would eventually collapse and present a possible shipping hazard. Toppling is not the government's preferred method of removal, although a Department of Energy specialist at a 1990 conference criticised environmentalist opposition to any toppling at all as being unrealistic. In central and



northern sectors of the North Sea the DTI has even proposed that at least 55 metres exist above submerged remains in cases where partial removal is permitted. This recommendation is even more stringent than the IMO's own requirement. In a zone above a line running east by north from St Fergus in Scotland the norm will be removal to provide a minimum



clearance of 75 metres, 55 metres applying south of that area. Where sea depth is less than the desired clearance, installations must be removed from the seabed. One reason for governmental concern is fears over submarine navigation.

With the need to remove more platforms, developing the best, most cost-effective ways of doing the job gains urgency. Shallow-water platforms should present no problem, as they are within barge-lifting capacity, but

> deepwater steel platforms are different. Much research has been done on methods of severing. Cutting is slow and the use of explosives can be tricky.

In April this year Amoco and partners in the North-West Hutton group raised a grant of £2.4 million over 18 months to enable a team of mechanical engineers at UMIST, Manchester, to 'come up with a safe, reliable and validated underwater circular-shaped charge cutting tool'. UMIST said that over 180 platforms would eventually have to be tackled in the North Sea. The aim of the team, headed by Professor Salim Al-Hassani, is to achieve removal 'with minimal disturbance to the jacket, adjacent structures, other sea users and the environment'.

'There are some 260 ways of approaching deconstruction', said Professor Al-Hassani, 'but there are only a few which are viable'.

Concrete platforms offer another formidable obstacle. They can be taken out by neutralising the suction effect underneath

the platform so that it is freed from the sea-bed but this has its risks. When tonnes of earth loosen from the shafts of a concrete structure it can rise uncontrolled to the surface.

The cheapest solution might seem to be to leave platforms in place, fairylighted and ringed with marker buoys, with deck modules and equipment removed. This is unlikely to be an acceptable solution politically, and it has been estimated that in the long term it would cost more than toppling.

Recycling platforms

Offshore casinos, prisons and luxury hotels; waste disposal sites and marine research centres; electricity generation centres and locations for problem industries such as nuclear power or certain types of chemical plant; communications, navigation and meteorological centres; artificial reefs for fish farming – all these ways of recycling platforms have had their proponents. In the long run, however, such alternatives will probably remain of marginal importance.

The potential removal market worldwide was examined in 1990 by Mr Jeremy Daniel of Hollobone Hibbert & Associates. He put the number of platforms installed globally, excluding US waters, at 2,572 between 1960 and 1989. Of those, 1,523, or almost 60 percent, were established in the period 1980-1989. The number for

removals between 1990-2005 was conjectured at 600, of which 365, or just over 60 percent, would be taken out between 2000-2005. Only 27 of the installed platforms were concrete, one of which had been removed. Of the 2,572 platforms installed, 323 were on the northwest European Continental Shelf.

The problem of removal is not confined to platforms. According to Mr Daniel, 2,433 pipelines of six inch diameter were overlaid outside the United States between 1960 and 1989 alone, with 40 subsea manifolds and templates installed globally in the same period. According to the latest DTI figures, at the end of 1992 there were 3,531 miles of oil, gas and associated lines operating on the UK Continental Shelf alone. The Petroleum Act 1987 was the first attempt to place abandonment legislation on pipelines. Both national and international legislation had previously ignored the subject. Buried pipelines will almost certainly be allowed to remain, as removing them would merely cause upheaval.

As yet there has been little removal work in the North Sea. BP led the way on the UK shelf, spending £2 million in 1978 to remove its unmanned WE unit on the West Sole gas field. It was cut below the sea bed and above water and hoisted out in two sections before being barged to shore. Phillips' Piper Alpha platform was toppled after the disaster; Mobil had a failed Beryl singlepoint mooring and at Linnhe a twowell tieback to Beryl B removed; Hamilton has seen hardware taken out from Crawford, Forbes, Argyll, Duncan and Innes; and Amerada Hess's Angus, having ceased production last year, needed wells removed and debris clearance. On the Dutch shelf, removals of gas units, such as Pennzoil's K/13-D wellhead in 1988 and the larger K/13-C structure in 1989, did not present insuperable problems, and other structures should follow routinely.

Off Norway, on the Elf Frigg and Phillips Ekofisk fields, units are being closed down and their removal studied. Early this year Elf was pressing the government to opt for its plan to remove the North-East Frigg platform and dump it in a fjord in 1995. The CDPI unit is already closed and is periodically inspected for safety. Esso Norway has been drawing up a field abandonment plan for Odin, to be implemented next year. In the UK, North Sea Hamilton wants to remove its Gordon unit for



re-use elsewhere; bids have been put forward to abandon MSR's Emerald; and Unocal's Heather and BP's Thistle have been tipped as possible abandonment candidates.

It is reasonable to assume operators will seek to use their platforms for as long as possible, making abandonment and removal prediction difficult. New discoveries, for example, are often developed subsea and tied back to platforms originally installed for other fields.

Shell's experience shows how it is possible to make optimum use of hardware beyond its earlier-expected practical life. Shell originally conceived that Auk would be its first platform removal job. The field had gone on stream in December 1975, hit peak production of just over 47,000 b/d in 1977 and was conceived to have a five-year life. But by 1987 Shell was confident it could extend Auk beyond 1997. Careful planning has meant that in 1993 Auk was still worth over 8,000 b/d. Shell has argued that if the price of oil were not satisfactory for a while, a field like Auk might

cease production and then start up again at the right price. This would require the platform to be maintained in readiness.

Dunlin was envisaged to be Shell's second platform to go, but it has had a capital injection of around £100 million, extending its economic life 'well into the next century'. It

extending its economic life 'well into the next century'. It was reinvigorated early in 1991 when first oil from Osprey began to flow for handling in a dedicated mod-

ule. Osprey field life was put at 16 years. Brent field redevelopment, the world's biggest marine refurbishment scheme to extend the life of the UK's largest North Sea oil and gas producer, is the prime example of what can be done to rethink the longevity of offshore hardware. Over five years from 1993 facilities will be replaced or modified on three of four platforms, all installations will be overhauled to improve efficiency and safety will be enhanced. This will add to national reserves the equivalent of a small oilfield and a medium-size gas field. Brent's life will be extended at least a decade to around the year 2015.

'Rig removals now exceed installations in the Gulf of Mexico'

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Microbiological Test Methods for the Petroleum Industry and Users of Petroleum Products

> A 'Hands-On' Workshop at the University of Hertfordshire 21 September 1994

The introduction of 'greener' petroleum products will inevitably lead to more in-use problems due to accelerated biodeterioration and possible associated corrosion. Even without these changes there has been an increase in spoilage of some products, particularly distillate fuels. New regulatory initiatives are restricting or controlling the use of traditional anti-microbial chemicals (biocides) whilst others are drawing attention to direct or indirect health hazards from micro-organisms.

All of these changes will result not only in the introduction of more standard laboratory-based microbiological tests for petroleum products but also an increasing need for non-microbiologists to run simple on-site tests for micro-organisms and biocides.

With this in mind the IP's Microbiology Committee has invited academic microbiologists and commercial organisations to demonstrate their techniques, instruments and test kits at a one-day workshop at the University of Hertfordshire. Demonstrators have been particularly asked to make their presentations relevant to the oil industry's needs and to allow, where possible, delegates to conduct the tests themselves.

Following registration Dr Barry Herbert will present an overview on 'Laboratory and on-site microbiology tests'. After this delegates will be free to visit about 30 displays.

For a copy of the registration form, please contact Caroline Little, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR Tel: 071 467 7105/6 Fax: 071 255 1472

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HELP US TO RECRUIT A MEMBER

IP Membership growing

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Anyone joining before the end of September will receive 15 months' membership for the price of 12!

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If you propose an applicant for membership before the end of October, we will present you with a 1995 IP diary, bound in burgundy leather with the IP crest in gold, and packed full of valuable oil industry information, as a token of our appreciation.

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

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IP ANNUAL DINNER 1995

The Institute of Petroleum's Annual Dinner in 1995 will be held at Grosvenor House, Park Lane, London W1 on WEDNESDAY 15 FEBRUARY

The ticket application form will appear as a page of Petroleum Review in the OCTOBER 1994 edition

However, because of possible postal delays, non UK/European members who wish to apply for tickets should contact **Caroline Little** at the IP at 61 New Cavendish Street, London W1M 8AR as soon as possible, and an application form will be forwarded during late September.

The closing date for receipt of ticket applications will be **Friday 21 October 1994.** No applications will be considered after this date.

> Telephone: 071-467 7105/6 Fax: 071-255 1472

IP OF PETROLEUM

POLITICAL RISK – OUTLOOK FOR THE OIL INDUSTRY IN 1995

Tuesday 22 November 1994

To be held at The Institute of Petroleum

The oil industry has become well experienced in evaluating the economic and technical risks which it faces in its business and particularly when planning major new investment. Yet the greatest uncertainties which may profoundly affect the security of supply and the price of oil and which may fundamentally change the economics of new projects are political risks.

This conference will include papers from widely respected expert analysts and commentators on political developments and risks in several areas of the world of strategic interest to the international oil industry. Particular attention will be paid to the outlook for 1995 and some challenging scenarios will be developed.

For 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, UK. Telephone: 071 467 7105/6. Fax: 071 255 1472

A strong beginning for Agip as a North Sea operator

By Geoffrey Mayhew

When Agip (U.K.) Limited brought the Tiffany Platform on stream last November in Block 16/17 - T-block - in the North Sea 150 miles northeast of Aberdeen, the company had already decided to carry out high quality 3D seismic acquisition through the area where it is the operator. Four fields have been established there, two of which have come on stream recently.

Production on stream

The new acquisition will update a 3D survey carried out in the early 1980s. Its object is to help field engineers and management to bring forward other production as soon as the Tiffany platform has the capacity to accept it which is expected to occur after 1996. The seismic data which is currently being acquired will form the database for T-block's oil production over the next 10 years. Agip operated production in the North Sea for the

first time on 21 November 1993 when Tiffany came on

stream. Initially, the field's production through the

eight-legged steel platform which stands in 130 metres

of water was at the rate of 10,000 barrels of oil a day.

Tiffany Platform



Within a month this steadily improved to the designed plateau rate of 66,000 barrels a day.

Tiffany's estimated recoverable reserves are some 121 million barrels, with a further possible 10.7 million barrels of reserves in an area which has yet to be drilled. The plateau production rate of 66,000 barrels a day is sustainable for three years, after which a decline is likely.

A month after the Tiffany start-up, the Toni field subsea installation, six kilometres to the south, came on stream with its designed flow rate of 20,000 barrels of oil and associated gas a day. Its installation comprises four production wells and three water injection wells, which are controlled by a multiplex electro-hydraulic control and data monitoring system connected to the Tiffany platform via umbilicals.

Toni's output rate is sustainable for three years after which, like that of Tiffany, it will gradually decline. Its oil and gas is processed on the Tiffany platform.

Technology threshold

As one of the first post-Piper Alpha platforms, the standard of engineering and materials used on Tiffany were at the threshold of technology. These innovations were not without a price and problems occurred with the welding of exotic materials which, promptly resolved, did impact on production levels during the first four months of production. The remedial work is fully complete and the Tiffany platform is now producing to plan.

Immediately south of Toni are the sites of the Thelma and South East Thelma fields, spread over an area of some six square kilometres. They are awaiting Annex B approval from the Department of Trade and Industry.

As soon as the Tiffany platform has spare productive capacity, the company plans to fill it from the Thelma fields.

Agip as operator

As an operator offshore and onshore elsewhere, it has perhaps been incongruous for Agip not to have been a North Sea operator until now.

Soon after it was incorporated in 1965, Agip (U.K.) took over the interests acquired by Agip SpA under a 'Base North Sea Agreement' between Phillips Petroleum Co, Petrofina and Agip. Under that agreement Phillips was nominated as operator for the Group in all areas of the North Sea between 51° North and 62° North. It precluded Agip from making its own independent moves.

Then, in January 1984, the agreement was terminated, which was followed shortly thereafter by Phillips' desire to sell assets in order to overcome financial problems in the United States. Agip became free to apply for licences independently of Phillips and, indeed, acquired Phillips' working interest and the operatorship of Block 16/17 – the T-block – in 1986.

Having participated in all UKCS licensing rounds since their inception, Agip then applied for and was awarded



licences as an operator in the 10th Round (1987), the 11th (1989), the 12th (1991) and the 14th (1993).

Agip reached a position in mid-1993 where it was a participant in 59 offshore joint ventures, of which it was the operator in six licences covering eight blocks and had a joint interest as a non-operator in 11 North Sea operations. Five fields in which it has an interest are in production and four are under development.

These activities give Agip an interest in 56 offshore blocks or part-blocks which are concentrated in the Southern Gas Basin, the Central Graben and the South Viking Graben. Major field developments are expected, and among these, in the Greater J-Block where Agip has an interest but is not the operator – the operator is in fact its old partner in T-block, Phillips.

A significant new phase in Agip's development was considered to have taken place when it became a production operator last November. The company said that the re-investment of the financial resources now made available would be critical in the further progress of Agip's role in the UKCS.

A second important phase has soon followed with the conceptual engineering studies now being undertaken on the two Thelma fields in T-block, in which the current seismic acquisition will play a vital part. Thelma's production will be tied back to the Tiffany platform. In the application for Annex B, the target date for production is 1996.

'Careful management and rationalisation of the exploration development and production portfolio will become increasingly important in order that Agip (U.K) can take full advantage of its core assets and jointly owned production and transportation infrastructure,' said Mr J L Stretch, Deputy Managing Director, Agip (U.K.). 'Increased production, increased responsibilities and increased technical capacity all indicate a robust future, with Agip well placed to take maximum benefit from the opportunities presented.'

Oil export from Tiffany platform is through a 5 kilometre pipeline to the Brae/Forties pipeline, which goes on to Cruden Bay. Gas is exported from Tiffany via a 34-kilometre pipeline to the inter-field line which lies between the North and South Brae fields.

Seismic survey

In comparison with the seismic survey previously carried out on T-Block in the early 1980s, that being shot now across the whole block is considerably technically advanced. The *Western Pride*, a state-of-the-art seismic vessel operated by Western Geophysical, has been contracted for the survey. The vessel is using a four kilometre streamer to receive data from two 3,000 cu. in. airgun sources. This enables the recording of eight seismic lines simultaneously with a spacing of 25 metres.

Subsequent processing of this data will be executed by Agip SpA using 3D operating techniques specifically designed for the complex geology of the area. For example, the sand-shale sequence of the Lower Hordaland Gp

(Eocene) had previously proved to be a natural energy barrier, but recent test lines processed by Agip SpA have shown these effects to be largely removed.

The reservoirs of the two Thelma fields are geologically complex. The first drilling in 1976 was followed by five successful appraisal wells, and a further appraisal well was drilled in 1991. Agip feels it is mastering the challenge of the Thelma fields.

The interpretation of the current seismic data will assist understanding of the deeper Upper Jurassic fan system emanating from the Fladen Ground Spur and thus help to optimise production.

'Of further significance to Agip is the potential of satellite field prospects within T-block that could, if successfully tested, also be tied back to the Tiffany platform in the future,' added Mr Stretch. 'Tiffany's facilities can handle several fields.'

Looking ahead

'Had there not been the Agreement which prevented Agip from being a North Sea operator for many years, I think it fair to say we would have found exploration and production opportunities and gone to develop them successful]y,' said Mr Stretch.

'However, our intention now is to make steady progress as an operator using the best technology with the highest efficiency in the North Sea because it is clear that there is still a good deal of oil yet to be won.

'Whether this potential contains another very large field, an 'elephant', is questionable. It may be there – who knows? You can be sure we shall watch for any technical indication of it.'

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The effects of microbial contamination on middle distillate fuels

By H Stockdale, B N Herbert & R Calvert, Shell Research Ltd, AL James, University of Northumbria, and R Tucker, Shell International Petroleum Company Ltd

The contamination of middle distillate fuels by micro-organisms is an issue that has provoked considerable debate over many years.

That microbes could cause problems was first recognised within aviation fuels where the consequences of contamination were clear and serious. Strict operational guidelines were developed and, as filamentous fungi were believed to be the prime culprits, a method that counted fungal hyphae (the fibre count) was adopted in the United Kingdom to determine acceptability of aviation fuels. In addition to aviation fuels, there have always been spasmodic reports of microbial contamination of other middle distillate fuels. Perhaps the most widely reported episode occurred in 1992 when gasoil imported into Western Europe from the Russian Federation resulted in contamination.

Though the incidents were handled within the trading community and caused no problems to end-users, they resulted in new pressure from inside the industry for guidelines or standards to be set for acceptable levels of microbes in middle distillate fuels. In response to this, the Institute of Petroleum established a working group to address these concerns.

The presence of micro-organisms contaminating middle distillate fuels in bulk storage presents unique problems to those concerned with fuel quality. The debate and misunderstandings surrounding microbial contamination are not seen with most other fuel properties, which are readily understood and measured with generally agreed methods. This is not surprising as the term 'microbes' includes a disparate range of particulate living organisms of widely different size (ranging from 1 to 20 µm in diameter), shape and and metabolic ability. They are usually distributed unevenly throughout what is essentially a two-phase system, oil and contaminating water. Further complications arise from the ability of these organisms to grow, multiply and die with time, and to be present either as discrete cells or clumped together in small or very large communities (at the oil-water interface, in water droplets entrained in the oil or as biofilm on the internal surface of the tank). Such variations, and there will be no two tank environments alike, make sampling difficult at best. Furthermore, sampling is usually superficial with accepted principles of frequency and replication rarely applied.

Effects of microbes on filterability of automotive gasoil

A guideline adopted for the acceptability of aviation fuels by the UK Ministry of Defence was that fibre counts greater than 500 per litre would give cause for concern and should be investigated. In the absence of definitive data and correlations between microbial numbers and associated problems in other fuels, it is hardly surprising that a number of other organisations would take a conservative view. Accordingly, levels of microbes within the same order of magnitude as adopted for aviation fuels have been suggested as being appropriate also for other middle distillates.

The objective of the work described here was to relate

the amount of microbial contamination to its effects on the performance of engines. After appearance, the next most obvious effect of microbial contamination is filter blocking. Engines that run on gasoils and diesel generally have a filter in line to remove particulates and sludges before the fuel enters the combustion chamber. These filters can vary in pore size depending on application and in recent years the trend has been for them to become finer. As with other particulate contaminants found in fuels (eg rust, silica and various fibres), microbes can be conveniently considered as particles in their ability to block filters, resulting in the stopping of fuel flow. Although this view does not take into account possible growth on and within the filter, there are few convincing data to hand that demonstrates that growth actually occurs.

A study was initiated to determine whether it is possible to correlate microbial contamination with the blocking of filters in automotive systems. Assessment of the amount of contamination needed to influence the filterability of various middle distillates is hampered by the lack of industryagreed tests for this property. (IP 387/90 exists, but was developed for marine application and uses a different filter medium to that commonly used in road vehicles.)

Accordingly, we utilised a simple filtration rig, similar in principle to that used in IP 387/90 (Determination of filter blocking tendency of gasoils and distillate diesel fuels) but adapted for automotive conditions. The most important difference is that our apparatus uses an actual paper filter from vehicles (albeit from a controlled batch). In essence, in this apparatus the increase in back pressure across the filter is measured while a constant flow of fuel is maintained; poorly filterable fuels cause a rapid increase in back pressure as the filter progressively blocks, whilst with fuels of good 'filterability', the increase in back pressure hardly rises above the baseline. The development of this rig and method was based on extensive experience within Shell laboratories on testing the filterability of fuels, including trials run on vehicles and a larger scale rig that simulates closely vehicle conditions.

Calibration of this apparatus was achieved with a series of fuels of known filterability, none of which included microbial contamination, but which spanned the range between fuels of excellent filterability to those which are known to cause problems in the market. The basis of the work reported here is therefore to assess how microbially-contaminated fuels compared with fuels of known filterability in this rig. A filamentous fungus, its spores, a yeast and a bacterium were introduced individually at a range of levels to a fuel of good filterability. The effects of these additions on filterability are shown in Figure 1. In this table 'good filterability' is defined as the performance of a clean summer DERV, whereas 'poor filterability' was obtained when this fuel was mixed with 30 percent of a high acid blending component; a combination known to cause premature filter blockage in vehicle tests. The discriminating power of the rig is good in that there is a factor of eight difference in the volume of fuel required to reach a defined pressure drop in the two cases. The hatched bars represent the scatter obtained from replicate runs. It is noteworthy that the greatest scatter was observed with the fungal hyphae which can be expected to have the greatest variation in particle sizes. The numbers of cells that are required to block filters is related to size. Thus more bacteria are needed than fungi and yeasts which are much larger.

On a dry weight basis (ie biomass), however, the amounts of bacteria, yeasts and fungal spores that resulted in poor filterability were comparable (0.1 -0.7 mg per litre). Fungal hyphae gave a higher value (10 - 20 mg per litre) to give equivalent blocking. This possibly reflects the likelihood that filtration of fungal hyphae results in a pad of hyphae collecting at the filter surface, whereas the other more unicellular organisms are more likely to penetrate the filter pores more effectively. The most important finding was that relatively large numbers of organisms needed to be introduced into the fuel, in the order

of 10³ - 10⁴ per ml or greater, before poor filterability resulted. These values are considerably higher than those that have been suggested by others in the industry to be adopted as quality standards (Institute of Petroleum workshop, 'Current Problems of Microbial Spoilage of Bulk Distillate Fuels', held in November 1992).

One Shell company has adopted criteria for microbes and fuel quality which are of the same order as the results described here. Several years experience has demonstrated a reasonable correlation between reported and proven problems and these values.

It was stated earlier that other non-microbial particles can also block filters and that these are likely to be present together with microbes. Our studies were extended to determine the influence of other contaminants, eg iron oxide and sludge, on blockage patterns shown by the microbes and it would seem that the combined effects of these are additive rather than synergistic.

No mention has been made of the consequences of the presence of sulphate-reducing bacteria (SRB). This is because there are no apparent relationships between numbers of these organisms and the level of hydrogen sulphide that they can produce. Consequently, it is not possible to correlate SRB numbers with fuel quality and corrosion of storage facilities with which their activity is associated.

Detection of microbes in fuels

In attempting to extend the use of the fibre count method for aviation fuels to other middle distillate fuels, a number of difficulties emerged. In the first place microbes other than filamentous fungi (principally bacteria and yeasts) are more usually found in these products and the fibre count does not detect these. Another problem with the fibre count method is that it can be difficult for the nonspecialist to distinguish between fungal fibres and those of non-microbial origin. Cultural methods such as those described in IP385/88 1993 (Code of Practice for examination of light distillate fuels for viable micro-organisms which is being revised) have been developed to detect all the microbial types at the low levels considered by some to be of significance but they require microbiological skills to operate and are highly inconvenient for normal operations. In addition, all cultural methods require incubation periods of several days or more. To address these disadvantages, dip slides have been widely adopted, but this technique has much lower sensitivity.

Need for speed

There is a great desire within the industry for a rapid method for detecting microbes in fuel. We have not been



able to identify a rapid method that would be sensitive enough to detect the low levels of organisms previously considered to be of significance. However, a number of possibilities spring from the results of our studies. There are a number of procedures that are, in principle, capable of detecting 10³ organisms per ml. Direct ATP photometry is a possibility and would give a very rapid result but this will not detect bacterial and fungal spores. We have developed a fluorometric procedure which can detect this level of organisms. It requires an incubation period of up to 16 hours but allows the detection of all microbial types including spores. The method is based on the ability of microbes to hydrolyse a mixture of two non-fluorescent fluorogens (7- acetoxy 6-ethyl 4,8-dimethylcoumarin and L- phenylalanyl 7-amido 4-methylcoumarin) and in doing so release the respective fluorophores that are fluorescent and can be readily detected using a simple UV light box. The first of these two fluorogens is a novel sterically-hindered acetate ester, synthesised with the specific aim of overcoming the problem of spontaneous hydrolysis, which is a drawback in the use of the lower fatty acid esters of coumarin derivatives in fluorometric assays. The method does allow a pragmatic yes/no guality assurance procedure. A series of trials have been conducted in a number of countries comparing the fluorometric method with the more conventional cultural methods. An excellent degree of correlation was found with greater than 90 percent agreement demonstrating the utility of the fluorometric method. Most importantly, there were no false negatives.

However, these rapid methods do not permit discrimination between different microbial types and where this is required cultural methods will continue to be needed, at least into the foreseeable future.

Conclusions

The significance of this work is that it shows the degree of microbial contamination required to adversely affect the end use of automotive gasoil is 10³-10⁴ per ml. This is significantly higher than the guideline values that have been proposed. A positive consequence of this is that more rapid assessment methods can be considered and developed than have been available hitherto, as sensitivity is less of an issue. This would allow fuel suppliers to make a judgement on the fitness for purpose of suspect samples. Different numbers may be appropriate for other end uses of middle distillate fuels.

The version of this paper published last month contained a few typographical errors. These have now been corrected.

FORTHCOMING EVENTS

September

6th-8th

Paris: 'Strategic Management and International Partnerships with the Former Soviet Union. How to get it right'. Details:CIBD, Kennedy House, 115 Hammersmith Road, London, W14 0QH. Tel: 44 71 603 1000 Fax: 44 71 602 400

8th

Aberdeen: 'EDI for the Energy & Utilities Sector'. Details: The EDI Association, 148 Buckingham Palace Road, London, SW1W 9TR. Tel: 071 824 8848 Fax: 071 824 8114

8th-9th

Alberta, Canada: 'International Oil & Gas Tax Conference'. Details: Kathy Walsh, Ernst & Young, Calgary, Alberta, Canada. Tel: 010 1 403 290 4275 Fax: 010 1 403 290 4265

12th-15th

Reading: 'Separations for Biotechnology'. Details: Society of Chemical Industry, 14/15 Belgrave Square, London, SW1X 8PS. Tel: 071-235 3681 Fax: 071 823 1698

15th-16th

Southampton: 'ICE Technology '94'. Details: Liz Johnstone, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO40 7AA. Tel: 44 0703 293323 Fax: 44 0703 292853

18th-23rd

Oxford: 'Natural Gas: The Commercial Challengers'. Details: Anita Gardiner, The Alphatania Group, London. Tel: 44 71 613 0087 Fax: 44 71 613 0094

18th-28th

France: 'PEL's 26th International Petroleum Executive Seminar'. Details: Miss L A Bolton, Education Administration, Petroleum Economics Ltd, Piercy House, 7 Copthall Avenue, London, EC2R 7BU, UK. Tel: 44 071 638 3758 Telefax: 44 071 638 3708 Telex: 225573 PETEC G

19th-21st

Manchester: 'Valves and Actuators – Applications and Developments'. Details: Lorraine Cookham, Independent Technical Conferences Ltd, PO Box 452, Kempston, Bedford, MK43 9PL. Tel: 44 (0)234 854756 Fax: 44 (0) 234 841375

19th-24th

Berlin: 'THERMIE Exhibition - Promotion of European Energy Technology'. Details: OPET-CS Communications Documentation Section. Fax: 32 2 7715611

21st

Hertfordshire: 'Microbiological Methods for the Petroleum Industry, A "Hands-On" Workshop'. Details: Caroline Little, The Institute of Petroleum.

22nd-23rd

London: 'UK and International Oil & Gas Taxation'. Details: Customer Services Manager, IIR Ltd, 28th Floor, Centre Point, 103 New Oxford Street, London, WC1A 1DD. Tel: 44 71 412 0141 Fax: 44 71 412 0145

25th-28th

New Orleans, USA:

'SPE 69th Annual Technical Conference & Exhibition'. Details: SPE Headquarters Office, PO Box 833836, Richardson TX 75083-3836, USA Tel: 214 952 9393 Fax: 214 952 9435 Telex: 163245 SPEUT

26th-28th

Cyprus: 'Middle East Strategy to the Year 2007'.

Details: APS Europe/TT, PO Box 2501, London, W5 2LR. Fax: 44 81 566 7674

27th

London: 'Pipeline Technology in the 1990's'. Details: Knighton Enterprises Ltd, 2 Marlborough St, Faringdon, Oxon SN7 7JP Tel/Fax: 0367 252525/241125

27th

Birmingham: 'A Look into the Future at APEA Conference'. Details: David Bucknall. Tel: 0472 341344

27th

London: 'Pipeline Seminar to Focus on the Problems of the 1990s'. Details: SEN, 2 Marlborough Street, Farringdon, Oxon. SN7 7JP. Tel: 0367 242525 Fax: 0367 241125

27th-28th

London: 'Achieving Cost-Effective Maintenance'. Details:IIR Ltd, Industrial Division 28th Floor, Centre Point, 103 New Oxford Street, London, WC1A 1DD. Tel: 071 412 0141 Fax: 071 412 0145

27th-28th

Aberdeen: 'Human Factors in Offshore Safety, Their Importance in Safety Case Preparation'. Details: Louise Pasha, Business. Seminars International. Tel: 44 71 490 3774 Fax: 44 71 490 8932

28th-29th

Sydney: 'Shipshape for the 21st Century'. Details: Ms Jessica Wong, Conference Co-Ordinator, Synergy Conventions Pty Ltd, Suite 506, 1 Newland St, Bondi Junction, NSW 2022, Australia. Tel: 61 2 369 1242 Fax: 61 2 387 5482

28th-30th Hanoi, Vietnam: 'Vietnam Oil & Gas Expo '94'. Details: Ms Janice Li in Hong Kong. Tel: 852 5117427 Fax: 852 5110692

28th-29th

London: 'Creating Value through Improved Strategic Decision Making in Upstream Oil & Gas'. Details: Lucinda Middleton. Tel: 44 71 637 4383 Fax: 44 71 631 3214

29th

London: 'Requalification and Decommissioning of Ageing Offshore Installations'. Details: Gareth Edwards. Tel: 071 973 1243.

October

4th-6th

Aberdeen: 'The International Offshore Contracting and Subsea Engineering Exhibition & Conference'. Details: IOCE '94, Spearhead Exhibitions Ltd, Rowe House, 55-59 Fife Road, Kingston upon Thames, Surrey KT1 1TA. Tel: 081 549 5831 Fax: 081 541 5657/5016 Telex: 8954102 BBSLONG

5th

London: 'The Tanker Market/Entering a New Era?'. Details: Caroline Little, The Institute of Petroleum.

5th-6th

London: 'Mastering the Human Factors in Shipping'. Details: IIR Ltd, 28th Floor, Centre Point, 103 New Oxford Street, London WC1A 1DD. Tel: 071 412 0141 Fax: 071 412 0145

5th-7th

Poland: '1st Silesian International Conference on Coalbed Methane Utilisation'. Details: Jan Surówka Fewe, ul. Powstanców 41A, 40-024 Katowice, Poland. Tel/Fax: 483 155 2729

FORTHCOMING EVENTS

7th

Malaysia: 'Gastech '94 – The 16th International LNG/LPG Conference & Exhibition'. Details: Gastech Secretariat, London RAI, Glen House, 200/208 Tottenham Court Road, London, W1P 9LA. Tel:44 71 436 9774 Fax: 44 71 436 5694

10th-13th

Veracruz: 'International Oil and Gas Industry Focuses on Mexico'. Details: Fred Herbst, SPE Public Relations Manager, Society of Petroleum Engineers, PO Box 833836, Richardson, TX 75083-3836. Tel: 214 952 9393

10th-14th

Thessaloniki Greece: 'European Wind Energy Association Conference and Exhibition'. Details: The Secretary, Organising Committe EWEC '94. 19th km Marathonos Ave. 190

09 Pikermi, Attica, Greece. Tel: 01 6039900/3627069 Fax: 01 6039904/5, 361 4709

11th-12th

Austria: '1994 International Conference on Trading and Transportation of Oil and Gas in the Former Soviet Union'. Details: Business Seminars International Ltd, The Old Court House, Hurst Green, East Sussex, TN19 7QP. Tel: 44 71 490 3774 Fax: 44 580 860304

12th

London: 'Waste to Energy Projects'. Details: Sarah Ashmore/Liz Hide. Tel: 071 637 4383 Fax: 071 631 3214

12th-13th

Chester, UK: 'Contaminated Soil Analysis'. Details: Geochem Group Ltd, Chester Street, Chester CH4 8RD. Fax: 0244 683306

16th-19th Abu Dhabi: '6th Abu Dhabi International Petroleum and Gas Exhibition (ADIPEC '94)'. Details: Alison Carew Cox, SBGI, George House, George Road, Edgbaston, Birmingham, B15 1PG. Tel: 021 455 9600 Fax: 021 456 1785

17th

London: 'Management & Storage of Seismic Data: Time for Decisions'. Details: Kate Hunnisett, Seismic DMS Seminars, Themedia Ltd, PO Box 2, Chipping Norton, Oxon, OX7 5QX. Tel: 0608 684700 Fax: 0608 684796

17th-18th

Cape Town, South Africa: 'AfricaOil '94'. Details: AIC Conferences, PO Box 67762, Bryanston 2021, South Africa. Tel: 2711 463 2802 Fax: 2711 463 6000

17th-18th

London: 'Oil & Money'. Details: Brenda Hagerty, International Herald Tribune, 63 Long Acre, London, WC2. Tel: 44 71 836 4802 Fax: 44 71 836 0717

18th-19th

London: 'Update on Sour Service: Materials Maintenance & Inspection in the Oil & Gas Industry'. Details: Nadia Ross, IBC Technical Services Ltd. Tel: 071 637 4383 Fax: 071 631 3214

18th-20th

Aberdeen: 'Control and Operation of Centrifugal Gas Compressors'. Details: Tony Watkins, Institution of Chemical Engineers, Davis Building, 165-189 Railway Terrace, Rugby, Warwickshire, CV21 3HQ. Tel: 01788 578214 Fax: 01788 577182

18th-20th Antwerp: 'The International Bulk Transport and Storage Meeting'. Details: Tank Europe '94 Baltic Conventions, The Baltic Centre, Great West Road, Brentford, TW8 9BU. Tel: 44 81 847 2446 Fax: 44 81 569 8688

19th

London: 'Environment Management Systems – Implications for the Oil Industry'. Details: Caroline Little, The Institute of Petroleum.

20th-21st

Phuket, Thailand: '2nd Annual Conference on Pan Asian Refinery 2000'. Details: Centre for Management Technology (Singapore). Tel: 65 3457322 Fax: 65 3455928

24th-28th

London: 'Introduction to Refinery Technology'. Details: Tony Watkins, Institution of Chemical Engineers, Davis Building, 165-189 Railway Terrace, Rugby, Warwickshire, CV21 3HQ. Tel: 01788 578214 Fax: 01788 577182

25th

Aberdeen: 'Developing Partnerships in the Oil Industry'. Details: Robin Bowden. Tel: 041 332 2827

November

1st-3rd

Birmingham: '8th ProcAnEx Exhibition'. Details James (Exhibitions) Ltd, 6 Anne Mount, 44 Madeley Road, London, W5 2LU. Tel: 081 998 4684 Fax: 081 998 8733

3rd

London: 'Education and Training Conference, Life after Re-engineering'. Details: Caroline Little, The Institute of Petroleum.

8th-10th

Birmingham: 'IWEX '94, International Water and Effluent Treatment Exhibition'. Details: Mr Paul Tweedale. Tel: 44 923 228577 Fax: 44 923 221346

10th

London: 'IFEG Conference "Beyond the Bookshelf"'. Details: Caroline Little, The Institute of Petroleum.

12th-15th

Egypt: 'Twelfth Petroleum Exploration and Production Conference'. Details: Mr Ahmed Ragheb, E.G.P.C., PO Box 2130 – New Maadi Cairo, Egypt. Tel: 202 353 1571 Fax: 202 3531457 Telex: 92049 PETMISR UN

15th-17th

Amsterdam: 'Holland Offshore Congress '94'. Details: IRO, Association of Dutch Suppliers in the Oil & Gas Industry, PO Box 7261, 2701 AG Zoetermeer, Netherlands. Tel: 31 79 411981 Fax: 31 79 419764

15th-17th

Amsterdam: 'Energy Economy '94'. Details: Energy Economy '94 c/o Amsterdam RAI, PO Box 77777, 1070 MS Amsterdam, Netherlands. Tel: 31 20 549 1212 Fax: 31 20 646 4469

15th-17th

Amsterdam: 'Petrotech '94 Emphasis on Environmental Investments'. Details: RAI Press Department, Hans Verweij, Europaplain, Netherlands-1078 GZ Amsterdam. Tel: 31 20 549 1212 Fax: 31 20 646 4469

16th-18th

London: 'Techniques for Cost Effective Exploration and Production'. Details: Petex Ltd, 17-18 Dover Street, London, W1X 3PB. Tel: 071 495 5800 Fax: 071 495 7808

Remote intervention in deep waters

The world record-breaking project for Petrobras in Brazil's Marlim field earlier this year was the latest in Stena Offshore Limited's progression into deeper waters and it also marked a milestone in the development of remotely operated vehicle (ROV) and remote intervention capabilities. The ability to provide remotely operated intervention support for these deep water operations was the result of a concerted 18-month programme to develop and acquire the necessary technologies.







Pipeline recovery procedures had previously involved two alternatives:

(i) use of the lay down wire, if still connected, or

(ii) use of diver intervention to burn a hole for the recovery wire shackle and subsequent connection if the pipeline had either parted or required cutting.

The diverless requirements of the contract meant the acquisition or development of a totally ROV operated recovery system and procedures.

A pipeline recovery operation consists of a few key steps:

- Locate and expose the affected area
- Prepare the line for recovery
- Attach the recovery device and wire

• Recover the line to the lay vessel. The Remote Systems Group undertook an analysis of the requirements particular to reel-lay operations with the Stena Apache and also began a survey of available equipment. This equipment fell into the following groups:

- Dredging units
- Pipeline supports systems
- Dewatering systems
- Cutting tools
- Recovery connections.

Appropriate dredging units and pipeline support systems were purchased as it was intended to use existing hardware whenever practical and restrict development only to those areas where absolutely necessary. The design and depth of the flowline and the associated recovery line pull tensions precluded the requirement for a dewatering capability

Cutting tooling fell into the three main groups of explosives, grit entrainment and mechanical methods. It was decided to use some form of mechanical system which would be easily operated by the ROV and also offered the simplest fail-safe contingencies possible. Commercially available and modified rotary and saw cutters were evaluated and discounted for a number of reasons.

Another mechanical cutting system which had been used, primarily in the quarry and onshore construction industries, is diamond impregnated wire. A continuous loop of wire is spun at high speed and gradually wears through any concrete and metal it contacts. A number of successful cuts on platform members and other steel work have been completed by units installed by divers and powered from the surface.

The small size, flexibility, light weight and commercial availability of the diamond wire made it an ideal component of an ROV mounted system but as none of the existing wire cutting systems were directly applicable to the requirements for Marlim, a suitable arrangement was specifically designed and developed.

The system was designed as a separately deployed package onto which the ROV attaches itself prior to placement and operation. The system has its own valve pack, telemetry system and surface control panel and only depends on the ROV for hydraulic power and signal conductors.

Once lowered to the bottom, the cutting system is grabbed by the ROV which makes an electro-hydraulic connection. After communications are verified, the ROV places the cutter onto a pre-selected spot on the pipeline and actuates the clamp assembly. The wire drive motor is powered from the ROV hydraulic system and the feed cylinder lowers the wire onto the pipe. As the wire cuts through the flowline, it is lowered at a controlled rate to maintain the correct combination of line tension and bearing force. Once the cut is complete, the wire carriage is raised back to the starting position.

Should the wire become trapped or caught, a simple cutter is energised to free the system. Pipe cutting is monitored by a cutter-mounted camera connected through the ROV video system. Should power to the unit or ROV fail, the wire cutter has a combination of a passive and automatic failsafe actuation. The system can cut up to 16" OD pipe and this upper limit can be easily increased with a larger carriage assembly. Cutting times are typically one hour for a 10" diameter, 0.5 " wall thickness pipe.

The pipeline recovery connector development followed a path similar to the cutter. In addition to a number of possible concepts, there were some existing connectors available which had been designed for manned and unmanned subsea use. A review of these possibilities resulted in introducing a gripping connector which had been used mainly above water and never by ROV.

A version of the Ball Grip was chosen, designed and manufactured by BSW Engineering. This system relies on a wedge surface engaging ball bearings against the internal pipe wall and is held in place by the recovery line pull. The ROV functions required are to insert the assembly into the pipeline and to actuate an optional latch assembly with a simple manipulator held Tee bar.



Ball Grip has been used for years to lift drill pipe and other tubulars topside. The pipeline recovery version of this design is essentially unchanged from the original concept. This unit is also separately lowered to the sea-bed but can be delivered directly by the ROV. The recovery wire is attached by a simple rigging hook or by a smaller version of the ball grab connector. Recovery connectors with a proof load of 80 and 200 tonnes have been fabricated for use on 10" and 12" lines. Sizes from 2" upwards are possible.

Dewatering of the flowlines for the Marlim deeplay project would take place from the pig launchers which are part of the initiation assembly. These launchers are also ROV operated and similar to previous designs.

Once the recovery connector and cutting system were assembled, comprehensive testing was undertaken to confirm the systems's operation and capabilities. This testing included functional testing and cutting procedures in the workshop, a purpose-built shallow water test facility and under offshore conditions.

Offshore trials were performed at the Underwater Centre test site at Loch Linnhe. These trials introduced

depth, current and poor visibility conditions similar to those expected in the Marlim field. It was also a good opportunity to verify the MRV systems selected for the Marlim contract and to provide the crew some pre-project familiarisation and training. The trials were a success as both 10" and 12" pipe samples were cut and recovered from a 150 metre depth.



As a result the company was confident that the pipeline recovery system would perform well if required. So it proved when following a weld fracture in the Marlim field, a 12" pipe was successfully recovered from 830 metre water depth using the pipeline recovery system.



Tordis subsea success

The need to reduce costs by major oil and gas operators and a move towards deep-water field developments have provided a new lease of life for Remotely Operated Vehicles (ROVs).

> **R**OVs have been used by Rockwater on its four largest construction projects this year – Saga Tordis, Shell Troll, Conoco Heidrun and Amerada Hess Hudson.

> It is a trend which Mr John Smith, Rockwater General Manager in Norway, believes is set to continue. 'Our industry is maturing in the North Sea and it is absolutely essential that operators and contractors work together to keep costs down. If planned properly, ROVs offer the most cost-effective way of carrying out subsea work.

> 'In addition, exploration and development is continuing in deep-water areas such as west of Shetland, mid-Norway, Brazil and the Gulf of Mexico. With depths beyond the practical limits of saturation divers, ROVs will play a very important part in establishing producing fields in these areas,' he added.

Preparing an ROV for subsea work in Tordis field

The installation of Saga Petroleum's subsea facilities highlighted the effectiveness of ROVs. The contract was regarded as one of the most complex diverless construction projects in the oil industry. Using the semi-submersible MSV Regalia and its fleet of four ROVs, two work class and two observation class vehicles, a 550-tonne manifold was connected to Gullfaks C by two 10" flowlines, one water injection line and two umbilicals. Six satellite wells, connected by jumpers, were arranged round the template. Everything then had to be protected by a steel over-trawlable structure.

One key to the success of the project was the diverless design of the installation. Mr Smith explains, 'It is essential that any subsea development requiring remote intervention work is designed with this in mind. It is a process which should start at the very beginning of field design and will continue to the point where items are launched into the water offshore. This approach, as followed by Saga Petroleum, eliminates any risks and will reduce the problems encountered during the actual workscope.

'A crucial part of this process is designing methods and procedures while assuming the very minimum of dexterity and spatial awareness of the vehicles. This will ensure that the ROV can conserve its working energy so if the unexpected does happen, it is in a position to cope,' he continued.

Mr Smith also pointed to the skills of the ROV operators. 'As is often the case, success offshore is more likely

to be due to the people behind the equipment rather than the hardware itself. At any one time on the Tordis project there were about 17 lines from vessel to sea-bed including ROV umbilicals, lift lines, guide wires etc, yet the pilots managed to manoeuvre their vehicles about the work site calmly and without incident.'

Despite the success and growth of ROVs, Mr Smith said that there will always be a need for saturation divers. Although company statistics show a progressive decline in the number of diving days since the 1980s, he thinks that there is a range of subsea tasks and situations better suited to divers.

'Conventional construction work in conventional depths is ideally suited to saturated divers, and there is still a tremendous amount of work of this sort out there. Using ROVs for complex projects in this area would probably be less cost-effective due to the high level of detailed engineering and planning required,' he said.



An uphill task in Siberia

By Carol Reader

The European Commission Energy Centre in Tyumen, officially opened recently, sets out to promote energy technology improvements in Western Siberia. Given the less than whole-hearted reception frequently given to representatives of western oil companies and equipment suppliers and their consequent growing disenchantment, how successful is the new centre likely to be?

> **S**et up by the European Commission's DG XVII within the framework of its THERMIE programme, the new centre, one of 14 in Central and Eastern Europe and the newly independent states, is located in Tyumen, the administrative capital of the *oblast* of Western Siberia which is divided into three areas or *okrug* – Tyumen, Khantis-Mansiysk where the main oilfields are located, and Yamal-Nenets with its huge gas fields.

> As elsewhere, the Tyumen centre is organised and run by the Organisation for the Promotion of Energy Technology (OPET). Its small office has been installed in a less than pristine building in a side street. However, behind an imposing door are four brand new offices with modern furniture and the latest in office equipment, looking like an immaculate bit of Brussels uprooted and set in very different surroundings. Visiting journalists reckoned this haven had the only operating fax machine in town.

The centre's objectives are :

Processing plant at Fyodorovskoye field • To promote the use of recent technological achievements and equipment in order to improve the Siberian industry's operations in exploration, production and the transport of oil and gas



resources development and technical know-how transfer

Decline and stagnation

To reduce energy consumption

To help to set up joint ventures

between Russia and European companies

The last three years have seen dramatic changes throughout Russia – in the political system, the social structure and the economy. Where the oil and gas industry is concerned, however, change has obviously begun but a great deal remains to be done.

• To further economic and technical cooperation

• To participate in all events linked with energy

For instance, recent figures quoted by AE Putilov, President, Rosneft, when he addressed this year's World Petroleum Congress in Stavanger, show that production of oil and condensate dropped from 462 million tonnes in 1991 to 351 million tonnes in 1993. In the same years the production rate of old wells fell from 10 to 8.3 tonnes per day and for new wells from 14.2 to 12 tonnes a day.

These revealing statistics reflect what Mr Putilov described as the 'unfavourable maturity' of the Russian oil industry. Equipment supplies are short; funds for maintenance and new investment are extremely tight, almost non-existent, and made all the more severe by escalating and ever-changing taxation imposed by local and central administrations. Details of problems encountered by major western companies trying to get business in Russia, to set up and to operate are now fairly well known – they make gloomy reading.

Over-riding everything is the lack of legislation specific to the oil and gas industry – and progress here is slow. After a long period of gestation, a draft oil and gas law was thrown out last month by President Boris Yeltsin and Prime Minister Victor Chernomyrdin. It is not known when the legislation is now expected to get final approval. Also keenly awaited are decisions on crude export quotas and the tax treatment for joint ventures with foreign partners. Several big projects are held up, or even threatened, by the lack of progress in these matters.

Problems and more problems

The drop in production is just one bit of evidence of an industry in decline, or even in crisis, according to some observers. Drilling rates for exploration and development shrank too – from 29 million metres in 1991 to 18.3 million metres in 1993.

In fact Russian oil output reached a peak in 1988 which it has failed to match again in subsequent years. The reasons given include the maturity of many oil producing regions, reduction in exploration activities and a slow-down in the development of new fields, because of a lack of funds.

In Western Siberia, the principal producing area, the problems also include the past massive use of water injection which has led to corrosion problems and the need for more extensive means to activate the wells. A number of wells are shut awaiting repair and are held up by lack of supplies, such as tubing and pumps. Other problems concern non-payment by buyers of crude, causing staff to be laid off and insufficient funds to buy essential supplies.

A recent report by Smith Rea Energy Analysts also stresses the same point, putting the overall Russian shortfall in the supply of oilfield equipment at an average of 30 percent. According to this report, since there is a critical shortage of hard currency, this gap will eventually have to be filled by increased local production - for instance, plants that were formerly devoted to military equipment are now being converted to manufacture all manner of civilian requirements.

In the Tyumen oblast, crude output in 1993 for the main producers was around 85 percent of the previous year's production, with only one exception. For natural gas the figures were better, though neither

The shopping

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One well head at Fyodorovskoye field

production the 20,000 wells that are currently idle in Western Siberia. Other needs centre on enhanced oil recovery technology and manufacturing facilities for basic materials and components previously supplied from the Ukraine. But producer Surgutneftegaz, now a joint stock company, is desperately short of funds, exacerbated by the low price paid for crude by the state, refiners and industrial companies, delays in payment - moreover the final receipt is depreciated as a result of severe inflation. In addition, it resents the control still wielded by Moscow over the operations of the Siberian industry

Despite all its requirements, the local oil industry is hardly giving a warm reception to would-be foreign investors. It seems that managers who have lived by the Soviet system are experiencing difficulties in adapt-



ing to a free market system and fear that they might be 'exploited' if they do business with non-Russians. When asked directly whether a western engineering firm could be put on a tender list or whether there were opportunities for a Dutch company specialising in land reclamation, though the state of the roads around the oilfield seemed to offer enormous scope, the answer was a flat 'No'

This attitude contrasts with the obvious desperate need for supplies of basic equipment, for replacement parts, for new technology of many kinds. It contrasts also with frequent statements that, 'We welcome direct foreign investment'. The Russian managements acknowledge that they have urgent needs but at the same time they are obviously extremely concerned at how they are going to pay, how they are going to repay any loan. and above all whether to allow western companies a foothold in their industry

Signs of an oil industry with problems were revealed during a visit to the Fyodorovskoye oilfield near Surgut in the Tyumen region of Western Siberia. Mr Victor Deshura, Chief Engineer, Surgutneftegas, confirmed that crude output was now well below its peak rate. Undeveloped reserves existed but they were not easily recoverable; and drilling had declined. Poor quality materials were evident as was widespread corrosion and an obvious lack of maintenance. The general landscape showed a persistent disregard for environmental concerns - with contamination of land and water particularly noticeable and no attempt made to minimise the amount of land taken for wells or pipelines

Matters such as these are already being studied by the Energy Centre in Tyumen which was in operation for 12 months before the official opening in July. During that period it received enquiries on many subjects - specifically on equipment for fracturing, for waste and cuttings processing, for anti-corrosion measures for pipes, for flow improvers, bottom hole measuring devices, for energy conservation and enhanced oil recovery methods, technology for 3D seismic and horizontal drilling.

This list is long and grows daily, so under its Director, Dominique Bertault, this centre is certain to do big business but its task is not easy.

PEOPLE



Roland Shaw CBE has retired as non-executive director and chairman of Premier Consolidated Oilfields with effect from 3 August 1994. *Richard Cox-Johnson*, a nonexecutive director, will serve as acting chairman until a successor to Mr Shaw is appointed.

Hamilton Oil Company Ltd has announced the apointment of **Jim Riemersma** as Executive Vice President and General Manager. He replaces **Ed Blair** who has been transferred to Houston, Texas to assume the position of President and General Manager of BHP Petroleum's Americas Division.

John Orange is the new president of the United Kingdom Petroleum Industry Association in succession to David Varney. Mr Orange is Chief Executive of BP Oil UK Ltd, and IP Vice President. Mr Varney is a Managing Director of Shell UK plc. and President of the Institute of Petroleum.

Alex Blake-Milton has accepted an offer from Elf's UK refining and marketing company to become Corporate Communications Manager from September 1994. He is at present External Relations Manager for Elf Petroleum UK and they will shortly be announcing his replacement.

Mr Arthur Fletcher has joined Kvaerner National Ltd as managing director of their new UK business based in Aberdeen. This follows the Kvaerner Group's acquisition in February of the international wellhead systems business of National Oilwell. He will join the board of Kvaerner National Ltd and will report to **Dr Marco Fabbri**, the chief executive officer of both Kvaerner National Ltd and Kvaerner FSSL Ltd.



McDermott Marine Construction, an operating unit of McDermott International Inc., has announced the appointment of John M Clinton as Managing Director of McDermott Marine Construction Limited.

Mr Brian Nixon has been appointed business manager of leading oil and gas contractor AOC International. Formerly onshore director with Atlantic Power and Gas Ltd (APG), he brings over 20 years experience to his new post. He will be responsible for developing major longterm construction, maintenance and operations support contracts within onshore industries.

The Board of British-Borneo Petroleum Sundicate PLC (British Borneo) announces the appointment of Ted D Autry as President of its wholly owned subsidiary, British Borneo Exploration Inc. Mr Autry has spent his entire career in the oil and gas industry, most recently as Vice President, North American Production with Hunt Oil Company in Dallas. Prior to joining Hunt, he spent almost 30 years with Amoco where he started as a production engineer and became Chief Engineer and than Manager of Planning and Operations for Amoco International.

Don Storey, who was formerly director of operations for Foster Wheeler Petroleum Development Ltd has relocated to Aberdeen to take up his new position as managing director for Foster Wheeler Wood Group Engineering Ltd.

Members of the Shetland Oil Industries Group (SOIG) have appointed **Barry Stevens** as their new chairman. He previously held the position of the Group's Vice Chairman and is Highlands and Islands Airports' Assistant Manager at Sumburgh Airport. Mr Stevens succeeds **Allan Wishart**, General Manager of Lerwick Harbour Trust and SOIG chairman for the past two years.

Jack R Brammell has been appointed managing director of northern and eastern Europe for Pennzoil Overseas bv, a subsidiary of Pennzoil Products Co. In this position he will direct Pennzoil's growth strategy in Europe, with the exception of Spain and Portugal.



Serck Controls, the Coventry telemetry specialists have appointed *Mr Steve Robinson* as resident regional manager in Abu Dhabi. He will be actively involved in providing technical sales support to local associates following a series of major export successes in the United Arab Emirates.

Clyde Petroleum plc has announced that Mr Roderick Paul and Mr Michael Garner have joined the Board as a non-executive Directors with effect from 1 and 14 July respectively. Mr Paul is Group Chief Executive of Severn Trent plc and Mr Garner ecently retired as Finance Director of T.I. Group plc. Dr Colin Phipps retired as Chairman of Clyde on 23 July but remains as a Director. His successor as Executive Chairman is Malcolm Gourlay currently chief executive and Roy Franklin will become Group Managing Director.



Mr James Wood has been appointed the new Scottish representative for Tramp Oil & Marine. Initially based in Peterhead, from October this year he will be representing Tramp Oil from Aberdeen as well. Mr Wood has been involved in the marine industry since 1976.

Kevin Fitzgerald has been appointed Managing Director for Valetmatic Brushwash, suppliers of automatic vehicle washing equipment to forecourt and retail motor industries, as well as commercial vehicle and bus operators.

Marine Offshore Management Ltd have announced the appointment of their new managing director **Robert Evans.** Mr Evans comes to MOM from Enterprise Oil where he was closely involved with the Nelson Field Development. Prior to that he worked throughout the world with the Royal Dutch Shell Group.

Ukrainian gas - surrounded by debt and dispute

By Colin Barraclough in Kiev

On 17 August, Ukraine and Russia agreed to a timetable for Ukraine's payment of gas debts to Russia. In return, the Russian authorities pledged to guarantee adequate shipments of gas through the coming winter.

> With almost 90 percent of Russia's gas exports to Europe piped through the territory of Ukraine, the settlement should guarantee European gas supplies from former Soviet states until next year.

> With so much of Europe's imported gas routed through Ukraine, the dispute takes on a wider significance. Gas supply to southern Europe from Algeria is already under threat from the continuing violent insurgency - and the fear among analysts that the Westernbacked Algerian government cannot last forever (see *Petroleum Review*, January 1994). What appears to be a local dispute between two former Soviet republics may have a stronger significance for Europe.

Debt dispute

The energy dispute between Ukraine and Russia is part of a wider political tussle taking place between the two ex-Soviet republics. Moscow and Kiev are currently arguing over the future of the Black Sea Fleet, Crimea, nuclear weapons and money. The governments have signed several protocols which appeared to settle the gas debt question but each time the issue has again reared its head.

Russia accuses Ukraine of failing to pay over two trillion roubles (\$950 million) for fuel and energy it imported from the Russian company Gazprom. Moscow stopped supplying Ukraine with gas earlier this year and threatened a total shutdown of piped gas if Ukraine failed to come up with payment options. After much bluster and sabre-rattling, the two sides signed a protocol in April which saw supplies resumed for several months.



Last month, however, Gazprom again threatened to shut down gas supplies, raising the prospect of severe disruption to European customers. Rem Vyakhirev, Chairman of Gazprom, said that Ukraine had not done enough to ensure that payments were made. Russian officials said that 71 billion cubic metres (bcm) of gas was intended for European customers in the first six months of this year and accused Ukraine of diverting some for use inside Ukraine.

Since 1991, Russia and Turkmenistan, the two great energy exporters of the ex-USSR, have raised their oil and gas prices to approximately world rates. By January 1994 Russia was asking Ukraine to pay \$80 per 1,000 cubic metres for natural gas. The Ukrainian government,outraged at the high rates and still shocked to find the old Soviet system in tatters, delayed payments.

Kiev has a strong argument in reply. The government argues that Russia owes it \$367 million in transit fees for gas transported to Europe. Nevertheless, Russia has always had the upper hand in the dispute. Moscow has been all too willing to exploit political tensions in Crimea - the local parliament in Crimea has unilaterally declared independence from Kiev - and it has used the Black Sea Fleet issue to extract political and economic concessions from Ukraine.

Chernobyl

Additionally, Kiev's energy crisis has been exacerbated by pressure from Western countries to close the Chernobyl nuclear power station, site of a 1986 fire which Ukraine's health authorities admitted caused the death of thousands of people. Three reactors remain in operation at Chernobyl, and parliament has so far refused to shut them down, despite European offers to build replacement stations. The parliament's argument is that one-third of Ukraine's energy comes from nuclear power and seven percent from Chernobyl alone. Parliamentarians want the replacement stations to be operational before shutting down Chernobyl.

Prodigal energy use

At the heart of Kiev's energy trouble is its enormous gas consumption. It produces only 18-20 bcm of gas a year itself but consumes over 100 bcm a year. 'We produce about 20 percent of our requirements,' said Ivan Diyak, President of Ukrgazprom, Ukraine's state gas company. 'Of course we need to increase production but our main problem is consumption. We are the third largest consumer in the world.

'When everything was centralised, we were told how much gas to use. Enterprises in Ukraine, electrostations, communal farms, even houses, everyone was told to use as much as they liked. We were building

Communism, so it was all free of charge,' he said. Three years after independence, apartments and houses still have no gas meters to measure consumption. In their homes, Ukrainians regularly keep gas

Chernobyl

power station.

Colin

Photos by

Barraclough



cookers burning between meals or to heat cold flats. Western organisations including the European Bank for Reconstruction and Development (EBRD) and Gaz de France have offered to install meters but the new meters have concentrated on communal users.

'More than 50 percent of gas used here is wasted,' says Michael Zienchuk, a Canadian adviser to Ukraine's Economics Ministry. 'Energy is just squandered in this country. Near some of their military bases, so much kerosene has leaked into the ground that local people simply siphon it out to use in their cars. You have to change the attitude of the whole population.'

Ukrainian officials admit that very little has been done to educate people about efficient consumption. 'I still use as much gas as I need,' admitted Mr Diyak. He said that the government had instructed Ukrgazprom to increase domestic production by 40 percent by the year 2000, if possible through new technology. The government, however, has insufficient funds to pay for such investment.

How to reduce debts

In order to pay its debts, the Ukrainian government has taken the short-term option of handing assets in its oil and gas industries to Russia. In his August agreement, newly elected Ukrainian president Leonid Kuchma agreed that Ukraine should pay off some of its debt to Russia with shares in Ukrainian oil and gas enterprises. In particular, Mr Kuchma advocated selling the Lisichansk oil refinery in the industrial east of the country.

Mr Kuchma's edict confirms what has in fact been happening over the last few months. Russian companies have bought shares in Ukrainian storage facilities or taken over operation of pipelines. Russia's statecontrolled Gazprom has even bought into newly privatised joint-stock companies.

Western advisers, who for months have urged Ukrainian leaders to privatise, are now trying to ensure that Ukraine does not simply hand over all its best assets to Moscow.

'We keep hearing about these debt-equity swaps,' says Paul Amery, a British government Know-How Fund adviser to Ukraine's Finance Ministry. 'It's really not a sensible option. Ukraine is giving away assets for such ridiculous prices. Better to generate some income

Radiation warning in Slavotich, 50 km from Chernobyl

with the assets, and pay off the debt in instalments.'

The Ukraine's parliament has tried to slow down the practice but for the wrong reasons. Parliamentarians, mostly anti-reform communists, are suspicious of private ownership and have tried to stymie all privatisation.

They are doubly scared that privatising the country's gas pipelines would weaken the Ukrainian state.

Indeed, a recalcitrant parliament has succeeded in blocking almost all privatisation and reform. Ukraine

remains a very Soviet country. In the industrial east, no one has thought to remove hoardings proclaiming 'Glory to the Heroes of Labour!' People still address each other as 'comrade.' Huge state factories continue to operate inefficiently.

Vasily Dervanko

'The government is reluctant to privatise large industries,' said Vasily Derevanko, director of the huge Petrovski Metals Plant in the eastern city of Dnipro-Petrovsk. 'The state doesn't want to sever its tentacles. Of course, privatising small businesses like hairdressers or shops is easier than privatising factories. Here we employ 10,000 people.'

This plant - and hundreds like it in the oil and gas industries - have barely changed since independence. The factory still provides housing for 10,000 employees, medical care through several hospitals and outpatient clinics, 15 schools, a 27,000-seat stadium, 15 restaurants, a house of culture, and a summer camp. 'We'd like to privatise,' says Mr Derevanko, 'but it's not something we can do overnight.'

Officials in Ukraine's industries - including oil and gas - have failed to adapt to the strictures of independence. Until they do, the country will continue to be mired in perpetual disputes with Russia over energy. As Mr Diyak acknowledges, Russia will continue to exert a powerful influence over Ukraine for some years to come. 'Russia wants to retain a monopoly, not just on economic issues, but on political questions as well,' said Mr Diyak. 'I doubt they would allow us to take free decisions.'

Petrovski Metal Plant, Dnipro-Petrovsk



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TECHNICAL REPORT

Exploration and Production

The Institute now provides the secretariat services to the PSE/17committee and its subcommittees covering 'Materials, Equipment and Offshore Structures for the Petroleum and Natural Gas Industries'. The transition from BSI has been relatively smooth. A Technical Assistant has been recruited.

Efforts continue to identify a significant role for the IP in the CRINE initiative. IP now has a member on the Cultural Change Subcommittee.

W.S. Atkins have completed all their technical work on subsea equipment operating envelopes and drafts of the final report on the Routine and Non-Routine Cases have been issued to Task Group members.

The Position Paper on the 'Safe Design of High Pressure Shell and Tube Heat Exchangers' has been distributed to all operators and interested parties. A revised research proposal for more theoretical work is being prepared.

A record 81 people at an April meeting heard John Brooks of the DTI on the exploration potential of the UKCS.

Petroleum Measurement

"Petroleum Measurement Paper No 6: Guide to Coriolis Direct Mass Flowmeters' is now being progressed for publication.

A meeting has been held with National Weights and Measures Laboratory(NWML) to discuss Self Verification in the downstream oil industry, where some weights and measures activities currently undertaken by Trading Standards Officers may be transferred to industry/specialist contractors.

Microbiology

Arrangements have been made for the IP's Hands-on Workshop to be held at the University of Hertfordshire in September. Academic microbiologists and commercial organisations have been invited to demonstrate.

The revision of the method IP 385 `Determination of the viable microbial content of fuels and fuel components boiling below 390°C - filtration and culture method' has been completed.

Refining and Marketing

The research into static electricity effects during meter proving, sponsored by a number of member companies and being carried out at BP Sunbury. The conclusions will be published through the Institute and will be used in discussions with the Health and Safety Executive.

An initial meeting of the HSE steering committee has been arranged to discuss the replacement of HS(G)41 covering design and operation of service stations. Plans for setting up the three permanent committees are in hand. The Code of Practice for Driver Controlled Deliveries has now been published on behalf of UKPIA and plans are underway to provide guidance on specification of underground pipework, principally at service stations.

The Safe Loading Pass Scheme update is being published and the Conveyance Panel has now turned its attention to updating the Road Tank Vehicle Workshop Code of Practice.

Publication of the Code of Practice for Internal Floating Roofs is scheduled for publication in September – well timed for the expected issue of the EC VOC Directive. `Guidelines for Uplift of Product from Service Stations and Customer Tanks', revised to include a section on electrostatic hazards, is now being prepared for publication.

Environment

`A sector application guide for BS 7750 for oil refineries' has been completed for publication later this year.

Work has continued to find a suitable replacement for Freon (CFC 113) as the extraction solvent for the test `Determination of the oil content of effluent water'. IP sponsored work carried out by BP Research has shown that tetrachloroethylene may be a suitable replacement and may give a better oil recovery than Freon. It is planned to conduct an inter-laboratory evaluation of the test.

The IP held a successful workshop on the subject of tradeable permits in June. Representatives from all the major oil companies, DTI, DOE and HMIP attended.

Standardization

A meeting of ST committee members with ASTM representatives was held in June at the Institute. Although the number of ASTM delegates was disappointing, there was much useful discussion on ASTM and IP policy with regards to test method standardization, and the involvement of the two organisations in ISO.

An ISO/TC 28 meeting took place in Paris in June. It was noted that out of the 12 ISO Standards published in the last year by TC28, nine were developed by IP ST-BSI PTC/13, demonstrating the UK commitment to standards.

Thirteen new or revised Parts of BS2000 were published by the IP. Six parts were ISO Standards that had been adopted as European Standards (ENs).

Advice on test methods has been given to the Department of Transport which is preparing the `Motor fuel (composition and content) Regulations 1994' to come into force on 1 September. This Statutory Instrument calls up the new European Specifications for automotive fuels.

Health

Work has started on the estimation of the benzene content of gasoline manufactured in the period 1920-80 in UK refineries for use in the estimation of the benzene exposure of the leukaemia study members. Job history collection work by the oil companies is nearing completion.

Personal exposure monitoring of several historical tasks is taking place to derive more reliable estimates. The leukaemia part of the epidemiology study is scheduled for completion by the end of this year.

The research project to investigate the use of ³²P post labelling method for the determination of the bioavailability of carcinogens from oils has been completed by BIBRA. A paper on the usefulness of this technique in the measurement of the effects of pollution is being developed for publication in professional journals.

A document which reviews health aspects of environmental air pollution is nearing completion. The document reviews current health concerns, the implications for the petroleum industry, and the involvement of the medical profession, government and academia.

> John Hayes, Technical Director

TECHNOLOGY NEWS

Lightweight stack emission sampling system

Clean Air Engineering has announced a new lightweight, compact, isokinetic stack emission sampling system designed to monitor compliance with HMIP and local authority environmental regulations.

Housed in a highly portable probe assembly lined by an umbilical to a metering cabinet, the Clean Air Engineering Method 5 sampling train is said to contain all the apparatus required to measure particulate stack emissions.

A Stausscheibe (type S) pitot is used for flow rate measurement, enabling insertion through a 75mm sampling port and giving accurate results in low gas stream velocities.

Traverse in restricted spaces such as narrow walkways is catered for by a monorail support system that allows the



The Method 5 stack monitoring system is available for hire or purchase

apparatus to be rotated as it is withdrawn from the stack. Similarly, access doors on both sides of the equipment housing allow easy access when working adjacent to a wall or other obstruction. Other features include a meter box with LED digital temperature indicators, solid state probe temperature controllers, all plug-in connections to the probe and a timer.

ESP innovation for horizontal high rate wells

Centrilift has designed a new electric submersible pump (ESP) with a diameter of only 5.62 inches but with the capacity to produce over 30,000 barrels of fluid per day from horizontal high-rate wells requiring artificial lift.

The KC 20 000 is 70 percent efficient, with a head of 50 foot for each stage at the specified flow. 'This efficiency rating is equivalent to that normally associated with larger pumping assemblies,' said Mr William Milne, Area Engineer for Centrilift's Europe branch, 'making this achievement a major breakthrough for the whole ESP industry.

'It is our understanding that the performance of the new ESP far exceeds that of competitive assemblies in terms of efficiency and head generation thereby reducing costs to the customer,' he added. 'In some cases our competitors require up to a third more stages to meet our performance.'

Glands for armoured and braided cables

Hawkes' new 501/453 EExe/EExd Universal cable gland has been designed to ensure improved safety and usability.

Suitable on and offshore, the Universal cable gland makes the specification and installation of EExe and EExd cable glands faster, simpler and more reliable, by reducing possible selection and installation errors.

The innovative design of the flameproof inner seal has several features and benefits. Firstly, it will accept a larger range of cable diameters than any conventional compression seal. It has also been subjected to and passed BASEEFA flame transmission and flame erosion tests when fitted onto cables. These tests are over and above the normal requirements for flameproof cable glands.

The seal also eliminates cable sheath damage which may be caused by overcompression of conventional compression seals. It is captive onto the armour clamping spigot, does not need to be removed from the gland when the armour clamp is effected, and has low smoke and fume zero halogen properties.



Universal cable glands

New test borehole facility

CSM Associates' borehole test facility is now available at Rosemanowes in Cornwall.

Formerly the UK government's hot dry rock geothermal energy research site, this facility is said to offer access to one of the most comprehensivelylogged well systems in the world. The boreholes are in a benign fresh water-filled granite environment, and are suitable for testing a wide range of production, seismic and open hole tools.

There are a number of test borehole facilities on site including: three 2.5km deep boreholes completed at 8.5 inches and cased to 2.2km, giving a 300m open hole section inclined at 30°.

The site also includes four vertical 300m deep borehole completed at six inches uncased and one 150m borehole completed at 8.5 inches uncased and inclined from the surface at 30°, which is completed with a tool delivery and handling system.

The facility also provides three logging winches with standard seven conductor wireline cable, a logging tower with tool handling hoists, full mechanical and electronic workshops, data processing and interpretation facilities and access to an extensive archive of research logging data.

The site itself is in a remote location offering total confidentiality but with good road, rail and air links.

Camera for inspection of risers

Stenmar Ltd has developed what it claims is the first underwater camera capable of carrying out underwater inspection of flexible risers.

The FM 3000, developed in association with Deep Sea Power and Light of San Diego, is fitted with two cameras, has an in-built system and can rotate 360°. It measures just 2.5 inches in diameter and can monitor the internal condition of risers.

TECHNOLOGY NEWS

Digital satellite terminal for fast, reliable communication

A new digital satellite terminal has been developed by ABB Nera of Norway for faster and more reliable communication.

Saturn Bt is suited for use as a local fixed or semi-fixed telecommunication centre and is said to cost 15-20 percent less than an Inmarsat A terminal.

Designed for fixed installations, the terminal consists of an antenna/RF unit and a control unit that are connected by a single coaxial cable, which can be extended up to 100 metres. The system can be powered by either DC or AC and is built to operate in the most adverse arctic and tropical weather conditions. The whole system, including power supply, cables and accessories, is packed in a rugged suitcase for easy transport and installation.

The unit is equipped with five extra telephone/fax outlets, in addition to hook-ups for modem, PC and a printer that will print out alarms, call logs, telex and broadcast messages.

All operations are handled from keypads on a handset that is similar to that of a mobile phone. It has a redial function, and up to 99 short numbers can be chosen by name on the display, which also indicates signal strength and will show the cause of any malfunction.

One new feature is network information which provides



Both equipment and user costs are reduced with the Saturn Bt terminal

data on operational LES and operational satellite.

The terminal has been developed for the new digital Inmarsat B satellite system,

which is said to work faster and more reliably than the Inmarsat A service, providing noise-free high-quality voice and data communication.

Diverless pipeline connection

Hydra-Tight has added a new diverless Morgrip coupling to its range of weldless pipeline connection systems.

The new design, which works at depths of 1,000 metres, has been developed and tested as part of a programme to meet the needs of the Norwegian Oil Directorate. All companies operating in the Norwegian sector must have a pipeline repair system in place for operating at depths in excess of 350 metres, specifically in the Norwegian trench which has to be crossed by any pipeline feeding back to the mainland.

The coupling development programme now entering its third phase is for the manufacture of a 16 inch connector.

The manufacturer believes that the importance of this programme reaches beyond its immediate parameters by providing a feasible solution to reducing diver intervention at any working depth, anywhere where pipeline connection and repair is necessary. This will provide an important aid in addition to the inherent benefit of eliminating welding to join pipe either subsea or topside.

Universities research rock overpressure

The universities of Durham, Newcastle and Heriot Watt are to begin a £660,000, threeyear research programme into the problems of rock overpressure below the seabed.

Funded principally by oil and gas companies, the research is being seen as a key step towards securing the commercial development of deep-rock reserves.

We need more basic knowledge about what causes overpressure and what effect it has on the rocks and the fluids in them,' said Dr Dick Swarbrick Lecturer in Geological Sciences at Durham. When the conditions are understood, it will be possible to work out ways of predicting the overpressure and drilling safely into these deeply-buried rocks to tap the gas and oil.'

A solution to the overpressure problem will unlock deep reserves in many parts of the world, including areas of the Far East, North America, as well as the central part of the North Sea where up to 20 percent of the remaining oil and gas is thought to be in high temperature/high pressure reservoirs.

The collaborative project involves geologists and geophysicists at the University of Durham, who will examine seismic and pressure data and rock samples to identify where the very high overpressure exists and how it affects their ability to produce oil and gas.

Geochemists at the University of Newcastle upon Tyne will investigate the trapped fluids to determine pressures and to examine the movement of oil through the rock, while reservoir engineers at Heriot-Watt will assess the effects of pressure and differential stresses in deeply-buried rock on the flow properties of oil and gas at sub-surface temperatures and pressure.

Flowline hose management set

Following a dual order from an international drilling contractor, NIM Winches has designed and manufactured a complete set of hose management equipment for connection and disconnection of flowlines between production platforms and a floating facility.

The order, which was carried out at the firm's Newcastle manufacturing base, consisted of a 4.8 metre diameter reel for 200 metres of three or five inch diameter hose. The contract also included fabrication of a storage and handling stand, featuring an additional powered reeling facility. This comprised of a compressed air driven winch assembly which enables the reels to be powered for loading and unloading offshore.

The package also included compressed air-driven powered connection winches with a 15 tonne safe working load, featuring all the special requirements for rapid disengagement and recovery in the event of an emergency.



Hose management equipment

TECHNOLOGY NEWS

Rugged rescue boats delivered by air

Five rescue craft, specially developed to withstand high stress from the extreme North Sea and Alaskan weather conditions, have been delivered to Tidewater Pacific of Alaska.

According to Mr Geir Skaala, president of the Norwegian rescue-boat builder, Norsafe, the craft are equipped with 210 HP diesel engines, propelled by water jet and delivered with a fiveyear guarantee.

'Our American representative worked with the customer so that we were able to adapt our craft to their national safety requirements and total work needs,' said Mr Skaala.

The craft were shipped by air from Europe to the United States to satisfy the



Five rescue craft sent air freight to Alaska

delivery terms of Tidewater Pacific. 'Air freight allowed us to deliver faster than any competitor,' said Mr Skaala. They will be used for transport of personnel to and from offshore oil barges and will also be available for all types of rescue and oil-spill operations that may arise in the area.

Metal seal for horizontal trees

Wireline services firm, Petroline, has developed a metal to metal seal for incorporation into a metal seal plugging system for use in subsea horizontal trees.

The through-life cost saving using horizontal trees as opposed to conventional trees has been estimated at between £1 million and £2 million per subsea well,' said Technical Director Fraser Innes.

'One of the main stumbling blocks in developing horizontal subsea trees to meet all the industry's requirements has been the development of a suitable metal seal plugging system which can offer the necessary security, safety and integrity normally expected from metal seal gate valves.

'Our seal is the first dynamic seal of this type to have been successfully demonstrated and we are confident that this breakthrough will have a significant impact on the subsea systems' business.'

Goggle with antifog coating

Cabot Safety has added a goggle with anti-fog coating to its extensive range of protective eye and facewear.

The 4800AF is a general purpose goggle, which provides good impact, dust, chemical and molten metal protection. It is said to be ideal for operators working in steamy conditions or for moving about between areas of different temperatures.

Designed for long-term comfort combined with maximum protection, the goggle will fit the majority of users and can be worn comfortably over wearers' prescription spectacles.

The flat polycarbonate lenses provides excellent impact protection with minimal optical distortion, whilst the broad, spring design surround absorbs shocks. Indirect ventilation points not only increase the goggle's wearability but also protect the wearer against chemical splashes.

Conforming to prEN166, medium energy impact C, the goggles are available in cases of 200, with each pair individually wrapped.

New pipe fittings range

A comprehensive stock of seamless, stainless steel, butt weld fittings for use in the chemical, petrochemical, oil and gas industries is now available from Southamptonbased distributor, Tubesales (UK) Ltd.

The range of stainless elbows, tees and reducers complements the company's core range of seamless, stainless steel pipe and provides a complete package of pipes and fittings for plant maintenance and refurbishment projects.

The distributor is now offering 1/2 inch up to six inch sch 10s and sch 40s fittings. All items are dual certified to either WP 304/304L or WP 316/316L and, of particular importance to the oil and gas industry, they are also supplied fully certified to NACE standard MR-01-75.

The ex-stock service guarantees next day delivery.



Butt weld fittings

CONTACTS

Clean Air Engineering	0462 850626
CSM Associates	0209 860141
Centrilift	0224 772233
Hawke Cable Glands	061 308 3611
Stenmar	0224 827288
ABB Nera	010 47 66 84 47 00
Hydra-Tight	0922 612521
Dr Swarbrick, Durham University	091 374 3334
NIM Group	0773 603997
Norsafe as	010 47 37 08 65 55
Cabot Safety	0625 878320
Petroline Wireline Services	0224 770962
Tubesales	0703 739333

NEW MEMBERS

Mr P Agarwala, 173 High Road, Leyton, London, E15 2BY. Mr J J Allwood, Harold Whitehead & Partners, Bluegate, Willow Avenue, Oxford Road, Denham, Uxbridge, Middx, UB9 4AF.

Mr G J Audas, 51 Mount Hill Road, Hanham, Bristol, BS15 2QT. Mr S C Birkett, Nile Safety Ltd, Braemore, Pitmurchie Road, Kincardine O'Neill, Aboyne, Aberdeenshire, AB34 5AQ.

Mr T B Bishop, Whistlefield, Challacombe Close, Hutton Mount, Shenfield, Brentwood, Essex, CM13 2LU.

Mr Y Blazhevich, Ventspils Nafta, 75 Talsu Street, Ventspils LV 3600 Latvia.

Dr S A R Boldy, Amerada Hess Ltd, 33 Grosvenor Place, London, SW1X 7HY.

Mr J Bradley, Conoco Ltd, Thameside Terminal Salt Lane, Cliffe, Rochester, Kent, ME3 7TA.

Mr P Brice, 16 Knights Park, Kingston upon Thames, Surrey, KT1 2QN.

Mr M A Burrows, Monition Ltd, Bolsover Enterprise Park, PO Box 10, Station Road, Bolsover, Chesterfield, Derbyshire, S44 6BD.

Mr P Byfield, 7 Plover Way, Surrey Quays, London, SE16 1TS. Mr L M Campion, Blugas Ltd, Tolka Quay Road, Dublin 1 Ireland.

Mr N E Chell, 40 Woodcote Grove Road, Coulsdon, Surrey, , CR5 2AB

Mr N Cherbanich, NMC Consulting, Apt 2, 43 Crouch Hall Road, London, N8 8HH.

Mr J Clarke, 27 Chesterfield House, South Audley Street, London, W1Y 5TB.

Mr D M Comstock, 6323 Hidden Arbor, Houston, Texas, 77088 USA.

Mr J L Crabb, 10 Silksworth Hall Drive, Sunderland, SR3 2PG. Mr A J Dyson, Alan Dyson Ltd, Forum House, Stirling Road, Chichester, W Sussex, PO19 2EN.

Dr J F E Fabri, VEBA AG., Bennigsenplatz 1, D-40474 Dusseldorf, Germany.

Mr D J Finlayson, 26 Chiltern Hills Road, Beaconsfield, Bucks, HP9 1PL.

Mr R G R Galbraith, Kvaerner National Ltd, St Magnus House, Guild Street, Aberdeen, AB1 2NJ.

Mr J S Gillam, Yule Cottage, 92 Candlemas Lane, Beaconsfield, Bucks, HP9 1AE.

Mr S M Gill, 52 Ruden Way, Epsom Downs, Epsom, Surrey, KT17 3LN.

Mr C Gothard, 41 St Andrews Crescent, Dumbarton, G82 3ES. Mr J A Harris, 27 Moyness Park Drive, Blairgowrie, Perthshire, , PH10 6LX.

Mrs G Hill, Amerada Hess Ltd, 33 Grosvenor Place; London, SW1X 7HY.

Mr M J Hunter, 35 Foxenden Road, Guildford, Surrey, GU1 4DL. Mr J R A Kersey, Conoco Ltd., Humber Oil Refinery, South Killingholme, Grimsby, S Humberside, DN40 3DW.

Mr H C Laidlaw, Cunningham IAP, Av Romulo Gallegos, Santa Eduvigis, Torre KLM., Piso 11, Caracas Venezuela.

Mr P D Lawrence, Paul D Lawrence Associates, Doubleday House, 25 - 27 High Street, Solihull, W Midlands, B91 3FJ.

Mr D G B Leggate, 75 Lavender Walk, Hollingberry Park, Evesham, Worcs, WR11 4LN.

Mr Wing Sun Lo , Kenthworth Engineering Ltd, 7th Chevalier Commercial Ctr, 8 Wong Hoi Road, Kowloon Bay Hong Kong.

Miss J A Mack, Amerada Hess Ltd, 33 Grosvenor Place, London, SW1X 7HY.

Mr A Malkin, Petroleum Economist, 25/31 Ironmonger Row, London, EC1V 3PN.

Miss R Mal, Europe Energy Environment Ltd, 3 Mayne Street, London, EC1A 9HH.

Ms D Mann, 16 Knights Park, Kingston upon Thames, Surrey, KT1 2QN.

Mr A M Mitchell, Amerada Hess Ltd, 33 Grosvenor Place, London, SW1X 7HY.

Mr G Mitchell, Fina plc., Fina House, Ashley Avenue, Epsom, Surrey, KT18 5AD.

Ms K-L A Murdoch, 124 High Street, Riseley, Bedford, MK44 1DF. Mr A J Perry, Conoco Ltd., Humber Refinery, South Killingholme, Grimsby, S Humberside, DN40 3DW.

Mr M J Pye , 43B Empress Avenue, Ilford, Essex, IG1 3DE.

Mr M D Rawlinson, Toplis & Harding (Intl) Ltd, P O Box 21533, Safat 13076 Kuwait.

Mr M H Reynolds, Prospect Exploration Ltd, 15 Manor Way, Beckenham, Kent, BR3 3LH.

Mr N J Robertson, 27 Garnet Lane, Tadcaster, North Yorkshire, LS24 9LD.

Mr S C F Rogers, Systems Union Ltd, 1 The Broadway, Hammersmith, London, W6 9DL.

Mr J Ryder, Concord Gas Ltd, 71 Victoria Street, London, SW1H 0HW.

Mr P J Smith, Amerada Hess Ltd, 33 Grosvenor Place, London, SW1X 7HY.

Dr M J Stenhouse, INTERA, 47 Burton Street, Melton Mowbray, Leics, LE13 1AF.

Mr R Sweitzer, B J Hughes C.I. Ltd, P O Box 9525, Kuwait.

Mr J Theakston, Hydraulic Analysis Ltd, Mill House, Hawksworth Road, Horsforth, Leeds, LS18 4JP.

Captain E Theodoridis, Agion Anargyron 15, Athens, 143 43, Greece.

Dr A P Tilbrook, Milton, Church Place, Pulborough, West Sussex, RH20 1AF.

Mr J R Torrance, Sutcliffe & Co, Chartered Surveyors, 2 Nicholas Street Mews, Chester, CH1 2NS.

Mr N S Trainor, 10 Udny Place, Castle Park, Ellon, Aberdeen.

Mr M P C Turner, Plantation House, Ockham Road South, East Horsley, Leatherhead, Surrey, KT24 6SG.

Mr M B Umar, 31 Okugade Street, Mende Village Maryland, PO Box 73089, Victoria Island, Lagos Nigeria.

Drs P J Van Den Bold , NS - Cargo du Chemie, PO Box 2060,Utrecht, Netherlands.

Mr D Wadhawan, Systems Union Ltd, 1 Hammersmith Broadway, Centre West, London, W6 9DL.

Mr R Wainwright, Hillcrest, Church Street, Blakesley, Towcester, Northants, NN12 8RA.

Ms V Wilfert, Europe Energy Environment Ltd, 3 Haynes Street, London, EC1A 9HH.

Mr T Wrafter, Dublin Port & Docks Board, Port Centre, Alexandra Road, Dublin 1 Ireland.

Mr A J B Wright, 25 Guernsey Grove, London, SE24 9DF. Mr A Zafar, Energy Banking, Group, Nationsbank of North, Carolina N.A., 35 New Broad Street, London, EC2M 1NH.

STUDENTS

Mr L I Abanah, 39 Mortimer House, Queensdale Crescent, Holland Park, London, W11 4TQ.

Mr D Fabrizio, Via Argine Destro 95, 18100 Imperia, Italy.

DEATHS

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

DONN
1900
1929
1909
1915
1904

POPM



Mr Tim Berryman (right) presents Mr David Antell with the IP's Certificate of Appreciation.

Mr Antell had a very active involvement with IP test method work. He was a member of numerous panels, including the Sulfur Panel (ST-G-5), the Lubricant Rheology Panel (ST-C-3), and the panel that dealt with Miscellaneous Tests of Lubricants (ST-C-4), which he chaired from 1984 to 1989.

In 1991, his work changed from the field of lubricants to fuels, and he joined the Panel on General Tests of Fuels and Light Distillates (ST-B-10). He became Chairman of the Fuels Subcommittee (ST-B) in 1993 and also became a very active member of the main Test Method Standardization Committee, roles he took on with great commitment until his retirement in 1994.

His breadth of knowledge was invaluable in the numerous and varied tasks he took on within the Institute.

NEW COLLECTIVE MEMBER

Land Restoration Systems, Camphill Industrial Estate, West Byfleet, Surrey KT14 6EW.

IP Nominated Representative: Mr M A James

Land Restoration Systems is involved in consulting and contracting services relating to the remediation of contaminated soils and groundwaters. They have considerable experience in the assessment and investigation of oil product storage and handling facilities including service stations, depots and main terminals. They have completed numerous contracts both managing and implementing higher technology approaches to remediation of hydrocarbon contamination including bioremediation, dual phase groundwater treatment and vacuum extraction.

BENEVOLENT FUND

The Institute of Petroleum Benevolent Fund was established as a separate fund, with independent finances, in 1958. Previously it was maintained by the Institute. In 1986 a new Trust Deed constituted the Fund as a charity under English law.

The Fund exists to provide financial and other help to present or former members of the Institute of Petroleum and their families and dependent relatives who are in financial need.

The Management Trustees are the President, the Honorary Treasurer, the Honorary Secretary and the Director General of the Institute for the time being. In addition, there are two General Trustees who are currently long-standing members of the Institute with experience of its operations and its membership.

Applications for support are dealt with as and when received. When considered appropriate, a visit is made to the person making the application. The General and Management Trustees meet annually to review the finances of the Benevolent Fund.

In 1993, income from investments, interests on deposits and donations and legacies totalled \pm 7,032. Expenditure on grants, audit fee and sundry expenses totalled \pm 4,614. There was therefore \pm 2,418 new money available for investment. Taking investments at market value the net assets of the Benevolent Fund at 31 December 1993 totalled \pm 126,119. The auditors are Ernst & Young.

Applications for assistance are invited from persons who are or have been members of the Institute, and their families and dependants. Assistance is at the discretion of the Trustees and can only be given for the relief of poverty, according to law.



Mr Tim Berryman (right) presents Mr John Pelling with the IP's Certificate of Appreciation.

Mr Pelling, an expert on thermometry, joined the IP Thermometers and Hydrometers Panel in 1966 and the Apparatus Sub-committee in 1972, serving on both committees until they were disbanded in 1985. From 1988 to 1993 he was Chairman of the Flammability Panel, ST-B-4.

UK Deliveries into Consumption (tonnes)

Products	+Jun 1993	*Jun 1994	†Jan-Jun 1993	*Jan-Jun 1994	% Change
Naphtha/LDF	321,110.0	226,336.0	1,560,890.0	1,467,688.0	-6
ATF – Kerosene	651,629.0	664,253.0	3,301,989.0	3,382,585.0	2
Petrol	2,008,359.0	1,940,717.0	11,728,013.0	11,246,878.0	-4
of which unleaded	1,060,129.0	1,112,009.0	6,022,073.0	6,336,948.0	5
of which Super unleaded	123,971.0	122,092.0	722,571.0	703,619.0	-3
Premium unleaded	936,158.0	989,917.0	5,299,502.0	5,633,329.0	6
Burning Oil	116,408.0	107,514.0	1,290,335.0	1,461,218.0	13
Derv Fuel	990,368.0	1,080,095.0	5,734,651.0	6,154,894.0	7
Gas/Diesel Oil	549,825.0	563,222.0	3,930,235.0	3,919,252.0	0
Fuel Oil	842,771.0	736,604.0	5,264,233.0	4,954,867.0	-6
Lubricating Oil	73,573.0	73,381.0	408,761.0	393,733.0	-4
Other Products	634,812	707,588.0	3,775,684.0	3,983,854.0	6
Total above	6,188,855.0	6,099,710.0	36,994,791.0	36,964,969.0	0
Refinery Consumption	516,774.0	542,307.0	3,092,720.0	3,177,204.0	3
Total all products	6,705,629.0	6,642,017.0	40,087,511.0	40,142,173.0	0
+ Revised with adjustments *preliminary					

AROUND THE BRANCHES

ABERDEEN Dr G Wood, J P Kenny Caledonia Ltd, Holburn Secretary: House, 485 Union Street, Aberdeen Tel: 0224 851044 Fax: 0224 581735 1994 8 November: Handling the Media, Mr S Phillips, Aberdeen Journals 13 December: The Work of N.E.L., Ian Knox N.E.L. 1995 10 January: Role of the P.F. in Offshore Matters, G R Craig, **Procurator Fiscal 14 February** Annual General Meeting Water Weights, Melford Campbell 14 March: The Alba Field Development, Alan Higgins, Chevron 11 April: **EDINBURGH & SOUTH EAST SCOTLAND** Dr R Hutchison, Polyethylene Group Offices, BP Secretary: Chemicals Ltd, PO Box 21, Bo'ness Road, Grangemouth, Stirlingshire FK3 9XH Tel: 0324 493339 Fax: 0324 493890 1994 11 October: A Case Study in Offshore Data Collection and Analysis, Mr Jens Tveita, Total Oil Marine (to be finalised) Young Student's Visit to BP Oil October: Kinneil and Hound Point Annual Student Lecture and Lothian European 22 November: Lecture, The European Charter, Mr Clive Jones, Secretary General, European Energy Charter 8 December: Hydrostatic Cleaning and Testing of the NW **Ethylene** Pipeline 1995 10 January: AGM, followed by The Mission and Activities of the IP, Mr Ian Ward, Director General, IP Unmanned Offshore, BP Exploration 28 February: (to be finalised) Annual Spouses' Event - Visit to Spring: **Operations Area of Edinburgh Airport** ESSEX A L Carlson Esq., 471 Kents Hill Road, North Thundersley, Benfleet, Essex SS7 4AD. Tel: 0268 794615 Secretary: 1994 12 October: Mobil's Isomerisation Unit - Cleaner Petrol for a Cleaner World, Mr Stefan Smith, Mobil Venture Group 9 November: Ladies' Evening - Cheese Tasting, Tesco Stores Ltd. 1995 11 January: Taking Stock - Aspects of Cargo Surveying, Mr Mike Rennie, of Hammond, Rennie & Company Ltd. 8 February: Environmental Management Systems, Mr Rick Kelly for B.S.I. 8 March: The Shell Naphtha Minus Project - Petrol for the Future, Mr Mark Stevens of Shell Haven Refinery 24 March: Annual Dinner-Dance HUMBER Greg Stratford, L.E.S. Engineering Ltd, Armstrong Secretary: Street, West Marsh Industrial Estate, Grimsby, South Humberside DN31 1XD Tel: 0472 353516 1994 **6** September: Visit to British Steel, Scunthorpe Salvage Operations on the Humber, Mr Dalrymple, 6 October: Humber Tugs Annual Dinner and Dance 28 October VOC Emissions, Methods of Control, Mr R Bryden 24 November and Mr R Smith of McTay Tank Services. 1995 19 January: Effluent Treatment Plants, Concept to Commissioning, Biwater Europe Ltd Three Dimensional CAD and Modelling for 16 February: Offshore Platforms, Mr Jim Tonge, Conoco UK Ltd 3 March: Annual Dinner 20 April: Ladies Night Development in Marine Lubrication Technology, 10 May: Mr Tony J Baron, Texaco.

	LONDON
Secretary:	Mrs Edith Walker, Conoco Ltd. Conoco Centre.
	Warwick Technology Park, Gallows Hill, Warwicks
	CV34 6DA Tel: 0926 404257
1994	
27 September:	Consequences of the UK Free Market for Gas, N
	Harrison, Kinetica Ltd
25 October:	Additives for Modern Fuels, Ms C Hickey, Shell UK
	Ltd Downstream Oil
8 November:	Rough Gas Field Gas Storage Operations, Mr A J
	Mackinder, British Gas
1995	
Mid-January:	Future Air Quality Standards for Europe, jointly with
	Environmental Discussion Group
March:	UKCS Oil and Gas Reserves, Mr J Brookes, DTI
	Petroleum Directorate
25/26 April:	Speaker, Mr D R Varney, President of the IP
17 May:	AGM followed by The Role of the Institute of
to an an	Annual Visit, Cilbarra Pasildar
June:	Annual VISIT – Gilbarco, Basildon
	1000000000
	MIDLAND
Secretary:	T Dicken, Rocol Ltd, Rocol House, Swillington, Leeds
	LS26 8BS. Tel: 0532 866511 Fax: 0532 872159
1994	7 0 11 1 0 0 1 0
21 September:	Dil Decorror Ma Calin Programme – Waste
	Director of Oreal Firela Ltd
10 October	The Pole of the Independent Poteller, Mr. Press
19 October:	Petter Director of the PRA
16 November	Petrol for the Supermarket Petail Mr Paul Henshaw
To November.	National Accounts Manager of Gulf Oil GB Ltd
1995	National Accounts Manager of Guil On Ob Elu
18 January	Independent Gas Suppliers View of the Market
To January.	Place for Natural Gas Mr Peter Franklin Head of
	Marketing and Sales Coordination, AGAS Ltd
15 February:	Annual General Meeting
15 March:	Petrol or Diesel, Which is Better for Air Quality?
	Professor Roy Harrison, University of Birmingham
19 April:	Groundwater Protection and Risks from Petroleum
and the second se	Storage, Mr Jeff Dolby and Mr Bob Harris, NRA
	NORTH EAST BRANCH
Secretary:	J M Sparke, Phillips Petroleum Co UK Ltd, Seal
	Sands, Middlesbrough, Cleveland TS2 1UH
	Tel: 0642 546411 Fax: 0642 546096
1994	
20 September:	Visit to Nissan Motor Manufacturing (UK) Ltd,
7 October:	Social Evening at Hallgarth Manor Hotel
28 October:	Neural Networks in the Petrochemical Process
20 Marcal	Industry, R Browne, D11, London
1005	Four of Theakston's Brewery and Visitor Centre
24 January	Annual Ceneral Meeting
14 February:	Abandonment of Offshore Oil and Cas Fields Mr. A
i + i coruary.	McEwen Subsea Manager Stena Offshore Ltd
28 March	Sub-sea Contracting, I Seamans, Northern Ocean Services
April:	Annual Dinner Dance
9 May:	Visit to Nutec Centre for Safety
	NOPTHEPN
Secretary	Dr.P. Miles 13a Carrwood Avenue Bramball
secretary:	Stockport Cheshire SK7 2PX Tel: 061 439 3183
1994	
1 September:	Golf Day
18 October:	Marine Oils, Peter Russell, Lubrizol (UK) Ltd.
22 November:	, Neil Palmer, Shell (UK) Ltd.
2 December:	Annual Dinner Dance
1995	
17 January:	Recycling of Oils, Paul Ramsden, Evergreen
	Consultants Ltd,
14 February:	AGM followed by Aviation Lubricants, Brian
A CONTRACTOR OF	Raynor, Consultant (formerly with Rolls Rovce)

15 March:	Improvements in Industrial Effluent Treatment, Dr	1	SOUTH WALES
10 April:	Topliffe, Shell (UK) Ltd, Hot Pot Supper	Secretary:	I J Thomas, BP Oil Llandarcy Refinery Ltd, Britannic House, Llandarcy, Neath, West Glamorgan SA10
Secretary: 1994 14 September: 19 October: 11 November: 7 December:	STANLOW John Wellsteed, Castrol UK Ltd, PO Box 14, Bridges Road, Ellesmere Port, South Wirral L65 4ER Tel: 051 355 3737 Fax: 051 356 8098 Evening visit to Ness Gardens <i>Computer Integrated Manufacturing for Continuous</i> <i>Processes</i> , David Stockhill, Shell UK Ltd Annual Branch Dinner & Dance <i>Recent Developments for Energy Saving in Industry</i> , Chris Grove	1994 22 September: 20 October: 29 November: 1995 18 January: 24 February: 16 March: 24/26 March: 18 April:	Edutainment, Mr Gavin Nichols IBM From Pipe to Pump, Elf Distribution The Work of the IP, Mr Ian Ward, Director General, IP Visit to Cardiff Airport AGM and Reflexology, Mrs Linda Knight Wind Farming, Mr Steve Macken, National Wind Power Visit to Harvey's Bristol Low Energy Futures, Mr Peter Harper, Centre for Alternative Technology
25 January: 8 March: 26 April:	AGM followed by Hamilton Oils at the Point of Ayr, Roger Pearson, Improvements in Industrial Effluent Treatment, David Topliffe, Shell UK Ceramic Engineering in the Process and Automotive Inducting Sim Parrott, Duramic Coramics	Secretary: 15 September '94 : 16 March '95:	WEST OF SCOTLAND A Lowson, 2 Wylie Avenue, Newton Mearns, Glasgow G77 6AX Tel: 041 639 4716 Annual Golf Tournament Petroleum Dinner
12 May:	Evening visit to The British Coal Liquefaction Plant	Secretary:	YORKSHIRE I Bennet Esq, Millers Oils Ltd., Hillside Oil Works, Brighouse, West Yorkshire, HD6 3DP, Tel: 01484 713201
Secretary: 1994 10 September:	Nigel Hobson, Esso Petroleum Co Ltd, Fawley Refinery, Fawley, Southampton SO4 1TX Tel:0703 896021 IP Southern Branch Ball	1994 11 October: 8 November:	Alternative Fuel Technology, Mr J Seymour, Chairman, East Durham bio-diesel group. Lubricating Greases, Mr J Cliff - Ironsides
20 September: 16 October: 15 November:	Tour of BP, Hamble Treasure Hunt Distillate Hydrofining Catalyst – AKZO	3 December: 1995 14 February:	Ladies Visit, Visit to Granada TV Studios AGM/HotPot Supper, Mr Ian Meadows, President B.L.F.
6 December: To be confirmed:	Visit to AEA Winfrith Review of State of the Art Technology to Make High Octane Components, J Bauld, Esso Engineering	14 March: 17 March: 14 June:	Joint Meeting, Institute of Energy Dinner Dance Golf Tournament

Technical Sales Representative

Speciality Chemicals

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BASF is one of the world's largest chemical and plastic product manufacturers.

A vacancy will shortly be arising for a Technical Service & Sales Representative within our Speciality Chemicals Business, to develop our sales to the UK refinery industry. You will be office based and your territory will cover the UK.

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Please forward a comprehensive CV, quoting your expected salary to Michelle Parr, Personnel Officer,

BASF plc,

PO Box 4, Earl Road, Cheadle Hulme, Cheshire SK8 6QG.



EUROPEAN INVESTMENT BANK

The **EIB**, the financial institution of the European Union, is currently seeking for its headquarters in **LUXEMBOURG** an:

Energy Economist (m/f)

(with 3 to 5 years of practical experience)

Duties: he/she will be responsible, as a member of EIB project evaluation teams, for the economic appraisal of energy projects located in the European Union and EFTA countries.

Qualifications: candidates should possess a university degree in economics (MA, MBA or Phd) and possibly a post-graduate qualification in energy economics. A strong background in quantitative analysis and experience both in the economic evaluation of energy projects and the preparation of energy sector studies is required. Experience in the oil and gas industry, including refinery economics would be appreciated.

Languages: as the working languages are English and French, it is essential to have perfect knowledge of one and a good command of the other. Knowledge of other languages would be an advantage.

The EIB offers attractive terms of employment and salary with a wide range of welfare benefits.

Applicants, who must be nationals of a Member Country of the European Union and **preferably not over 35 years of age** are requested to send a detailed curriculum vitae, together with a photograph, **quoting the appropriate reference**, to:

EUROPEAN INVESTMENT BANK Recruitment Division (Ref.: ET/PM 9420) 100 boulevard Konrad Adenauer L-2950 LUXEMBOURG. Fax: 4379 3360.

Applications will be treated in strictest confidence and will not be returned.

IP W THE INSTITUTE OF PETROLEUM

THE TANKER MARKET **ENTERING A NEW ERA?**

5 October 1994 To be held at the Institute of Petroleum

Papers at this conference will consider the major commercial and technical uncertainties facing the marine transportation of oil. The recent Donaldson Report on the Braer accident together with other regulatory and environmental developments will be considered as well as the commercial pressures created by an ageing international tanker fleet and continuing low freight rates.

Papers will be presented on the following topics:

An Overview of the Tanker Market

A Charterer's View of the Tanker Market

The Owner's Perspective

The Role of the International Tanker **Owners Pollution Federation**

The Braer Incident Lessons to be Learnt and Regulatory Implications

Developments in the Classification and Survey of Tankers

An Oil Major's Perspective

The Tanker Insurance Market – Current Issues

Current Legal Problems for the Tanker Industry

For a copy of the registration form please contact Caroline Little, The Institute of Petroleum, 61 New Cavendish Street, London, W1M 8AR, UK. Telephone: 071 467 7105/6 Fax: 071 255 1472



Environmental **Management – Implications** for the Oil Industry

19 October 1994 To be held at the Institute of Petroleum

Papers will include:

- EC Approach to Environmental Policy and the Eco Management and Audit Scheme Dr B Delogu, Commission des Communautés Europeénes, DG XI
- Features of a Good Environmental **Management System** Ms Ruth Hilary, Centre for Environmental Technology
- **Auditing and Verification** Dr S Baverstock, Environmental Auditors **Registration Association**
- An External Perspective on Environmental Management Frau K Taschner, European Environmental Bureau
- **Integrating EM Into the Business** Mr Alan Marples, Arthur D Little
- Company Experience Mr R Shipway, Lindsey Oil Refinery Limited
- **Company Experience** Mr David Harries, Manager Quality Assurance & Environment, Texaco Ltd., **Pembroke Refinery**
- **Company Experience** Mr J A C Bell, Divisional Director Distribution, Esso Petroleum Company Limited

Communicating and Reporting the Environmental Performance of an Organisation

Mr Klaus Kohlhase, British Petroleum Company plc

For a copy of the registration form, please contact Caroline Little, The Institute of Petroleum, 61 New Cavendish Street, London, W1M 8AR, UK. Telephone: 071 467 7105/6 Fax: 071 255 1472

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