**APRIL 1992** 

#### The Institute of Petroleum



# PETROLEUM REVIEW

### Scotland

An exclusive interview with Alex Salmond of the Scottish National Party

### Accounting

Best accounting practice for oil company annual reports, otherwise known as SORP4

### Loss control

An analysis of marine loss statistics

### Flame arresters

Recent research into detonation flame arresters



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### ... news in brief

#### **15 February**

Work on the Canadian offshore oilfield Hibernia is to be slowed and many workers laid off after the Newfoundland project ran into trouble when one of its four partners, Gulf Canada, said it was pulling out.

#### **18 February**

Fina Inc is negotiating to sell a 50 percent stake in its downstream assets to a private Saudi Arabian company — Arabian Petroleum Company.

#### 20 February

UK oil production in January averaged 2 million barrels per day from the North Sea and onshore fields although the value declined for the third month in succession. Subsea contractor Stena Offshore has won a contract worth more than £35m from Saga Petroleum on the Tordis project.

Ferranti International has won a £500,000 contract to supply a supervisory control and data acquisition system to Petroleum Development Oman.

#### 22 February

Total oil stocks at sea at the end of January amounted to 744m barrels, compared with 808m barrels a year earlier when the Gulf War was at its height.

#### 24 February

The Health and Safety Executive have published new regulations on safety management which will require detailed safety cases to be prepared on all 230 offshore installations.

#### 27 February

Fewer seabirds appear to be dying from oil and other pollution in the North Sea according to first indications from a survey for the Royal Society for Protection of Birds.

#### **28 February**

**Stena Offshore has been awarded** a £2.5 million inspection, repair and maintenance contract by Texaco North Sea for work this summer in the Tartan field.

Statoil group saw profits fall last year despite an increase in revenues and oil and gas production. It achieved an operating profit of more than  $\pounds 1.2$  billion on revenues of some  $\pounds 7$  billion, compared with  $\pounds 1.5$  billion-plus in 1990 on earnings worth around  $\pounds 6.5$  billion.

#### 3 March

**BP Exploration has announced** plans for the £65 million development of the Hyde gas field in the southern sector of the North Sea.

#### 4 March

The French government has given the go-ahead for the postponed sale of 2.3 percent of the capital of state-controlled oil company Elf Aquitaine.

Inspection and survey equipment hire company Subspek Oceanics is to invest  $\pounds750,000$  in new rental systems for the UK and international offshore oil and gas sectors.

British Petroleum has sold its stake in the Canadian Hunter joint venture in British Columbia to the Noranda group. Toronto-based Noranda already owns Canadian Hunter Exploration, the other partner in the venture stake.

#### 6 March

Britain has announced the latest round of licences for North Sea oil exploration, intended to secure output from the UK Continental Shelf for the next 25 years. Olympia & York, the property

**Olympia & York, the property** developer is to raise C\$160m by selling its controlling interest in Interprovincial Pipe Line, which operates the world's longest network of oil pipelines.

British Gas has announced a plan to build a large capacity pipeline to transport gas from Scotland to Northern Ireland in a bid to open up the commercial and industrial market in the province.

#### 7 March

Chevron Corp is to implement a major cost cutting programme at its Port Arthur refinery in Texas involving the loss of 700 jobs and drastic reduction in capacity and investment.

Rotterdam's Shell Tankers BV has had its fleet of 18 tankers awarded top quality certification by Lloyd's Register Quality Assurance Limited.

UK energy group Midland and Scottish Resources has lost its appeal against a High Court judgment on the ownership of the much delayed production platform, Emerald Producer.

North Sea Assets announced the sale of its diving support Vessel, the *MV British Argyll* for £4.3m. Delivery to Diamar Srl is expected to take place in August or September.

Texaco has discovered oil with its Rhu 1/A well off the east coast of the Malaysian peninsula and is

implementing an extensive test programme to determine the significance of the find.

#### 9 March

A collision between a small ferry and a coastal tanker in the Gulf of Thailand left 87 people dead — the accident happened off the oil port of Sriracha.

The British government has agreed to provide £1m from its 'know-how' fund to help Russian managers improve efficiency in the oil and gas industry.

World demand for oil is set to rise by more than 1 million barrels a day this year, mostly because of the forecast recovery in the US economy from the second quarter onwards according to analysts at Chevron International Oil.

#### 10 March

Chian Light and Power and its partner Exxon plan to spend up to HK\$60bn over the next decade on new power plants and associated transmission and distribution systems in Hong Kong.

#### 12 March

British Gas has sold a 15 percent stake in Toronto-based Consumers Gas in line with undertakings given to the government of Ontario when it acquired the company in 1990.

#### 17 March

Spanish state oil company Repsol Exploration has upped its stake in the North Sea with acquisition of Chevron UK's interest in North Sea blocks 9/18a and 9/19.

The Norwegian government has initiated its first sale of state owned North Sea assets with the auction of a 5 percent stake in the Brage field.

#### 18 March

**UK standby vessel operator** North Star Shipping, owned by the Geroge Craig group, has been awarded a contract by Chevron to provide standby vessels for the Ninian field.

Phillipines Coast Guard officers have seized three oil tankers alleged to be involved in smuggling oil and petrol, as well as being used to steal fuel from ships in Manila Bay.





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Dates and speakers will be announced later.

Enquiries at this stage to: Malcolm Naylor—Arthur Andersen—071 438 3072

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# **FORECOURT MARKETING & EQUIPMENT SHOW 1992**



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### ... newsdesk

#### Lasmo seeks to dispose of assets

Lasmo, the independent oil and gas production and exploration company, has indicated that it is seeking buyers for certain sections of its portfolio, particularly some of the interests it picked up from the Ultramar acquisition.

Although the complete absorption of Ultramar into Lasmo is not yet complete, senior managers have indicated that they are looking to 'tidy up the portfolio' and divest the company of any interests where its equity is less than 10 percent. It will also be considering proposals for trades and swaps to increase stakes in preferred fields. Approximately 20 fields are believed to be affected and disposals are likely to begin soon.

Around 40 job losses have resulted from the Ultramar acquisition and management pointed out that the process was 'still going on'. Around 230 staff remain in the company and not all of the job losses have been in the Ultramar set-up though the Ultramar name will disappear from upstream operations.

The company also stated that it intends to dispose of Ultramar's downstream component and would be willing to sell it as a group or broken up.

'We are still in the process of going through revisions of Ultramar's assets but we are not in a position of having to sell the downstream immediately. That sector is in profit, it has been kept together and we will be negotiating the best deal for our shareholders,' said North Sea managing director, Mr John Hogan.

This is consistent with Lasmo's insistence on remaining solely an exploration and production company. The Ultramar acquisition increased Lasmo North Sea's commercial reserves from around 300 million barrels of oil equivalent (mmboe) to 528 mmboe, making the company the 11th largest commercial reserves holder in the province. The company has allocated resources for 46 exploration and appraisal wells in its 1992 budget.

#### Tunisian assets

Elf Aquitaine has agreed the purchase of BP's refining and marketing activities in West Africa and Tunisia.

The distribution network is made up of more than 650 service stations and represents a market share of about 14 percent. Also included in the agreement are BP's interests in three African refineries in Gabon, the Ivory Coast and Senegal.

The distribution subsidiaries are located in 12 countries: Burkina Faso, Cameroon, Ivory Coast, Gabon, Gambia, Ghana, Mali, Niger, Senegal, Togo, Mauritania and Tunisia.

Following an approach made by Elf, BP Oil agreed to sell its West African business as the company is continuing to focus its resources on selected strategic markets.

#### Malta deal

Officials of Amoco Mediterranean Petroleum Company, AGIP International BV and the Republic of Malta have signed a production sharing contract for 837,700 offshore acres located about 60 miles south of Malta.

According to the contract, Amoco Mediterranean will operate an exploration programme that includes a commitment for acquiring seismic data and drilling at least one well in the next three years. If a commercial discovery is made, Amoco and AGIP may develop the petroleum resources and share production with the Republic of Malta. 'We are optimistic about the prospect of discovering petroleum resources offshore Malta,' said Amoco Corporation Chairman H Laurance Fuller.

#### **Oman LNG**

cooperation with the In government of Oman, Shell International Gas Ltd has performed a preliminary feasibility study within the Petroleum Development Oman concession area, which indicates that developing the gas and condensate and establishing an LNG project to produce some 5 mtpa, is potentially commercially viable. Accordingly, the Sultanate of Oman and Shell have agreed to proceed with a more detailed identification study, including full appraisal of the gas and condensate reserves, with the intention that, if the project proves to be commercially and technically viable this could lead to the full implementation of an LNG project, by the end of the decade.

#### 'War on wear'

A major campaign has been launched by the Institution of Mechanical Engineers (IMechE), which aims to save British industry £1.5 billion a year.

With IMechE-commissioned research showing that 75 percent of UK industry is throwing money down the drain through lack of awareness, Tribology Action, driven by the Institution and supported by the Department of Trade and Industry, is declaring 'war on wear'.

The national campaign aims to encourage better management of basics better design and use of materials, better use of industrial lubricants — all geared to reducing wear and tear in machinery through greater control of friction.

#### Rockwater predicts subsea engineering slump

Underwater engineering contractor Rockwater has attempted to deflate bullish expectations of the subsea market in the 1990s saying that the North West European Continental Shelf market will peak next year before going into a steep decline.

The company forecasts a fall from around \$800 million to \$500 million until 1997 when abandonment work and higher oil prices could lift investment.

'It is clear to us that the recent hype about tremendous growth in the subsea market is not only unfounded but dangerous,' said Rockwater chief executive officer, Mr Norman Chambers.

Rockwater has been developing what it sees as a new approach to operator/contractor relationships through deals where Rockwater provides a total systems package and agrees to take its profits from a stake in the development.

The company is also ready to submit five safety cases (see page 168) for its vessels to the Health and Safety Executive

The Institute of Petroleum

although under the recommendations of the Cullen report into the *Piper Alpha* disaster it is only required to submit three as its two monohull vessels, Rockwaters 1 and 2 are excluded. It has costed the exercise at £150,000.

The company has also increased its training programme and estimates that 735 of its worldwide workforce of 1,200 will undergo training this year. Total spending on training accounts for five percent of the company's overheads.

It recently won a contract from Petrobras for a study into hydrocarbon production gathering systems for the Albacora Field development and believes it won a significant contract with Chevron in the North Sea based on overall company performance where it did not submit the lowest price.

Rockwater expects to show an increase in revenue in the current financial year, doubling its operating cash flow and returning a modest operating profit.



### £32 million Nelson field contracts placed

Three new contracts worth a total of some £32 million have been placed for the Nelson field's subsea satellite and pipelines in the central North Sea. Seven companies are participating in the development of Nelson but the design and construction of the facilities are the responsibility of Shell UK Exploration and Production. Enterprise Oil has begun development drilling and will operate the field when it starts production early in 1994.

The three new contracts have been placed with:

- FMC Corporation (GB) Limited of Dunfermline for subsea equipment, worth £20 million. Delivery will be phased from 1993 to 1995.
- NKK of Japan for linepipe material for the two export pipelines, worth in total nearly £8m. Delivery is in October 1992, and the installation will be in the spring of 1993. The lines are:

a) A welded line 20 inches in diameter to take oil from the Nelson platform 15.5 miles north-west to the new BP riser platform. This will be three miles west of the BP Forties Charlie platform.

b) A seamless line 10



#### Nelson field

inches in diameter to take gas from the Nelson Platform. It will run 30 miles south-west to the Fulmar gas line, near the Kittiwake platform. The line will be trenched.

 To FSSL Limited of Aberdeen, for the subsea control system, worth £4.5 million. Delivery will be phased from 1993 to 1995. The Nelson field will be

developed primarily through a

platform capable of producing at peak 160,000 barrels of oil and 65 million cubic feet of gas a day. Parts of the field beyond reach by drilling from the platform will be developed by satellite subsea wells.

The satellite will be 3.7 miles to the south-east of the platform. When in full production, it will be able to handle 40,000 barrels of oil a day and water injection of up to 40,000 barrels daily.

The anticipated cost of the subsea development, to be built in phases, is about £70 million, excluding drilling.

The first phase comprises the manifold, control system, umbilical, two wells and one production flowline. These will be installed in 1993, so that production can start from the satellite in 1994. Further subsea wells and additional flowlines will be installed from 1995.

#### Chevron safety award

Chevron UK has been awarded an advanced three star safety rating within one year of participating in an international safety audit.

The award, which places Chevron UK in the top 5 percent of companies rated by the International Safety Rating System (ISRS) worldwide, follows an independent audit carried out by the US-based International Loss Control Institute of safety management and control systems on Chevron's three Ninian North Sea oil production platforms. Currently no business operating in Britain has achieved more than three stars and no oil company has gained three stars at the advanced level.

The audit, undertaken last December, involved random interviews conducted in private among the platforms' 650 personnel — both Chevron employees and contractors — to check and verify how fifteen pre-selected safety activities were being managed and controlled.

Tony Barrell, Chief Executive of the Health and Safety Executive's Offshore Safety Division, said: 'I congratulate Chevron UK on its achievement. A prerequisite of satisfactory health and safety standards is positive management control through the mechanism of a safety management system.'

#### Petroleum Review April 1992

#### Retail market in Spain

Discussions on the joint development of a new petroleum marketing network in Spain have begun between the Italian refining company SARAS Spa, Conoco Inc, and a group of Spanish investors.

The proposed network, which would be concentrated in the northern and central regions of the country, would deal in a wide range of petroleum products for retail and commercial sale, including gasoline, diesel, heating and fuel oil and liquid petroleum gas.

A memorandum of understanding has been signed by Mr Massimo Moratti, managing director, SARAS, and by Mr David Kem, Conoco's vice president of Refining and Marketing in Europe.

The new company, which has yet to be named, will set up a joint task force to develop a sales programme through:

- Retail sales of gasoline and diesel at existing or new petrol stations
- Direct sales to industry and commerce of auto and agricultural diesel, heating oil and fuel oil
- The use of existing marketing opportunities in Spain as distributors of the new company's products.

### ... newsdesk

### **Century Oils restructuring**

Fuchs Petrolub AG has stated that the restructuring programme at Century Oils, the company they took over last year, is now complete and further redundancies are unlikely.

The chairman of the German specialist lubricants company, Dr Manfred Fuchs, has also stated that the company has achieved its goal of developing into a major independent lubricants company based world-wide and that further acquisitions are unlikely.

Around 100 redundancies were made when Century Oils was taken over and Adrian Parsons - already with the Fuchs group through their of Silkolene acquisition Lubricants in 1989 - was appointed as group managing director. Mr Parsons stressed that the redundancies had mainly occurred in the white collar section of the business. Only 13 percent of the redundancies were from the shopfloor. Other 'fat', including the company aeroplane, has also been trimmed and the business is, according to Mr Parsons, poised to take advantage of the next economic upturn.

Despite early difficulties where Century produced a modest profit that fell well short of the acquisition financing costs, the company believes that Century is vital to the strategic development of the group. It was a difficult year for Fuchs as consumption in 1991 dipped between 6.2 percent and 11.1 percent in France, Italy, West Germany, Great Britain and the United States; consumption in East Germany fell by 50.2 percent compared with demand in the previous German Democratic Republic.

Fuchs are exposed in markets affected by recession and where little, if any, long term growth in total lubricant consumption is expected. However, the company believes it is established in niche markets for specialist lubricants and that it has reached a 'critical size' in the European market to respond to demand.

The company is keen to develop its range of 'environmentally-friendly' lubricants using base oils from harvestable crops and bio-degradables. Despite the slightly higher costs to consumers. Dr Fuchs believes that these oils will be seen as more cost-effective in the long term as they can avoid expensive clean-up costs after accidental spillages and the problem of waste disposal is not as great. 'When we develop a product now,' added Dr Fuchs, 'we must consider its effects and how it will be disposed of.'

The group will not be releasing its results until May, however despite slightly increased earnings, due mainly to product sales from new acquisitions, the return on shareholders' funds for 1991 is likely to fall 35 percent below its own target of 15 percent.

#### Helicopter crash

Investigators are still examining the wreckage from the crash of a Super Puma helicopter which ditched into the North Sea while on a short journey ferrying oil workers from Shell's *Cormorant Alpha* platform to an accommodation module.

Eleven men died when the helicopter ditched into the sea during a fierce storm, though the aircraft manufacturer, Bristow, stressed that the aircraft was operating inside its safety parameters.

#### OFT gas agreement

The Director General of Fair Trading, Sir Gordon Borrie has accepted undertakings from British Gas in relation to the market for gas to large industrial and commercial users. The Office of Fair Trading has therefore decided not to refer the gas market to the Monopolies and Mergers Commission for investigation under the Fair Trading Act.

#### New offshore round announced

The UK government has announced a further licensing round for exploration acreage on the United Kingdom Continental Shelf (UKCS).

Acreage in the 14th round will be announced in three stages — the first will include all remaining unlicensed acreage in the main mature areas of the Northern, Central and Southern North Sea.

Energy Minister Colin Moynihan recently indicated that the initial discussions with operators had already been completed though no specific details had been decided.

'We have entered discussions with the oil companies,' he said, 'and they have expressed an interest in another offshore round and believe there is sufficient acreage and interest to justify it.'

The second stage due to be announced at the end of July will cover acreage the Department of Energy (DEn) considers 'more speculative' and principally contains acreage on the margins of the more mature areas.

In the third announcement at the end of November, the areas likely to be offered include 'new frontier' areas such as the Western Approaches and the Irish Sea.

For the first time in the United Kingdom, applicants will be required to submit a statement detailing their policy towards the environment.

The minister, speaking at the official opening of the new £1 million Salvesen Tubular Services custom-designed premises in Aberdeen, also expressed his belief that the DEn has an important role to play but it was 'up to the Prime Minister to decide if the Department would be closed'.

A decision on the Procurement Directive has also been reached by DEn but it was in the process of consultation with other departments. He hoped a decision would be made 'soon'.

Birds in East Anglia will benefit from the addition of three new trucks to the fleet of Hardy Craske Fuels Limited of Lowestoft.

For each of the new trucks, which have been sign written with the names avocet, bittern and tern, the company has donated £100 to the Royal Society for the Protection of Birds. It has also persuaded the trucks' Norwich based suppliers, Carrow Leyland DAF, and pumping and metering equipment suppliers, Drum Engineering of Bradford, to match its contribution and has rounded up the total to £1000.



L-R Mr Paul Lewis, RSPB Information Officer and Mr James Milne, Managing Director, Hardy Craske Fuels.

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#### **OFFSHORE SAFETY** — THE RESPONSE TO CULLEN

#### Tuesday 16 June 1992

#### A one day conference to be held at the Cavendish Conference Centre

Lord Cullen's report of the Public Inquiry into the Piper Alpha disaster was published on 12 November 1990 and 10 days later the Institute of Petroleum held a conference 'Offshore Safety — The Way Ahead' in order to examine the implications of the report's recommendations for the management of offshore safety in North Sea oil and gas operations.

Since the publication of the report, all those with responsibility for safety in the offshore oil and gas industry have been considering how best to implement the recommendations regarding safety cases. The issuing of the HSC consultative document 'Draft Offshore Installations (Safety Case) Regulations 199-' in February has provided proposals for regulations and guidance to implement the introduction of a safety case regime.

The conference will examine the implications of the draft regulations and the steps which have been taken in implementing the recommendations of the Cullen Report. A concluding paper will review the way in which offshore safety is regulated in Norwegian waters in comparison with the proposed new UK offshore safety case regime.

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



#### The Institute of Petroleum

#### PETROLEUM RETAILING IN EUROPE A SINGLE MARKET?

#### Tuesday 19 May 1992

#### To be held at The Cavendish Conference Centre, London

Each year, the Petroleum Retailing Conference organised by the Energy Economics Group of the Institute of Petroleum, provides a valuable forum for retail management from the oil industry, station operators and suppliers of equipment and services from both the United Kingdom and elsewhere in Europe, to meet and discuss topics of current interest to the retail petroleum market.

This year, the theme will be 'Petroleum Retailing in Europe — A Single Market?' The conference will review developments in the retail market in the UK and across Europe in the months leading up to the Single Market of 1992. Speakers will consider the similarities and differences to be found in the various European markets and the opportunities and threats they present both to the oil companies and to their suppliers and contractors.

Leading oil companies will discuss their strategy for meeting these challenges and there will also be papers on product quality standardisation, retail technology in Europe and the European retail lubricants market.

Topics to be discussed will include:

The Structure behind Petroleum Retailing in Europe — Similarities and Differences Pan European Retail Management — BP's View Hypermarkets Automotive Fuel Quality Standards European Retail Lubricant Market Retail Technology in Europe — The Way Ahead

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

# Scottish independence: lochs, stocks and barrels of oil

In the period before the General Election the political fate of Scotland and the North Sea hangs in the balance as calls grow for some form of devolution or even independence for Scotland. In an exclusive interview with *Petroleum Review*, Alex Salmond MP, Scottish National Party leader, former oil analyst and prominent member of the Energy Select Committee, details the plans for the industry that he believes will reshape the oil province's. future and secure Scottish industry well into the 21st century.

### Robert McLeod: In your view what areas of the North Sea belong to Scotland?

Alex Salmond, MP: These things will be a matter for negotiation. The Scottish position will be that these areas are well defined on the 55 degree 50 eastward line — the 'Scottish sector' under the Continental Shelf Act 1964. That would place the central and northern North Sea in Scottish waters and the southern basin in English waters.

If that wasn't acceptable to the English government, then the dispute would have to go to international arbitration and be settled along the lines of the Geneva Convention of 1958. In that case there would be a line of equidistance drawn into the central North Sea. I have seen this described as an extension of the border but it is no such thing. Virtually all of the boundaries in the North Sea have been drawn in this way.

If you draw a line of equidistance into the North Sea, it would go in a gentle northeast direction. Then Auk and Argyll would be the only fields in the central North Sea that would go into what would become the waters of the United Kingdom.

If it was settled this way, 90 percent of the revenue-bearing oil and gas fields in the central and northern North Sea would be in Scottish waters.

We would be very relaxed about a quick settlement based on the current position or about going to negotiation because the outcome could be determined with great probability. There is always a possibility of a quicker settlement between the governments.

#### How important to an independent Scotland is control of the oilfields?

I have to say that people have not caught up with the fact that the political importance of North Sea oil and gas has changed. Ten years ago where the revenues were going would have been hugely important because they were 15 percent of UK income at that time.

Oil and gas revenues are  $\pounds 1.2-1.4$ billion this current financial year. That is only a small fraction of the error in the Chancellor's public sector borrowing requirement forecast. I am not saying he is not going to miss  $\pounds 1.2$ billion. I am saying it is not going to break the Bank of England.

It is hugely important in a Scottish context because Scotland is only a tenth of the size of the United Kingdom. The oil revenues will increase over the course of this decade, to probably nearer £6 billion than £1 billion, given the extent of increases in output and assuming no great increase in prices.

The political and strategic importance of oil and gas is as a European energy reserve and the real critical importance of the North Sea is that it contains some 80–90 percent of the EC's oil and gas reserves.

The assurance that a Scottish government will be wise to make, and certainly one that the Scottish National Party (SNP) is more than willing to make, is not some deal on revenues with Westminster but an assurance to the rest of the community, including London, that in the event of an oil price shock, dislocation of supplies or another oil price crisis, then it is an EC reserve and the powers that a Scottish government will have will be the same emergency powers that exist in the United Kingdom at the present moment.

This assurance has already been given by the SNP by letter to the other heads of government in the EC. That said, apart from having 90 percent of its oil reserves, it will have one-third of its fish stocks. Scotland is an extremely valuable country in European terms but we have to take these responsibilities seriously.

### What changes would be made to the taxation regime in an independent Scotland?

The oil companies don't care which country is in charge of the reserve; all they care about is a security of taxation regime and a guarantee of security of investment — that the terms are attractive enough to stimulate further investment. We are more than happy to give assurance on all of these things.

I don't see any need for substantial changes in the oil and gas tax regimes in the North Sea.

We are proposing a regime that is inherently stable which will not have many changes from the existing regime with regard to royalties, corporation tax and petroleum revenue tax. We have released a discussion document that asks oil companies for their opinion on a couple of our suggestions.

What they will find extremely pleasant are proposals that will increase the attractiveness of developing ancillary reserves around the major fields. We have some possibilities in that area for improving the tax regime from the companies' point of view.

Our second concern is the bias within the tax regime in favour of long distance offshore pipelines against pipelines onshore. One can offset offshore pipelines travelling huge distances against petroleum revenue tax offshore but there is no similar offset onshore and that produces a bias within the tax regime which is inefficient. We are concerned about that and we will be making some proposals that will make the tax regime neutral between offshore and onshore developments.

Nothing we do, of course, will be retrospective and it will all be done in consultation with industry.

I am quite certain that there will be three cheers for the proposals we have got for ancillary development. I suspect that the issue of long distance pipelines won't have such an enthusiastic reception but people have to understand that no tax regime should be biased against the most economic and efficient form of development and against one company and another.

The taxation structure in an independent Scotland would be that bit more flexible. Our basic interest in Scotland would be in maintaining the momentum of the industry for as long a period as possible. I think everybody who looks at this thing without trying to indulge in short-term vested interest understands that the North Sea as a province is going to be here in 50–60 years' time. It is a long-term industry.

### How would you attract long-term investment to Scotland?

The real change in terms of development is to concentrate all decisionmaking with regard to central and northern North Sea in the northeast of Scotland.

With regard to the long-running dispute over the control of the Petroleum Engineering Directorate in the Department of Energy opposite Buckingham Palace. There is no possibility that the decision-making with regard to development of the waters around Scotland will be located anywhere else but the northeast of Scotland. That will bring beneficial results to the economy of the region and will shorten decision-making in the oil industry because there is an advantage, called the 'Houston Effect', in having it in one area. This will be widely welcomed by the more progressive companies in the industry.

Companies that have concentrated decision-making in the northeast of

Scotland have already found this move to their advantage and when the official and governmental bodies are located beside them it will increase the momentum in that area. There is no question that the control of development will be in northeast Scotland located at the centre of the oil province, not opposite Buckingham Palace.

### What about the regulatory structure and regulation of the industry?

The changes we envisage have largely been suggested in the Cullen Report and we go along with the basic drift of those recommendations. We support the current Act going through parliament.

We would act quickly to introduce proper legislative protection for safety representatives. I think it right and proper that safety representatives are given the full force of legislative protection. It is virtually inexplicable that the government has not acted quicker on this matter. I think that progressive opinion in the companies would welcome that legislative protection.

There is an atmosphere of concern among offshore workers that enthusiasm on safety matters can have an adverse effect on their employment. I don't think there is any doubt about that whatsoever. It is a conclusion I've drawn from long experience in the industry and talking to many of my constituents. The best companies would like to lose that atmosphere and I think they will welcome the legislation we put forward. There has been an imbalance, in my opinion, between the rights of those working for the major companies and developers and those who have been working for some, and I stress the word some, of the contracting companies.

My own view is that the industry would be far better if it were dealing with one offshore union. I think there is a very strong argument for a single union in the North Sea representing all offshore workers. My own preference, though it is not for me to tell offshore workers how they should be represented, is that the Offshore Industry Liaison Committee could become such a union. I think that much of the confusion has been a result of the many facets of union decision-making and the many unions seeking to represent workers offshore.

### Would you set up a new civil service structure?

Not a new structure but a relocation of the existing structure under a different geography and different management. There is no point in change for the sake of change. The changes we propose are

### North Sea's importance to Britain

The current general election campaign in the United Kingdom could be of crucial significance to the future of the North Sea oil and gas province.

After nearly 300 years of rule from Westminster, there are signs that the Scottish electorate is looking for some form of political self-determination as the Tories hold only a handful of seats north of the border. Some opinion polls in the weeks before the election have put support for some form of independence or home rule at up to 60 percent and whichever party forms the next government in the United Kingdom, it is almost certain there will be changes to the political structure of the nation.

The importance of oil revenue to the economy of the United Kingdom should not be underestimated. There are indications in a survey by analysts at Arthur Anderson that oil production could reach a new peak of 2.7 million barrels per day in 1995 and gas production could total 8.9 billion cubic feet (bcf) per day in 1998, compared with the present record level of 5.4 bcf daily.

Oil production from the North Sea has tailed off over the last three years largely because of safety and maintenance work in the aftermath of the *Piper Alpha* disaster as well as the loss of production from the accident itself.

Although few new fields have come onstream in the past two years, up to 15 projects could come onstream in the next two years, boosting government oil revenues to over £10 billion by 1995.

Proven reserves in the UK sector of the North Sea are estimated at around 12.3 billion barrels of oil and 53 trillion cubic feet of gas. the minimum requirements to make sure the public interest in the development of Scottish oil and gas resources is properly protected. We are not intending any upheaval but a smooth transfer of responsibilities.

There will be a Department of Energy (DEn) in the SNP's proposals for departments of state in an independent Scotland. I think the proposals to abolish the DEn is ludicrous. The idea that industry is in the private sector and that there is no need for any public policy or strategy in terms of development of energy resources is ridiculous. I think it will be a recipe for total confusion and chaos if the government were foolish enough to proceed with the proposal to abolish the DEn and put it into the Department of Trade and Industry.

### The oil and gas industry is still very strong but what about the broad energy policy for Scotland?

I think Scotland has an enormous opportunity at the present moment in terms of its energy supplies. We have, with the possible exception of Iceland, access to the most diverse and cheapest energy sources in Europe. It is not accidental of course that combined cycle gas is now seeing a huge surge in terms of electricity generation. Scotland clearly has ample gas resources to make a significant contribution to our electricity supply.

I would like to see a combination of Scottish electricity supply between combined cycle gas; low-sulphur coal which Scotland has in some abundance; hydropower, which is the cheapest form of electricity generation; and increasingly the development of alternative energy resources for which Scotland has half of the potential for the entire UK but only a fraction of the research and development budget.

Our energy policy would be to phase out nuclear power over a period of time because it is hideously expensive, leaves unanswered huge environmental questions and has been cosseted and protected against the market for far too long.

Some projects in Scotland, such as the International Drilling and Downhole Technology Centre, receive some of their funds from government and some from donations from companies. The Norwegians have required companies to invest in these projects. What would be a future Scottish government's position?

The responsibility of companies is to pay their taxes on time and apply and obey the financial and regulatory regimes. Beyond that there should not be obligations on them. Quite clearly it is useful for companies to contribute to projects whether they are community projects or ones that will benefit the whole industry.

But there are clear public and private responsibilities and the infrastructure of a developing industry is a public responsibility and one that an independent Scotland will accept.

I think it is the case that Scotland hasn't fully capitalised on the opportunities that oil and gas has brought. That partly requires enterprise on behalf of Scottish companies but there are measures government can take to ensure small and medium size companies have an accelerated development process.

We have important proposals for a Scottish export unit which covers the whole of Scottish industry, obviously very strongly geared to the oil and gas industry, which will provide companies with a platform by which they can penetrate overseas markets.

Take one example. An example of failure would be the steel industry. When I asked questions about the steel component of Mobil's recent major project in my constituency, the Bell export pipeline, the company indicated that British Steel was not able to produce to the specifications required 25 years after the development of oil and gas in the North Sea. Quite clearly, it would be very much in the public interest in Scotland to have a steel industy that is capable of producing to the specifications required by this hugely important market on its own doorstep.

### So are you looking for buyer or developer for the Motherwell plant?



Alex Salmond, MP.

### Would you be able to give assistance to someone coming into that?

Within the terms of the Treaty of Paris of course, but there can be investment assistance. We would take the assets out of British Steel's hands for a start. It is immaterial to ask whether the venture is run in the public sector, by joint venture or by private sector investor. Any solution which keeps the industry is acceptable to us.

The investment plan we are looking for is one that gears the industry to compete not just in the offshore market in Scotland but the market internationally. When we know that a third or more of the pipelines in the former Soviet Union are leaking, nobody is going to tell me there isn't a major market for pipelines of the appropriate design and size.

#### What proposals have you got to make the industry more effective and what stake would you want in the developments?

There are good examples in Japan and The Netherlands where export units can work effectively. Scotland has not had a major corporate gain from the huge investment in the North Sea. There have been some outstanding individual company successes and I think we all know their names and the fact that we do indicates how narrow the development has been. We have got to extend the range of the Scottish supply industry.

I have never approved of the idea of a government oil company having lots of minority stakes in individual field developments. I cannot think of anything more ludicrous than a nagging minority partner. The Scottish Department of Energy would be strong enough and well-resourced enough to know what is happening in its waters to not have a nagging stake in individual companies.

I have seen suggestions that the SNP wants to nationalise oil and gas resources. I find the suggestion totally ludicrous.

Scotland is very proud of the oil and gas industry and the achievements so far and the aim and objective of policy is to make sure that it is continued as long as possible and every ounce of potential of the waters around Scotland is fully developed in the interest of the companies and in the wider public interest in Scotland. I think we will have an offshore province that continues to be highly developed, achieves the highest safety standards and which will have a more substantial impact on the industrial infrastructure of Scotland than has hitherto been the case.



The Institute of Petroleum

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Steps the Commission and Industry Still Have To Take

#### 11 June 1992

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Chairman: Baron Pierre Snoy, formerly Public Affairs, Shell Europe

**Objectives for the Single Energy Market** Mr Clive Jones, Deputy Director General, Directorate-General for Energy, Commission of the European Communities

Fair Competition and the EC Court Mr I Johnson, Partner, Ashurst Morris & Crisp

The Licensing Directive — New Opportunities Mr Richard Vernon, Director, External Affairs, Phillips Petroleum Co. United Kingdom Ltd

01.01.93 European Procurement Legislation — Upstream, Downstream Mr Paul H Hopwood, Chief Supplies and Contracts Officer, European Procurement Affairs Branch, British Gas

Excise Tax Policy — Harmonisation and Consequences Mr Keith Myers, Partner, Arthur Anderson

Implications of Single Market on Company Operations and Organisation Dr David W Bennett, Management Consultant, McKinsey & Co.

(Title to be agreed) Mr G Cardinal, Manager, Marketing Support and Development, Mobil Europe

#### LIBERALISING THE EUROPEAN GAS MARKETS

Transit, Third Party Access and Cross-Channel Link

#### 12 June 1992

The EC draft proposal, 'Common Rules for the Internal Market in Natural Gas,' is designed to take the gas industry towards a fully unified market. In parallel heady strides are being taken in the United Kingdom including the release of significant quantities of British Gas' contracted supplies to its competitors and the study of a cross-channel link.

Will such measures achieve their stated goals of greater competition, more efficiently functioning gas markets and increased supply security? Or, is there the risk that the outcome could be counter-productive?

Chairman: Mr James Allcock, Director of Gas Supplies, British Gas plc

The Latest EC Proposal and Potential Relevance of the British Liberalisation Experience Mr Graham Weale, Manager, WEFA Energy

Greater Access to the Market for Producers? Ms Elizabeth Berge, Natural Gas Marketing Manager, Statoil

Improved Purchasing Power for Consumers? Mr Alan Wilson, Head of Fuels Purchasing, Dow Chemicals

**Opportunities for New Utility Operations** Mr Robert Kelly, Chairman and Chief Executive, Enron

The Future Role of Gasunie in a More Strongly Integrated European Gas Market Mr J ter Gast, Head of Gas Purchase Department, NV Gasunie

The Wintershall Natural Gas Project — A New Challenge

Mr Eike Müller-Elschner, Head of Joint Ventures, Wintershall AG

The Consequences of T P A on Supply Security, Prices and Future Investment Dr Wolf Pluge Managing Director BCW (Federal

Dr Wolf Pluge, Managing Director, BGW (Federal Germany Association of Natural Gas and Water Industries)

For futher information, please contact Caroline Little, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR, UK. Telephone: 071 636 1004. Telex: 264380. Fax: 071 255 1472

# The 'Umbrella' SORP

By Peter Newman, Partner, Arthur Andersen

This spring's crop of oil company Annual Reports will reflect the impact of the Oil Industry Accounting Committee's (OIAC) fourth Statement of Recommended Practice: 'Accounting for various financing, revenue and other transactions of oil and gas exploration and production companies' (SORP 4). Conceived as a codification of best accounting practice for a wide range of oil and gas transactions, it is easy to appreciate the merits of its informal title — the Umbrella SORP. This paper summarises the origin and significance of the oil SORPs and discusses some of the more controversial and radical elements of this latest statement.



OIAC was established in 1984, with the blessing of the Accounting Standards Board's (ASB) predecessor committee, to develop and promote formal accounting guidance for the oil industry in the form of SORPs. The 17 members of OIAC are drawn from the oil industry, major accounting firms, banks, investment institutions and academia. Proposed SORPs are exposed to a process of review by the ASB, government and preparers and users of oil company accounts before being issued in final form. Unlike the ASB's new Financial Reporting Standards (or the Statements of Standard Accounting Practice issued by its predecessor), compliance with SORPs is not mandatory. However, there has been wide acceptance of many of the recommendations in the earlier SORPs. These tackled:

 Disclosure about oil and gas exploration and production activities
 (April 1086 SOBP 1)

(April 1986 - SORP 1)

- Accounting for oil and gas exploration and development activities
- (December 1987 SORP 2) Accounting for abandonment

costs (June 1988 — SORP 3)

The Umbrella SORP was issued at the end of December 1990 and most oil companies will be implementing any necessary changes in accounting treatment and disclosures for the first time in their 1991 Annual Reports. The various topics addressed by SORP 4 are organised into three sections (Table). Unlike earlier SORPs, the explanatory notes, definitions and recommendations associated with each item are integrated under the relevant topic headings. The overall statement is thus, in a sense, an aggregation of a whole series of 'mini-SORPs'.

### Financing and risk sharing arrangements

The first section of SORP 4 deals with 'Financial and risk sharing arrangements'. The thorny issue of off-balance sheet financing has absorbed the attention of the mainstream accounting standards bodies for several years and, following two Exposure Drafts, a formal standard is expected from the ASB this spring. As this debate commenced, OIAC recognised that the upstream oil industry has developed 'a wide range of contractual arrangements designed to share and spread the costs, risks and rewards of exploration and production activity amongst co-participants in particular ventures'. SORP 4 includes 'explanations defining these various types of arrangement, the accounting issues involved and recommendations as to the most appropriate form of accounting treatment and disclosure in financial statements'.

The SORP explores the basis for determining whether particular transactions should be regarded as sales, contingent sales or financing agreements. For each type of transaction, guidance is given regarding the timing and presentation appropriate to the recognition of assets, liabilities and income or expense. Many of the paragraphs codify practices which are already widely followed. However, there are a number of innovative recommendations in this section of the SORP — for example:

• Farm-outs

SORP 4 sets out that 'where the consideration for a farm-in includes an arrangement for the farmee (the party farming-in) to bear subsequent costs which would otherwise fall to the retained interest of the farmor, the farmor should disclose the amount of such expenditure incurred by farmees in aggregate during the accounting period to provide an indication of the consideration received for the farm-outs'.

In the past, this quantification of the impact of farm-outs, a common method of financing exploration activity in the oil industry, has rarely been disclosed in financial statements.

#### • Carried interests

The SORP defines a carried interest as 'an agreement under which one party (the carrying party) agrees to pay for a portion or all of the preproduction costs of another party (the carried party) on a licence on which both own a portion of the working interest'. The arrangements for 'repayment', contingent upon the success of the pre-production expenditure, may either be in cash (albeit out of the proceeds of production) or through a disproportionate split of production.

The SORP differentiates between the accounting treatment appropriate for each of these two types of repayment arrangement.

Where reimbursement is in cash, the arrangement is essentially a non-recourse financing; the parties should reflect the outstanding sums within debtors and creditors as soon as it is apparent that the project will be successful. Any carried exploration costs previously capitalised or written off by the carrying party should therefore be reclassified or reinstated as being receivable from the carried party. For consistency, therefore, the carrying party should not recognise in its own accounts any reserves or production associated with the carried interest. Again, this approach may represent a departure from the methods pursued by some companies.

During the development of the SORP, several commentators argued for an alternative method which the OIAC acknowledges as appropriate for production sharing contracts and for carried interests characterised by reimbursement in oil and gas, rather than in cash.

In these circumstances the SORP recognises that the carrying party typically enters into such arrangements 'not as bankers but primarily to gain access to additional future production'. They therefore do not distinguish between the costs and revenues attributable to their own and the carried interests. Also 'the carried party has no liability to reimburse carried costs and no entitlement to the revenue stream from which reimbursement is directly appropriate'.

It follows that in such circumstances 'the carrying party should combine costs, revenues, oil and gas reserves and production attributable to the carried interest with those associated with its own equity interest'. Conversely, the carried party should not account for carried costs or the related revenues, reserves or production 'rom which such costs are 'ecovered.

#### Turnover and cost of sales

In its second major section, SORP 4 tackles the presentation of a number of elements of revenue and related expense.

With regard to **royalties**, the OIAC distinguishes between those of the UK government type (where the oil company sells the production and pays over part of the proceeds) and those more typical of the United States, where the royalty holder can make lifting and sale arrangements directly. For the former, the SORP recommends that the royalty be considered as a production cost and included in cost of sales. But, for the 'US type' of royalty, the OIAC concurs with the SEC regulations which require royalties to be excluded from both turnover and cost of sales.

There was a great deal of debate during the development of the Statement as to the most appropriate method for recognising and valuing **overlift** and **underlift**.

Virtually all commentators agreed that, where there is a material imbalance between production entitlement and liftings amongst coventurers, there should be some form of accrual entry to match revenues and costs. However, it was apparent that several methods are employed to achieve an equitable result. Some adjusted turnover and others cost of sales. In the balance sheet, the entries were variously recorded within stocks, debtors and creditors.

SORP 4 concludes that gross profits should be reported on an entitlement basis but that turnover should represent actual invoiced liftings. The overlift or underlift adjustments should, therefore, be made through cost of sales. Most controversially the Statement recommends that underlifts, as well as overlifts, should be recorded at market values and recognised within debtors or creditors respectively. Conscious, however, of the exposure to falling prices, the SORP points out that 'market value... should be determined in relation to the market price prevailing at the balance sheet date, adjusted downwards (but not upwards), if appropriate, to reflect significant post balance sheet date price changes or expectations'.

#### Other matters

The third section of the SORP collects together a number of topics which have become increasingly important as the North Sea matures (redeterminations, tariffed and shared assets) and as other regulatory changes occur (consortium accounting, capitalisation of borrowing costs).

The SORP discusses the options for depreciation rate calculations where arrangements are made to prolong the useful life or increase the utilisation of infrastructure through processing or transportation of production from other fields. Normally the assets in a cost centre would be depreciated on the unit of production basis over the related oil and gas reserves in which the company has an equity interest. However, where a **tariff** or **costsharing** deal is made with a third party,

#### **Contents of SORP 4**

#### Financial and risk sharing arrangements

- Introduction
- Farm ins and similar arrangements
- Bottom hole contributions
- Carried interests
- Production loans, forward sales and similar arrangements
- Project finance: presentation and disclosure

#### Turnover and cost of sales

- Introduction
- Indirect taxes and duties
- Royalties
- Overlift and underlift
- Crude oil trading
- Production testing revenue
- Tariff income
- Gas sales contracts

#### Other matters

- Unitisation and redetermination
- Consortium accounting
- Tariffed and shared assets
- Disclosure of expenditure commitments
- Capitalisation of borrowing costs

Table: Contents of SORP 4

the original equity owners need to address whether and how to revise their unit of production rate calculations to take account of this incremental future throughput.

The SORP recommends that the calculation should recognise 'the thirdparty throughput and its reserves projected to be produced under the committed period covered by the tariff or cost-sharing arrangement'. However, it counsels that 'no account should be taken ... of third-party reserves which are not contractually committed to flow through the owners' facilities'.

In one of its last pronouncements, the Accounting Standards Committee (now succeeded by the ASB) set out draft guidance for the **capitalisation of borrowing costs** in the form of ED 51. The ASB is still considering comments received prior to issuing guidance formally and draws attention to this fact in its statement accompanying the SORP. However, it did not object to the essential principles of ED 51 being incorporated within SORP 4.

SORP 4 reiterates the earlier recommendation that financing costs related to capital expenditure **may be** capitalised up to the commencement of production. 'A company that incurs borrowing costs in financing expenditure on a fixed asset that takes a substantial period of time to bring into use for its intended purpose should adopt a policy of either consistently capitalising borrowing costs or not capitalising them at all.'

However, unlike earlier statements, SORP 4 goes on to explain the 'capitalisation rate' method which should be followed. The capitalisation rate method does not require that, to be capitalised, interest must arise only on borrowings specifically associated with assets under development. Rather it promotes the use of an average rate based upon a company's total borrowings during an accounting period relating to the financing of expenditure on fixed assets.

The SORP does emphasise that the Companies Act 1985 allows capitalisation of interest 'to the extent that it accrues in respect of the period of production (of the asset concerned)'. Hence capitalisation of borrowing costs should not commence until there is a reasonable probability that a field will be developed and when development is in stages, capitalisation of borrowing costs on each part should cease when production commences through that part.

#### Summary

With the implementation of SORP 4, the UK upstream oil and gas industry has completed another major step in the development of a comprehensive body of industry-specific accounting principles.

The industry-specific guidance available is now at least on a par with that in the United States and greater than that for any other industry in the United Kingdom. The OIAC has had a great deal of success in meeting its objectives of encouraging greater standardisation, consistency and improved levels of usefulness of the financial statements of upstream oil and gas companies. The implementation of the revised US standard on deferred tax accounting should finally clear the way for the OIAC to resolve its position on the last major item on its original agenda - that of accounting for petroleum revenue taxation.

The author served as the secretary to the OIAC sub-committees responsible for the development of SORP 1 and SORP 4. The views expressed herein are his own.

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Participants from within the oil industry whose experience is limited to one function of the industry and who require a broader perspective of the economic factors affecting the industry.

Participants from financial institutions, government, other energy industries and the supply and service industries who require to obtain an informed and concise introduction to the economic and commercial background to the industry.

For copies of the registration forms for both courses, please contact Caroline Little, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR, UK. Telephone: 071-636 1004. Telex: 264380. Fax: 071-255 1472.

# Major refinery expansion in Bahrain

#### By Naji Abi-Aad

Bahrain is about to carry out a major expansion and modernisation scheme in its single refinery in Sitra. The \$5-million first contract concerning front-end engineering design is to be awarded soon to one of the seven international companies, namely the US firms Foster Wheeler, Ralph M Parsons, Fluor Daniel, Bechtel Corp and ABB Lummus Crest, Stone & Webster Engineering of the United Kingdom and France's Technip, which were invited to submit bids in November last year.

The Sitra refinery was built in 1936 and its capacity has been successively raised from 10,800 b/d to the current 250,000 b/d. The plant had been wholly operated by Caltex Bahrain through Bahrain Petroleum Company (Bapco) until July 1980 when the state-owned Bahrain National Oil Company (Banoco) acquired a 60 percent equity in Bapco. A 40 percent stake remains in the hands of Caltex which continues to provide the refinery with operational expertise and to market its share of output.

A minor part of the refinery's throughput is supplied by Banoco from its Awali field. Saudi Arabian crude supplements the local production and is piped to the refinery through a 12 inch, 54 kilometre long line.

In 1990, crude throughput in the Sitra refinery totalled 92.9 million barrels or 254,520 b/d representing over 100 percent of the plant capacity. Of the total, Saudi Arabia supplied 76.2 million barrels (82 percent), Awali field 15.3 million barrels and the

Sitra refinery c	apacities
ude units/vacuum units (5)	250.000 b/d
talytic cracker	42.000 b/d
dro desulphuriser	20.000 b/d
drocracker	50,000 b/d
ifiner/platformer	17.000 b/d
phalt converter	800 tons/day
phur recovery unit	170 tons/day

rest was drawn from stocks.

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Most of the refinery output in 1990 was exported, reaching 238,080 b/d. Almost half of the total exports went to Southeast Asian countries, and the remainder was distributed between the Far East, the Middle East, Africa and the United States. The domestic demand for petroleum products is currently running at about 8,500 b/d.

The modernisation of the plant has been considered since 1988 when a team of Banoco and Caltex submitted a feasibility study to the government. The scheme, temporarily shelved by the Gulf crisis, was reactivated in summer 1991.

The project provides for increasing the plant's capacity to 360,000 b/d in two phases at an overall cost of \$800 million. The first phase, estimated to cost \$550 million, involves the replacement of all but one existing distillation units (No 1, 2, 3 and 5) by new refining units with a combined capacity of 180,000 b/d, the installation of a new continuous catalytic reformer and upgrading the efficiency of the catalytic cracker. The second phase, which is still at the planning stage, envisages the construction of an additional 180,000 b/d of refining capacity, a 40,000- ton/ year MTBE plant, and isomerisation and alkylation units.

The engineering, procurement and construction contracts for the first phase are all expected to be awarded by the end of this year. The new units would come on stream in 1995–96.

The upgrading plan is basically aiming to maximise unleaded gasoline and low-sulphur diesel oil output. Until the completion of the revamping work, Banoco will continue to carry out the Yield Improvement Programme which started at the beginning of 1989. This programme is improving the refinery output by changing to a bigger proportion of high-value-added products. It is reducing production of heavy fuel oil from 25 percent to 10 percent and instead concentrating on lighter grade fuels kerosene, gasoline and diesel.



Mrs EA Poynter, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR.

# 'A long haul' for safety cases

#### By Robert McLeod

The Health and Safety Commission (HSC) has published a set of draft regulations containing detailed proposals for a fundamental change in the regulation of health and safety in offshore installations.

The proposals are contained in a consultation document, 'Draft Offshore Installations (Safety Case) Regulations 199–' and implement 30 of the recommendations made in Lord Cullen's report into the *Piper Alpha* disaster.

Introducing the proposals, HSC chairman Sir John Cullen stated that the regulations and guidance will 'set the pace for major change in North Sea safety.

'They will mean that no offshore installation will be allowed to operate in the British sector without a case for safety having been accepted by the Health and Safety Executive (HSE).

'The safety case will be the basis for subsequent audit and inspection by HSE and for the management and monitoring of safety by the operator. I stress the latter. The operator's responsibility is fundamental.'

Copies of the consultative document have been distributed to 'bodies which appear to it to be appropriate' by HSC which requires responses to be submitted no later than 1 May. Although the time allowed for submissions appears to be short, considerable consultation on the proposals has already been undertaken. In addition, the HSE has drawn on its experience of safety case regimes operating at hazardous onshore locations, including nuclear installations and petrochemical plants, in drafting these proposals.

Implementation of the regulations is expected to take several years with safety cases to be submitted in 1993 for approval by 1995. After that date no installation will be able to continue operation without an approved safety case. Companies will then be required to submit updated safety cases every three years or whenever modifications to the operating system or structure are carried out. If a safety case is submitted and accepted in 1993, then the operator will be required to re-submit the case again in 1996; companies which submit their safety cases and have them accepted just before the cut-off date of 1995 will not need to re-submit them before 1998.

#### Legal right

The Commission has placed emphasis on active workforce involvement in the implementation of the regulations and there will be provisions for a legal right of access for the workforce to the final document.

The HSE intends to take in six sample safety cases from different organisations and use them when developing models. In order to get the widest range of examples, they have arranged for cases from a production platform, a mobile drilling rig, a lifting barge, a diving support vessel and an accommodation platform. It is understood that three of the safety cases have been submitted. HSE had originally stated that they would be seeking 10 model safety cases.

As usual the HSE has attempted to carry out a cost-benefit analysis of the proposed regulations through consultation with a number of major operators and has estimated that the total cost for the preparation of the initial operational installations and vessel safety cases will cost £115-130 million. It gives an individual cost of, on average, £1 million for each fixed installation and £150,000 for each mobile platform, although there will be some savings for operators with a number of installations.

The ongoing cost of preparing and updating safety cases is estimated to be between £4.5 million and £11 million a year. The HSE admits that it is extremely difficult to quantify the total cost and resultant benefits of the whole safety case programme when modifications to existing installations and management structures are taken into account. According to its analysis, a best-case scenario will generate a benefit surplus of £1 billion over 15 years with a worstcase scenario giving a cost surplus of £1.6 billion.

The HSE has no exact figures on the number of safety cases that have already been prepared, although a number of companies have submitted, or are about to submit, proposals for acceptance. Although publicly it welcomes the early submission of cases, some officials privately express concern that the department could be swamped with paperwork and that it would be preferable to deal with the cases gradually over the three-year period.

#### Consultations

The publication of the draft regulations was welcomed in a statement by the Institute of Petroleum. In particular, that a 'goal-setting regime, rather than the former prescriptive approach for managing offshore safety, should be introduced.

'IP Codes of Safe Practice make a contribution to oil industry selfregulation and so the guidance set out in the draft regulations that Codes of Practice and other technical standards should be referenced as main elements of an offshore safety case for an installation is particularly relevant.'

The director-general of the United Kingdom Offshore Operators Association (UKOOA), Dr Harold Hughes, said that the industry 'will participate fully in the consultation process to ensure that the regulations proposed to Parliament lay down a robust goalsetting framework which serves the whole industry and which will stand the test of time'.

The Offshore Industry Liaison Committee, the recently formed offshore union, will also be preparing detailed responses to the draft regulations and has expressed grave concerns about proposals for exemptions and workforce participation.

Union leader Ronnie McDonald said that he was particularly concerned about the ability of an elected individual to be aware of all the nuances of quantitative risk analysis and cost benefit analysis without any back-up. 'We will be making some very strong submissions on this point and with regard to exemptions for temporary safe refuges.'

Although widely welcomed, a

### The requirements

Safety cases will be required for the design and operation of fixed installations, mobile installations, combined operations, well operations from a fixed installation, well operations from a mobile installation and for abandonment of fixed installations.

All aspects of the management of health and safety will have to be addressed in the safety case but there will be a focus on potential major accidents. In general the greater the risk, the greater the attention should be made to control the risk.

Two key features will need to be particularly addressed:

(1) An effective safety management system (SMS) which is audited at regular intervals. (Regulation 9 (1) a & b)

The SMS should consider the full spectrum of health and safety risks including lesser hazards and potential major hazards. The draft guidance describes the important elements in effective SMS including good industrial practice and reference to specific Lord Cullen recommendations. The guidance also describes how the requirements of the proposed Health and Safety (General Provisions) Regulations need to be taken into account.

In addition to regular monitoring of health and safety, there is an additional requirement for the SMS to be audited at appropriate intervals by competent persons outside the immediate line management.

(2) A demonstration that all major hazards have been identified and measures taken to reduce the risks to the lowest level that is reasonably practicable. (Regulation 9 (1) c & d)

Apart from the hazards associated with hydrocarbons, the proposed regulations cover a wide range of hazards including ship collisions, losses of stability, hazards of heavy lifting, diving operations, etc.

#### **Risk assessment**

In line with Lord Cullen's recommendations the use of quantitative risk assessment (QRA) is encouraged where it serves a useful and well-defined purpose. The

number of drilling companies have expressed concern that the original Cullen inquiry did not take sufficient evidence in relation to international conventions or from classification societies.

Because of the different type of operations and risk inherent in drilling operations, some contractors believe the specifications for fixed platforms do not necessarily apply to mobile rigs. They contend that the requirement for temporary safe refuges with a miniHSE maintains that onshore experience demonstrates that QRA can help to provide a structured and objective approach to the assessment of risk, provided that it relies on and is supplemented by good engineering judgement and the limitations of the data used are thoroughly understood.

In particular, QRA should be used to assess the performance of the temporary safe refuge (TSR) on each installation. Certain standards have been defined for this part of the safety case:

• A minimum endurance time for the TSR of one hour; and

• A likelihood that the TSR will be breached within the specified period of no greater than 1 in 1,000 per year.

#### Consultation

The draft guidance recommends that companies should consult the safety committees in advance about key elements of the safety case. The regulations also require a copy of the accepted safety case to be held at the installation and safety representatives will have right of access to the document. HSE will consult the installation safety committee before granting an exemption to these regulations (Regulations 14 & 15).

#### Well operations

The proposed regulations also include replacement provisions for safety controls now exercised by the Department of Energy as part of consents for well operations under the petroleum licensing regime. This will complete the clean break between HSC/E's responsibilities for offshore safety and those of energy ministers in relation to the exploitation of offshore resources.

The new requirements to demonstrate the adequacy of SMS and risk control measures will strengthen the discipline of both operators and owners of drilling rigs to ensure effective planning and control of well operations.

The consents systems will remain, however, to support the Department of Energy's interest in non-safety matters

mum endurance time of one hour could cause instability — a major problem on rigs — and also believe that an ideal refuge could be a muster point. It is understood that the British Rig Owners Association and the International Association of Drilling Contractors will be employing a 'twopronged approach' during the consultation period.

Reform of the existing law on offshore safety and its replacement with a series of 'goal-setting' regulations has principally related to the conservation of resources.

#### Transition

Subject to satisfactory progress during consultation and in obtaining parliamentary approval the regulations will come into force by May 1993. A further six months will be allowed for submission of safety cases for existing installations.

After November 1995 it will be an offence to operate an offshore installation without a safety case accepted by HSE.

Safety cases for well operations will replace the safety aspects of well consents from November 1993.

#### Other provisions

The remaining provisions of the regulations support their implementation and comprise:

 A duty to comply with any health and safety procedures or arrangements described in the accepted safety case;

• A duty on various persons to cooperate with the duty holder (the operator or the owner of a mobile installation) to enable them to fulfil their duties under these regulations;

• A duty to keep a copy of each safety case and audit report at a notified address in Great Britain and on the installation;

• A power for HSE to grant exemptions to the regulations provided that health and safety will not be prejudiced as a consequence.

#### Seveso

Although the regulations do not extend to the application of a safety case to pipelines, the definition of an offshore installation overlaps with that of a pipeline since any 'apparatus or works' associated within 500 metres of an installation is included in the definition.

In view of the approach likely to be taken in the expanded Seveso Directive the HSC/E may have to consider the expansion of the safety case regime to include offshore pipeline systems. Although any modifications or alterations in this context will be consulted on fully with industry, the HSC/E would welcome any general observations on these matters.

been described by Sir John Cullen as 'a long haul, not a quick fix' but the HSC/ E has, to date, kept to its planned timetable and seems determined to meet its target deadlines.

Consultative documents are available from: Sir Robert Jones Memorial Workshops, Units 3 and 5-9, Grain Industrial Estate, Harlow Street, Liverpool L8 4UH. Comments and enquiries should be sent to: Miss C McKean, Health and Safety Executive, Offshore Safety Division, 15 Marylebone Road, London NW1 5JD.

## CATS — a new era

In May last year, government approval of plans by Amoco and its co-venturers to develop the Everest and Lomond gas fields, and construct the 36-inch diameter, 225-mile Central Area Transmission System (CATS) pipeline to transport the gas to Teesside, heralded a new era in the development and use of North Sea gas reserves. CATS is one of the largest civil construction projects underway in the United Kingdom. Initial gas supplies flowing through the line will fuel the new 1,750 MW combined heat and power plant being constructed by Teesside Power Limited, one of the largest in the world.

The real significance of CATS, however, is that it opens up the prospect of other gas fields in the Central North Sea area being developed at a time when the demand for this clean fuel is increasing. The concept of a North Sea gas gathering system has been discussed for many years but only now, with the advent of CATS, is it becoming a reality. CATS will gave the capability to transport 1.4 billion cubic feet per day and a substantial amount of this capacity will be available for third-party users. CATS thus opens up the possibility for development of a number of gas accumulations which could not support 'stand alone' transportation systems.

Petroleum Review has been to the offices of Amoco's principal contractor, Brown and Root Vickers, to interview Amoco's CATS project manager, Don Nelsen.



The Institute of Petroleum

#### Can you start by giving us some idea of the scale of the CATS project?

The Central Area Transmission System (CATS), together with the development of the North Everest and Lomond fields, by any standards, is a major project. It will cost over £1 billion — it is the largest single investment by Amoco and its co-venturers in the North Sea since the North West Hutton field development was brought onstream in 1983. The average expenditure rate of the entire project last year was £1.4 million per day, which will make a total for 1991 alone of an estimated £525 million.

But cost is only one way to measure the size of CATS. The decks, weighing a total of 9,200 tonnes each, and incorporating the processing, production, utilities and accommodation facilities at North Everest and Lomond, are the heaviest constructed for an Amoco-operated platform.

Moreover, the pipeline, which will be capable of transporting its contents in 'dense phase' (that is, the liquids in the gas remain in a vapour), and at 1,600psi represents the first of a kind for Amoco.

#### What about the schedule?

First gas is due for delivery in April 1993, so we are working to a very tight schedule. This has led us to adopt some innovative approaches to the management of the project.

One of these was our decision to purchase many of the construction materials ourselves, sometimes in advance of the award of major construction contracts.

We are also using a computerised procurement system to allow us to monitor the progress of hundreds of orders from small items right through to major fabrication elements such as structural steel.

Our procedures for selecting and awarding major contracts have also been developed on a 'fast track' basis so that we can make and implement contract decisions quickly. An example is the time it took from bid committee recomendation to letter of agreement for one of our major deck fabrication orders - about two weeks!

We were also able to get our subsea templates for the Everest and Lomond fields designed, constructed and installed in less than a year, so that predevelopment drilling could be started on schedule.

#### Have you been able to award many important contracts to British yards? Yes. The platform jackets and the topsides are being constructed at three fabrications yards in Scotland.

UIE on the Clyde and RGC in Fife are constructing, respectively, the topsides for the Lomond and North Everest fields. At Nigg Bay, Highlands Fabricators is building the platform jackets for both production platforms and the riser platform. Hib-Fab also has the contract for the riser platform topsides.

The subsea templates which I referred to earlier have been construc-



Don Nelsen.

ted at the Arnish Point yard in the Western Isles.

In addition to these major construction contracts we also have placed significant equipment orders with a large number of UK manufacturers.

#### How advanced is the project now?

We've just about approaching the halfway mark. The next major milestones will be the completion of pre-development drilling in March 1992, followed by the installation of the platforms later the same year.

#### Trying to keep up with your schedule must mean everyone is working under great pressure?

We have more than 2,000 people, contractors' staff and Amoco people, working on this project. It's a great team of people in all areas and, thanks to them all — and to the co-operation of our co-venturers — we are looking forward to having the project completed on time, within budget, and safely.



# Recent research advancing the development of standards for detonation flame arresters

By Ken Lapp, Westech Industrial Ltd, Alberta, Canada and Hal Werneburg, Risk Analysis Laboratory Inc.

The authors have investigated accidents and conducted research which has discovered significant flame propagation phenomena. The tests developed for this research produced procedures to qualify a detonation flame arrester and have been written into the Canadian Standards Association (CSA) and the US Coast Guard (USCG) standards.

As a result of this body of work, new detonation flame arrester designs have been developed, manufactured and tested using these new design parameters. The authors offer their discussion of this work to other standards committees around the world in the interest of developing unified international test standards.

### Issues in the European marketplace

European environmental concerns have driven the development of procedures which will reduce hydrocarbon emissions in many areas, including marine transfers. Both US and Canadian oilfields require similar procedures. (In the United States, the procedure for the control of marine vapours, administered by the US Coast Guard in their regulation 'Marine Vapour Control Systems' (1), has been in operation since 1991.) These procedures, while controlling vapour emissions, create a high risk. For the first time a ship's hold is connected by a potentially explosive vapour line to an ignition source, such as a flare or thermal oxidizer. Among the many forms of flashback prevention introduced, the device emerging as the key safety item is the detonation flame arrester.

The detonation flame arrester has the benefits of being a passive device, having a large flow capacity, easy installation, reduced maintenance and low financial cost.

#### Alberta experience

Similar high risk conditions exist in Alberta oilfields in Canada. The environmental control concerns administered by Alberta's Energy Resources Conservation Board (ERCB) require flaring of collected sour  $H_2S$  vapours from production tanks. This procedure requires the connection of production tanks by vapour lines to flare stacks with the use of conventional flame arresters for flashback prevention. The incidence of production tank explosions over the years has been as high as 30 per year.

#### **Research work**

In 1985, Westech Industrial Ltd initiated a \$1.2 million research programme which investigated tank explosions, flame propagation in pipelines and flame channels and lightning effects on flare stacks venting explosive vapours. The company conducted actual tests rather than calculating results on paper, as had been the industry practice, devising a test to replicate actual operating conditions. The company contacted Energy, Mines and Resources (EMR) in Ottawa, Canada, which conducts all explosion testing for the CSA. EMR, however, had limited background in testing flame arresters and worked with them to develop a suitable prototype test. In a span of two years, internally developed testing equipment was transported four times to EMR's explosion laboratory in Ottawa. Using additional EMR equipment and monitoring instruments, a rigorous test procedure was developed.

The trips between Calgary and Ottawa brought about a major breakthrough in developing the theory to explain why, historically, flame arresters failed. In the early days of testing, it was found that a design under test would show test failures in Ottawa but not in Calgary. These results were resolved as a difference in altitude and therefore pressure between the two sites. From this came the discovery that pressure sensitivity is a major factor in the failure of flame arresters based on older, traditional designs and materials.

Research indicated that virtually no flame arrester was capable of

adequately preventing flames from reaching storage vessels containing explosive materials. In the process of conducting the research, an independent, US Coast Guard certified, research facility was created to test flame arresters under actual field conditions. The specific research involved:

- Flame propagation phenomena for deflagration and detonation
- Flame channel design
- Flame profile characteristics
- Reflected downstream pressure effects
- Detonation attenuation
- Detonation and deflagration test
- procedure
  Detonation flame arrester element design
- Momentum impulse effect
- Thermal effects
- Reignition of downstream mixtures of burnt and unburnt gases
- Lean mixture effect
- Other fuels with lower EMSG, like ethylene.

Flame fronts were viewed travelling at speeds of Mach 5.2 using Schleran photography (the same process used in the development of hypersonic aircraft). This photographic recording process records activity up to 12,000 frames per second and has contributed to the documentation of the first ever, high-speed flame profile — used to estimate flame front characteristics under all conditions.

This research has been the basis for the development of the most comprehensive test standards in the world, including the US Coast Guard and CSA standards. In fact, much of this research forms an intrinsic part of world-wide detonation flame arrester standards.

#### Standards for flame arresters

There are nearly as many standards for

detonation flame arresters world-wide as there are different test procedures for flame propagation phenomena. The standard comparison chart (see table) shows an indication of the differences in acceptance testing. The Westech Industrial Ltd and Risk Analysis Laboratory Inc work on test procedures for detonation flame arresters has been a significant factor in the USCG (1) and CSA (2) standards. Future work is also expanding the standards acceptance procedure to ensure detonation flame arrester capability for all known flame propagation phenomena.

#### Conclusion

Actual field experience suggests that to be of value, detonation flame arresters must meet two criteria:

- Explosive mixtures of gas and air must be able to flow through the flame arrester without causing significant pressure drop in a pipeline.
- At the same time, they must prevent a flame front from passing in any piping configuration igniting potentially explosive vapours.

The current body of research indicates that to meet these criteria the detonation flame arrester designs must be tested to withstand test flame propagation under the following conditions if they are to be considered as providing complete flame protection:

- Deflagration in downstream reflected pressure
- 2. Overdriven detonations
- 3. Stable long run detonations
- 4. Lean mixture detonations
- 5. Endurance burn.

Both companies recommend a certified approach to the acceptance testing of detonation flame arresters. In the international arena this will prove to be particularly important for the initial area of detonation flame arrester application: marine hydrocarbon vapour recovery.

TEST	USCG	CSA	BSI	IMO	DAbf
LP deflagration, restricted	10	10	x	x	x
LP deflagration, open	10	10	X	X	X
HP deflagration, open	х	5	1	X	X
Overdriven detonations	5	5	11	3	3
Stable detonations	5	5	1	x	3
Momentum impulse	?	X	x	X	X
Lean mixtures	?	x	x	X	x
Endurance burn	2 hr	3 hr	0.5 hr	2 hr	Yes
Flow capacity	Yes	Yes	Yes	Yes	X
Corrosion resistance	240 hr	x	X	240 hr	x
Hydrostatic	23 bar	25 bar	30 bar	Pipe	24 bar
Production pressure	10 m	X	10 m	X	X

Comparison of standards for detonation flame arresters

#### **Canadian test facility**

A sophisticated detonation flame arrester test facility is located near Calgary, Alberta. Owned by Risk Analysis Laboratory Inc, it has the ability to perform fully documented explosions on 18" pipe size detonation flame arresters. The tube lengths are in excess of 1,000 feet (305 meters). Current capabilities include explosions of propane air mixtures with initial pressures up to 24 psig with some work done on ethylene and future ethylene oxide proposals. Endurance burn, corrosion and hydrostatic tests are also conducted at this facility. Measurement capabilities include mixture percentage, pressure, temperature, speed, strain, flame presence and flame profile. Instrumentation for these measurements has been searched out worldwide and includes sources from universities in France and Mexico. as well as equipment from Germany.

The tests conducted at this facility are reproducible. They are recorded by video giving visible and audio reproductions, as well as computer raw data collection at sample rates of 100,000 samples per second from each of eight DIGISTAR research computers. All data is kept on disk and up to four megabytes of data is recorded from an explosion. These tests can be recreated as desired.

A two-hour procedure each morning produces calibrations traceable back to standards for all data collected.

Recent enquiries indicate that no other rigorous testing and data recording facilities for detonation flame arresters exists. This facility has tested the Westech Detonation Flame Arrester to the USCG (1) and the CSA (2) acceptance standards.

All of this testing is used to broaden the understanding of the explosion phenomena in pipelines.

#### References

- Federal Register, Department of Transportation, US Coast Guard Marine Vapour Control Systems, 33 CFR Part 154 et al dated June 21, 1990.
- (2) Canadian Standards Association (CSA) Task Force.

#### Acknowledgement

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- (2) Dr Paul Thibault, Combustion Dynamics;
- (3) George Lobay, Certification Officer, Mining Research Laboratories, Energy Mines & Resources of Canada in Ottawa.

# Italian exploration moves to high gear

#### By John Cranfield

In 1990, Italy's energy consumption was 162.5 million tons oil equivalent (toe) making it the fourth-largest user in Europe. But its heavy dependence on oil made it Europe's biggest oil consumer apart from Germany. In gas demand, Italy holds fourth place. Yet both oil and gas sectors are heavily dependent on imports, gas to the tune of 64 percent, oil 97 percent. Not surprisingly, therefore, the search for indigenous oil and gas has been underway for half a century. Fortunes have varied but Italy is currently on an exploration upturn, with more discoveries being made each month and production set to rise steadily over the next few years.

Local oil production in 1990 was just 85,000 b/d, against demand of 1.9 million b/d. Gas has always done better, with production of 17.3 billion cubic metres/year (bcmy) against consumption of 47.6 bcmy. The end result was that, taking into account oilproduct exports and the import of electrical power, Italy in 1990 had to cover an energy-import bill of \$18.7 billion. Under the terms of the stillcurrent Plano Energetico Nazionale of 1988, overall demand is expected to hit 180 million toe by 2000, with indigenous energy making a far larger contribution, output rising from 28 million toe in 1987 to 42.5 million toe in 2000 (all energy forms).

The aim is to cut the 1987 dependence on imports of 81 percent to just 24 percent. Improved energy use would chip in savings of 10 million toe but the main thrust is a rise in local oil production from 3.9 million tons in 1987 to 8 million tons in 2000. Gas production should rise from 13.4 million toe to 16.5 million toe over the same period. In 1990, the figures were 4.6 million tons for oil and 15.6 million toe for gas. Such advances within just two years suggest that the new national energy plan, now being formulated, will probably set even higher targets for locally-produced oil and gas. All the signs are that the industry will rise to the task.

#### **On-and offshore**

The most active explorer continues to be Agip. At the start of 1991, the state firm reckoned that its reserves off Italy amounted to 284 bcm of gas and 440 million barrels of oil. To boost these figures, 20 wildcats were planned for the year 1991, together with 47 development wells. And at least six new platforms were scheduled for installation, on fields in the northern Adriatic, including Agostino/Garibaldi, Annabella, Barbara and Cervia/ Ariana. And 5,440 km of new seismic was to be shot.

Onshore, some \$811 million was earmarked for the doubling of oil production in the north. Although a detailed breakdown is not available, one of the biggest projects involves raising output from the Trecata-Villa Fortuna field near Novara from the 17,000 b/d obtained early in 1991 to 40,000 b/d by end-1992. In all, 76 onshore development wells were scheduled for 1991 drilling.

All told, Agip's 1991 budget for exploration and production development within Italy was \$1.2 billion. Nine gasfields have been further developed offshore, bringing a further 80-90 bcm of reserves into play and leading to a production gain of around 20 MMcmd. Field work involved further platforms for Amelia ('B' and 'C', Annabella, Barbara ('F' and 'G'), Cervia, Giovanna, Hera Lacinia, Laura, Luna ('B') Porto Corsini Est and Porto Corsini Ovest, and Porto Garibaldi/Agostino Phase II. Three offshore oilfields - Prezioso, Rospo and Vega - were further developed to provide 70,000 b/d output.

Awaiting appraisal and development are a number of 1990 discoveries. Of those in the Adriatic, Clorinda, Donatella, Nicoletta and Raffaella are described by Agip as 'most interesting'. Onshore finds awaiting development include Manara, Metaponto and Monte Alpi.

#### New target - oil

Impetus for the present spurt in Italian exploration stems from Agip's mid-1980s discovery of the Mallossa and Villa Fortuna oilfields in the Po Valley. Most previous drilling had been



Most significant of recent Appennine finds is Monte Alpi, where pilot production will start in the near future. Photo courtesy of Enterprise Oil. relatively shallow, with gas the usual result whenever success came. Thus, the Po Valley and its extension into the northern Adriatic became best known as a gas province. But advances in seismic showed up the presence of deep structures — down to 6,000 metres — and when these were investigated by the drill the result was oil.

Now, while gas always finds a ready market in Italy, there is really only one buyer, Snam. Oil can command a better price. The limestone formations that proved productive at depth in the Po Valley were known to extend both northwards into the Alps and southwards to the foot of the peninsula. The Appennines have thus presented a fertile, but previously mostly ignored, field for explorers prepared to drill deep. Structures are large, with gross pays of anything up to 1,000 metres. But problems have to be overcome first. Seismic is difficult in such mountainous terrain, taking excessive time - which raises cost considerably - if run entirely from the surface. The helicopter has proved to be invaluable here. Then the reservoir rocks themselves have low porosity, though this is countered by the extremely fractured nature of the rock. And, in the early days, much of the oil found has reflected the fact that southern Italy is a volcanic zone. Heavy, high-sulphur, oil was the norm.

Persistence has paid off, however. While Agip was largely content to stay in the Po Valley — most of which is anyway reserved to state firms others took up acreage further south and this is where the luck changed. For, despite the problems of running seismic, the low porosity and the length of time needed to drill to the required depth — around nine months per hole — the result has been worthwhile: high-quality crude.

Recent months have seen the confirmation of a pair of discoveries in the south. Tempa Rossa-2 on the Torrente Sauro tract tested 1,366 b/d of 17° API crude from 4,800-5,037 metres, while a zone at 4,479-4,730 metres flowed 2,172 b/d of similar oil over a three-day period. This effectively confirmed a Fina discovery on the neighbouring Laurenzana permit. Total operated on the later well but has since sold its Italian exploration interests to Lasmo, which now joins Fina and Enterprise on both blocks. Further appraisal is under way and the partners plan to seek a production licence.

While Tempa Rossa has a useful flow, the oil is of low gravity, artificial lift was needed on and off to test the



#### Italy

upper pay, and the reservoirs are deep. Of much more commercial significance, therefore, is the nearby Monte Alpi find. Here Agip affiliate Petrex is operator with 60 percent. backed by Canada's Encor and Britain's Enterprise, each with 20 percent. The 1988 discovery flowed 1.700 b/d from three zones, the best of which turned out 1,100 b/d. Total well depth was 3,570 metres. The second hole, tested last year, flowed an aggregate 3,500 b/d from five zones spread over a huge 1,000-metre gross pay. Even more significant is the fact that, while crude in the upper zones is in the low-20s API, further down the column it is in the high-30s/low-40s API, probably the best quality oil yet found in the country.

Petrex and its partners sought and won a production licence last year for an extended flow test. All told, 100,000 bbl were flowed, confirming that the structure is large. Now work is under way on a pilot-production scheme that will see both wells feeding into a pipeline that will take oil down the mountain — the wells are at an altitude of around 1,000 metres — to the nearest road. There, process and storage facilities are being installed to handle 2,000 b/d. Crude will be trucked, as it was during the long-term flow test, by road to Agip's refinery at Taranto.

Phase 1 permanent-production plans are also well advanced. Four more wells will be drilled, to take output to 5,000 b/d, with the terminal expanded to cope. Road transport may later be replaced by a pipeline to the coast but a decision on this will await performance appraisal once Phase 1 starts up in 1993. But reserves are now reckoned by those close to the action to be several hundred million bbls.

Also to be fed into Taranto refinery will be 8,200 b/d from Petrex's Grumento Nova oilfield in the same general area. Application is in for permission to build a processing terminal at Viggiano, which will also handle 210,000 cmd of gas, to be delivered to Snam. For the area, though becoming best known as an oil play, has also thrown up gas finds such as Marciano, where Canada Northwest and its partners plan further wells and eventual production into Snam's nearby grid.

Caution, however, remains the watchword. Offshore, oil experience has been mixed, so onshore explorers are holding back the euphoria, just in case. Typical of how caution pays is Elf's success at Rospo Mare, where heavy oil is produced entirely by horizontally-completed wells, with stepwise field development. This spring sees a third platform commissioned, allowing production to be raised from 26,000 b/d to around 35,000 b/d. Yet Rospo Mare began producing as long ago as August 1982.

Off Sicily, Selm and its partners are still mulling plans for a second platform for the Vega field, to join that which heralded the production start back in August 1987. Trouble is, the investment needed is around \$375 million and it is still unclear whether the reservoir will repay further expenditure on such a scale. It's not that reserves are lacking: 300 million bbl are confirmed. It's more a question of how to produce under extremely difficult geological conditions. Complex, fractured, reservoirs can considerably raise costs offshore. Hence the caution. And hence the increasing interest in onshore exploration. For, despite the mountains, if oil is found its development is far easier onshore.



Typical Appennine terrain surrounds one of the earlier — unsuccessful — wildcatting attempts (Monchio-1).

### **CONFERENCE PROCEEDINGS**

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# A tanker master's dream?

#### By GAG Brooke, Racal Marine and Energy

Three or four manufacturers offer integrated bridge systems of differing levels of sophistication. Going for simplicity and ease of operation, Racal field three systems known as MIRANS 3000. 4000 and — the most recent - 5000, all on a modular basis so that, if necessary, a shipowner can start with the first and work up without having to invest in any unwanted equipment on the way.

Racal's ChartMaster system caused a considerable stir at the Europoort exhibition in November last year. The new system comes with MIRANS 5000 and is an electronic chart.

The standard method of digitising a paper chart is rasterscan, an all-in-one equivalent of a photographic process. Instead, the latest system employs the more laborious vectorisation method, which not only delivers better quality (the result is a screen display that

is barely distinguishable from an authorised paper chart to quote Ocean Voice) but has the advantage of almost unlimited flexibility. Chartmaster is built up by programming its computer with some 300 different categories of information (eg depth marks, separation schemes, topographic contours) known as layers. These layers can be removed or replaced at will. This vectorised system confers virtually unlimited flexibility, permitting (a) more or less detail to be displayed as required (it is as important to avoid over-cluttering the screen as it is to provide the right detail when required) and (b) changes to be made at will, with unlimited scope for future adaptations, and innovations. In addition, the operator can add any information he wishes such as anchorages, uncharted wrecks, naval exercise areas or, for fishermen, hard and soft grounds. All removable at will. When a shipowner orders an electronic chart, he is given a disk with all the information on it. Thereafter, it is up to his Master or Officer of the Watch to display as much of it as he requires — remembering IMO guidance on what is to be displayed at any time.

In practice, water depths for instance might be turned off when the ship was in clear water and the navigator more interested in the vessels around him; tidal information might be suitable when approaching a port; areas such as traffic separation schemes put in or taken out as required. (Notwithstanding all this, it must be pointed out that an electronic chart is but an aid and must be used in conjunction with a paper chart.)

Thus the electronic chart can show more, the same, or less than the original. With National Marine Electronic Association standard interfaces for full integration, the system's main characteristics are as follows - any selected area of the chart can be enlarged by a  $4 \times$  zoom facility (with warnings to remind that the scale is different); the adjacent automatic radar plotting aid's (ARPA) targets can be displayed, with serial numbers, time vectors and history dots; guard lines or zones can be set up: the symbol denoting own ship is always shown at the right relative size (down to a minimum of 5 mm) with a time vector available. Dual tracks of own ship are displayed, being (1) driven by position derived from the navigational processor and (2) by either direct reckoning or estimated position; this reassures the user that the prime navigational system is operating correctly (with an accuracy limited only by the radionav Continued on page 180



Integrated bridge system. Right to left: (a) paper chart with electronic 'puck' (b) alarm panel (c) electronic chart (d) ARPA radar (e) nav processor (f) 2nd ARPA (g) left hand console – ISIS display/alarms.

### FORTHCOMING EVENTS

#### April 6th-7th

Tokyo: 'Pacific Insiders — Headquarters Management Briefings'. Top level intensive management strategies conference. Details: Jean Etherton, Summerhill, Little Common, Stanmore, Middlesex HA7 3SZ. Tel: (081) 954 7302. Fax: (081) 954 1703.

#### 6th-10th

Leeds: Short Course on 'Diesel Particulates'. Details: Sheila Speedy, Department of Continuing Professional Education, Continuing Education Building, Springfield Mount, Leeds LS2 9NG. Tel: (0532) 333226. Fax: (0532) 333240.

#### 7th

Bromley: Conference on 'New Technology for Environmental Gas Monitoring'. Details: Sira Communications Limited, South Hill, Chislehurst, Kent BR7 5EH. Tel: (081) 467 2636. Fax: (081) 467 7258.

#### 7th-8th

London: Conference on 'Energy Prospects: Post-Soviet Republics and Eastern Europe'. Details: Mary Hogan, Conference Coordinator, PlanEcon Inc, 1111 Fourteenth Street, NW Suite 801, Washington DC 2005, USA. Tel: (202) 898 0471. Fax: (202) 898 0445.

#### 7th-10th

Exeter: Course on 'Cleaner Production and Waste Minimisation'. Details: Debbie Hockham, The Institution of Chemical Engineers, Davis Building, 165 Railway Terrace, Rugby CV21 2HQ. Tel: (0780) 578214.

#### 7th-10th

Lagos, Nigeria: 'First Exhibition for Oil, Gas and Petroleum'. Details: Carolyn Anderson, Project Manager, Glahe International Group Ltd, Woodcroft, Bures Hamlet, Suffolk CO8 5DU. Tel: (0787) 228086. Fax: (0787) 228164.

#### 9th-10th

London: Course on 'Refinery Loss Control'. Details: Natalie Cox, IBC Technical Services Ltd, Gilmoora House, 57-61 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 631 3214.

#### 12th

Moreton-in-Marsh: Course on 'Chemsafe Transport Emergency Response'. Details: Ron Cameron, Marketing Manager, The Fire Service College, Moreton-in-Marsh, Gloucestershire GL56 0RH. Tel: (0608) 52156. Fax: (0608) 51788.

#### 13th-14th

London: 'Pacific Petroleum Insiders — Headquarters Management Briefings'. Top level intensive management studies conference. Details: Jean Etherton, Summerhill, Little Common, Stanmore, Middlesex HA7 3SZ. Tel: (081) 954 7302. Fax: (081) 954 1703.

#### 13th-17th

Edinburgh: Course on 'Reservoir Modelling'. Details: Tom Inglis, Centre for Continuing Education, Heriot-Watt University, Riccarton, Edinburgh EH14 4AS. Tel: (031) 451 3014. Fax: (031) 451 3005.

#### 15th

Warley: Course on 'Safety in the Petroleum Retailing Environment — Managing Safety'. Details: The Practice Administrator, QST, 5 St Andrew Street, Hertford SG14 1HZ. Tel: (0992) 501440. Fax: (0992) 500354.

#### 22nd

Leicester: 'Workshop 92 — Environmental Audits/ Impact Assessments'. Details: Neil Allen, Flexible Learning Systems, Leicester Polytechnic (Technology) Ltd, Eric Wood Building, Gateway Street, Leicester LE2 7DP. Tel: (0533) 577660.

#### 27th-29th

Southampton: 'Oil Spill Familiarisation Course'. Details: The Oil Spill Service Centre, Lower William Street, Northam, Southampton, Hampshire. Tel: (0703) 331551. Fax: (0703) 331972.

#### 28th

Dubai: 'Britain in the Gulf 92'. Details: International Conferences and Exhibitions Ltd, 51-53 High Street, Kings Langley, Herts WD4 9HU. Tel: (0923) 261988. Fax: (0923) 261669.

#### 28th-29th

London: Conference on 'Energy Use and the Environment — Cleaner Energies for the Future'. Details: IBC Technical Services Ltd, Gilmoora House, 57–61 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 631 3214.

#### 28th-29th

London: Conference on 'Integrated Flowline Bundles'. Details: IIR Industrial Ltd, 28th Floor Centre Point, 103 New Oxford Street, London WC1A 1DD. Tel: (071) 412 0141. Fax: (071) 412 0145.

#### 28th-29th

London: Conference on 'Oil and Gas Economics, Finance and Management'. Details: Society of Petroleum Engineers, 4 Mandeville Place, London W1M 5LA. Tel: (071) 487 4250. Fax: (071) 487 4229.

#### 28th-30th

Birmingham: 'Control and Instrumentation 92'. Details: MGB Exhibitions Ltd, Marlowe House, 109 Station Road, Sidcup, Kent DA15 7ET. Tel: (081) 302 8585. Fax: (081) 302 7205. London: Course on 'Drilling Technology Overview'. Details: The Administrative Secretary, JAPEC, c/o The Geological Society, Burlington House, Piccadilly, London W1V 0JU. Tel: (071) 434 9944. Fax: (071) 439 8975.

#### 28th-30th

Huddersfield: Course 'Boiler Engineer (Skill Enhancement Modules)'. Details: Keith Gauld, Training Adviser, Petroleum Industry Training Association Scotland, 27 North Lodge Road, Blythswood, Renfrew PA4 9AS. Tel: (041) 886 3913.

#### 29th-30th

London: Conference, cosponsored by the IP, on 'Subsea Control and Data Acquisition'. Details: Institute of Measurement and Control, 87 Gower Street, London WC1E 6AA. Tel: (071) 387 4949. Fax: (071) 388 8431.

#### May 7th-10th

Istanbul, Turkey: 'Chem-Turkey 92' and 'Instrumentation-Turkey 92'. Details: Overseas Exhibition Services Ltd, 11 Manchester Square, London W1M 5AB. Tel: (071) 486 1951. Fax: (071) 935 8625.

#### 11th-12th

Singapore: Conference on 'Oil and Money: Asia and the Pacific'. Details: Brenda Hagerty, Conference Coordinator, International Herald Tribune, 83 Long Acre, London WC2E 9JH. Tel: (071) 379 4302. Fax: (071) 836 0717.

#### 11th-13th

Amsterdam, The Netherlands: Course on 'Cost/Planning/Economics for the Offshore Oil and Gas Industry'. Details: The Center for Professional Advancement, Box 1052,

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### FORTHCOMING EVENTS

East Brunswick, New Jersey 08816-1052, USA. Details: (908) 238 1600. Fax: (908) 238 9113.

#### 11th-15th

London: Course on 'Exploration, Appraisal and Marginal Field Economics'. Details: DCA Consultants Ltd, Haughend Farm, Bridge of Earn Road, By Dunning, Perthshire PH2 9BX. Tel: (0764) 84664. Fax: (0764) 84665.

#### 13th-14th

London: Course on 'Introduction to the Petroleum Geology of the North Sea'. Details: The Administrative Secretary, JAPEC, c/o The Geological Society, Burlington House, Piccadilly, London W1V 0JU. Tel: (071) 434 9944. Fax: (071) 439 8975.

#### 14th

London: Lecture on 'Pipe Freezing, Technological Developments and Improvements in the Offshore Oil and Gas Industry'. Details: Mr AA Reed, The Pipeline Industries Guild, 14/15 Belgrave Square, London SW1X 8PS. Tel: (071) 235 7938.

#### 14th

Geneva: Joint aviation/oil industry seminar on electronic data interchange. Details: International Air Transport Association, Maria Guinevan, Data Automation Services, Route de l'Aeroport 33, PO Box 672, 1215 Geneva 15 Airport, Switzerland. Tel: 41 22 799 2707. Fax: 41 22 799 2683.

#### 14th-15th

London: Conference on 'The Financing and Economics of Gas and Electricity Projects'. Details: Sue Cockburn, IBC Financial Focus Ltd, 57/61 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 323 4298.

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#### 19th

London: Evening meeting on 'The International Impact of Marine Engineering Offshore (Oil and Gas)'. Details: Mr David Long, Technical Secretary, Institute of Marine Engineers, The Memorial Building, 76 Mark Lane, London EC3R 7JN. Tel: (071) 481 8493.

#### 19th

London: 'Petroleum Retailing in Europe — A Single Market?' Details: Miss C Little, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR. Tel: (071) 636 1004. Fax: (071) 255 1472.

#### 20th-22nd

Kuala Lumpur, Malaysia: 'Asian Natural Gas IV: Development of the Domestic Industry'. Details: Asian Natural Gas IV, Institute of Gas Technology, 3424 South State Street, Chicago, Illinois 60616, USA. Tel: 312/567-3881.

#### 21st

London: Conference on 'The Safe Handling of Gas Cylinders'. Details: Conference Department, RIBA Services Ltd, 39 Moorland Street, London EC1V 8BB. Tel: (071) 251 5885. Fax: (071) 253 1085.

#### 27th

London: Conference on 'Operational Strategy for Crisis Management'. Details: Conference Secretariat, 2 Tavistock Place, London WC1H 9RA. Tel: (071) 837 6362. Fax: (071) 837 0822.

#### 28th-29th

London: Conference on 'Control and Instrumentation in Power Plants'. Details: Liz Hyde, IBC Technical Services Ltd, Gilmoora House, 57-61 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383.

#### June 1st-2nd

London: Conference on 'The condition monitoring and corrosion prevention in refineries and petrochemical plant'. Details: Lisa Bilby, Brintex Ltd, 32 Vauxhall Bridge Road, London SW1V 2SS. Tel: (071) 973 6401. Fax: (071) 233 5054.

#### 1st-3rd

Trondheim, Norway: 'European Applied Research Conference on Natural Gas'. Details: The Norwegian Institute of Technology, SEVU Conference Office, N-7034 Trondheim, Norway. Tel: (47) 7595267. Fax: (47) 7517226.

#### 2nd-4th

Aberdeen: Seminar on 'Financial Management and Accounting for the Oil and Gas Industry'. Details: MD Consultancy, 18a Carden Place, Aberdeen AB1 1UQ. Tel: (0224) 626268. Fax: (0224) 626950.

#### 2nd-5th

Espoo, Finland: '5th World Conference on Continuing Engineering Education'. Details: Ms M Suvanto, Conference Director, c/o Helsinki University of Technology, Revontulentie 6, SF-02100 Espoo, Finland. Tel: (358) 0451 4078. Fax: (358) 0451 4086.

#### 3rd-4th

Aberdeen: 'Subsea Europe 92'. Details: Ms J Heddle, PR Consultants Scotland, 52 Queens Road, Aberdeen AB1 6YE. Tel: (0224) 325326. Fax: (0224) 325303.

#### 7th-12th

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

#### 8th-10th

London: Course on 'Land Pipeline Engineering'. Details: Nadia Ellis, IBC Technical Services Limited, 57/67 Mortimer Street, London W1N 7TD. Tel: (071) 637 4383. Fax: (071) 323 4298.

#### 8th-12th

Oxford: Course on 'The Refinery — Power Generation Interface — Residue Processing and Integration for Power Production and Cogeneration'. Details: The College of Petroleum and Energy Studies, Sun Alliance House, New Inn Hall Street, Oxford OX1 2QD. Tel: (0865) 250521. Fax: (0865) 791474.

#### 9th-11th

**Birmingham:** 'Forecourt Marketing and Equipment Show'. Details: Blenheim Pel, Blenheim House, 630 Chiswick High Road, London W4 5BG. Tel: (081) 742 2828. Fax: (081) 742 3183.

#### 10th

Birmingham: 'Petrol Pump Ball'. Details: Tina Steele, BEN, Lynwood, Sunninghall, Ascot, Berkshire SL5 0AJ. Tel: (0344) 20191. Fax: (0344) 22042.

#### 11th

London: 'A Fully Unified EC Oil and Gas Market?' Details: Miss C Little, The Institute of Petroleum.

#### 12th

London: 'Liberalising the European Gas Markets'. Details: Miss C Little, The Institute of Petroleum. system(s) in use). In accordance with IMO recommendations, dedicated function keys are provided for depth and lights, either on or off; voyage planning is greatly assisted by automatic timing markers eg every 30 minutes; during the period of transit of an area, tidal diamonds with directional arrows and 'feathers' to indicate strength are displayed. Both automatic and manual chart correction facilities are provided.

Every care has been taken to make it as easy to use as a paper chart. For instance: the most frequently used facilities have their own separate controls, with others activated by keyboard and joystick. The operator is able to alter scale, zoom into parts of the chart or move to a new part, without having to change the operating mode. The chart number is permanently displayed (together with that of the next one) allowing quick reference to the paper chart. Routes can be displayed north-up or track-up, by revolving the chart; thus direct comparison is possible with the radar picture alongside. As all symbols correspond exactly with those of a paper chart, the operator has next to no familiarisation problems.

Voyage planning has received careful attention. Sequentially numbered waypoints - entered by latitude/ longitude, range/bearing, paper chart digitiser, cursor or navigation processor - are displayed automatically on request. For calculating an estimated time of departure it is possible to enter a required estimated time of arrival (ETA) at a waypoint (or destination); on passage this facility can be updated to provide revised ETAs. Transit time and speed for vessels of deep draft across shallow tidal banks can be calculated automatically using optimum rhumbline calculations. A separate database is compiled, containing all navigational warnings etc that relate to the chart or area the ship is transiting; and built-up parameters are provided to ensure than any route chosen does not put the vessel inside set danger limits, such as shallows or distances from land. In this connection, danger areas along the route are highlighted. Previous routes are easily recoverable for reference.

Steering data for each leg is provided to the autopilot, either as a course change when the next waypoint has been reached or as a smooth turn onto the next leg without overshooting. The Course to Steer signal to the autopilot will also reflect constant radius turns from the electronic chart, such as might be required around headlands. Operator intervention is necessary



Close-up of electronic chart of Calais approaches. Own ship (circled) painted in correct relative size is about to enter harbour. Echoes of three other ships, with vectors, are offshore.



Electronic chart of Folkestone – Boulogne, showing own ship (top left) in collision avoidance situation with others (black diamonds, produced by ARPA). Large circles give true course between waypoints; small ones are waypoints joined by intended tracks.

before an alteration of course is made, each waypoint approach being automatically drawn to his attention. Lastly, when a route has been planned, it is possible to call up on the screen and print if required, a list of all charts and relevant literature, eg leg distances and light lists.

If desired this electronic chart can be ordered entirely 'stand-alone'. However, its ability to interface with ARPA navigation receivers, autopilot, compass, would thus be lost, together with all the advantages (eg the display of rader targets on the screen). The use of standard memory cards means that there is no limit to the number of charts that can be stored/retrieved at will. When chart corrections are made, they are highlighted. There is a cross-track limit alarm. When 'zooming', the operator is warned when going outside or off the scale of the chart; and the display resets automatically when own ship's symbol approaches the edge of the screen.

This new electronic chart thus represents a major step forward in the development of integrated bridges. Its value to the Master of any tanker is evident – and a version for the fishing industry is being developed. ■

# More ships for LNG

Because of increasing demand, more liquefied natural gas (LNG) ships are being built after a decade in which one type of containment system membrane the design which allows most of the interior of the hull to be used for the carriage of product - had seemed to be eclipsed by the Moss Rosenberg type, where the ship is built to carry a series of spheres in which the gas is held.

The leading country in the construction of LNG ships is Japan, whose yards have produced the majority of the new generation of LNG carriers utilising improved Moss Rosenberg Independent Spherical Tank Type Containment Systems. They include the *Ekaputra*, which at 136,000 cubic metres is the largest LNG carrier ever built and is now in service between Indonesia and Japan.

Japanese shipyards are also building all eight ships in a series of 125,000 cubic metre capacity vessels ordered for an international consortium comprising BHP Petroleum, BP, Woodside, a joint Mitsubishi and Mitsui Corporation, Shell and Chevron. They will carry gas from the Australian North West Shelf terminal to Japan. The first three entered service in 1989 and the final vessel is due for completion in 1994.

When a ship is built to carry gas in spheres, these are supported round their equator by vertical cylinders which are attached to a foundation deck in the ship's structure. The deck will deform as the ship moves and the stresses are among the items calculated in the design stage stress analysis for the whole ship. The construction tolerances set by this analysis are systematically checked throughout the building period. Final acceptance of the tank take place after loading and

#### By Geoffrey Mayhew

unloading of the first cargo. The precision, quality of materials used and skill with which such vessels are constructed gives them a calculated life of some 200 years, several times that of their expected operational use.

At the French port of St Nazaire, Chantiers de l'Atlantique has begun the construction of the first of five LNG transports of the membrane type, in which the whole of the hull will be used for gas storage under low pressure. Each ship will have capacity for 130,000 cubic metres of LNG and their role will be to take product from Malaysia to Japan, in line with increased demand.

Their Invar membranes, made of nickel steel, will be placed longitudinally at top, bottom and sides, and horizontally at each bulkhead. The thinness of the membranes, 0.7mm, allows them to become a liquid-tight barrier with the flexibility required for sea passages. A series of exceptionally strong plywood boxes, constructed to close tolerances and containing insulation, provide support for the two layers of membranes around the cargo and also aid the overall flexibility of the system.

Lloyd's Register has been involved in the approval of this system as well as in the alternative Technigaz membrane system for LNG carriers, in which the membrane is of stainless steel and therefore has a greater degree of expansion and contraction. Another feature of the Technigaz system is that the membranes contain corrugations which are claimed to reduce the sloshing impact of the liquid. The secondary barrier in this design is of thin aluminium foil which is sandwiched between layers of glass fibre to form a liquid-tight membrane.

The reason for the demand for ships, and the desire for choice, is the growing market for LNG in Japan and Korea in particular. Receiving an order for LPG containment ships for Europe in the mid-1980s, the major Korean yard soon established its credentials. Lloyd's Register of Shipping provided advisory services for the design of the cargo containment for the four LPG ships the yard was asked to build for Denmark. In this design the product is held in a rectangular prismatic vessel with a centreline bulkhead. It is a shape more easily accommodated than spheres within a ship's hull.

The Korean yard developed this experience by building for India a series of smaller type LPG vessels, and this was followed by an order for a 75,000 cubic metres capacity vessel, one of the largest of its kind.

The yard then carried out the major task of re-equipping to work with aluminium in order to build LNG ships, in the design of which Lloyd's Register of Shipping was also asked to assist. The vessel under construction will have four spheres with a capacity of 125,000 cubic metres, the tops of which appear in a line above the deck. The spheres are of aluminium.

Korea may need as many as 12 LNG carriers for its own supply of industrial and domestic fuel by 2005. Other Korean yards are likely to build membrane type transports, whose steelwork follows normal ship construction methods.

In 1991 32 of the Moss Rosenberg type LNG carriers were in service, three were being built and there were contracts to build six more. The number of membrane design ships in service was 26 and there were contracts for seven more to be built.

These developments are likely to be substantially increased by construction in Korea of the membrane type gas transport and will lead to a much larger LNG world fleet, a matter of great interest to Lloyd's Register, which has an unrivalled experience across the whole range of LNG gas transport systems.



# Crude oil shipments update of marine loss statistics

#### By IP Petroleum Measurement Committee PM-L-4A

In the context of this article, the term 'marine losses' refers to the real and apparent losses of crude oil in transit occurring between the loading port and the cargo's destination. The losses are mainly apparent losses rather than real, physical losses. The major causes of apparent loss are factors such as measurement and analytical errors or the use of obsolete measurement tables and non-standard measurement and calculation procedures.

Since 1986, the IP Marine Loss Control Panel, PM-L-4A has been compiling and analysing marine loss statistics from voyage data submitted by its members. Reports on the findings have been presented at the Second Oil Loss Control Conference held in London in 1987 (1) and in Petroleum Review (2) and (3). These reports have given detailed findings on factors influencing marine losses. The objective of this paper is to udate the overall marine loss picture in the light of detailed analysis of 1990 voyage data. Such an update is useful since volumes and crude types in the data base change. In 1990 several new crude oils from Africa and the North Sea basin were added to the expanding data base.

#### **Overall loss**

The overall picture of marine losses showed an improvement between 1986 and 1987. However, there has been no further significant reduction since then. In the following, the term *net loss* is used to represent the difference between the outturn figure, net of sediment and water, and the bill of lading quantity adjusted similarly. *Gross loss* is calculated from figures inclusive of sediment and water at both ends of the voyage. Marine loss figures over the last five years are summarized in **Table 1**.

The figures indicate that the accurate determination of water in crude oil

continues to be a major problem. An average voyage still identifies about 0.1 percent more water at discharge than at load. This variance arises from different sampling and analysis methods used at the load and discharge terminals and possibly from undischarged ballast water not accounted for. The use of different Volume Correction Factor (VCF) Tables, coupled with different water measurement test methods, represent the major challenges to further loss reduction. The gross loss figure of 0.14%, when corrected for the use of different VCF tables, undischarged ballast water and gross measurement biases/errors gives the best estimate of real marine losses, which is around 0.1%.

### Loss picture by geographic area

Losses vary by load port area and this has been detected in each year of the study. The losses for 1990 are shown in **Table 2**.

Variations also occur between discharge port area even when the load port area is the same. The variation is shown in **Table 3**, where losses between differing areas are given. For example movements between the Gulf and the Far East show smaller net losses than between the Gulf and other destinations. By contrast, movements between West Africa and North-west Europe, the Mediterranean and the United States are all very similar. The

	1	Net Loss (%	)	G	ross Loss (%	6)
Year	Mean	Standard Deviat'n	No of Voyages	Mean	Standard Deviat'n	No of Voyages
1986	-0.32	0.46	2681	-0.23	0.43	2017
1987	-0.27	0.47	1767	-0.15	0.45	1763
1988	-0.24	0.44	1737	-0.14	0.45	1725
1989	-0.27	0.42	2399	-0.17	0.42	2400
1990	-0.25	0.42	3141	-0.14	0.42	2980

#### Table 1: Overall statistics

		Net I	.oss (%)	Gross Loss (%)		
Load Port Area	No of Voyages	Mean	Standard Deviation	Mean	Standard Deviation	
Australasia	21	-0.13	0.42	-0.02	0.48	
C America	171	-0.31	0.49	-0.13	0.53	
Europe	210	-0.32	0.37	-0.23	0.36	
Far East	96	-0.25	0.37	-0.16	0.44	
Gulf	622	-0.37	0.41	-0.20	0.43	
N Africa	482	-0.18	0.57	-0.08	0.55	
North Sea	833	-0.20	0.31	-0.15	0.30	
S America	65	-0.17	0.50	-0.07	0.42	
USA	70	-0.11	0.33	-0.09	0.33	
W Africa	306	-0.26	0.43	-0.05	0.44	

#### Table 2: Losses by load port area

reasons for these variances are not clear and further analysis is required. However temperature changes of the crude oil between load and discharge, the effectiveness of crude oil washing at low ambient/crude oil temperature, the accurate determination of water and the correct measurement of remnants in cargo tanks could influence the level of marine losses.

#### Losses by crude oil

The reported net and gross losses for major crude oils in 1990 are shown in **Table 4**. This data provide some of the details behind the broader load area results.

The impact of crude types on average results continues to vary from year to year. For example, the 1990 data reflect higher liftings of newer crudes such as Oseberg and Gullfaks compared with previous years.

#### Summary

Losses vary by load and discharge area. Specific load ports can be identified with high losses. Losses in marine transportation are believed to be caused primarily by measurement problems and inconsistencies between load and discharge procedures. Use of different volume correction factors caused by refusal of some countries to adopt the revised API/IP/ASTM Tables published in 1980 and since adopted as an International Standard and differing sampling and analytical methods for water measurement are the most common problems. Accordingly, losses are generally measurement discrepancies and not physical hydrocarbon loss. Previous work indicates that a small physical loss may arise due to evaporation during load and discharge although there is little evidence to suggest that any appreciable vapour loss occurs during the voyage itself.

The IP Marine Loss Group's major objectives during the next few years will be to improve the analysis of the crude oil loss data, to reduce measurement discrepancies and to extend the study into product movement losses.

#### References

 Smith DL. Crude Oil Loss Analysis. IP Second Oil Loss Control Conference, London, October 1987. John Wiley & Sons.
 Shipping Statistical Survey displays measurement problems — Petroleum Review, 1989, 43, August 1989, Page 409.
 Shipping Survey shows continuing loss reduction — Petroleum Review, 1990, 44, December 1990, Page 627.

A STATE OF THE	3	Net I	Loss (%)	Gross	Loss (%)
Load port — Discharge Port Areas	No of Voyages	Mean	Standard Deviation	Mean	Standard Deviation
Australasia — Australasia	18	-0.22	0.32	-0.13	0.40
C America - NW Europe	41	-0.29	0.85	-0.18	0.89
C America — USA	126	-0.31	0.29	-0.12	0.36
Europe — Mediterranean	132	-0.32	0.34	-0.24	0.35
Europe - NW Europe	72	-0.27	0.40	-0.17	0.35
Far Éast — Australasia	21	-0.30	0.29	-0.17	0.33
Far East — Far East	41	-0.32	0.45	-0.26	0.82
Far East — USA	16	-0.13	0.33	-0.06	0.36
Gulf — Australasia	68	-0.40	0.35	-0.11	0.38
Gulf — Far East	254	-0.28	0.29	-0.14	0.28
Gulf — Mediterranean	90	-0.44	0.48	-0.23	0.56
Gulf - N America	36	-0.63	0.49	-0.41	0.54
Gulf - N W Europe	130	-0.41	0.50	-0.26	0.50
N Africa — Mediterranean	381	-0.15	0.62	-0.06	0.59
N Africa — NW Europe	70	-0.24	0.32	-0.07	0.34
N Africa — USA	10	-0.51	0.36	-0.40	0.42
N Sea — Mediterranean	46	-0.34	0.59	-0.16	0.45
N Sea — NW Europe	637	-0.20	0.26	-0.16	0.27
N Sea — USA	118	-0.13	0.36	-0.08	0.36
S America — C America	12	-0.05	0.12	-0.07	0.14
S America — USA	42	-0.13	0.52	-0.00	0.43
USA — Australasia	22	-0.17	0.50	-0.13	0.43
USA – USA	48	-0.09	0.21	-0.07	0.28
W Africa — Mediterranean	74	-0.21	0.51	-0.05	0.54
W Africa - NW Europe	127	-0.29	0.41	-0.07	0.42
W Africa — USA	91	-0.27	0.42	-0.10	0.37

#### Table 3: Losses between load and discharge areas

	Net	Loss (%)	)	Gross	Loss (%)
Crude Oil	No of Voyages	Mean	Standard Deviation	Mean	Standard Deviation
Alaskan N Slope	64	-0.07	0.19	-0.03	0.25
Arab Heavy	60	-0.43	0.42	-0.30	0.50
Arab Light	228	-0.26	0.34	-0.15	0.36
Arab Medium	42	-0.31	0.51	-0.12	0.44
Belaym	43	-0.44	0.36	-0.38	0.36
Beryl	41	-0.32	0.38	-0.29	0.23
Bonny Light	57	-0.39	0.29	-0.22	0.37
Bonny Medium	30	-0.15	0.63	-0.10	0.51
Brent	48	-0.11	0.22	-0.07	0.19
Danish	37	-0.19	0.23	-0.13	0.24
Dieno	33	-0.18	0.47	0.02	0.44
Dubai	107	-0.27	0.30	-0.12	0.34
Ekofisk	76	-0.08	0.21	-0.00	0.21
Forcados	62	-0.26	0.58	0.09	0.56
Forties	41	-0.16	0.20	-0.06	0.18
Fulmar	54	-0.22	0.45	-0.14	0.42
Gullfaks	98	-0.12	0.16	-0.16	0.15
Iran Heavy	60	-0.33	0.45	-0.21	0.42
Iran Light	69	-0.40	0.55	-0.25	0.54
Isthmus	60	-0.29	0.58	-0.15	0.62
Marib Light	42	-0.48	0.26	-0.23	0.20
Maureen	68	-0.37	0.15	-0.35	0.16
Maya	63	-0.45	0.48	-0.18	0.58
Murban	64	-0.46	0.39	-0.26	0.50
Oman	68	-0.25	0.29	-0.14	0.29
Oseberg	51	-0.07	0.19	-0.05	0.20
Qua Ibo	83	-0.28	0.25	-0.10	0.27
Rospo di Mare	31	-0.28	0.63	-0.19	0.59
Soviet	138	-0.27	0.33	-0.20	0.30
Stratfjord	185	-0.32	0.24	-0.30	0.22
Syrian Light	32	-0.51	0.35	-0.35	0.38

Table 4: Statistics for individual crude oils

The Institute of Petroleum

# Production reporting systems: why proliferate?

By Dr Gary M Vasey and Phillip V John, Price Waterhouse Management Consultants

The development of a new oil or gas field involves the delivery of a series of very complex projects ranging from engineering design and fabrication through to thorough training of staff to operate the field safely and efficiently. Many of these projects require considerable sums of money and must often be undertaken to rigid timescales usually driven by external factors such as a weather window or the dependencies between discrete but interdependent activities.

A small, at least in cost terms, but vital part of this process is the development and implementation of computer systems to support the field's operation. These systems range from complex, highly technical, real time systems which monitor and control the production process as it takes place through to the less exciting but equally important administrative systems providing financial and management information to management, partners and regulatory authorities.

An example of the latter would be a Production Reporting system which stores, processes and reports a variety of field production data. It provides valuable information to the field operator's management and enables the operator to meet its contractual and statutory obligations to partners and regulatory authorities.

Procurement of such a system usually begins with defining the operator's business requirements which need to be met. These would include factors such as the field data to be stored, the allocation methods which will be used to allocate production back to individual wells and the content and frequency of reports required. In addition to these, physical and technical constraints must be taken into account such as the physical location of the system, the preferred hardware and software configuration and the need to interface to other existing or planned systems such as SCADA.



Figure 1: Example of a simple modelled production configuration

The most usual scenario is that the operator will complete the system definition about 12 months in advance of the field coming onstream. This will then form the basis for the system to be developed by the operator's IT department or by a suitably qualified third party, often after a competitive tendering evaluation has been held, with a view to installation just prior to first production from the field.

This approach produces a production reporting application which is specific to a particular field, as its development will have been influenced by the operator's current hardware and software base, methods of allocation, data needs and organisation. After installation in the 'live' environment the appropriate field and set up is entered into the system, allocations performed and the various reports produced.

#### Problems

As with any bespoke systems development, problems will be encountered by the operator in the definition, development and installation of the system. These will result from factors such as poorly defined or incorrect requirements, poor system design, late delivery of the system and so on. A further problem with this approach is that when the operator brings another field onstream the system which has been developed is unlikely to be able to be reused.

For example, the operator's first field produces oil from a small number of wells (with some water injectors to maintain reservoir pressure and any gas produced will be utilised aboard the platform or flared) and their second field is to be a large gas field. Under these circumstances the operator's production reporting requirements for the gas field are unlikely to be met by their existing application.

The consequence of this situation is that the entire project cycle, from systems definition through to implementation and problem solving, is repeated at significant financial and resourcing cost. Therefore, over a period of time. the field - specific approach will result in a proliferation of production reporting systems. Each of these applications will need to be maintained and supported by computing staff, may reside in different locations on different hardware and may be written in different programming languages. Each system will require automated or manual interfaces to be built to other corporate systems and each system will produce its own suite of production reports.

There are several other factors





which deserve to be mentioned. It is unlikely that consistent data or processing standards will be adhered to in the development of each of the systems. As a result differing allocation methods may be used. The location of the systems in terms of hardware and physical location may present a security problem not just in terms of ensuring inappropriate access to the data but also in providing adequate disaster recovery procedures.

The inefficiency, waste and risks incurred by the above approach, whilst unsatisfactory, might not be critical. However, the actual production data stored is of great value and importance to the operator. The data is often used by many technical, accounting and legal personnel; for example to monitor well and reservoir performance, track and monitor production and sales and in the preparation of contracts. Each of these activities is vital to the efficient operation and consequent profitability of an exploration and production company, yet the industry continues to repeat the same mistakes time and time again.

#### Solutions

However, all of these problems can be avoided from the outset if the operator adopts a different approach. This approach requires that the operator calls upon all its production expertise to define, at the outset, its core requirements for production reporting in general. In order to pursue this approach there are four main areas to consider:

- a) Modelling production configurations
- b) Production data requirements
- c) Reporting requirements
- d) Allocation methods

If the system is to be able to handle production reporting for any field then some means of modelling production



Figure 3: Alternative approach

configurations must be devised. The resulting models need not be complex but must enable the system user to identify to the system pieces of equipment such as meters, tanks, flares and so on, at which produced fluids can be tracked through the delivery system from the individual wells or perforated intervals. These should also be represented in the model (Figure 1).

Flexibility is key, as the user must be able to maintain the model throughout the life of the field as, for example, new wells are brought onstream or new equipment is added to the production configuration. The user must also be able to quickly build a model to represent a new field's production configuration. This could be facilitated by a graphical user interface for ease of use in building, changing and viewing modelled delivery systems.

Once a method of modelling production configurations has been defined each new field can be modelled within the same production reporting system. The production data requirements include determining the data that management, partners and government require in addition to identifying data that is required by the operator's technical and administrative staff. A corporate data model must be defined which will include data item definitions, formats, 'ownership' (who is responsible for collecting that data), the origin of that data item and a full data item description. Core reporting requirements need to be determined with the aim of reducing the absolute number of reports produced and restricting the data reported to just that which is essential.

Various methods of allocation exist. However, it should be possible to identify, agree and document a standard method of allocation within a single company. There may be more than one method (for example for different products) but there should be a standard approach to allocation methods.

Once the core requirements have been defined, in terms of the functions to be performed and the data to be collected, stored and processed, the system can be developed according to the operator's customary system development practices and procedures. However, the result will be a standard production reporting system.

At this stage the operator may wish to give consideration to utilising the integrated production database to hold other production or field data such as drilling data, equipment maintenance scheduling and so on.

In conclusion, there are many tangible benefits to be gained from the development and use of a single production reporting system:

- Reduced procurement costs over time
- Reduced maintenance costs
- Reduced manpower requirements
- Increased data security
- Reduction in the number of automated and manual interfaces to other computer systems
- Standardisation of methods and data
- Reduction in the number of paper reports

Whilst a general production reporting system may cost more to develop in the first instance there is a little doubt that in the longer term such a system will be of significantly more benefit to the operator.

Since this article was written, Dr Vasey has joined the Hoskyns Group plc.

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Book review

### 'A Love of Ships'

· · publications

#### By George King

This book, sometimes with excruciating humour, sometimes with great sadness, but always with the ring of truth, takes the reader through the maritime adventures of one of those many young men of our island race who looked to the sea for a career and fought hard to achieve it.

That there were many of them with the courage and persistence of George King from Lockerbie, content to endure something of the life which so many today would consider unendurable, not only made our country the great trading nation it was but kept us (at an inordinate and little appreciated price in blood and treasure) from starvation in two world wars, despite the unrestricted German U-Boat campaigns and the efforts of the Royal Navy to prevent so many wholesale sinkings.

The first half of the book tells of George King's education in Scotland during the summer of 1940 with invasion in the air, of Alfred Holt's agreement to open his indentures when he reached the age of 16 (King was only a little older than Nelson when the sea got into his blood), his mother's sacrifices to pay for his uniform and of his training and early life at sea as a cadet and midshipman, in wartime. 'This was the Asphalion, and my heart sank a little for by comparison with the two liners (both commandeered as troopships) she looked small, unglamorous and dirty. Lockerbie seemed, suddenly, a long way away.' Cannot one visualise a young lad wondering whether after all he had chosen aright? With words which well reveal his feelings, but without the emotional cant so common today, George King paints a realistic picture of life at sea for a young boy with guts. And guts he had to show, as the Asphalion, in convoy, and later on her own sailed from much bombed Liverpool across the stormy Atlantic and Pacific to Sydney; to Suez with supplies for our hard pressed troops; to Aden with coal and back to Australia just as Japan, without warning, attacked America and the whole world was at war.

So, after 'only' his first nine months voyage it was back to port at Swansea and after only a few days leave to the SS Phemius, to Capetown, Suez again and later once more round the Cape of Good Hope and up the Congo to Matadi, then Lagos, Accra and Takoradi where with the rest of the crew he contracted malaria never wholly to leave him. Then Liverpool again, just 10 days freedom, some gunnery drill for the one 4" gun she carried and so to the SS Polydorus almost a sister ship of the Asphalion.

Alone and unescorted, a vicious gun battle drove off a U-Boat only for the *Polydorus* to be torpedoed by it later the same day. King, in charge of one of the boats that just got away, once more showed his sterling worth. With West Africa 750 miles in one direction and South America 2000 in the other they were fortunate that the U-boat commander was one of the few by then, still with remnants of a civilised attitude to his victim. Picked up later by a Spanish ship, while heading in their open boat with little water or food and the Trade Winds to drive them for South America, they were interned in Spain and finally repatriated.

Then after that tough stress inducing mountaineering course initiated by Mr Holt of the Blue Funnel Line to prepare young men like King for the hardships they would almost certainly have to endure when sinkings escalated (and which the services have since adopted as 'adventurous training') it was back to sea again and into battle, this time and more successfully with bombers. And then another short leave and such was the demand back to another ancient ship the *Gleniffer*, coal fired with Scotch boilers and the toughest of Liverpool firemen. Then it was the Mediterranean war and trekking backwards and forwards supporting the Sicily and Italian campaigns. But all the time King was becoming a marked man and after another Atlantic crossing he joined the *Priam*, the Blue Funnel flagship and soon after passed for his Second mate's certificate and a wooing which later became a happy marriage. Then, parting from Blue Funnel King found himself Third Mate of an ancient steamer taking machinery to Abadan where VE Day was celebrated; and so at its then heart started King's acquaintance with the oil industry.

### 'of great interest to . . . anyone interested in the world petroleum industry'

The last half of this fascinating book is a brilliant summary of the problems of the supply to Europe and the United Kingdom of what has become its lifeblood. With several short intermissions one of them happily for a younger generation, when as a Master Mariner King joined the *Conway*, the ship in which so many British merchant seamen officers have been trained by great men like King, his career after a sea command, took off in administration.

So, where the first part of this book provides as thrilling a tale of life at sea as it really was half a century ago, the second half will be of great interest to the historian or anyone interested in the world petroleum industry and the sad demise of British seapower in the shape of its shipbuilding, shipowning and oceanic carrying trade. King's gradual rise to the top in BP coincided with the evolution from the 12,000 ton to the 350,000 ton tanker and a minimal crew recruited probably from the Far East. How this was accomplished and how measures to cope with the inevitable tanker/pollution disasters such as the *Torrey Canyon* or the *Andros Patria* owe much to George King's wisdom allied to experience. His pencil and ink sketches, so well reproduced add greatly to an altogether enthralling tale.

I commend this book not only as a good read but of very considerable importance as we seek in the coming years, despite apparently discarding our maritime heritage which George King so vividly describes, to overcome the problems now besetting Europe and indeed the world.

#### Vice Admiral Sir Louis Le Bailey, KBE, CB.

A Love of Ships, George King, Kenneth Mason (Emsworth) £14.95.

# The last word — voice messaging

By Jonathan Visbal, Director Marketing Europe, Octel Communications Ltd

Oil companies were among the first UK businesses to adopt voice messaging to improve their employee efficiency and customer service. Now, oil companies such as ARCO and Shell (Australia) are using enhanced call processing technology to resolve a range of problems.

Without doubt, issues such as 'improving customer service' and 'maximising management and employee efficiency' are currently at the top of most boardroom agendas as the economy moves out of recession. However, there is a marked difference in the way that different companies go about achieving the same end result. While many UK businesses are currently cutting staff numbers and any 'unnecessary expenditure', others believe that investing in new systems and new technologies can help in gaining a competitive edge.

UK-based oil companies have been some of the first businesses to adopt voice technology as a corporate tool the same technology that is familiar in the form of 0898 telephone services. Oil companies such as Esso, Shell, BP and Conoco, are now big users of voice messaging, with thousands of UK mailbox users and several years of experience of different voice processing techniques.

Take the specific case of ARCO British Ltd. When the company decided to move its European headquarters to new offices in Guildford, Surrey, it undertook a review of all its communication requirements including telephone systems and data networks. Two key factors needed to be considered. Firstly, since all the company's diverse operations were to be conducted from the new office, communications between the Guildford office, ARCO's platforms and warehousing operations in Great Yarmouth, and its Head Office in Dallas, Texas and Corporate Office in Los Angeles needed to be efficient and quick. Secondly, any new technology also needed to take into account that most employees were on direct dialling numbers.

ARCO's research led them to the conclusion that a new switchboard plus a fully integrated voice messaging system would provide the ideal solution. David Ratcliffe, head of ARCO's Information Services Dept explained that, 'Our parent company in the States is a heavy user of voice messaging, and we have a philosophy that technology — if properly applied — can help us run more efficiently by making more productive use of time'. In 1990, ARCO installed an Ericsson MD110 switch and an Octel Series 200 voice processing platform.



Jonathan Visbal

Although some people were initially unhappy about being answered by a voice system, they soon realised that if they left a detailed message, that the recipient could reply with a detailed message — even if it wasn't the final answer — and work could therefore be progressed'.

While the example of Arco is one of voice processing working at its

### 'It is another tool in the cupboard'

After the new system was installed in June 1990, most of Arco's 250 Guildford-based staff have mailboxes on the system. 'We have a relatively simple need for telephone answering, and effectively voice messaging gives us 250 answering machines in one box' explained Mr Ratcliffe. 'But it is also important when it comes to presenting a good image. We have close links with many other companies in the UK, and although we believe that it is better to have the phone answered by a real person, we also think that it is better to have the phone answered by a voice messaging system than not at all. simplest, the case of Shell (Australia) shows how the technology can be used to resolve more complex communication problems.

The first problem facing Shell in Australia was one created by the sheer size of the country. Not only did this make face-to-face contact between Shell employees dotted all over the country extremely difficult but because of the time differences between cities, it also made telephone communications difficult.

Voice messaging has now been used to overcome this particular problem. Shell (Australia) currently has five

voice messaging systems spread over the main population centres of Melbourne, Sydney, Brisbane, Adelaide and Perth - and all the systems are networked together. This means that if an employee in Sydney wishes to leave a personal voice message for a colleague in Perth while the latter office is closed, he can do so by simply pressing a short code on his telephone handset and speaking the message. When the Perth office opens again and the message is collected, the two individuals can either speak to each other, or alternatively a message can be sent back to the Sydney office and left in a personal voice mailbox. Many people, indeed, are finding that

The first of these problems is how to disseminate basic pricing and promotional information to Shell's retail outlets, 24 hours a day. In Shell (Australia) this is achieved by voice processing - retail outlets simply phone into the voice system on a Freephone number and enter a unique password. They can then find their own way around the automated system using the distinct tones generated by their telephone handsets and find the information they require. This system not only gives stores access to a wide range of information but also frees up staff who previously spent their time answering price and promotional queries.

#### 'This system frees up staff'

they do not need to speak simultaneously to a business partner to conduct business — it can all be done just as effectively by using voice messaging.

In addition to straightforward voice messaging, Shell's voice processing platforms have other uses. The examples given below are known as 'Enhanced Call Processing Applications'. Shell (Australia) also uses voice processing to disseminate information to staff. The company set up internal information lines (or Training Lines) which allowed the caller to search for the information that he/she wanted. The Telecoms Department, for example, set up a pilot service explaining how to use the telephone and voice mail system and detailing,



The Library, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR.

Telephone: 071 636 1004. Fax: 071 255 1472.

for example, how to call forward a phone — and a recorded message on the system would explain the process. Similarly, a helpline was set up by the Data Processing Department which gives details to Shell Australia callers about mainframe computer problems and system availability. Both these systems are now available 24 hours a day — and both save the respective departments a great deal of time and effort.

Another area in which voice messaging is assisting oil companies is in the area of mobile communications. Shell UK has just integrated an Octel Series 500 voice processing system with the Shell UK private voice network — and is using the system to provide voice mailbox facilities to mobile phone users and other staff. A personal message left on the system can be accessed by the relevant person via any touch tone phone (or via a non touch tone phone with the aid of a keypad) from virtually anywhere in the world. Mobile staff can even be alerted to a message waiting by the system calling out to any pre-programmed phone number.

Mr Peter Thompson, an IT Client Manager within Shell's Information and Computer Services Division, believes that given Shell's particular communications needs 'Installing an in-house voice messaging system was a more cost-effective solution than using voice mailboxes on a bureau basis and one which also allowed us more flexibility when it comes to distributing messages internally.'

Other companies are finding that their voice processing systems can be used in a number of ways. For example, when Conoco UK first looked at voice messaging, it wanted to resolve a simple need for telephone answering at its Aberdeen base. After conducting extensive research into the voice processing market, the company decided that buying a single voice messaging box was much more practical and would offer a lot more functionality than buying a series of answering machines. Today, voice messaging is used extensively by staff at Conoco's London office and new applications are constantly being introduced.

Although the introduction of voice messaging can bring clear commercial benefits, Mr Ratcliffe is quick to point out that voice messaging is not a panacea. 'I am not saying it is better than E Mail or better than fax — it is another tool in the cupboard. However, because it only involves a telephone and the human voice, it is sometimes a little more convenient'.

#### Conference report

### 'Doing business without paper' the impact of electronic data interchange on the upstream and downstream oil industry

Over 70 people attended this one-day conference and exhibition which was organised by the Institute of Petroleum with help from the Oil Industry Interest Section of the EDI Association. The conference formed part of IP Week in February.

#### What is EDI?

As a North Sea operator or a joint venture partner, you will appreciate the amount of time and resources taken month in, month out to handle joint interest billing statements. You are faced with two problems. One is the mound of paper involved, the other is the lack of standards in terms of what information is presented and how it is formated. Recently business people from a number of oil companies have been meeting together and this business process has been simplified and speeded up by agreeing a standard format for the exchange of this information, and by sending the information as an electronic message. This is what 'doing business without paper' or EDI (electronic data interchange) means.

Roger Till, from The British Petroleum Company plc, who was the Chairman for the conference pointed out that EDI is beginning to be used in both upstream (such as joint interest billing exchange) and downstream (such as product exchanges) activities. Making use of EDI is primarily a business issue because it aims to make business processes more efficient and simpler and ultimately involves the opportunity for changing the way that things are done. Much work has already been done to develop international standards (UN/ EDIFACT) for the EDI messages needed to perform basic trading procedures electronically.

This conference set the scene by introducing EDI (defined as the exchange of business information in standard formats from one company's computer to another company's computer), showing its importance in many industries (the weekly shop at the supermarket depends on EDI for ordering the goods), its impact in Europe (efficient trading in an integrated Europe, both east and west will demand EDI) and hearing the views of an oil industry director.

Rodney Wallace, the Finance Director for Conoco (UK) Ltd, opened the conference with a very positive Keynote Address, expressing the urgency and importance for companies to enlist EDI. He pointed out that today, with the big emphasis on quality, continuous improvement, partnering, team working and wide-ranging changes in business practice, EDI can and does provide a tool to do business more effectively. He has the long-term vision of 'the environmentally friendly, totally paperless office. The effortless, rapid exchange of information with increased efficiency and accuracy of record keeping.'

Hans Roden, from DGXIII of the Commission of the European Communities, then explained the importance of using Europe-wide standards for EDI. The TEDIS (Trade EDI Systems) programme within the European Commission was initiated to support the crucial growth of trade between member states by improving trading relationships between partners within the community. A large number of initiatives within various industry sectors are being supported and inter-industry activities are being introduce EDI encouraged, to throughout the whole trade cycle. The overall results for the European Community (and in these EDI activities it already includes the EFTA (European Free Trade Area) countries) will be to increase innovation through competition, reduce costs in key industries and to support the on-going adaptation of company strategies and structures.

Ian O'Reilly, Director of Computing for Tesco Stores Ltd, explained how one of Britain's best-known food retailers has successfully implemented EDI with nearly 900 of its suppliers. It was refreshing to hear from a user whose business serves many million customers weekly and depends on successful electronic trading - Tesco has won a number of prizes recently for the quality and wide range of its EDI work. The Tesco use of information technology coupled with EDI and fundamental business changes illustrate quite clearly the base from which an efficient integrated supply chain can be built. With closer trading relationships between Tesco, suppliers and software and network vendors, the growth of firmer links between trading partners is inevitable. Importantly, the same structure exists for the international supply chain and Tesco perceive expansion in this area will prove to be just an extension of the stable UK base already achieved.

#### **Oil industry and EDI**

The afternoon was devoted to reports of the current EDI activities in the UK oil industry, both upstream and downstream. (See Petroleum Review, December 1991.)

David Howard, of Conoco (UK) Ltd and leader of the Joint Interest Billing Exchange Group, described this upstream EDI project. In 1988, following a presentation on EDI at the London Society of Chartered Accountants -Oil and Gas Discussion Group, a pilot study team was formed to consider implementing EDI for joint interest billings. Representatives of BP, Chevron, Conoco, Esso, Phillips, Shell, Price Waterhouse and INS began work in two areas. Firstly, an Accounting Group defined the necessary business contents for a standard chart of accounts for joint interest billing — thereby simplifying the wide range of company specific approaches previously used. Secondly, a Technical Group looked at how to implement EDI. A new draft international standard (EDIFACT) message has now been produced, called JIBILL, benefits have been identified and a number of companies are ready to use EDI.

Bill Hogg, of BP Oil (UK) Ltd and leader of the Product Exchange Reconciliation Group, reported on the status of this downstream EDI project. This group met initially at the end of 1987, under the auspices of UKPIA, to look at the possibilities for EDI. Since they all had a common interest in product exchange this was chosen as the area to study. BP, Esso, Mobil and Shell, with Fina, Texaco and Total assisted in later stages. Conoco, Elf, Gulf, ICI and Phillips have also been kept informed of progress. It was soon obvious that implementing EDI was relatively easy, the problem was to agree standards first of all — for such things as the method for calculating standard litres, the product names and the format for monthly reports. A new draft international standard (EDIFACT) message has now been produced, called PRODEX, benefits have been identified and a number of companies are ready to use EDI.

Mark Hyde, of the International Air Transport Association (IATA) from Geneva, reported on a joint oil industry/airlines EDI project called AVNET. This project is jointly sponsored by IATA and the API and has developed EDI procedures based on international standards for the fuel invoice, fuel delivery ticket and price notification. The airlines are keen to do EDI because it allows them to obtain faster and more accurate information about fuel prices and deliveries and to make more informed fuel purchasing and operational decisions. Airlines spend 10-20 percent of their operating costs on fuel, so any savings on this can be significant. In December 1991 in London the final form of the EDI messages to be used was agreed and a number of pilot projects (eg BA/Shell, KLM/Esso/Shell, AA/Exxon/Sun) are happening.

Peter Windebank, of Esso Petroleum Company Ltd and leader of the Pipenet User Group, talked about this newly formed user group which is considering the business opportunities for using EDI in the UK White Oil Pipeline operations. After initial analysis of their business this group is looking at the possible benefits to be derived in three areas; for nominations, scheduling and ticketing for the British Pipeline Agency, for nominations, scheduling and ticketing for the Mainline; and invoicing for the Oil and Pipelines Agency.

#### Exhibition

Associated with the conference there was an exhibition from EDI service providers (those companies that provide the electronic 'Royal Mail' services by which the EDI messages are transmitted), software, hardware and consultancy/training providers.

#### Finale

The whole day was nicely rounded off with a reception, hosted by International Network Services and GE Information Services which have been closely involved with the EDI developments in the oil industry both in the United Kingdom and in the United States.

The purpose of this conference was to make oil industry business people aware of the implications of using EDI for 'doing business without paper' and to show that, in spite of its name, EDI is primarily a business, not a technical issue.

EDI certainly underpins good, forward looking business practices. There are a wide range of internationally defined EDI messages and many organisations ready, and able, to help with the technical implementation of EDI. The creativity in using 'paperless trading' is in seeing the business opportunities that it offers — and that is up to everyone individually!

#### Dr Roger Till

The proceedings of this conference are available from the Library, The Institute of Petroleum, price UK £55, Overseas £60.



#### ENERGY ECONOMICS GROUP

An evening meeting has been arranged on Thursday May 14 at 5.30 pm

#### Orimulsion

#### a speaker from BP Bitor

Tea and biscuits will be available from 5.00 pm. For further details please contact: Mrs J Thompson, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR. Telephone 071 636 1004.

#### Conference report

### Prices of perennial interest

On the day when OPEC had agreed collectively to limit oil production, but the agreement was viewed with such scepticism by the market that prices fell, an international audience gathered at the Institute to hear about some of the underlying influences on oil price information. The annual Oil Price Information Seminar has often concentrated on the emergence of the futures market and the effect of increasingly rapid spot price reporting. This year it began by considering oil as a real commodity.

#### **Back to fundamentals**

Classic economic analysis assumes that prices are formed through the balance between supply and demand, and the size of stocks. Mark Lewis explained how his company, Energy Market Consultants Ltd, used information about these fundamentals to make short-term forecasts of oil price. Price could only be predicted reliably a month or more ahead but analysis of the fundamentals established trends and movements in trends.

The oil market is not perfect because OPEC is a cartel. A perfect market would require perfect knowledge, such as the futures market provides for spot prices. Mr Lewis pointed out a number of problems in using supply and demand information. The first is the time-lag. After a month you can get nearly all the supply information, 50 percent of demand information and about 80 percent of stocks information, so a good picture can take several months to emerge. Confidence in the quality of the data is another problem the quicker it comes, the worse it tends to be. Most people ignore data that is more than about three months old but understanding can often be improved by reworking old data. Finally some data, for example on stocks, is never revealed. He estimated the uncertainties in the data as two million barrels per day (mbd) for demand, one mbd for supply and three mbd for stocks. Anyone who wants to predict prices from fundamentals has to estimate these uncertainties.

The level of stock (floating storage and surplus land stocks) shows whether the market is long or short. When stocks are low, prices tend to rise and vice versa. Since 1980 oil companies have tended to keep mimimum stocks, especially when the price is high. Government stocks have grown substantially and it used to be possible to ignore them as they were held only for emergencies. That this is no longer the case was shown during the Gulf War. When the Allies invaded Kuwait, the International Energy Agency announced that it would release two mbd from stocks and the price instantly fell from \$30/bbl to \$20. The additional knowledge that the Saudi oilfields would not be destroyed meant that the market went from short to long very quickly.

Mr Lewis then looked at figures for the second half of 1991 to illustrate how marginal changes in the fundamentals could have a disproportionate effect on prices. During this period stocks were initially above average and the weather was dry and mild so the price was low. By assuming that normal cold weather had prevailed and that the USSR had slightly cut exports, he showed that prices could have increased to \$25–30/bbl. This analysis effectively demonstrated how important it is to have accurate data.

#### Medium-term uncertainties

Medium-term oil prices were designated the great uncertainty by Dr Paul Stevens from the Economics Department of Surrey University. In his view, there is much greater confidence in the prediction of longand short-term prices, so the trick is to determine the point when long-term certainty dissolves into medium-term insecurity.

He put forward two fundamental propositions. The first was that setting crude prices begins with an administered price, once decided mainly by the oil companies. This system was fine while the market believed it but uncertainties entered. National governments took over as price setters, joined in 1981 by OPEC. Indicating all the price reporting systems displayed as part of the seminar, Dr Stevens made the point that price transparency can affect the credibility of an administered price.

The second proposition was that whoever has excess capacity to produce crude and can control it can set the price. As an example he cited 1979, when with the loss of Iran as a producer and high demand, excess capacity disappeared and so did price control. When excess capacity returned through OPEC this was seen to be less controllable as members cheated and the set price collapsed in the mid-1980s through lack of conviction.

The characteristics of the short-term market are considered to be largely known. Excess capacity is small and concentrated in Saudi Arabia which appears to want low prices. The only unknowns are political — what will happen in the former Soviet Union; is Algeria stable? The long-term prospects for oil prices are governed by the certainty that excess capacity to produce oil will re-emerge.

In the medium term there is only one relative certainty; that the Gulf region



will recover its excess production capacity. Uncertainties are legion how much excess capacity will emerge, when and where? Kuwait should soon begin to produce again, with a potential of 1.5 mbd by the end of the year. Iraq could instantly produce one-two mbd, but UN sanctions are likely to remain as long as Saddam Hussein is in power. Iraqi resumption of production represents the shift from a short- to a mediumterm market.

A further uncertainty is whether Saudi Arabia and the other Gulf states will move away from a low price. Dr Stevens believes that the Saudis could recover the costs of the Gulf War through higher oil prices. Kuwait also desperately needs revenue for rebuilding. All the Gulf states are experiencing pressure on revenue, for development and defence, especially if they do not come to terms with the Iran regime.

The United States will probably favour a low price until its November election but might prefer a high price afterwards. The Saudis might also want to ensure that they retain US support.

The medium-term uncertainty could be summarised as when would excess capacity return to the current tight market of disbelief, a point in time allied to the political future of Saddam Hussein. Subsidiary questions concern the degree of cohesion amongst the Middle East controllers of the excess capacity and their price objectives.

#### Gas supply and demand implications

Gordon Summers, a director of Shell International Gas Ltd, showed that the future of gas-fired power stations depends on a sufficiently high gas price. He explained that there is no world market in gas, because its energy density is low, hence transport costs are high. Global gas consumption has doubled in the last 20 years at the expense of oil and coal and has reached 20 percent of world consumption. Price competition will therefore remain.

There are two driving forces for increased power generation from gas, the first of which is environmental. Burning gas produces no sulphur dioxide, few nitrogen oxides and less carbon dioxide than coal or oil. Secondly, modern power stations can deliver a thermal efficiency of over 50 percent in combined cycle plant. Worldwide installations already generate 30 gigawatts.

Mr Summers forecast developments up to the year 2000. Known plans will double generating capacity in Western Europe and the Far East, while the declining trend in the United States will be reversed and increase by 50 percent. Natural gas reserves already approach those of crude and annual gas discoveries are four times those of oil. Many are, however, remote from users, with concomitant transport problems.

Looking at regional markets in greater detail, Mr Summers predicted that demand in the Far East will grow, particularly if there are further problems associated with nuclear power. New LNG projects will certainly be needed by 1997 to meet demand for power generation but the greater production and transport costs will put an upwards pressure on price. The Far East market is expecting this but also appreciates long-term stable contracts.

The United States is the second largest world market, after the former Soviet Union. Its current potential over-supply could switch very quickly to shortage because of the limited reserve base and lack of investment. Mr Summers predicted a shortfall from 1995 or possibly before. The current US price is the lowest for 10 years in real terms and there is a significant spot market.

When reserves deplete, competition between different fuels will re-establish. We shall see a medium-term rise in gas



prices, as gas supplants low sulphur fuel oil. Demand will depend on how much gas can be produced and sold below the ceiling but imports will ultimately be needed.

In Europe, there will be more longterm supply deals. Public distribution will spread in Holland and Germany, leading to greater industrial use apart from power generation. Demand could rise by 50 percent in 20 years but supply is only guaranteed until the mid-1990s. Imports will be needed from Norway, Russia, North Africa and possibly beyond. Nigeria is likely to be exporting LNG by 1997.

An analysis of supply costs showed that although long-haul pipeline gas must cost more, the rise is hard to quantify. Supply security and expected return on investment are important factors. Despite the strong demand prospects in major areas, it will be hard to justify investment in large projects unless gas prices strengthen. The first signs of this firming are appearing. Wholesale long-term contracts, already emerging in the United States, will be important. The price rise would not lead to an unacceptable level of price exposure as competition would be provided by oil and coal which will remain major suppliers.

#### Judith Mirzoeff



### IP Information Service News

#### Photocopy accounts

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To set up an account send a cheque, for at least £50, made payable to the Institute of Petroleum to Liliana El-Minyawi, Library Assistant. Please make it clear what the cheque is for.

#### **Times of service**

Visitors welcome 9.30 am to 5 pm Telephone queries 10.00 am to 5 pm Monday to Friday, except Bank Holidays Library, 61 New Cavendish Street, London W1M 8AR



#### **Obituary: HA Richardson**

It is with much sorrow that we have to report the death of Tony Richardson of ASR Books. Tony was an active supporter of IFEG, coming to many events and offering constructive, friendly criticism, help and advice throughout the years. We will miss him.

#### IFEG visit to IP

There will be an opportunity for IFEG members to visit the IP Library on 21 May 1992. Places will be limited to 20. Contact Catherine Cosgrove on 071-636 1004 Ext 210 for more details.

#### **Reuter Textline**

The IP Information Service now has access to the Textline data base through the Data-star on-line host. Textline is one of the world's leading business information databases. It contains news and comment from a wide range of international publications on companies, industries, products, markets, economics, public affairs, the European Community and personalities. Coverage is worldwide, with a European (both East and West) emphasis. Most articles in Textline are full text and are taken from Newspapers such as *The Times, Le Monde* and periodicals such as *The Economist*.

#### Selected additions to Library stock

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The Power and Efficiency of Marine Propulsion. Institute of Petroleum. Edited by: Holbrook P. London, IP, 1991.

Safety/Standby Vessels: The New Requirements. Institute of Petroleum. Edited by: Ellis Jones P. London, IP, 1991.

Institute of Petroleum Epidemiological Study: Distribution Centre Study Principal Results 1951–1989. London, Thames Polytechnic, 1991.

#### **Pollution control**

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Air Pollution from Road Vehicles. Department of Transport. By: Watkins LH, London, HMSO, 1991. Class Number: 769.1.

*Emissions from Heavy Duty Diesel Vehicles:* 15th Report. Royal Commission on Environmental Pollution. London, HMSO, 1991. *Making Cleaner Fuels in Europe: Their need and cost.* Institute of Petroleum IP. Edited by: Cluer A. London, IP, 1991.

Refining and Reformulation: The Challenge of Green Motor Fuels. By: Seymour A. Oxford, Oxford Institute for Energy Studies, 1992.

### Standardization News

### IP delegates' review of the ASTM D.02 meetings held in Austin, Texas, December, 1991

In the review of the December 1990 ASTM D.02 meeting, the overall impression was rather pessimistic of the ability of ASTM D.02 to react to the challenge of the International (ISO) and pan-National (CEN) activities. It was especially pleasing to note at this meeting, that there was a far greater sense of realism and understanding of ASTM's role in these activities, and a determination in many areas to ensure that their standards remain in the mainstream of petroleum methodology. This does not of course cover all areas or aspects and there are some very difficult topics on which we need to obtain a reasonable compromise position, but a start has been made. Undoubtedly the decision to hold the next meeting of ISO/TC28 in Philadelphia in June 1992 has provided a spur to ASTM D.02 attitudes, and one of the interesting and positive results of this was the appointment of several more project leaders for ISO methods during the week from among ASTM members.

#### Overview

At the officers meeting, the IP delegates presented an overview of the IP structure and procedures, and how this linked in to the activities of ASTM, ISO, and CEN. This was extremely well received and clearly illustrated that lack of clear information was often the cause of misunderstanding and even mistrust. The concept of a 'legal' application of standards, including the methodology, is contrary to ASTM experience and philosophy, and therefore it is not surprising that IP and ASTM are increasingly facing a different challenge. If, as the EC proposes, there is a further erosion of 'consensus' within Europe, this will accentuate the differences. The pressures are most likely to be related to time, and the United States is not immune to this. It is interesting that ASTM is resorting to 'emergency' standards ahead of their normal 'due process', in order to get methods required for State or Federal regulations into print in time, and it is possible, or even likely that CEN will react similarly (perhaps by publishing ISO/DIS or even ISO/CD methods). This balance between time and degree of consensus is the major challenge of the petroleum standards community, together with the minimisation of administrative time.

#### Joint standards

The future of ASTM/IP and ASTM/API joint standards is still in balance. It is to be hoped that the question of logos does not dominate the real issue of standardization. The issue has been heightened by the IP decision to reprint ISO methods with multiple logos, but this is only a symptom of the issue. The real issue is how to decide when standards are technically 'identical' or 'equivalent', or perhaps just 'related'. This would seem to be a prime task of ISO/TC28/WG8, and when a method is established as being in one of the above categories, the actual indication is of secondary relevance.

The environment is likely to dictate the direction and pace of new standard development for the foreseeable future and has already had considerable impact on the allocation of resources. A

symposium held during this ASTM D.02 meeting on 'The Impact of US Environmental Regulations on Fuel Quality', although a little disappointing in range of topics, was extremely well supported and received, and is undoubtedly the forerunner of other similar events.

#### Demand for accreditation

Finally, another positive note. For the first time in North America, the author heard the words 'ISO 9000' used, not just once, but on several different occasions. It is perhaps a sign of the different cultures that although there was obviously an increasing awareness, and a real demand for accreditation, necessary for exports to Europe after EC92, the US government has set up no agency to provide this service. Those few organisations accredited or in the process of accreditation, were having to use BSI as auditors. This seems to be a strange way to support your industry.

#### Standard Methods for Analysis and Testing of Petroleum and Related Products 1992

The 1992 edition was published on 10 February.

It contains one new method IP 395 'Determination of the dryness of propane — valve freeze method' and three new proposed methods.

<sup>'</sup>PM BK Determination of Wet and Dry Crude Oil Density-Hydrometer method.'

'PM BL Determination of Chipping retention properties of surface dressing binders- Mini fretting method'.

'PM BM Determination of Ba, Ca, P, S and Zn content of lubricant and additive components by wavelength dispersive X-ray fluorescence spectroscopy'.

Major changes to the book include:

- All methods have been retitled in order to have a consistent style.
- A new safety statement is included in all methods.
- An additional section 'Mathematical style and equation layout' has been added to the forward.
- An expanded list of ISO Petroleum Test Methods appears in the frontpiece
- Two methods and one appendix has been deleted IP 59 Density and Relative Density IP 171 Vapour Pressure Micro Method Appendix D Evaluation of Crude Petroleum
- Fourteen methods have been fully revised and rewritten in ISO format.

In addition to the above many methods have been revised and minor technical and editorial changes made to them. *Standard Methods for Analysis and Testing of Petroleum and Related Products* is available from John Wiley & Sons Ltd, Distribution Centre, Shripney Road, Bognor Regis, West Sussex PO22 9SA. Tel: (0243) 829121. Fax: (0243) 820250.

### ... people



Salvesen Well Services has appointed **Mr Hamish MacEwen**, above, in a specialist services role. Mr MacEwen has 15 years experience in well servicing operations, including coil tubing, nitrogen, stimulation and cementing gained in both the North Sea and at various overseas locations.

Mr Alirio Parra, former Managing Director, Petroleos de Venezuela Europe SA, has been appointed Venezuelan Minister of Energy and Mines.

The Petroleum Science and Technology Institute has appointed **Mr Roy Askew** as Financial Controller with responsibility for financial control systems and **Mr John Gaskell** as Project Development Manager who will be responsible for leading a number of projects in engineering and geoscience.

Mr Ken Lax, below, has been appointed Industrial Sales Manager with Wilson International (UK) Ltd, the manufacturer of cathodic protection systems.



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BP has announced several changes to the board. Sir Campbell Fraser and Mr Ray Knowland have retired and Mr James Ross has resigned as Managing Director to join Cable and Wireless plc as Chief Executive. The board has appointed Mr Steve Ahearne and Mr Rodney Chase as Managing Directors; Dr Karen Horn has been appointed as a non-executive Director. Mr Ahearne will retain his title of Chief Financial Officer; Mr Chase, presently Chief Executive, Western Hemisphere for BP Exploration, will be appointed Chairman and Chief Executive Officer of BP America Inc. Dr Horn is Chairman and Chief Executive Officer of Bank One, Cleveland, NA and was previously President of the Federal Reserve Bank of Cleveland.

Texaco have appointed Dr Leonard Magrill as General Manager of the Strategic Planning Department and Mr Tony Price, General Manager of Texaco Ireland. Texaco has also made several management appointments in their downstream operations - Mr John Darnley. General Manager, Sales and Marketing, Mr Mats Fredriksson, Assistant General Manager of Texaco's Pembroke Refinery, Mr Don Henderson, General Manager, Downstream Planning, Mr Simon Humphries, General Manager, Supply, Operations and Trading, Ms Louise Nemanich, Manager, Commercial Sales.

Mr John Holmes has been appointed Managing Director of ABB Global Engineering Ltd.



Billington Osborne-Moss Engineering Limited has appointed **Dr George Zintilis**, above, as Supervising Engineer of the Specialist Study Group in the company. Dr Zintilis joins the company from Advance Mechanics and Engineering where, for three years, he was Principal Engineer responsible for work on ship impact, offshore decommissioning, design of blast resistant structures and a series of related projects.

Halliburton Geophysical Services has announced a number of key management appointments in the company which is responsible for all seismic operations of Halliburton Geophysical Services in Europe, Africa and Middle East. **Mr Barry Gammon** has been named as Land Acquisition Manager, **Mr Andy Cuttrell** has been appointed Land Data Processing Manager and **Dr Andy Jackson** is now Marine Data Processing Manager.



Helle Engineering Ltd, the Aberdeen based subsea and diver communications manufacturer, has appointed **Mr Jad Mohamed**, above, as its Sales Manager. Mr Mohamed has extensive knowledge of the oil and gas industry and subsea related markets with first hand offshore experience gained while working with Subsea Offshore Limited.

Ranger Oil Limited has appointed **Mr Robert Campbell** to its board of directors to fill the vacancy created by the resignation of **Mr Michael Phelps.** Mr Campbell is a director and former Chairman of the board of Canadian Pacific Limited and a Director of Pancanadian Petroleum Limited. Mr Campbell is also a Director of the Royal Bank of Canada as well as several affiliated companies of Canadian Pacific Limited.

Mr Stephen Summerland has been appointed as Senior Consultant at Executive Scientist Appointments Ltd. Mr Summerland was formerly with British Gas and IITS (UK) Ltd.



Mr Colin Haycock, above, Finance Director and Deputy Chief Executive of WS Atkins Limited has been appointed as Chief Executive. He succeeds Mr Terrel Wyatt who will continue as Chairman of the company. Also joining the board of the company will be Mr Keith Hounslow, presently Managing Director of WS Atkins — Civils, Mr Michael Jeffries, Managing Director of Atkins Lister Drew and Mr David Slater, Managing Director of WS Atkins — Midlands.

Subsea specialist **Mr Glyn Pritchard**, below, has joined Aberdeen-based Altra Consultants Limited as a senior consultant. Mr Pritchard was previously Subsea Manager with BP Exploration and was responsible for the management of the annual inspection, repair and maintenance of BP's North Sea pipelines and some of its platforms. He also has in-depth experience of design, construction and commissioning of pipelines, subsea valve control systems and subsea developments.



### ... technology news

# Top invention award for oil and gas rig crack detector

A hand-held instrument capable of accurately measuring underwater welding cracks in oil and gas rigs has won top prize in the individual category of the national Toshiba Year of Invention competition.

The Linear Angular Measurement (LAM) gauge has been developed by commercial diver Moss Mustafa and technical consultant Richard Tomlinson in conjunction with TWI (formerly The Welding Institute), and is available from Instruments & Inspection Services.

The LAM gauge is designed to enable deep sea divers for the first time to take accurate measurements of the angle and depth of cracks in oil and gas rigs.

When a crack is found during routine inspection of underwater structures, the common practice is to grind it out using a burr or "peanut" grinder. This prevents the crack from propagating further around the weld and increases the fatigue life of the weld. The depth of the excavation must then be determined to establish the size of the remaining ligament, to allow stress analysis and assessment of the need for repair.



Fitted with swivelling magnets, the LAM gauge can be attached to flat or curved structural members leaving the diver's hands free. The sliding probe is set at the excavation angle, zeroed on the member surface and then lowered into the deepest point. The depth and angle of the excavation can then be read consistently and with a greater degree of accuracy than with any other presently available method.

### New low-emission fuel under trial

Year-long trials are under way in Helsinki, Finland, with a new type of diesel fuel that promises to cut both sulphur and particulate emissions from public transport vehicle exhausts.

The fuel, known as City Diesel, has been developed by Finland's Neste Oil company following a survey of the needs of engine manufacturers. Its very low sulphur content — 0.005% compared to 0.1% to 0.2% for normal diesel grades plus a smaller content of aromatic compounds, has resulted in 10-30% less particle emissions while under test by Volvo, Saab-Scania and the Swedish Environmental Protection Agency.

The tests showed that sulphur emissions are a fraction of those of other diesel fuels. City Diesel also generates slightly lower carbon monoxide and nitrous oxide (NO<sub>x</sub>) emissions, and it was found that its low-sulphur content allows the use of catalysts or particle filters and has the potential to extend engine life by as much as a third.

Neste produced the first quantities of City Diesel in 1990 and, following tests by Swedish public transport authorities, the fuel underwent trials throughout 1991 in 140 Helsinki buses to study its ability to cut exhaust emissions in urban areas and how effectively it can do this in winter.

### Mud and cuttings oil removal

An oil-cleaning machine employing a new thermo-mechanical technique achieves virtually complete removal of oil in drilling muds and cuttings.

The new treatment, called TCC for Thermodynamic Cleaning of Cuttings, reduces the amount of residual oil in drilling muds and cuttings to 0.1 percent by weight. The technology was developed by Thermtech in Norway.

The treatment meets the new strict Norwegian limit of 0.5 percent oil in mud to be dumped in the sea, introduced because of the increasing pollution from oil-based muds.

The mass is exposed to intense whipping and vibration which creates sufficient heat of friction or shear to evaporate oil and water. The whipping also crushes particles so that oil inclusions in capillaries are exposed and partially evaporated. This is particularly effective for cleaning cuttings intimately impregnated by oil under high pressure in the well.

The partial-pressure distribution between oil and water makes oil evaporate at a temperature more than 100°C below its normal boiling point. The vibrations also shake some of the oil loose as a microdispersed mist that is removed without having to be evaporated.

Because of the moderate heat exposure the oil is not being fractionated or split into other components and can therefore be reused without further treatment.

There are no emissions to air or water and energy consumption is low.

#### BST develops new retrievable bridge plug for monobore well profiles

Baker Service Tools has developed a new retrievable bridge plug for a major North Sea operator.

The Model "GT" retrievable bridge plug can be used in drilling, completion/ production, and workover applications where Monobore well profiles are prevalent.

A special feature of the Model "GT" plug allows the operator to test the plug from above and below with applied differential pressure. Prior to closing a molded seal by-pass in the plug, pressure is applied across the bottom of the plug through the drillpipe. The plug is then disconnected from the drilling string, closing the by-pass and allowing the plug to be tested from above.

The Model "GT" Bridge Plug is currently being utilised as a temporary bridge plug in wells drilled through subsea templates by semi-submersible drilling rigs.

The semi-submersible drilling rig is released by the operator and the production platform is installed. The retrievable bridge plugs are then released and retrieved to surface, allowing the operator to continue the completion of the well installation.

# ... technology news

## Environmental solution

Serck Baker, a market leader in the field of fluid processing technology, has launched a new product, The Sandwash Hydrocyclone.

The Sandwash Hydrocyclone, designed and developed by Serck Baker, efficiently removes oil from jetted sand allowing the sand to be discharged into the sea without causing an environmental hazard. This makes it a cost effective and labour saving alternative to storing contaminated sand in skips for eventual land disposal.

The Sandwash consists of ceramic hydrocyclones housed in a duplex stainless steel or other suitable lined metal vessel. The ceramic materials are erosion resistant for reliable long term operating with minimum maintenance required. Able to separate sand particles five microns and above, the Serck Baker Sandwash has already been selected by Chevron for the new Alba development.

# New range of gas monitors

Casella London Limited have announced their alliance with Oldham France in the launch of a new range of Portable and fixed gas detection equipment.

This high performance instrumentation utilises the latest advances in electronic and sensor technology, and is able to monitor a wide variety of gases and vapours including O<sub>2</sub>, Cl<sub>2</sub>, CO, H<sub>2</sub>, H<sub>2</sub>S, HCN, HCl, NO, NO<sub>2</sub>, SO<sub>2</sub> and combustibles.

The OX11 and TX11 Pocket Oxygen and Toxic Gas Detectors provide an efficient and inexpensive method of protecting personnel from exposure to harmful levels of toxic gases and vapours or oxygen deficient atmospheres, and when used in its leather case it is CENELEC Safety approved to the highest classification EEx ia IIC T6.

The simple but powerful MX11 can continuously monitor for both  $O_2$  deficiency and the build-up of combustible gas levels, giving both audible and visual alarms in case of gas or fault detection. Connectable to a PC by an RS232 output and interface, the unit has a built-in datalogging facility which includes modes for self-checking, programming and calibration.

### Alloy's immunity to hydrogen embrittlement

Marinel alloy, a new cupronickel developed by Langley Alloys Limited, offers a combination of high tensile strength, good elongation, resistance to corrosion and immunity from hydrogen embrittlement.

The material has been designed for marine and offshore subsea high strength fastener applications where it may be used as a direct substitute for established high strength bolting materials. Marinel promises longer service life and reduced risk of premature failure and is also fully compatible with stainless steels and other cupronickels for general fastening applications. In offshore conditions, use of cathodic protection and the possibility of establishing a galvanic cell between dissimilar metals substantially raise the risk of exposure to nascent hydrogen. Absorption of hydrogen by the surface crystal structure of a metal can subsequently compromise its mechnical performance.

Marinel's immunity to hydrogen embrittlement has been substantiated by independent authorities including BNF-Fulmer, Conoco (USA), SINTEF (Norway) and BP Research. The material also exhibits excellent resistance to general corrosive media encountered in marine/offshore environments.



### **Outboard fast rescue craft**

The Department of Transport has awarded RTK Marine Type Approval for the outboard version of their RTK FRC 606 Fast Rescue Craft under the Standby Vessel Code published July 1991. RTK already have DTp Type approval for their inboard diesel fast rescue craft.

A major feature of the RTK FRC 606 is the fender system which is constructed of polyurethane foam totally encapsulated within a polyurethane elastomer skin. This RTK system is superior over the more conventional inflatable RIB collar. The RTK fender is far more hard wearing and resilient to damage.

Due to its modular construction it is easily replaced by simply unbolting the damaged section. Unlike RIBs the RTK FRC 606 does not rely on the collar for buoyancy therefore the craft can be operated with minor damage to the fender. Propulsion for the outboard version is twin 55 HP Yamaha engines.

# ... technology news

#### High-strength drill pipe resists fatigue

Prideco, Inc. has introduced a new high-strength XLT drill pipe to the oil and gas industry.

The XLT drill pipe features a special extra-long taper upset with a guaranteed minimum length of  $4\frac{1}{2}$  inches, compared to the standard API upset of 1 to  $1\frac{1}{2}$  inches. This longer taper resists fatigue damage and improves the plastic coating surface for increased corrosion resistance. Prideco XLT tool joints also have a larger outside diameter and are two inches longer than standard boxes and pins for increased service life.

Additionally, the company can custom heat-treat tube bodies and tool joints for special applications including  $H_2S$  service.

Another key feature of this new pipe is the manufacturing process. Traditionally, drill pipe was supplied by two or three sources, i.e. the heattreater, the upsetter or the tool jointer. Prideco has simplified this process to one source. Drill pipe tubes are ordered from the steel mill per their specified chemistry, then all manufacturing steps are conducted by Prideco.

### **Automatic forecourt terminals**

The French company Lafon, specialists in the design and manufacture of service station equipment, offer a complete range of automatic forecourt terminals for self-service petrol stations, operated by a smart badge.

These electronic badges are inserted into a terminal at the pump and provide details of the driver and the vehicle and enable a precise record to be kept of the fuel supplied. The badges are hard wearing and resistant to shock, dust, oil, petrol, grease, humidity and extremes of temperature. The data on the badges cannot be tampered with.

Terminals of the GLS and ABILYS type are available in single or double reader versions, where the latter can also accept conventional magnetic cards. They can control the supply of fuel from four pumps simultaneously. With the GLS version data on sales can be read out from a terminal in the office, whereas with the ABILYS this is done directly from the forecourt terminal.

### Sulphur analysers

A new range of analyser systems for optimising sulphur removal and recovery from petroleum and natural gas refining and processing operations has been introduced by Ametek Process and Analytical Instruments and distributed in the United Kingdom by Hobre Instruments.

All systems are based on the industry-standard ultra-violet photometric technology and the complete range is designed to provide all the sulphur compound measurements required for start-to-finish control of removal and recovery operations.

#### **Oil-absorbing socks and cushions**

Oil-Eater, the fast acting absorbent of oil and hazardous liquids such as oil-based chemicals, paints and inks, is now available in socks and cushions.

The new socks and cushions are specially designed for use in situations where regular spills or seepage of oil is occurring. They can also be used in emergencies to rapidly contain and absorb unexpected spills.

By using Oil-Eater socks and cushions, a cleaner and safer working environment can be achieved without the need for a permanent carpet of messy and untidy granules.

Oil-Eater claims to be 40 times lighter and up to 20 times more effective than clay granules. Its fibrous structure enables these new socks and cushions physically to soak up over 10 litres of oil. Once absorbed, Oil-Eater does not release the oil so normal clean-up times are greatly reduced.

The socks and cushions are available in

packs of five and can also be supplied loose-packed in bags or bulk-supplied in 230 litre bales.



# Fault tolerant power supply

Elcon Intrinsic Safety announce the PS-1500 fault tolerant, multiple redundant modular power supply system designed for use with fire and gas and other safety systems.

Consisting of dual redundant input modules, which may be DC, AC line or one of each, plus from two to six load sharing DC output modules, all housed in a 4U 19"rack, PS-1500 delivers up to 40A of secure 24VDC power. Automatic fault detection with an alarm relay contact output signals failure of any modules. Removing and replacing modules for servicing can be carried out safely with the power still on and with the load fully supported by the other modules.

Protection against short circuits is provided by an automatic shutdown and timed re-try/reset and persistent partial overloads are detected and alarmed, with eventual shutdown to prevent damage. Thermal protection is provided as standard.

The PS-1500's claimed operating efficiency of over 80% minimises cooling needs which are handled by miniature DC powered integral fans.

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The Institute of Petroleum

### Institute News

#### **Proposed Netherlands Branch**

Around 50 delegates attended a preliminary meeting held in Rotterdam last month with a view to setting up an Institute of Petroleum Branch in The Netherlands.

Opening the meeting, IP president Mr Basil Butler outlined the Institute's concerns over the spread of standards, information and education for the petroleum industry and how the Institute was working closely with its European counterparts to ensure the best possible practices for the industry.

A recent analysis of the IP membership disclosed that five percent of all members are based in Europe, with 65 members in The Netherlands.

Initial enquiries indicated a keen interest in setting up a Netherlands branch similar to those that already exist in the United Kingdom and Malta to provide a conduit for information and a forum for discussion. Such a branch could also help the IP to pursue its aims of contributing to increased standardisation across Europe.

Mr Ian Ward, IP Director-General, set out the Institutes aims, objectives and vision for Europe and said that he believed that there is a role in Europe for the Institute to improve its services to members and to 'enable the European petroleum industry effectively to be self-regulating through the technical competence and independence of its appointed forum'.

The role of a branch, its organisation and typical programme was outlined to the meeting by the chairman of the IP Branches' Committee, Dr Tom Farmer, who also laid out the guidelines for forming a branch. 'A Netherlands Branch would,' he said, 'help foster interests specific to a locality and provide a local forum for meetings, lectures and discussion groups.'

After questions from the floor, it was the general view of the meeting that an interim committee should be set up to lay the groundwork for forming a Netherlands Branch.

For more information contact Mrs Mary Wood at the Institute of Petroleum.

#### Around the Branches

#### Aberdeen

- 14 April: 'Open Learning Offshore', Mr Frank Jenkins, Petroleum Open Learning Aberdeen.
- 12 May: 'Technical and Operational Aspects of Piper Re-Development', Michel Romieu, Chairman and Managing Director of Elf Enterprise Caledonia.

#### Humber

9 April: Ladies Night.

13 May: 'Pilot Operations Past and Present', Mr C Wilkin, Pilot Operation Manager, ABP.

#### London

20 May: 'Integrated Pollution Control', Dr J Marshall, HM Inspectorate of Pollution.

#### Midlands

15 April: 'The Role of Management Consultancy in the Petroleum Industry', Mr AP Miskin, KPMG Management Consultancy.

#### Northern

#### 6 April: Hot Pot Supper.

Stanlow:

30 April: 'Are Oil Refineries Clean Enough', Mr D Pounder, Department of Environment, (joint meeting with SCI).

#### South Wales

30 April: 'The Work of the Field Studies Council', Mr C Walker, FSC. Yorkshire

17 June: Golf Tournament.

Petroleum Review April 1992

#### **New Fellows**

#### Mr J Napier, Strategic Planning Consultant

Mr Napier is a Fellow of the British Institute of Management and a freelance member of Specialist Information Services Ltd, London. During more than 30 years in the petroleum and associated industries, Mr Napier has held senior economic and planning positions in a number of major oil and service companies in the United Kingdom and abroad, most recently as Senior Planning Adviser — UKCS Offshore Planning — with Britoil.

Mr T Rees, Reliability, Measurement and Loss Controller, BP Oil Refinery, Grangemouth

Mr Rees is a Chartered Engineer and a Fellow of the Institute of Mechanical Engineers. He has worked in various European and Middle East refineries and from 1982 to 1988 he was Refinery Maintenance Superintendent at BP's Grangemouth Refinery. He is currently Reliability, Measurement and Loss Controller at Grangemouth and also Chairman of the Institute's PML-5 Committee, having been a member of the committee since its inception.

Mr D Morrison, Director, County NatWest Mackenzie & Co Ltd

After leaving St Andrews University with a BSc in Applied Maths, Mr Morrison joined Wood Mackenzie in 1976 and became a partner in 1984. He is currently a Director of CNWM, responsible for corporate finance/oil and energy and, until recently, was responsible for the North Sea Service and other publications, economic models and numerous oil industry consultancy projects. Mr Morrison is also a member of the Society of Investment Analysts and is a qualified airline pilot.

#### New Collective Member

IMCO Maritime Surveyors Pte Ltd, 52 Telok Blangah Road, Appt No 01-04 Telok Blangah House, Singapore. Tel: (65) 2722633 Fax: (65) 2787782

IP Nominated Representative: Capt Royston LC Cole, Managing Director

IMCO Maritime Surveyors operate in the field of consultancy in the transport industry and retail services, specialising in ship to ship transfer quantity, loading and discharge at terminals, expediting discharge, bunker surveyors, supervision of tank cleaning, tank inspection, ship inspections and oil sampling analysis, ship inspections/loss prevention surveys, on/off hire surveys and P & I surveys.

#### New Members

- Mr DG Antell, BP Research, BP Research Centre, Chertsey Road, Sunbury-on-Thames, Middlesex TW16 7LN
- Mr J Avery, Nutwood, 11 Copthorn Avenue, Broxbourne, Hertfordshire EN10 7RA
- Mr MJH Avis, 22 Natal Road, Cambridge CB1 3NS
- Mr A Bareket, PAZ Oil Co Ltd, PO Box 434, Haifa 31003, Israel
- Mr C Barnes, Sheen, Old Odiham Road, Alton, Hampshire GU34 4BW
- Mr NJ Brenton, 13 Bourne Firs, Lower Bourne, Farnham, Surrey GU10 3QD
- Mr CI Brown, 25 Carr Lane, Willerby, Hull, North Humberside HU10 6JP
- Mr EJP Browne, BP Exploration Co Ltd, D'Arcy House, 146 Queen Victoria St, London EC4V 4BY
- Mr IA Brown, 96 Montrose Road, Arbroath, Angus, Scotland DD11 5JW
- Mr S Burchell-Davies, 12 Homington Court, Albany Park Road, Kingston-upon-Thames, Surréy KT2 5SP

### Institute News

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- Alhaji GA Kanomah, NNPC PH Ref Co Ltd, PO Box 585, Port Harcourt, Nigeria
- Mr CD Kay, 11 Corvedale Road, Sellyoak, Birmingham B29 4LG
- Mr DJ Kirkham, The London School of Fire Engineering Ltd, 12 St Lukes Road, Ironbridge, Shropshire TF8 7PU

Mr MA Lucas, 31 The Avenue, Haslemere, Surrey GU27 1JT

#### **Deliveries into Consumption**

UK deliveries into inland consumption of major petroleum products - Tonnes

Products	Jan 1991†	Jan 1992*	% change
Naphtha/LDF	395,380	294,160	-25.6
ATF-Kerosine	445,810	470,510	5.5
Motor Spirit	1,932,930	1,895,610	-1.9
of which unleaded	736,080	831,120	12.9
Super unleaded	85,850	100,790	17.4
Premium unleaded	650,230	730,330	12.3
Burning Oil	341,090	297,180	-12.9
Derv Fuel	924,460	877,540	-5.1
Gas/Diesel Oil	925,560	805,550	-13.0
Fuel Oil	917,660	1,122,020	22.3
Lubricating Oil	71,290	73,750	3.5
Other Products	367,470	581,150	58.1
Total above	6,321,650	6,417,470	1.5
Refinery Consumption	541,330	524,950	-3.0
Total all products	6,862,980	6,942,420	1.2
†Revised *Preliminary			

- Mr A Malkin, 14 Hawkswood, Yardley, Chase, Olney, Buckinghamshire MK46 5NB
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Caroline Little, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR, UK. Telephone: 071-636 1004. Telex: 264380. Fax: 071-255 1472.

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It is recognized that exposure to fluids used in drilling operations associated with the exploration and production of oil and gas may give rise to health risks and appropriate measures must be taken to control them.

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