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Please contact: Laura Viscione, T: +44 (0)20 7467 7174 e: lviscione@energyinst.org.uk

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A charitable company limited by guarantee 61 New Cavendish Street, London W1G 7AR, UK Chief Executive Designate: Louise Kingham **General Enquiries:** T: +44 (0)20 7467 7100 F: +44 (0)20 7255 1472

EDITORIAL
Chris Skrebowski FE

Associate Editor:

Editor:

Kim Jackson

Design and Print Manager: Emma Parsons

Editorial enguiries only: T: +44 (0)20 7467 7118 F: +44 (0)20 7637 0086

e: petrev@energyinst.org.uk

www.energyinst.org.uk

ADVERTISING

Advertising Manager: Hootan Sherafat McMillan Scott plc 10 Savoy Street, London WC2E 7HR

T: +44 (0)20 7878 2300 F: +44 (0)20 7379 7155 e: petroleumreview@mcmslondon.co.uk www.mcmillan-scott.co.uk

SUBSCRIPTIONS

Subscription Enquiries: El Membership Department T: +44 (0)20 7467 7120/7122 F: +44 (0)20 7252 1472

e: subscriptions@energyinst.org.uk

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ABBREVIATIONS

365 Blair Road, Avenel, NJ 07001

The following are used throughout *Petroleum Review:* mn = million (10⁵) kW = kilowatts (10³) bn = billion (10⁹) MW = megawatts (10⁶) tn = trillion (10¹²) GW = gigawatts (10⁹) cf = cubic feet kWh = kilowatt hour cm = cubic metres boe = barrels of oil

equivalent t/y = tonnes/year

- km = kilometre sq km = square kilometres b/d = barrels/day t/d = tonnes/day
- No single letter abbreviations are used.

Abbreviations go together eg. 100mn cf/y = 100 million cubic feet per year.

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Front cover (Left): Heerema crane-barge Thialf removed BP's P15-B platform this summer. Photo: Heerema Marine Contractors (Right) (from left to right): Christine Stewart Munro, Executive Secretary, Parliamentary Group for Energy Studies; Pierre Jungels, CBE, Co-Chairman, El Council; Stephen Timms MP, Minister of State for Energy, E-commerce and Postal Services; Professor Martin Fry, Co-Chairman, El Council; Paddy Tipping MP, PGES Chairman; Louise Kingham, Chief Executive El Photo: Liz Shaw

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ROUNFrom the Editor

Dreams of desert rides in Libya

Possibly the most important news over the last month has been the UN's lifting of the sanctions on Libya. Potentially this opens the way for a return of the major oil companies to Libya, but for the moment this appears to be stymied by Washington's apparent determination to maintain ILSA (Iran Libya Sanctions Act) unmodified and to keep Libya on its list of states that sponsor terrorism

At present European and Asian companies with limited US interests are able to steal a march by signing exploration contracts. Recent reports suggest Total, Agip and RWE have already done so. The prize for the companies is that Libya remains relatively lightly explored, with many convinced that the Sirte Basin has great potential. This prize is made even more tantalising as the Head of State Moamer Quaddaffi has suggested that the oil sector should be privatised, while the Head of Government Choukri Ghanem is reported to be a supporter of foreign investment. The prize for Libya is the chance to reverse the steady erosion of its production capacity, which has fallen from a peak of 3.3mn b/d in 1970 to the current 1.45mn b/d. If the Bush administration is as beholden to oil interests as its critics claim, US oil companies should soon be back in Libya.

So far so good

Despite low oil stocks, lack of Iraqi exports, Nigerian shut-ins, Venezuelan shortfalls and recovering oil demand the whole system is holding together remarkably well with no obvious shortfalls in delivery and prices holding high but steady. Clearly the whole system is more flexible and more resilent than is sometimes feared. However, the nagging doubt remains as to the degree to which global economic recovery is being held back by high energy prices.

The US natural gas market also remains something of an enigma (see p35). It is clearly a system under pressure, but against the odds levels of gas in storage have been largely rebuilt so the country will start the winter heating season with only a limited shortfall.

A combination of a cool spring and a relatively cool summer, relaxation of environmental controls (allowing more coal-fired generation), closure of chemicals facilites and conservation caused by high prices means that, so far, all has lucked out. Prices are down, although still running at more than double the 1990s average. Supply has expanded with the recommissioning of the Cove Point LNG import facility – currently the largest of the country's four import terminals. Production from the Na Kika project in the Gulf of Mexico should also boost supplies later in the year. So, if the weather is kind and there are no accidents, it looks as though US customers will get the gas they want – albeit at fairly high prices – suggesting that traditional economics does work at bringing supply and demand into line.

Doing well – but why the secrecy?

Eagle-eyed readers of this publication will have noted that despite the UK's roads being choked with cars and new vehicle sales remaining very strong, the volume of fuel sold in the UK is either declining (petrol) or flat (diesel) (see p11).

The UK experience is hardly unique. Global oil demand growth is currently on a 1.5–1.8% growth trend, heavily focused in the Far East. Improving efficiency in use has brought demand growth to minimal levels in most developed economies. Minimal growth may pose challenges for the industry but it gives the lie to those who wish to characterise the industry as an environmental threat.

As this column has noted before, emissions of undesirable by-products such as carbon dioxide can only rise if volumes of fuel burnt rises. Clearly the UK's road users are now creating less CO2 as part of the well-established move to cleaner, more economical vehicles. This should be a cause for praise and rejoicing (although maybe not for those who've lost sales). Emotional dislike of other vehicles on the road should not blind us to the fact that vehicles contribute to our standard of living and usually represent the most economical way of moving people and goods. As the oil and auto industry are clearly succeeding in meeting the environmental objections, shouldn't we be rather more pleased?

Recent figures inform us that UK agriculture accounts for 74% of the land area, but creates just 2% of gross national product (GNP). It seems probable that the judicious building of some more roads would produce social, economic and environmental benefits for the vast majority of the population.

Chris Skrebowski

The opinions expressed here are entirely those of the Editor and do not necessarily reflect the view of the El.



Sulzer Pumps, in cooperation with Pump-Flo Solutions, has launched a new service - the 'SulzerSelect' service - at www.sulzerpumps.com Previously it was necessary for potential pump purchasers to describe their needs to a sales engineer, who made lengthy manual calculations. The new portal makes it possible for buyers to select their ideal pump from the Sulzer Pump website, simply by entering their basic selection criteria in response to prompts online. The programme presents a list of the pumps that can satisfy the duty, sorted in terms of pump size, efficiency, NPSHr or maximum power.

The UK Health and Safety Executive (HSE) has launched an online version of its Offshore Hydrocarbon Releases (HCR) System that contains detailed voluntary information on offshore hydrocarbon release incidents supplementary to that provided under RIDDOR (and previous offshore legislation prior to April 1996). The HCR System can be accessed from the 'Offshore Sector' pages of the HSE website at www.hse.gov.uk/offshore/ hydrocarbon.htm

Bollfilter has updated its website at www.bollfilteruk.co.uk to offer an easy online spares enquiry service for its automatic filtration system portfolio. Customers provide details of the spare parts required and receive a quotation by email. For very old filters for which the paperwork has gone astray, customers can email a digital photograph for identification purposes.

OlLspace, a global provider of online services for the energy industry, has partnered with BBC Monitoring to enhance the scope of the global energy-related news offered via the OlLwatch service. The subscriber-only service also has news feeds from Dow Jones, Platts and Reuters. For more information, visit www.oilspace.com

ASTM International has launched a new Internet-based system designed to initiate, develop and track draft standards and revisions before and during their balloting stage. The new Work Item Registration system - which is accessible from www.astm.org adds increased openness and transparency to ASTM's consensus standards development process. Users will be able to utilise the system to perform keyword searches about new standards and revisions; sign up for a free e-mail advisory service that provides notification of new work items in their area of interest; and view a committee's jurisdiction for the item in question.

2

In Brief

NEW_{Stream}

UK

Venture Production has announced a gas discovery with its 48/10a-12 well on the Annabel prospect in the southern sector of the North Sea. The well flowed in excess of 50mn cf/d. The field is due onstream during the winter of 2004/2005.*

The North Sea Talisman Energyoperated Beatrice field is being considered as the potential site of what is claimed would be the world's first deepwater offshore wind farm.*

Shell is understood to be considering a water injection development on its North Sea Pierce oil and gas field in order to accelerate recovery.*

BP has made a new oil discovery in North Sea block 16/28, close to the Andrew field. The Farragon field has estimated reserves of 30mn barrels.

The UK Government has made another 'out of round' award, offering a licence to Wimbledon Oil & Gas to cover North Sea block 14/29b. It is also prepared to include part of block 14/28a in Wimbledon's existing licence offer covering block 14/27b.*

Talisman Energy has made a new oil discovery in North Sea block 15/16a. The TNT-B exploration well flowed 8,100 bld. It has been completed as a future subsea producer via a single well tie-back to the Tartan platform, with first production expected in 2H2004.

Europe

Maersk (19.5%), Shell (23%), ChevronTexaco (7.5%) and Dong (50%) are to build a new gas pipeline

Complete news update

The 'In Brief' news items in Petroleum Review represent just a fraction of the news we regularly publish on the El website @ www.energyinst.org.uk via the 'News in Brief Service'.

Furthermore, those news stories marked with an asterisk (*) In the magazine are covered in more detail on the News in Brief Service

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www.energyinst.org.uk

Lively Gulf of Mexico offshore auction

There was much keener competition in the 20 August US Minerals Management Service's (MMS) auction of leases for offshore blocks in the western Gulf of Mexico than in any Gulf of Mexico auction in recent years, writes Judith Gurney. Generally the spread between the value of total bids and successful bids is minor. In this latest auction, however, losses were considerable. There were \$148.7mn apparently successful high bids out of \$258.7mn put on the table. In the lease sale held for the same region in August 2002 there were \$151.3mn successful bids out of \$181.6mn ventured.

Almost all of the confrontation was focused on blocks in the shallow waters of the Gulf where substantial reserves of natural gas are believed to exist at great depths. The highest successful bid at the auction – \$22.6mn made by LLOG Exploration Offshore – was for a shallow-water block in the High Island area, which attracted another 12 bidders. Nine of the single highest bids were for shallow-water blocks – four in High Island, four in Garden Banks and one in East Breaks. The sum of all bids for 110 blocks in these waters was \$157.8mn; almost half of this amount was spent on unsuccessful bids.

On the other hand, many of the 63 companies who took part in this auction were interested in blocks in ultra-deep waters with depths in excess of 800 metres. These blocks received some 54% of all bids. The ultra-deep area has been attracting increased interest since the turn of the century. This year there were bids on 180 ultra-deep blocks. In 2002, there were bids on 56 blocks and in 2001, on 38 blocks.

There were few surprises in the list of the most active bidders, with more than half of the top ten bidders independents. Amerada Hess and BHP Billiton both submitted more than 60 bids each and succeeded with most of these. BP submitted 48 bids, of which 36 succeeded. No other company submitted more than 30 bids. With regard to high bids, LLOG Exploration Offshore was well at the top with \$26.3mn, followed by Amerada Hess, Shell, BP, BHP Billiton, Kerr-McGee, ExxonMobil and Total.

North Sea rig pool to help cut costs

Seven licence groups in the Tampen area of the Norwegian North Sea have joined forces to establish a rig pool for three years from 1 January 2004. Created at the initiative of Statoil as operator for all the licences, the venture includes the Statfjord East and North, Sygna, Snorre, Vigdis, Tordis, Borg, Visund and Gullfaks fields.

The rig pool allows overall demand to be met with fewer rigs, while long-term and continuous operation of selected units lays the basis for good health, safety and environmental results, reports Statoil. It is thought that the financial benefits for participants in the Tampen pool could reach several hundred million Kroner over the next three years.

The collaboration embraces all rig activities relating to exploration and production drilling as well as well workovers. It will initially cover *Borgland Dolphin* during 2004 and *Stena Don* from 2004 to the end of 2006. The latter is to be modified for work on Snorre's subsea production facilities. Additional requirements will be met by new charters for the pool.

Improving access to UKCS data

Two initiatives to stimulate new exploration in the North Sea by improving access to the vast collection of scientific data gathered over three decades of oil and gas activity in the UK have been launched by the UK Government. The new DEAL Data Registry (www.ukdeal.co.uk/) publishes via the Internet a comprehensive catalogue of released well and seismic survey data for the UK Continental Shelf (UKCS) and points viewers to where this data may be obtained.

Meanwhile, the Department of Trade and Industry (DTI), together with the British Geological Survey (BGS), has established the National Hydrocarbon Data Archive (NHDA) to preserve, for posterity, the most valuable geo-science data collected from the UKCS and make this data available at low cost for public use. Six oil companies are currently transferring data for UKCS licences to the new archive and the first data is expected to be consigned to the NHDA before the end of 2003.

NEW_{Stream}

Shell focus on East China Sea

Shell has finalised an agreement to explore, develop and market gas, oil and condensate in the East China Sea. Shell subsidiary Pecten Orient will take a 20% stake in the project, which comprises three exploration and two development contract areas of the Xihu Trough covering some 22,000 sq km. Partners are CNOOC and Sinopec, each holding a 30% interest, and Unocal 20%. CNOOC will act as operator of all five contract areas and will establish the Xihu Oil and Gas Operating Company.

The first development will be the Chunxiao area, where offshore production facilities are due onstream in mid-2005. Production is expected to reach 2.5bn cm/y within two years. The production facilities will process gas, oil and condensate from wells to be drilled in the Chunxiao, Tianwaitian, Can Xue and Duanqiao fields. A 350-km subsea pipeline will carry gas to an onshore terminal in Ningbo, Zhejiang Province. The gas will be marketed jointly by the contract partners to users in East China. Oil and condensate will be exported via a 60-km pipeline to the Pinghu oil platform.

Marathon sells west Canadian E&P assets

Marathon is selling its upstream interests in western Canada to Husky Energy for \$588mn. The assets include booked reserves of approximately 69mn boe and average net production of approximately 21,000 boe/d. The sale is part of Marathon's 2003 asset rationalisation programme announced earlier this year. Other asset sales this year include the company's interest in CLAM Petroleum, in the Netherlands, for \$100mn.

Upon closing of the sale of the western Canada interests, Marathon will have sold more than 95mn boe in

proved reserves and average daily production of approximately 30,000 boe, generating upstream proceeds of more than \$745mn.

Proceeds from these sales are being used to strengthen Marathon's balance sheet and invest in other high-potential business opportunities, including the recent acquisition of Khanty Mansiysk Oil Corporation (KMOC). Purchased for \$282mn (including assumed debt), KMOC is located in western Siberia and has approximately 250mn barrels of proved and probable oil reserves.

West Seno Phase 1 comes onstream

Unocal (operator, 90%) has begun oil production from Phase 1 of the deepwater West Seno project offshore East Kalimantan, reportedly the first deepwater oil and gas project in Indonesia. Current production is 14,000 b/d of oil and 18mn cf/d of gas from the first four wells. A fifth well will soon bring production to over 17,000 b/d. Gross production from Phase 1 is expected to reach 35,000–40,000 b/d by the end of 2003 as further wells are completed, with additional production expected in 2004 as development drilling continues.

Daily production is expected to peak at 60,000 barrels of oil and 150mn cf of gas per day by year-end 2005 with the completion of the Phase 2 development at West Seno. Unocal expects to ultimately recover between 210mn and 320mn boe from the field.

West Seno is being developed in two phases via two tension leg platforms (TLP) and a floating production unit (FPU). Phase 1 includes 28 development wells to recover resources in the northern section of the field. Phase 2 will include a second TLP and up to 24 additional development wells on the field's southern section. Production from Phase 2 is expected to begin in 2005.

Unocal has recorded several potentially commercial deepwater discoveries offshore East Kalimantan that are expected to come onstream over the next few years. These discoveries also include significant gas resources that could supply as much as 40% of the needs of the Bontang plant, the world's largest LNG facility to date.

Woodside a key player offshore Kenya

Woodside Energy has farmed in to Kenyan blocks L6, L8 and L9 held by Afrex and Pancontinental Oil & Gas. Woodside will hold a 50% interest and operate the blocks on behalf of the joint venture. Afrex will have a 30% interest and Pancontinental 20%.

Woodside will earn its stake by carrying the cost of acquiring 2,000 km of 2D seismic in the initial phase of the exploration programme. The blocks cover predominantly offshore acreage in water depths up to 1,500 metres. They also contain some coastal onshore acreage.

Woodside also holds a 40% stake in Kenya's four other offshore blocks – L5, L7, L10 and L11 – and acts as operator.

In Brief

between the Tyra facilities in the Danish sector of the North Sea and the NOGAT pipeline system in the Dutch sector. The new pipeline will be commissioned in 2004.

Dong's Nini and Cecilie oil fields in the Danish sector of the North Sea have come onstream. It is expected that Nini and Cecilie will together produce around 25,000 b/d of oil in 2003 and 30,000 b/d in 2004 via the Siri facilities.*

Statoil has commenced production drilling on the Kvitebjørn field in the Norwegian sector of the North Sea, with 12 wells due to be completed in just over three years. The high pressure, high temperature field is due onstream in autumn 2004.

The European Investment Bank is planning to lend up to €300mn to Spain's Planta de Regasificación de Sagunto, reports Keith Nuthall. The money would help fund the construction of an LNG import terminal at the Valencia-area port.

A €75mn loan is being paid by the European Bank for Reconstruction and Development to Russia's stateowned Transnefteproduct (TNP), owner and operator of the Russian oil pipeline system. The money will help upgrade its 15,200-km network, writes Keith Nuthall.

Norwegian Finance Minister Per-Kristian Foss from the Conservatives is reportedly planning to tap Norway's oil revenues fund for some NKr 10bn (about \$1.3bn) in a bid to avoid budget cuts next year.*

Recoverable reserves in Statoil's Glitne development in the North Sea have been upgraded by 50% to 37mn barrels from the estimate in the original plan for development and operation (PDO). This means that the producing life of the field has been almost doubled, and is likely to extend until the end of 2005.*

Ramco Energy has announced a preliminary upgrade to the proven and probable reserves in the Seven Heads field in the Celtic Sea. Proven and probable field reserves are put at between 700bn and 800bn cf (2002 figure was 552bn cf), with proven and recoverable reserves of between 375bn and 425bn cf (2002: 304bn cf).*

Centrica's Easington terminal has been selected as the location for a new



reception facility for the Ormen Lange gas pipeline. Field reserves are put at 375bn cm of dry gas and 22mn cm of condensate.*

Statoil has made a new oil discovery in the Ellida gas field in the Norwegian sector of the North Sea.

North America

BP reports that the Orion satellite field in Prudhoe Bay has come onstream. The field has estimated reserves of 200mn barrels of heavy oil.

A C\$3bn oilsands project in Alberta, Canada, proposed by Nexen and OPTI Canada, has been given provincial government approval, reports Monica Dobie. Located 40 km southeast of Fort McMurray in northern Alberta, it will begin production in 2006.*

Marathon (60%, operator) and Unocal (40%) have brought onstream the Ninilchik Unit in Cook Inlet, Alaska. The field is currently producing some 15mn cf/d of gas. Two additional wells are expected to come online in October. By year end, Ninilchik production is expected to approach 40mn cf/d.*

Anadarko reports that its 2003 finding and development (F&D) costs are expected to be at the low end of its previous guidance of \$7.50-\$8.50 per boe, a significant improvement over 2002 results.

Middle East

Indonesia's state-owned Pertamina has been given the green light from Iraq's Oil Ministry to restart oil and gas exploration in Iraq's Western Desert block 3. The block is estimated to hold 3bn barrels of oil reserves.*

Petroleum Development Oman (PDO) is reportedly planning to invest \$2bn in an expansion of gas production over the next two years. Some of the funds will facilitate development of fields in central Oman.

A significant oil discovery is reported to have been made in block 9 in Yemen. Similar formations in the nearby Sayun-Masila Basin currently produce oil at rates of between 5,000–15,000 bld.*

Oil production in southern Iraq was reported at end-August to have

NEV/Spstream

Small fall in UKCS oil and gas output

UK oil and gas production fell marginally during June 2003 while higher oil prices saw revenues up on the month, according to the latest (August) Royal Bank of Scotland *Oil & Gas Index*. Oil production was down 0.5% in June, at 1,937,445 b/d, and down by 14.8% on the year. Gas output was down just 0.5% on the month, at 10,476mn cfd/, but 8.5% higher than in the 12 months to June 2002. Furthermore, according to Tony Wood, Senior Economist at the Royal Bank of Scotland Group, Opec's decision to leave output unchanged in July reflected the current strength of the oil market. However, he stated that he shared Opec's concern that 'prices could weaken in the final quarter without a strong recovery in demand and continued quota compliance from Opec'.

Year Month	Oil production (av. b/d)	Gas production (av. mn cf/d)	Av. oil price (\$/b)
Jun	2,273,257	9,128	24.10
Jul	2,071,570	7,569	25.70
Aug	1,895,886	8,744	28.40
Sep	2,127,594	8,699	28.40
Oct	2,273,645	10,611	27.60
Nov	2,301,341	11,276	24.20
Dec	2,353,028	12,175	28.30
Jan 2003	2,274,870	12,200	31.20
Feb	2,215,831	12,949	32.20
Mar	2,251,714	11,794	29.90
Apr	2,092,765	11,143	27.50
May	1,947,234	10,525	25.60
Jun	1,937,445	10,476	27.30

Source: The Royal Bank of Scotland Oil and Gas Index

North Sea oil and gas production

Impact of Argentina's economic crisis

Argentina's economic crisis has had a significant detrimental effect on the country's upstream oil and gas sector, according to Edinburgh-based independent consultant Wood Mackenzie. Although the oil sector has been negatively affected by the new 20% tax on crude exports, by far the most significant impact has been on companies with substantial gas portfolios, it states. During 2002, the US\$:peso exchange rate averaged around 1:3.1 - thus, with 'pesificación', domestic wellhead gas prices realised in 2002 averaged a mere \$0.40/mn Btu. This compared with a precrisis average of \$1.20/mn Btu in 2001.

With domestic prices at an all-time low, upstream operators have had no option but to drastically scale back all activity on gas projects. According to Wood Mackenzie, the level of investment made in Argentina's gas fields over the past year and a half has been minimal, with only essential work being carried out to ensure that existing supply commitments are met. 'In the longer-term, this situation is inevitably unsustainable,' explains Pauline Geddes, a consultant at the firm. 'With a continued lack of investment in the country's gas fields and infrastructure, production and transportation capacity will soon be insufficient to meet the expected increase in domestic demand.'

Although the government is acutely aware of the problem, there is still no clear schedule as to when wellhead gas prices may be increased. 'The political sensitivity of the situation appears to be the main barrier to any action being taken, as the government does not want to impose increased consumer prices on users that can ill-afford to pay them (in particular, residential users). However, the need to improve wellhead prices will inevitably put pressure on the government to increase consumer prices as soon as possible,' comments Geddes.

'Meanwhile, a key concern for Argentina is whether upstream producers will actually be able to meet domestic gas demand during the winter of 2004,' adds Matthew Shaw, Senior Consultant. 'With some shortages already experienced this winter, production capacity is unlikely to be increased sufficiently by next year if no new investment is made in 2003.'

NEW_{Upstream}

What next for Brazilian licensing?

Brazil's fifth round of bidding for exploration acreage took place in Rio de Janeiro in August 2003. As had widely been anticipated, bidding was subdued with only six companies participating. According to Edinburgh-based independent consultant Wood Mackenzie, Petrobras stole the show, winning some extremely large tracts of acreage in a major strategic effort to keep an iron grip on Brazil's upstream sector.

In just three or four short years Brazil seems to have moved from being one of the global exploration hotspots to a region of comparative disappointment, comments the analyst. The trends of the past five bidding rounds show a clear maturing in the process of opening up the upstream sector to competition.

A central tenet of the policy of the Brazilian Government when it first dismantled Petrobras' monopoly in 1997 was to encourage local companies to participate in the opening up. There are now eight local players active in the upstream sector (excluding Petrobras), with one new entrant appearing in Round 5. This process now seems to have run its course. Matthew Shaw, Senior Latin America Analyst at Wood Mackenzie, believes that a continuation of the licensing round strategy is unlikely to attract many more new local players. 'We suggest that the only way to truly stimulate this local aspect of the industry is for Petrobras to offload its extremely long tail of peripheral, onshore fields. Ultimately there is no reason why Petrobras should not extricate itself almost entirely from the onshore arena as its myriad of small fields simply does not fit within the portfolio of a major international oil company.'

International oil companies also stayed away from Round 5. This is worrying, states Shaw, as, ultimately, they will have the biggest impact on sustaining Brazil's reserves and production base. Reasons are varied, including the fact that the new bidding guidelines were squarely directed at smaller players. International oil companies also stayed away because the quality of the acreage on offer was generally perceived as being poor, and many players are already smarting from disappointing drilling results over the past few years.

Disappointing exploration results have been particularly prevalent in deep water, which is the major lure that Brazil has to offer the larger companies. Compounding this disappointment are tough fiscal terms that render uneconomic the little that has been discovered to date. Moreover, at a time when the industry is pleading for more lenient treatment, several initiatives launched by the all-important State Government of Rio de Janeiro (which holds jurisdiction over most of the prospective acreage in the Campos and Santos Basins) have actually made the tax system even tougher for the upstream players. These initiatives obviously leave both existing and potential investors extremely wary of Brazil. Significantly, Petrobras was the only company to bid for deepwater blocks in Round 5.

Shaw concludes that: 'In this respect, perhaps the best strategy for the government is to show that it is willing to be flexible enough to those existing Brazil players to warrant their staying. This strategy will not only avoid an exodus that is already beginning to manifest itself, but it will also convince the long list of companies that are still wary of Brazil that, once here, they will be welcomed and encouraged to make the best of the opportunities that they have. Ultimately this will benefit both the companies and, most of all, Brazil itself.'

Rise in global pipeline and umbilical installation

The installation of 51,000 km of pipeline is forecast over the next five years in the new third edition of *The World Offshore Pipelines and Umbilicals Report* 2003–2007, recently published by offshore analyst Douglas-Westwood and offshore data specialist Infield Systems.

According to the report's lead author, Dominic Harbinson of Douglas-Westwood, this total represents an increase of 42% over the previous fiveyear period. 'We estimate that these installations – which include flowlines, risers, export systems, and trunk lines – will require a global capex of \$54.4bn.' Two regions, Western Europe and North America, look set to dominate the market, accounting for over 40% of the activity forecast for the 2003–2007 period. 'Capex off Western Europe is forecast at \$10.8bn, while off North America it could top \$11.5bn, driven almost entirely by activity in the US Gulf of Mexico. Activity off Africa and Asia is also expected to grow strongly, requiring regional spends of \$9.7bn and \$8.3bn respectively.'*

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In Brief

reached a maximum capacity of 1.2mn b/d, although continued power cuts were expected to make it difficult to keep pumping at that level. Production had been fluctuating between 200,000 b/d and 1mn b/d due to theft of power cables that had made it difficult to move and export oil.



Rosneft is understood to be intending to increase its annual gas production from the current 7bn cm to 45bn cm by 2013. The target will be met by implementing Sakhalin projects, increasing subsidiary Purneftegas' output and developing the Shtokman field.



The Western Australian state government has given in-principle approval to ChevronTexaco to use Barrow Island as the site for the processing facilities for its proposed A\$11bn development of the Gorgon offshore gas field.*

PetroChina is reported to have discovered some 650mn tonnes of oil in the Haila'er Basin in the eastern part of the Inner Mongolia Autonomous Regions of China. It is thought production from the field could reach 1mn t/y by 2005.

Pertamina recently proposed a 50-50 joint venture with ExxonMobil to develop Indonesia's Cepu oil field, which has become a battleground between Exxon Mobil, which has a contract to develop the field until 2010, and local politicians who want Pertamina to take control.*

China has proposed the joint oil exploration and development of the disputed Spratlys area of the South China Sea. Brunei, Malaysia, the Philippines and Vietnam, as well as China and Taiwan, have claimed the Islands. Although it is believed the Spratlys sit on top of huge oil and gas reserves, their commercial potential has never been confirmed. The islands also flank international shipping lanes.*

MANY OF THE MONTH'S UPSTREAM NEWS STORIES NOT INCLUDED ABOVE CAN BE FOUND ON THE NEWS IN BRIEF SERVICE @ www.energyinst.org.uk



Dong of Denmark (37.5%), the UK energy company Centrica (25%) and Norwegian Statkraft (37.5%) have acquired Barrow Offshore Wind Farm, which owns the right to build a 90–108 MW offshore wind farm off Barrow-in-Furness on the west coast of England. The facility is expected to be completed in 2004/2005. It will produce some 310 GWh/y, making the wind farm one of the UK's largest-ever wind power projects.

A three-year gas sales contract covering the delivery of 2bn cm/y from 1 October 2003 has been secured by Statoil from British Gas Trading.*



Fortum is to separate its oil business into a new company and subsequently list the new operation on the Helsinki stock exchange through an initial public offering. The company has also decided to invest €500mn on upgrading its Porvoo refinery.

Halliburton Energy Services has been awarded ISO 14001 certification for environmental management by certifying body Det Norske Veritas (DNV) for its entire operation in Norway.

E.On has acquired for an undisclosed sum Deutsche Gas SARL's shareholding in D-Gas, increasing its stake to 100%.

Eastern Europe

The Hungarian Government is considering joining the EU's multi-billioneuro emissions market by its 1 January 2005 launch, reports Stella Zenkovich.*



Statoil has committed to the purchase of 1bn cm/y of gas between 2003 and 2006 from Tractebel LNG North America. The Norwegian company is to supply up to 2.4bn cm/y of gas to the US through Cove Point from the Snøhvit field in the 2006–2023 period. One of four US import terminals for LNG, Cove Point reopened in mid-August after being mothballed since 1980. It is now operated by Dominion. Statoil has leased one-third of the capacity at the terminal. BP and Shell share the remaining two-thirds.

Latest on BP-TNK deal

NEW_{industry}

BP and the Alfa Group and Access-Renova (AAR) have completed the deal to combine their Russian and Ukrainian oil and gas businesses. The completion is the final step in the creation of TNK-BP, a new company owned and managed 50:50 by BP and AAR.

BP is to pay AAR an immediate \$2.6bn in cash for its stake in the new company, together with three annual tranches of \$1.25bn in BP shares payable on the anniversaries of the deal closing. In addition, BP is to incorporate AAR's 50% interest in Slavneft into TNK-BP in return for a cash payment by BP of \$1.35bn, subject to adjustments.

The main transaction does not for the moment include BP's share of the Sakhalin interest, which it originally intended to contribute to TNK-BP. The formation of a Sakhalin joint venture with licence partner Rosneft was still under negotiation and the Sakhalin interest could be contributed to TNK-BP at a later date. BP said the exclusion of Sakhalin, together with interest and other minor adjustments, accounted for the slight rise in its initial cash payment to AAR to \$2.6bn, up from the \$2.4bn estimate announced in June.

Completion of the Slavneft deal, which is subject to the approval of the regulatory authorities of the EU, Russia and Belarus, is expected before the end of the year. The deal will be effective from May 1, 2003.

BP earlier revised down the reserves it expects to secure through the alliance following a change in SEC regulations. It reduced its initial 5.2bn barrels of recoverable reserves to 3.2bn barrels. The initial figure was based on all the reserves that would be recoverable over life of field, rather than life of licence – a tightening of SEC regulations means that only the latter figure can be cited.

TNK-BP will be Russia's third largest oil and gas company, producing some 1.2mn b/d from its main oil fields in West Siberia and the Volga Urals. Completion of the Slavneft acquisition will increase TNK-BP's production by some 160,000 b/d.

News from the European Commission

A comprehensive deal over third-party access to gas pipelines has been agreed between German joint venture BEB and the European Commission, leading to Brussels closing its competition investigation into the company's refusal to allow Norway's Marathon to pump gas into its infrastructure, reports *Keith Nuthall*. BEB – owned by Shell and ExxonMobil – will establish a sophisticated entry and exit system for competitors, allowing them to book online the feeding of gas into BEB's German networks and the removal of gas elsewhere for their customers. Crucially, fees charged will not reflect the distance between the entry and exit points – standard German practice.

Other EU news includes:

- The European Bank for Reconstruction and Development (EBRD) is lending Mol some €150mn for upgrading the environmental performance of its Hungary operations. Part of a €750mn financing package, the largest portion will fund refinery improvements.
- The Commission is threatening European Court of Justice (ECJ) legal action against the Netherlands, Greece, Spain and Portugal over their failure to set compulsory air quality limits for benzene and carbon monoxide, as required under EU law. Warnings have also been sent to France, Belgium, the Netherlands, Germany, Ireland, Italy, Greece, Spain and Portugal for not setting emission limits on sulphur dioxide, nitrogen oxides and other pollutants. Also, Belgium is being taken to the ECJ for failing to prioritise the processing of waste oils by regeneration. The Commission says this breaks the EU waste oils directive.
- The new Italian Presidency of the European Union has announced that its key energy priorities, until leaving office in December, include the passing of the proposed directives on minimum oil and gas stocks.
- The Commission has proposed that the right of EU Member States to levy discounted VAT on domestic gas supplies be made permanent under EU law.
- Brussels has asked EU Ministers to approve the spending of €8.6mn from the European Union Solidarity Fund on Prestige disaster clean-up measures.
- The European Investment Bank is lending €150mn to the Egyptian Electricity Holding Company to construct the second module for the Nubariya gas-run power plant.

NEVIS

Expanding NW Shelf LNG production

The North West Shelf Venture has awarded a A\$14mn contract to Australian construction company United Constructions for the commissioning of the Venture's fourth LNG train. The contract is the last major contract for the Train 4 project, part of the A\$2.4bn expansion of North West Shelf Venture facilities that will boost LNG production to nearly 12mn t/y. The fourth train will have a capacity of 4.2mn t/y of LNG and is scheduled for completion in mid-2004.

The six equal participants in the North West Shelf Venture are Woodside Energy (operator), BHP Billiton, BP Developments Australia, Chevron Australia, Japan Australia LNG and Shell Development (Australia).

Offshore wind power project first for Ireland

GE Wind Energy and Airtricity report that construction is under way for the Arklow Bank offshore wind park, Ireland's first offshore wind power project, and is expected to be completed by the end of October. Located about 10 km off the coast of Arklow, Ireland, the project's seven GE 3.6-MW machines are claimed to be the world's first commercial application of offshore wind turbines over 3 MW in size. first introduced by Airtricity as phase one of a much larger offshore project, which Airtricity proposes to build over the coming years. Airtricity's offshore wind project proposals have been made possible under a foreshore lease, which can provide for more than 520 MW of offshore wind power on the Arklow Bank. The first phase of the project is expected to produce enough clean wind energy to serve the annual needs of about 16,000 average Irish households.

The 25-MW Arklow Bank project was

Developments upstream Africa

Stella Zenkovich reports on recent E&P developments in Africa:

- South African Minerals and Energy Affairs Minister Fautazile Mlambo-Ngcuka has formally announced the start of a second drilling campaign in the Ibhubeshi gas field on the Cape West Coast. The campaign follows a four-well drilling programme back in 2001.
- The Angolan Government has approved a Memorandum of Understanding with its counterpart in the DR Congo, concerning joint oil exploration in the Lower Congo Basin and the common maritime corridor.
- Marathon Oil has suspended for later re-entry its gas discovery in block D of the Bococo project offshore Equatorial Guinea.
- The development of the Nigeria to Ghana West African gas pipeline is expected by Nigerian National Petroleum Corporation to spur private investment in profitable power generating plants throughout the sub-region and to make its power pooling projects viable operations.
- Shell has offered a 24% stake in a deepwater exploration block off the Egyptian coast to GAIL of India, whose group board has approved an initial bid for the stake.

PetroChina starts key pipeline project

PetroChina recently commenced construction of its Zhongxian-Wuhan gas pipeline project – an energy trunk line linking the Sichuan-Chongqing gas fields with Hubei and Hunan Provinces. With a planned annual capacity of 3bn cm, the trunk line will stretch 718.9 km from Zhongxian to Wuhan. The project also has three branches reaching from Jingzhou to Xiangfan (210 km), Qianjiang to Xiangtan (340.5 km), and Wuhan to Huangshi (77.9 km), making the total length of the pipeline 1,347.3 km.

The trunk line and the Xiangfan and Huangshi branches of the project are scheduled to be put into operation by 30 December 2004, to supply commercial natural gas to users in Wuhan and other cities along the pipeline. The Xiangtan branch will start operation on 1 July 2005, supplying gas to users in Changsha and cities along the pipeline.

The gas to be transported by the Zhongxian-Wuhan pipeline will be supplied from fields in the Sichuan Basin. With total reserves exceeding 7tn cm, the basin has 680bn cm of proven reserves. PetroChina has signed gas supply contracts with 27 customers in Hubei and Hunan Provinces. The gas will be used mainly for petrochemical, power generation, building materials, metallurgy and urban fuel projects.

In Brief

The Federal Energy Regulatory Commission (FERC) is reported to have approved Sempra's plans for a \$700mn LNG import terminal in Hackberry, La. It is planned to commence construction of the 10.4bn cf storage facility by the end of March 2004 and start operations in 2007. The facility will import 1.5bn cf/d of LNG, some 10mn tonnes of which will come from BP Midgas.

Seven formal proposals for LNG import terminals are understood to have been filed with the Federal Energy Regulatory Commission or the US Coast Guard, with several others reported to be in advanced stages of planning. The proposed projects are thought to represent a potential maximum sendout capacity of 5.8bn cf/d.

Middle East

Saudi Arabia is reportedly on track to take \$85bn in oil revenues in 2003, its best year since 1980–1981, up from \$65bn last year, according to Saudi American Bank forecasts.*

The Kuwaiti Government is planning to raise oil production from the current 2.04mn b/d to 3mn b/d by 2005, and to 3.5mn b/d by 2010, writes Stella Zenkovich. In the process it wants to open oil operations in the country to international oil majors.*

Russia & Central Asia

ExxonMobil and ChevronTexaco are reported to be planning to submit rival plans to acquire a 25% plus one share stake in YukosSibneft.*

Rosneft is planning to start oil exports from the Kola Gulf in the Murmansk region in November, according to company President Sergey Bogdanchikov.*

It is understood that the ExxonMobiloperated Sakhalin 1 project in Russia will be ready to supply Japan with natural gas by 2008.*

The Latvian Government is planning to sell a 12% stake in the Ventspils Nafta oil export terminal. It currently holds a 39% interest.*

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European energy futures and options exchange IPE has unveiled plans to trade IPE Brent Crude futures both open outcry and electronically, side by side, from 6 October 2003. It also plans to make parallel trading available for IPE Gas Oil futures.

Petroplus Tankstorage International, Europe's third largest independent oil storage operator, has been granted planning permission to expand its proposed LNG import terminal in Milford Haven. The planned additional third tank will have a capacity of 165,000 cm and would potentially increase the total annual throughput for the terminal to 9bn cm.

The UK Government is to end the financial incentives promoting the use of LPG as an auto fuel in 2004. Fuel duty on LPG is currently set at 6.5 pll.

Global Commodities UK Ltd, which claims to be the largest producer of biodiesel in the UK from its purposebuilt factory based at Shipdham, Norfolk, is to expand its operations with the purchase of an additional plant at Lowestoft. The new facility will increase production to in excess of 180mn litres per year. Global Commodities UK also reports that it is currently the only UK fuel company to be granted a low emission IPPC (Integrated Pollution Prevention and Control) permit by the Environment Agency.*

Shell UK Oil Products has made new arrangements for the distribution of fuel to its 1,100 retail sites and to over 3,000 commercial, marine and aviation customers in the UK. The following companies were selected: Hoyer UK – responsible for Shell fuel deliveries in the south-east, the Midlands and north-west; Suckling Transport – for the south-west, South Wales and Scotland; and Stiller Group – for the north-east.

The independent market analyst Datamonitor has reported that despite widespread grievances with customer service provided by their electricity suppliers, 61% of UK industrial and commercial customers decided to stay with their supplier at their last contract renewal date.*

NEVSwnstream

Key challenge facing Nordic electricity sector

The key long-term challenge facing the Norwegian and Nordic electricity markets is the basic and growing imbalance between production capacity and expected demand, Norsk Hydro President and CEO Eivind Reiten recently stated. 'With continued economic growth in the Nordic region the demand for electricity must be assumed to increase. The Norwegian outlook is such that the power system even in years with normal precipitation is highly dependent upon imports to cover domestic consumption,' he said.

He underlined that the solutions are not to be found through tinkering with the energy legislation, but in consistent and concerted efforts by government and other market actors to help bridge the expected gap between supply and demand. 'The challenge is to improve the supply situation through improved transmission systems and by encouraging new generation capacity. The deregulated Nordic electricity market is basically working quite well, even in very tight situations as we saw last winter. It is, however, important to improve handling of security of supply issues and in this connection clarify the different roles to be played by the government and the market's commercial players. Possible new extreme situations should be dealt with primarily through market related mechanisms.'

Renewable energy may contribute to bridging the supply demand gap, but rapid clarification of the future framework conditions, including the implementation of 'green certificates', is necessary to secure implementation of new projects, Reiten said. 'The energy intensive Norwegian industry is facing a period of structural change. This change will happen even more rapidly if Norwegian authorities implemented regulations for greenhouse gas emissions and electricity taxation that adds to the burden of these industries.'

UK companies to invest in US grid

Over \$100bn of investment is needed to prevent another blackout like the one that recently affected 50mn US citizens, reports UK analyst Datamonitor, and UK firms with a stake in the US transmission system are looking to increase their levels of investment, potentially capitalising on the opportunity of higher returns.

The blackouts in the US should push forward much needed investment in the US grid network, with stakeholders in the grid finally working together to overcome the lack of central coordination on policy and how this is translated operationally – both contributing factors to the blackout.

The key contributor for the blackout was severe under-investment in the grid infrastructure, states Datamonitor. This lack of investment has been driven by a combination of high economic risk associated with competition, and FERC capping the rate of return to around 11–11.5%. Deterred by these factors, companies have found other ventures that deliver a higher rate of return. However, FERC has begun to show greater flexibility and permitted a higher rate of return of 13.5% for the Trans-Elect's Path 15 project in California.

National Grid Transco (NGT) plans to

increase the £655mn of investment it has made in the US over the past three years. Initial whisperings saw blame for the blackout directed towards its US subsidiary, Niagara Mowhawk, and NGT's share price fell by 4%. Its UK peer, ScottishPower – owner of PacifiCorp and PPM Energy – also stated it was looking to increase its investment in the North Western US power transmission system to around \$1.2bn, reports the analyst.

The grid network requires \$56bn of new investment over a 10-year period just to keep growth capacity in line with growth in demand. To plan for future growth in demand and update the infrastructure could exceed \$100bn. The amount of investment needed, along with public and government demands, is likely to influence FERC to provide a higher rate of return for investors as an incentive. This market scenario also makes it more viable for consolidation in the US market. A more pliant FERC allowing higher returns will encourage merger and acquisition activity, with UK and European firms at the forefront of possible acquisitions. Thus the \$2bn of investment by UK firms could see a much larger return than even they imagined.

NEV/Swnstream

UK consultation sought on electricity sector

A further consultation document in the series on BETTA (the British Electricity Trading and Transmission Arrangements) was published in mid-August. The document is part of an ongoing series of consultations on BETTA jointly issued by the UK Department of Trade and Industry (DTI) and Ofgem, the regulator for the electricity and gas markets.

Entitled Transmission Charging and the GB Wholesale Electricity Market, the document covers two areas:

- An Ofgem/DTI consultation on changes to transmission licences to implement UK transmission charging under BETTA.
- A DTI consultation on transmission charging, in the context of the government's policy objectives for growth in renewables.

Part 1 sets out proposals for establishing a UK transmission charging regime, and the UK system operator's responsibilities within it. Specifically, this part sets out:

Proposals for how Ofgem/DTI are intending to use anticipated legislative powers, once enacted, to modify conditions in transmission licences to create a single UK transmission charging regime.

- A timetable for the development and implementation of the revised transmission charging regime and the charging methodologies.
- A discussion of some key issues raised by the development of UK charging methodologies.

Part 2 looks at how the transmission charging regime required to deliver a competitive UK wholesale market might impact on the government's other policy objectives for the growth in renewables.

The government recognises that applying the current licence obligations on a UK basis are likely to result in transmission charges which are highest in Scotland – an area of significant renewable potential. Views are therefore invited on whether there are any well targeted and efficient adjustments that could be made in developing the UK charging model that are consistent with the government's approach to other policy instruments and with its objective to deliver a low carbon economy at least cost to consumers.

The document can be found at www.dti.gov.uk/energy or on the Ofgem website at www.ofgem.gov.uk

Wingas takes on Belgian gas market

German natural gas marketing company and pipeline operator Wingas has reported that within just a few months of entering the Belgian gas market it has concluded supply contracts that will represent a market share of some 6% by 2005. Customers include BASF, Air Liquide and RWE. By the end of 2003 the company will have supplied over 100mn cm of gas to Belgian customers. It plans to double this volume in the medium term, equivalent to a 10% market share.

The gas is currently distributed to customers via third-party access through the network of the only Belgian transport company – Fluxys. According to Wingas Chairman Dr Rainer Seele, the company 'could offer customers more service and flexibility' if it were allowed to construct its own pipeline infrastructure. The company is therefore preparing an application for the relevant permission to build a new pipeline from the Dutch border to Antwerp. At present pipeline construction is only permitted if the national transport company Fluxys does not submit a 'reasonable offer' for using its network. However, as Fluxys' transport prices are always considered by the regulatory authorities to be reasonable, a pipeline monopoly effectively comes into being that excludes competition in pipeline construction, comments Seele. He argues that competition in pipeline construction is imperative if a reliable supply of natural gas for EU member states is to be maintained in the future.

Seele has also claimed that there are 'fundamental shortcomings' in Belgium in the handling of different qualities of gas supplied to customers. Furthermore, natural gas providers are not allowed to process their gas – as is otherwise common practice – to meet the quality requirements of existing customers. He has urged Belgian politicians to create a sustainable, competition-friendly environment as soon as possible.

View the latest job vacancies under the 'Careers' section @ www.energyinst.org.uk In Brief

Technip has secured a contract from Motor Oil Hellas for the addition of new process units and utilities at its refinery in Corinth, Greece. The contract is worth in excess of \in 300mn.*

Gazprom, in consortium with Ruhrgas, is understood to be in negotiations with Gas Natural of Spain regarding the acquisition of a 35% stake in Depa, a gas distribution company in Greece.*

Eastern Europe

Ceska Rafinerska – owned 51% by Unipetrol and 16.33% each by IOC consortium members Agip, Shell and Conoco – has been transformed into a contract processor for a processing fee including operating and refining costs by its owners, reports Stella Zenkovich.*

OMV and Yukos have signed a Memorandum of Understanding covering the supply of up to 5mn t/y of crude oil to OMV's Schwechat refinery via a pipeline is due to be commissioned in January 2006.

The Czech Government is to tender a 63% stake in state-owned Unipetrol by March 2004. The downstream company holds controlling stakes in two refineries with a combined capacity of 9mn tonnes, as well as over 300 service stations and petrochemical assets.

North America

Petro-Canada is reportedly planning to close, sell or convert 125 retail service stations in Ontario and other eastern provinces over the next two years.*

Following a review of its Eastern Canada refining and supply operations Petro-Canada is to shut down its Oakville refining operations and expand its existing Oakville terminalling facilities.*



A specialist report from the United Nations on the growth in Iraq's organised crime following the fall of Saddam Hussein has claimed that 3mn litres of diesel are currently being smuggled from the country every day, writes Keith Nuthall.*

In Brief

Russia & Central Asia

Sibneft has opened a subsidiary in St Petersburg with the aim of seizing a significant share of the city's fuel retail market, writes Mark Rowe.*

Lukoil is reportedly paying €117mn for a 79.5% stake in Beopetrol, Serbia's second largest fuel retailer. The Russian company is also to invest €90mn in the company over the next five years.

Asia-Pacific

Indonesia's state-owned Pertamina is reported to be planning to build an oil refinery in East Java in 2004. The plant, which is expected to be ready in 2008, will have the capacity to process between 125,000 b/d and 150,000 b/d of oil.

China is understood to have approved a \$200mn joint venture between Sinopec and Shell that will establish some 500 service stations in China.

Africa

Domgas Nigeria, Lead Bank and South Africa's Fideldstone Africa have signed a \$200mn agreement covering the development of an LNG service station network, writes Stella Zenkovich.

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NEV/Swnstream

Promoting biomass power generation

New moves to encourage the greater use of biomass-powered generators were recently outlined by UK Energy Minister Stephen Timms. The proposals – published in a consultation document entitled *Technical Review of the Renewables Obligation* – will mainly benefit farmers who grow energy crops and co-firing power stations, those which burn a combination of biomass and fossil fuels.

The main measures outlined are to: extend the timescale by which co-

- firing generators will be eligible to benefit from Renewable Obligation Certificates (ROCs) from 2011 to 2016;
- extend the eligibility timescale for which co-firing generators can use any type of biomass generators from 2006 to 2009;
- stage the current limit of eligible biomass that must come from energy crops from 25% to 75% over 2009–2016; and
- reduce the 25% cap from co-firing on an individual supplier's obligation to 10% from April 2006 until end-March 2011 and to 5% from April 2011 to end-March 2016 to cut the risk of

flooding the market with ROCs.

The Renewables Obligation, which began in 2002, set out targets for energy suppliers to source an increasing amount of their energy from renewable resources. Certificates, or ROCs, are awarded to suppliers using renewable sources, allowing them to demonstrate their compliance with the targets. ROCs can be traded between suppliers to make up any shortfall.

These new moves will mean farmers have more time to plant and harvest energy crops, creating a greater incentive and certainty to the developing energy crops market.

The government also plans to allow small generators, like households or community buildings with solar panels or wind turbines, to benefit from the ROCs market. Currently generators only qualify for certificates if they produce at least 0.5 MWh in a month. Smaller generators, who do not produce this much surplus in a month, will be awarded certificates based on their yearly output.

The consultation document can be accessed from the DTI website at www.dti.gov.uk/energy

Waking the 'Green Giant' in Europe

New research from independent market analyst Datamonitor has found that over 7mn European energy customers in Austria, Ireland, Finland, Germany, Sweden and the UK could switch to green energy by 2008 if offered the right incentives by their utility companies. Whilst acceptance of green tariffs is currently less than 1% of the customer base in most countries, the example of the Netherlands, where over 2mn (30% of customers) have signed up to renewable energy sources, suggests that environmental sentiment could become a powerful force, states the company.

To date governments have done little to encourage green tariffs at the residential level, preferring to place responsibility on generators and utilities to supply certain amounts of green energy. The household customer's involvement has therefore been minimal, with many still unaware they can choose green energy, or even what it entails.

UK Deliveries into Consumption (tonnes)

Products	†JuL 2002	†Jul 2003	tJan-Jul 2002	†Jan–Jul 2003	% Change
Naphtha/LDF	87,546	145,642	631,523	1,332,743	111
ATF – Kerosene	1,007,510	925,889	5,767,345	5,849,817	1
Petrol	-		-		-
of which unleaded	1,640,024	1,445,747	11,451,278	10,888,940	-5
of which Super unleaded	59,755	69,600	319,514	473,683	48
ULSP (ultra low sulfur petrol)	1,580,269	1,376,147	11,131,764	10,415,257	-6
Lead Replacement Petrol (LRP)	52,515	16,782	346,051	133,183	-62
Burning Oil	191,818	153,326	2,200,557	2,274,444	3
Automotive Diesel	1,481,562	1,497,322	9,714,928	9,713,347	0
Gas/Diesel Oil	463,855	513,976	3,15,833	3,628,797	3
Fuel Oil	82,873	179,926	1,130,286	1,411,209	25
Lubricating Oil	76,083	69,963	495,763	490,910	-1
Other Products	800,023	703,276	4,854,157	4,892,366	1
Total above	5,883,809	5,858,746	40,107,721	40,842,614	2
Refinery Consumption	388,225	382,509	2,830,340	2,670,531	-6
Total all products	6,272,034	6,241,255	42,938,061	43,513,145	1
† Revised with adjustments			All figures provided by the	UK Department of Trade a	nd Industry (DTI)

decommissioning



North Sea

Decommissioning – considering all the options

In the UK sector the industry waits to hear what BP proposes to do with North-West Hutton (pictured right), the first redundant platform for which derogation from complete removal could be sought, writes *Nick Terdre*. Meanwhile, in Norway ConocoPhillips and Total have entered the tendering process for decommissioning operations on the Ekofisk and Frigg fields respectively. One contender for Frigg is Technip-Coflexip's recently revealed jackup concept for platform removal.

Heerema crane-barge *Thialf* removed BP's P15-B platform this summer. After sale talks fell through, the platform was demolished

ollowing cessation of production at North-West Hutton last year, BP is considering its abandonment options (log on to www.bp.com/location_rep/uk/ bus_operating/ for more information). But instead of revealing its plans around mid-year, as it had previously said it would, the company has put the date back to the end of the year. With its large platform - 20,000 tonnes of topsides on a 17,200-tonne jacket -North-West Hutton is one of the fields where decommissioning has been most studied. The original operator Amoco, for example, studied the use of explosives for underwater steel cutting and sponsored the development of the single-lift Versatruss system, both for possible use on the platform.

That was in the early to mid-1990s. Following the determination of abandonment guidelines by the Oslo-Paris Commission (Ospar) in 1998, North-West Hutton is one of 40 North Sea platforms for which derogation from the norm of complete removal can be applied for on the grounds that its jacket weighs more than 10,000 tonnes. As it is the first in this category to be decommissioned, there is a lot of interest in the industry to see what the licensees decide to do.

When it announced its guidelines, Ospar made it clear that there would be no automatic approval of derogation requests, stating that: 'We will strive to avoid using such derogations for footings of steel installations by returning to land for recycling and disposal all steel installations where it is safe and practical to do so.' So, if the North-West Hutton licensees wish to seek derogation, they will probably have to come up with persuasive evidence that it would be hazardous or unfeasible to attempt to remove the footings. The question of cost is secondary.

Cuttings and pipelines

Options are also being considered on two other major issues, according to BP. One is the 42,000-tonne pile of drill cuttings. The UKOOA-led drill cuttings research project, which ended in 2002, concluded that each pile should be treated on its merits. BP has identified five possible options for the North-West Hutton pile – leaving, covering, excavating, bringing to shore or reinjecting.

There is also the question of what to do with the pipelines, a 20-inch oil line and a 10-inch gas line. These could be left in place, recovered, or the oil line could be trenched or buried.

On one point BP has made up its mind – its preferred method of topside removal is reverse installation. When the platform was installed in 1981, the topsides was installed in 22 lifts. When the platform is removed - which BP currently expects to happen in the period 2006-2008 - the topsides is likely to come off again in a similar modular fashion. This rules out the use of the single-lift technology, a decision that should not be surprising given the huge size of the topsides and the fact that the single-lift technology is so far untried.

Single-lift tender

The first opportunity for this new technology to prove itself is coming from ConocoPhillips, which has tendered the removal of two medium-sized Ekofisk booster platforms, 36/22 A and 37/4 A, exclusively to single-lift contractors. The company says it hopes to award a contract before year-end. Removal operations would probably take place in the period 2005-2006. (Log onto www.phillips.netpower.no)

The seven contractors invited to bid, together with their concepts, are:

- Aker Offshore Partner (AOP) Nersatruss (Versatruss)
- Excalibur Engineering (Pieter Schelte)



Crew from Heerema's Thialf crane-barge prepare to remove ExxonMobil's Camelot CB platform, which has been preserved pending a possible sale

- Global Maritime/Prosafe (GM Lifter)
- MPU Enterprise (MPU Heavy Lifter) Seametric International (Twin
- Marine Shuttle (Offshore Shuttle) Master Marine (SeaFork One)
- Marine Lifter)



decommissioning



The North-West Hutton platform, where BP is wondering whether to seek derogation from full jacket removal for the 17,200-tonne jacket

Last year the contractors performed front-end engineering studies for the operations, on the basis of which ConocoPhillips concluded that all the proposed concepts were technically capable of doing the job. The focus of the current tender is commercial – it will show whether or not the concepts can be put to work at a competitive price.

North Sea

However, it is by no means clear that a straightforward answer will emerge from this exercise. With the exception of Versatruss, the concepts exist only on the drawing board. The winning contractor, unless it is AOP/Versatruss, will therefore have to raise financing to build its vessel on the back of a job which will only pay for part of the investment. The amount of risk that the contractor is required to take on is therefore a crucial element, and concern has been expressed at the possibility that ConocoPhillips might decide to let a lump-sum contract. Perhaps in recognition of this situation, the operator has already made one important change to its contract strategy, deciding to let a single contract instead of one for each platform as it previously planned. But much still depends on how it finally decides to apportion the risk in this contract. From ConocoPhillips' point of view, as it has stressed, reasonably enough, the bids from the single-lifters must be competitive, otherwise it will consider inviting the traditional heavylifters into the tender.

If the company sets the bar too high for the single-lifters, however, it may well defeat its own strategy of giving these contractors an opportunity to prove themselves. And the losers would not only be the Ekofisk licensees and the contractors that have invested considerable money and efforts in developing their concepts. The industry will also lose if a technology with the potential of competing with the heavylifters and bringing down the cost of platform removal fails to make it into the light of day.

Tank tasks

Two other important Ekofisk contracts have been bid this summer. Both relate to the tank platform, the concrete base of which is to be abandoned in situ. One contract is for the cleaning of the nine storage cells, each of which is 70 metres high and filled with water with a layer of toxic sediments at the bottom. Access to the cells is difficult. Of the three contractors invited to bid, one, AOP, was previously awarded a contract for preparatory engineering work.

The other contract is for the removal of the tank topsides, which consists of 82 modules and weighs 24,000 tonnes. Three removal methods have been proposed – use of a conventional heavy-lift crane, a platform-mounted crane, and piece-small removal.

Frigg approval nears

Meanwhile, Total is well advanced in the complex task of having the £266.3mn Frigg abandonment plan approved by the Norwegian and UK Governments (see www.total.no). Both Oslo and London accepted its proposal to leave the three concrete gravitybases in place, and no objections were raised by Ospar. The UK Government can now give its approval, while in Norway the final approval has to be given by the Storting. This is expected to come before Christmas.

The remainder of the plan – which proposes bringing ashore all the topsides and the steel jackets, retrieving all in-field pipelines and cables, and leaving the drill cuttings piles in place – is also understood to have been accepted by both Oslo and London. An announcement to this effect should come before long.

Frigg production is expected to end some time in the first half of next year, after which Total aims to stick to a tight schedule and have the abandonment completed by 2012. It plans to award a hook-down contract by early 2004, in order to bypass a cold phase between cessation of production and the start of offshore decommissioning work.

The company is also in the early stages of tendering platform decommissioning, with contractors being prequalified for topside and jacket removals. Prequalified companies will first perform front-end engineering design for the operations, after which the main contracts will be tendered and awarded in mid to late 2004. The work is expected to be divided into several packages. It is expected that single-lifters, as well as the heavy-lift contractors, will seek to prequalify.

Jackup concept

Another contractor keen to prequalify will be Technip-Coflexip, a relative latecomer to the abandonment scene with a jackup concept for offshore removal. The concept is a development of the TPG 500 jackup technology as used for BP's Harding and Total's Elgin platforms in the UK sector. Known as the TPG 500 IDV (installation and decommissioning vessel), the new vessel has four legs and a u-shaped hull. Using lifting cradles or shuttles, one mounted on each leg, the IDV is able to lift both topsides and jackets.

The vessel can also perform removal tasks in other modes. Technip-Coflexip has performed a study for Total of the removal of modules from the deck of the Frigg CDP1, the concrete base of which does not permit access by a single-lift vessel. For this operation, the vessel would be fitted with a gantry crane or an A-frame with sufficient reach to lift modules from the deck and deposit them on a lay-down area formed by placing beams between the two sides of its hull.

No change at Ospar

Five years after drawing up the offshore abandonment guidelines, the Ospar ministers met in Bremen in June to review them, and to consider whether the scope for derogation should be reduced. In this period there has been so little decommissioning activity, however, that the meeting decided to make no changes. The next review of Ospar's 1998 guidelines will come in 2008. The meeting also discussed the subject of drill cuttings, but decided that further study was needed before guidelines could be proposed.

Ospar has recently posted an updated version of its database of offshore installations on its website – www.ospar.org (search under heading 'Publications'). This shows that there are currently 1,167 offshore installations operational in the north-east Atlantic, including 527 fixed steel installations, 23 concrete-gravity based installations and 530 subsea installations. A further 74 installations have been decommissioned, including 29 steel platforms, 18 floating platforms and 25 subsea installations.

Two installations have been removed in recent months, both small gas platforms. One is ExxonMobil's Camelot CB in the UK sector, which the company said it would not demolish immediately as there was the possibility of selling it. The other was BP's P15-B platform in the Dutch sector. A windmill park consortium showed interest in buying the structure, but eventually withdrew.

Production from Tullow's Welland gas field in the UK ceased earlier this year, but the company plans to use the platform and export pipeline for the development of nearby discoveries. Also in the UK sector Shell is mulling options for abandoning six anchor blocks which formed part of the mooring system for the Brent Spar loading column and a redundant remote flare tower on the Brent field. Total is planning to decommission the MCP-01 booster platform located on the two Frigg-St Fergus gas pipelines. This is a concrete-gravity structure that the operator is likely to want to leave in place.



Gas

The Kenai, Alaska, liquefied natural gas (LNG) plant has been producing and shipping LNG to Japan for more than 30 years, and uses the proprietary Optimized Cascade LNG process to change natural gas into a condensed liquid for shipping *Photo: ConocoPhillips*

LNG – sexed up or here to stay?

Liquefied natural gas (LNG), once the ugly stepsister of the petroleum industry, has suddenly become the belle of the ball. *Gordon Cope* examines the metamorphosis and asks whether it will last past midnight.

n his testimony to Congress in June 2003, the Federal Reserve Board Chairman Alan Greenspan highlighted the dangers of a natural gas shortage in North America, saying that the shortfall could cause 'some erosion' in the US economy.

He has reason for concern. The Energy Information Administration (EIA) estimates that US gas demand, currently in the range of 60bn cf/d, may rise to 96bn cf/d by 2025. Yet in 2002, US natural gas production fell almost 2% as drilling failed to keep up with depletion rates. Canada, which accounts for 11bn cf/d of American imports, is also seeing production declines. The proposed pipelines from Alaska and the Canadian Arctic are proving difficult to approve, expensive to build and years away from completion. The potential for a significant shortfall looms on the near horizon, with all the attendant steep price hikes and disruptions in delivery.

The US is not alone. While the situation in Europe is hardly as dire, consumption is running at 41bn cf/d - 45%of which is imported. Demand is increasing as more and more electricity generators switch to the environmentally-friendly fuel, but some of the largest, most easily accessible fields in the North Sea are running out. By 2015, Europe is expected to consume 55bn cf/d-70% of which will have to be imported.

Fitting the bill

At first blush, LNG seems to fit the bill. Various governments and energy companies around the world are eager to build the liquefaction plants, carriers and regassification facilities necessary to deliver product to market anywhere in the world. 'The main driver is price,' says John Conway, Managing Director of the Energy Services Division of Energy Markets, an energy consultancy based in the UK. 'Prices have gone up tremendously, and there is a huge opportunity to capitalise.'

LNG already has a significant impact on natural gas markets around the world. In 2002, global gas production hit 263bn cf/d. Exports rose 2.6% to 71bn cf/d. Of those exports, LNG now accounts for 5.8% of all marketed production. A study by Ocean Shipping Consultants in the UK shows that LNG trade is the fastest growing segment, averaging 7% annually over the next decade. It is expected to more than double from 15.8bn cf/d in 2002 to 32.4bn cf/d in 2015. In the US, Lehman Brothers estimate that LNG imports will reach 1.5bn cf/d in 2003, double the rate in 2002. Expansion of existing import facilities is expected to increase capacity to 3.5bn cf/d by 2005. And, if all facilities that have been proposed for the US in the last year are built, import capacity could reach 20bn cf/d by 2015, pushing the international trade much higher.

But in order for LNG to achieve that expected growth, there are several significant barriers to surmount, including environmental concerns, safety issues and, perhaps most importantly, the volatility of the natural gas market itself, which has fluctuated in price between \$1.50 and \$10/mn Btu in the last three years. Will LNG overcome these hurdles in time?

A history of gas

There are approximately 5,500tn cf of proved natural gas reserves in the

world. Unlike oil, which is economically transportable by tanker, the most efficient means of delivering gas to market is by pipeline. But practical and economic considerations limit pipeline distances to around 3,000 km, which leaves around 60% of these reserves too far from market, or 'stranded'.

The next most efficient means of transporting gas is by converting it to LNG, which reduces the volume some 600 times. At a liquefaction facility, or train, the gas is run through a succession of refrigeration levels until it reaches approximately –160°C, where it turns into liquid under normal atmospheric pressure. It is then loaded onto insulated carriers made of cold-resistant nickel steel and shipped to market. A regassification facility returns it to gaseous form, and it is then injected into the conventional distribution system.

When the LNG industry evolved over 30 years ago, Japan, which had no indigenous supplies, wanted to mitigate dependence on Middle Eastern oil. Security of supply was most important. 'From an historical point of view, the developers were the Japanese,' says Conway. 'Price almost didn't matter, because they could pass it on to consumers.' In Europe and the US, distributors were looking to supplement anticipated shortfalls. The huge, upfront infrastructure cost was rationalised through the security of 20-year plus contracts in which deliveries were rigidly fixed. 'The facility was financed from start to finish.'

As a rule of thumb, 1tn cf of gas reserves is needed for every 1mn t/y LNG train. Many such deposits exist, from the North Sea to the Middle East, Asia, Africa and Australia. Two regional markets emerged, with Algeria supplying much of the US and Europe (the Atlantic Basin), while Japan relied on Southeast Asia and Alaska for its supplies (the Pacific Basin).

Over the following decades these two markets diverged. New sources of natural gas were tapped by pipeline in Europe and North America, and the price fell. LNG facilities could not compete economically, especially in deregulated markets, and so facilities such as Cove Point in the US were mothballed. In contrast, the economic vitality of Japan, Korea and Taiwan, which had no alternative supply source, spurred LNG growth in the Pacific Basin market.

Several factors converged in the 1990s to alter LNG's status quo, however - prices rose, and the cost of delivering LNG decreased. LNG production costs have fallen from \$400/t/v in the 1980s to as little as \$175/t/y today. This has been accomplished through the growth in train size from 1mn t/y to 4mn t/y (a 4mn t/y facility equals approximately 0.56bn cf/d production), and advances in technology. Ship costs have also come down due to increased size, increased competition and better technology. The price of a 140,000cm tanker has dropped from \$250mn to \$160mn over the last decade. Delivery price for LNG is now in the \$2.50-\$3/mn Btu range, which puts it in competition with supplies delivered to North America and Europe by pipeline.

Monetising reserves

All of this has made LNG suppliers eager to further monetise their reserves. According to the *Oil & Gas Journal's* annual LNG survey, at the end of 2002 some 12 countries were operating 69 liquefaction trains with a capacity of

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Gas

135mn tonnes, operating at 84% capacity, or 113mn tonnes (15.8bn cf/d). Indonesia was the largest exporter, with 26.5mn tonnes, followed by Algeria with 20.5mn tonnes, Malaysia with 15mn tonnes and Qatar with 13.7mn tonnes. Australia, Brunei, Nigeria, Abu Dhabi, Oman and Trinidad & Tobago also had significant production. Currently, an additional 40mn tonnes of capacity is being built, primarily expansion of facilities in Nigeria, Australia, Qatar and Malaysia. Egypt and Norway have new plants under construction.

Transportation capacity is also expanding. At the end of 2002 there were 140 LNG tankers with a capacity of 14.6mn cm plying the seas. Most are dedicated to individual facilities under long-term contract. A further 65 tankers are under order and are expected to add 8.9mn cm of capacity by 2008.

Japan is the world's largest importer, at 7.5bn cf/d. Due to a stagnant economy the country's LNG needs are expected to remain relatively static, however. Korea, which increased its imports by 11% to 2.5bn cf/d, and Taiwan, whose imports grew 13% to 0.75bn cf/d, are rapidly expanding their regassification facilities. But the greatest potential sits to the north. 'China is a prized market,' says Gavin Law, Director of Global Gas for Wood Mackenzie. 'They've got the money to pay and the latent demand. By 2010, they could be taking 8–10mn tonnes.'

France and Spain are Europe's largest LNG importers, with slightly over 1.4bn cf/d each. In all, Europe accounted for around one-quarter of world trade, with a growth rate in imports of almost 20%. 'There has been an increase in demand from power generators,' says Conway. 'It gives you an environmentally clean plant, and also gives you much more flexibility.' The cost of infrastructure has come down guite dramatically, to the point where it can compete with long-distance pipelines, adds Conway. 'Spain and Italy are right at the end of those pipelines.' France is also expanding capacity, and even Britain, which ceased LNG imports a decade ago, is being eyed for a new facility that will fill the gap from declining North Sea production.

While Algeria has traditionally supplied most of the US LNG market, the majority now comes from Trinidad & Tobago, which can compete on price because it is close to market and an efficient, low-cost producer. Trinidad & Tobago production currently stands at 1bn cf/d. It is in the midst of expanding its export capability by adding a fourth train. Construction of two more trains are under consideration for the end of the decade. In the US, LNG competes directly with pipeline gas. Sellers are offered the Henry Hub price, which averaged \$3.24/mn Btu in 2002. Analysts reckon that sellers need at least \$2.50/mn Btu to break even, and \$3/mn Btu to make favorable returns. Prices averaged \$6.90 in 1Q2003, and a very robust \$5.63 in off-season 2Q2003. Even with the increase to 1.5bn cf/d, the American LNG market is still comparatively small, but all four facilities operating in the US are under expansion and will raise import capacity to at least 3.5bn cf/d by 2005.

Still, that only amounts to 6% of daily consumption. To provide a significant impact, new LNG regassification plants will have to be built. Around two dozen proposals have been submitted, but many are running into regulatory approval difficulties over safety fears and environmental concerns. 'The LNG industry has a very good record on safety,' comments Conway. 'It works to very high standards. The whole process is inherently safe. The liquid form is not dangerous. Methane is refrigerated down to -160°C and kept at normal pressure. If there is a crack in the container, it almost seals itself because it freezes and goes solid. It's safer than crude to transport.' Even the large, bulbous storage tanks for the regassified product aren't as dangerous as they look. 'Methane gas has relatively small flammability limits. There has to be just the right mixture of oxygen and methane to burn."

Environmental concerns can have far greater implications, however. 'In the late 1990s an Italian electricity company wanted to bring LNG into northern Italy,' recalls Conway. 'They signed contracts for Nigerian LNG, but couldn't get permission for the regassification plant. In the end the LNG had to be diverted to France.' In order to deal with such concerns, American builders have come up with two solutions - offshore and out-of-country terminals. The former involves building the regassification plant on a floating platform far from offended eyes, such as BHP Billiton's plan to station a 0.8bn cf/d LNG terminal some 30 km off Ventura, California. The latter involves congenial Mexico - in August authorities issued Shell a permit for a 1.3bn cf/d facility in Baia California.

The future

In Asia, long-term contracts still dominate the sector – but markets are deregulating and buyers are looking for more flexibility and smaller deliveries. Japan has renegotiated some of its long-term contracts with Asian suppliers, reducing prices by up to 10%. LNG suppliers are also proving more willing to take risks by investing in capacity that hasn't been pre-sold. Shell is constructing an immense, 9.6mn tonne plant – the Sakhalin II project in eastern Russia – largely on speculation. Only about one-quarter of the capacity is currently bespoke, and the company is offering flexible, short-term contracts as enticement. Customers for its 5mn tonne regassification facility in India, for instance, will be allowed to buy gas in short or long-term periods as befits their needs.

This is good for the market, as it creates greater flexibility for LNG to respond to demand, but long-term contracts will still dominate the sector, limiting the evolution of LNG to a true international commodity. 'With Sakhalin, Shell took a punt to get a lead in that market,' says Law. 'It's unlikely you will get too many others following Shell's example.'

In the short term, the fastest growing market will be in the US. 'We've seen offtakes of 2bn cf/d this summer,' points out Matt Snyder, Managing Consultant for Wood Mackenzie's North American gas and power team. 'But the real issue with the US is lack of long-term offtake agreements. In the summertime, the US takes rejected cargoes - we're the saint of unwanted cargoes. In the winter, there's no intake - it's going to long-term contracts in Asia. As the gap between US conventional supply and demand increases, we'll see growth in long-term contracts."

What of the potential for LNG imports to reach 20bcf/d by 2013? 'It's not going to happen,' says Snyder. 'There's a lot of public attention focused on LNG, and that attention can lead to wildly optimistic statements. You have to take a common sense check – watch how the banks respond to what's viable and what's not. We see around 6bn cf/d by 2010.'

Even at that more modest level, the construction of North American LNG regassification facilities during this decade, along with the building of Arctic pipelines in the next decade, will play a significant role in meeting longterm US supply needs. But the other side of the coin - demand - will be just as important. 'Conservation, efficiency and demand destruction will play a role,' says Snyder. And the key to all three factors in North America will be, as always, the price. 'A price above \$5/mn Btu is not sustainable for the long term. We see a general downward trend, maybe to the mid-\$4 range by next summer, and a \$3.75 range for 2010-2015."

*Note: 1bn cm of gas = 37.3bn cf = 0.73mn tonnes of LNG

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Dr Silva-Calderón obtained a doctorate degree in law and politics from Universidad Central de Venezuela science in 1956. For over 25 years he has been a lecturer at the Law School of Universidad Central de Venezuela, Department of Mining and Hydrocarbons Law. He is also an Emeritus Professor there and has taught in the postgraduate programme on the Economy of Hydrocarbons.

Silva-Calderón started his career as a member of the advisory team of Juan Pablo Pérez Alfonso, and was President of the regional legislature of his home state of Monagas. Subsequently, he was a member of the National Congress, serving as President of the International Treaties Sub-committee and member of the Energy and Mines Committee.

He has been a columnist for national daily newspaper *El Globo* for several years, contributing articles on oil and the impact of oil activities in Venezuela. He is an active member of the Venezuelan Chapter at the World Petroleum Congress, where he has participated as Venezuelan delegate on several occasions.

He is a member of the National Energy Council and was appointed Minister of Energy and Mines of Venezuela in 2000, a position he held until mid-2002. In this capacity, he has actively promoted cooperation within OPEC and with non-OPEC oil producing countries. He was also actively involved in co-ordinating and organising the Second Summit of OPEC Heads of State, held in Caracas in September 2000.

On 1st July 2002, Dr. Silva-Calderón was appointed Secretary General of OPEC.

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Asia-Pacific Vietnam



Already self-sufficient in many energy resources – except for refined petroleum products due to the present lack of local refining facilities – Vietnam is pushing ahead with a number of domestic energy development initiatives aimed at increasing the use of natural gas, coal and hydroelectricity in order to meet a projected threefold rise in primary energy demand over the next two decades. *David Hayes* reports.

Pollowing the launch of the Vietnamese Government's open door policy in the mid-1980s and the break up of the former Soviet Union, Vietnam has succeeded in attracting a growing inflow of foreign investment, particularly to the manufacturing sector as local labour costs are lower than in many other Asian countries. This has caused a rapid increase in energy demand, which is expected to continue in the future as industrial expansion and rising living standards create further energy consumption demand.

According to government forecasts, primary energy demand will grow 50% from 17mn tonnes of oil equivalent (toe) in 2000 to 24.6mn toe in 2005. Demand is then forecast to increase a further 50% over the next five years to reach 36.2mn toe in 2010, almost doubling over the following decade to reach 70.3mn toe in 2020.

Energy demand imbalance

While energy demand is forecast to grow nationwide, energy consumption is currently growing fastest in southern Vietnam. Energy demand growth is highest in the major urban centres of Ho Chi Minh City and Hanoi, although government attempts to encourage rural development are expected to boost energy demand in provincial areas in the future. 'There is still an energy demand imbalance as most industry is located in Ho Chi Minh City and the surrounding region,' commented an energy analyst in Ho Chi Minh City. 'The north is a bit slower. The government has tried to provide growth incentives in the central region but development is still slow there.'

Coal and natural gas are expected to be the two fastest growing energy sources over the next two decades, with a high proportion of local coal and gas production being earmarked for power generation. Hydroelectric power development also will be rapid. However, hydropower is seasonal in Vietnam and gas-fired generation is needed to maintain electricity supplies during the dry season when dam reservoir levels drop too low for power to be generated.

Growing use of motor transport will be responsible for most of the increase in oil-based consumption. Crude oil demand is forecast to grow from about 10mn tonnes in 2000 to 20mn tonnes in 2005, then rising gradually to 25mn tonnes in 2020.

Refining plans

At present all fuel and other petroleum products have to be imported as

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Vietnam does not have its own refinery. Plans call for two refineries to be built, although the country may have to build the 135,000 b/d Dung Quat refinery in central Vietnam alone after state-run Petrovietnam and its Russian partner Zarubezhneft recently disagreed over details in the main contract. Dung Quat refinery was originally scheduled to begin full operation in 2004, but is likely to be delayed if the Russian side withdraws.

Petrovietnam has also signed an agreement with Mitsubishi Corporation of Japan to build a refinery-petrochemical complex at Nghi Son in Thanh Hoa Province, designed to refine 7mn t/y of oil. Detailed plans for the Nghi Son complex are due to be submitted to the Vietnamese National Assembly for approval by the end of 2003.

Exploration and production

Vietnam has 600mn barrels of proven oil reserves and further discoveries are likely. Of the 46 production sharing contracts that state-run Petrovietnam has signed so far, 25 contracts remain active, including 19 under commercial study. Six oil fields are currently in production. Output has more than doubled from the mid-1990s to reach 342,000 b/d in 2002. Total oil production last year was 17mn tonnes, almost all of which was exported due to Vietnam's lack of refining facilities. Japan is the largest importer of Vietnamese oil. Other customers include Singapore, South Korea and the US.

Meanwhile, coal demand is forecast to grow by one third from 7.5mn tonnes in 2000, including 2.1mn tonnes used for power generation, to 10mn tonnes in 2005, with coal-fired power generation doubling to 4.2mn tonnes by then. Power generation will be responsible for most increased coal use during the following decade. By 2020 some 20mn tonnes of coal is likely to be consumed annually, with 15.7mn tonnes earmarked for power station consumption.

Vietnam's coal reserves total 3.5bn tonnes, according to government figures, most of which lie in northern Quang Ninh Province. In addition, a further 5–7bn tonnes of muddy coal are thought to be available, while an estimated 300bn tonnes of brown coal lie 1,000 metres below the surface of the Red River Delta region.

Natural gas will grow in importance very soon. According to the government's long-term energy forecast, natural gas consumption will grow threefold from about 1.2bn cm in 2000 to 5.6bn cm in 2005, and then reach 9.2bn cm in 2010. While power generation will remain the major consumer of gas in the future, industrial use including fertilizer production also will grow over time.

Vietnam has large indigenous natural gas resources which, according to various gas industry estimates, total anywhere from 60tn cf to 80tn cf. Current proven gas reserves total about 12tn cf.

In the pipeline

Petrovietnam is planning to build a gas pipeline transmission grid serving the fast growing southern provinces, including Ho Chi Minh City, that will link a number of offshore gas fields already in production and under planning for future development. Government plans call for the longterm use of gas-fired power generation to grow substantially along with industrial use of gas.

Vietnam first discovered gas in the search for oil. In 1986 Vietnam and the Soviet Union set up the Vietsovpetro joint venture to develop and exploit the offshore Bach Ho (White Tiger) oil field containing oil and associated gas in the Cuu Long Basin after western companies had looked at the scheme but decided not to invest. Gas production from Bach Ho is currently estimated at about 1.4bn cm. Oil and associated gas from the Bach Ho oil field is piped ashore at Vung Tao in southern Vietnam through a 100-km submarine pipeline for processing by Dinh Co processing plant. The processed gas is then supplied to the Phu My gas-fired power plant through a 35-km onshore pipeline. Electricity generated by the Phu My plant is supplied to Ho Chi Minh City and the surrounding region.

Gas production for power generation has recently increased with the coming onstream of the offshore Lan Tay and Lan Do gas fields in block 06-1, operated by BP in a consortium with Petrovietnam (PV) and ONGC of India. Block 06-1 lies in the Nam Con Son Basin and contains 2tn cf of proven gas reserves. Under an agreement with PV, the Vietnamese corporation will take over operation of the pipeline and the receiving gas terminal in 2007. All gas produced is sold to PV, which sells it on to state-run power utility Electricite de Vietnam (EVN) to use at Phu My power plant complex. PV will be responsible for buying all gas produced in Vietnam in the future and selling it to end users and other customers.

Gas is piped ashore from a gas gathering system linking the Lan Tay and Lan Do gas fields in block 06-1. A BP source explained that the pipeline is currently capable of carrying up to 3bn cm of gas annually but is designed to double in capacity to carry 6bn cm when gas production grows in 06-1 and other nearby blocks. The new gas processing terminal has also been built to cope with an eventual doubling of capacity. It currently handles 2.7bn cm to 3bn cm from block 06-1. The 300mn cm swing capacity has been incorporated into the terminal design to cope with possible fluctuations in gas supplies as part of PV's gas sales agreement requirements.

In addition to its investments in the block 06-01 development and associated subsea pipeline and gas processing plant, BP has acquired a 33% interest in the Phu My power plant Phase III expansion with Sembcorp of Singapore and several Japanese partners. The 750-MW power plant is due for completion in February 2004 and will use most of the 2.7bn cm to 3bn cm annual gas output from block 06-1.

Gas from 06-1 will also be used as feedstock at a nearby 800,000 t/y ammonia-urea fertilizer plant being built to supply fertilizer to Vietnam's rapidly expanding agricultural sector.

Downstream investments

BP is not the only foreign company with gas reserves in Vietnam that is keen to invest in the downstream power generation market to create demand for its upstream gas production operations. Unocal Vietnam, for example, is planning to develop its gas reserves for use at the O Mon dual gas/oil-fired combined cycle power station located in southern Vietnam where the first units are due for commissioning by mid-2006. State-owned Electricite de Vietnam (EVN) and Unocal will jointly invest in constructing a 750-MW combined cycle station at O Mon at a cost of \$350mn, while EVN separately will build a 300-MW gas/oil-fired unit at O Mon at a cost of \$240mn to start up by mid-2006.

O Mon power station is planned to eventually reach 2,700-MW installed capacity, making it one of Vietnam's largest power plants. The station will comprise four 300-MW gas/oil fired units and two 750-MW combined cycle plants.

Following the lead of BP and Unocal, PV also plans to enter Vietnam's electricity generation market with the construction of the gas/oil-fired Ca Mau power station using its own finance. Electricity generated will be sold to EVN. Two 240-MW units are due to be commissioned in 2005, followed by a third 240-MW in 2006. PV plans to eventually expand gas supplies to the Ca Mau complex to provide fuel to power units totaling a maximum of 1,400-MW installed capacity.

Asia-Pacific

Vietnam



Power station plans

Vietnam plans to more than double its installed power generation capacity to meet an anticipated double digit increase in power consumption by 2010. According to government targets, the nation's total installed generating capacity will grow by an average of 12.5% per annum during the current decade. In 2007 EVN's installed capacity is expected to reach 15,000 MW and by the end of 2010 the total installed

energy

capacity will have more than doubled since 2003 to reach 21,143 MW.

Power generation is forecast to grow slightly ahead of the increase in installed capacity and rise by about 13% annually. Vietnam's power plants are expected to generate 40,329 GWh in 2003, doubling to 96,126 GWh by 2010.

Hydroelectricity is Vietnam's major power generation resource. At the start of 2003 EVN's installed hydropower capacity stood at 4,141 MW and accounted for 45% of Vietnam's total electricity supply capacity. Gas-fired power plants totaling 3,950 MW were second in installed capacity and represented 42% of the nation's generating capability. Coal-fired stations totaling 1,240 MW were third and represented 13% of installed capacity.

While hydropower, gas-fired and coalfired generation will remain the main source of electricity generation in the future, both hydroelectric plants and gas-fired power stations will decrease slightly as a proportion of Vietnam's total installed generating capacity while the proportion of coal-fired generation capacity is due to increase.

EVN plans to build 37 new power plants by 2010 to meet Vietnam's growing electricity needs. The power plants include 22 hydroelectric schemes of various sizes, eight gas-fired stations and seven other thermal power plants, mostly coal-burning units. The total investment is estimated at \$19bn, of which EVN is expected to raise \$14bn. The balance will be funded by other sources, including private companies and foreign investors.

Plans include the development of the 2,400 MW Son La hydroelectric scheme that will be the largest hydropower project in Vietnam. The dam site is in northern Vietnam, upstream from Hao Binh dam, currently the country's largest hydropower scheme. Plans call for the first 300-MW Son La generator to be commissioned in 2012. Two 300-MW units will be commissioned in 2013, 2014 and 2015, while the final generating set will enter service in 2016.

Meanwhile, the government's longterm power development plans for 2011 to 2020 will involve further developing Vietnam's hydropower potential. In 2020, when Vietnam's total power supply capacity is forecast to reach 41,000 MW, hydroelectric schemes will represent 36.4% of installed capacity. Gas-fired power plants will see a big leap during the next decade to reach 33% of installed capacity in 2020, while the proportion of coal-fired capacity will slip to 16.2%. Geothermal and other local power supplies will constitute the balance.

conference Tuesday 4 November 2003

Using Computers in the 21st Century: Harnessing Computer Technology to Deliver Better E&P Returns

Aberdeen, UK

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The conference will be of interest to delegates from all sizes of organisations in the oil industry and their equivalents from the service sector. In particular, new entrants or small operators with tight operating margins would benefit from attending.

E&P managers with asset responsibilities IT managers Geophysicists Technology managers Reservoir engineers

For further information and booking details, please contact Laura Viscione, Energy Institute Conference Department, T: +44 (0)20 7467 7174 F: +44 (0)20 7580 2230 e: *lviscione@energyinst.org.uk* or visit www.energyinst.org.uk

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WEEK WELCOME TO 90TH IP WEEK!

IP Week is the focal point in Europe each year for leading oil and gas industry professionals. It offers an intensive round of conferences, seminars, industry and trade association events, oil industry's largest Annual Dinner and Annual Lunch.

This is the first IP Week staged by the new Energy Petroleum Institute, a professional body created in 2003 by the merger of the Institute of Petroleum and the Institute of Energy formed to support individuals and organisations across the energy industry.

The week will include conferences focusing on:

- Energy price Oil and gas in FSU Refining
 - Transportation security
 - European downstream issues
- Exploration



Selected IP Week 2003 events are organised in partnership with / sponsored by:



IP ANNUAL LUNCH

Tuesday 17 February, Dorchester Hotel, London

Gas

The Annual Lunch provides a unique opportunity to hear one of the world's senior figures in today's oil and gas industry discuss the key issues facing the industry in the context of the changing economic, social and political environment.



IP ANNUAL DINNER

Wednesday 18 February, Grosvenor House Hotel, London

The 90th Annual Dinner is a unique event in the international petroleum industry, which brings together over 1000 of its leading figures, and provides an opportunity to meet with old friends and acquaintances.

> Guest of Honour and Speaker: John Simpson CBE, BBC World Affairs Editor

EXHIBITION

16 - 19 February, London

Maximise on business and promotional opportunities connected with IP Week 2004 by participating in the oil and gas information services exhibition. The exhibition will be held alongside 2004 events.

All conference and seminar refreshment breaks will be held in the exhibition hall, enabling exhibitors to take full advantage of networking opportunities offered by IP Week. Each conference and seminar session will attract a number of senior oil and gas executives.

Space is very limited so book your stand now!



THE REST OF THE INDUSTRY WILL BE THERE, PLAN NOW TO JOIN US IN LONDON ! For more information on IP Week 2004, contact the Events Department at the Energy Institute: T: +44 (0)20 7467 7100 e: events@energyinst.org.uk or visit: www.ipweek.co.uk

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Energy Intelligence



lifetime learning

Lifetime learning for all

All of us involved in the world of work have a need for lifetime learning of one sort or another, writes *Sarah Beacock*, Professional Affairs Director at the Energy Institute (EI). This includes both staff and members of the EI and, in particular, those professionally recognised members who have made a commitment to updating their professional development as a key part of their membership. Professional membership organisations represent the sum of their members' skills and knowledge, which in turn is reflected in the development they have undertaken during their time as

members.

Professional development (PD) is something that we all do to some extent, possibly without thinking much about it. It can be defined as 'the systematic maintenance, improvement and broadening of technical and commercial knowledge and competencies to carry out a member's professional job, together with the development and broadening of personal and professional competencies'.

While this might sound onerous, it needn't be. In fact, for those who are doing their jobs well, it could be that the only extra activity required is the recording of relevant experiences. You should find that you are already undertaking activities that contribute to your PD. In this case, the important task is to make sure that you are approaching them in such a way as to gain maximum benefit.

Why do we need PD?

A frequently heard comment is: 'I don't have time to undertake PD and anyway I already know all there is to know about my area of business'. You will probably already treat such people with extreme caution! However, it is worth considering the reasons why we should all keep our knowledge and skills up to date. The QCA* has researched this area and considers that PD has five specific goals:

 Improving and maintaining quality of practice – becoming more fluent, more productive, more collaborative or more expert, often simply by learning through experience.

- Career development preparing for and anticipating future roles or jobs.
- Expanding one's domain of competence – development of one or more recognised specialist skills, broadening as well as deepening one's technical expertise and developing in an organisational (eg management or training) role.
- Facilitating changes in practice using PD to facilitate the modification of practice at both individual and organisational levels.
- Quality assurance for users and the public – the professions often have an implicit social contract with the public, based on the assumption that qualified professionals are, and will remain, competent. PD provides a means of establishing and publicising this competence.

PD – how do you do yours?

PD activities can take many forms – they may be formal or informal; in-house or external; work-related or concerning personal development; technical or general – and can focus on skills or knowledge. Similarly, there are many ways of recording your PD. One way is to count the amount of time you have spent on various PD activities. However, El members are encouraged to consider the learning outcomes of activities, rather than simply the time spent on them. In this way much more will be gained from PD when members take into account their goals and aspirations.

Take a moment to look at your own work activities over the past year – you will almost certainly find something that has contributed to your career development whether you are at the early stages of it or nearing retirement. As a wise man of 75 once told me: 'So much to learn, so little time'. In a world that changes as fast as it apparently does these days, it would be inconceivable for anyone to go through an entire year and not learn something new of use to them in their work.

Many members ask about the best forms of PD to undertake and what activities will 'count' towards PD. The short answer is that there is no hard and fast rule. The activities that will count best towards your PD are those that are relevant to your situation. PD doesn't necessarily equate to 'attending courses'. Although many members will achieve some useful learning from attending formal courses there are many other ways of acquiring new learning that contribute to an individual's professional development. Some of the areas that will be familiar to most people are:

- attendance at conferences, meetings or seminars;
- writing or presenting papers;
- active participation in your local community;
- active participation in the life of your professional body;
- private study or distance learning; and
- learning in the workplace, either formally or informally.

You may find that just one of these can more than take up enough time during a year. For example, if you are studying towards an MBA there is likely to be little opportunity also to write papers for technical journals or attend many conferences. However, most people are likely to take a 'pick and mix' approach, so that attending El branch events, giving talks to local university or school students, and mentoring younger colleagues towards professional membership will all contribute equally to your own PD.

So, having established that we can all identify our 'professional development' what should we do with it? Chances are



we have already taken that knowledge or learning, assimilated it and put it to good use. What else should we do with it? Well, as far as members of a professional body are concerned, we should record it. It doesn't matter how, or where, or even when. But recording it formally, and giving ourselves time to reflect on it, allows us to benefit fully from that learning and use it to good advantage. It also means we can look at our PD over a period of time and see, in career terms, where we have come from.

Recording PD – what next?

Having begun to record and reflect on our PD, the next use of it is to enable you to plan your future career. An essential tool for your PD to be successful is a personal development plan (PDP). This helps you to define what your goals and choices really are and identify how you can achieve them. The PDP therefore has three key elements:

- What your objectives are.
- How you're going to achieve them.
- When the timescale you need to work to.

A variety of development objectives can be built into the PDP, from the small (learn to use spreadsheets effectively in budgeting) to the major (find a new job). Similarly, your objectives might be technical (additional job-relevant skills), professional (related to the requirements of your professional body) or non-technical (eg communications skills, managerial/administrative etc).

There are a few principles to be followed when planning your professional development:

- For practical purposes it is a good idea to limit the number of objectives you identify for the forthcoming year. It is important to retain a balance between your own PD and your day-to-day work. Where possible, development opportunities should arise as part of your work as experiential learning is probably the best and most effective form of PD. However, it is always useful to supplement this with more formal learning through courses and directed study where appropriate.
- Don't make the objective too large or too far distant. Where you have a long-term objective such as to gain promotion it is important to break this down into smaller objectives with shorter term targets.
- Keep your objectives realistic everyone would like to aim to be the CEO but it's not going to happen to most of us!

- Vary the time constraints of your objectives so that you can see progress quickly in some areas whilst taking a more measured view of your longer term goals.
- Make your objectives as practical and specific as possible – a vague or general goal will be much harder to turn into action.
- Keep your PDP flexible you won't always know what new projects and tasks will arise in your job so it's important to allow yourself to change your objectives throughout the year.
- Don't forget to involve your line manager – they will be able to advise you on any training opportunities available as well as guiding you on the specific development needs for your position. You will often find them willing to act as a sounding board for developing your ideas on future career plans. Alternatively use the organisation's annual review or appraisal system to identify your weaknesses that you can then build into your development plan.
- Remember to include objectives that will help you improve in doing your job now as well as preparation for your future career plans.
- The format of your PDP is irrelevant. Professionally recognised members of the Energy Institute receive a Lifetime Learning Workbook and Plan as part of the 'new member' pack of information. This is an ideal place to start if you haven't already. Alternatively, draw up a format that suits you. The important thing is your objectives and your plan.
- Lifetime learning means just that it applies to anyone at any age. Although you may hold a senior position and perhaps be nearing retirement age there will still be opportunities for you to learn new

skills that may become even more valuable after your working career is over.

For qualified members who have a commitment to maintaining the currency of their skills and knowledge, PD is an invaluable tool against which to measure your own achievements. However, it needs to be organised, planned and recorded in order to provide full benefit. You will only see the value of PD when you start to plan it so don't delay any longer – start today.

*Qualifications and Curriculum Authority's (QCA) Standards and Vocational Qualifications in Continuing Professional Development, published in 1998.

> If you feel you require any assistance with planning and recording your own PD, or want any guidance and advice on the courses and opportunities for learning that are of relevance to you please do not hesitate to contact the Professional Affairs Directorate for help.

Please contact Nellie de la Monneraye, Education and Training Officer, at the Energy Institute on T: +44 (0)20 7467 7178. or e: education@energyinst.org.uk A CPD record card will be sent to all members later in the year, however, if you wish to have a further copy of the Lifetime Learning Workbook and Plan, which gives detailed information and step by step guidance on developing your own learning plans, please send a cheque for £5 to: Membership Officer, Energy Institute, 61 New Cavendish Street, London W1G 7AR, UK.

IP MEMBER TIES - HALF PRICE SALE!

We have a small stock of IP member ties that members may like to purchase as a souvenir of their membership of the Institute of Petroleum. They are available at a reduced price of just £10 each.

If you would like a tie please send a cheque by post to: Membership Officer, Energy Institute, 61 New Cavendish Street, London W1G 7AR, UK.

Please remember to state whether you are a Member or Fellow.

Due to limited supplies, orders will be dealt with on a first come, first served basis. Your cheque will be returned if supplies run out.



Training and education directory

This directory lists training and education suppliers, both within the UK and overseas, which offer courses that are particularly relevant for the oil, gas and energy industries. Where courses have received official accreditation from the relevant Sector Skills Councils (SSCs) this is indicated.

El partners in training

Energy Institute, 61 New Cavendish Street, London W1G 7AR, UK

T: +44 (0)20 7467 7100 F: +44 (0)20 7255 1472

e: nwilkinson@energyinst.org.uk www.energyinst.org.uk

The Energy Institute (EI) is the leading professional body for the energy industries with more than 400 group members and almost 12,000 individual members represented both nationally and internationally. A Royal Charter membership organisation, the El serves society with independence, professionalism and a wealth of expertise in energy matters, creating a home for energy professionals and a scientific and technical reservoir for the industry. It is licensed by the Engineering Council to offer Chartered, Incorporated and Engineering Technician status to engineers.

The EI has been created by the merger of the Institute of Petroleum and the Institute of Energy. Both Institutes had a proud and distinguished heritage developed over many years of supporting their particular energy sectors. Increasingly these sectors have converged, creating an integrated global energy market that has been mirrored by the development of the Energy Institute - established to address both the depth and breadth of this subject.

The Energy Institute runs a number of training courses and programmes in partnership with the following organisations. For further information regarding specific courses, visit the El website at www.energyinst.org.uk

Alphatania Group

Rodwell House, 100 Middlesex Street, London E1 7HD, UK T: +44 (0)20 7650 1402 F: +44 (0)20 7650 1401 e: training@alphatania.com www.alphatania.com

Alphatania management training courses are the by-word in natural gas training, with over 2,000 delegates from over 50 countries around the globe having looked to the company for natural gas management training. At the core of gas management training courses are the many decades of experience in the gas industry of its staff.

BMT Cordah

Scotstown Road, Bridge of Don, Aberdeen, AB23 8HG, UK T: +44 (0)1224 414200 F: +44 (0)1224 414250

e: main@bmtcordah.com www.bmtcordah.com Consultancy and training in all aspects of environmental management, including a range of training programmes specifically for the oil and gas industry. A published calendar of courses attracts participants from a wide range of countries and companies. Programmes are tailored to the requirements of client organisations, and delivered worldwide.

ENSPM Formation Industrie

232 avenue Napoleon Bonaparte, 92852 Rueil-Malmaison Cedex, France

T: +33 1 47 52 72 93 F: +33 1 47 52 71 09

e: michael.howard@enspmfi.com www.ifp.fr/enspmfi

ENSPM Formation Industrie has been providing continuous professional training for the oil and gas industry since 1975. The depth and quality of ENSPM Formation Industrie is enhanced by its affiliation within the Institut Français du Pétrole Group. This associates ENSPM Formation Industrie with one of the largest oil industry research centres in Europe and also links it to ENSPM (École National Supérieure du Pétrole et des Moteurs), a distinguished French specialist oil and gas industry institute of higher education that offers postgraduate studies to doctorate level. More than 800 companies in over 80 countries have benefited over the last 20 years from ENSPM Formation Industrie's training services.

Petroleum Economist Energy Training PO Box 105, Baird House, 15/17 St Cross Street, London, EC1N 8UW, UK

T: +44 (0)20 7831 5588 F: +44(0)20 7404 4241 www.petroleum-economist.com

Petroleum Economist Energy Training offers a comprehensive range of upstream, midstream and downstream courses delivered by a team of industry experts. Each course is designed to meet specific needs, including those of refiners, traders, economists, energy lawyers, strategists, analysts, sales and marketing, accountants, operations, purchasing, risk managers, regulators, management consultants, projects financiers, ship owners and brokers, geoscientists, reservoir and facilities engineers, IT service providers and new recruits.

The Professional Development Institute (PDI) of the University of North Texas PO Box 310769, Denton, Texas 76203-0769, US

T: +1 940 565 2483 F: +1 940 565 3362

e: hbrock@pdi.org www.pdi.org The Professional Development Institute of the University of North Texas is one of the world's leading organisations offering seminars, schools, conferences and in-house training programmes in oil and gas accounting, finance and taxation. PDI is the continuing professional education arm of the University of North Texas in Denton, Texas, US. It has provided seminars and conferences in the UK since 1978.

QinetiQ Fuels and Lubricants Centre Building 442, QinetiQ Pyestock, Cody Technology Park, Ively Road, Farnborough, Hants GU14 OLX, UK T: +44 (0)1252 374772 F: +44 (0)1252 374791

e: pcarberry@QinetiQ.com www.QinetiQ.com

QinetiQ is a world leader in the creation and application of technology. It was formed in July 2001 from selected divisions of the Defence Evaluation and Research Agency (DERA). The Fuels and Lubricants Centre (FLC) offers comprehensive advice and support on fuels, lubricants, science and technology to the Ministry of Defence and other customers. The capability provided covers the development of new and improved fuels and lubricants, the investigation of related engineering aspects, specifically tribology, the handling and use of fuels, the development of specifications, extensive laboratory facilities for the investigation of problems and quality surveillance of fuels and lubricants. FLC maintains Defence Standard 91-91, which is the most commonly used jet fuel standard in the world.



Professional level and short courses

Abacus International

Abacus House, Watton Road, East Wretham, Thetford, Norfolk IP24 1QS, UK

T: +44 (0)1953 497099 F: +44 (0)1953 497098; +44 (0)870 052 2235

e: information@abacus-int.com www.abacus-int.com

A totally independent organisation which, since 1993, has specialised in providing professional training for the petroleum industry. Regular open seminars are presented in Europe, the Middle East and the Asia-Pacific region. Also designs customised in-house training courses for individual clients that can be presented almost anywhere, worldwide.

Aberdeen Drilling School & Well Control Training Centre 50 Union Glen, Aberdeen AB11 6ER, UK

T: +44 (0)1224 572709 F: +44 (0)1224 582896 e: info@aberdeen-drilling.com www.aberdeen-drilling.com All aspects of drilling technology and equipment, well control, drilling technology, management and safety training. Standard in-house training and specialised training offered to meet individual customer requirements.

Aberdeen First Aid School

Norton Centre, Poynernook Road, Aberdeen AB11 5RW, UK T: +44 (0)1224 585 844 F: +44 (0)1224 585 899

e: info@afas.co.uk www.afas.co.uk HSE-approved offshore and HSE-approved first aid at work courses. Four-day HSE courses with two-day refresher courses running every week. Places always available and courses are never cancelled. Advanced courses also available.

Aberdeen University Oil and Gas Centre, Research and Innovation

University Office, Regent Walk, Aberdeen AB24 3RY, UK T: +44 (0)1224 272484 F: +44 (0)1224 487658

e: e.bowie@abdn.ac.uk www.abdn.ac.uk/oilgas

Offers wide ranging multi-disciplinary expertise including petroleum economics, petroleum geology, safety engineering, environmental monitoring, environmental law, business management and international relations. The Centre facilitates and project manages collaboration with the University of Aberdeen. It works with the University's professional development department - CPD Services - and academic departments to develop accredited programmes and short courses requested by the industry.

Allomax Engineering Innovation Centre, Exploration Drive, Bridge of Don, Aberdeen AB23 8GX, UK

T: +44 (0)1224 827217 F: +44 (0)1224 827218

e: mark.bexon@allomax.com www.allomax.com www.sysmax.com

Training in risk management, well engineering project management, artificial lift, sand control, well completion design and production technology are provided through both public and in-house courses. Allomax is a well engineering consultancy and can supply well engineering personnel, well construction project management services and systems (Wellmax) and the leading competence assurance system (Casmax). Other systems include the risk management system, Riskmax; Drillmax, the risk-based well cost estimation tool; and Fieldmax, the risk-based asset option and valuation tool.

Alphatania

Rodwell House, 100 Middlesex Street, London E1 7HD, UK T: +44 (0)20 7650 1402 F: +44 (0)20 7650 1401

e: training@alphatania.com www.alphatania.com

Alphatania offers a series of public and bespoke courses relating to natural gas. Some courses are scheduled and held for a wide variety of delegates from many disciplines, companies and countries. Alphatania can also select from its extensive library of

material and experience to provide a bespoke course for your specific needs. The intention is always to provide delegates with a comprehensive approach to understanding the practical, commercial and political framework, concepts and developments within which gas executives and managers have to operate on a day-to-day basis. Alphatania is a training partner of the Energy Institute.

Atlas Interactive

Offshore House, Offshore Technology Park, Claymore Drive, Aberdeen AB23 8GD, UK

T: +44 (0)1224 708430 F: +44 (0)1224 708431

e: timlove@atlasinteractive.com www.atlasinteractive.com Atlas has been producing world-class e-learning modules for the oil and gas industry since 1995. Its products cover health, safety, environmental and technical topics, and are used by over 100,000 people worldwide per year in this industry. Atlas products are available via CD-Rom, intranet or Internet. Customised products and bespoke developments can also be provided.

Baker/OTS International Training Services Third Floor, 104 College Road, Harrow, Middlesex HA1 1BQ, UK

T: +44 (0)20 8861 0104 F: +44 (0)20 8861 3101

e: training@mbakercorp.com www.mbakercorp.com

Extensive experience in preparing HR development plans for clients in the petroleum and energy sectors, and in producing and conducting programmes and short courses to international standards which are tailored to individual client requirements. These courses cover production operations; marine operations; mechanical, electrical and instrumentation maintenance; and onshore and offshore HSE.

Blackpool and the Fylde College - Fleetwood Offshore **Survival Centre**

Fleetwood Offshore Survival Centre, Broadwater, Fleetwood, Lancashire FY7 8JZ, UK

T: +44 (0)1253 779123 F: +44 (0)1253 773014

e: offshore@blackpool.ac.uk www.blackpool.ac.uk

Basic offshore safety induction and emergency training/further offshore emergency training. OPITO-approved establishment. Fleetwood Testing Laboratory is one of the premier test houses in the EU for the testing of lifejackets, immersion suits and buoyancy aids. FTL also undertakes R&D work for manufacturers. It has recently won a contract for the compatibility testing of various combinations of lifejackets and immersion suits for a major operator in the UK sector of the North Sea.

BMT Cordah

partner of the Energy Institute.

Scotstown Road, Bridge of Don, Aberdeen AB23 8HG, UK T: +44 (0)1224 414200 F: +44 (0)1224 414250

e: enquiries@bmtcordah.com www.bmtcordah.com Consultancy and training in all aspects of environmental management, including a range of training programmes specifically for the oil and gas industry. Its published calendar of courses attracts participants from a wide range of countries and companies. Programmes are tailored to the requirements of client organisations, delivered worldwide. BMT Cordah is a training

British Oil Spill Control Association (BOSCA) 4th Floor, No 30 Great Guildford Street, London SE1 OHS, UK T: +44 (0)20 7928 9199 F: +44 (0)20 7928 6599

e: bosca@maritimeindustries.org www.bosca.org A member organisation that runs a comprehensive suite of IMOand UK-accredited training delivered worldwide. A leader in spill training. Member companies may be contacted directly via the website.

Caledonia Training & Consultancy Silverburn Crescent, Bridge of Don, Aberdeen AB23 8EW, UK

T: +44 (0)1224 708141 F: +44 (0)1224 705718

e: info@caledoniactc.co.uk www.caledoniatraining.com



A specialist in well and completion engineering with a current portfolio including drilling well control, well intervention pressure control, production technology, management, IT, health and safety, competence and English as a foreign language. A general oil industry and industry consultancy, Caledonia also offers a range of tailored specialised courses. For more information, please check website.

Cambrian Consultants

Mayfield, Llanbadoc, Usk, Monmouthshire NP15 15Y, UK T: +44 (0)1291 673022 F: +44 (0)1291 673023

e: training@cambri.com www.cambrian-group.com

Cambrian provides specialist geoscience and IT training courses to the upstream oil industry. It also offers geoscience services and products ranging from wellsite geology to technical evalu-ation and software applications. Offices in Usk (South Wales), Houston and Kuala Lumpur enable the full range of services to be supported internationally.

Centre for Advanced Maritime Studies Strathclyde University, Henry Dyer Building, 100 Montrose Street, Glasgow G4 OLZ, UK

T: +44 (0)141 548 3740 F: +44 (0)141 552 2879 e: admin@camsedin.org.uk www.camsedin.org.uk

Courses on petroleum tanker safety, liquified gas carrier safety, crude oil washing and IG systems, pollution prevention and abatement, chemical tanker safety, and an introduction to ship inspection principles. Competent analyst (marine), transportation of packed dangerous goods by sea, jetty operations safety, introduction to sea transportation of LNG courses also offered.

The Center for Professional Advancement Oudezijds Voorburgwal 316A, 1012 GM Amsterdam, The Netherlands

T: +31 (0)20 6382806 F: +31 (0)20 6202136

e: amsterdam@cfpa.com www.cfpa.com

The Center provides high-quality continuing technical education to industry and government worldwide. Its two- to five-day courses in applied industrial technologies are intensive, focused and practical. The courses are primarily designed for working scientists and engineers, with highly interactive programmes providing ample opportunity to address individual concerns.

CHaRM - Centre for Hazard and Risk Management Loughborough University, Loughborough, Leicestershire LE11 3TU, UK

T: +44 (0)1509 222175 F: +44 (0)1509 223991

e: J.G.Bostock@lboro.ac.uk www.lboro.ac.uk/departments/index.html The Centre for Hazard and Risk Management (CHaRM) runs a series of postgraduate programmes on a modular basis at the levels of Certificate, Diploma and Masters. In addition, modules can be attended as a short course. A series of short courses in back care management, healthcare risk management, occupational health and safety management, and security management are also offered.

Cinar

11 Elvaston Place, London SW7 5QG, UK T: +44 (0)20 7581 2245 F: +44 (0)20 7581 2265 e: cinar@cinar.co.uk www.cinar.co.uk

Cinar offers training courses for industrial engineers using software tools, case studies, and physical and mathematical modelling demonstrations. It focuses on increasing the efficiency of combustion units and, where appropriate, improvement of the product, pollutant emission control, process reliability, together with time and cost constraints. All courses are set within the context of market forces and environmental policies.

Cogent SSC - The Sector Skills Council for the Oil and Gas Extraction, Chemicals Manufacturing and Petroleum Industries

Minerva House, Bruntland Road, Portlethen, Aberdeen **AB12 4OL, UK**

T: +44 (0)1224 787800 F: +44 (0)1224 787830

e: info@cogent-ssc.com www.cogent-ssc.com

Cogent develops training standards for the oil and gas extraction, petroleum and chemicals manufacturing industries. It accredits training courses which meet such standards, and approves training providers and centres. It offers workforce development solutions to employers, training information to employees and careers information to students. Cogent acts as the industry's voice on skills and training issues.

Cranfield University Cranfield, Bedfordshire MK43 OAL, UK T: +44 (0)1234 750111 F: +44 (0)1234 751206

e: shortcourse@cranfield.ac.uk www.cranfield.ac.uk Offers courses on safety, corrosion, underwater engineering, pipelines, maintenance, gas turbines, and reliability.

Downhole Technology

Offshore Technology Park, Exploration Drive, Bridge of Don, Aberdeen AB23 8GX, UK

T: +44 (0)1224 382300 F: +44 (0)1224 826458 e: info@the-rig.com www.the-rig.com/

Downhole Technology is a Weatherford-owned company with open access to drilling and well services training as well as product testing and development of new drilling and downhole equipment and techniques

EMD - Executive-Education.Net Naarderstraat 296, NL-1272 NT Huizen, The Netherlands

T: +31 35 695 1111 F: +31 35 695 1900

e: mail@emdcentre.com www.executive-education.net Since 1992, EMD Centre has published independent executive education directories for Europe, Asia-Pacific, America and in-company. The annual directories describe all relevant executive courses in detail, including dates, fees, content and faculty. Subscribers receive both a hard cover copy and a password for online access. Training managers in over 60 countries worldwide use these directories for selecting, budgeting and planning management courses. EMD Centre also hosts company-specific course catalogues for many international corporations. These course catalogues contain in-company courses plus external courses from preferred suppliers. Company-specific course catalogues are online accessible for all employees through a hyperlink on the company intranets. Over 650,000 people worldwide currently have access to such courses catalogues.

Energy Institute, 61 New Cavendish Street, London W1G 7AR, UK

T: +44 (0)20 7467 7100 F: +44 (0)20 7255 1472

e:nwilkinson@energyinst.org.uk www.energyinst.org.uk The Energy Institute (EI) believes in the fundamental importance of structured personal and professional development, offering a wide range of training and development courses designed to provide worthwhile learning opportunities for people, at all stages of their career in the oil, gas and energy sectors. Together with training partners such as Petroleum Economist Training, the Institute provides one of the most comprehensive training programmes in the industry, offering introductory, intermediate and advanced level short training courses, including the long-established Introduction to Oil Industry Operations and Introduction to Petroleum Economics. Other course subjects include aviation, benchmarking, environment, financial accounting, financial man-agement, fuel, gas, HSEQ, logistics, loss control, lubricants, oil industry petroleum contracts, refining, and trading. For organisations with more specific training needs, the El also provides inhouse training that is tailored to suit an organisation's individual requirements. This service is available to organisations worldwide and is not limited to the UK.

The Institute also offers a range of training and education packages to suit those involved in energy management or those involved in advising others on their energy management needs (see p34). These include an Introduction to Energy Management one-day course, an Advanced Energy Management one-day course, Training in Energy Management through Open Learning (TEMOL), NVQ Level 4 in Managing

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Energy, Diploma in Energy Management and Utilisation. Bespoke energy management training can also be provided for organisations.

Engineering Careers Information Service (ECIS) EMTA House, 14 Upton Road, Watford, Hertfordshire WD18 0JD, UK

T: 0800 282167 (UK only); +44 (0)1923 238 441 F: + 44 (0)1923 652389

e: ecis@engineeringcareers.org.uk www.enginuity.org.uk Offers advice on many aspects of an engineering career, including modern apprenticeships and engineering degrees. Free careers literature available. Information service for young people, careers advisers, teachers and parents also provided, including e-careers CD-Rom for careers libraries.

Environment & Resources Technology Ltd (ERT) Research Avenue 1, Heriot-Watt University, Edinburgh EH14 4AP, UK

T: +44 (0)131 449 5030 F: +44 (0)131 449 5037

e: Ingeborg.McNicoll@ert.co.uk www.ert.co.uk

Provides environmental and scientific services and consultancy to industry, government and government agencies. Technical areas include environmental management, oil spill studies, waste management, environmental survey and monitoring, consent and compliance support.

Geosphere

Netherton Farm, Sheepwash, Beaworthy, Devon EX21 **5PL, UK**

T: +44 (0)87 09090 087 F: +44 (0)87 09090 006

e: timharper@geosphere.uk.com www.geosphere.uk.com Short courses run on the geomechanics of oil and gas operations in tectonic regions. Uses theory and case histories to demonstrate the nature of the extreme geomechanical conditions of tectonic regions and their influence on drilling, completion and production. Intended for both engineers and geoscientists and can be tailored to specific interests - eg drilling.

Honeywell Hi-Spec Solutions for Energy Chilworth Science Park, Southampton, Hampshire 5016 7NP, UK

T: +44 (0)23 8076 0111 F: +44 (0)23 8076 3500

e: uk.infocentre@honeywell.com www.hispec.com

Hi-Spec Solutions, Honeywell Industry Solutions' advanced application software and services business unit, is the leading supplier of Unified Manufacturing[™] solutions for business optimisation in the process industries. These solutions help companies maximise their profitability through a balanced approach to improving manufacturing performance, expanding asset capability and enabling improved decision making.

HOTA

Malmo Road, Sutton Fields Industrial Estate, Hull HU7 OYF, UK

T: +44 (0)1482 820567 F: +44 (0)1482 823202 e: bookings@hota.org www.hota.org

HOTA is one of the UK's leading training providers for offshore, SBV, maritime and onshore organisations. HOTA provides over 100 nationally approved training courses across several industry sectors, both offshore and onshore, in survival, firefighting, health and safety, first aid, electrical, management, technical and specialist areas.

IFAP Survival Training Centre

PO Box 339, Willetton, Western Australia 6955 T: +61 8 9430 6611; Mobile: +61 0418939667 F: +61 8 9430 6093

e: mgillespie@ifap.asn.au www.ifap.asn.au

IFAP Survival Training Centre provides OPITO- and Australian-accredited courses in HUET, sea survival, OSH management, equipment (crane, scaffolding, rigging,) safety

consulting and customised training. Courses include BOSIET, FOET; basic offshore survival and refresher; aviation escape and survival - HUET; fast rescue craft - STCW95; firefighting; helicopter landing officer; H2S; confined spaces; and breathing apparatus.

Imperial College London, Centre for Professional Development Room 318 Sherfield Building, Exhibition Road, London

SW7 2AZ, UK T: +44 (0)20 7594 6886 F: +44 (0)20 7594 6883

e: cpd@ic.ac.uk www.imperial.ac.uk/cpd

Offers short courses in fuel cell technology, petroleum engineering, special core analysis in reservoir engineering, two three-month courses in integrated reservoir management and reservoir characterisation and modelling, and a five-day modular course on climate change.

The Institute of Petroleum (IPA) Accounting and the Professional Development Institute (PDI) of The University of North Texas PO Box 305460, Denton, Texas 76203, US

T: +1 940 565 3170 F: +1 940 396 8839

e: brock@unt.edu or coet@unt.edu www.unt.edu/ipa Offer seminars, schools, conferences and in-house training programmes in oil and gas accounting and finance. The two organisations constitute the continuing professional petroleum education arm of the University of North Texas in Denton, Texas. Courses and conferences on UK, US and IASB financial accounting requirements and on PSCs, risk service agreements and joint operating agreements are available.

International Boundaries Research Unit (IBRU) Department of Geography, University of Durham, South Road, Durham DH1 3LE, UK T: +44 (0)191 334 1961 F: +44 (0)191 334 1962

e: ibru@durham.ac.uk www-ibru.dur.ac.uk IBRU organises regular training workshops on practical aspects of boundary delimitation, demarcation, management and dispute resolution.

Invincible Energy

Westport House, Bentley, Farnham, Surrey GU10 5HY, UK T: +44 (0)1420 22862 F: +44 (0)1420 22863

e: learning@invincible-energy.com www.invincible-energy.com Offers training courses in economics of the oil supply chain (ESC), economics of refining and oil quality (RFT), trading oil on the international markets (ITO), price risk management in the oil industry (PRO) (all in association with the IPE); supply and price risk management of aviation fuels (PRA) (in association with IATA); and price risk management in traded gas and electricity markets (PRP) (in association with Alphatania).

John M Campbell & Company (JMC) 1215 Crossroads Blvd, Norman, OK 73072, US T: +1 405 321 1383 F: +1 405 321 4533

e: registrar@jmcampbell.com www.jmcampbell.com Provides a range of consultancy services and technical training in oil and gas production facilities, gas processing, LNG and commercial issues, as well as short courses targeting technical areas within these broad fields (such as dehydration, refrigeration, oil and gas separation, carbon dioxide facilities/injection). Operator training also provided. JMC also publishes textbooks dealing with various aspects of gas processing and production facilities and will develop site-specific manuals for operator training.

Kennet Oil Logistics

Trevellion Barn, Trevellion, St Austell, Cornwall PL26 8RT, UK T: +44 (0)1208 831145 F: +44 (0)1208 831143

e: rabkol@aol.com www.kennetoil.com Offers courses in international supply, trading, transportation and operations practice.



Lancashire Fire & Rescue Service Washington Hall Fire Training & Development Centre, Euxton Chorley, Lancashire PR7 6DH, UK T: +44 (0)1257 266611 F: +44 (0)1257 261767

e: keithcunliffe@lancsfirerescue.org.uk

www.lancsfirerescue.org.uk

IOSH, NEBOSH courses available. Also fire safety, fire risk assessment, fire warden/extinguisher training as well as basic, team member and team leader fire fighting courses. Incident response, damage repair and confined space training. OPITO, JO+IFF, STCW95 and ILM accredited. Company-specific or generic courses available. Trainers to Cert Ed standard.

LINK Associates International

Trent House, RTC Business Park, London Road, Derby DE24 **SUP, UK**

T: 44 (0)1332 222299 F: +44 (0)1332 222298

e: info@linkassociates.com www.link-associates.co.uk

Assisting and training companies in board room facilitation. Also offers executive seminars for emergent risks and crisis avoidance; stakeholder engagement and reputation management programmes; evaluation, exercising and testing of crisis command centres; bespoke training programmes; emergency and risk management, business continuity, safety and environmental management courses.

Marine Safety Training Centre

Wapping Street, South Shields, Tyne & Wear NE33 1LQ, UK T: +44 (0)191 427 3900 (enquiries); +44 (0)191 427 3772 (bookings) F: +44 (0)191 427 3600

e: marsim@stc.ac.uk www.stc.ac.uk

OPITO-approved basic offshore safety induction and emergency training, as well as further offshore emergency training, universal combined survival and firefighting, and basic offshore European refresher.

Maritime Rescue International

The Old Pier, Stonehaven, Aberdeenshire AB39 2JU, UK T: +44 (0)1569 764065 F: +44 (0)1569 764065

e: lynda@mri-group.com www.mri-group.com/

Courses on emergency response and rescue vessel (ERRV) crew initial training shipboard operations, ERRV crew fast rescue craft boatsman, ERRV crew fast rescue craft, coxswain, ERRV crew daughter craft coxswain, ERRV crew, advanced medical aid, ERRV crew advanced medical aid further training practice and update, command and control for ERRV masters and mates, ongoing onboard development and training programme for ERRV master and crews. Also MCA IMO proficiency in fast rescue boat operations, MCA IMO medical care, MCA IMO first aid, MCA IMO radio communications course - both GOC and ROC.

NIFES Consulting Group Training Division, Spinney Hill, Landmere Lane, Ruddington, Nottingham NG11 6ND, UK T: +44 (0)115 984 4944 F: +44 (0)115 984 4933

e: training@nifes.co.uk www.nifes.co.uk Established in 1953, NIFES Consulting Group has a dedicated training division which specialises in courses on energy efficiency and environmental topics for industry, commerce and the public sector. NIFES is active in delivering energy awareness campaigns and runs two open courses - a three-day energy saver course and a two-day boiler house management course.

Oil Firing Technical Association for the Petroleum Industry

Foxwood House, Dobbs Lane, Kesgrave, Ipswich, Suffolk IP5 2QQ, UK

T: +44 (0)845 658 5080 F: +44 (0)845 658 5181

e: enquiries@oftec.org www.oftec.org Comprises major oil companies, oil distributors and manufacturers of oil firing equipment in the UK and Irish Republic. The Association operates an OFCERT equipment testing and approval scheme. It also provides technical training and registration, as well as other technical support for the oil firing industry.

Oil Spill Response

Lower William Street, Southampton SO14 5QE, UK T: +44 (0)23 8033 1551 F: +44 (0)23 8033 1972 e: osrl@osrl.co.uk www.oilspillresponse.com

A wide portfolio of training offered, including oil spill management and hands-on type courses specialising for operators, shoreline clean-up, inland, offshore, cold weather, environmental impacts, responder health and safety, claims and compensations. Also IMO Levels 1–3, UK Levels Foundation – 5/5p and other specialised courses, both home or away. Courses can be tailored to company requirements.

Onsite Training Services 6 Wellheads Road, Farburn Industrial Estate, Dyce, Aberdeen AB21 7HG, UK

T: +44 (0)1224 729500 F: +44 (0)1224 729300

e: sales@onsitetrainingservices.com

www.onsitetrainingservices.com

Provides specially designed training courses for individual companies, both onshore and offshore, including OPITO-approved slinging and lifting operations, OPITO-approved rigging and lifting operations, OPITO-approved helicopter landing officer, offshore crane operator training and assessments, forklift truck operator training, confined space entry and gas detection. IADC rig pass training also offered.

The Oxford Princeton Programme 1st Floor, 59 St. Aldates, Oxford OX1 1ST, UK T: +44 (0)1865 250521 F: +44 (0)1865 254599

e: info@oxfordprinceton.com www.oxfordprinceton.com Courses in derivatives and risk management, commodity derivatives, oil industry, natural gas industry, power industry, coal industry, supply and trading, commerical management of refining, lubricants, fuels quality, shipping, liquefied petroleum gas, petrochemicals, aviation, downstream logistics and distribution, retail marketing.

PEICE – Petroleum Institute for Continuing Education Bankers Hall Box 22325, Calgary, Alberta T2P 4J1, Canada T: +1 403 284 1250 F: +1 403 685 4621

e: domenic@peice.com www.peice.com

PEICE offers short courses, conferences, mentoring, and CD- and web-based resources for the technical and personal development of working professionals in the petroleum industry. Its mission is HOPE - Helping Other People Excel.

The Petroleum Economist

PO Box 105, Baird House, 15/17 St Cross St, London EC1N **8UW, UK**

T: +44 (0)20 7831 5588 F: +44 (0)20 7831 4567/5313 e: marketing@petroleum-economist.com,

editorial@petroleum-economist.com

www.petroleum-economist.com

Central London-based open training courses and in-house bespoke courses across the energy value chain. Topics include basin analysis and ranking, exploration and production technology, energy industry fundamentals, fiscal issues and con-tracts, logistics, natural gas and LNG industry fundamentals, oil refining, oil trading, portfolio valuation and risk, project management, prospects and reserves, strategic planning, and unitisation.

Petroleum Open Learning (Cogent)

Minerva House, Bruntland Road, Portlethen, Aberdeen AB12 4QL, UK

T: +44 (0)1224 787813 F: +44 (0)1224 787830

e: corinna.mcconachie@cogent-ssc.com www.cogent-ssc.com Open learning courses provided on oil and gas well technology, including oilwell drilling technology, well completions and wireline servicing and drilling calculations. Petroleum processing technology modules all carry City & Guild certification by examination.



PetroSkills/OGCI

PO Box 35448, Tulsa, Oklahoma, OK 74153-0448, US T: +1 918 828 2500 F: +1 918 828 2580

e: registrations@ogci.com www.ogci.com

Courses in geology; geophysics; petrophysics; well construction; reservoir engineering; production engineering; production facilites design, operation and maintenance; environment; economics and management.

Power Ink

Victory House, Trafalgar Place, Brighton, East Sussex BN1 4FY, UK

T: +44 (0)1273 202920 F: +44 (0)1273 203720

e: margaret@power-ink.com www.power-ink.com/ Power Ink's courses present maximum UK energy market knowledge in the shortest possible time. The courses will help delegates understand and deepen their knowledge of market fundamentals such as generation markets, NETA and trading, supply markets and how carbon emissions are driving changes in the UK energy industry.

PTF

48a West Bar, Banbury, Oxon OX16 9RZ, UK T: +44 (0)1295 255811 F: +44 (0)1295 273110

e: ptftraining@compuserve.com; jeannieobeirne@aol.com www.ptftraining.co.uk/ptf.htm

Forecourt staff training – management, supervision, risk assessment, competent persons. BTEC in petroleum risk management (retail) CD-Rom. Forecourt Management (with builtin test) – contractors, safety passport. Driver training – ADR, beyond ADR, customer care, team building, risk assessment, health and safety legislation update, working at heights, CD-Rom Class 3 (with built-in test). Depot Staff – depot operations, health and safety, environment, risk assessment, working at heights. Electrical contractors – on forecourts, sites with special hazards. Dangerous goods safety adviser courses (DGSA). Training needs assessments also offered, as well as bespoke courses tailored to meet customers' specific requirements.

QinetiQ

Fuels and Lubricants Centre, Building 442, Cody Technology Park, Ively Road, Farnborough, Hants GU14 0LX, UK

T: +44 (0)1252 374772 F: +44 (0)1252 374791 e: pcarberry@qinetiq.com www.qinetiq.com

Courses on aviation jet fuel (AV) (in association with the EI).

Redwood International Training Services 5 Firmans, Langdon Hills, Basildon, Essex SS16 6LY, UK T: +44 (0)1268 417843 F: +44 (0)1268 410547

e: bradcerny@hotmail.com

Courses on oil measurement and terminal operations, custody transfer of crude.

Scitech Educational

Kent Innovation Centre, Millennium Way, Thanet Reach Business Park, Broadstairs, Kent CT10 2QQ, UK T: +44 (0)1843 609300 F: +44 (0)1843 609301

e: info@scitech-ed.com www.scitech-ed.com,

www.universal-manager.com

Assesses corporate and learner needs, sourcing specialist authors and creating a true, measurable, learning solution (whether online, via intranet or text). Publications and training for management development up to level 5 and customer care.

Serco International Fire Training Centre

Technology House, Teeside Airport, Darlington DL2 1NU, UK T: +44 (0)1325 333317 F: +44 (0)1325 333655

e: sdavies@iftc.co.uk www.iftc.co.uk

Provider of training courses to OPITO emergency response related standards. Also offers rescue and fire fighting courses for the aviation industry to meet UK CAA and ICAO standards, as well as emergency response related company-specific courses to the chemical and petrochemical industry. Fire warden and extinguisher training also provided, both on and off site.

Shell Global Solutions Learning & Competence Development

Langelaan 3, 2211 XT Noordwijkerhout, The Netherlands T: +31 (0)252 379 252/345 F: +31 (0)252 379205

e: learn@shell.com www.shellglobalsolutions.com/learning The Learning and Competence Development team offers high quality training and competence management solutions to its customers globally. It helps clients improve their bottom line by improving their people performance. It does this by combining its skills in people development with hands-on experience in running the energy business.

SIS GeoQuest Education and Training Centre Schlumberger House, Buckingham Gate, Gatwick Airport, West Sussex RH6 0NZ, UK

T: +44 (0)1293 557595 F: +44 (0)1293 557039

e: training@crawley.oilfield.slb.com www.sis.slb.com/ Provides a comprehensive education and training service for the complete SIS product catalogue, as well as education, training and development in the use of SIS (GeoQuest, Merak, Baker Jardine) software. Client-specific and customised courses are also available.

Southampton Institute of Higher Education

Warsash Maritime Centre, Newtown Road, Warsash, Southampton SO31 9ZL, UK

T: +44 (0)1489 576161 F: +44 (0)1489 573988 e: wmc@solent.ac.uk www.solent.ac.uk/wmc/

Provides basic offshore safety induction and emergency training and further offshore emergency training. OPITOapproved establishment. Also provides oil, gas and chemical tanker training programmes approved by the UK Maritime and Coastguard Agency (for STCW'95) as well as short courses in inert gas and crude oil washing, training the trainer and transport of dangerous goods by sea. A full complement of maritime training is available.

Speak First

Premier House, 309 Ballards Lane, London N12 8NE, UK T: +44 (0)870 841 4111 F: +44 (0)870 841 4222 e: info@speakfirst.co.uk www.speakfirst.co.uk

Speak First aims to add value to your business by making your people more effective communicators. A training specialist in basic and advanced presentation skills, business pitching, personal impact training, media training, leadership development, one-to-one executive and management coaching, coaching skills, interviewing techniques, client relationship management, negotiating skills, and training the trainer.

Training International PO Box 28, Hailsham, East Sussex BN27 1RA, UK T: +44 (0)1323 832939 F: +44 (0)1323 832862

e: TrainA@compuserve.com www.training-international.co.uk/ Training International provides training services for the oil and gas sector in supply chain management (purchasing, inventory, contract management etc), materials operations (storage hazardous materials, chemicals handling etc), geosciences for E&P, HR (training, training management, coaching, HR planning), and environmental, health and safety auditing (IEMA, IRCA).

Trevor Jee Associates 26 Camden Road, Tunbridge Wells, Kent TN1 2PT, UK T: +44 (0)1892 544725 F: +44 (0)1892 544735

e: admin@tja.co.uk www.tja.co.uk

Trevor Jee Associates is an independent company which carries out pipeline engineering consultancy and training for the oil and gas industry. Its core consultancy activity is the



design of subsea and land pipelines, and it has various specialities such as connectors, fishing and trenching. The company carries out analysis, particularly FEA and CFD. Its training courses on pipeline engineering cover the entire spectrum – overview, design, construction, integrity management, and many more. Full details and secure booking are on the web page.

courses

Tristar Training Services

8 Nobel Road, Wester Gourdie Industrial Estate, Wester Gourdie, Dundee DD2 4HU, UK

T: +44 (0)1382 400990 F: +44 (0)1382 400616 e: tristar@sol.co.uk www.tristar-oilfield-services.co.uk

Five-day introduction to wireline course, introduction to offshore oil operations course and production well testing (also five-day). Also four-and-a-half-day courses on IWCF – well intervention pressure control course, introduction to coiled tubing and completion design.

Univation

The Robert Gordon University, The Academy, Belmont Street, Aberdeen AB10 1LB, UK

T: +44 (0)1224 263320 F: +44 (0)1224 263323 e: univation @rgu.ac.uk www.univation.rgu.com

Univation is the award winning commercial company of The Robert Gordon University, an institution internationally recognised for excellence in professional, applied education and research. The company focuses on graduate and postgraduate level education and training services for professionals in the energy sector. Engineering and management courses are available through part-time and online learning in the UK and overseas.

University of Abertay Dundee Bell Steet, Dundee DD1 1HG, UK T: +44 (0)1382 308 000 F: +44 (0)1382 308 877

e: p.martin@abertay-dundee.ac.uk www.abertay.ac.uk/ Full-time and part-time Postgraduate Diploma/MSc degrees in urban water and environmental management, industrial environmental management and water pollution control. Part-time BSc in engineering. Full-time BSc(Hons) in mechatronics. Full-time BSc(Hons) internet and communications technology.

University of Leeds, Faculty of Engineering – CPD Unit Leeds, LS2 9JT, UK

T: +44 (0)113 343 2494 F: +44 (0)113 343 2511

e: cpd.speme@leeds.ac.uk www.leeds.ac.uk/business/cpd.htm The CPD Unit is responsible for organising an ever-increasing annual programme of accredited short courses, conferences and events on behalf of the Faculty of Engineering at the University of Leeds. Aimed mainly at engineers, they are attended by industrial and academic delegates from all parts of the world. In addition to continuous professional development courses, the Faculty has an extensive postgraduate research programme.

If you are an industry training provider and have details of courses not listed here, please email

lis@energyinst.org.uk

BIEE

British Institute of Energy Economics

Joint Meeting with the Energy Institute

'After the Energy White Paper: Delivery and Regulatory Reform'

Dieter Helm, Fellow, New College, Oxford

27 October 2003, 17.30 John Power Hall, Chatham House, 10 St James' Square, London SW1

In the Chair: The Rt Hon the Lord Lawson (BIEE President)

Reception in the Astor Room from 4.30 pm

If you wish to attend this Keynote Speech on 27 October 2003, please photocopy this ad and complete the form below and return it to the Administration Office, 37 Woodville Gardens, London W5 2LL T: +44 (0)20 8997 3707 F: +44 (0)20 8566 7674 e: biee@btopenworld.com by Wednesday 22 October 2003.

I wish to attend the Keynote Speech at Chatham House on 27 October 2003.

Name: _____ Company: _____ Address: _____

Tel:_____

e:

Registered Charity No 326875

IN NEXT MONTH'S ISSUE

The November 2003 issue of *Petroleum Review* will review recent oil and gas developments in the Asia-Pacific, one of the fastest growing energy markets in the world. It will include comment from analysts Wood Mackenzie and Scottish Development International, as well as a listing of all current and pending E&P projects in the region.

Rod Parker of the British Lubricants Federation (BLF) will provide an overview of the latest trends in the lubricants market, while strategy consultant PIMS Associates will explain how its global benchmarking programme has helped cut costs in the lubricants sector by as much as 30%.

The issue will also take a look at how the US is focusing on Russia and West Africa as it diversifies its oil and gas supplies following September 11th in a bid to lessen its dependence on imports from the Middle East.

Readers will also be brought up to date on recent developments in the Middle East gas-topower market, while Online-Data will continue with its series analysing some of the smaller and intermediate oil and gas companies from around the world.



EI TRAINING COURSES 2003

in association with **ENSPIN**

FORMATION

Course Dates: 7 - 10 October, 2003 Course Venue: London, UK El Member: £1900.00 (£2232.50 inc VAT) Non-Member: £2100.00 (£2467.50 inc VAT)

Planning and Economics of Refinery Operations

This intensive, **four-day course** will enable delegates to understand the essential elements of refinery operations and investment economics, reviewing the various parameters affecting refinery profitability, and to develop a working knowledge of the management tools used in the refining industry.

Who Should Attend?

- Technical, operating, and engineering personnel in the refining industry
- Trading and commercial specialists
 Analysts and planners
- Independent consultants
 Process licensors
- Catalyst manufacturers and refining subcontractors



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ECONOMIST ENERGY TRAINING

Course Dates:

15 -17 October, 2003

Course Venue:

London, UK

El Member:

£1400.00

(£1645.00 inc VAT)

Non-Member:

£1600.00

(£1880.00 inc VAT)



Fundamentals of the Oil and Gas Industry

This **three-day** course provides a core understanding of the oil and gas industry, from upstream exploration and production to downstream refining, sales and marketing. Under the guidance of an expert course faculty, participants will develop awareness of the business and an appreciation of key issues. The course will help delegates to appreciate the dynamics of the industry and, through the use of specially designed exercises, allow them to gain hands-on experience of key aspects of it.

Who Should Attend?

- Those requiring an understanding of the energy value chain
- Analysts and planners
- New recruits, traders, bankers, lawyers, and consultants working with energy companies

Introduction to Lubricants

Course Dates: 23 - 24 October, 2003

> Course Venue: London, UK

El Member: £1000.00 (£1175.00 inc VAT)

Non-Member: £1200.00 (£1410.00 inc VAT) This **two-day course** provides an overview of the lubricants business for those personnel needing a working knowledge of it, but in a limited amount of technical detail. The broad scope of the course will allow those new to the industry, or those with some experience of it, to draw immediate benefits from their increased knowledge to the advantage of themselves and their organisations.

The importance of lubricants within an oil company product portfolio will be explained and the course will provide a sound background to those engaged in sales, marketing, planning strategy, and the purchase and use of lubricants, enabling them to make informed decisions. The environmental aspects of lubricants will be explored during the programme, together with their impact on the business itself.



Hazardous Area Classification

This **two-day course** is designed to provide a technical overview and to introduce the delegate to the many facets of area classification using the latest IP Code (IP 15). The course will take delegates through the various methodologies and give time to partake both individually and as a syndicate in exercises using the various methodologies.

The course will allow sufficient time for discussion and questions regarding the code.

Who Should Attend?

- Technical, operating, engineering, and electrical engineering personnel seeking an in-depth view of area classification
- Those new to the industry, including graduate trainees, who require a concise introduction to area classification



Course Venue: London, UK

El Member: £1000.00 (£1175.00 inc VAT)

Non-Member: £1200.00 (£1410.00 inc VAT)

For more information, see enclosed inserts or contact Nick Wilkinson Tel: + 44 (0) 20 7467 7151 Fax: + 44 (0) 20 7255 1472 or visit: www.energyinst.org.uk/training E-mail: nwilkinson@energyinst.org.uk



education & training

Energy management training – a key to success

Effective energy management is key to the success of all businesses. The Energy Institute (formerly the Institute of Petroleum and the Institute of Energy) has been providing education and training in this field since 1927, offering a wide range of training packages to suit all needs. *Nellie de la Monneraye*, El Education & Training Officer, reports.

To date the Institute has helped several hundreds of businesses to reduce their energy consumption and carbon dioxide (CO_2) emissions, containing the costs associated with the Climate Change Levy. It has also helped many organisations raise staff awareness on energy management issues.

A wide range of courses are available to those involved in energy management or in advising others on their energy management needs – all of which lead to a recognised qualification in energy management. Below is a brief overview of the training packages on offer, which will help you determine which qualification is the right one for you.

The right qualification

TEMOL (Training in Energy Management through Open Learning) – The TEMOL course is a flexible, practical and employment focused distance-learning programme covering both technical and managerial aspects of energy management, aimed at those relatively new to energy management. Past students have worked for universities, local authorities, energy consultancies, utility companies, government departments, manufacturing organisations... and many others.

The course takes approximately 12–18 months to complete at your own pace, including a 100-hour work-based project. It is organised in 14 elements, which can be learned as a cohesive body of study or as individual modules. You will receive specialist tutor support and continuous assessment through written assignments. You will also have the opportunity to join an email support group made up of other students.

Having worked through the TEMOL course, a candidate is able to recommend a wide range of improvements with fully worked technical solutions, costing and financial analysis. In addition, being a TEMOL student entitles you to a year's free Affiliate membership of the Energy Institute and regular newsletters.

The course fee is £1,550, including all materials, tutor and project support, plus a free year of Affiliate membership. Each element can be studied at £120 per module.

National Vocational Qualification (NVQ) Level 4 in Managing Energy – The NVQ Level 4 in Managing Energy is a formal national qualification developed by the Management Charter Initiative. It recognises your competence and expertise based on the National Occupational Standards in Managing Energy, which draw together the key functions of managing activities, people, resources, information, energy and quality.

The course is aimed at supervisors, first line, middle and generalist energy managers, as well as those specialised in the areas of energy and quality management. Previous delegates have worked in local authorities, health trusts, universities, manufacturing organisations and utility companies, among others.

It is a competence-based qualification linked to the student's ability to perform competently a range of tasks associated with their job. It comprises core and optional units, assessed by means of a collected portfolio of evidence. Guidance is provided by a mentor, who helps interpret the standards.

Completion of the NVQ makes you eligible to the grade of Associate member of the Energy Institute.

The courses fee is £1,950, including all materials, tutor and project support plus a year's free Associate membership. Individual 'bite-size' units can be studied.

One-day Energy Management courses – The Energy Institute's one-day Energy Management courses enable energy professionals and newcomers to the industry to keep up to date with recent developments in the field of energy management. The Institute provides an Introduction to Energy Management course, as well as Advanced Energy Management courses. These courses provide delegates with practical solutions to assist in producing an effective energy management strategy, increasing energy efficiency and reducing energy consumption.

The Introduction to Energy Management course covers the following basic concepts of energy management:

- Energy policy
- Investments for energy efficiency
- Emissions targets
- Climate Change Levy
- Energy technology
- Energy efficiency accreditation

The course employs interactive techniques, such as case studies, practical exercises, workshops and discussions. It is run in several central locations in the UK and delivered by experienced energy managers and lecturers. The course fee is £199 for EI members, and £279 for non-members.

Advanced Energy Management courses cover the following specific areas of energy management:

- Part L building regulations
- Educating the workforce
- Monitoring and targeting
- Renewables
- Energy auditing

Courses provide in-depth information on energy management techniques and are ideally suited to those more experienced in energy management, who will find the course beneficial in developing their knowledge and expertise. The course fee is £199 for members, £279 for non-members.

The next one-day Energy Management courses are to be held in London. Last enrolments are still being taken for the following dates. Please book as soon as possible.

seen as person	2101					
October 8:	Educating the Workforce					
October 16:	Monitoring and Targeting					
October 29:	Introduction to Energy					
	Management					

November 6: Renewables

November 26: Energy Auditing

For more information on all the above courses, please contact Nellie de la Monneraye on T: +44 (0)20 7467 7178 or e: ndlm@energyinst.org.uk gas

The North American gas crisis

The US, having peaked in oil production more than three decades ago, is beginning to realise that the same is now true for its natural gas production. *Julian Darley* of the Post Carbon Institute looks at the current state of US gas production and consumption, and what is being done to confront the situation – including calls for selective conservation, fuel switching, more coal-bed methane (CBM) production and increased LNG imports. He also addresses the political dimension, which could affect Bush's run for a second Presidential term.

eflecting the importance of the situation, US Energy Secretary Spencer Abraham recently convened a Natural Gas Summit, organised by the National Petroleum Council, that took place on 26 June 2003 in Washington DC. Abraham's opening speech set the tone by asking, to some extent begging, his invited industry guests to furnish the short-term solutions to get America out of what could be its worst energy crisis since the 1970s. The public were allowed to attend, but not given any opportunity to speak. Most notably, as the Union of Concerned Scientists pointed out, no one from the renewable energy industry was represented amongst the panelists or the invitees.1

Overall, the US consumes about 23tn cf/y of natural gas a year,² the gas equivalent of about 4bn b/y of oil. However, domestic production is now less than 20tn cf/y and falling. Every year the US must find more than 3tn cf, or approximately 15% of its consumption, from outside its borders. (See Figures 1, 2 and 3.)

Tight demand-supply situation

The demand-supply situation has been very tight several times in the last three years. However, in the winter just passed, there was the largest drawdown in history from the underground gas storage system, bringing it danger-





ously close to its working minimum of roughly 500bn cf. Refilling it ahead of this winter was painfully slow until late June, when the injection dramatically increased. Even so, by the administration's own calculations, the storage could be up to 400bn cf short by the time the winter heating season starts in October 2003. This could easily be enough to disrupt the whole system later in the winter. (See Figure 4.)

There are two obvious answers to the problem – import more or produce more. Or both. In fact, the US has been importing a great deal of natural gas by pipeline – by far the cheapest and easiest solution. Unfortunately, Mexico has become a net gas importer and Canada, the mainstay of US imports (supplying over 16% of demand in 2002) is now also in decline, and becoming worried about supplying its own users.

Gwyn Morgan, CEO of EnCana, the largest producer of gas (and oil) in Canada, who was not present at the Summit, recently summed up the situation with brutal honesty: 'It's looking like North American gas production may have peaked. Production from the average North American gas well declines about 26% every year. The industry needs to run harder just to stand still. Here's a startling statistic - in order to keep pace with natural declines, every year the in-dustry is forced to find and develop daily production that's equivalent to roughly 18bn cf. That's greater than the production from all of Canada."

That leaves only the hard way to solve the problem – shipping LNG, mainly from Trinidad now, and soon from Africa and beyond, which is a costly and complex operation for which the US has insufficient infrastructure.

Push for more gas

Despite last year's assertion of bleak continental gas prospects by EnCana's Morgan, none of the Summit panelists from industry or government mentioned geology. They all agreed, however, that the US natural gas crisis was not market failure, but that government over-regulation was the culprit. Industry users bluntly told Abraham and other government representatives that they need to lift the moratorium on drilling off Florida, remove drilling restrictions in the Rocky Mountains gas plays, relax widespread and popular clean air rules, and connect Alaska to the pipeline grid.



Relaxing the clean air rules is the only measure that would make much difference to the availability of natural gas this year. Some 50% of US power generation is coal-fired, which has been a target of legislation – first by Nixon's original Clean Air Act of 1970 and now by the Clear Skies Act being promoted by Bush. This latter act will aim for big reductions in mercury emissions, which only affects coal, as well as limiting SO_X (oxides of sulphur) and NO_X (oxides of nitrogen), which again hits coal hard, but also affects oil.

The Clear Skies legislation will strongly encourage the use of natural gas, both for electrical power generation, which is approaching 20% of the US supply, and for space heating. When California was gripped by blackouts in 2001, large-scale conservation efforts made a great difference to electricity, and hence gas consumption. Whether that can now be repeated across the nation is an open question.

Fuel switching

To be able to switch to another fuel, a power station must be built or retrofitted for the task. It must have the necessary permits and there must be sufficient alternative fuel to burn. The price must also make sense. These factors make fuel switching anything but a straightforward task and tend to limit the extent to which switching will happen.

In the first place, many of the hundreds of new power stations coming onstream now are all gas and not duelfuelled – even though they were supposed to be. Sometimes they are more efficient than duel-fuel plants, but usually they are just cheaper. Obviously these plants will do what they have to in order to get their fuel, provided they can pass the cost on to the customer, who will more often than not be residential.

Many of the plants that can fuel switch are older and often only half as efficient as the new plants. Their number is dwindling as new single-fuel stations replace them. Thus, the absolute capacity to switch is further limited.

Then there is the problem of the fuel itself. Stocks of distillates (diesel and fuel oils) like heating oil, which is a primary alternative fuel, are now quite low, partly because of historically low crude oil stocks and the knock-on effect of refining distillates into gasoline to improve low stocks of that fuel.

Bearing this in mind, and the tighter clean air restrictions, Raymond James & Associates is now suggesting that with oil at \$30/b gas would need to be more like \$10/mn cf before switching will take place – meaning a three to one



factor, rather than the normal five or six, suggested by the calorific equivalence of gas to oil, which is about 5.5mn cf to 1 barrel. This makes fuel switching still less likely.

Coal-bed methane (CBM)

Next in the time frame is more drilling. Although more drilling failed to raise supply after the price spikes of two years ago,⁴ the industry will say that was because they were using old prospects. They say that the only good and easy new prospects are in Federal lands and seas – ie the Rocky Mountain territories of New Mexico, Colorado, Wyoming and Montana, and the eastern part of the Gulf of Mexico, off the Florida coast.

It is almost a physical impossibility to get from permit to pipeline in less than six months, and even a year is tight, so extra drilling cannot be seriously regarded as a short-term solution. Nonetheless, the gas companies are using this situation to argue for a great increase in permits to drill. No doubt the White House would like to back them all the way – indeed, Cheney's National Energy Plan is quite explicit about it – but it may not be so simple. Much of the gas that is off limits is unconventional, particularly CBM and deepwater in the Gulf of Mexico.

In the Intermountain West – mainly Wyoming, New Mexico and Colorado – much of the new gas will be coal-bed methane. This is gas associated with coal deposits, usually not economically interesting in themselves. The gas is extracted by pumping off some of the water above the coal deposit. The pumped water, however, contains many contaminants that increase its salinity and sodium⁵ to abnormal levels.⁶ When this water reaches ordinary soil, it will usually kill the existing vegetation while encouraging noxious species. It has a toxic effect on range



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and crop lands, especially when used as irrigation water.

As so often with regulations, despite the banning of 'direct stream discharge' for new wells, many CBM producers are still allowed to discharge straight into stream channels under 'grandfathering' schemes. Wells in the Powder River Basin in Wyoming, for example, can produce anywhere from 7,000 to 28,000 gallons of contaminated water a day. and there may be as many as three wells per 80 acres.7 For an 80-acre system that can be over 50,000 gallons a day. If CBM extraction reaches levels predicted by the US Department of Energy, that will result in billions of gallons of toxic waste water, and no really effective methods of dealing with it.

However, rising popular resistance to CBM may be tempered by the realisation that this is not simply a nationwide re-run of the California phenomenon,[®] but a real shortage rather than shortterm market distortions caused by the likes of Enron. Despite the local political difficulties, there is no doubt that the US will have to become increasingly reliant on coal-bed methane, or face greater likelihood of actual shortages.

Gulf of Mexico

The supply prospect which looks the most promising in America is the Gulf of Mexico off the Florida coast. The problem for the Bush administration is that most of the Gulf area that is presently off limits is in the jurisdiction of Jeb Bush, the President's brother. But Jeb knows that three-quarters of Floridians are opposed to drilling offshore and George W knows that Florida is vital to another Presidential term. And yet America is desperate for the energy that may be off Florida.

No one at the Summit referred to this conundrum directly. They just made calls to open up restricted Federal areas. But in a private press briefing, a *Fox News* reporter asked Secretary Abraham why he didn't just open up Destin Dome, off the Florida coast. Was it politically unacceptable?

Abraham said: 'That decision [to block offshore drilling access] was made after taking into account a lot of different perspectives.' Just before this he said: 'I think that those policies are not ones we are looking at right now. What we're trying to look at is other ways to address this short term. The broader policy issues are certainly open to Congress as it continues work an energy bill.'

For now the Gulf of Mexico will see further developments mainly in already permitted areas. This means more deepwater drilling, which finds less gas and more oil, and new, very deep wells in the old shallow water areas.⁹ But Jeb Bush should not relax too quickly, because in June the Senate moved to allow a new inventory of oil and natural gas resources along US coastlines, which some say is a prelude to lifting bans on offshore drilling on all three coasts.¹⁰ This is no doubt what Abraham meant by 'broader policy issues'.

The reserves in question, relative to US consumption, are small. Destin Dome, off Pensacola, for instance, is reputed to hold 3tn cf of gas – a month-and-a-half of US demand. Petroleum geologists are not even sure of that. Furthermore, these are not the giant shallow plays of the Gulf some 45 years ago, but entail drilling to 20,000 feet," with high-powered rigs costing up to \$50,000/d. With natural gas at \$5/1,000 cf, operations are still economically profitable – but the EROEI (energy returned on energy invested) is sinking rapidly.

To underline the situation, BP and Shell have recently sold off Gulf of Mexico holdings to Apache, a company known for operating mature fields.¹²

Pacific and Atlantic Margins

The industry is looking at the two main oceanic coasts of the Atlantic and the Pacific. The problem in both cases is once again geological lack of large proven reserves. At the 26 June Summit, some US companies spoke of wanting to emulate Canada on its eastern seaboard, with its Hibernia and Sable Island gas plays.

But the geology on both US coasts is quite different. For instance, on the west coast, little oil or gas has been found anywhere, except some oil off California. There are no other proven petroleum deposits until you reach Alaska (the Cook Inlet), which aside from potential North Slope natural gas production, is in swift decline.¹³

What of Alaska?

And what of the Arctic gas in the Alaska and the Mackenzie Delta reserves? They were discovered in the 1970s, and are regarded as holding between 35tn and 9tn cf respectively, which is not even two years of US consumption. The only realistic way of getting the untapped Arctic gas is via pipelines (talk of Alaskan LNG has once again been recently rejected by the producers).

The pipeline to the Mackenzie Delta in Canada's Northwest Territories has now finally been set in process, but there are many regulatory procedures that may slow its completion scheduled for somewhere between 2008 and 2010.¹⁴ When, or if, it is finished, it is scheduled to provide somewhere between 800mn cf and 1.2bn cf/d of gas to Alberta. Given that the tar sands are projected to require an extra 1.5bn cf/d, that seems to offer little relief to American consumers.¹⁵

Some believe that efforts to get a gas pipeline to Alaska are complicated by the Mackenzie pipeline agreement,¹⁶ but not all of the potential pipeline builders agree. What is not in dispute is the fact that the pipeline is not here now, will likely cost at least \$15bn, and probably much more if the Athabasca cost overruns are anything to go by, and will not be ready much before 2012, even if everything goes to plan and the US Government offers huge subsidies.¹⁷

All of the above measures to increase domestic supply are predicated on discoveries matching expectations. Given that some in the industry are saying openly that North American gas production has peaked, I asked Energy Secretary Abraham directly why he hadn't invited any petroleum geologists to speak and evaluate the potential of what the producers were calling for. He expressed the view strongly that this would not help the short-term situation. Maybe not, but it might have saved some wasted effort and money, which could be better directed elsewhere, such as reducing demand according to some, or investing in LNG, according to others, including, most notably, Alan Greenspan.

LNG imports

The industry agrees that within the realm of 'supply push' there is a necessity to 'globalise the gas market', by which it simply means increase LNG imports. At present, the US imports about 1% of its gas consumption through three LNG terminals. A fourth terminal, built in 1974 at Cove Point at the southern end of Chesapeake Bay, came online in August 2003, adding 1bn cf/d. More than a dozen new LNG terminals have been proposed, and that can only be a small beginning if the US is to import 10% by decade end.18 Whether it will be easy for them to counter widespread and well-organised local objections to new LNG plants remains to be seen. There will have to be an enormous parallel effort in LNG tanker building as well.

Not surprisingly, the 26 June Summit saw strong representation from the LNG industry. However, they did not highlight the fact that a whole LNG supply train, including liquefaction system, tanker fleet, regasification plant and associated pipelines costs between \$2bn and \$5bn, nor that the US will have to commission the expen-



gas

sive new vessels from the Far East, at least in the near term.

Clearly though, the US sees LNG being a major part of its energy future. On 8 July US Energy Secretary Abraham announced that 'later this year' there would be a second natural gas summit to 'discuss increasing LNG supplies' to the US. The invitees will include Energy Ministers from gas exporting countries and industry.

Writing on the wall

The reality is that North America is a mature gas province. It has most certainly now peaked in production, just as with oil some 30 years ago, and any sustained increases in continental gas consumption will have to come from LNG imports. Aside from the 1bn cf from the reopened Cove Point terminal, there is no possibility of any more quick LNG.

The gap between production and demand leaves only one short-term option - demand reduction. It will happen either through planning, reluctant voluntary conservation, more industry 'demand destruction', or through random blackouts. The great fear in the White House, and beyond, is that natural gas could be one more factor constricting the US economy and constraining growth, and thus condemning Bush Junior to follow Senior into Presidential retirement. For many less well off Americans, some of whom may also be in retirement, the consequences may be a matter of life and death if they cannot afford to heat their homes. For those in producer countries, if gas goes the same way as oil, there may be gas wars too.

A warning for Britain

For Britain, this story should be a salutary warning. As in so many other ways it is following the US, so that it too will soon be a net importer of gas. It has more options for pipelines and is much closer to the Russian, African and Middle Eastern gas, but it is squandering its energy sovereignty and will one day face similar kinds of energy security issues as America.

The US Energy Information Administration (EIA) on 11 September reported the largest gas storage build in nine weeks, 97 bn cf for the week ending 5 September. Working gas in storage nationwide now stands at 2.486 tn cf. The deficit from the year-ago level fell to 369 bn cf from 392 bn cf in the second week of September.

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www.energyinst.org.uk

shipping

Marine crude oil transport 2002 analysis

This article by Paul S Harrison - Consultant to the

PM-L-4(A) Marine Oil Transport Database Panel -

presents findings from analysis of the 2002 data,

updating the 2001 analysis that was reported in

Petroleum Review in October 2002.

he Energy Institute's (EI) Hydrocarbon Management, Marine Oil Transportation Database Panel, PM-L-4(A), was formed in 1986. It collects and analyses worldwide crude oil shipping data with the general aim of improving loss control through a better understanding of loss patterns and trends. The losses noted include apparent as well as any physical losses. Apparent losses result from the combination of fixed and random errors in the measurement systems used at load and discharge.

The Panel has established a website www.oil-transport.info - for the publication of the information presented here as well as additional data concerning crude oil marine transportation.

Panel members submit their company data for analysis and an annual report is issued individually to all members. This report includes a confidential analysis of the individual company data together with a general global analysis of the entire annual data set. Reports are issued in hard copy and in electronic format.

The following companies submitted data for 2002:

- Agip Petroli (now Eni SpA)
- 0 **BP Oil**
- . ChevronTexaco
- Chinese Petroleum Corporation 0
- 6 ConocoPhillips
- ۲ ErgMed
- 0 ExxonMobil Company
- Marathon Ashland Petroleum LLC
- Petrobras

- **PMI Pemex** . .
- **Repsol-YPF**
- . Saras Spa
- ۲ Scanraff (PREEM)
- 0 Shell .
- Statoil .
- Sunoco Inc . TotalFinaElf

Membership is open to all oil companies with data to contribute. Anyone interested in joining the panel should contact John Phipps at the Energy Institute on T: +44 (0)20 7467 7130 or e: jp@energyinst.org.uk

Database growth

The database continues to grow, due partly to the growth in membership but also as a result of existing members gathering more data from affiliates. The total number of voyages reported rose again in 2002 to over 9,200 and included a record 6.04bn barrels of crude at bill of lading (BOL). As shown in Figure 1, total volume for voyages with complete load and discharge data was also a record 5.12bn barrels, an increase of 8% over the 2001 volume.

The latest BP Statistical Review of World Energy gives global crude trade for 2002 as 12.21bn barrels. The database therefore includes almost 50% of the global volume at bill of lading and has load and discharge data for over 40% of global volume. The database is therefore considered sufficiently large to represent the global situation and it is not unduly influenced by minor structural changes.

Global mean loss

The mean net standard volume (NSV) loss from the database from 1989 to 2002 is plotted in Figure 1. The overall



Database

shipping

Crude type	API gravity	Overall volumes (NSV)		Calculation by voyage						
		Total	Barrels	Barrels loss %	NS Mean	V loss % Std dev	No.	NSV Mean	loss %	No.
A960	16.6	-	-	-	-		-	-0.18	0.31	22
Abu Safah	28.8	26 280 175	-87.888	-0.33	-0.34	0.29	34	-0.06	0.67	- 28
Alaskan North Slope	31.2	331,380,418	-28,178	-0.01	0.00	0.24	478	0.02	0.22	178
Alba	19.5	11,602,576	-32,563	-0.28	-0.28	0.39	61	-0.24	0.18	54
Anasuria	39.2	-		-			100	-0.43	0.50	30
Arab Extra Light	38.9	140,915,896	-384,497 93,884	0.27	-0.26	0.34	124	-0.25	0.45	160
Arab Light	33.4	324,590,023	-832,081	-0.26	-0.19	0.53	353	-0.20	0.46	245
Arab Medium	30.7	100,731,871	-336,337	-0.33	-0.28	0.56	159	-0.24	0.38	59
Asgard Azeri Light	43.1 34.8	29,712,879	-26,307	-0.09	-0.08	0.20	32	-0.14	0.14	23
Bach Ho	40.4	51,869,796	-214,743	-0.41	-0.39	0.49	107	-0.38	0.42	36
Basrah Light Belavim	28.2	16,704,970	-50,941	-0.30	-0.31	0.24	34	-0.22	0.17	27
Belida	46.7		CC 015	0.28	0.29	0.70	31	-0.41	0.57	27
Beryl Bonny Light	39.1 34.9	33,185,734	-9.352	-0.03	-0.03	0.42	36	-0.19	0.40	31
Bouri	25.8	19,312,721	-48,537	-0.25	-0.24	0.24	33	-0.15	0.24	38
Brent Blend	38.9	19,055,766	23,591	0.05	0.06	0.21	46	-0.01	0.25	54
Canadon Seco	25.1	26,705,432	-8,407	-0.03	-0.03	0.35	72		-	
Cano Limon	29.3	11,881,090	-6,145	-0.05	-0.03	0.18	54	0.17	0.52	50
Champion	27.9	5,563,130	-8,869	-0.16	-0.17	0.64	21		-	-
Coban CDC Blond	16.5	30.052.050	-60.014	-0.20	-0.19	0.29	38	-0.02	0.37	51
Cusiana	42.8	21,502,913	-47,079	-0.22	-0.21	0.13	38	-0.19	0.22	31
Danish	33.9	52,675,971	-87,367	-0.17	-0.16	0.20	93	-0.23	0.22	67
Draugen	40.4	51,690,644	-1/5,2/6	-0.54	-0.54	0.10	-	-0.14	0.38	22
Duri	20.9			-	0.00	0.15	176	-0.37	0.32	33
Ekofisk Er Sidor	37.6	119,134,352	-110,379 -40,730	-0.09	-0.09	0.15	21	-0.40	0.21	34
Escalante	23.5	22,311,166	33,196	0.15	0.13	0.35	37	-	0.10	-
Escravos	33.8	29 179 473	-119 953	-0.31	-0.33	0.23	57	-0.26	0.19	59
Fotta	26.4	23,495,829	-1,099	0.00	-0.03	0.19	31	-	-	
Forcados	30.6	37,327,334	27,076	0.07	0.04	0.25	38	-0.18	0.35	62 46
Forozan Forties Blend	43.8	128,344,448	-260,349	-0.29	-0.20	0.18	190	-0.18	0.16	165
Galeota Blend	37.1	40.000 767	41.070	0.00	0.00	0 17	11	-0.01	0.35	31
Girassol	31.3	48,982,767	-41,970	-0.20	-0.08	0.22	48	-	1	-
Gullfaks A	36.4	62,355,155	-259,130	-0.42	-0.42	0.18	75	-0.33	0.43	73
Gullfaks C	36.6	44,361,462	-1/1,/42	-0.39	-0.39	0.20	31	-0.50	0.17	
Heidrun	26.4	17,450,024	-413	0.00	-0.01	0.20	24	-0.08	0.20	34
Hibernia	35.1	32,055,184	-26,752	-0.08	-0.08	0.27	50	-0.25	0.22	124
Iranian Heavy Iranian Light	33.7	58,085,192	-148,283	-0.26	-0.24	0.43	72	-0.24	0.41	71
Isthmus	33.0	-			-		-	-0.09	0.46	29
Jotun Kirkuk	34.5	56,194,322	-189,215	-0.34	-0.32	0.28	57	-0.28	0.22	64
Kumkol	39.8	10,503,350	-55,301	-0.53	-0.52	0.28	29	-0.18	0.18	66
Kuwait	30.5	15,670,780	-235,350	-0.22	-0.22	0.13	23	-0.10	-	-
Liverpool Bay	44.8		co. 000			0.24	-	-0.51	0.13	24
Lower Zakum Masila	39.6	34,692,875	-52,429	-0.15	-0.18	0.24	27	-0.14	0.18	22
Maya	21.9	311,362,182	-1,180,638	-0.38	-0.39	0.24	582	-0.38	0.25	528
Menemota	20.4	54 916 889	135,202	0.25	0.23	0.27	103	-0.16	0.28	42
Mesa 30	30.3	39,375,619	9,204	0.02	0.02	0.24	60	-0.04	0.26	53
Murban	39.1 39.7	52,270,132	-188,336	-0.36	-0.33	0.42	36	-0.16	0.22	34
Njord	45.2	-	-		-	-	-	-0.23	0.24	22
Norne	32.6	30,784,061	-85,791	-0.28	-0.28	0.29	3/	-0.17	0.35	- 00
Olmeca	38.7	88,564,430	-206,008	-0.23	-0.23	0.22	167	-0.24	0.25	190
Oman Opako Liebt	32.9	58,492,716	-147,119	-0.25	-0.18	0.41	64	-0.20	0.18	22
Oriente	23.9	18,351,933	32,109	0.17	0.17	0.48	48	0.07	0.31	35
Oseberg	38.2	53,830,028	-158,707	-0.29	-0.30	0.14	67	-0.27	0.16	52
Qatar Land	41.0	24,350,713	-231,946	-0.95	-0.96	0.30	33	-	-	-
Qatar Marine	34.4	40,203,689	-79.011	-0.20	-0.13	0.54	51	-0.06	0.66	24
Qua Iboe Rabi Light	36.7 33.8	18,294,346	-1.014	-0.01	-0.01	0.32	22	-0.15		-
Russian Export Blend	32.3	333,831,934	-844,939	-0.25	-0.26	0.29	513	-0.25	0.24	362
Saharan Blend Santa Barbara	46.0 39.4	64,693,003	-85,320	-0.13	-0.12	0.23	33	-0.10	-	-
Schiehallion	25.8	25,283,774	9,680	0.04	0.01	0.29	29		0.27	
Senipah Seria Light Export	52.6	8.967 471	-2 435	-0.03	-0.01	0.37	25	-0.12	0.37	21
Siberian Light	35.6	16,778,055	-35,149	-0.21	-0.21	0.18	32	-0.27	0.28	36
Sirtica	39.9	19,362,866	-26,481	-0.14	-0.14	0.21	31	-0.21	0.16	63
Statfjord	39.4	129,494,850	-354,308	-0.27	-0.28	0.22	161	-0.25	0.24	178
Syrian Light	37.8	57,938,939	-192,575	-0.33	-0.33	0.33	105	-0.24	0.25	107
Tengiz	45.8	36,342,652	-99,338	-0.27	-0.27	0.32	53	-0.41	0.32	99
Terra Nova	32.6	22,128,799	-9,307	-0.04	-0.04	0.14	35	-0.36	0.34	41
Troll	39.9	47.696.824	-83,626 -29,347	-0.46	-0.47	0.32	81	-0.06	0.51	63
Vasconia	24.9	13,766,202	-11,326	-0.08	-0.06	0.25	31	-	-	-
	22.5	6 751 225	-28.248	-0.42	-0.43	0.82	24	-	-	-
Widuri Zəfiro	32.5	23 122 388	-93 473	-0.40	-0.42	0.34	24	-	-	



improvement from 1989 to 1995 is readily apparent, and it can be seen that global loss then showed no significant change between 1995 and 2000. However, a significant increase in mean NSV loss occurred between 2000 and 2001: -0.213% compared with -0.195% (by convention losses are given as negative).

Further analysis showed that this increase came from a number of popular grades. The largest contribution was from Russian Export Blend (REB) loaded at Novorossisk, where a large number of voyages are reported and NSV loss increased from -0.24% to -0.33%. The NSV loss increase was due to an increase in total calculated volume (TCV) loss rather than a change in water loss. Detailed analysis of all voyage measurements indicated that increases occurred at loading, in-transit and at discharge. The loss increase therefore appears to be real rather than a result of measurement system



changes and coincides with an increase in API gravity for this grade from around 31° at the beginning of 2000 to 32.5° at the end of 2001.

NSV loss for REB from Novorossisk has stabilised for 2002 at -0.34%, with mean API gravity also steady at 32.6°.

As can be seen from **Figure 1**, mean global NSV loss fell between 2001 and 2002, and now stands at -0.203%. However, due to an increase in the spread (standard deviation) of the 2002 data this reduction was not statistically significant.

Loss comparison

Table 1 gives mean NSV loss and standard deviation for shipments of the most popular crudes in the database (20 or more voyages with full data). The mean of the reported API gravity is also given, together with the overall percentage loss based on reported total barrels shipped.

For comparison, figures for NSV loss calculated by voyage are given for 2002 and 2001. Where a grade is not reported for 2002 as the number of data sets has fallen below 20 the API gravity is given as the 2001 mean value.

Note that the data in **Table 1** is not 'table corrected' but based on original BOL figures. Where possible, for load ports using 'old' Table 6 or Table 54, corrected BOL figures are calculated using 'new' tables for comparison with outturns at discharge ports which also use the 'new' tables. The effect of using table corrected BOL data for specific crudes is shown in **Table 2**.

It should be noted that as the information in **Table 2** is derived from a smaller set of voyages than those used for **Table 1** (ie those with both corrected and uncorrected BOL figures) the actual mean losses will differ. **Table 1** should be used as a guide for typical measurement differences while **Table 2** gives an indication as to likely table difference. The figures in **Table 2** are based on a minimum of five voyages per grade.

Detailed loss analysis

In addition to NSV loss figures the database contains details of all the measurements made through each voyage. This enables more detailed analysis to determine where losses are occurring and sets realistic performance limits for each stage in the measurement process.

Overall results for each of the main measurement differences are shown in Table 3, comparing figures for 2002

Database

shipping

Crude type	Mean N	SV loss %	
	Original	Corrected	Table difference %
Abu Al Bukhoosh	-0.11	-0.02	0.09
Abu Safah	-0.54	-0.44	0.10
Al Shaheen	-0.41	-0.41	0.00
Arab Extra Light	-0.28	-0.10	0.18
Arab Heavy	-0.05	0.02	0.07
Arab Light	-0.23	-0.05	0.18
Arab Medium	-0.34	-0.25	0.09
Arun Condensate	-0.28	-0.27	0.02
Banoco Arab Medium	-0.02	0.06	0.09
Belida	-0.36	-0.24	0.13
Dulang	-0.13	0.12	0.25
Eocene	-0.07	-0.06	0.00
Khafji	-0.04	0.00	0.04
Lower Zakum	-0.27	-0.13	0.13
Marib	-0.54	-0.45	0.09
Masa	-0.56	-0.45	0.12
Minas	-0.28	-0.20	0.08
Murban	-0.38	-0.24	0.15
North Field 2	-0.43	-0.43	0.00
Oman	-0.20	-0.07	0.13
Qatar Land	-0.96	-0.89	0.08
Qatar Marine	-0.23	-0.16	0.07
Ras Gas Condensate	-0.63	-0.63	0.00
Saharan Blend	-0.10	-0.03	0.06
Senipah	-0.46	-0.34	0.11
Seria Light Export	-0.17	0.17	0.00
Souedie	-0.22	-0.15	0.06
Syrian Light	-0.37	-0.33	0.05
Tapis Blend	-0.33	-0.20	0.14
Umm Shaif	-0.21	-0.10	0.11
Widuri	-0.52	-0.24	0.29
Zarzaitine	-0.33	-0.29	0.04
	Mean diffe	erence %	0.091



	2002 Mean Std dev.		20 Mean	01 Std dev.	
NSV loss %	-0.20	0.39	-0.21	0.36	
TCV loss %	-0.16	0.35	-0.16	0.34	
Load difference %	0.04	0.38	0.03	0.36	
Ship loss %	0.02	0.21	0.01	0.22	
Discharge difference %	-0.22	0.41	-0.20	0.40	
Water loss %	-0.05	0.18	-0.06	0.18	
OBQ-ROB difference %	0.02	0.12	0.02	0.14	

with those for 2001. There has been a small increase in the gain seen at load (load difference) and in the gain noted between the ship after load and before discharge (ship loss). These are balanced by an increase in the loss seen at discharge (discharge difference). This movement is a small reverse of the trend seen over recent years.

A point to note is that the standard deviations (spread) of all the main losses has increased. In particular the NSV loss standard deviation has increased from 0.36% to 0.39% – the highest ever seen. The data suggests that this is due to a general spreading of the data rather than an increased number of more extreme results and may indicate some relaxation in measurement/controls.

Key comparisons used in the analysis are as follows:

- NSV (net standard volume) and TCV (total calculated volume) losses are simple comparisons between bill of lading (BOL) and outturn figures.
- NSV is the volume of crude corrected to 60°F with sediment and water quantities (free and dissolved) deducted. TCV is the NSV plus sediment and free and dissolved water.
- Load difference is the TCV difference between the ship after loading and the shore delivered volume.
- Discharge difference is the TCV difference between the the ship before discharge and the shore received volume.
- Load and discharge differences are not corrected for VEF (vessel experience factor). However load loss and discharge loss figures are calculated making allowance for OBQ (preload onboard quantity) and ROB (remaining onboard) and taking into account load VEF.
- Ship loss or 'transit difference' is the difference between ship TCV measurements at the load port before sailing and at the discharge port on arrival.
- Water loss is the difference between BOL and outturn water and sediment, adjusted for ROB/OBQ water difference where figures are available.
- OBQ-ROB difference is the difference between the TCV measured on the ship prior to loading (OBQ) and that remaining after discharge (ROB).

The last four years have seen a trend of reducing load differences balanced by a similar increase in discharge differences. However this now shows signs of levelling off as noted above. **Figure 2** shows the above differences compared with the

Table 3: Global loss analysis

load and discharge loss figures which are adjusted for VEF and OBQ and ROB.

It can be seen that the gap between the uncorrected 'difference' figures and the corrected 'loss' figures has levelled out at 0.02%. The closing of this gap over recent years is due to a general reduction in VEFs and a reduction in OBQ and ROB volumes as shown in **Figures 3 and 4**.

Load loss now stands at 0.009% – very close to the zero. This should be the case as application of the VEF will generally take account of ship/shore differences, including calibration differences and vapour losses.

Figure 3 shows fall in load VEF values over the past six years. This fall is apparent from the average by voyage values and also from the average by vessel values.

OBQ and ROB (expressed as percentages of BOL and outturn TCVs respectively) have also both fallen over recent years as shown by **Figure 4**. However, this fall seems to have levelled out in 2002. The difference between OBQ and ROB has also steadily reduced, indicating that ROB clingage volume has reduced. This has stabilised at around 0.02%.

The changes in VEF and OBQ-ROB quantities have been significant and would seem to be due to the introduction of new vessels with double hulls and tanks that are more easily calibrated and cleaned. More effective crude oil washing may also be a factor.

Conclusions

The 2002 data indicates that the small but significant increase in average NSV loss for 2001 over 2000 has reversed but the increase in the standard deviation or spread of the data has led to the small reduction being not statistically significant. Global NSV loss for 2002 was -0.203%.

The rapid changes in global loss patterns seen over recent years in relation to ship/shore comparisons at load and at discharge seem to have levelled out with OBQ-ROB difference constant at 0.02%. However, VEFs continue to fall, with the average VEF by voyage for 2002 only just above 1 at 1.00004.

The database increased significantly again for 2002 in terms of volume and voyage numbers. The panel is on target to achieve full data for 50% of seaborne crude trade by 2005, having received load data only marginally short of this volume in 2002 and full data for over 40% of global volume.

The panel meets twice a year and meetings are held in conjunction with those of the sister panel, PM-L-4B, the Oil Transportation Measurement Panel. The next meetings will be held in Washington DC, US, on 11–13 November 2003 and will be hosted by ExxonMobil. Prospective new members are welcome and are encouraged to contact John Phipps at the EI for further details: T: +44 (0)207 467 7130, e: jp@energyinst.co.uk

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Making the difference to crude oil measurement

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Taiwan



Taiwan has embarked on a major programme to develop the use of renewable energy for power generation as part of government plans to clean up energy pollution emission and reduce energy import growth by making greater use of indigenous energy resources. Hydroelectric power and natural gas currently provide the country's main nonimported energy supplies, while most renewable resources remain untapped, writes *David Hayes*.

Taiwan's energy supply depends heavily on imported fuel, which provided 96% of total energy needs by the late 1990s. All oil, coal and most natural gas supplies are imported. To reduce energy imports and accommodate the Kyoto Protocol on global carbon dioxide emissions, the government has accorded the renewable energy programme top priority within Taiwan's overall energy development policy.

Asia-Pacific

Efforts to develop the use of renewable energy for power generation will be backed up by two new pieces of legislation that are currently working their way through the Legislative Yuan (Parliament) to ensure government targets are met.

Under one tabled amendment to the existing electricity industry laws, staterun Taiwan Power Company (Taipower) will become responsible for building part of Taiwan's planned renewable power generation facilities, together with some LNG power generation units that are planned to enter service in the future. While the remaining facilities will be built and operated by private companies, the legal amendment will make Taipower responsible for constructing any planned renewable generation facilities allocated to private developers that the private sector fails to build.

The second tabled legal change will require Taipower and independent power producer (IPP) companies to pay a levy on their non-renewable and non-LNG-fired generation. The levy collected will be passed to a foundation that will use the money to promote the development of renewable electricity generation.

Renewable programme

Taiwan's renewable generation programme was drawn up by the Energy Committee under the Ministry of Economics following a series of public consultations in the late 1990s. The Energy Committee has announced that by 2020 power stations totalling 6,500 MW installed capacity will be fuelled by renewable energy.

Hydroelectric power dams are planned to reach 2,500 MW installed capacity, including existing dams totalling 1,820 MW – they will be Taiwan's largest renewable energy source. Wind farms installed with generating sets totalling 1,500 MW will be the second largest source of renewable power generation, while solar power facilities will reach 1,000 MW installed generating capacity.

Other fuel sources will include biomass and refuse burning, for which stations totalling 550 MW installed capacity will be built, including methane-fired facilities totalling 50 MW compared with 23 MW at present. Power stations burning other refuse and biomass products, including sugar cane leaves, rice husks, pulp, petroleum char and old tyres, will supply a further 750 MW of generating capacity. In addition Taipower has plans to build geothermal power plants capable of generating 150 MW.

The government's renewable programme is considered ambitious by



Chinese Petroleum Corp (CPC) headquarters, Taipei, Taiwan

some energy analysts. Renewable energy generation schemes in Taiwan, not including hydropower, currently total 132 MW, while renewable energy generation schemes that include hydropower total about 2,000 MW – equivalent to 6.2% of Taiwan's total electricity generating capacity.

Although Taiwan is following the international trend to develop renewable energy, the success of the renewable generation programme will be important as Taipower has announced it will decommission its three existing nuclear power stations before the end of their planned 40-year working lives. Taipower's number one nuclear station was due to be retired in 2018, but now will be taken out of service in 2011. The number two and three nuclear stations will also be retired earlier than originally planned. Renewable power generation will help replace part of the lost nuclear baseload electricity generating capacity.

Taipower has forecast that by 2010 Taiwan's renewable power generation capacity will reach 3,300 MW of the total 6,500 MW planned. Of the 3,300 MW, some 470 MW will be from wind power, of which Taipower will own 300 MW and private developers 170 MW.

LNG imports

Meanwhile, government efforts to promote clean energy use will involve a substantial increase in natural gas consumption. The import of LNG will remain under state-control, however, while power generation, oil refining and the supply of petroleum products already have been opened to the private sector.

In July Taiwan's state-owned Chinese Petroleum Corporation (CPC) won a keenly contested NT\$298bn (\$8.7bn)



CPC petrol station, Taipei, Taiwan

LNG contract to supply Tatan power station in northern Taiwan. The 25-year contract award to supply the fellow state-run Taipower's power plant with 1.74mn t/y of LNG ended more than five years of efforts by Taiwanese companies to break CPC's LNG import monopoly after the government earlier ended CPC's monopoly on oil refining and petroleum product supply in 2000.

Had Taipower chosen a second supplier to enter the LNG market instead, CPC had expected to lose gas sales in northern Taiwan to the newcomer. Now CPC retains full responsibility in helping the government meet its clean energy targets by raising natural gas use throughout the island.

Since CPC first began importing LNG in 1989, Taipower and other LNG users have had to pay whatever price CPC asked, as no alternative supply source was available. Now, for the first time, CPC has had to bid for business and offered Taipower LNG for Tatan at a price 25% lower than what the power utility pays for its current supplies. CPC submitted the lowest bid, although bids from the three other contenders were also below Taipower's ceiling price. Taipower announced that it would pay CPC NT\$5.69/cm for LNG used at Tatan, in present value terms, compared with the NT\$8.33 it now pays for gas.

The recently awarded tender was the third issued by Taipower for Tatan's LNG import needs after two previous tenders in 2001 failed to attract the required minimum of three bids. Apart from CPC's bid – which involves importing LNG from Qatar's Ras Laffan LNG Company, owned by Qatar Petroleum and ExxonMobil – Taipower received bids from Shell with local partner Asia Cement, Tung Ting Gas Corporation and United Resources. Shell offered LNG from gas fields to be developed by offshore Russia's Sakhalin Island, while the Japanese-backed Tung Ting consortium intended to supply LNG from Oman. The Taiwanese-Indonesian United Resources consortium planned to import LNG from BP's Tangguh LNG scheme in Indonesia had the group's bid been selected.

According to CPC's forecasts total annual domestic demand for natural gas is estimated to grow from almost 6mn t/y in 2002 to 9mn t/y in 2010. However, Taiwan's Energy Commission under the Ministry of Economic Affairs believes that gas demand will more than double to 13mn t/y by 2010. Total demand could reach 16mn t/y or more by 2020 if the Energy Commission's forecasts prove correct.

In 2002 CPC imported 5.3mn tonnes of LNG, of which 2.82mn tonnes were supplied by Indonesia and 2.48mn tonnes by Malaysia under long-term contracts. Total gas supplies were the equivalent of 5.9mn tonnes in 2002 as CPC also sold about 600,000 tonnes of indigenous gas production. In 2003 CPC expects to import about 5.35mn tonnes, the volume increasing only very slightly above last year's import level due to Taiwan's current economic downturn.

Details of Taiwan's indigenous gas reserves have not been published. In 2000, about 10 years of gas reserves were thought to remain in Miaoli, based on an annual production rate of about 880mn cme (cubic metres equivalent) to about 600,000 tonnes of LNG.

Taipower and independent power producer (IPP) plants take about 64% of CPC's total gas sales which, including the equivalent of about 600,000 tonnes of indigenous natural gas produced in Miaoli County in north Taiwan, were the equivalent of about 5.9mn tonnes Asia-Pacific Taiwan

in 2002. Taipower uses about 60% of the 3.65mn tonnes of LNG equivalent supplied for power generation each year, while IPP power plants consume the remaining 40%.

Apart from gas supplied for power generation, city gas companies purchase about 13.5% of CPC's gas sales to use as feedstock, while about 400 industrial customers take another 13.5%. In addition, CPC itself uses the equivalent of 500,000 t/y of LNG at its three oil refineries where gas has replaced oil use as fuel for environmental reasons.

Piped gas distribution is currently under the control of 26 city gas distribution companies that each enjoy a monopoly in their own geographical area supplying customers using under 1mn cf/d of gas, while about 400 large gas users are supplied by CPC.

New power plants

Meanwhile, the construction of four new power stations is expected to boost LNG import demand by about 2.8mn t/y by 2012. Three new IPP power plants are due to start up by early 2004, followed by Taipower's Tatan power plant four years later.

The 4,000-MW Tatan power plant will be one of Taiwan's largest power stations when completed. The first two units to be commissioned in 2006 and 2007 will be designed for dual gas/oil firing – they will burn diesel oil initially as gas will not be available until 2008. Taipower plans to start burning gas at Tatan in 2008 when 700,000 tonnes of LNG will be required. LNG use will build up to 1.74mn t/y by the end of 2011.

LNG use is rising because both Taipower and IPP developers face less public opposition when constructing gas-fired plants than building the coalfired and nuclear stations that Taipower would prefer to see constructed to benefit from cheaper coal and nuclear fuel costs.

'By 2011 LNG-fired generation will be over 34% of our power load [including IPP power purchases],' commented a Taipower source. 'LNG units have to run baseload because of LNG purchase commitments. CPC requires us to run our LNG units to ensure stable LNG consumption. IPP stations also are restricted by CPC. Little flexibility is possible as the suppliers demand that CPC take an average quantity throughout the year.'

At the end of 2002 Taiwan had a total installed capacity of 31,915 MW, of which IPP projects accounted for 4,850 MW, or 15.2% of total capacity.

Coal-fired stations totalling 11,197 MW accounted for 35.1% of installed capacity, while Taipower's 5,144 MW nuclear power capacity represented 16.1% of total installed capacity. LNGfired stations amounting to 7,482 MW represented a further 23.5% of installed capacity, hydroelectric schemes totalling 4,381 MW were 13.7%, while oil-burning stations totalling 3,579 MW accounted for 11.2% of Taiwan's total installed generating capacity.

Nuclear and coal-fired stations generate most baseload power supplies. In 2002 coal-burning stations produced 44.1% of Taiwan's total power output, while nuclear stations generated a further 22.9% of power supplies. In addition, LNG stations supplied 15.1% of total power supplies and oil-fired stations 9%.

Over the next ten years Taiwan will build power plants totalling 18,430 MW and retire existing stations amounting to 3,507 MW. Consequently, the total installed generating capacity will increase 50% from 2002 to 2013.

LNG-fired stations built by Taipower and IPP developers totalling 7,441 MW will account for 40.4% of the additional installed capacity, while coal-fired stations totalling 6,897 MW will represent 37.4% of the new capacity additions.

Refining competition

Meanwhile, the government's decision to open Taiwan's oil refining industry and petroleum products market to competition in 2000 has led to an oversupply of some petroleum products following the start up of Formosa Plastics Corporation's (FPC) naphtha cracker and oil refinery complex in Mailiao to challenge CPC's former monopoly. Slated for privatisation in the future, CPC is facing tough competition in the production and sale of products, including gasoline and jet fuel, as both CPC and FPC look to export markets to unload their excess capacity.

Plans to open the oil and petroleum market to competition were approved in the mid-1990s when FPC was given the green light to build Taiwan's number six naphtha cracker. FPC's Mailiao refinery in northern central Taiwan has the capacity to refine 450,000 b/d, equivalent to processing 21mn t/y of crude oil. The refinery accounts for 37% of Taiwan's current 1.22mn b/d refining capacity.

CPC remains Taiwan's leading refiner, operating three refineries with a combined refining capacity of 770,000 b/d and accounting for 63% of Taiwan's refining capacity. The two largest refineries are located in southern Taiwan, while the third refinery is located in the north.

In the meanwhile, Taiwan's refining industry is coping with a 50% overcapacity following FPC's entry into the market. CPC and FPC operate a combined 1.22mn b/d refining capacity compared with the present domestic market refining capacity requirement of about 820,000 b/d. CPC refines about 620,000 b/d, while FPC currently is thought to refine about 300,000 b/d – of which about one-third is exported. With CPC and FPC refining a combined total of 920,000 b/d and FPC being assumed to export about 100,000 b/d, this suggests the domestic market is 820,000 b/d.

'Refining is over capacity so the situation is not good. Any increase in production must be exported,' a CPC source said. 'Also, some competitors like ExxonMobil are exporting to Taiwan. The economy in this region is very slow. I don't think the situation will change for the next year or so. CPC's refineries are currently running at about 81% to 82% utilisation. Our target is 85%. To achieve this target we have to export.'

Gasoline and diesel

Following the start-up of FPC's refining operations, the economic downturn affecting Taiwan for the past two years has reduced the previous rate of energy consumption growth. Gasoline consumption is rising slowly by 1% to 2% annually, having reached 9.6mn kilolitres in 2002 compared with 9.53mn kilolitres in 2001.

CPC has a 70% share of Taiwan's gasoline market while FPC has 28%. Total domestic gasoline consumption is expected to reach 9.71mn in 2003, before rising to 9.87mn in 2007 and reaching 10.4mn in 2010.

FPC's strategy in entering Taiwan's refining industry has been to focus on the gasoline and diesel markets by installing a 450,000 b/d topping unit with a 150,000 b/d cracking unit to crack fuel oil for gasoline and diesel. FPC's refinery is capable of producing 6.7mn kilolitres of gasoline and 7.75mn kilolitres of diesel a year.

As FPC does not have the channels to sell all its production domestically the FPC refinery and cracker are estimated to be operating at about 60% to 65% of capacity, or at about 300,000 b/d at present. FPC is estimated to export about 30% to 40% of its refinery production, mostly to China. Other markets include the Philippines and Vietnam.

Meanwhile, diesel consumption is growing by 1% to 2% a year, the same rate as gasoline use. CPC supplies 80% of the diesel market while FPC supplies the remaining 20%. Analysts expect FPC's share to grow in the future.

The diesel market, which was 6.28mn kilolitres in 2002, is expected to continue growing at about 1% to 2% annually, the same as gasoline consumption. By 2007 annual diesel consumption is forecast to reach 6.9mn kilolitres.

All Photos: David Hayes

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Wintershall goes from strength to strength

In the third of our series of feature articles analysing some of the intermediate oil and gas companies from around the world – based on information supplied by *Online-Data** – we take a closer look at the activities of German company *Wintershall*.

www.intershall is a wholly-owned subsidiary of BASF, based in Ludwigshafen, and has been active for more than 70 years in the exploration and production of oil and natural gas. Today, the Kassel-based company is Germany's largest oil and gas producer (see Figure 1).

Wintershall focuses its exploration and production activities in selected core regions where the company holds a wealth of regional and technological expertise (see Figure 2). These regions include Germany and the southern part of the North Sea, North Africa and South America. Russia and the Caspian Sea area are new core regions where the company is currently expanding its activities.

Highlights in 2002

In 2002, Wintershall reported an income from operations of 1.2bn – the third consecutive year that it posted income of more than 1bn. Net sales contingent on revenue (sales net of nat-

ural gas tax) fell by 0.4bn to 4.6bn against the previous year. Wintershall's result after income taxes and minority interests rose by 15mn to 435mn against the previous year.

After a significant 13% increase in 2001, oil and gas production held steady at the same high level for 2002. As in the previous year, a total of 12.3mn toe was produced. In addition to the acquisition of Clyde Netherlands and highly encouraging concessions, a total of six new oil and gas fields were discovered during the year. Oil production totalled 8mn tonnes, almost reaching 2001 output. Meanwhile, 2002 gas production increased by 2% to 5.1bn cm.

Wintershall achieved a 44% discovery rate for successful wells during its 2002 exploration programme – significantly higher than the industry average of between 15% and 30%. The company discovered five gas fields in the Dutch sector of the North Sea, Argentina and Romania. In addition, a highly promising oil reservoir was discovered in Libya.

The acquisition of Clyde Netherlands

doubled Wintershall's production and reserves in the Netherlands and further developed its attractive exploration portfolio. Wintershall is now the third largest natural gas producer in the Netherlands, operating 21 offshore platforms.

The company is planning to increase both oil and gas production in 2003, together with a simultaneous increase in reserves. To achieve this objective there will be a more intensive approach to exploration and development investment for existing and new deposits. The production anticipates company increases in the Mittelplate, Germany's largest crude oil field, while gas production will be increased following the commissioning of a number of new gas fields in the North Sea. In addition, Wintershall is planning further development of gas fields in Argentina, in the Tierra del Fuego offshore area. Together with Shell, the company is also to drill in extremely deep waters offshore Brazil during 2003.

Russian relations

Wintershall is also to become the first German gas company to produce natural gas in Russia. In July 2003 the world's largest producer of natural gas – Gazprom – established what is claimed to be the first-ever joint venture with a German partner to produce Russian natural gas. Documents for the joint venture were signed in Moscow by Urengoygazprom, a 100% subsidiary of Gazprom, and BASF continued on p49...



Dubai

Aviation

fuel



Aviation fuel handling developments

Martin Hunnybun, Technical Manager Distribution & Aviation at the Energy Institute and

Bob Simpson of R A Simpson Consultants report on the development of a portfolio of

internationally acceptable aviation fuel handling standards and recommended practices.

n recent years the IP Aviation Committee has been working jointly with the American Petroleum Institute's (API) Aviation Technical Services Sub-Committee to develop a portfolio of internationally acceptable aviation fuel handling standards and recommended practices. The suite of joint API/IP publications has been steadily increasing, as documents that originated from either organisation have been revised to take account of the latest technical developments and needs of the industry. In total seven are now available for use by product manufacturers and fuel supply companies worldwide, see Table 1.

The technical activity preparing joint documents has continued this year, as two more were due for their five-yearly review – the review period used by both the API and Energy Institute (EI). These were the IP Model Code of Safe Practice Part 7 Airports Safety Code, and API Standard 1529 Aviation fueling hose.

Airports Safety Code

The first edition of this guidance on aviation fuelling facilities was published back in 1965, with the 3rd edition issued in 1998. A similar document had been published by API (Bulletin 1500), but was withdrawn in 1998 in favour of Part 7. At that time an annex listing appropriate US references had been provided by API and was included in Part 7 - an early indication of the co-operation between the two organisations. During the last 12 months experts have been engaged in technical debate as the guidance has been revised jointly. The former IP material had always been widely used internationally, but statutory regulations and working practices differ significantly in the US, where approximately 40% of all iet fuel is handled.*

This has resulted in several technical challenges to the justification for specific equipment features and working practices, which have served as a useful reassessment for the industry. One of these items – the bonding and hose connection sequence for refuelling when using a hydrant dispenser – is the subject of an ongoing study as part of the El's technical work programme for 2003. Another – recommendations for flow velocities – is likely to be progressed by API working with other industry groups such the Coordinating Research Council (CRC) and the National Fire Protection Association (NFPA).

In addition to the technical revisions, the document has also been given a new number to be consistent with others in the fuel handling portfolio – API/IP RP 1540. It has also been retitled as *Design, construction, operation and maintenance of aviation fuelling facilities* to clearly reflect the content. This has become increasingly important as prospective purchasers rely more on key word searches on the Internet.

API/IP 1542 -	Identification markings for dedicated aviation fuel manufac- turing and distribution facilities, airport storage and mobile fuelling equipment, 7th edition, August 2002		
API/IP 1581 -	Specifications and qualification procedures for aviation jet fuel filter/separators, 5th edition, July 2002		
API/IP 1582 -	Specification for similarity for API/IP 1581 aviation jet fuel filter/separators, 1st edition, February 2001		
API/IP 1583 -	Specifications and qualification procedures for aviation fuel filter monitors with absorbent-type elements, 3rd edition, November 2000		
API/IP 1584 -	Four-inch hydrant system components and arrangements, 3rd edition, April 2001		
API/IP 1585 -	Guidance in the cleaning of aviation hydrant systems, 1st edition, February 2001		
API/IP 1590 -	Specifications and qualification procedures for aviation fuel microfilters, 2nd edition, April 2002		

All of these publications are available from Portland Customer Services, Commerce Way, Whitehall Industrial Estate, Colchester CO2 8HP, UK. T: +44 (0)1206 796351; F: +44 (0)1206 799331; e: sales@portland-services.com A 25% discount is offered to Energy Institute members.

Table 1: API/IP aviation fuel handling publications

A final draft of the new edition was sent to a number of stakeholder organisations, especially those based in the US, to seek feedback on whether our aim of truly internationalising the technical content had been achieved. Among them were the Society of Automotive Engineers, the Air Transport Association of America, the National Fire Protection Association and the National Air Transportation Association. It was also referred to the Joint Inspection Group Ltd. Indications are that the document is indeed acceptable to the international industry.

API/IP Recommended Practice 1540 Design, construction, operation and maintenance of aviation fuelling facilities will be available later this year. Full details will be provided on the El website (www.energyinst.org.uk)

Aviation Fuelling Hose

API Standard 1529 was due for revision at the same time as the former Airports Safety Code. Standard 1529 was essentially a manufacturing specification, but

... continued from p47

subsidiary Wintershall.

The joint venture, set up in Novy Urengoy in western Siberia under the name of Achimgaz, will extract gas from the Achimov horizon of the Urengoy field. The deposits, located within the Polar Circle, are expected to produce a total of 200bn cm of gas and 40mn tonnes of condensate.

This project signals the expansion of a collaboration between the two partners that has been marked by a pioneering

it also included several annexes which provided useful guidance to users on aspects such as hose storage, flushing, hose recoupling and inspection and testing in the field. It also guoted a recommended lifetime. Those annexes have been removed and incorporated into the hose section of API/IP 1540, which has ensured that the new edition of 1529 will be a manufacturing specification and suitable for use by the API Monogram Program, a certification body that already provides witnesses and certification services for qualification testing of aviation fuel filter/separators, monitors and microfilters specified by API/IP 1581, 1583 and 1590 (see Table 1).

One of the key aims during the revision of 1529 has been to increase the alignment of the technical requirements in 1529 and the European Standard EN 1361, which is widely used as a purchase specification in Europe. To this end the requirements for cold temperature testing have been extended in 1529 to all product types, as API 1529 previously had a requirement for special hoses for use in very cold climate conditions.

and entrepreneurial spirit since its inception more than 13 years ago. As early as 1990, the partners established a completely new form of Russian–German cooperation with their collaboration in the buying and selling of natural gas. It was only through this strategic alliance that Gazprom gained direct access to the natural gas market in Germany. The establishment of the Wingas joint venture ranks even today as one of the largest investments by a Russian company in Germany. Further, EN 1361 recognises only one grade of hose suitable for use at a maximum working pressure of 20 bar. It is expected that the Grade 1 hose, suitable for maximum working pressure of only 10 bar, will be dropped from API/IP 1529. It is anticipated that global hose suppliers will be able to offer a product that meets the requirements of both the new API/IP Specification and EN 1361.

In order for the latest technical knowledge to be considered during the preparation of this sixth edition of 1529, a draft version was distributed to all of the known global manufacturers of aviation fuelling hose – 11 companies in total. All were invited to attend a technical session to debate the content in Montreal on 30 September 2002. This highlights the ability of the Institute, working with API, to engage companies on a truly international scale, ensure consensus and due process and develop technical publications that reflect this considerable wealth of expertise.

The 6th edition of API/IP 1529 Aviation fuelling hose is now in the final stages of preparation and will be available for use within the industry early in 2004.

Looking ahead

It is satisfying that API/IP 1540 and API/IP 1529 are the last two publications in the API/IP aviation fuel handling portfolio to have originated from editions that were published separately by either organisation. There has been a complete amalgamation of the separate API and IP publications in a little over three years, which would not have been possible without the commitment of the leading experts on both the Aviation Committee and Aviation Technical Services Sub-Committee, the support of both API and IP to work jointly on issues related to development, publication, copyright and sales of these documents, and the support and endorsement of all the industry stakeholders.

*Based on International Energy Agency (IEA) statistics for 2000

Visit Wintershall's website at www.wintershall.de

*Visit www.oilvoice.com to view over 300 continually updated oil company profiles or e: cp@online-data.co.uk

Energy Institute official launch



Launch reception at the House of Commons



All photos: Liz Shaw

The Energy Institute (EI) was officially launched at the House of Commons on 9 September 2003. *Shaun Bell*, Communications Director, EI, reports.

Top (from left to right): Christine Stewart Munro, Executive Secretary, Parliamentary Group for Energy Studies; Hon Lord Fraser of Carmyllie QC, Hon Treasurer of the PGES; Paddy Tipping MP, PGES Chairman; Pierre Jungels, CBE, Co-Chairman, El Council; Stephen Timms MP, Minister of State for Energy, E-commerce and Postal Services; Sir John Mogg, Chairman of Ofgem; Louise Kingham, Chief Executive EI; and Professor Martin Fry, Co-Chairman, EI Council. Left: Stephen Timms MP meets Lord Francis Gugin, Chairman, Stratgas and Raphael Vermier, ConocoPhilips UK





fter months of planning and consultation and the formal creation of the Energy Institute at the beginning of July, the 'official' launch of your new Institute was marked by a reception at the Terrace Marquee in the House of Commons on 9 September. The reception was held in partnership with the Parliamentary Group for Energy Studies (PGES) – a long-standing supporter of both the former Institute of Petroleum (IP) and former Institute of Energy (InstE).

Over 130 invited guests from industry, the government, academia and an array of stakeholder organisations joined members of the Energy Institute's team in glorious sunshine at the House of Commons. They heard PGES Chairman Paddy Tipping MP give a ringing endorsement of the new Energy Institute, saying: 'I am delighted to be here today to celebrate the merger of the Institute of Petroleum and the Institute of Energy, two staunch supporters of the PGES. On behalf of the PGES, we welcome and support the new Energy Institute's work towards ensuring that the development of energy professionals is provided for.'

Challenges ahead

Tipping then introduced keynote speeches from the two Co-chairmen of the Energy Institute, spelling out the challenges that lie ahead for both the industry and the EI. Professor Martin Fry CEng FEI said: 'Both the Institute of







Petroleum and Institute of Energy had a proud and distinguished heritage, developed over many years supporting their particular energy sectors. Increasingly these sectors have converged, creating an integrated global energy market. We recognise the challenges presented in the White Paper and believe that the El and its members can play an important role in delivering solutions to our future energy needs.'

Dr Pierre Jungels CBE CEng FEI went on to develop the vision for where the Energy Institute will be in the future. 'With the advent of an integrated global energy sector, the new Energy Institute is needed not only to mirror developments in our own market but also to lay the foundations for the foreseeable future. The Energy Institute is a community, a home for energy professionals and an intellectual reservoir for the industry."

Amongst the many other guests joining the celebrations was Stephen Timms MP, Minister of State for Energy, E-Commerce and Postal Service, emphasising the importance that the UK Government places on the work that the Energy Institute is involved with. The Minister spent some time finding out about how the El has been formed and what we can do to help the government with future strategy consultation and development.

Top: Assembled guests listen to key speeches. Middle row (left): Professor Martin Fry, Co-Chairman, El Council; (centre) Paddy Tipping MP, PGES Chairman; and (right) Pierre Jungels CBE, Co-Chairman, El Council. Bottom: Paddy Tipping MP chats to the Rt Hon Lord Jenkin of Rodin



Natural Gas Hydrates – A Guide for Engineers*

John Carroll (Elsevier Science, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1YW. www.elsevier.com). ISBN 0 7506 7560 1. 270 pages. Price: £57.50.

The petroleum industry spends milions of dollars every year to combat the formation of hydrates – the solid, crystalline compounds that form from water and small molecules – that cause problems by plugging transmission lines and damaging equipment. They are a problem in the production, transmission and processing of natural gas, and it is even possible for them to form in the reservoir itself if the conditions are favourable. In spite of their importance hydrates are often misunderstood, and misconceptions abound. This book explains how, when and where hydrates form, while providing the knowledge necessary to apply remedies in practical applications.

Safety Management: A Qualitative Systems Approach*

John Davies, Alastair Ross, Brendan Wallace, Linda Wright (Taylor & Francis, 11 New Fetter Lane, London EC4P 4EE.) ISBN 0 415 30371 0. 220 pages. Price: £24.99.

This book is aimed at risk managers and safety experts working within safety critical industries such as energy, transport and utilities. It illustrates how companies can adopt an innovative reporting system – developed by Professor John Davies, Director of Human Factors Analysts, together with colleagues from the University of Strathclyde – that combines eyewitness accounts and opinions with engineering and technical data to provide critical information that can be used to prevent accidents occurring in the workplace.

European Oil Industry Guideline for Risk-Based Assessment of Contaminated Sites (Revised)*

(Concawe, Boulevard du Souverain 165, B-1160 Brussels, Belgium. e: info@concawe.be). 96 pages. Available as free download from www.concawe.be

This report proposes a three-tier approach to assessing the nature and extent of the contamination of soil and groundwater at oil industry sites and implementing corrective action. Such sites range from complex refineries down to retail service stations. The nature and extent of contamination range from major to insignificant, while the potential for exposure of own workers or third parties also varies enormously. The principle of the approach is to tailor corrective action to site-specific conditions and hazards. This leads to more costeffective solutions, and allows the greatest effort to be targeted to where it is most beneficial.

Manual of Process Economic Evaluation

A Chauval, G Fournier and C Raimbault (Editions Technip, 27, rue Ginoux, 75737 Paris Cedex 15, France. e: info@editionstechnip.com). ISBN 2 7108 0836 6. 480 pages. Price (hardback): \$135; 135.

This book aims to enable the reader to undertake pre-project evaluations, especially in the areas of refining and petrochemistry. It encompasses all the essential steps: market analysis, comparative studies of the technical and economic issues sensitivity studies, sizing and costing of the equipment required for an industrial-scale plant, estimation of capital spending, calculation of costs and sales, prices etc.

* Held in IP Library



Two collections combined

With the help of an MA Information Studies student, Joanna Barwick from Brighton University, we recently completed the integration of the material originally held by the Institute of Energy into the collection held by the Institute of Petroleum library.

Over 570 items have been added to the library book catalogue. There are now more than 13,000 items listed (not including periodicals). Many periodical titles have also been added, dealing with forms of energy other than oil and gas. See the library section of the website at **www.energyinst.org.uk** or come and visit us to find out more.

Please note that suggestions for additions to library stock are always welcome from institute members.

New Editions to Library Stock

- Brazil Energy. Bruce McMichael, Julian Bray (Eds). Lloyd's List, London, UK, 2003.
- Climate Adaptation: Risk, Uncertainty and Decision-Making. R I Willows, R K Connell R K (Eds). UKCIP, Oxford, UK, 2003. ISBN 0954483006.
- The Green Building Bible: All You Need To Know About Ecobuilding 2003/2004. Keith Hall (Ed.). Green Building Press, Llandysul, UK, 2003. ISSN 1479-4616.
- International Petroleum Encyclopedia 2003. PennWell, Tulsa, Oklahoma, US, 2003. ISBN 0878148930.
- New and Renewable Energy Prospects for the 21st Century: The Renewables Obligation (Amendment) Order 2003: Statutory Consultation. UK Department of Trade and Industry (DTI), London, UK, 2003.
- Robin Rigg Offshore Wind Farm (Navigation and Fishing) (Scotland) Act 2003. HMSO, London, UK, 2003.
- Sustainability and Environmental Impact of Renewable Energy Resources. R E Hester, R M Harrison (Eds). Issues in Environmental Science and Technology 19. RSC, Cambridge, UK, 2003. ISBN 08054042903.

Contact Details

- Information, careers and educational literature queries to: Chris Baker, LIS Officer, +44 (0)20 7467 7114 Sally Ball, LIS Officer, +44 (0)20 7467 7115
- Library holdings and loans queries to: Liliana El-Minyawi, LIS Officer, +44 (0)20 7467 7113
- LIS management queries to: Catherine Cosgrove, LIS Manager, +44 (0)20 7467 7111
- IFEG queries to: Sally Ball, IFEG Secretary, +44 (0)20 7467 7115

Fax any of the above on +44 (0)20 7255 1472 or e: **lis@energyinst.org.uk** Visit our website at **www.energyinst.org.uk**

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conference



FREIGHT TRANSPORT ASSOCIATION

Fuel Tankers Operators Bolton, UK



Changes in dangerous goods regulations will have a fundamental impact on the operators and manufacturers of fuel tankers. In particular, the changes to construction requirements for tankers, tank inspections being carried out in future by Approved Competent Persons and Accredited Inspection Bodies together with changes to placarding, equipment and load thresholds, will transform fuel tanker operation in the UK.

This conference will be a key event for transport managers, road tanker operators and tanker manufacturers. The cost to FTA and joint sponsor members is $\pm 310 + VAT$ (± 364.25), with second and subsequent delegates at the rate of $\pm 250 + VAT$ (± 293.75). For non-members the prices are $\pm 360 + VAT$ (± 423.00) and for second and subsequent delegates $\pm 320 + VAT$ (± 376.00).

For more details or to book, contact the FTA Member Service Centre on 01892 552222, use the on-line booking form at www.fta.co.uk or e: conferencesales@fta.co.uk



9 October 2003

energ



Virtually zero emission valve stem packing



The emission levels around the valve stem in third-party tests on James Walker's Supagraf[®] Premier valve stem packing were so low that they challenged the sensitivity of the helium mass spectrometer used to measure the leak rate, reports the company. The packing is based on a patented form of exfoliated graphite. It was tested to Shell procedure SPE 77-312 *Industrial valves: Fugitive emissions measurement* by the CETIM laboratory in France.

In a test with a four-inch gate valve, Supagraf Premier is reported to have achieved a Class A rating with helium, at valve body temperatures from ambient to 450°C. According to the manufacturer this is the same degree of leak tightness normally associated with a bellows sealed valve and significantly exceeds the requirements of German 'TA-Luft' regulations.

The valve stem packing is available in easy-to-fit length form. It is also offered as preformed rings and sets.

T: +44 (0)1483 757575 F: +44 (0)1483 746105

Online conditionmonitoring



Controlstar's Pulsar online conditionmonitoring system is designed to carry out detailed vibrational analysis of equipment in local or remote applications. As well as enabling users to maximise the operating efficiency of their machines, the data generated by Pulsar is claimed to help reduce the cost of downtime for routine inspections and can trigger key maintenance activities to prevent potentially dangerous and expensive equipment failures.

Pulsar is a DIN-rail-mounting, modular system comprising a base module – housing the communications and DSP functionality – and up to eight additional modules, depending on the requirements of the individual application. Providing 24/7 sentinal operation, the system continuously checks up to 64 different FFT profiles, each of which can be configured with up to four warning/ alarm limits in four frequency bands.

T: +44 (0)1507 523303 F: +44 (0)1507 522743

ATEX valve operators

ACSO Joucomatic recently unveiled a new range of solenoid valve operators. Meeting Category 2 requirements of the ATEX Directive for use in gaseous and dust laden environments, these flameproof (II 2 G/D EEx d IIC) operators are manufactured in lightweight aluminium (NF), which is epoxy coated to combat erosion, cast iron (NL) and stainless steel (WSNF).

The introduction of the stainless steel WSNF operator is part of a new overall package from the company, providing the offshore oil and gas industry with all stainless steel valves and operators in sizes up to G1" for



use in piloting large actuators, or to directly operate large diaphragm or diverter valves.

All of the new operators are available

as both push or pull type solenoids.

T: +44 (0)1695 713600 F: +44 (0)1695 729477



Portable lone worker protection system helps save lives



SBES has added a self-contained lone worker protection system to its LifeSaver safety alarm product portfolio. Contained in a lightweight carrying case, the system extends the safety loop to individuals working in buildings having no adequate emergency response system.

The stand-alone system's case is kept within the working area, while the user wears a transmitter including a tilt sensor that activates the alarm if the wearer falls further than a normal 45° from vertical or for longer than 25 seconds. A pager unit is given to a colleague or first-aider on site, who is alerted to the emergency.

Providing the simplest means to summon help at the touch of a button, or even in the case of incapacity, the complete system is claimed to offer unlimited extendability to tailor functionality to each user's needs.

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If you would like your new product releases to be considered for our Technology News pages, please send the relevant information and photos/graphics to: Kim Jackson, Associate Editor, Petroleum Review, 61 New Cavendish Street, London W1G 7AR, UK or e: petrev@energyinst.org.uk

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Canadian Association for CAEE Energy Economics

Mark Your Calendar

Integrating the Energy Markets in North America: Issues & Problems, **Terms & Conditions**

23rd IAEE North American Conference VI Congreso Anual de la AMEE Camino Real Hotel-Mexico City October 19-21, 2003

Topics Include: Role of the State Owned Utilities in North America North American Energy Security and Reliability Environment and Energy in North America Continental Trade and Transportation: Forward or Reverse? Oil and Gas in Mexico Gas and Power-Convergence or Divergence?

Official Conference Website: www.usaee.org

Membership News

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NEW CORPORATE

Hayward Tyler Group, 1 Kimpton Road, Luton, Bedfordshire LU1 3LD, UK

T: +44 (0)1582 731144 F: +44 (0)1582 393404

e: marketing@haywardtyler.com www.haywardtyler.com Representative: Claire Morrice

The Hayward Tyler Group specialises in submersible motors and pumps for the power generation and oil and gas industries. It is experienced in the design, manufacture, supply and service of specialised pumps, motors and mixers across the globe.



Branch News

ESSEX

Contact: Arnold L Carlson, T: +44 (0)1268 794615 8 October: 17.30: Tank Cleaning and Processing of Sludge, Sarah Seenan, Willacy Oil Services MIDLAND

Contact: Margaret Ward, T: +44 (0)1299 896654 **15 October:** 10.30: Visit to the Lubrizol Research Facility, The Knowle, Nether Lane,

Hazelwood, Derbyshire

ABERDEEN

Contact: Alan Higgins, T: +44 (0)1224 790389

15 October: Silverpit Crater Discovery, Phil Allen, Petroleum Geoservices Ltd

Please note: Aberdeen members who have not received a copy of the forthcoming 2003/2004 programme may view it at www.energyinst.org.uk Members attending the first meeting at 6pm on Wednesday 15 October at the new Marcliffe Hotel may also be able to pick up a copy.

Discussion Groups

ENERGY, ECONOMICS, ENVIRONMENT

Talent Strategies – Managing the Attraction and Retention of Talented Individuals in Today's Market

Tuesday 14 October 17.00 for 17.30–19.00 Energy Institute, 61 New Cavendish Street, London W1G 7AR, UK Speakers: lain Manson and Jon Glesinger, Energy and Natural Resources, Norman Broadbent Contact: Laura Viscione T: +44 (0)20 7467 7174 F: +44 (0)20 7580 2230 e: lviscione@energyinst.org.uk

BLF 2003 Annual Dinner Wednesday 5th November 2003 London Hilton Hotel, Park Lane, London, U.K.

Don't miss the only major lubricant industry annual dinner in Europe.

Come and join the British Lubricants Federation Council, members and their guests from the U.K. and World Lubricants industry at this prestigious event. Non-BLF members especially welcome. Contact chrisabbott@blf.org.uk Tel: +44(0)1442 230589

PETROLEUM REVIEW OCTOBER 2003

IP ANNUAL DINNER

Wednesday 18 February, Grosvenor House Hotel, London

Guest of Honour and Speaker:

John Simpson CBE, BBC World Affairs Editor

John is an accomplished public speaker and enthrals audiences across the world with his lively and entertaining talks and lectures. With over 30 years' experience in international journalism he has the ability to cover topics from highly factual and intense World Affairs to more light-hearted and amusing tales from his extensive travels.

TICKET APPLICATION FORM



energy

Please photocopy this page and London W1G 7AR, UK Fax: +4	d send completed form to the Events Departme 4 (0) 20 7580 2230	ent, Energy Institute, 61 New Cavendish Street,
I wish to order	ticket(s) @ £193.00 + 17.5%	VAT (£33.78) each = Total £
Title: Forename:	Surname:	
El Membership No:	Company:	
Address:		
	Postcode:	Country:
E-mail:	Tel:	Fax:
Visa MasterCard Card Number: Card Number: Card Number: Credit card holder's name and Forename:	Euro Card Diners Club America Expiry: D. (1990) Expiry: D. (1990) Address (if different from above): Surname:	an Express
Billing Address:		
Postcode:	Country:	
Signature:	Date:	
Data Protection Act 1998		Charles and the state of the second second

in association with

Petroleum

Any information provided by you may be held by the IP in its computer records. Please tick if you do not want to receive details of products or services from other organisations with whom we associate.

a) Tickets can only be purchased by Energy Institute Members and by purchasers of an IP Week Pass

b) All tables seat 10. Purchasers of less than 10 tickets will be seated with other guests. c) Ticket purchasers wishing to share tables with named individuals or companies must state this when completing the application form, as changes cannot be made after tickets have been allocated.

d) Applications should be made by completing this form and sending it to Energy Institute, with the full remittance including VAT. (Extra charges may apply - see item 'g'.) Orders received by Friday 31 October 2003 will be included in the primary table allocation. Applications received after 31 October 2003 will then be considered on a first-come first-served basis. e) The cost of one ticket is £193 plus VAT at £33.78. VAT is payable by all UK and overseas

purchasers. No additional charges will be incurred for credit card payments. Full payment must be received before tickets can be guaranteed. All tickets are the same price, whether or not your guests are El Members. (Extra charges may apply - see item 'g'.)

(b) For bookings requiring additional administration (eg: incorrect payments, requests for invoices, etc.), or if payment is not received before 5 January 2004, an extra charge of £20 per ticket will be made.
(g) Upon EI receiving your booking form (by fax, post or e-mail) you become liable

for full payment of the fee and you undertake to adhere to the terms and conditions as specified.

h) Tickets for tables in the primary allocation will be mailed during the week of 17 November. Please note that the EI may be unable to meet requirements in full, and we suggest therefore that you do not invite guests until you have received your tickets. In the event that the Dinner is oversubscribed, allocation of tickets will depend on the degree of the applicant's involvement in El affairs, and a

will depend on the degree of the applicants intovenient in Eranas, and e waiting list will operate. Full refunds will be made as appropriate. i) If you cancel your order after it has been processed, a refund less a 20% administration charge of the total monies paid will be made provided that notice of cancellation is received in writing by 5 January 2004. No refunds will be actide involves concelled ofter this date be paid or invoices cancelled after this date.

j) Successful applicants should submit their guests' names, in writing, to the EI by Wednesday 28 January 2004 at the latest. Name changes or additions submitted after this date cannot be included in the printed guest list. Further information regarding the guest list will be provided with the tickets.

k) Please notify the Energy Institute in writing of any special dietary requirements by 9 February 2004. An additional charge may be incurred. I) Dress is black tie with decorations.



