Petroleum review

OCTOBER 2002

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- Dawn of a decommissioning era

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- Scandinavian contradictions
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Petroleum review

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ABBREVIATIONS

The following are used throughout *Petroleum Review*:

mn	= million (10^6)	kW	= kilowatts (10^3)
bn	= billion (10^9)	MW	= megawatts (10^6)
tn	= trillion (10^{12})	GW	= gigawatts (10^9)
cf	= cubic feet	kWh	= kilowatt hour
cm	= cubic metres	km	= kilometre
boe	= barrels of oil equivalent	sq km	= square kilometres
		b/d	= barrels/day
t/y	= tonnes/year	t/d	= tonnes/day

No single letter abbreviations are used. Abbreviations go together eg. 100mn cf/y = 100 million cubic feet per year.

Front cover: Aircraft refuelling at Cardiff International Airport

Photo: P&O Trans European

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ROUNDUP From the Editor

Saved by the Russians?

At the time of writing the Iraqi Government has just conceded access to the weapons inspectors. The Russians are enthusiastically claiming credit for a move that could potentially avoid conflict in the region. Global stock markets immediately rose on the news while oil markets fell as the 'war premium' in the price of oil eroded.

The Russians have very good reason to avoid an invasion of Iraq. The Iraqi's have recently agreed to honour their $10–12bn debt to Russia. Russian companies sell up to 40% of Iraqi crude, Russian contractors are already busy in the Iraqi oil fields and the major Russian oil companies all have concessions to develop Iraqi fields once the UN sanctions are lifted.

The problem for the US Administration and its supporters such as the UK leadership is that peace in this form would mean Saddam Hussein was still in place. But, the very real danger that Iraq might be reduced to a 'badland' like Afghanistan would have been avoided.

The overwhelming danger remains that once the immediate pressure is off Saddam Hussein may start to cheat again. What the West's most senior politicians will have to decide is whether war or peace offers the greater risk.

Amazing arrogance

You would have thought that stockbrokers' analysts would currently be keeping a very low profile, yet, apparently without embarrassment, London analysts have been publicly telling the Chairman of Shell how to do his job. This summer has seen endless revelations showing that over the recent past analysts reports have been little more than sales brochures for the shares. Figures published in *The Economist* (31 August) show that in the bear market of the last two years managed funds (including costs) have barely beaten tracker funds. Yet the justification for all those highly-paid analysts and fund managers was precisely that their superior skills and knowledge would really come into their own in a downturn. Even *The Economist* concluded you'd be better off buying tracker funds.

The basis of the analysts recent public attack was that Phil Watts, Shell's Chairman, was not communicating effectively with them. Now anyone who has dealings with Shell knows that they positively drown you in data and information while their hospitality is not to be faulted. So the analysts can't be complaining about the lack of data, food or drink.

So what are they really saying? Do they want Shell to do their data analysis for them or are they looking for an inside track? Is it worth pointing out that soliciting insider knowledge is unethical and probably illegal? It would certainly be illegal to give it. It also raises the question of what do these analysts get from companies they favour more highly than Shell?

Now, as an oil journalist, I have an interest to declare. Around 20–25 years ago virtually all the oil and gas companies decided to put more resources and effort into investor relations compared with press relations. Naturally, all oil journalists thought this was a bad thing. Now that the analysts' arrogance has reached the point where they feel entitled to publicly criticise CEOs, is it time for a rethink? To be fair, the analysts often produce excellent reports that are of great help to journalists. However, many of these reports are somewhat less objective than they appear at first sight.

In a report issued earlier this year a well-known investment house managed to add 10% to the future deepwater production of Company A and remove 14% from Company B by using the wrong shareholdings. Company C gained nearly 40% by being given large shareholdings in a block where they didn't have any involvement in. There were numerous other errors.

Two key questions arise. The analysts concerned strongly favour and recommend Company A. The errors favour Company A. Coincidence? Which then raises the further question, why aren't the investor relations departments of the oil companies checking the analysts' reports and coming down hard given that it is all public domain data?

Oil journalists are generally fairly good about admitting and apologising for their errors, but this is a humility virtually unknown from the investment community, despite the fact their words have large financial implications.

Chris Skrebowski

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

e world

Plimsoll Publishing has launched a new website aimed at owners/managers in the UK fuels industry who are looking to make an acquisition or to sell their own company. The **www.whatcompany.co.uk** site is designed to help companies gain a better understanding of what their own company is worth and presents company names and analysis of what companies would be their best options for buying or selling. The service costs £600 plus VAT.

www.e-pakistantrade.com is a new business-to-business (B2B) trade portal which covers more than 60,000 product categories.

Portum, a European e-sourcing specialist, has launched its Enterprise Administration Tool (EAT), a software that allows its customers to self-manage online auctions (recommended as a tool for marketplaces staging more than 100 auctions a year). The tool is reported to help minimise customer reliance on third-party vendors and to keep costs down.

Users are able to register and train auction participants, assign suppliers to address books, create analyst accounts, generate passwords and export user data. The application is hosted by Portum – **www.portum.com** – but the customer uses it as if it were his own platform. A number of additional services complementing the tool have also been unveiled, including technical and administrative seminars and training on how to build a customer support centre.

The International Marine Contractors Association (IMCA) has published industry guidance on the safe application and use of chain lever hoists in the subsea arena. The ten-page IMCA D 028 guidance costs £5 for members and £10 for non-members. To order, log on to **www.imcaint.com/www/divisions/diving/publications/028.html**

www.petrolstationdesign.com is a website which has been developed by Minale Tattersfield and Partners for the energy design sector.

Shell has unveiled a new bitumen website at **www.shell.com/bitumen** that contains information on the company's bitumen products and advice on what to use for each purpose. It also gives examples of how Shell's bitumen products have been used across the globe – from roads in China to the Ferrari race track in Malaysia.

Petrobras has unveiled a new refineries mini-site on its main website at **www.petrobras.com.br** The new site contains refining statistics, production figures, contacts and related information.

In Brief

UK

BP (50%) is understood to be planning *a two-phase development for the £480mn Rhum gas condensate field in central North Sea block 3/29a. First condensate is slated for 3Q2004.*

Kerr-McGee has brought onstream the *Tullich oil field in central North Sea block 9/23a.*

UK Energy Minister Brian Wilson has *awarded 25 production licences to groups made up of 33 different companies in the 20th Offshore Licensing Round. A full list of the awards can be found at* ***www.og.dti.gov.uk/upstream/licensing/offshore_20th/index.htm***

Marathon Oil has gained UK *Government approval for its Braemar field development plan in block 16/3c and a new 380mn cf/d pipeline linking the Brae facilities with the BP-operated Miller platform in the central North Sea. First production is anticipated in 4Q2003 at 46mn cf/d of gas and 4,000 b/d of condensate.*

Europe

HGB Offshore of the Netherlands is *reported to have secured an engineering, procurement and construction contract from Clyde Petroleum covering the 1,200-tonnes platform jacket, piles and 2,200-tonnes topsides for the Q/4C field in the southern North Sea. Fabrication is due to complete in June 2003.*

Keppel Corporation of Singapore is *reported to have acquired Dutch off-*

Complete news update

The 'In Brief' news items in *Petroleum Review* represent just a fraction of the news we regularly publish on the IP website @ **www.petroleum.co.uk** via the 'News in Brief Service', together with our daily News 'ticker' on the main home page.

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

Why not visit the site to find out more about the latest developments and trends in your industry? Click on

www.petroleum.co.uk

NEWS Upstream

Premier Oil makes move out of Myanmar

Premier Oil has announced a $670mn group restructuring and exit by Amerada Hess (25%) and Petronas (25%) in a deal that will see Premier transfering its entire 26.67% interest in and operatorship of the Yetagun project in Myanmar to Petronas and/or other partners in the project who will assume and repay at completion $152mn of project debt and pay Premier a cash consideration of $107mn. Premier is also to transfer a 15% stake in Natuna Sea block A to Petronas who will make a cash payment of $100mn, and a 23% interest in Natuna Sea block A to Amerada Hess for $17mn.

Premier also reported that it has concluded an agreement with BG to farm into the Amerada Hess-operated licence P1029 in North Sea blocks 204/16 and 176/20 located adjacent to the UK/Faroes boundary. The independent is to carry BG through parts of the forthcoming seismic acquisition and drilling programme to earn between 16% and 20.8% equity.

Together with partner Indian Oil Corporation, Premier has also announced a 38% farm-in agreement with Hindustan Oil Exploration to explore the Jaipur block that lies adjacent to the Digboi oil field. Additionally, it has concluded agreements with Tullow Oil and Essar Oil, subject to Indian Government approval, to take an 84% stake in and operatorship of block CR-ON-90/1 in the Cachar region, adjacent to large gas discoveries in eastern Bangladesh.

Finally, subject to approval from the Gabon Government, Premier has concluded an agreement with Sasol under which it will share in the costs of evaluation of the Ex-Phenix area offshore southern Gabon. If the evaluation proves positive, Premier has the right to negotiate a 25% share.

UKCS production rises in June

Oil production from the UK Continental Shelf rose in June 2002, on both the month and year, according to the latest Royal Bank of Scotland *Oil and Gas Index*. UK oil production, at 2,143,228 b/d, was up 1.8% on the month and 7.5% on the year. Gas output was down 6.4% on April at 9,324mn cf/d, but 7.8% higher than June 2001.

During August the price of Brent rose to $28/b. Senior Economist Tony Wood commented: 'Much of the current premium on oil prices results from expectations on an imminent US action in Iraq. However, unless supply and supply routes are more widely affected, oil markets are unlikely to be fundamentally undermined by the loss of Iraq's oil. Price spikes are always possible, but higher prices for a sustained period is less likely.'

Year Month	Oil production (av. b/d)	Gas production (av. mn cf/d)	Av. oil price ($/b)
Jun 2001	1,993,483	8,639	27.60
Jul	2,033,323	8,841	24.70
Aug	2,018,982	8,814	25.60
Sep	1,984,388	9,091	25.90
Oct	2,169,226	8,909	20.60
Nov	2,161,755	11,949	18.80
Dec	2,425,159	12,621	18.60
Jan 2002	2,270,322	12,303	19.30
Feb	2,247,395	11,732	20.20
Mar	2,153,321	11,640	23.80
Apr	2,230,781	11,182	25.70
May	2,106,088	9,962	25.50
Jun	2,143,228	9,324	24.10

Source: The Royal Bank of Scotland Oil and Gas Index

North Sea oil and gas production

Native Canadians reaping oil rewards

Native Canadians are reaping the healthiest rewards from oil exploitation on their ancestral lands since the boom years of the early 1980s, with C$296mn being collected by various tribes last year, writes *Monica Dobie*.

This flow of money is supervised by Indian Oil and Gas Canada, a regulatory body affiliated with the federal Ministry of Indian Affairs. It is charged with monitoring oil and gas deals on Indian land and ensures that tribes and companies conduct adequate consultation before signing deals.

Obviously it is the native bands that need the most help and representatives from Indian Oil and Gas examine every potential deal to make sure they receive a fare deal. Notably, because petroleum companies do not pay federal income tax on royalties when exploiting native land, the agency ensures payments are set a couple of points higher to fetch a comparable price to non-Indian land.

John Dempsey, Director of Policy for Indian Oil and Gas Canada said the biggest benefit for companies working on native land is flexibility. He said: 'When dealing with the bidding process on non-native land, companies can only buy small tracks that the government puts up for sale. When you deal on First Nations land the company has the ability to lease as much land as the band will let them, and when they want.'

The oil companies preferring to deal with tribes are generally smaller because of the intimacy level demanded by native chiefs. 'The chiefs expect the owner of the oil company to have personal negotiations with him, and get to know the band; not be an anonymous CEO,' said Dempsey.

Included in every agreement is a clause that prevents companies from exploiting sacred land and telling them to suspend operations if sacred land is discovered in the exploration process. For example, burial grounds, teepee rings, or soil that contains traditional artifacts might be discovered through drilling or digging.

All profits go to the First Nation tribe where the exploitation took place. There is no sharing of profits between tribes. A lump sum is put in the tribe's bank account and can be accessed only with government permission. The funds go toward improving the tribe community services such as schools, job training and hospitals.

Brazil announces winning fourth round bids

Brazil's National Petroleum Agency (ANP) has announced the 4th round concession contracts for the exploration bidding round that was held on 19/20 June 2002. Fourteen companies were awarded 21 blocks (10 onshore and 11 offshore) covering virtually all the major basins.

The total signature bonus was R$92.4mn. Five blocks attracted bids well above all the others. The highest bid was for the key Santos Basin BM-S-29 block that went to Maersk Oil (100%). The next highest bid was from Shell (100%) on BM-S-31, also in the Santos Basin. The next highest bid was for BM-C-24 to BHP Billiton (100%), located in the Campos Basin. The other Campos Basin award went to Petrobras (40%; operator) in conjunction with Shell (60%). The only other high bid block was BM-J-3, in the Jequitinhonha Basin, to a consortium of Petrobras (60% and operator) and Statoil (40%).

Green light for phase 2 Alba expansion

The Government of Equatorial Guinea has approved Marathon Oil's Alba field Phase 2A expansion plans that will increase gross condensate production from 17,000 b/d to 46,000 b/d by 4Q2003. Two new platforms are planned, together with the drilling of new production and gas injection wells offshore and an expansion of the onshore condensate processing facilities on Bioko Island. More than 800mn cf/d of wet gas will be produced and processed to extract the condensate. Two new compressors will return all gas not used in methanol production or for fuel to the offshore field for reinjection at a rate of 590mn cf/d.

In addition to gas and condensate production within the Alba PSC, some 2,700 b/d of LPG is recovered and processed at the Bioko Island LPG facility. Some 120mn cf/d of lean gas is processed at the methanol plant, which produces an average 2,500 t/d of methanol.

The company is also finalising Phase 2B plans to increase production through the expansion of existing LPG facilities from 2,700 b/d to 16,000 b/d. Upon approval and completion of both expansion projects, Marathon's net proven reserves in Equatorial Guinea will total 300mn boe.

In Brief

shore repair and conversion shipyard Verolme Botlek for €22.4mn.

North America

***ChevronTexaco and joint venture partners** BP and Shell have announced a new deepwater discovery at the Great White prospect in Alaminos Canyon block 857 in the Gulf of Mexico.*

***A unitisation agreement is understood** to have been completed on Alaska's Prudhoe Bay oil field. BP (26.35%) is the sole operator of the project and ExxonMobil the biggest shareholder with a 36.4% working interest. Other partners are Phillips Petroleum (36.07%), ChevronTexaco (1.6%) and Forest Oil (0.02%).*

Middle East

***The Iranian authorities are reported to** have suspended for a year the award of any major new oil contracts to foreign companies. The move is a blow to oil majors such as TotalFinaElf, BP, Shell and Eni who were seeking to agree oil buy-back deals to develop large onshore oil reserves in the Bangestan and Azadegan fields.*

Russia & Central Asia

***The Russian Ministry of Natural** Resources is reported to have announced that the starting bid for the auction of the 832mn barrel Talakanskoye field in Sakha that is to be held on 26 December 2002 will be set at $56mn, with an increment of 10%.*

***Russia is reported to have drawn up a** plan to license foreign oil companies to develop its offshore oil and gas fields. It is proposed to auction rights to explore for and develop hydrocarbons from 44 offshore areas from now until 2005. The areas cover 315,000 sq km and account for 8% of Russia's oil and gas resources offshore.*

Asia-Pacific

***Woodside Petroleum has announced** that the recent reserve downgrades at its Sunrise gas field in the Timor Sea would have minimum impact on the proposed A$6.6bn floating LNG project. The news follows media speculation that Woodside's partner, Shell, could also abandon the project.*

In Brief

***British Gas, Oil and Natural Gas** Corporation (ONGC) and Reliance Industries are reported to have agreed to invest more than $150mn in India's Panna-Mukta and Tapti oil and gas fields by 2004 even though operatorship of the fields has yet to be agreed.*

***The Indonesian authorities are** reported to be planning to put a further 10 oil blocks out to tender after oil companies expressed little interest in blocks offered in 17 areas at the start of 2002.*

***A total of 11 oil companies are understood** to have bid on 27 onshore and offshore blocks in India's third licensing round.*

***The proposed A$6.8bn Papua New** Guinea–Australia gas pipeline is reported to have been rerouted in order to take gas direct to Moomba, a key distribution hub for southeast Australia. The decision to reroute followed the project's failure to secure a gas contract for the new Townsville power station in Queensland.*

***A total of 15 areas off the coast of** Western Australia are being offered in the latest Australian offshore licensing round. For more details visit* **www.industry.gov.au/petexp**

***CNOOC is understood to have** acquired a 5% interest in the North West Shelf (NWS) gas project offshore Western Australia for $320mn.*

***The Cambodian National Petroleum** Authority is reported to have awarded block A in the offshore Gulf of Thailand to ChevronTexaco (70%) – it is the first exploration licence to be awarded by the authority since 1998.*

Latin America

***BP has discovered 1tn cf of gas in its** Iron Horse field offshore the east coast of Trinidad. It is the company's second major gas find in 2002 and its fourth in three years, raising its estimated Trinidadian gas reserves to 17tn cf.*

***BG and ChevronTexaco have been** given the green light to develop the Dolphin Deep and Starfish gas condensate fields offshore Trinidad and Tobago. Production is to be tied into a long-term LNG contract with El Paso*

NEWS Upstream

'Spirited bidding' in GoM lease sale

The results of the 21 August 2002 US Minerals Management Service's (MMS) auction of leases for offshore blocks in the western region of the Gulf of Mexico were very similar to those of the lease sale held for the same region in August 2001, reports *Judith Gurney*. This suggests that most bidders continue to follow consistent and, with the exception of Shell and ExxonMobil, relatively low-risk strategies.

Some 50 companies bid for 323 blocks in this auction, compared to 44 companies bidding for 329 blocks in the previous western region auction. Once again, independent oil and gas companies dominated the action, demonstrating, in the words of MMS Director Johnnie Burton, 'spirited bidding activity'. And, once again, Shell and ExxonMobil figured among the top 10 companies with the most apparent high bids. Kerr-McGee, which had been at the head of this list for three years in a row, slipped to second place this year, bested by Amerada Hess, with high bids of only $13.1mn, compared to $31.9mn in 2001.

In all, this auction had apparent high bids (the MMS will not issue its final bid acceptance for several months) of $151.3mn, compared to $165.6mn last year. The highest bid, $8.4mn made by Dominion Exploration and Production in partnership with Nexen Petroleum Offshore, was for a block in Garden Banks very close to the Garden Banks block which received the highest bid of $8.3mn in 2001.

Tanker conversion to *Fluminense* FPSO

The *Sahara* – one of the 15 largest tankers in the world with an oil storage capacity of 1.3mn barrels – is to be converted into a FPSO vessel and renamed the *Fluminense* for use on the Shell-operated Bijupira and Salema fields in the Campos Basin offshore Brazil. Modec International is the owner/operator of the unit that is due for delivery to Petrobras in 1Q2003. The FPSO will be moored in 700 metres of water and will process 70,000 b/d of oil and 75mn cf/d of gas. ABS is to provide classification services for the tanker conversion. *Photo: MODEC*

Middle East upstream developments

Stella Zenkovich *reports on recent upstream developments in the Middle East:*

- *Slavneft's new management, in place since June, is reviewing its involvement in Iran and Iraq, where its role in the past has often been limited to servicing oil wells rather than developing production. In Iraq, the previous management had agreed to develop the 800mn barrel Shubba oil field while, in Iran, it had planned to maintain oil wells, build a pipeline and upgrade a refinery. The new management wants to concentrate on projects in Western Siberia, its core production area.*
- *There are eight pre-qualified bidders for a $100mn contract aimed at expanding oil production by 100,000 b/d from the onshore Bab field in Abu Dhabi that is currently producing 250,000 b/d.*
- *The United Arab Emirates' recoverable oil reserves are put at 98bn barrels, fourth largest after those of Saudi Arabia, Iraq and Iran, and could last up to 150 years according to* Al Ghorfa, *the Fujairah Chamber's monthly magazine.*

NEWS Upstream

Spends and trends in the UKCS

Over the next five years exploration, appraisal, development, operations, abandonment and decommissioning spend on the UKCS is projected to be worth between £32bn and £40bn, according to the Scottish Enterprise Energy Team in its recently published *Spends and Trends 2002* forecast.

The *Spends and Trends* study, available on CD-Rom, includes forecasts based on three UKCS oil price scenarios, ranging between $15 and $25/b. At the current oil price of around $25/b it is predicted that for the five years between 2002 and 2006 opex will total £20.2bn. Under the same price scenario, capex spend will be £16.9bn.

The report also examines, for the first time, international opportunities in the oil and gas markets of the Gulf of Mexico, West Africa, the Middle East, North Africa, South America, South East Asia and West Australia. For further information, e: **emlane@webershandwick.com**

Concerns voiced over Australian gas supplies

Australian national commodity forecaster ABARE is understood to have reported that there is growing concern that Australia's gas supplies will be unable to keep pace with demand medium to long term (2020). The shortfall is predicted to be particularly acute in the eastern states unless significant infrastructure investment is undertaken.

The ABARE study noted that despite a four-fold increase in coal bed methane production from 1999 to 2020, existing supplies to Queensland need to be supplemented in the near future. Meanwhile, demand for gas in New South Wales, South Australia, Tasmania and Victoria is forecast to be met by existing supplies and increased production of coal bed methane until 2020.

Market potential for gas from the Bonaparte Gulf and Timor Sea regions is thought to be relatively more competitive than gas from Papua New Guinea, ABARE believes.

Matterhorn TLP

Atlantia Offshore has subcontracted Paragon Engineering Services to provide facilities design/engineering on TotalFinaElf's Matterhorn project in deepwater Mississippi Canyon block 243 in the Gulf of Mexico. Atlantia has a turnkey contract to deliver the mono-column tension leg platform (TLP) – its first ever dry tree TLP – for installation in summer 2003. The platform will handle 33,000 b/d of oil and 55mn cf/d of gas.

African E&P news

Stella Zenkovich *reports on recent African E&P developments:*

- *The new management of the Russo-Belarus joint venture Slavneft has withdrawn from the Sudan, where its predecessor had signed a profit sharing agreement to develop a ninth oil and gas block in the country at a cost of $126mn, citing high risks and poor profit prospects.*
- *The ChevronTexaco subsidiary Texaco Nigeria Outer Shell (TNOS) has completed the Aparo-2 appraisal well that it drilled and is operating on behalf of the Nigerian National Petroleum Corporation (NNPC). The well results are reported to have confirmed the OPL 213 Aparo oil discovery.*
- *A new Memorandum of Understanding for cooperation has been signed by Algeria's Sonatrach and Shell for broad upstream and downstream developments. It does not cover the 200bn cm Gassi-Touil integrated gas field project, where Shell is one of 30 companies to have been invited to participate by Sonatrach.*

In Brief

Merchant Energy with some 80mn cf/d of gas to be piped to the Elba Island LNG terminal in Georgia from 2005.

***The Colombian Government is** reported to be targeting a 1bn barrel increase in oil reserves from the current 2bn barrels over the next four years.*

Africa

***ExxonMobil has awarded $400mn in** contracts for its Yoho shallow water oil field offshore Nigeria. Global Offshore is understood to have secured the contract to engineer and construct a wellhead platform for the first phase of the project (a fixed production platform is planned for the second stage), while SaiBos won the engineering and construction contract for the facility. The 0.4bn barrel field is due onstream before the close of 2002. Full field start-up is scheduled for late 2004, with a target peak production of 150,000 b/d.*

***US independent Vaalco Energy is** reported to be targeting 15,000 b/d production from the Etame field offshore Gabon once the 1.1mn barrel capacity* Petroleo Nautipa *FPSO is connected to three subsea wells.*

***State-owned Sonangol and BP have** announced an oil discovery in the ultra-deepwater block 31 offshore Angola. The Plutao well tested at 5,357 b/d of oil.*

World

***According to Douglas-Westwood and** Infield Systems' recently published* The World Offshore Pipelines and Umbilicals Report, 2002–2006 *nearly 50,000 km of pipeline will be installed globally over the next five years. This total represents an increase of 44% over the previous five-year period and will require a global capital expenditure of almost $54bn. Meanwhile, the companies' latest* World Oil Supply Report 2002–2050 *assesses all current and potential oil producing countries and forecasts their likely oil reserves depletion, year and level of peak production. For more information, log on to* **www.dw-1.com**

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

In Brief

UK

Premier Oil has posted a 1H2002 profit *after tax of £15.3mn, a rise of 23% over the same period a year earlier.*

Halliburton Brown and Root changed *its name to KBR as of 2 September 2002.*

Cairn Energy has posted a 1H2002 *profit after tax of £15.6mn (1H2001: £22.8mn).*

It has been reported that BG is planning a £250mn debt issue in the UK in order to help finance company expansion plans.

Europe

Wintershall of Germany is reported to *be acquiring Dutch operator Clyde Petroleum that is being sold off by the merged ConocoPhillips operation.*

Reports say that the Greek *Government is to privatise the Public Gas Corporation (DEPA) through a sale of up to a 35% equity holding in the company.*

Petroleum Geo-Services has consolidated *its three Houston, London and Oslo corporate centres as part of an ongoing company-wide cost reduction programme. The future PGS corporate centre will be located in London.*

Saipem, an Eni company, has acquired *96.8% of the voting rights of Bouygues Offshore of France.*

Aker Kvaerner has posted 1H2002 *operating revenue of NKr22.05bn compared with NKr21.6bn in 1H2002, with net profits for the period rising to NKr430mn from NKr148mn.*

The Polish Government has approved *the Initial Public Offering (IPO) for state gas monopoly PGNiG and is to place 10% of shares on the Warsaw Stock Exchange in 2004, reports UFG. A further 30–40% will be sold to private investors in 2004.*

North America

US energy research company Zeus *Development Corporation is reported to have concluded that CNG ocean transport is competitive with LNG and subsea pipelines for gas reserves con-*

NEWS Industry

New gas export policy from Gazprom

Gazprom has prepared a draft export policy document that proposes granting the Russian gas monopoly greater influence in Europe and allocating some of its export business to independent gas producers, according to UFG.

The main points of the document are reported to be:

- The elimination of intermediaries between Gazprom and its final European customers in order to concentrate the entire export business in the hands of Gazprom and its subsidiaries and associated companies.
- Although Gazprom will retain a monopoly in exports to Europe, it will allocate the oil majors a share of the export business. This may require the independents to sell gas to Gazprom at a weighted-average export price, with the gas then resold by Gazexport to Europe. Another option would be for Gazexport to sell gas on commission.

It is proposed that the new gas policy will be implemented in four stages:

- 2002–2003: Gazexport will stop selling on commission but will purchase gas from Gazprom's production subsidiaries.
- 2004–2005: A foreign subsidiary will invest in the development of Gazexport's distribution network in Europe. By 2015 Gazprom plans to sell 30% of its gas directly to consumers, energy companies and gas distributors in Europe.
- 2006–2010: Gazprom's (Gazexport's) entry to wholesale and retail markets in Europe.
- 2011–2020: Gazprom plans to raise exports to Europe from 130bn cm today to 200bn cm in 2020. Given that Gazprom is unlikely to be able to raise production proportionately, the share of independent gas producers in total exports to Europe will reach 25%, comments UFG.

China pipeline

A report on a major social consultation programme along the route of China's West–East pipeline project has been made public by the United Nations Development Programme (UNDP) in China. The survey provides input for an overall environmental and social impact assesssment (ESIA) for the project.

The report makes a number of recommendations to address future development priorities identified by the 10,000 people surveyed. It can be viewed at UNDP's China website at **www.unchina/org/undp** or via a link from **www.shell.com.cn**

Merger completion

The ConocoPhillips merger recently completed following clearance by the US Federal Trade Commission. Shareholders of both companies and all US and foreign regulatory authorities cleared the merger earlier this year.

The merged operation is the third-largest integrated US energy company. On a global basis, it is the sixth-largest publicly-held energy company based on hydrocarbon reserves and production, and it is the fifth-largest global refiner.

The company has net proved reserves of 8.7bn boe, daily oil and gas production of 1.7mn boe, and a refining capacity of 2.6mn b/d. It has assets of $75bn.

Russian update

Stella Zenkovich *reports on recent industry developments in Russian and Central Asia:*

- *Under a bilateral protocol signed with the Ukraine, Russia has guaranteed the delivery of not less than 110bn cm/d of gas from 2003 for onward export to western and central Europe via Gazprom's pipeline network. In lieu of transit fees of $1.093/mn cm over 100 km, Russia will provide 26bn cm of gas or equivalent (ie a part in cash). Supply to the Ukraine for local use will be priced at $50/1,000 cm. Under the terms of the agreement, Ukraine can re-export 1bn cm of this; any more and it will have to pay $100/1,000 cm.*
- *Kazrogaz – a gas transport/export joint venture set up by Gazprom (30%), Rosneft (20%) and Kazmunaigas (50%) in May 2002 – plans to expand in international markets after becoming the first Kazakh gas seller to the UK spot market. Kazakh gas is delivered to Russia's southern Orenburg region and swapped for volumes supplied by Gazprom to Western Europe. The first 800mn cm gas shipment was sold via Wieh, Wingas & Wieh in Germany, a Gazprom/Wintershall joint venture.*

Reducing Aussie greenhouse gas emissions

Australia's recently published National Greenhouse Gas Inventory 2000 has 'once again demonstrated that increasing the use of natural gas is helping to reduce greenhouse gas emissions from the stationary energy sector,' said the Chief Executive of the Australian Gas Association (AGA) Bill Nagle.

'The Inventory found that while there was a 4.3% growth in overall demand for electricity between 1999 and 2000, there was only a 2.3% increase in electricity generation emissions. It reported that "contributing to the reduction in emissions intensity [of electricity delivered to consumers] was a decrease in the share of electricity generated from brown coal and a corresponding increase in the share of natural gas (a low emissions intensity source of generation)."'

He continued: 'The Inventory also found that while fugitive emissions from oil and natural gas increased by 1.4% between 1990 and 2000, this compared with a 37.4% increase in activity levels. It reported that "the small rise in emissions relative to the increase in activity is the result of improvements in gas distribution and a 25.5% reduction in the emissions from flaring."'

'Coal accounted for the highest absolute increase in stationary energy sector emissions between 1990 and 2000, with the increase in coal related emissions accounting for 72.5% of the overall increase in emissions for the sector, gas accounting for 21.5%, oil 5.6% and biomass the remaining 0.3%,' Nagle said.

'While the Inventory found that natural gas emissions have shown the largest relative growth over that period, this is clearly due to the very large overall increase in natural gas use – use which has contributed substantially to reducing the overall greenhouse gas emission levels coming from the stationary energy sector.'

'In summary, this most recent inventory clearly demonstrates that the increased use of natural gas over coal in producing power is having a very positive effect on reducing emissions from Australia's electricity generation sector. At a time when the Council of Australian Governments is developing a National Energy Policy, the Inventory sends a strong message to governments that the further use of natural gas in electricity generation – and in direct residential, commercial and industrial applications – must be encouraged.'

Developments in the pipeline

Stella Zenkovich *reports on recent pipeline developments:*

- *Israel has cancelled its tender for a $400mn domestic gas pipeline network following the rejection of a proposal by Paz Oil, Africa-Israel Investments and Bateman Engineering to build and operate the 450-km grid because it lacked a strategic foreign partner holding a minimum 10% stake as required by Israeli law. Paz has struggled to secure such a partner since Tractebel quit in April this year. BG had offered to step in but had insisted on a controlling interest – talks broke off in mid-July. The government may commission a local contractor to build the first 40-km stretch by mid-2004 and subsequently call a new tender for the remaining 410 km of the network.*
- *Gazprom of Russia has proposed the construction of a $3.2bn subsea pipeline that would carry Iranian gas to India using new technology developed for the Blue Stream gas pipeline serving Turkey.*
- *Ongoing tensions between Algeria and Morocco over the Western Sahara, and Morocco and Spain on several issues (including a territorial dispute over the uninhabited Perejil/Leila Island), have underscored fears that Morocco may decide to block Algerian gas exports to Spain and added impetus to the Medgaz project. The Medgaz project, launched two years ago by Algeria's Sonatrach and Cepsa of Spain, is to carry 10bn cm of Algerian gas direct to Spain.*
- *The projected cost of the much delayed West African Gas Pipeline project has increased by 25% to $500mn for its promoters Nigerian National Petroleum Corporation (27.7%), Shell (18%), Societe Beninoise de Gaz (2%) and Societe Togolaise de Gaz (2%). However, the Sponsors' Management Committee has now finalised the project's commercial and legal structure. The next step is to undertake an environmental impact assessment.*
- *Construction of the 865-km pipeline that will link the Temane and Pande gas fields in southern Mozambique is advancing at the rate of 2 km/day and is scheduled to complete by mid-January 2003.*

In Brief

taining between 0.3tn and 3tn cf and located between 300 and 1,500 nautical miles from market.

Middle East

***A study by the Kuwait-based** Organisation of Arab Petroleum Exporting Council (Oapec) has indicated that despite the high level of investment by the Arab states in the oil and gas sector over the past five years, they still need to invest at least a further $113bn in order to expand their oil, gas and petrochemicals sectors over the next five years.*

Russia & Central Asia

***Ukrainian President Leonid Kuchma** has invited Georgia and Moldova to fully participate in the international consortium managing the Odessa–Brody-Gdansk oil pipeline that is to carry Azeri and Kazakh oil to western Europe.*

Asia-Pacific

***Esso Australia Resources and BHP** Billiton are reported to have delivered their first Gippsland gas to Duke Energy in Tasmania through a major subsea trunkline.*

***Media reports say Sinopec has confirmed** that it will axe 20,000 jobs in the second quarter in an attempt to cut back on operating costs.*

Latin America

***Kerr-McGee is reported to have sold its** Ecuadorean assets to Perenco Ecuador and an unnamed company for $88mn.*

***The US and Venezuelan authorities** are reported to be negotiating an agreement that would guarantee Venezuelan oil exports to the US over a 20-year period. Venezuela currently produces some 2.5mn b/d of oil.*

***Petrobras has signed a final agreement** in order to acquire total control of Petrolera Santa Fe, Devon Energy's Argentina branch, for $80mn.*

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In Brief

UK

***Kuwait Petroleum (GB) (Q8) has significantly** increased its network in Scotland with the signing up of nine dealers in the Inverness region after their supply agreements with BP and Esso came to an end. A total of 13 sites are involved – all incorporating shops – bringing the total Q8 Scottish network to 52 service stations.*

Europe

***OMV's German subsidiary has acquired** 40 service stations in Bavaria from Martin GmbH in Nuremburg, increasing its share in the Bavarian fuel sales market to 4.5%. Together with the purchase of 32 sites from Shell & DEA Oil earlier this month, the deal almost doubles OMV's total German network from 79 to 151 outlets.*

***IBM has announced the award by Eni** of a contract to build and run web-based information systems for AgipPetroli's service station network. The systems will link 3,300 of the company's 9,000 independently owned service stations in Italy directly with management and in a more efficient way. Current plans are that ultimately nearly half of AgipPetroli's 9,000 filling stations will be connected in this way.*

***TotalFinaElf is planning to sell 165 service** stations currently operating under the Elf brand in Switzerland and a further 12 under the POCO brand to Geneva-based Tamoil for an undisclosed sum. The outlets represent less than 3% of the Swiss market and will boost Tamoil's network to 431 sites.*

***Fortum has started production of** ethanol-based gasoline at its Porvoo refinery in Finland. The new product was launched on the southern Finnish market in September 2002, marking the company's first step into the biofuels arena. The maximum ethanol content in the gasoline is 5% by volume. The trial is to run until end-2003 and has been granted a 30 cents/litre fuel tax concession during this period.*

Eastern Europe

***The consortium of Rotch Energy and** Lukoil is ready to pay $274mn for a 75% stake in the Gdank refinery and invest at least $330mn in the plant over the next five years, reports UFG.*

Nectar: sweet, but with a sour taste

Nectar – the new customer loyalty scheme launched by BP, Sainsbury's, Barclaycard and Debenhams – is claimed to be the UK's largest ever consumer loyalty programme. Some 50% (12mn) of UK households are expected to sign up to the scheme that will offer consumers the opportunity to collect points from more than 1,800 Sainsbury's, Debenhams and BP outlets and with all Barclaycard purchases. Points collected will be exchangeable for a wide range of rewards, such as grocery shopping, consumer goods, flights, holidays, restaurant meals, family days out and cinema tickets.

The advantages for the sponsors are envisaged to include access to shared resources, increased customer loyalty and the opportunity to attract new customers. In addition, each founding sponsor will have sector exclusivity within the programme.

The scheme is operated on behalf of the sponsors by Loyalty Management UK (LMUK), a subsidiary of Loyalty Management International, the founder of large coalition loyalty programmes in Holland, Spain and Canada where up to 70% of households participate.

However, research recently published by Datamonitor suggests that the Nectar scheme may not offer consumers the high level of reward expected. For example, the analyst reports that 'BP customers will receive less reward per litre than under its current scheme, and Sainsbury's petrol offers a better deal.'

LMUK is running a huge advertising campaign, across all media, to raise awareness and encourage initial uptake, reports Datamonitor, who expects most interest to come from migrating members of existing schemes run by BP, Barclaycard and Sainsbury's (Debenhams has no existing programme). Points currently held on Sainsbury's Reward Card and Barclaycard Rewards can be transferred onto a new Nectar account. Points held with BP's decade-old Premier Points scheme, however, cannot. Datamonitor suggests that this may be because BP, unlike Sainsbury's and Barclaycard, is giving customers a lower rate of reward than before. 'On Premier Points, where points can be redeemed for money off at Argos, customers effectively receive 0.8% per litre of fuel – equivalent to a 1.06% rate of reward at 75 p/l,' says the analyst. 'On Nectar, they effectively receive 0.5 p/l, or a 0.66% rebate at 75 p/l. BP clearly hope that customers do not feel short changed, but Premier Points will keep running until 2004 – perhaps as a bit of insurance. To make matters worse, Sainsbury's is giving back 1 pence per pound on all purchases, including petrol, which equates to 0.75 p/l on 75 pence fuel (1% rate of reward). Customers might not notice – but if they do, Nectar could turn slightly sour for BP.'

Downstream developments in Middle East

Stella Zenkovich *reports on recent Middle East downstream developments:*

- *Turkish oil refinery group Tupras of Izmir has signed an agreement with National Iranian Oil Corporation (NIOC) to buy and resell by mid-2003 some 4.5mn tonnes of Iranian crude, with an option to increase this to 6.3mn tonnes. NIOC is also reported to be negotiating the purchase of unleaded petrol from Tupras.*
- *The Sultanate of Oman is reported to be on the brink of ordering several LNG tankers from Spanish shipbuilding group Izar to ship LNG to Union Fenosa of Spain which is contracted to take 50% of production from Oman's third LNG train.*
- *Israeli Oil Refineries (IOR), the refining monopoly, is reported to be at an advanced stage of negotiations regarding the purchase of a Turkish fuel retailer with 500 service stations. IOR exports 25% of its annual oil products production, which it is unable to market domestically under existing Israeli law, and is keen to secure access to foreign networks.*

NEWS Downstream

New generation ISO gas tank

Interoute Transport Services, which specialises in the distribution of bulk edibles, chemicals, gases and milk, has worked with ISO tank manufacturer Van Hool and ISO tank chassis builder Corus to create a new generation of ISO gas tank that is claimed to increase payload by more than one-third. The 30-ft, IMO6 ISO units will increase payload from 18 to 25 tonnes within the 44-tonnes gross limit, states the company, increasing efficiency of gas distribution and reducing environmental impact by having fewer, yet larger, vehicles on the road.

State-of-the-art tanker loads in Alaska

Phillips' newest state-of-the-art Endeavour Class double-hulled tanker, the *Polar Resolution*, sailed into the port of Valdez, Alaska, at the end of August, where it loaded its first cargo of Alaska North Slope crude oil. The vessel is operated by Polar Tankers, a Long Beach, California-located subsidiary of Phillips Petroleum.

The vessel is the second of five 140,000 dwt Endeavour Class crude oil carriers that Polar Tankers is to add to its fleet each year until 2005. They are claimed to be the first crude oil carriers being specifically built for the Alaska trade in compliance with the Federal Oil Pollution Act of 1990. The next tanker, the *Polar Discovery*, will join the fleet in 2003. Each vessel is valued at more than $200mn.

Yukos acquires Mazheikiu refinery stake

Yukos has agreed to purchase for $85mn the 26.85% stake in Lithuania's Mazheikiu refinery that Williams of the US is selling in an effort to stave off bankruptcy. The deal also includes the transfer of management rights over the refinery to Yukos.

However, the Lithuanian Government has certain pro rata purchase option rights that the government claims includes the right to pre-empt the acquisition. According to UFG, the Lithuanian President has opposed the sale to Yukos, while the Parliament on the other hand has suggested that it supports the Russian company's entry to Lithuania.

Yukos is understood to have earlier hinted at a compromise when First Vice-President said the company would not object to the government acquiring part of the Williams stake as well. Yukos is planning to further expand in Lithuania by acquiring service stations and developing its downstream operations in the country.

Shell investigates biomass for cleaner diesel

Shell Global Solutions has joined forces with the Energy Research Centre of the Netherlands to investigate the feasibility of an integrated process that produces climate-neutral, premium-quality synthetic transportation fuels from biomass sources. The companies have developed a three-step process, known as Bio-FT, that produces a synthetic diesel that can be blended with conventional diesel to create a fuel that is claimed to produce much lower emissions. Once blended, the fuel can be used without engine adjustments, reports Shell, although the neat synthetic diesel may require some engine adaptation.

Shell reports that it is aiming to turn the Bio-FT process into a technology option and compare it to other sustainable transportation fuels options, such as biofuels and hydrogen obtained from photovoltaic water hydrolysis.

In Brief

***Shell PowerGas is to soon make its** European debut in Poland, with plans to sell the fuel from 100 selected service stations (approximately half the network) by the end of 2002. Some 700,000 tonnes of autogas were sold in Poland last year, an increase of 30% on year earlier sales, reports Shell.*

North America

***Marathon Oil has acquired Enron's** right to deliver and sell LNG at terminal facilities located at Elba Island, near Savannah, Georgia. The company secured the right with a bid of $31.9mn. Under the terms of the agreement, Marathon can supply up to 58bn cf/y of LNG for 17 years to El Paso Merchant Energy at the Elba Island LNG regasification terminal.*

***According to a soon to be released** study from Business Communications Company (**www.bccresearch.com**), the North American fuel cell market for large-scale applications is currently valued at $251mn. The market is expected to increase over the next five years at an average annual growth rate of 20.7%, reaching $642mn by 2007.*

***Kansas City-based Aquila is reported to** have announced that it is to sell its Southeast Texas and Mid-Continent gas pipelines and processing systems, as well as its 50% stake in Oasis Pipe Line Company, to private company Energy Transfer of Dallas. The $265mn deal is part of a restructuring programme that Aquila hopes will raise $1bn in capital.*

Middle East

***Minale Tattersfield and Partners has** completed work on the first of 400 service stations that it has redesigned for Israeli fuel retailer Delek.*

***Foster Wheeler Energy has secured a** contract from Aramco Overseas to provide engineering and project management services for two distillate hydrotreaters and power cogeneration plants at Saudi Aramco's Riyadh and Yanbu refineries.*

Russia & Central Asia

***Lukoil, Yukos, Sibneft and TNK have** hired a western expert to assess the feasibility of building a 1,500-km crude oil pipeline to the north Russian port*

of Murmansk and a deepwater export terminal capable of accommodating large 300,000-tonne dwt tankers, by 2005, reports UFG.

Gazprom management is reported to have approved a plan to refurbish its ageing gas pipeline system where 14% of the pipelines are worn out and 64% are between ten and 32 years' oil while less than one-quarter of the system is less than ten years' old, reports UFG.

Eni of Italy has bought fuel distributors Tamoil-Slovakia and Tamoil Praha from Oilinvest for an undisclosed sum, reports Stella Zenkovich.

Rosneft is to begin construction work on a new oil terminal at Nakhodka in the Russian Far East in January 2003, reports UFG. The project is expected to cost in the region of $92mn. The new terminal will double total capacity at Nakhodka to 12mn tonnes.

Asia-Pacific

Sinopec Zhenhai Refining and BP are understood to be planning to establish a 50:50 joint venture in China at an initial cost of $25mn.

It is understood that CNOOC and BP are in talks to discuss the second supply contract for LNG to a proposed LNG terminal in the Chinese Province of Fujian. The first contract, which was recently awarded to Australia and worth around $10bn, will be developed in the Guangdong Province.

Australia's four biggest fuel retailers – Caltex, Shell, BP and Mobil – are reported to have made an aggregate loss of A$506mn on their combined refining and marketing operations in 2001 – their first profit loss ever. The losses are claimed to amount to more than one cent for every litre of fuel sold.

The Asian Development Bank is reported to be offering to fund the $3bn gas pipeline project from Turkmenistan to Pakistan via Afghanistan.

Latin America

PdVSA has entered Brazil's lubricants and fuel market under the PDV brand name.

Repsol YPF has announced the start-up of the second train at the Atlantic LNG plant in Trinidad, part of a project to ramp up capacity to 12.8bn cm/y. The first shipment of LNG from the new 4.4bn cm/y unit has sailed for the Lake Charles refinery in Louisiana. Partners are Repsol YPF (25%), BP (42.5%) and BG (32.5%).

Africa

BG, the Egyptian Natural Gas Holding Company (EGAS) and the Egyptian General Petroleum Corporation (EGPC) have signed a Heads of Agreement with Gaz de France (GdF) for the sale of output capacity of the first train from Egyptian LNG's (ELNG) new facility to be built at Idku, east of Alexandria.

Nigeria's four oil refineries are to become self-accounting and independent of the Nigerian National Petroleum Corporation as part of its ongoing reorganisation, writes Stella Zenkovich.

MANY MORE OF THE MONTH'S DOWNSTREAM NEWS STORIES NOT INCLUDED ABOVE CAN BE FOUND ON THE NEWS IN BRIEF SERVICE @ www.petroleum.co.uk

Phasing out LRP across UK network

Lead replacement petrol (LRP), which replaced leaded 4-star petrol, will be gradually withdrawn from UK filling stations across the country over the next year, particularly at sites where demand has rapidly diminished, reports the UK Petroleum Industry Association (UKPIA). However, owners of cars that require this type of fuel will still be able to continue using them by switching to super unleaded 97 RON or premium unleaded 95 RON petrol as appropriate and, in both cases, using an additive at each fill-up.

The options are explained in more detail in a recently published briefing paper on *Alternatives to LRP* on the UKPIA website at **www.ukpia.com** A leaflet will also soon be available on the UK Department for Transport website at **www.dft.gov.uk**

UK Deliveries into Consumption (tonnes)

Products	†July 2001	†July 2002	†Jan–July 2001	†Jan–July 2002	% Change
Naphtha/LDF	151,205	87,546	973,883	631,523	–35
ATF – Kerosene	675,720	1,007,510	5,858,914	5,767,345	–2
Petrol	–	–	–	–	–
of which unleaded	1,672,836	1,640,024	11,525,230	11,451,278	–1
of which Super unleaded	44,050	59,755	232,159	319,514	38
of which Premium unleaded	–	–	4,890,793	–	–100
ULSP (ultra low sulfur petrol)	1,628,786	1,580,269	6,402,278	11,131,764	74
Lead Replacement Petrol (LRP)	58,051	52,515	541,415	346,051	–36
Burning Oil	423,146	191,818	2,742,941	2,200,557	–20
Automotive Diesel	1,391,508	1,481,562	9,218,392	9,714,928	5.4
Gas/Diesel Oil	520,277	463,855	3,680,788	3,515,833	–4
Fuel Oil	183,169	82,873	1,341,367	1,130,286	–16
Lubricating Oil	83,444	76,083	542,185	495,763	–9
Other Products	598,258	800,023	4,563,363	4,854,157	6
Total above	5,757,614	5,883,809	40,989,288	40,107,721	–2
Refinery Consumption	456,895	388,225	2,779,476	2,830,340	2
Total all products	6,214,509	6,272,034	43,768,764	42,938,061	–2

† Revised with adjustments

All figures provided by the UK Department of Trade and Industry (DTI)

The Opec message was delivered by Analysis Manager Javad Yarjani

Energising a new generation

Oil and gas shows provide a good platform for launching news. Offshore Northern Seas 2002 proved no exception with the Norwegian and UK Energy Ministers joining forces to announce a cross-border initiative offering potential benefits worth $2bn. With a theme of 'Energising a New Generation', the show also threw the spotlight on the contribution of young professionals to the offshore industry. *Nick Terdre*, Editor of the *ONS Today* newspaper, rounds up some of the highlights of the Stavanger show.

The need for the UK and Norway to open up potential synergies and cost-saving by breaking down the barrier represented by the median line between their two sectors has been a topic at conferences for some time. Had the Ministerial announcement at ONS, which was flagged in advance, not been substantive, there would have been grounds for disquiet at the lack of progress.

In the event, a breakthrough would seem to have been made with the UK–Norway North Sea Cooperation Workgroup – consisting largely of representatives from Pilot and Kon-Kraft, respectively government/industry committees in the UK and Norway – putting forward recommendations for a legal framework to apply in a corridor stretching some 60 km either side of the median line within which cross-border initiatives can take place.

A binational treaty will be required to give the framework legal effect – this is expected to be signed by early next year, the two Energy Ministers, Einar Steensnæs of Norway and Brian Wilson of the UK, told a press briefing. In the period up to 2010 it will open the way to savings worth $2bn, at a conservative estimate, from four main sources:

- *Capital expenditure* – each 1% saving on the projected $27bn of spending to 2010 equates to an annual saving of about $35mn.
- *Satellite fields* – development times could be reduced by between two and four years, and the value of each accelerated project increased by $50–100mn.
- *Operating costs* – each 1% saving on the projected $41bn of operating costs in the corridor equates to an annual saving of about $50mn.
- *Decommissioning costs* – each 5% saving on projected costs of $3.3bn is worth about $150mn.

Precisely what the contribution of each of these sources to the overall savings might be was not clarified, although the report of the workgroup says all sources have the potential to contribute significantly and accelerated field developments could generate up to half of the total. But the eventual outcome depends on the action taken by the industry once the treaty is signed.

The main scenario envisages cooperation to enable UK needs to be met by Norway, or, as one of the recommendations puts it, facilitating '...cross-border opportunities which recognise Norway's supply and UK demand-side drivers'. In the medium term the most obvious example is the UK's desire to meet part of its coming shortfall in gas supplies by importing from Norway, and a number of the recommendations deal with this.

An implementation team is to be formed to carry forward the report recommendations. Regular updates will be posted on the Pilot website (**www.pilottaskforce.co.uk**) and the Norwegian Ministry for Petroleum and Energy website (**www.dep.no/oed**).

Pipeline links

On the back of the Ministerial announcement, BP took the opportunity to announce that it was seeking to engage stakeholders in a major drive to promote new pipeline links between existing infrastructure either side of the border. 'Linking existing infrastructure could meet the anticipated supply of new gas from Norway for the medium term,' said Scott Urban, BP's Group Vice President for the North Sea and a member of the UK/Norway workgroup. 'After that, additional new pipeline capacity may be required.'

The view seems to be shared by major Norwegian gas players Norsk Hydro and Statoil, which both favour new pipeline links from Sleipner to existing lines on the UK side. But a different approach is taken by Marathon, which is pushing ahead with plans to build the Symphony pipeline, a new line running from Heimdal to Brae and thence to Bacton. Marathon, which in the last couple of years has built up its position in Norway and become an operator, marked the

Clarence P Cazalot Jr, President and CEO of Marathon Oil, which has just opened an office in Stavanger, welcomes King Harald to the stand

Rune Freyer, owner of Easy Well Solutions, was presented with the new incubator company award

expansion of its activities in the Norwegian sector by exhibiting at ONS and opening an office in Stavanger during ONS week.

Anniversary

There was a strong sense of history at ONS this year with both Statoil and the Norwegian Petroleum Directorate (NPD) commemorating their 30th anniversaries. The decision to locate these two bodies in Stavanger provided the solid platform from which the city developed into the Norwegian oil capital. An exhibition to mark the historic occasion was mounted at the Norwegian Petroleum Museum, which is sited down at the waterfront in Stavanger harbour.

Both Statoil and the NPD have undergone reorganisation to meet future challenges. Since its part-privatisation last year, Statoil has had to adjust to the demands of the stock market and continues to implement cost-cutting initiatives, while NPD has also streamlined its organisation the better to respond to demands on it. During ONS Statoil CEO Olav Fjell revealed that the company was reviewing its base arrangements – it currently uses five bases along the Norwegian coast – and hinted strongly that consolidation was likely.

He also talked of his desire to strengthen cooperation with Russian companies in the Barents Sea to the north of Norway. Norwegians are concerned that Russian operations in the Barents could involve inadequate attention to the environment, and many see closer cooperation with them as a means of encouraging better environmental standards.

New ways in innovation

Whatever happened to downhole separation? The H-Sep method developed by Norsk Hydro in conjunction with Kværner Oilfield Products and Weir Pumps won the ONS innovation award two years ago but has shown little sign of life since then. This is not a criticism, more a reminder that new technology can take a long time to become commercial, and does not always do so. This year, interestingly, the innovation award was won by Shell for its zero-emissions fuel cell technology. There will be many hoping the technology becomes commercial as it offers a solution to fossil fuels' environmental problems.

Shell's victory was notable in two important ways. Firstly, it indicated a move away from the purely upstream concerns of exploration and production, reflecting the trend for oil and gas companies to redefine themselves as energy companies. Secondly, it was the first time that a technology with an explicitly environmental aim at its core has won the ONS innovation prize. The technology is presented as a clean form of electricity production in which no greenhouse gas is generated, apart from carbon dioxide, which is captured and either safely disposed of or used for some positive purpose.

Shell, with the back-up of Siemens Westinghouse which provides the fuel cell technology, is planning to commission a 250-kW pilot plant at the Kollsnes gas terminal in western Norway in 2004, but by 2012 aims to develop the technology to the point where it has sufficient capacity – 10-20 MW – to power an offshore installation. For the latter project it has entered into a partnership with offshore contractor Aker Kværner and Norwegian power generator Statkraft.

Of the eight shortlisted entries for the innovation award, two others also had explicitly environmental aims: Cetco Norway's zero discharge filtration system for cleaning produced water, and Knutsen Shipping's system for preventing volatile organic compounds being released from crude oil during offshore loading.

Incubator park

In a new move aimed at encouraging companies with innovative ideas, ONS introduced the 'Incubator Park'. Here 19 small start-up companies in need of bigger partners to help with marketing displayed their ideas. In fact a few have already gone some way down the road to commercialisation. Easy Well Solutions of Stavanger attracted interest from Norsk Hydro at an early stage and completed development of its Swell Packer for isolating downhole zones with Hydro's support – the oil company is already saving money by using the product. Easy Well was awarded the inaugural incubator award.

There are many awards at ONS – clearly the element of competition makes it easier to draw attention to the activity being rewarded. The second new award this year was for young professionals. This was made on the final day, when teams of young professionals from oil companies and contractors were given 15 minutes and a free hand to have their say about where the industry should be going and how it should comport itself. Some chose conventional presentation techniques, others made their point through drama. The award went to the team from Det Norske Veritas.

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Russian gas supply for West European demand

Natural gas is the fastest growing source of energy in the European Union (EU), currently accounting for 22% of energy consumption. *Mojgan Djamarani* focuses on the potential for Russia to meet a forecast 2.3%/y increase in demand for gas in Western Europe, and in particular on Gazprom – currently the only Russian company permitted to export gas from Russia.

Paris-based Cedigaz forecasts an annual growth in gas consumption of 2.3% from current levels of 400bn cm until 2010 when it is expected to reach 530bn cm/y. Indigenous production, which at present meets 70% of demand, is expected to peak at around 320bn cm/y by 2005, before stabilising at around 300–310bn cm/y by 2010. In 2010 some 40% of the gas demand of the existing 15 EU members will be met from outside of the EU, dropping to 6% by 2020.

Gas market reforms

So far, the abundance of gas supply has prevented the rise in gas demand translating into higher prices. However, in the longer term, as the EU becomes dependent on Russian gas reserves that lie in more inaccessible areas and Norwegian reserves that lie at greater depths the price of gas is likely to be affected. This is especially likely in the case of Russian gas where long-distance transport would require heavy expenditures that would have to be recouped. According to Eni Chairman Gros Pietro's comments at a conference in Rome earlier this year, the cost of Russian and Norwegian gas at the end of the decade is expected to rise by 75% for Russian gas, due to the construction of new pipelines, and by a factor of more than 100% for Norwegian gas.

The liberalisation of the EU gas market over the next few years is also going to make the major investment decision-making process a great deal riskier. The Gas Directive of 1998 discourages long-term take-or-pay contracts and stipulates short-term and spot deals. The price of gas will be increasingly determined by gas-to-gas competition rather than in relation to the price of oil as is currently the case in continental Europe.

Impact on Gazprom

Gazprom, more than any other EU supplier, will be affected by the EU gas market deregulation – 62% of Russian gas exports go to Western Europe. Until now Gazprom has relied on its long-term take-or-pay contracts as the basis for investment in its upstream and transport infrastructure. All its major gas transmission pipelines have been built to export gas to Europe from a few giant West Siberian fields with low extraction costs. But as these fields enter the final phases of their expected productive life, Gazprom will have fewer opportunities for exporting relatively cheap gas to Europe. The new developments in the northern seas and Yamal Peninsula are expected to require investments on a massive scale as new production and transport infrastructure have to be built in the difficult Arctic environment. According to a study by Vladimir Likhachev of Russia's Energy Research Institute (RAS), gas prices in western markets will have to rise by 1.5–2 times to make these projects economically viable.

Opening up the EU market to further competition from the gas exporting countries as well as from the various European merchant gas companies will lead to lower prices as competition will force the gas companies to accept lower margins for each cubic metre of gas supplied to the final consumer. Gazprom will have to maximise the volume of its gas sales to maintain market share by offering more flexible contracts and pricing packages. Long distance and transit fees are what adversely affect the cost structure of Gazprom compared to other producers but, as its transmission network is in a poor state, increases in capital expenditure to revamp the system are going to further increase Gazprom's transport costs.

Gazprom's possible future

In the last few years Gazprom's production has been declining as the West Siberian fields that make up 75% of the total production have begun to deplete. In 2001, production of 510bn cm was down 12% over the previous year and 3% below target. The record $14bn revenues generated last year was achieved as a result of higher prices, even though exports to Europe actually declined 4.2% compared to 2000.

The lower oil prices this year are likely to squeeze Gazprom's profit margins and further constrain its financial resources, especially as domestic gas prices remain artificially low.

Gazprom has a large debt of $11–13bn that will cost it $2bn to service this year. This has seriously curtailed its ability to invest in upgrading infrastructure and in new field development. The company is responsible for the development of the large deposits of the Yamal-Nenets region and, through its subsidiary Rosshelf, of the Shtokman field in the Barents Sea. But it has found it difficult to meet the sheer cost and technical challenges that development of the Arctic fields entail. Only one major field – Zapolyarnoye – was brought onstream last autumn.

Russian Government reaction

Gazprom has been criticised by the Russian Government for failing to proceed with the development of its acquired licences. Earlier this year, the Russian state regained its voting majority of shares in the company. It now owns 38.4% of Gazprom. Given the importance of the company to the

national economy – Gazprom contributes 25% of budget revenues and 8% of the GDP – as well as the geopolitical importance of gas trade with Europe and China, reform of Gazprom has become a priority policy of the Putin Administration.

Last year, President Putin instituted a new management team headed by Alexei Miller that has the task of straightening out Gazprom's finances. The government has also initiated a restructuring programme for the gas industry that seeks to break up Gazprom's production operations and its monopoly on the transportation of gas in order to foster greater competition. Up to 15% of Gazprom's pipeline capacity is now open to use by other producers, although exports still remain in Gazprom's control. It is intended to spur the oil companies to sell rather than flare or leave in the ground the gas that they produce. Ruhrgas CEO Burckhard Bergmann has already expressed his company's interest in investing in Russian oil companies that also produce natural gas for sale to the domestic market.

The government has also initiated a policy for gradual increases of wholesale gas prices from the current level of $17.20/1,000 cm to approximately $40/1,000 cm by 2007. This is still far below the $110/1,000 cm value on the European market. But given the sensitivity of the issue the Russian Government is hoping that larger volumes of gas exports will underwrite the subsidising of domestic prices.

Ongoing gas projects

Over the next 20 years the EU is urging Russia to double its 125bn cm/y gas exports to Europe. To achieve this Gazprom has three pipeline projects in various stages of development:

- The Blue Stream pipeline running under the Black Sea to Turkey is due to complete in 3Q2002. It is designed to supply Turkey with 365bn cm of gas over 25 years.
- The Yamal–Europe pipeline that goes through Poland and Belarus is currently under construction.
- The Northern European Gas Pipeline (NEGP) that would run from Russia to Germany under the Baltic Sea, which is still on the drawing board.

The Yamal–Europe pipeline aims to provide Italy, Germany and France with 60bn cm/y of natural gas from the fields of the Yamal Peninsula. The onshore Yamal fields are thought to hold more than 10tn cm of gas and include the giant Bovanenkovskoye, Kharasaveiskoye, Kruzenshternskoye and Novoportovskoye fields.

Figure 1: Main Russian gas supply corridors (actual and planned)

Earlier this year Gazprom sent for government approval a development programme for the gas reserves on and offshore Yamal. If accepted, development will begin on the Bovanenkovskoye and Kharasaveiskoye gas condensate field at the foot of Yamal that stretches offshore into the Kara Sea. The Gazprom programme is reported to define both the gas price and tax level needed for the project to become economically viable. Yamal has been officially defined as a 'strategic gas producing region', which makes it eligible for special tax breaks and government subsidies.

During recent years, Gazprom has been linking the Yamal fields to the existing domestic pipeline network running to the western border of the country. When completed in 2010 the 5,800-km, six-trunk pipeline will have a capacity of 60bn cm/y. In October 2000, a consortium of Gazprom, Ruhrgas, Wintershall, Gaz de France and Italy's Snam was created to execute the external part of the project. The pipeline transits third party countries, but Belarus is seen as a more reliable transit provider than Ukraine where Gazprom has had problems with illegal tappings of its gas.

Russia has been keen on building a route that would circumvent Ukraine by means of an extension pipeline from Poland to Eastern Slovakia. Such an extension would reduce Gazprom's dependence on Ukraine for its gas exports. The company's long-term goal is to reduce gas transit via Ukraine to 35–40% of total exports compared to the current 90%.

European importers would gain from a pipeline that bypasses Ukraine through diversification of Russian gas transit options. Recently Gazprom's partners – Gaz de France and Ruhrgas, which owns 5% of Gazprom – acquired for $2.5bn a 49% stake in Slovakia's gas network SPP. This means that the Yamal–Europe consortium controls the pipelines that carry some 70% of Russia's exports to Europe. Gaz de France and Ruhrgas, both of who have long-term contracts with Gazprom, have agreed to make Gazprom a full partner in the deal and cover its share of the cost in the short term.

The Poland–Slovakia extension is the only outstanding issue in the completion of the pipeline. Poland has been reluctant to agree to the extension as it would undercut Ukraine. Poland's agreement with Norway, reached last year, to purchase 74bn cm of gas over 16 years from 2008, limits Moscow's power to pressure Poland into an agreement. Although Poland has to pay more for Norwegian gas and a new pipeline has to be built across the Baltic Sea, the agreement eliminates its sole dependence on Russian gas supplies.

In the meantime Gazprom and Neftegaz Ukrainy have signed a preliminary agreement that would allow Russia to ship at least 110bn cm/y through Ukraine until 2013 at a

reported cost of $1.09/1,000 cm/100 km. The deal gives Russia joint control of the Ukrainian gas pipelines and the siphoning of its gas. Although Ukraine has a lot to gain from the deal, its implementation depends on the resolution of Ukraine's $1.4bn gas debt to Gazprom.

A Heads of State Agreement has also been signed between Germany, Russia and Ukraine to create a consortium for managing and developing the pipeline. According to President Putin, the consortium could attract $2.5bn in investment to Ukraine for upgrading its ageing pipelines and another $15bn over the next decade for developing the gas network.

The prospects for the Northern European Gas Pipeline are difficult to assess. According to a report prepared by Purvin & Gertz for the Finnish Ministry Of Trade and Industry evaluating Finland's gas supply options, the Yamal–Europe pipeline has an advantage over the NEGP in cost and financing because it is possible to progressively expand the system by looping the pipeline and adding compressor capacity whereas the scope for progressive investment on NEGP is limited. Although it is not certain, the report states, the total investment cost/unit of gas transported may be a little lower for the Yamal–Europe pipeline than the NEGP.

Extensive studies have been carried out for the project and it is considered to be technically feasible. The pipeline, which would be 1,400 km long and 42 inches in diameter, is being pursued on a 50:50 basis by Gazprom and the Finnish Fortum Corporation. It would run from the Russian Finnish border via the Baltic Sea to northern Germany and in future could be extended via the Netherlands to the UK. Once completed the pipeline would provide Gazprom with an export route that would not have to transit any countries other than the EU members.

The question of whether the pipeline will be constructed is dependent on the development of the Shtokman field in the Barents Sea. The field contains 3.2tn cm of gas and 31mn tonnes of condensate, and lies 600 km offshore. The field has been approved for development under the PSA (production sharing agreement) scheme involving foreign countries. This would be the first Russian gas PSA and therefore provide the first instance that dent's Gazprom's monopoly on Russian gas exports.

Development of Shtokman has been on the agenda since 1996 but so far little substantial progress has been made. A consortium of Gazprom and Rosshelf (50%), Conoco, TotalFinaElf, Norsk Hydro and Fortum (12.5% each) has been formed for the development of the field. Shtokman can guarantee annual production of 60–90bn cm and, on its own, it is argued, the field can cover the entire increase in gas demand of Western Europe and Northern Europe during the duration of its development project.

According to Arvid Halverson, Senior Vice-President at Norsk Hydro, the plan is to develop the field in four phases with four ice-resistant platforms, four offshore and two onshore pipelines and a Russian onshore terminal. It is expected that the first phase of the project will take approximately eight years from the signing of the PSA until first gas is ready for delivery. The start-up date for Shtokman is pencilled in for 2010–2012.

Progress on the Shtokman field has been slow in part because of the liberalisation of the EU gas market. Long-term contracts are important for the development of the field and although the project has been highlighted as a priority area of cooperation between the EU and Russia it has not been endorsed by the EU, a move which would assure the financial community of the commercial feasibility of the project and enable the consortium members to raise the $15–20bn estimated cost of the project.

The Shtokman development is also being held up by TotalFinaElf's recent moves to raise its stake in the consortium to 25% as the project operator. A PSA had been prepared for negotiation with the Russian Government that probably now has to be redrawn.

Looking ahead

Once the Shtokman project comes onstream and the ensuing NEGP is constructed in around 2010–2015, the Purvin & Gertz report concludes that increased Russian export capacity and higher natural gas prices, as well as greater familiarity with the competitive European gas market on the part of both project sponsors and lenders, would make the financing of such projects a more certain process.

In the meantime, as a stop-gap measure to make up for falling production, according to Julian Lee of the Centre for Global Energy Studies (CGES), Gazprom will continue to purchase increasing amounts of gas from Central Asian producers who are dependent on Russian export routes, and reselling it at a higher price to its European customers. This situation allows Gazprom to control Central Asian gas before they develop alternate export routes and allows it to control competition whilst its own production is in decline.

...continued from p13

The session began with a few words of wisdom from the older generation in the form of 91-year-old Norwegian philosopher Arne Næss Sr. One of his messages was that one shouldn't tie oneself down to career and commitments at too early a stage, which sounds a salutary piece of advice to a neutral ear but is possibly not what oil chiefs having trouble with recruiting skilled staff might want to hear!

Opec message

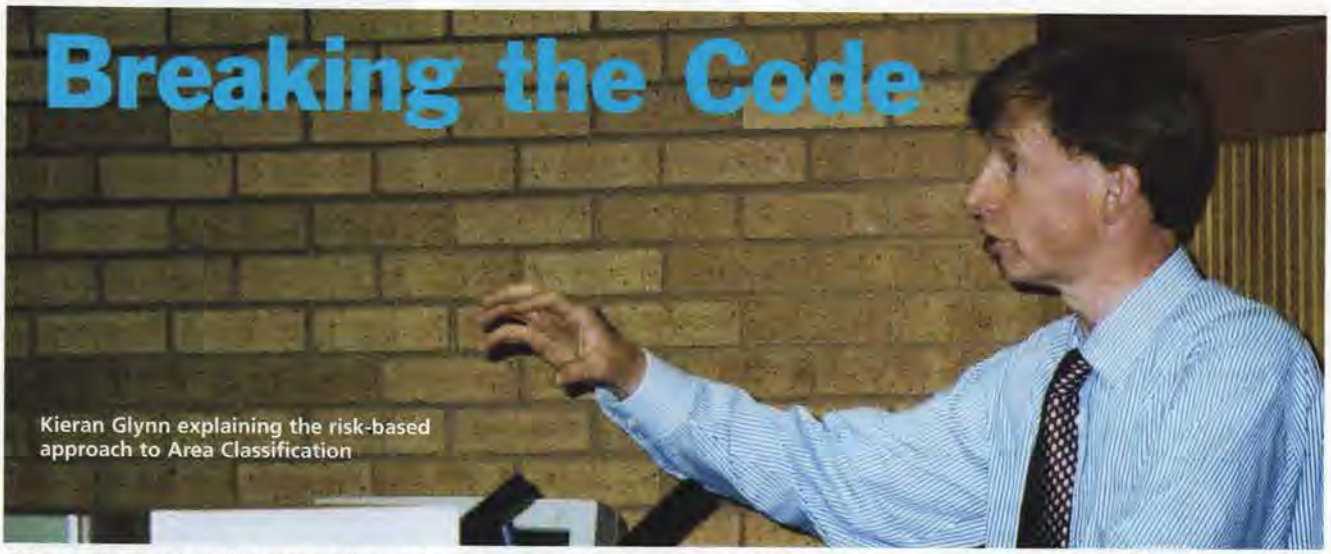
The presence of a speaker from Opec concentrated minds on prospects for the world oil market. Originally the speech was to be given by Opec President Rilwanu Lukman but, as he had to attend the Johannesburg Earth Summit, his place was taken by Analysis Manager Javad Yarjani. The message was a familiar one – as world oil demand continues to grow, so will reliance on Opec supplies.

According to Yarjani, Opec expects consumption, which totalled 76mn b/d in 2000, to increase to 89mn b/d in 2010 and 106mn b/d in 2020. As three-quarters of world reserves are in Opec hands, its members would be expected to meet most of this increased demand, which in Yarjani's view would come primarily from China and other developing countries. The speaker also noted that the world appeared to be comfortable with an Opec basket price of $25/b, which the organisation intends to stick to for the remainder of the decade, he said.

Opec expects non-Opec producers to play an increasingly back-seat role in supplying world demand. However, judging by the demand to take advantage of ONS's Exploration Promotion Forum, many producers clearly see a bright future for themselves and are keen to attract both foreign capital and expertise to help make it materialise. Presentations were given by Western Australia, Azerbaijan, Russia, Iran, Canada-Newfoundland and Nigeria, while in separate sessions members of CCOP – the Coordinating Committee for Geoscience Projects in East and South-East Asia – made a first visit to ONS to describe opportunities in their sectors.

Non-Opec production may yet spring a few surprises, as does Phillips' apparently indefatigable Ekofisk field. Since it was redeveloped in the late 1990s, Ekofisk has become one of Norway's leading producing fields. Plans for a third stage of development were described to the conference by Hroar Hermansen, Section Leader for Ekofisk reserves development. These include a 30-slot wellhead platform and new recovery mechanisms which might include carbon dioxide and air injection into the reservoir.

Breaking the Code



Kieran Glynn explaining the risk-based approach to Area Classification

The IP's revised *Area Classification Code for Installations Handling Flammable Fluids* (IP15) has been published in good time to help companies meet their obligations under the DSEAR regulations, writes *Peter Mackay*.*

When work began on reviewing and expanding IP15 in 1995, it was known that the European Commission's ATEX Directives would at some point bring a requirement for hazardous area assessment into national legislation within the EU. However, those on the IP15 Working Group could not have known that seven years after the project started the results of their deliberations would appear just weeks before the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) was laid before Parliament for planned implementation in July 2003.

DSEAR will place a statutory obligation on a wide variety of sites to undertake risk assessments of their operations and include both safety management measures and hazardous area classification. The UK Health & Safety Executive (HSE) says this should not place a great burden on industry; certainly, those sites in scope of the Control of Major Accident Hazards (COMAH) Regulations should have already done most of the work necessary to achieve compliance with DSEAR.

However, the new regulations will bring a large number of smaller facilities under the spotlight, and also force larger sites to consider not only the potential for a major accident but also the possible effects of operational releases of flammable fluids. DSEAR will not specify how hazardous area assessments are to be undertaken but HSE will expect companies to use the standard or code of practice most appropriate to their circumstances. For many in the refining, petrochemical and pharmaceutical sectors, the revised IP Code will undoubtedly provide the best route to demonstrating compliance.

IP15 – then and now

IP15 was first published in 1990 and at that time represented a compendium of current best practice. It was realised even then that much of this best practice was little more than industry folklore, based on decades of experience. However, the shortcomings of the Code rapidly became apparent in the feedback that the Institute received.

In particular, the hazard radii specified in the first edition of the Code had been set at deliberately conservative levels. While this was done to ensure safety in all installations in the face of a lack of published data, it did throw up some problems, particularly in the offshore sector. Moreover, there was no technical basis given for the distances that were published, which made their application inflexible. There were also some glaring omissions from the Code, most notably any data relating to LPG.

These deficiencies helped set the terms of reference for the Working Group that was established to revise the Code and draft a second edition. It was felt vital to provide users with an appreciation of the methodology used to set the hazard radii given in the tables – in this way, distances could be varied by users, appropriate to their own needs, on the basis of a close evaluation of the factors involved.

Another major change was to include the effects of pressure on substance releases. This has had a profound impact on the Code, especially when it was realised that substances normally regarded as being fairly safe can, when released under pressure, create a mist or spray that is flammable.

Another change arising from taking pressure into account has been the loss of the differentiation between buoyant and dense gases; in the first edition it was assumed that buoyant gases would create a risk above the point of the release and that dense gases would spread over the ground, and that in both cases the hazardous area would be downwind of the point of release. In fact, when released under pressure, both buoyant and dense gases will spread in the direction of the leak due to momentum and it cannot be assumed that because a gas is lighter than air there will be no hazard below the point of release.

Aims of the Code

Speaking at a one-day launch seminar in Runcorn last month, organised by the Institute of Petroleum in association with the Institution of Chemical Engineers (IChemE), Howard Crowther, Chairman of the IP15 Working Group, explained in more detail the changes that have been introduced in the second edition. He made the important point that the Code is now applicable to all installations handling flammable fluids – both liquids and gases – and not just petroleum facilities. In particular, additional guidance has been given for small-scale facilities such as laboratories.

It is perhaps worth reiterating the aims of hazardous area classification. As the Code says in Chapter 2: 'The object of the area classification approach is to reduce,

Delegates taking notes during the seminar in Cheshire

to an acceptable level, the probability of a coincidence of a flammable atmosphere and an ignition source'.

It requires delineation of the facility into hazardous areas and non-hazardous areas. Hazardous areas are further divided into zones which are graded according to the estimated probability of the presence of a flammable atmosphere.

Such flammable atmospheres are caused by frequent and minor leaks of fluids, such as might be encountered frequently under normal operating conditions found near flanges, valves, pumps and other equipment. Hazardous area classification is not designed to deal with rare, catastrophic events.

The first edition of the Code aimed to help industry by providing standard assessments of the hazard radii associated with different types of product in a variety of scenarios. While much of this has been retained, in the direct examples quoted in Chapter 3, the second edition is less prescriptive. Indeed, engineers using the second edition will find that they have more work to do in order to establish hazard radii and it is expected that some knowledge will have to be applied to incorporate the specific details of any particular process or facility under consideration.

On the other hand, those in the offshore sector will encounter a fully revised Chapter 4 with type examples given for drilling rigs, equipment and well operations. However, recognising that no two offshore installations are the same, there is a great emphasis on using the point source method.

Chapter 5 is where the new edition significantly diverges from its predecessor. This is where users will find information on the classification of individual point sources and where the compilers have included the basis for those hazard radii that are given. It also takes into account the effects of pressure release, referencing a number of look-up tables in the Annexes so that engineers can make their own risk assessments. According to Crowther, installations that have hitherto made use of the direct examples may well find that they need to reconsider their area classifications, especially when product is being processed or handled under pressure.

The Working Group also put a lot of effort into rationalising the Code's guidance on the effects of ventilation and, once more, the new edition provides much more reasoned guidance. Crowther explained that, on reflection, diagrams that were provided in the first edition could not be supported. Instead, a new Annex D gives detailed descriptions of ventilation effects.

The official view

The HSE's representative on the IP15 Working Group, Alan Tyldesley, presented what he referred to as 'an important digression' – an explanation of DSEAR's origins and aims. Based on the number of questions from the audience, it was clear that industry is concerned at the time and effort, not to mention the financial resources, that it is going to have to devote to this topic over the next few years.

Drafting DSEAR has been a useful exercise, Tyldesley said, as it will remove a number of anomalies and consolidate several existing regulations into a single document. It derives from two separate EC Directives, the Chemical Agents Directive (CAD) and the Explosive Atmospheres Directive (ATEX), but does not address all the requirements of these. Additional duties will be included in the revision of the Control of Substances Hazardous to Health (COSHH) Regulations and other legislation.

DSEAR also for the first time brings into UK legislation the concept of hazardous area classification and Tyldesley admitted that, in this regard, the regulators are only now catching up with best practice in the petroleum industry. The topic is too technical to be dealt with sensibly in guidance from HSE and international standards such as IEC 60079/10 and BS 60079/10 have tended to lack the specific details applicable to petroleum and petrochemical facilities. HSE therefore welcomes the efforts made by IP to draw up more detailed and specific advice for industry.

A number of other members of the IP15 Working Group were present at Runcorn to explain the new Code in greater detail. IChemE also provided some examples of how it is designed to be used. That the audience was sometimes left behind is an indication of the complexity of the document and it is likely that many users will benefit from training, particularly in the area of calculating the risks associated with point sources. To support the Code's adoption, the IP is considering holding a number of workshops in the future, and possibly a training course. Further details will be available on the Institute's website, **www.petroleum.co.uk** The Code itself is available, priced £95, from Portland Customer Services, Commerce Way, Whitehall Industrial Estate, Colchester CO2 8HP, UK. Telephone: +44 (0)1206 796351; e: **sales@portland-services.com**

Peter Mackay is Managing Editor of* Hazardous Cargo Bulletin, *a monthly magazine covering the transport and handling of dangerous substances. For more details see* **www.hazardouscargo.com

FEEDBACK FROM ATTENDEES...

'Good, informative discussion'

'Overall an informative and enjoyable event'

'A very useful day'

'Very valuable'

'Very interesting presentations with generally enough depth to provide an introduction to the subject'

'Picked up useful comments re COMAH ... overall it was worthwhile attending'

'Very useful event'

'Thank you very much for all the hard work over the past seven years culminating in the publication of the second edition and today's launch'

'Thank you for a well organised and useful seminar'

'A very worthwhile seminar'

'Many thanks for organising a useful day'

'Thanks for a great seminar'

'... a great conference'

'... a good day'

Dawning of a decommissioning era

Photo: Kerr-McGee

Kerr-McGee's Hutton TLP, which was towed from the field in July, has been indirectly sold to Sevmorneftegaz of Russia

The age of multiple platform removals is drawing closer – at least in Norway. In the UK it is still some way off, although the recent cessation of production on BP's North-West Hutton platform brings the challenge of removing this huge structure under the spotlight. *Nick Terdre* reports on some of the latest decommissioning developments in the North Sea.

Late last year the Ekofisk partners received approval from the Norwegian Government for their plan to remove all but one of the 14 redundant platforms on the field. This work is expected to get under way by around 2006, although field operator Phillips Petroleum plans first to try out new single-lift technology on two redundant booster stations. If all goes according to plan, these should be removed in 2005.

Meanwhile TotalFinaElf plans to remove the two steel platforms and topsides of the three concrete gravity-base structures from the Frigg field in the period 2006–2011.

New survey

A recent survey by Ian L Prince, Decommissioning Manager of Wood Group Engineering, foresees the peak removal period for fixed platforms in Norway running from 2006 to 2017, with an average of five removals a year. Activity is forecast to get under way at about the same time in the Netherlands, with an average of seven removals a year over a peak removal period from 2006 to 2020.

However, the most active sector will be the UK, which is forecast to have an average of 15 removals a year over a peak period running from 2009 to 2021. Removal activity in Denmark is expected to take place primarily from 2010 to 2013 at a average rate of five removals a year. The higher rate of activity in the UK is due to the larger number of fixed installations – 228 platforms with jackets, compared with 130 in Holland, 69 in Norway and 40 in Denmark. According to the survey, there are currently a total of 660 installations in the four countries, including 114 fields developed with subsea facilities. There are also a total of 29 GBSs (gravity base structures), of which 14 are in Norway.

The heaviest platform with a jacket removed to date remains Esso Norge's Odin, which was brought to land in 1997. Its jacket, which was cut into several parts, weighed 6,150 tonnes and topsides 7,300 tonnes. BP's North-West Hutton platform represents a challenge of a quite different order of magnitude, with a topsides of 21,000 tonnes supported by a 17,000-tonne jacket. The topsides consists of 21 modules.

End for NW Hutton

Production on North-West Hutton ended earlier this year and BP is now 'engineering down' and preparing the platform to be left in a cold state for some time – it is not expected to be removed before about 2006. The company says it will only reveal details of its abandonment planning early next year. In fact, it may be some while yet before the field partners commit to a plan as they are understood to want to see how Phillips' first single-lift removal operations go.

There are no doubt other issues to be decided. One of these is the question of whether to apply for derogation from the requirement for full removal, on which the partners are understood to be divided. Under the Ospar guidelines, the footings of jackets of 10,000 tonnes or more may, in some circumstances, be left in place. No derogation has yet been sought for a jacket.

Tank derogation

However, the first derogation has been granted for a concrete substructure – the base of the Ekofisk Tank. This was approved by the Norwegian Parliament in June, no objections having been raised by the Ospar signatories. A massive work programme will first have to be carried out – once the 36,000-tonne topsides have been removed, the nine storage tanks have to be cleaned. Oil and wax will be removed from the tanks, and the sediments left at the bottom will be collected and reinjected into the reservoir through the Ekofisk 2/4-X wellhead platform. Three contractors – Aker Offshore Partner, the Ekofisk Alliance and Halliburton – are currently performing competitive studies of how this work can best be done, and the contract is expected to be awarded by early 2003.

The remainder of the Ekofisk abandonment plan has also been approved, including proposals to leave the pipelines, which are buried, in place, along with the drill cuttings pile. While accepting the proposal to remove the steel platforms, the government stipulated a shorter period than the partners sought, with work to be concluded by 2013 rather than 2018. However, no date has been set for the removal of five of the platforms, including the 2/4-A and 2/4-B wellhead platforms and the 2/4-FTP treatment platform, which are still in operation.

Single-lift trial

The first two Ekofisk platforms are due to come out by 2005. These are the 36/22-A and 37/4-A booster platforms located on the Ekofisk–Teesside oil export line in the

UK sector. Seven single-lift companies and consortia – out of around 20 which applied to prequalify – have been commissioned to carry out paid front-end engineering design for how they would perform the removal operations for both topsides and jackets. They are understood to be: Excalibur (*Pieter Schelte*), Prosafe (*GM Lifter*), Marine Shuttle (*Offshore Shuttle*), Mastermind (*Master Marine*), MPU (*MPU Heavy Lifter*), SeaMetric and Versatruss/Saipem/Aker Kværner. The removal contract is expected to be tendered early next year, with contract award following after mid-year.

One new concept that has been making steady progress well away from the glare of publicity is the Controlled Variable Buoyancy System (CVBS). Developed by CVBS Ltd, the system uses clusters of buoyancy bags known as intelligent buoyancy units to apply uplift as a means of lifting subsea structures. Earlier this year CVBS, represented by Zenocean, and Halliburton developed a technical and commercial proposal for raising TotalFinaElf's 4,210-tonne Frigg QP jacket. The system cannot lift topsides but could perhaps be used for platform removal in conjunction with one of the singe-lift concepts developed primarily for topsides removal.

Hutton progress

Meanwhile, the comparative ease with which fields produced through floating production facilities can be abandoned is evidenced by the rapid progress made by Kerr-McGee in abandoning the Hutton field. The company announced in August that it had sold the Hutton tension-leg platform – the world's first – to Monitor TLP which will sell it on to Russian company Sevmorneftegaz. Net proceeds to Kerr-McGee are $29mn.

The TLP was removed from the field in July and floated to the Vats fjord near Stavanger where it is being looked after by Maritime GMC. Kerr-McGee's decommissioning plan was approved by the UK Department of Trade and Industry (DTI) in May and work on removing subsea equipment is well under way courtesy of Coflexip Stena Offshore. The scope includes the retrieval of the 8-km flexible gas import line which runs from a tee on the Ninian to North-West Hutton line by the reelship *CSO Apache* and the removal of four 1,000-tonne tether foundations and a 225-tonne drilling template which will be performed under subcontract by Saipem's crane-barge *S7000* – both the pipeline and the subsea structures were due to be removed in September.

Reuse headaches

Difficulties continue to attend the reuse market, at least with respect to the reuse of whole installations. Despite its worldwide marketing effort, Phillips Petroleum failed to find a buyer for the Maureen platform, and TotalFinaElf has so far had no luck with the Frøy platform. The latter is perhaps the cause for greater disappointment, given that the platform is only seven years old and all the equipment is in good condition.

Photo: TotalFinaElf

The Frøy topsides was removed by Heerema crane-barge *Thialf* in July 2002. TotalFinaElf still has hopes of finding a buyer for it

TotalFinaElf has not so far given up – it is still actively marketing the Frøy topsides and, in late August, was in contact with an interested party. However, it has in effect abandoned hope of selling the jacket. The topsides were lifted off by Heerema crane-barge *Thialf* in July and brought to shore at the Lyngdal site in southern Norway where they are being conserved for possible reuse. The jacket was expected to be brought to shore in September but TotalFinaElf does not intend to keep it for long.

In the absence of a buyer Phillips was late last year obliged to take the decision to scrap the Maureen platform, which in summer 2001 had been refloated and towed to sheltered inshore waters near the Aker Stord yard in western Norway. The topsides were removed in three lifts in April and landed at Aker Stord's decommissioning site where demolition work is expected to continue at least to year-end. Some equipment items have been sold, and parts of the platform and the loading buoy are to be used in the construction of a deepwater quay at the yard and as a breakwater at a nearby marina.

Tax breaks

The feeling is growing that if governments really are in favour of reuse, as they claim, they will have to provide an incentive for it. This was one theme which emerged strongly at the Investment Recovery Forum held at this year's Offshore Northern Seas (ONS) show, where several speakers called for some kind of tax break to make reuse more attractive. Sverre Rott, head of recycling company Valiant Industrier, proposed that licence holders should be allowed a 30% bonus on any sale. Valiant has been a pioneer in encouraging second-hand use, refurbishing and selling on various redundant drilling modules from the Ekofisk field, most recently disposing of subsea structures from TotalFinaElf's East Frigg and Lille Frigg fields.

The forum was also addressed by Norway's Deputy Energy Minister, Britt Skjelbred, who called for the development of an international reuse market and said that the ultimate fate of offshore installations should be dealt with in the field development plan. But she made no mention of tax breaks, and according to the Oil and Energy Ministry, no such studies are planned, even though the government would benefit economically by stimulating reuse as it shoulders much of the decommissioning cost.

Cuttings clarification

The UKOOA-led £5.5mn study of drill cuttings and how best to deal with them reached the end of its three and a half-year course earlier this year. It identified three main options that represent the best environmental strategy as covering, retrieval, followed by shipping to shore or injection into the subsoil, and natural degradation. The choice of option would be guided by an assessment of whether a particular pile was considered to have a significant environmental impact or not. The feasibility of recovering cuttings piles to the surface using dredging techniques was proven in a trial last year at the North-West Hutton platform.

The results of the initiative, which involved a wide range of research and regular consultation with stakeholders, have been presented to Ospar's offshore industries committee that is drawing up guidelines for tackling cuttings.

Clash of contradictions

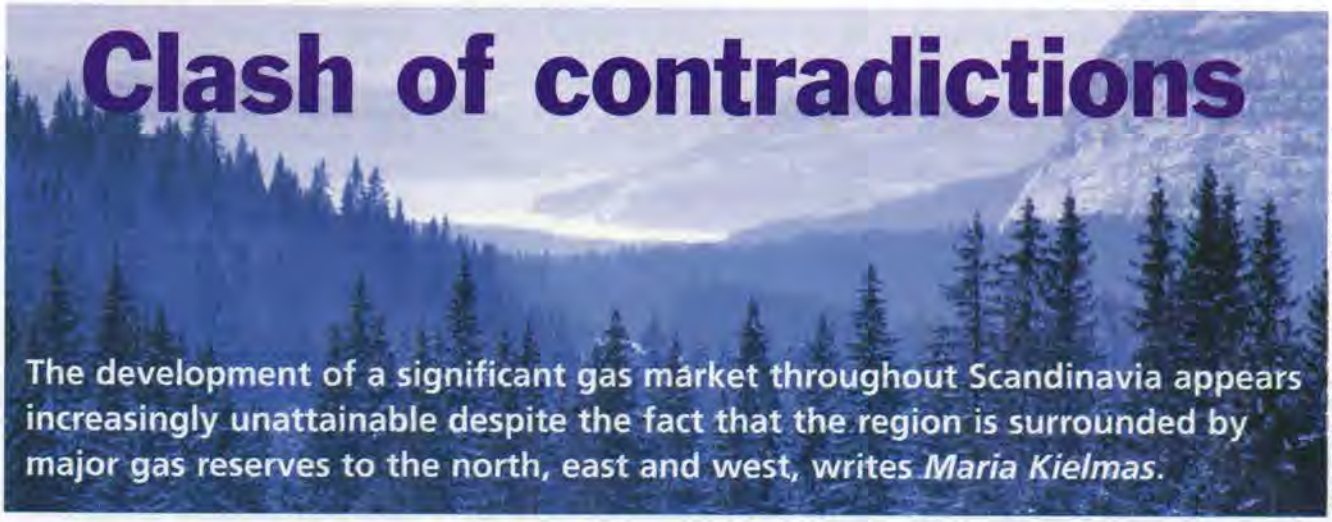


Photo: Swedish Tourist Board/Kramfors Turism

The development of a significant gas market throughout Scandinavia appears increasingly unattainable despite the fact that the region is surrounded by major gas reserves to the north, east and west, writes *Maria Kielmas*.

Environmental regulations both in Sweden and Norway make gas-fired electricity generation an uneconomic option for energy producers, while Finland is reluctant to increase its dependence on Russian gas. European Union (EU) and national government policies on climate change are targeting an increase in the share of renewable energy in the energy mix. However, this is complicating matters for the region's energy-intensive industries – such as pulp and paper, aluminium and chemicals – who claim that there is no alternative to large-scale power generation if they are to survive. For the forestry industries in particular – who plan investments some 50 years ahead and whose energy bills amount to over 10% of their turnover – the nature and price of energy supplies over the coming decade is emerging as a fundamental concern.

Finnish market

Last year Finland consumed 4.308bn cm of gas with a daily peak in February of 19mn cm/d. Half of the imported gas is used by industry, with a further 46% used in municipal district heating plants. Industrialists have long argued that it would be a good idea to increase the use of gas, if only it could come from a source other than the single Russian pipeline that enters Finland from the southeast. Finnish policy has been to minimise energy dependence on Russia, partly because of the two countries' troubled history in the 20th century – Finland was paying World War II reparations to the former Soviet Union until the late 1960s – and partly because of a widespread belief among industrialists and policymakers that gas prices are likely to rise sharply in the long-term.

A gas market opening of sorts began last year with the introduction of a secondary market. Customers of Gasum, the company responsible for imports to Finland and the wholesale domestic market, are able to trade among themselves any gas that they have bought but not used. So far this accounts for a mere 0.6% of the total gas sold in the country.

Gasum's shareholding demonstrates the consolidation of Russian supplies in the Finnish market. Some 25% of the gas company's equity is held by Fortum, a part state-owned electricity and oil refining group; 25% by Russia's Gazprom; 24% by the state; 20% by Ruhrgas, the subject of a takeover by Germany's E.on; with the remaining 6% held by Finland's largest forestry companies, M-Real, Stora-Enso and UPM Kymmene.

If the E.on–Ruhrgas merger goes ahead, the aim of the new company – which would control about 70% of the German gas market – is to invest in the Russian upstream gas sector as well as gas transportation from Russia. With the UK on track to become a gas importer by 2005 (see *Petroleum Review*, September 2002), Russia is expected to compete to supply the UK market, potentially supplying more gas to Finland and other Scandinavian countries en route.

Supply routes

In a 2001 study commissioned by the Finnish Ministry of Trade and Industry, consultant Purvin & Gertz suggested that two possible new gas supply routes to Finland could result from the North Transgas Project (NTG), possibly based on gas from the Shtockmanovskoye field in the Russian Arctic. Fortum and Gazprom are assessing this project with both an overland route across Finland and Sweden to Germany and an offshore route through the Gulf of Finland and Baltic Sea to the German coast.

Purvin & Gertz believes that the potential western European gas market over the period 2010–2015 may be able to support such a project, whose timing would be crucial. Finnish industry would prefer supplies from the south from some extension of central European gas supplies.

The Norwegian Government has approved plans to construct gas-fired power generation plants at Kollnes and Karst in southwest Norway, but these are unlikely to be cost-effective for some considerable time. Under current environmental regulations, future gas-fired plants in Norway must re-inject 90% of their carbon dioxide (CO_2) and nitrous oxides (NO_x) emissions into the ground. This would require the equivalent of wholesale power prices of between 21 and 26 øre (or some €33.8/MWh) to break even. Spot prices on the Nordpool power exchange averaged about 17–20 euros/MWh between late June and early July this year. Prices peaked above €33/MWh in January 2002 during an exceptionally cold period.

Tightened supplies

Some 99% of Norway's electricity comes from hydropower and there has always been a political and social aversion to the use of gas in power generation. But with increasing domestic as well as industrial energy use, there is a growing view that electricity supplies could become tight in the medium term. The Norwegian Government has been keen this year to deny such a scenario – but this has not convinced the sceptics. Norway's forestry industry and energy consultants such as London-based ICF Consulting think that the last decade of high rainfall in Scandinavia has masked the tightening of power supplies. Norway exports electricity in wet years and imports in dry years. But rainfall over the past decade has been higher than the long-term average. When precipitation returns to its normal level, energy prices could be expected to rise by between 10% and 20% say forestry industry energy managers.

Neil Cornelius at ICF Consulting thinks that the tight energy supply situation

has been reflected in part by an increase in annual average Nordpool prices that were €20/MWh in 2000 and rose to €24/MWh in 2001. Interconnectors such as the planned UK–Norway link could help to address this problem, but another solution would be to increase interruptible contracts for electricity buyers.

Scandinavian forestry industries currently buy in power supplies on long-term contracts ranging between five and 15 years. The companies do not disclose their prices but intermediaries in the Nordic energy market believe these could be as low as €10/MWh – comparing well with Nordpool prices. So far, Scandinavian energy managers are not exposed to the same market risks as other countries in northern continental Europe. Contracts in these countries are usually of one or two years' duration. But neither can the energy intensive industries depending on continuous manufacturing processes, such as aluminium, afford the risk of interruptible supplies. If energy supply becomes a problem, the only solution is to relocate.

Forlorn hope

Swedish industrialists cherish a forlorn hope that there will be a future gas market. But at the moment national regulation does not permit the construction of new power plants that increase the current national level of greenhouse gas emissions. In addition, gas carries one of the highest energy taxes in the country.

Swedish industry's worry about energy supplies date from a 1979 referendum that voted narrowly to abolish nuclear power over the next 12 years. The vote was so narrow that subsequent governments kept postponing the deadline while no other realistic large-scale power supply source has been identified.

About half of the country's electricity supplies come from nuclear and the other half from hydropower. In 1999 the Swedish Government closed one of two reactors in the Barsebäck nuclear plant in southwest Sweden. Denmark and Norway are pressuring Sweden for a speedier nuclear shutdown. In June this year the government announced that it would follow the most recent German example and aim for a phased nuclear shutdown by the year 2020.

But Swedish industry still regards this as a rhetorical fig leaf as no realistic alternative to nuclear power generation exists. In Germany, at least in theory and if compensation considerations are not taken into account, new gas-fired power generation could replace nuclear. However, both the Swedish and Norwegian Governments hope that wind power will fill future energy supply gaps.

Finland, meanwhile, has few wind resources to exploit – an opportunity Sweden's small coal industry is keen to take advantage of. Coal currently provides just 7% of Swedish energy supply. However, technologies to reinject greenhouse and other emissions are being developed to produce an entirely CO_2-free coal-fired power plant.

Nuclear future

Sweden's prevarication has helped the nuclear cause in Finland, where the government recently approved the construction of the country's fifth nuclear power plant at Olkiluoto in the southwest. This will address a forecast 4,000-MW power generation capacity shortfall by 2010. The local community at Olkiluoto is also in favour of the construction of a high-level nuclear waste disposal site. This will be drilled 500 metres deep into the granite basement, cover a space of one square kilometre, and cost 2bn euros.

The new nuclear plant is also planned as a replacement to current coal-fired power generation and will help Finland to meet its obligation under the Kyoto Treaty on Climate Change. Some 35% of the country's electricity could be supplied by nuclear should the plant go ahead. But there is worry that environmentalist pressure group opposition could scupper the plant's future. The concept of additional trading from nuclear sources into the Nordpool market has angered Norwegian political opinion. Norwegian governments have made a policy platform from their anti-nuclear stance.

Greenhouse gas directive

Without the nuclear plant – whose environmental credentials are that it does not produce greenhouse gases – Finnish industry will be hard hit should the EU's draft directive on greenhouse gas emissions trading become law. The directive proposes a mandatory market in which pollution allowances are awarded per individual industrial installation. The Commission has estimated an average market price for a tonne of CO_2 equivalent of 20 and penalty prices, for those installations exceeding their emissions allowances, of 50 per tonne CO_2 equivalent. This would have a devastating effect on electricity price setting in the Finnish market should its dependence on coal – which currently accounts for 12% of national energy use – continue. It is estimated that power prices could rise by 50% if the greenhouse penalties enter into force.

Fabled alternative

For policymakers and green groups in Scandinavia, the fabled alternative to nuclear and large-scale conventional energy is the use of biomass, especially from the forestry sector. But this will pose even more problems for industry. Paper and pulp manufacturers have been using ever greater proportions of biomass, mainly in the form of wood residue following forest cutting, in their on-site power plants. Wood-based fuel provides for 80% of heat production for pulp and paper mills in Sweden and 71% in Finland. This is supplied chiefly from co-generation plants attached to the pulp manufacturing process. Surplus heat is sold to neighbouring community district heating systems. However, power generation from wood fuel is not an option for the electricity-thirsty paper manufacturing process as power generation alone from this source is three to four times more expensive than that from conventional sources.

That said, the concept of producing heat and power from wood residue and other biomass is gathering pace throughout the EU. For the Scandinavians this will cause more problems with the Kyoto process. In Finland the forest balance – the difference between the incremental tree growth and tree cutting during each year, or 'drain' in the industry jargon – has been steadily increasing since the late 1960s. This increasing forest balance is deemed necessary to provide the country with sufficient climate credits under the Kyoto Protocol that recognises forests as carbon sinks. But an increasing demand for wood fuel and wood residue abroad as well as at home could diminish this balance. In Norway and Sweden the forest balance is tighter as the Arctic latitudes of Nordic countries are not conducive to planting fast-growing trees.

As a result companies would have to import more timber, mostly from Russia. This future trend has been recognised by the Russian Government who recently announced that it plans to increase its timber exports in the hope that timber could provide greater export revenues than oil exports.

In the absence of massive timber exports from Russia, Scandinavian countries could address the perceived future demand for biomass through placing an increasing value on their wood resources. The upshot could be that, government subsidies notwithstanding, biomass energy could be priced out of the market. The problem is that only the industrialists have identified these problems – the policymakers have not yet thought so long-term.

Photo: The Scandinavian countries are now using forestry wastes and by-products to provide ever greater amounts of useful energy

Lifetime learning remains the key to successful career development

Lawrence Slade, the IP's Marketing Director, takes a brief look at career influences and the importance of Lifetime Learning in achieving career goals.

There are many influences on a career, ranging from your first boss to your peers, to your first presentation or perhaps winning your first contract. The common thread is that the myriad of personal day-to-day contacts we make and the activities we undertake progressively enhance our personal skill-set.

In today's, often harsh, business environment someone just starting their career can expect to change companies and possibly countries several times during their working life, whilst encountering numerous changes in working style and technology. Work undertaken by the IP's membership committees during 2001/2002, highlighted personal development as the key concern of our members, particularly those in the early stages of their career.

If we look back over the last 15 years at the changes our workplaces have seen over that that time, it helps illustrate that to succeed we must develop and embrace new skills.

Here are a few changes from a purely office-based perspective and from within the petroleum industry:

Office	Petroleum
Video conferencing	No unleaded fuel
E-mail	No GPS positioning for offshore rigs
Internet	No 3D seismic
Fax	No e-procurement
Cell phones	No internet-based data transfer
Portable PCs	No websites, intranets or extranets
PCs	No multi phase fluids pipelines

And, of course, some equipment and skills have been superceded and no longer feature in the workplace like the telex system.

Allied to changes in our working environment are changes to ourselves. Ask yourself how many hours was I working at the start of my career? How does it compare with your hours today? Importantly, ask yourself how you have managed change during your career, have you embraced it or fought against it or have you influenced it? How have your skills developed during your career?

In answering these questions a picture will likely develop illustrating how during your working life, perhaps without realising it, you have benefited from the ethos of lifetime learning.

On a fairly regular basis it is sensible to step outside your career and assess it, and ask how you have performed. Have you met your personal objectives? If yes, then where do you go from here? If no, the first step is to set out the reasons why you have not met them. Once you've addressed this you can plan again for the future.

This is where the IP's Lifetime Workbook and Plan can assist you. This service will help you assess your career progress to date, prior to guiding you through a process identifying aims and objectives and, most importantly, in developing an action plan to achieve these goals.

The IP's Lifetime Learning programme is just one way in which the IP can assist its members to develop their knowledge and skills base. By utilising our existing training, conference, publishing, library and information facilities and, importantly, our enthusiastic branch network, members have unrivalled access to industry information. During 2002/2003 the IP will also be developing and introducing new web-based career and recruitment services for its members and updates on services. Their availability will be published in _Petroleum Review_, on the web at **www.petroleum.co.uk** and via our e-mail newsletter.

The value of lifetime learning

In the last decade a fundamental change has occurred in the way that people consider their careers, write _Jon Glesinger_ and _Russell Pickering_*. Jobs for life no longer exist and lifetime learning is fast becoming key to the success of both the employee and employer.

The concept of the 'job for life' has virtually disappeared. Today's workers – particularly the much talked about generations 'X' and 'Y' – are far more active, mobile and demanding than ever before. They are willing to manage their careers, ask more of their employers and move place of employment frequently if their expectations are not met.

Long-term demographic changes – principally the decline in birth rates and ageing populations in the industrialised nations – mean that the pool of available labour is shrinking. Coupled with this, the continuing technological revolution is constantly increasing the workplace skills that employees require. In short, the stakes have been raised in the world labour market – it is harder than ever for employers to recruit and retain talented workers, whilst there is more pressure on employees to develop and maintain the skills they need in today's job market.

No exception

The petroleum industry is no exception to these changes. In fact, the cyclical nature of the business magnifies them. Long-term lack of job security in the industry means that there is a net outflow of talent in times of downturn – exacerbating the global phenomenon of skills shortages. In turn, it means that employees within the sector need to have more transferable skills than in other industries, in order to make themselves more marketable commodities.

The issue of 'lifetime' or 'lifelong' learning is therefore paramount to the future success of the petroleum business, since people and the skills they have are its greatest asset. Time and time again, research has demonstrated that relevant and regular training – continual professional development (CPD) – is a key factor in both recruiting and retaining employees.

The provision of training opportunities is a core element in the process of becoming an employer of choice and therefore moving to the top of the pile in terms of attractive companies to work for. It also produces more skilled, flexible, motivated and productive workers. The benefits for employers are clear. In turn, lifetime learning results in

employees who are more satisfied with their career, in control of its direction and, essential in the petroleum business, more marketable and therefore able to move from one area of the industry to another in times of downturn (benefiting the individual and the sector as a whole through retaining skilled workers and their knowledge).

Proactive approach required

Unfortunately, the issue of lifetime learning is still not sufficiently considered within the petroleum industry, by both the employers and employees. Employees need to take a more proactive attitude to the management of their careers, whilst employers need to instil a culture and put in place systems that encourage the continuous development of professional skills. The investment required on the part of employer and employee is minimal, whilst the potential benefits are extensive.

The key question is what actions do employers and employees have to take in order to turn the concept of adopting lifelong learning into reality? Given the diversity of the businesses operating within the petroleum industry, the needs of individual companies and their employees will be vastly different. Unfortunately, there is no 'one size fits all approach' – tailored programmes will always be the most effective ones. However, despite this there are a number of core areas that all businesses and employees should consider.

Why commit?

There are three main reasons why an employee will commit to lifetime learning. Each impacts upon the way employer and employee should approach the process.

Career goals. Employees who are truly serious about the business of their career will use lifetime learning as a means to stretch and obtain their career objectives. For these workers continual professional development is a tool that will help them realise their ambitions, develop their skills portfolio and increase their professional value. There is very much a 'push' from employees in this case – these ambitious individuals will be proactive about the process and therefore the principal duty of employers is to facilitate it. The more help employers can give to these motivated employees to improve themselves, the greater value they will see in return in terms of productivity and value to the business.

Career direction. Often going hand-in-hand (although not always) with the attainment of career goals is the use of lifetime learning to provide greater control on the direction of the career of employees. For example, an employee operating in the engineering arena may wish to move across to a more business development or management-oriented role. Both roles require different skills sets and therefore skills development will naturally be the key step in making the leap. The role of the employer in this process is one of both facilitation and management. The employee may be discontented in their current role, leading to lower productivity and a lesser chance of retaining the employee in the medium-term – outcomes which any employer would want to avoid. The role of the company is therefore to help the employee discover whether he or she is suitable for and/or in need of a change in direction. For example, it may be the case that an employee is not suitable for a change in direction, but is in need of new career goals – the employer has duty to coach and mentor in this situation to ensure that both the business and the employee reach the most mutually beneficial and satisfactory outcome.

Compulsory skills maintenance. The simplest of the three reasons that an employee will engage in lifetime learning is compulsory skills maintenance. This is based primarily on a compulsory pull – the need to keep certain skills (usually technical competencies) current. For example, a Health and Safety Officer will need to have regular training updates in order to maintain his or her technical skills. An engineer will have to stay up to date with rapidly changing technology. The role of the employer in this situation is to ensure that a framework is put in place that will ensure that such needs are well catered for.

Focus and skills areas

In the context of the three main drivers towards the adoption of lifetime learning outlined above, the first step in the process is to assess where the employer and employee needs to focus the learning process. Depending on why the employee wants to engage in a lifetime learning programme (career direction or development or skills maintenance), both employer and employee need to participate in setting relevant objectives.

The key areas to examine are: What do both parties want to achieve? What skills does the employee already have? Which ones need to be enhanced or added to his or her portfolio to achieve these objectives? Are they hard technical skills or softer business skills such as communication or networking?

Goals that are set need to be relevant and reasonable and should abide by the 'SMART' rule for objective setting – Sustainable; Measurable; Achievable; Relevant and Time scaled. Given the cyclical nature of the industry, planning within a five-year time window is ideal.

Coaching, assessment, motivation

Once goals have been set, employer and employee must decide what resources need to be deployed in order to achieve these goals. Is external or internal training available? Should the employee be assigned an external career skills coach (or coaches) or be partnered with a mentor from within the business?

As with all programmes, whether they be business development, marketing, or, in this case career development, ongoing assessment and evaluation is key. This should take the form of a number 'milestone' events such as six-monthly appraisals and annual assessment centres, combined with a steady stream of continual, lower-level assessments. The advent of numerous online testing and evaluation products has made the latter far more accessible and easier to manage.

Throughout the learning process, motivation is a key issue. Employers need to ensure that employees remain motivated, particularly when engaged in activities such as distance learning, where 'out of sight' may mean 'out of mind'. A mentor from within the firm is often the best way in which to achieve this. Incentives should also be provided for successful completion of the objectives set at the very beginning of the programme.

Key to success

Committing employees to lifelong learning is vital for the success of the businesses that employ them and for the careers of the employees themselves – success for one, means success for the other.

Although the general principles outlined above are relatively clear and simple, as is always the case, the devil is in the detail. Companies (and employees) serious about committing to lifetime learning should seek external advice from experts who will be able to provide counsel on how to establish the most effective programmes at best value in terms of investment.

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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 and gas industry. Where courses have received official accreditation from the relevant Sector Skills Councils (SSCs), this is indicated.

*Note: *OPITO approved establishment*

IP partners in training

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The Institute of Petroleum is an independent scientific body formed in 1913. Its mission is to be the best independent European centre for the advancement and dissemination of technical, economic and professional knowledge relating to the international oil and gas industry. The Institute runs a comprehensive programme of training courses, conferences, seminars, and publications, as well as operating a comprehensive library and information service, including worldwide online searching, to provide scientific, technical and economic data. These contribute to the Institute's growing interest in and support for Lifetime Learning, as individuals increasingly take responsibility for their own competencies and employability. The IP's greatest strength is the diversity and enthusiasm of its membership. We have over 8,350 individual members and almost 400 corporate members.

The Institute of Petroleum runs a number of training courses and programmes in partnership with the following organisations. For further information regarding specific courses, visit the IP website at ***www.petroleum.co.uk***

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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 Alphatania for natural gas management training. At the core of Alphatania gas management training courses are the many decades of experience in the gas industry of its staff.

BMT Cordah
Kettock Lodge, Aberdeen Science & Technology Park, Bridge of Don, Aberdeen AB22 8GU, UK
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Consultancy and training in all aspects of environmental management including range of training programmes specifically for the oil and gas industry. Published calendar of courses attracts participants from a wide range of countries and companies. Programmes tailored to the requirements of client organisations, delivered worldwide. A training partner of the Institute of Petroleum.

ENSPM Formation Industrie
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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.

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NExT, a Network of Excellence in Training, is a joint-venture between Schlumberger and three major petroleum engineering universities – Heriot-Watt in Scotland, Texas A&M and The University of Oklahoma in the US. The company offers training via 75 computer-based training programs, 155 traditional training classes and Masters degrees. NExT specialises in the areas of drilling, the geosciences, production engineering, reservoir engineering, and management. Competency assessments and skills gap analysis are a major part of the company's offering. The venture has training facilities in the US, the UK, France, the UAE, Indonesia and Australia.

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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. Charlotte Wright is an international consultant to major oil and gas producers throughout the world. She is PDI's lead petroleum discussion leader and has conducted seminars on petroleum contract accounting in China, Egypt, South America, Trinidad, and other countries. She regularly serves as discussion leader in PDI's two annual International Petroleum Accounting and Financial Management Schools. Dr Wright, who occupies the Wilton Anderson Chair of Accounting at Oklahoma State University, has written many articles on oil and gas accounting and writes a regular column on petroleum industry environmental accounting for the *Petroleum Accounting and Financial Management Journal*.

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Building 442, QinetiQ Pyestock, 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
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. The Fuels and Lubricants Centre (FLC) exists to give 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 maintain Defence Standard 91-91, which is the most commonly used jet fuel standard in the world.

SGS Redwood Services
Old Station Approach, London Road, Purfleet, Essex RM19 1QS, UK
T: +44 (0)1268 417843 **F: +44 (0)1268 410547**
e: bradcerny@hotmail.com

SGS is the world's largest independent testing and inspection group, operating in over 140 countries, and has unparalleled experience and expertise. The Redwood Division of SGS is primarily concerned with the inspection of bulk liquids, in particular crude oils and petroleum related products. The Redwood International Training department is a dedicated, technically-based advisory and training unit that has provided over 20 years of continuous support to the oil, gas, petroleum and petrochemical industries. The range of courses cover a broad spectrum of subjects related to the measurement of quantity and quality of crude oil, petroleum products and general bulk liquids. Its training personnel are highly experienced members of SGS' supervisory or managerial operational staff with a flair for training. Courses are tailored to customer needs and availability.

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 or +44 (0)870 052 2235**
e: info@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. In-house training courses also custom-designed for individual clients – can be presented almost anywhere, worldwide.

Aberdeen College
Gallowgate Centre, Gallowgate, Aberdeen AB25 1BN, UK
T: +44 (0)1224 612330 **F: +44 (0)1224 612001**
e: enquiry@abcol.ac.uk www.abcol.ac.uk

Courses in multi-disciplinary engineering, marine and offshore technology, and electrical technology.

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 585844 **F: +44 (0)1224 585899**
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 are always available, and courses are never cancelled. Advanced courses are also available.

Aberdeen University Oil and Gas Centre, Research and Innovation
23 St Machar Drive, 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 – 'Prospect CPD' – 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: Cameron.Laing@allomax.com www.allomax.com
www.casmax.com www.organisationallearning.com

Training in risk management, project management, artificial lift, sand control, drilling engineering, 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 systems (Wellmax) and the leading well engineering competency assurance system (Casmax).

Appropriate Training
Strand Street West, Preston, Lancashire PR2 2NS, UK
T: +44 (0)1772 723377 **F: +44 (0)1772 768611**
e: train@appropriatetraining.demon.co.uk
www.appropriatetraining.co.uk

Design and implementation of bespoke technical training programmes and producers of interactive and multi-media training materials.

*** 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: wwe@blackpool.ac.uk www.blackpool.ac.uk

Basic offshore safety induction & 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 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.

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

Specialists in drilling and well services. Accredited by IWCF, IADC, SQA.

Cambrian Consultants
Mayfield, Llanbadoc, Usk, Monmouthshire NP15 1SY, UK
T: +44 (0)1291 673022 **F: +44 (0)1291 673023**
e: training@cambrian-group.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 evaluation and software applications. Offices in Usk (South Wales), Houston and Kuala Lumpur enable the full range of services to be supported internationally.

The Center for Professional Advancement
Oudezyds Voorburgwal 316 A, 1012 GM Amsterdam, The Netherlands
T: +31 (0)20 638 2806 **F: +31 (0)20 620 2136**
e: amsterdam@cfpa.com www.cfpa.com

The Centre provides high quality continuing technical education to industry and governments worldwide via its two- to five-day, intensive, focused and practical courses in applied industrial technologies. Primarily designed for working scientists and engineers, programmes are highly interactive, providing ample opportunites to address individual concerns.

Centre for Advanced Maritime Studies
Albert House, 7 Johns Place, Edinburgh EH6 7FL, UK
T: +44 (0)131 555 0525 **F: +44 (0)131 554 0565**
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, 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 provided.

Cogent SSC – The Sector Skills Council for the Oil and Gas Extraction, Chemicals Manufacturing and Petroleum Industries
Minerva House, Bruntland Road, Portlethen, Aberdeen AB12 4QL, UK
T: +44 (0)1224 787800 **F: +44 (0)1224 787830**
London office: Monticello House, 45 Russell Square, London WC1P 4JP, UK
e: info@cogent-ssc.com www.cogent-ssc.com

Develops training standards for the oil and gas extraction, petroleum and chemicals manufacturing industries. Accredits training courses which meet such standards. Approves training providers and centres. Offers workforce development solutions to employers, training information to employees and careers information to students. Acts as the industry's voice on skills and training issues.

De Montfort University
Department of Chemistry and Physics, The Gateway, Leicester LE1 9BH, UK
T: +44 (0)116 257 7698 **F: +44 (0)116 257 7287**
e: sjd@dmu.ac.uk www.dmu.ac.uk

Offers Postgraduate Certificate/Postgraduate Diploma/MSc in Lubricant & Hydraulic Technology.

ECCTIS 2000
Oriel House, Oriel Road, Cheltenham, Gloucestershire GL50 1XP, UK
T: +44 (0)1242 252627 **F: +44 (0)1242 258600**
e: enquiries@ecctis2000.co.uk www.ecctis.co.uk

The official courses guide to approximately 100,000 courses at over 1,000 universities and colleges of further and higher education. Users can search by course subject, location, method of study or by institution. The database also provides information on routes to professional qualifications, including how study can lead to exemption from examinations.

Engineering Careers and Information Service (ECIS)
EMTA House, 14 Upton Road, Watford, Hertfordshire WD18 0JD, UK
T: 0800 282167 (UK only); +44 (0)1923 238441
F: +44 (0)1923 652389
e: ecis@engineeringcareers.org.uk www.enginuity.org.uk

Advice on all aspects of an engineering career, including modern apprenticeships and engineering degrees. Free careers literature available. Annual one-week Insight university course programme for female sixth formers considering a professional engineering career. Support service for careers advisers, teachers and parents including e-careers CD-Rom for careers library.

*** Fire Service College**
Moreton-in-Marsh, Gloucestershire GL56 0RH, UK
T: +44 (0)1608 650831 **F: +44 (0)1608 651839**
e: enquiries@fireservicecollege.ac.uk www.fireservicecollege.ac.uk

Offshore fire emergency response team member & team leader/offshore emergency helideck team member courses. OPITO approved establishment.

Geosphere
Netherton Farm, Sheepwash, Beaworthy, Devon EX21 5PL, UK
T: +44 (0)87 0909 0087 **F: +44 (0)87 0909 0006**
e: timharper@geosphere.uk.com www.geosphere.uk.com

Short courses run on the application of geomechanics in tectonic regions; the basics of geomechanics and its application to drilling performance, completion design and production; well productivity optimisation, providing an appreciation of the factors that control well performance for non-specialists (mixed groups of geologists, petrophysicists, drilling engineers, facilities engineers and reservoir engineers).

Heriot-Watt University
Institute of Petroleum Engineering, Research Park, Riccarton, Edinburgh EH14 4AS, UK
T: +44 (0)131 451 3567 **F: +44 (0)131 451 3127**
e: enquiries@pet.hw.ac.uk www.pet.hw.ac.uk

Postgraduate courses in petroleum engineering and subsea engineering.

Honeywell Hi-Spec Solutions
Chilworth Science Park, Southampton, Hampshire SO16 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 a 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 0YF, 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. It 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; Mob: 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; breathing apparatus.

Imperial College Centre for Continuing Education
Room 318 Sherfield Building, Exhibition Road, London SW7 2AZ, UK
T: +44 (0)20 7594 6884 **F: +44 (0)20 7594 6883**
e: cpd@ic.ac.uk www.ad.ic.ac.uk/cpd

The College offers short courses in petroleum engineering, special core analysis in reservoir engineering, two three-month courses in integrated reservoir management and reservoir characterisation and modelling.

Institute of Energy
18 Devonshire Street, London W1G 7AU, UK
T: +44 (0)20 7580 0077 **F: +44 (0)20 7580 4420**
e: info@instenergy.org.uk www.instenergy.org.uk

The Institute provides short courses, distance learning and national qualifications in energy management. Tailor-made courses based on The National Standards for Managing Energy can be developed for teams. Free energy management training consultation and staff awareness programmes are available for companies in membership. The Institute is an accrediting body able to approve and certificate in-house training.

Institution of Chemical Engineers
Davis Building, 165–189 Railway Terrace, Rugby, Warwickshire CV21 3HQ, UK
T: +44 (0)1788 578214 F: +44 (0)1788 534407 (conference dept.)
e: events@icheme.org.uk www.icheme.org

Provides training for the process industries in the form of courses, slide/video packages, books and journals.

International Boundaries Research Unit (IBRU)
Department of Geography, University of Durham, South Road, Durham DH1 3LE, UK
T: +44 (0)191 374 7701 **F: +44 (0)191 374 7702**
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.

International Human Resources Development Corporation (IHRDC)
Brouwersgracht 288, 1013 HG Amsterdam, The Netherlands
T: +31 20 638 0110 **F: +31 20 421 6228**
e: ihrdceurope@compuserve.com www.ihrdc.com

IHRDC is a fully integrated training, publishing and consulting organisation serving the worldwide petroleum, natural gas, and power industries. It offers to its worldwide clients a broad range of technical courses, as well as energy management programmes and business workshops covering the integrated business of oil, gas and power. IHRDC has developed an oil industry web-based training system – IPIMS.ep – covering exploration and production technology, which is licensed by oil organisations worldwide.

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

Training courses run on economics of the oil supply chain; economics of refining and oil quality; trading oil on the international

markets; price risk management in the oil industry (all in association with the IPE); supply and price risk management of aviation fuels (in association with IATA); price risk management in traded gas and electricity markets (in assocation with Alphatania).

IPE Training
1 St Katherine's Way, London E1W 1UY, UK
T: +44 (0)20 7265 3745 **F: +44 (0)20 7481 8485**
e: training@ipe.uk.com www.ipe.uk.com

IPE Training is a subsidiary of IPE Holdings. The company runs a combination of short and residential courses aimed at the oil, gas and power markets. In addition, IPE Training also offers companies tailor-made training courses that are designed to meet a company's specific training needs.

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

Runs courses on international supply, trading, transportation and operations practice.

***Lancashire Fire & Rescue Service**
Training and Development Centre, Washington Hall, Southport Road, Euxton Chorley, Lancashire PR7 6DH, UK
T: +44 (0)1257 266611 **F: +44 (0)1257 261767**
e: bobbradshaw@lancsfirerescue.org.uk www.washingtonhall.co.uk

IOSH and NEBOSH courses available. Also extinguisher training, emergency management response (CIMAH and COMAH). Company specific or generic courses offered. OPITO, JOIFF and NEBS accredited.

*** LINK Associates International**
Aspen Drive, Raynesway, Derby DE21 7SG, UK
T: +44 (0)1332 677066 **F: +44 (0)1332 679609**
e: link@link-associates.co.uk www.link-associates.co.uk

Facilitating and training companies in crisis and emergency management, risk management and communication, business continuity, safety and environmental management and against organisational failure. Sponsor of National Emergency Management Standards for assessment of competence for onshore management and OPITO accredited for offshore management.

*** 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 (bkings)
F: +44 (0)191 427 3600
e: marsim@stc.ac.uk www.stc.ac.uk

OPITO-approved basic offshore safety induction and emergency training; further offshore emergency training; universal combined survival and firefighting; basic offshore European refresher; basic offshore European upgrade.

MDT International
45 Albert Street, Aberdeen AB25 1XT, UK
T: +44 (0)1224 561 521 **F: +44 (0)1224 561 530**
e: info@mdtinternational.com www.mdtinternational.com

NEL
East Kilbride, Glasgow G75 0QU, UK
T: +44 (0)1355 272196 **F: +44 (0)1355 272626**
e: phone@nel.uk www.nel.uk

NEL is a leading provider of training courses, conferences, seminars and workshops worldwide, across all areas of flow measurement. These events are dedicated to helping engineers and technologists keep up to date with the latest flow measurement technology and provide a forum for networking with the key industry players.

***NUTEC Centre For Safety**
Haverton Hill Industrial Estate, Billingham, Cleveland TS23 1PZ, UK
T: +44 (0)1642 566656 **F: +44 (0)1642 563224**
e: tina.lucas@nutecuk.com
Foinavon Close, Aberdeen Airport East, Dyce, Aberdeen AB21 7EG, UK
T: +44 (0)1224 725808 **F: +44 (0)1224 725809**
www.nutecglobal.com

Nutec is a provider of safety and emergency response training services, working within a broad cross-section of offshore and onshore industries. Nutec has a network of high quality facilities around the world.

OGCI Training/Petroskills
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.

Oil Firing Technical Association for the Petroleum Industry
Century House, 100 High Street, Banstead, Surrey SM7 2NN, UK
T: +44 (0)1737 373311 **F: +44 (0)1737 373553**
e: enquiries@oftec.org www.oftec.org

The Association comprises major oil companies, oil distributors and manufacturers of oil firing equipment in the UK and Irish Republic. It operates OFCERT equipment testing and approval scheme and also provides technical training and registration as well as other technical support for the oil firing industry.

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

Oil Spill Response offers a wide selection of courses, including oil spill incident management and 'hands on' equipment familiarisation courses.

*** 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

OPITO-approved helicopter landing officer course; lifting and slinging operations; helicopter refuelling; CAA aeronautical radio; VHF marine radio; offshore crane operator stages 1-4; banksman slinger; forklift truck safety; COSHH; confined space entry; risk assessment; abrasive wheels; high pressure water jetting; manual handling.

The Oxford Princeton Programme
52 New Inn Hall Street, Oxford OX1 2QD, UK
T: +44 (0)1865 250521 **F: +44 (0)1865 791474**
e: info@oxfordprinceton.com www.oxfordprinceton.com

Short and long courses in supply and trading; international oil, gas, petrochemical and energy; bunkering; tanker ownership; chartering and operations; petrol retail and lubricants; North American natural gas, oil, power and coal.

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.

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
www.petroleum-economist.com

Residential, in-house and bespoke courses across the energy value chain. Topics include basin analysis and ranking; contracts management; exploration and production technology; energy industry fundamentals; fiscal issues and contracts; logistics; natural gas industry fundamentals; oil refining; oil trading; portfolio

valuation and risk; project management; prospects and reserves; strategic planning; 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 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 certificatation by examination.

PTF
48a West Bar, Banbury, Oxon OX16 9RZ, UK
T: +44 (0)1295 255811 **F: +44 (0)1295 273110**
e: ptftraining@compuserve.com www.ptftraining.co.uk

Forecourt staff training – management; supervision risk assessment; competent persons; BTEC in petroleum risk management (retail); CD-Rom forecourt management (with built-in test); driver training–ADR; beyond ADR; customer care; team building; risk assessment; health and safety, legislation update; CD-Rom Class 3 (with built-in test). Depot staff – depot operations; health and safety; environment; risk assessment. Electrical contractors – on forecourts; sites with special hazards. Dangerous goods safety adviser courses (DGSA). Training needs assessments. Courses tailored to meet customers specific requirements.

The Professional Development Institute of The University of North Texas (PDI)
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

PDI offers seminars, schools, conferences and in-house training programmes in oil and gas accounting, finance and taxation. It is the continuing professional education arm of the University of North Texas in Denton, Texas. Courses run on Financial Accounting for Petroleum Companies; Accounting for International Petroleum Contracts; Production Sharing and Risk Service Contracts and Joint Operating Agreements (in association with the IP).

Royal Holloway University of London
Department of Geology, Egham Hill, Surrey TW20 OEX, UK
T: +44 (0)1784 443612 **F: +44 (0)1784 471780**
e: bosence@gl.rhbnc.ac.uk www.gl.rhbnc.ac.uk

Runs courses in applied geosciences of particular relevance to the petroleum industry; MSc in basin evolution and dynamics; MSc in tectonics; special short courses for industry on demand in the fields of basin analysis, geotectonics, structural geology, stratigraphic modelling, and sedimentology.

Shell Global Solutions Learning & Development Consultancy
Langelaan 3, 2211 XT Noordwijkerhout, The Netherlands
T: +31 (0)252 379334 **F: +31 (0)252 379205**
e: learn@opc.shell.com www.shellglobalsolutions.com/learning

Shell Global Solutions offers training and competence management consultancy services to its clients worldwide. With access to 1,500 industry experts, it provides clients with the latest knowledge and best practices from its wide range of technical training programmes that can be tailor made to suit client needs.

SIRA Training
South Hill, Chislehurst, Kent BR7 5EH, UK
T: +44 (0)20 8467 2096/8296 1802 **F: +44 (0)20 8295 1807**
e: siratraining@siratc.co.uk www.siratraining.co.uk

Sira provide courses in laboratory accreditation, calibration, QMS, and hazardous area technology. Many include hands-on/practical interaction and can be tailored for on-site delivery at the customer's premises.

SIS GeoQuest Education and Training Centre
Victory House, Churchill Court, Manor Royal, Crawley, West Sussex RH10 9LU, UK
T: +44 (0)1293 844022/844023 **F: +44 (0)1293 844075**
e: training@gatwick.geoquest.slb.com www.sis.slb.com/

Provides a comprehensive education and training service for the complete SIS product catalogue. Education, training and development in the use of SIS (GeoQuest, Merak, Baker Jardine) software.

Stag Geological Services
3 Fortuna Court, Calleva Park, Aldermaston, Reading RG7 8UB, UK
T: +44 (0)118 9820151 **F: +44 (0)118 9820152**
e: info@stag-geological.com www.stag-geological.com

Short courses cover wellsite operations (drilling, mudlogging, wellsite geology, MWD, coring, wireline log interpretation, testing); well planning; advanced drilling (HPHT, horizontal, geosteering, underbalanced, coiled tubing) and safety systems. Extended (one- to two-year) training packages in petroleum engineering, suitable for new graduates, also offered.

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 consultancy providing engineering services and courses on subsea pipeline engineering. There is a two-day introduction to subsea pipeline engineering course and a three-day course on design, construction and integrity management. The company also recently (2002) introduced a course on titanium alloys and polymer composites for the offshore industry. Full details and secure booking are available on the website.

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 days). Also four-and-a-half-day day courses on well intervention pressure control, introduction to coiled tubing, and completion design.

Univation
RGU – The Energy University, Kepplestone, Queens Road, Aberdeen AB15 4PH, UK
T: +44 (0)1224 263320 **F: +44 (0)1224 263323**
e: univation@rgu.ac.uk www.univation.rgu.com
www.theenergyuniversity.com

Univation is the commercial training and consultancy company of the Robert Gordon University and provides tailored training programmes and consultancy services, as well as offering several Masters degree programmes designed specifically for industry personnel. These include part-time and online PgDip/MSc in asset management; drilling and well engineering; field and well management; and oil and gas engineering.

University of Abertay Dundee
Bell Steet, Dundee DD1 1HG, UK
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BSc in geoscience; MPhil, PhD in geoscience.

Changing tack to sail new waters

After a number of years in the oil and gas sector, retired IP Member *Hugh Quick* decided to change course following early retirement and set up his own consultancy business. Although now fully retired, he found the experience so enjoyable that he has penned a few helpful hints for any wishing to follow in his footsteps.

Above: Hugh Quick aboard his former yacht, *Isis Tres*

For anyone wishing to embark on a new career as a consultant, there isn't really a right way or a wrong way to do it. All I can do is proffer a few reflections on my experience in the hope that they stimulate some useful thought. What follows may appear blindingly obvious to many... however, I would have been glad to read it before I started!

First and foremost, you must want to go down the consultancy route – it does not take long for your clients to sense your enthusiasm... or lack of it! Make no mistake about it, trying to be a consultant is hard work. You have to think hard, work hard and attend to detail. It does not create a good impression if, for example, when dicussing a report with a client, you say: 'Oh, I didn't realise that there was a hydrant down that road'... especially if there wasn't!

Partners

Secondly, you need to decide if you are going to 'go it alone' or create/join a partnership. I had no doubt that I wanted to be on my own. I wanted to say 'No' when I felt like it, leaving me free to pursue personal interests (I am a keen sailor) without worrying what it might do to a partner. I think that my solo status also proved an attraction to some clients.

That said, I found that I didn't like working on a job by myself and usually made an ad hoc arrangement for support on a job by job basis. When you are in the thick of the action it is all too easy to forget answers or miss nuances of what should have been said and wasn't. I also found my colleagues' thoughts useful. Perhaps I was lucky, but I never found it difficult to get help on a one-off basis.

Getting started

I don't really know how I managed to get started! I wrote a bombastic piece about how good I was at refinery economics and sent it to all sorts of people in the industry, including a wise and trusted friend who wrote back 'Tear it up and try again'. I didn't. Instead, I followed up by visiting people in the oil industry – BP, Kuwait Oil, contractors and consultants. Not one of them gave me a job on refinery economics.

However, a number of jobs came up on refinery operations – which I hadn't worked on for 25 years. But, if you want to be a consultant, you have to do what the client wants... you learn quickly not to say 'No' unless you are certain you can't do it.

I think the point is that I let a lot of people know I was in the market, and some knew me and took the bait.

Independence important

I think that my independence was my main attraction, both for my clients and me. It certainly helped that I had a pension and clients knew that I was not dependent on their fees. I always tried to be honest – I didn't tell clients what I thought they wanted to hear, I told them what I thought. That, I think, was the main reason they employed me... it was certainly one of the main reasons why I enjoyed the job.

Two examples help illustrate this point. First, I wrote in a report on refinery operations that I thought safety was poor because of the attitude of senior management. When I was presenting the report, the refinery manager asked me who I meant, I replied 'You'. It didn't do my immediate business any good but it made me feel good and I think it did the safety some good too.

Another day, working for another consultant, I turned up at a gas processing plant. It transpired that we had misunderstood one another as to what the job required and, faced with a meeting at the facility, I said 'I can't do the job you asked me to but, if you like, I will look around until lunchtime and if I see something I think I can help with I will let you know.' They agreed. At lunchtime I told them they had no material balance in their operation and didn't know what their losses were. They were surprised and I ended up working on this for a couple of days.

Mr Right vs Mr Wrong

You must always recognise that you may be wrong. Misinformation and misunderstanding are always possible – no matter how good you are. Don't paint yourself into the corner of being right. Two examples...

First, I advised a company to buy a refinery. They did and it was successful. I think the main reason the operation was successful was because the CEO stayed on with the new owners. He wasn't part of the deal at all, so my advice had nothing to do with the success of the business!

Second, I worked on an insurance claim outside the UK. Having read the policy I said to my principal 'It is clear that our clients are not liable.' 'Ah,' he said, 'quite right about the policy, but it is not what is in the policy that matters, it is what the judge thinks should have been in it.'

Outsiders can underestimate how difficult it is to get an informed, but independent, view internally. Office and career politics play a big part in most firms.

What to charge

Fees – I found this a difficult subject. Sometimes a client, for example, an academic research group, will say: 'We are not a commercial outfit, we pay £100 a day – take it or leave it.' The work was interesting and I took it. Otherwise I just asked around to find out how much other people were charging. I ended up charging £500 per day.

Two points are worth noting here. First, I found that I could only bill the client for about half the time that I spent on his business because I didn't bill him for time researching or writing reports at home. Second, I never argued. If the client said 'That's too much' then that was the end of the matter as far as I was concerned.

Working world

I secured a lot of work through another consultancy. They liked me and thought I provided some of their younger staff with training. I certainly hoped that I showed them there was no easy money.

Shell was the first company to employ me because I wrote the Group a fairly detailed commentary on what I thought was wrong with SIPM and its consultancy work. The main work was refinery company evaluations for potential buyers – providing a brief and cheap once over to see if full evaluation was worth it.

Work for insurance companies on claims was also quite common. I worked in Aden, Angola, Montreal, Sweden, Norway, New Zealand, Belgium and Puerto Rico, as well as Germany, Thailand, Scotland and England (Lancashire).

Some things to check on – Will you be safe in the country in which you are working? Who has been there and what did they think? Will you get paid? Who are you working for? Only one client tried to cheat me during my nine years as a consultant – a Saudi. Fortunately I (and a colleague with whom I was working) had some leverage and we were eventually paid. It is depressing to be cheated, but it does happen – a consultant with much more experience than me found this quite a problem.

Its all in the timing

Job offers never come evenly spaced. You have to decide whether the work will be too much or not. I don't remember ever saying 'No' because it was too much. I always assumed that one of the jobs would or could be delayed. I don't think I was ever wrong – but don't forget about what I said about being right!

Insurance cover

I decided that my resources were so pathetic compared with the kind of sums that I was advising on that no client would be daft enough to sue me! However, that may not always be the case and each consultant must make up his or her mind about indemnity insurance and any other possible legal problems. You should also consider whether being insured will itself change your status. I had to register for VAT and keep the taxman happy, but neither were very difficult.

However, I would definitely advise getting an accountant – he can prevent trouble you didn't see and his fees are tax deductable.

For or against?

A number of my friends thought that I should not be doing what I was doing. The first and most common objection was that I was undercutting the professionals. This did not worry me in the slightest – let the professionals look after themselves. Besides, we were largely serving different markets. Sometimes professional firms are better because they have all the data available and the client doesn't have to pay me to get it. I passed at least one job to a firm precisely for this reason, they kindly employed me too (for the job, not permanently).

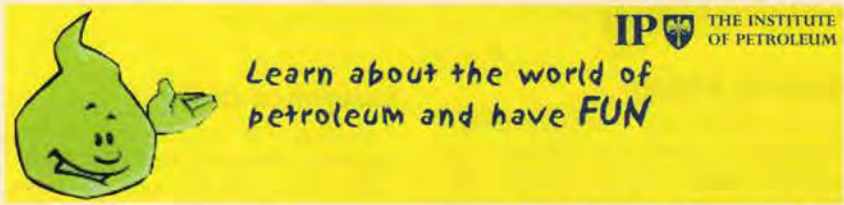
Second, was the objection that I was using skills and experience gained (in my case with Shell) without benefiting the company that provided the opportunity to gain the skills and experience. Well, I am what I am through whole chapters of accidents and happenstances and I am not going to start apportioning credit or blame now! Should I be paying my old school dues too?

Be sure

I think my final words of advice would be that if you have serious worries about what you are doing – don't do it. There are enough unthinking and tight-fisted clients out there to give you all the grief you can handle, without the self-generated stuff too.

Spreading the word

Gill Haben, IP Education and Training Manager, reviews some of the highlights in the IP Education Department over the past year...



Meeting of minds

This year's Association for Science Education (ASE) annual meeting was held at the University of Liverpool from 3–5 January. The meeting brought together many exhibitors of various education materials and there were a large number of courses/workshops and other events aimed at the science community. Some 4,000 people attended the 2002 show.

Once again, the Institute of Petroleum had a stand and, as usual, by the end of the three days teachers, eager for first rate resources, had taken all our literature.

I always take the opportunity of attending the ASE event as it provides the chance to speak with teachers about what they want the IP to produce for them and their pupils. It was most encouraging to have it reinforced that our strategy of building *The Hydrocarbon Trail (HCT)* (see *Petroleum Review*, March 2002) is very much supported. For those of you who do not know about our plans *HCT* will be an interactive education/career website to cover the full supply chain of the industry for every age group, from primary pupils to mature learners.

HCT is being developed in modular fashion. The first module – *Discover Petroleum (DP)* – was launched last Autumn 2001 (**www.petroleum.co.uk/discover**). This is a cross-curricular 'fun' site for 7–11 year-olds. Feedback has been excellent to date, not least from the teachers at ASE, and the message appears very much to be 'carry on the good work'.

More recently, IP Week in February 2002 afforded the perfect opportunity to gauge the opinion of more senior executives from all sectors of the industry about *Discover Petroleum*. I am pleased to report that the support was as strong as that shown by academia and the IP's industry support panels.

One of our specifications had been that *DP* should be FUN for the 7–11 year-olds – the over-11s at the IP Week stand exhibition at Great George Street, London, certainly had fun trying out the new site! We were encouraged to continue to build the whole *Hydrocarbon Trail* as soon as possible.

Fawley refinery – a virtual visit

Every piece of feedback that we have had since launching *Discover Petroleum*, the first module of *HCT*, indicates that it has been very well received. Now, through the sponsorship of ExxonMobil, we will be complementing the site with an interactive virtual tour of Fawley refinery. The tour provides an opportunity for young people to see right into the industry at their own pace and leisure.

We plan to build on this virtual visit for 7–11 year-olds with a tour aimed at 14–16 year-olds and the general public. Again, this has been made possible by the sponsorship, expertise and access to Fawley provided by ExxonMobil. Commenting on the project, Martin Tims, Manager of Education and Environment Programmes for ExxonMobil UK said: 'The Fawley refinery cannot unfortunately meet all the requests put to it for visits, for reasons of cost, time, safety and security. However, by using this innovative interactive technology we can show huge numbers of people what the refinery does, what careers there are in it, and how careful we are in terms of safety and environmental protection. The 7–11 year-old virtual visit work is almost complete now and is very exciting – however, the 14–16 year-old project will really allow us to go into a lot more depth and meet so many needs.'

IP THE INSTITUTE OF PETROLEUM

IP TRAINING COURSES 2002

In association with ensam FORMATION INDUSTRIE

Course Dates:
8 - 11 October 2002

Course Venue:
Institute of Petroleum, London

Registration Fee:
IP Member: £1800 (£2115.00 inc VAT)
Non-Member: £2000 (£2350.00 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.

During the course, delegates will review the various parameters which affect refinery profitability and will develop a working knowledge of the management tools used in the refining industry.

Economics of the Oil Supply Chain

During this **five-day course**, delegates will examine the various activities of the fictional Invincible Energy Company to explore the economic forces which drive the oil supply chain. They will concentrate on the main areas of risk and opportunity from the crude oil supply terminal, through transportation, refining and trading to the refined product distribution terminal. During their time in Invincible's refinery, delegates will learn about the quality aspects of product supply. They will study refinery process economics and the effects of upgrading.

In association with INVINCIBLE

Course Dates:
14 - 18 October 2002

Course Venue:
The Møller Centre, Cambridge

Registration Fee:
IP Member: £1950 (£2291.25 inc VAT)
Non-Member: £2150 (£2526.25 inc VAT)

In association with IP THE INSTITUTE OF PETROLEUM

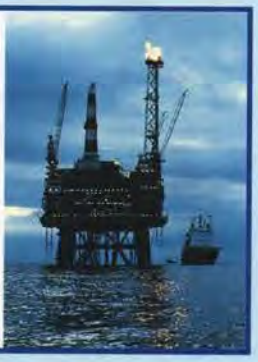
Course Dates:
16 - 17 October 2002

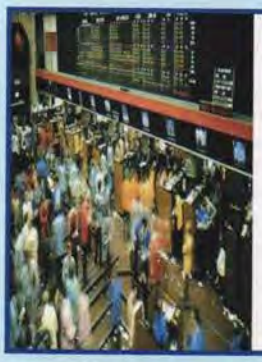
Course Venue:
Institute of Petroleum, London

Registration Fee:
IP Member: £900 (£1057.50 inc VAT)
Non-Member: £1100 (£1292.50 inc VAT)

Overview of the Oil Industry

This **two-day course** provides a concise introduction to the structure of the oil industry and its operations: from the search for oil and gas, the workings of the principal markets, through to the delivery of products to different customers. Participants will gain an appreciation of the principal activities in the international upstream and downstream petroleum industry and an understanding of how these inter-relate, as well as an appreciation of the impact of external influences.





Trading Oil on the International Markets

During this **five-day course**, delegates will become part of Invincible's fictional trading team, taking decisions about the company's activities to maximise profits through an understanding of the economics of trading and the management of inherent price risks. Delegates will trade the live, crude oil and refined product markets worldwide under the guidance of an expert team of lecturers reacting to events as they happen and using real-time information from Reuters and Telerate screens and daily price information from Platt's and Petroleum Argus.

In association with INVINCIBLE

Course Dates:
21 - 25 October 2002

Course Venue:
The Møller Centre, Cambridge

Registration Fee:
IP Member: £2600 (£3055.00 inc VAT)
Non-Member: £2800 (£3290.00 inc VAT)

Course Provider IP THE INSTITUTE OF PETROLEUM

Course Dates:
24 - 25 October 2002

Course Venue:
Institute of Petroleum, London

Registration Fee:
IP Member: £900 (£1057.50 inc VAT)
Non-Member: £1100 (£1292.50 inc VAT)

Introduction to Lubricants

Sponsored by LUBRIZOL

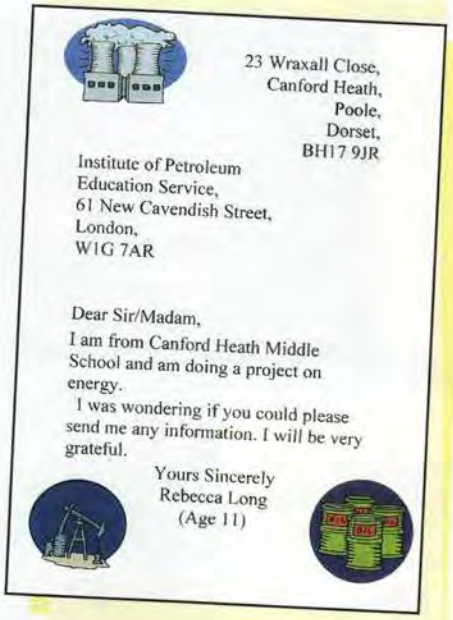
This **two-day course** will provide an overview of the lubricants' business for those personnel needing a working knowledge of it, but in a limited amount of technical detail. The broad scope of the course will allow those new to the industry, or those with some experience of it, to draw immediate benefits 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 and planning strategy.

For more information, see enclosed inserts or contact Lynda Thwaite at IP Training or visit: www.petroleum.co.uk

Tel: + 44 (0)20 7467 7154 Fax: + 44 (0)20 7255 1472 E-mail: lthwaite@petroleum.co.uk

Resourceful school children

I receive numerous letters from all sorts of people asking for information about petroleum. However, this spring, a couple of resourceful nine- and 11-year-olds really caught our attention with a letter from Rebecca Long, age 11, from Canford Heath Middle School.



23 Wraxall Close,
Canford Heath,
Poole,
Dorset,
BH17 9JR

Institute of Petroleum
Education Service,
61 New Cavendish Street,
London,
W1G 7AR

Dear Sir/Madam,

I am from Canford Heath Middle School and am doing a project on energy.

I was wondering if you could please send me any information. I will be very grateful.

Yours Sincerely
Rebecca Long
(Age 11)

It transpired that a group of students from the school had been set an energy project by their science teacher Mr Ailing. Mr Ailing had advised the pupils to contact the IP as the best source of information and it is very gratifying to know that our reputation is spreading.

When Rebecca's letter arrived it really caught the eye. I responded by sending her a 'pack' of IP resources.

Then, letters gradually began to arrive from each pupil in the class! I responded to each request.

After a while I started to get Thank You notes saying that all the materials had been incorporated into their projects. I was also informed that Mr Ailing said 'Hi and thank you.' *It was our pleasure Mr Ailing!*

Katie Stott and Mrs Fox at the prize-giving

Student prizes

The IP continues to award prizes to outstanding university students of petroleum related subjects and the latest round brought the usual extremely high standard.

Awards were presented to:

- Andrew Rutherford, MSc Petroleum Geology from Aberdeen University
- Christopher Hill, MSc Geophysics from Durham
- Pedro Carneiro, MEng Petroleum Engineering from Heriot Watt
- Carlos Merino, MSc Petroleum Geoscience from Imperial College
- Donald Allan, MSc Petroleum Engineering from Imperial College

We also make an award, when a suitable candidate is nominated, for the Tony Fox Award. This prize commemorates the life of the late A F Fox, MBE, ARSM, BSc, FGS, FinstPet for his outstanding contribution to the Institute. This year the prize went to Katie Stott.

All of the prizewinners are now Members of the IP and I have encouraged them to attend our events both here at New Cavendish Street and at the Branch meetings. Everyone appreciates that these occasions are great to network as well as add to their technical competence.

As always I have asked award winners to keep in touch, especially if we can be of any assistance to them. We welcome them into the industry and wish them happy and fulfilled careers.

Harriet Burdett

BTA studycards

The IP became involved with the BTA Studycards scheme in 2001, the aim being to broaden our education strategy through an established, far reaching initiative linking business and education. The scheme, now in its 49th year, is a National Schools' competition judged by an independent panel consisting of teachers and educational specialists.

The studycards are the primary source of information to encourage pupils to develop a research project based on one of the card themes. The IP – in response to a request from ChevronTexaco who viewed us as the most appropriate body to act on behalf of the industry – created a six-page studycard, reflecting the range of career opportunities with our sector. The IP 'Petroleum Studycard' has been widely used and 11-year-old schoolgirl Harriet Burdett, from Courthouse Junior in Maidenhead, won the top prize in this year's competition with a project inspired by the IP's participation.

'When I began my project, to me, the word 'petrol' just meant something you put into cars to make them go,' she wrote. However, with the IP's help, she went on to find out about Opec and pricing, marketing, distribution of petroleum and much more.

Harriet's entry won the category for project work based on the IP's studycard and went on to win the overall prize selected from all finalists from each individual card. The number and quality of entries was extremely high.

Science techfest

The IP is a member of SETNET – The Science, Technology, Engineering and Mathematics Network. Membership includes many institutes and companies that make varying contributions to an excellent programme of activities to support appropriate learning vehicles for young people.

Its events programme includes the Techfest Festival of Technology & Science – a wonderful amalgam of creative activities, run mainly at the Aberdeen Exhibition & Conference Centre by SETPOINT Scotland North. It is inspirational to the many young people and adults who attend.

Keep in touch

These are a few of the activities managed by the IP's Education and Training Department in a bid to encourage, influence, inform and inspire all learners and prospective employees about our industry.

If you have any views or ideas please feel free to contact me on T: +44 (0)20 7 467 7135 or
e: **ghaben@petroleum.co.uk**

Engineering composites – repairs to outlast the asset

In June 2001 the FD Alliance (FDA) was formed by Furmanite and DML to offer a range of repair services for oil industry assets based on the use of sophisticated composite technology.

***Chris Skrebowski* recently visited the Devonport Royal Dockyard in Plymouth where DML Composites is based.**

Jim Cuthill, FDA Business Development Manager, explained how the alliance was able to bring together Furmanite's international coverage, experience and expertise in working with the oil industry, providing a range of services to maintain production flows, with the leading-edge composite experience of DML. This combination enabled the amazing properties of carbon fibre reinforcement to be applied to a wide range of engineering problems experienced by the oil and gas industry both offshore and onshore.

He started by explaining that composite repairs had a somewhat negative image, probably coloured by many people's experience of fibreglass repairs to cars and the widely-held view that such repairs were quick-fix, temporary solutions. He noted that properly prepared work with careful alignment of the carbon fibres can provide ten times the strength of steel, twice the torsional stiffness at one-quarter the density.

DML originally developed its expertise in the repair of warships and had developed a wide range of research-based solutions to various engineering challenges ranging from component manufacture and installation to in-situ strengthening and repair services. In addition, DML has been working closely with the Atomic Energy Authority (AEA) in a comprehensive materials testing programme, the development and validation of design methods and preparation of the independently-approved design grades.

Composites' lightweight nature, coupled with the fact that no hotwork is required, makes them an extremely unobtrusive repair. In addition, application can often be carried out online. As they are low profile and conform closely to the surface of the pipe, only a thin application (typically 5 mm) is needed to significantly strengthen the substrate – this is of particular benefit where the repair has to be carried out in an area with restricted access.

Providing multi-axial strength and restoring full structural integrity and pressure containment, the finished repair is low maintenance and can often be classed as permanent. Indeed, the potential lifespan of 25 years means that the repairs will, in many instances, 'out live' the existing assets.

The application of composites has been backed up by extensive cooperation between the parties responsible for the introduction of the technology and those seeking to use it. AEA was commissioned to effect this initiative, instigated by Shell Expro and BP, with the preparation of a suite of documents to guide the design and installation of such repairs. DML has been involved in the production of these guidelines (covering design, installation and inspection) from the out-set. The new documents detail design requirements, calculations, safety allowances, and QA (quality assurance) inspection and control at every stage.

'These specifications have already made a huge contribution to a general understanding of the need for engineering in composites applications, and ultimately to the growing confidence and widespread acceptance of composites as a repair material,' commented FDA Composites Manager Paul Smith. 'We hope eventually to reach the point where operators are as familiar with, and comfortable about, the use of composites as they are currently with steel.'

According to Cuthill, the ground-breaking FDA projects, implemented in accordance with the AEA specifications to provide full validation and traceability, have instilled a growing confidence in the use of the technique. The development of capabilities such as tank and vessel repair and deck strengthening, as well as pipe repair methods, has further expanded the range of capabilities.

Acceptance of the technology in terms of an internationally recognised standard is now key to the next stage of development – FDA is currently actively working with ASME in order to achieve this. A draft standard has already been prepared and is being updated prior to issue hopefully later this year (FDA repairs already exceed the requirements of the planned standard), claims Cuthill.

Four recent jobs (three offshore, one onshore) illustrate the range of engineering challenges where FDA used composite technology to effect an engineering solution.

Offshore cunifer repair

On TotalFinaElf's Alwyn North B platform extensive lengths of piping, incorporating complex geometries that included a 180° elbow, have been successfully repaired online to restore full structural and pressure integrity in one of the first applications of carbon fibre composite repairs to cunifer pipe work.

The work was carried out on the 15-year-old seawater system CuNiFe (cunifer) piping, which had suffered wall thinning and pinhole leaks due to internal erosion caused by flow velocities. The options were limited. Nearly 30 metres of repairs were required on cunifer line ranging from 2-inch to 24-inch, incorporating straights, elbows and tees. Welding was not possible given the thinning that had occurred, and the extensive lengths of piping involved meant that clamps were not practicable. FDA carried out the repairs using its carbon fibre and epoxy resin materials to wrap the defective lengths of pipe.

'One of the attractions of our composites repairs is that they can be applied to elbows, tees and other complex geometries, often in areas of severely restricted access,' Cuthill pointed out. 'There aren't many repair systems that can be effectively applied to a 180° elbow. But with our compos-

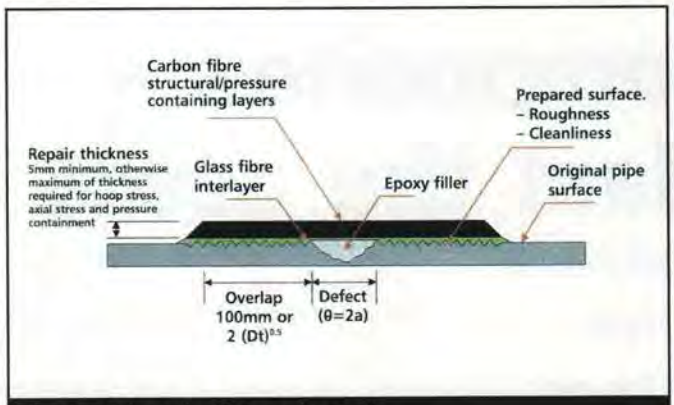


Figure 1: Schematic of composite repair

Composite wrap repair to tee pipe

Limited access on Statfjord platform for the composite wrap repair

ites technology, once the repair specification has been calculated (the surface preparation that's required, the repair thickness, resin formulation, and so on), the materials can be applied without needing prefabrication and are wrapped to fit on-site.'

'Most of the work using composites carried out to date has been on carbon steel. In this instance, consideration had to be given to the fact that this was a cunifer system,' stated Cuthill. 'For example, surface preparation before applying the composite is always critical to achieving a satisfactory repair, and particularly on cunifer. In this case low pressure water-blasting (rather than grit-blasting) was initially used, allowing for the relative softness of the cunifer, followed by a proprietary surface pre-treatment. The effectiveness of this pre-treatment has been assessed using hydraulic pressure testing of composite repairs made to cunifer plates incorporating manufactured through-wall defects, and lap shear testing.'

The critical pre-treatment of the surface removes any oxidation from the metal surface and provides a good bond for the fibre and resin. An SA2.5 finish (75 microns) is usually specified, and the repair work then starts within four hours to prevent re-oxidation. A glass fibre tie-coat is then applied, which provides a high quality interface between the pipe and layers of carbon fibre, as well as a degree of electrical insulation to prevent galvanic interaction – an integral element of FDA's quality control.

This is followed by resin-impregnated layers of carbon fibre, which are built up in accordance with the calculated and specified design thickness. In this instance the thicknesses ranged from the standard 5 mm up to 7 mm on a 16-inch line and 10.7 mm on the 24-inch tee. A final sacrificial peel ply is applied over the top layer of carbon (and removed once the resin has cured) to remove excess resin and create a textured final coating on the repair for the application of paints or other finishes as required.

The repair, which is classed as permanent, was designed based on a maximum operating pressure of 15 barg and an upper operating temperature of 30°C.

'We had used composites on Elgin/Franklin so were already familiar with the technology, and the FD Alliance had done some previous work with us on a flare riser last year,' reported Brian Duncan. 'We felt FDA was able to produce the best results for us, particularly in terms of restoring full structural strength and pressure integrity, and the permanence of the repair, and we're delighted with what has been achieved. The repair has been designed so that even if the cunifer erodes completely, the integrity of the pipe work will be maintained. That's one of the major benefits FDA was able to offer us.'

We've already undertaken a great many repairs on carbon steel but, as always with any new technology, it takes time to build confidence in it,' remarked Cuthill. 'The fact that we're now working successfully on exotic materials (we've dealt with super duplex as well as cunifer) should help to encourage that process.'

Refinery cooling

The largest composite repair to date involved more than three tonnes of carbon fibre and three tonnes of resin to make a repair to 75 metres of main cooling line at one of Europe's largest oil refineries. The 60-inch salt-water feed line, fabricated from concrete-lined steel, had suffered extensive corrosion after more than 50 years in service.

'Severe wall thinning and pitting of

the surface was giving cause for concern,' according to Paul Smith, the Composites Manager at FDA. 'The client, a multinational oil company, was worried about the structural integrity of the pipe and, although the pipe was one of two such lines supplying the refinery, the plant needs both to be able to run safely.'

The company considered replacement of the pipe at a cost of approximately £500,000 but discovered the composite repair would cost between 35% and 40% of the cost of renewal.

Smith noted that the cooling line included seven lobster-back elbows, two tee-pieces and a large pipe support. All these structures can be wrapped on-site, without having to design fittings of complex geometry to fit them.

For all composites repairs, preparation of the surface involves water- or grit-blasting to remove surface corrosion and prepare an oxide free surface that will provide a good bond for the resin and fibre. SA2.5 (75 microns) finish is the standard specification. A glass-fibre tie-coat is then applied, to prevent galvanic interaction between the steel pipe and carbon fibre. Although no such instances of this phenomenon have been recorded, the precautionary procedure prevents any future possibility of corrosion.

Once the tie-coat is finished, resin-impregnated layers of carbon fibre are carefully wrapped around the corroded area. 'Hand-application is probably the lowest-tech part of the procedure,' said Smith, 'and it looks deceptively simple. But having worked with AEA Technology and Shell Expro to draw up a validated repair procedure for composites materials, we've realised that one of the main obstacles to achieving consistent quality is in the application itself. At FDA, we maintain that quality by using only our trained engineers to carry out repairs. It's not something anyone can do.'

The AEA document also sets out the number of layers of fibre required, which is dependent on a number of factors including operating temperature and pressure, the nature of any defects and the diameter of the pipe. For the cooling water line, designed to run to a pressure of 7 barg at 30°C, ten layers of fibre to a total thickness of 12 mm were used. This is only a fraction of the uppermost limits for composite repairs of this nature; FDA has successfully applied the material for operation at temperatures of 150°C and 167 barg pressures.

'The refinery has now returned to full operation,' said Smith, 'and the client was sufficiently impressed by our technicians' unfailing attitude to safety that they awarded us a contractor safety performance gold award. That's very reassuring; safety is uppermost in our minds at all times and it's great to know that it's been recognised.'

Statfjord platform

Local external corrosion under isolation on a 30-inch n/b crude oil metering loop on a Statfjord platform was another recent repair by FDA. Local corrosion, caused by water trapped under isolation, is very difficult to detect and was therefore not discovered before a small leak occurred in the metering loop. FDA, using its composite repair technique, returned the loop to its original specification without the costly platform shutdown associated with a weld repair solution. The repair was completed with the platform still in operation, although the metering loop had been drained.

'The fact that the area of the pipe exposed to dampness was deeply pitted made the repair particularly difficult,' reported Smith. 'Essential to a successful repair is the preparation of the repair surface to ensure a sound interface between the composite material and the pipe substrate and this presented a particular challenge. Usually it is necessary only to blast the repair surface, but by using the filler we were able to prepare a suitable surface for us to begin the composites repair.'

As in other jobs, pressure containment is achieved through use of quadraxial material (laying in four ways) which bears both axial and bending loads and restores hoop strength. To date FDA has completed repairs at pressures up to 167 barg.

This particular repair was designed for a six-year lifespan, as required, but composites repairs can be specified for up to 25 years.

Amerada floater

Advanced composites technology has been successfully applied to a high pressure, high temperature carbon steel gas compression line on the Amerada Hess floating production facility, *AH001*, which during routine inspection was found to be suffering from external corrosion and severe localised wall thinning.

With the plant live a weld repair is not an option, and complex geometries make a clamp impractical, shutdown is generally seen as the only option. However, the development of bespoke composites solutions from FDA provided another solution.

Amerada Hess Integrity Team Leader, Henrik Andersen, explained: 'With potentially critical damage to the gas line a reliable long-term load carrying repair option was required to restore full structural integrity for the expected lifespan of the line (some five to seven years). We knew composites could deal with the awkward geometry of the 8-inch to 4-inch reducing tee, but were unsure of achieving the required strength and pressure integrity at the high temperature. The FDA composites system is fully engineered and, following third party validation, we were confident that the necessary standards could be achieved.

The gas line operates at 124°C and 80 barg and, in order to comply with AEA specifications (commissioned by Shell Expro, Amerada Hess, BP, BG HRL, Petrobras and Saudi Aramco, and developed with considerable input from DML), the repair had to cure at 20°C above this temperature.

The corrosion damage was fully assessed and the main area of corrosion was identified at the 6 o'clock position on the 8-inch pipe, directly below the 4-inch branch, the composite repair solution was then calculated and designed accordingly.

Since no hotwork was required for this repair, production was able to continue with the gas flow diverted to a parallel line. For safety reasons the damaged line was depressurised before the critical preparation stages of the repair took place.

For this specific project the high operating temperatures required a specialist curing technique that actually used the pipe's heat to aid the cure. To achieve the specified post-cure temperature, trace heating was applied to the pipe as it was brought back to full functionality. As the pipe began to repressurise and heat up to operating temperature the cure temperature remained constant at 20°C above the pipe operating temperature, eventually achieving the required 144°C.

'We believe this to be highest temperature and pressure composites repair achieved to data on a hydrocarbon line,' comments Smith. 'The work was carried out over two days, and whilst other solutions may have been a little faster, they would all have entailed a full platform shutdown, incurring significant cost. Our advanced, engineered repairs are able to meet stringent specifications and this technology is constantly breaking new ground.'

AH001 was able to remain at full production, some 17,000 b/d, during the period that the repair was executed.

Owning the motorist

Impending changes to European Union competition law in the automotive market will enable oil companies to offer 'total motoring solutions' on all volume vehicle brands. In addition to new revenues, there is considerable scope for securing high levels of customer loyalty. *Mike Phillips* of Datamonitor explains.

Oil companies have been steadily losing share of the motorist market ever since hypermarkets first started selling fuel. As if their invasion of the forecourt market weren't enough, the hypermarkets' growing penchant for diversified retailing has led some to launch further services for the motorist, such as autofinance and motor insurance. Indeed, the situation is such that Tesco is now selling more motoring products than some global heavyweights – a situation that the oil companies are very keen to address.

However, the European Competition Commissioner Mario Monti recently made an announcement that offers a golden opportunity to redress the balance and reclaim the motorist.

Golden opportunity

The announcement, made in July 2002, revealed Monti's finalised proposals for reforming competition regulations in the car distribution and servicing market. The proposals fall some way short of the radical reforms first touted in February – thanks to predictably fierce lobbying from car manufacturers – and are unlikely to deliver the original aims of price harmonisation and cheaper spare parts. However, two important concessions for car dealers do remain intact:

- Firstly, franchise agreements can no longer be both selective (having a defined list of approved, non-consumer customers) and exclusive (having a defined sales territory) – they must be one or the other.
- Secondly, dealers will now be allowed to sell multiple brands of car in the same showroom under the same management – ie in a manner that is economically viable for volume brands. These directives open the door for oil companies to tap into the car sales market, ideally by partnering with a new breed of large multi-marque dealers.

New revenues

There are essentially three ways in which a move across the automotive market would be of benefit to oil companies. Firstly, there is the opportunity for new revenues. Fuels and lubricants currently constitute just 21.3% of the consumer automotive market in Europe (see **Figure 1**), leaving considerable room for growth. Some 41% of Europeans would consider buying at least one of the following products/services from oil companies: new/used cars, servicing and repair, autofinance, and motor insurance. Some 21% would take two products/services, 6% would take three, and one in 40 consumers would consider buying all four of these essential motoring components from oil companies. Offering a complete solution would also entail providing breakdown assistance and road tax services, but the market for these elements is much smaller in value.

Datamonitor's modelling of take-up rates across all possible bundles (driven by the company's IMPACT consumer survey covering over 4,000 motorists) indicates that up to 14.2% of the non-oil automotive market is potentially available to oil companies – equivalent to €69bn in 2001.

Consumer acceptance of these diversified oil company offerings varies greatly by country and by product. Of the six European populations surveyed by IMPACT (France, Germany, Italy, Spain, Sweden, UK), Swedes are clearly the most receptive. Almost three-quarters would consider taking at least one product/service, compared to less than a third in Italy – the least receptive market.

Broadly speaking, Northern Europe provides more fertile territory than Southern Europe. When it comes to products, take-up is heavily dependent on the brand associations already present in consumers' minds. Take-up for car sales and servicing is significantly greater than for financial and insurance products, as consumers naturally associate oil companies with motoring. Partnering with banks to provide the latter elements of the offering is likely to significantly

Product/service	Average annual spend per motoring household/€	Total market size/€mn	Segment share of consumer market
New/used car purchases	1,875	207.168	33.6%
Finance	1,354	149,622	24.3%
Insurance	563	62,203	10.1%
Servicing and repair	605	66,853	10.8%
Fuels and lubricants	1,191	131,555	21.3%
Total	5,587	617,401	100%

Figure 1: The value of the European private motorist – by product type

Source: Datamonitor/Eurostat

increase take-up and make it easier to up-sell to the full bundle.

The 'per customer' yield from motoring solutions depends both on take-up and unit prices, but again there is something of a North–South divide in Europe. The high take-up rates seen in Sweden, combined with a reasonably high-value non-oil market segment, make it possible to double customer value averaged over all customers (both takers and non-takers). In Italy, an average increase of 17% is achievable on a revenue-driven basis. The impact on profits depends greatly on the market entry strategies employed, the profit margins on the different product types, and the terms of any partnership agreements. Given the thin margins on fuel, though, the relative profit contribution is likely to be roughly comparable to the relative revenue contribution – whether the offerings are sold through alliances or in a proprietary manner (ie through an acquisition).

Improved customer loyalty

The second major benefit to be derived from total motoring solutions is an improved level of customer loyalty. Unprecedented levels of loyalty may be secured by bundling volumes of fuel into complete motoring packages with, of course, an appropriate degree of added value. That value could be delivered either as loyalty points or as an immediate monetary discount – although high consumer sensitivity to fuel prices would suggest the latter.

Either way, the degree of added value should be driven by the number and value of other products taken by customers as part of their bundles – ie the more you buy into the offerings, the greater the discount/loyalty award you receive per litre. This will help encourage take-up of the new offerings whilst simultaneously driving forecourt trade. There are numerous ways to finance such a reward under an alliance arrangement. In any case, most retailers would happily trade a significant bonus reward for guaranteed high levels of loyalty – the associated non-fuel purchases are a particularly attractive prospect. The reward must clearly have a defined limit, such as a fixed timeframe or volume, but making the end of reward periods coincide with the requirement to repurchase would encourage high rates of renewal.

Brand development

The third benefit of a move across the automarket by oil companies is almost a combination of the previous two – the chance to develop oil company brands beyond forecourt retailing to become motoring solution providers. Bundling fuels into automotive purchases is a great way to secure customer loyalty, but the lifetime of that loyalty is limited by the terms of the purchase. Oil companies must look to build on the brand perceptions that are sown by this type of offering, and attempt to consolidate themselves as the customer's first port of call for all things motoring.

In the short term, this relates to motoring portals such as Shell GeoStar – providing information and online access to all the products and services necessary for long distance motoring, or for domestic and international tourism. There is also an opportunity to provide information services, such as traffic updates, via SMS messaging.

In the longer term, it may be possible to provide company-branded telematics services through partnerships with communications networks. Developing the solution concept in this way provides a natural path of progression, keeping motoring at its heart.

Several companies have already attempted to diversify their downstream B2C (business-to-consumer) activities, with the use of retail credit cards proving particularly popular. Datamonitor's research shows, though, that consumers implicitly trust oil companies to supply motoring services much more than they do financial services. Oil companies must leverage that inherent brand association to improve the return on diversification efforts. Mario Monti has provided an ideal opportunity.

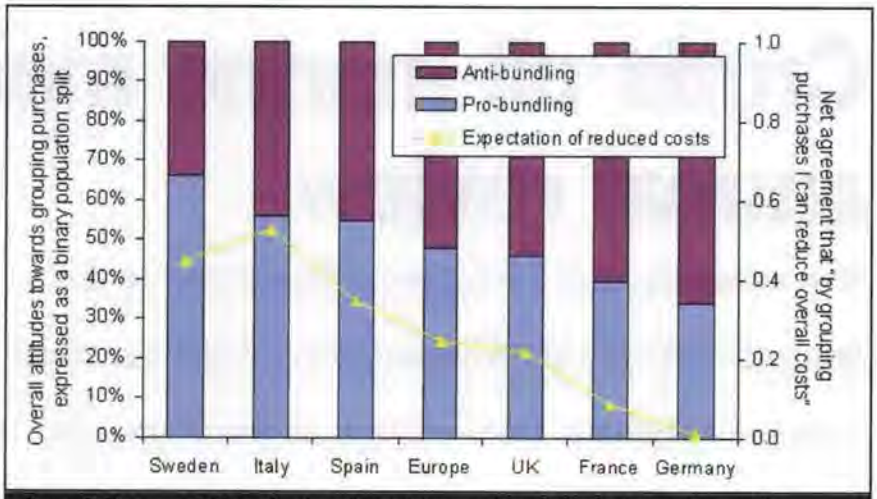


Figure 2: The expectation of reduced cost drives positive attitudes towards grouping purchases *Source: Datamonitor IMPACT survey*

Fuel price sensitivity – the trump card

Petroleum Review readers may be wondering just how competitive an oil company can be in the car sales market. Datamonitor believes inter-brand competition is already extremely strong and that, from October 2003 (when Monti's proposals take effect), the emergence of intra-brand competition will turn up the heat even more.

Many new cars now already come bundled with servicing and insurance – so what will make the oil company 'total solution' stand out and be noticed? Put simply – cheaper fuel. Consumers are so price sensitive when it comes to fuel that a relatively small value incentive could have a huge impact on sales. Imagine, for example, that buying a new mid-range VW Golf through an oil company secures a year-long fuel discount of 15 €cents per litre. Most prospective car buyers would give such a benefit serious consideration. However, even if you were a high mileage customer driving 30,000 km per year, the discount would have a cumulative value of approximately €300. Considering that a new mid-range Golf has a list price in the order of €15–18,000, €300 is a moderate sum compared to the negotiable dealer discounts enjoyed by the well-prepared car buyer. Car dealers would be more than happy to finance such a discount if it increased sales volumes, and oil companies would effectively improve loyalty for no cost.

Datamonitor's research into consumer attitudes towards bundled services reveals a further imperative to use discounted fuel when trying to up-sell a number of products. It asked several questions concerning the perceived benefits and drawbacks of grouping purchases under a single supplier, such as a single point of contact on the one hand and reduced control of expenditure on the other. The prospect of reduced costs seemed, at first sight, to be less important than other factors, but closer analysis revealed an interesting correlation. The more people

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Crude oil marine measurement annual review

This article by *Paul S Harrison* – Consultant to the PM-L-4(A) Marine Oil Transportation Database Panel – presents findings from analysis of the 2001 data, updating the 2000 analysis which was reported in *Petroleum Review* in September 2001.

The PM-L-4(A) Marine Oil Transportation Database Panel 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 are generally apparent rather than physical losses and result from the combination of fixed and random errors in the measurement systems used at load and discharge.

A new website – **www.oil-transport.info** – has been established by the Panel, which contains the information presented here together with additional data concerning crude oil marine transportation.

Membership of the PM-L-4(A) Marine Oil Transporation Database Panel has grown steadily since its formation in 1986. The following companies submitted data for 2001:

- Agip Petroli
- BP Oil
- ChevronTexaco
- Chinese Petroleum Corporation
- Conoco
- Equiva Trading Company
- ERG Petroli
- ExxonMobil Company
- Marathon Ashland Petroleum LLC
- PMI Pemex
- Repsol-YPF
- Saras Spa
- Scanraff (PREEM)
- Shell
- Statoil
- Sunoco Inc
- TotalFinaElf

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 both hard copy and electronic format.

Membership is open to all oil companies with data to contribute. Anyone interested in joining the panel should contact the Chairman of PM-L-4(A) via the Institute of Petroleum.

Database growth

The size of the database has increased over the years, 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 2001 to almost 8,500 and included a record 5.53bn barrels of crude at bill of lading (BOL). As shown in **Figure 1**, total volume for voyages with complete load and discharge data stood at 4.73bn barrels, an increase of 16% over the 2000 volume.

The latest *BP Statistical Review of World Energy* gives global crude trade for 2001 as 12.34bn barrels. The database therefore includes 45% of the global volume at bill of lading and has load and discharge data for over 38% of global volume. This is sufficiently large to be generally representative of the global situation and not to be unduly influenced by minor structural changes.

Global mean loss

The mean net standard volume (NSV) loss from the database from 1989 to 2001 is plotted in **Figure 1**. The overall improvement from 1989 to 1995 is readily apparent, although global loss showed no significant change between 1995 and 2000. However, mean NSV loss for 2001 was –0.213%. (by convention losses are given as negative) which is a significant increase over the 2000 figure of –0.195%. Detailed analysis indicates that this small increase is general, affecting many grades.

An increase in total calculated volume (TCV) loss was noted from 1999 to 2000. A similar increase has been seen betwen 2000 and 2001. By com-

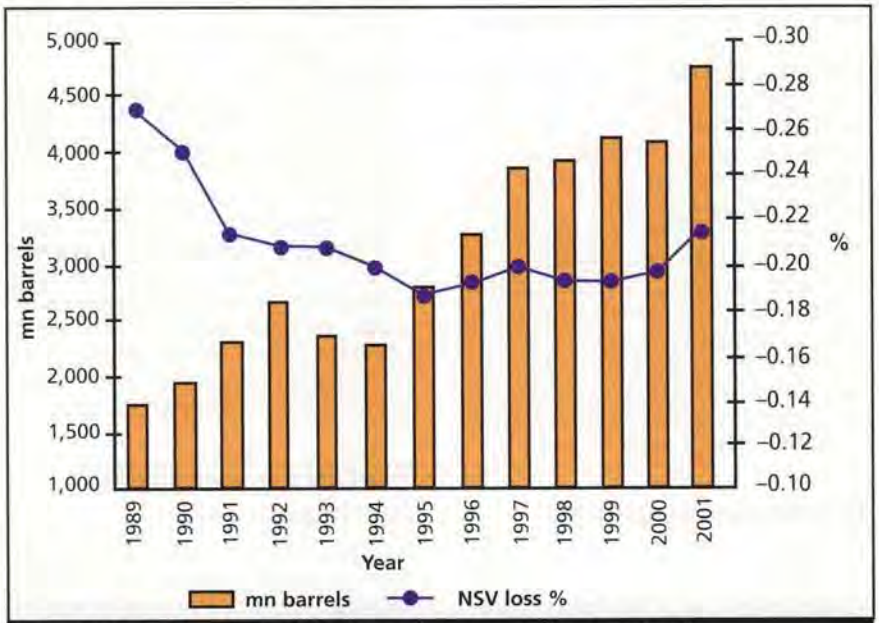

Figure 1: Growth in volume of database and average net loss of crude oil

Crude type	API gravity	Overall volumes (NSV)			Calculation by voyage 2001			2000		
		Total barrels	Barrels loss	Barrels loss %	NSV loss % Mean	Std dev	No.	NSV loss % Mean	Std dev	No.
A960	16.6	10,700,129	-21,030	-0.20	-0.18	0.31	22	–	–	–
Abu Safah	28.8	15,047,441	-11,495	-0.08	-0.06	0.67	28	–	–	–
Alaskan North Slope	31.2	138,960,523	38,249	0.03	0.02	0.22	178	-0.02	0.22	219
Alba	19.5	23,536,950	-9,113	-0.04	-0.03	0.35	46	0.25	0.40	34
Amna	37.7	32,549,358	-79,322	-0.24	-0.24	0.18	54	-0.15	0.19	50
Anasuria	39.2	15,442,933	-66,801	-0.43	-0.43	0.50	30	-0.23	0.92	23
Arab Extra Light	38.6	141,706,198	-417,655	-0.29	-0.25	0.45	163	-0.25	0.28	155
Arab Heavy	28.1	91,160,684	-225,264	-0.25	-0.21	0.45	160	-0.22	0.40	166
Arab Light	33.3	232,646,352	-616,319	-0.26	-0.20	0.46	245	-0.20	0.35	296
Arab Medium	30.9	112,857,221	-351,615	-0.31	-0.24	0.38	156	-0.20	0.37	165
Asgard	42.1	46,871,169	-155,804	-0.33	-0.33	0.26	59	-0.28	0.18	51
Azeri Light	34.9	23,130,461	-33,790	-0.15	-0.14	0.14	23	–	–	–
Bach Ho	40.6	26,964,888	-102,718	-0.38	-0.38	0.42	56	-0.46	0.36	37
Basrah Light	31.3	59,687,366	-77,078	-0.13	-0.12	0.27	36	-0.12	0.42	38
BCF 17	17.3	–	–	–	–	–	–	0.01	0.33	33
Belayim	28.3	13,402,771	-28,440	-0.21	-0.22	0.17	27	-0.21	0.34	45
Belida	46.7	7,145,622	-33,216	-0.46	-0.41	0.57	27	–	–	–
Beryl	39.2	15,593,901	-63,157	-0.41	-0.41	0.75	28	-0.46	0.58	24
Bonny Light	34.8	28,381,132	-56,872	-0.20	-0.19	0.40	31	-0.18	0.22	38
Bouri	26.3	21,444,608	-33,559	-0.16	-0.15	0.24	38	-0.42	0.56	34
Brent Blend	38.4	45,289,678	-36,245	-0.08	-0.08	0.15	70	-0.05	0.16	99
Cabinda	32.8	46,888,046	-4,638	-0.01	-0.01	0.25	54	0.08	0.24	45
Cerro Negro	16.5	24,971,711	42,586	0.17	0.17	0.52	50	0.36	0.42	32
Coban	16.5	6,463,302	-1,007	-0.02	-0.02	0.37	31	–	–	–
Cusiana	42.3	19,598,194	-38,942	-0.20	-0.19	0.22	31	-0.27	0.22	36
Danish	34.4	34,587,740	-74,772	-0.22	-0.23	0.22	67	-0.27	0.22	54
Draugen	40.3	51,048,480	-197,604	-0.39	-0.38	0.32	61	-0.33	0.20	66
Dubai	30.6	14,201,375	-22,401	-0.16	-0.14	0.38	22	-0.14	0.15	23
Duri	20.9	11,437,739	-40,775	-0.36	-0.37	0.32	33	-0.17	0.41	32
Ekofisk	37.4	110,283,656	-97,078	-0.09	-0.08	0.15	160	-0.07	0.12	167
Es Sider	36.5	20,756,285	-82,367	-0.40	-0.40	0.21	34	-0.47	0.26	33
Escravos	33.8	28,653,464	11,302	0.04	0.03	0.19	29	-0.09	0.25	53
Flotta	37.0	38,760,376	-102,370	-0.26	-0.26	0.12	59	-0.31	0.19	53
Forcados	30.7	77,526,071	-129,068	-0.17	-0.18	0.35	62	0.02	0.25	31
Forozan	31.3	43,517,858	-121,784	-0.28	-0.24	0.24	46	-0.22	0.21	37
Forties Blend	42.5	111,514,455	-208,351	-0.19	-0.18	0.16	165	-0.13	0.18	143
Galeota Blend	37.1	17,283,271	-1,691	-0.01	-0.01	0.35	31	–	–	–
German Blend	33.4	–	–	–	–	–	–	-0.44	0.49	23
Gullfaks A	36.7	61,271,256	-202,167	-0.33	-0.33	0.43	73	-0.40	0.20	85
Gullfaks C	36.0	44,775,871	-169,577	-0.38	-0.38	0.17	53	-0.47	0.37	53
Harding	20.6	–	–	–	–	–	–	-0.35	0.26	25
Heidrun	27.8	21,496,332	-18,886	-0.09	-0.08	0.20	34	-0.02	0.16	31
Hibernia	35.6	24,647,943	11,645	0.05	0.04	0.22	33	-0.17	0.28	23
Iranian Heavy	30.1	96,648,389	-228,816	-0.24	-0.25	0.38	124	-0.16	0.59	92
Iranian Light	33.5	69,410,488	-184,095	-0.27	-0.24	0.41	71	-0.32	0.57	78
Isthmus	33.0	9,626,921	-12,253	-0.13	-0.09	0.46	29	-0.11	0.49	26
Jotun	37.2	24,843,180	-49,206	-0.20	-0.21	0.34	33	-0.16	0.49	26
Kirkuk	34.0	70,972,748	-211,201	-0.30	-0.28	0.22	64	-0.24	0.27	140
Kumkol	41.1	–	–	–	–	–	–	-0.28	0.38	21
Kuwait	30.7	104,237,367	-203,684	-0.20	-0.18	0.18	66	-0.10	0.28	52
Liverpool Bay	44.8	15,606,066	-78,676	-0.50	-0.51	0.13	24	–	–	–
Lower Zakum	39.9	20,761,217	-33,267	-0.16	-0.15	0.25	33	-0.16	0.18	24
Masila	31.4	21,108,075	-23,745	-0.11	-0.14	0.18	22	-0.14	0.16	30
Maya	21.7	272,329,420	-1,037,096	-0.38	-0.38	0.25	528	-0.37	0.25	415
Menemota	20.4	11,780,256	15,354	0.13	0.13	0.28	25	–	–	–
Merey	16.0	20,179,943	-30,806	-0.15	-0.16	0.41	42	0.14	0.29	26
Mesa 30	30.2	33,108,164	-4,205	-0.01	-0.04	0.26	53	-0.10	0.29	55
Murban	39.3	42,033,582	-73,062	-0.17	-0.16	0.22	65	-0.23	0.36	76
Nanhai Light	39.5	–	–	–	–	–	–	-0.08	0.39	26
Nemba	39.1	30,986,219	-84,880	-0.27	-0.26	0.26	34	-0.31	0.20	25
Njord	45.2	11,085,471	-25,541	-0.23	-0.23	0.24	22	-0.19	0.13	33
Norne	32.8	45,522,245	-74,831	-0.16	-0.17	0.35	56	-0.15	0.25	50
Olmeca	38.7	99,547,900	-233,116	-0.23	-0.24	0.25	190	-0.25	0.27	190
Oman	33.0	58,157,851	-118,944	-0.20	-0.20	0.18	73	-0.19	0.20	63
Onako Light	47.1	4,631,461	-11,354	-0.25	-0.25	0.38	22	–	–	–
Oriente	24.2	17,138,675	14,638	0.09	0.07	0.31	35	0.09	0.37	23
Oseberg	37.8	42,000,669	-114,163	-0.27	-0.27	0.16	52	-0.21	0.14	61
Qatar Land	41.0	–	–	–	–	–	–	–	–	–
Qatar Marine	34.5	16,963,241	-4,253	-0.03	-0.06	0.66	24	–	–	–
Qua Iboe	36.7	97,436,162	-146,771	-0.15	-0.13	0.30	81	-0.08	0.27	63
Russian Export Blend	32.7	263,206,648	-644,885	-0.25	-0.25	0.24	362	-0.20	0.21	183
Saharan Blend	46.2	55,582,570	-53,412	-0.10	-0.10	0.22	83	-0.08	0.25	70
Santa Barbara	37.5	–	–	–	–	–	–	-0.14	0.22	21
Sarir	37.5	–	–	–	–	–	–	-0.33	0.43	26
Senipah	52.6	5,655,502	-9,879	-0.17	-0.12	0.37	21	–	–	–
Siberian Light	35.6	18,034,971	-47,908	-0.27	-0.27	0.28	36	-0.27	0.30	27
Siri	37.4	–	–	–	–	–	–	-0.28	0.34	30
Sirtica	40.2	20,171,328	-41,604	-0.21	-0.21	0.16	33	-0.23	0.15	31
Souedie	24.5	29,659,237	-46,364	-0.16	-0.15	0.25	63	-0.17	0.46	35
Statfjord	39.2	143,466,662	-356,443	-0.25	-0.25	0.24	178	-0.28	0.16	170
Syrian Light	36.2	60,496,069	-150,483	-0.25	-0.24	0.25	107	-0.27	0.25	71
Tapis	45.8	11,948,024	-52,039	-0.44	-0.49	0.52	24	–	–	–
Tengiz	46.3	45,097,342	-184,114	-0.41	-0.41	0.32	99	-0.51	0.35	63
Triton	40.1	20,985,204	-73,434	-0.35	-0.36	0.34	41	–	–	–
Troll	27.2	36,740,966	-35,968	-0.10	-0.06	0.51	63	-0.02	0.20	53
Upper Zakum	34.1	–	–	–	–	–	–	-0.25	0.19	28

Table 1: Analysis by crude oil type 2001

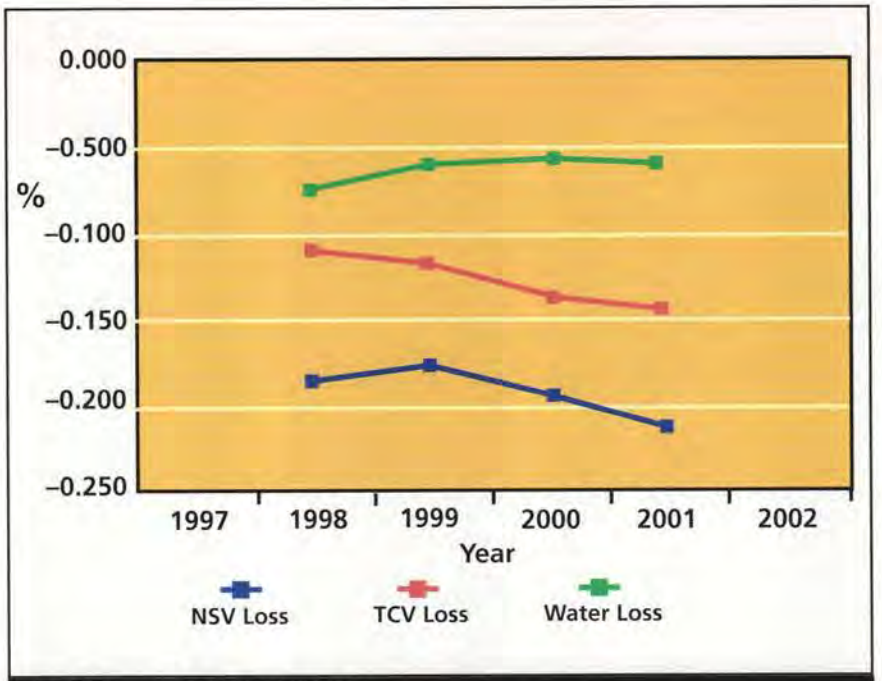

Figure 2: Increase in TCV and NSV loss

	2001 Mean	2001 Std dev.	2000 Mean	2000 Std dev.
NSV loss %	–0.21	0.36	–0.19	0.35
TCV loss %	–0.16	0.34	–0.15	0.33
Load difference %	0.03	0.36	0.07	0.42
Ship loss %	0.01	0.22	0.03	0.23
Discharge difference %	–0.20	0.40	–0.26	0.46
Water loss %	–0.06	0.18	–0.06	0.19
OBQ–ROB difference %	0.02	0.14	0.02	0.13

Table 3: Global loss analysis

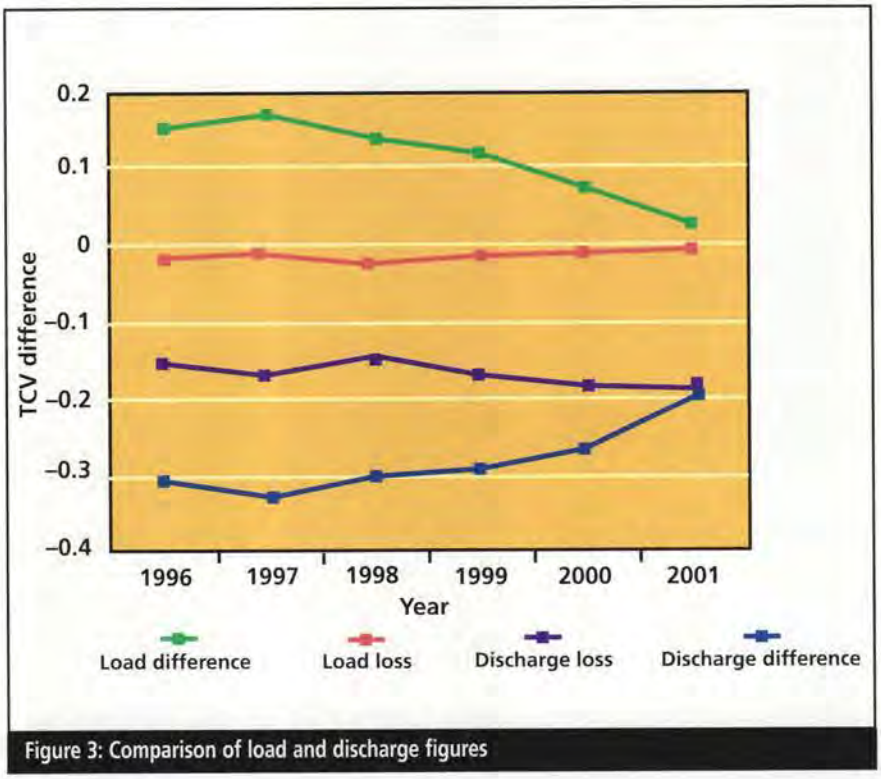

Figure 3: Comparison of load and discharge figures

paring only complete sets of voyage data in order to provide more consistency it can be seen that the recent NSV loss increase is due to an increase in TCV loss rather than a change in water loss. This is shown in **Figure 2**.

These differences could be due to changes in measurement practice either at load or at discharge (or both) and of course can indicate corrections due to improvements rather than any deterioration in performance. Due to the large changes relating to vessel measurements that are discussed below it has not been possible to define the situation more precisely.

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 total barrels shipped.

For comparison, figures for NSV loss calculated by voyage are given for 2001 and 2000. Where a grade is not reported for 2001 as the number of data sets has fallen below 20 the API gravity is given as the 2000 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' (1952) Table 6 or Table 5, corrected BOL figures are calculated using 'new' tables for comparison with outturns at discharge ports which also use the 'new' (1980) 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 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 2001 with those for 2000. As noted in last year's analysis, there is again a reduc-

tion 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 a reduction in the loss seen at discharge (discharge difference). Key comparisons used in the analysis are as follows:

NSV and TCV 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 onboard quantity (OBQ) and the shore received volume. Load and discharge differences are not corrected for vessel experience factor (VEF). However load loss and discharge loss figures are calculated making allowance for OBQ and remaining onboard (ROB) (the difference between the TCV measured on the ship prior to loading and that remaining after discharge) 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 OBL and outturn water and sediment, adjusted for ROB/OBQ water difference where figures are available.

The trend noted over the last three years continues, with a further reduction in the load difference. This is balanced by a similar increase in discharge difference.

Comparison with the load and discharge loss figures, which are adjusted for VEF and OBQ and ROB, produces **Figure 3**. This shows that the gap between the uncorrected 'difference' figures and the corrected 'loss' figures is continuing to reduce. This results from a general reduction in VEF's and a reduction in OBQ and ROB volumes as shown in **Figures 3** and **4**.

Load loss now stands at –0.002%, very close to the zero value. This is logical as application of the VEF will generally take account of ship/shore differences, including calibration differences and vapour losses.

Figure 4 shows fall in load VEF values over the past six years. This fall is apparent from the average by voyage values and remains when the average by vessel is considered. The fall is significant and may well be due in part to to the gradual introduction of new vessels with double hulls and more easily calibrated tanks.

OBQ and ROB (expressed as percentages of BOL and outturn TCV's respectively) have also both fallen, as shown in **Figure 5**. The reduced OBQ and the

Crude type	Mean NSV loss % Original	Corrected	Table difference %
A960	–0.15	–0.02	0.13
Abu Safah	–0.03	0.08	0.11
Arab Extra Light	–0.28	–0.09	0.18
Arab Heavy	–0.24	–0.18	0.07
Arab Light	–0.33	–0.16	0.17
Arab Medium	–0.22	–0.13	0.10
Arun Condensate	–0.43	–0.41	0.02
Attaka	–0.06	0.03	0.09
Belida	–0.45	–0.34	0.11
Dubai	–0.12	–0.02	0.11
Dukhan Condensate	–0.12	–0.11	0.01
Dulang	–0.43	–0.19	0.24
Duri	–0.33	–0.25	0.08
Khafji	–0.34	–0.28	0.05
Labuan	–0.05	0.00	0.05
Lower Zakum	–0.14	–0.01	0.13
Marib Light	–0.44	–0.33	0.11
Masa	–0.41	–0.28	0.13
Murban	–0.14	0.01	0.15
Oman	–0.17	–0.04	0.13
Qatar Land	–0.81	–0.71	0.10
Qatar Marine	–0.06	–0.02	0.05
Ratawi	–0.13	–0.11	0.01
Saharan Blend	–0.10	–0.07	0.02
Senipah	–0.10	0.01	0.10
Sepinggan	–0.10	–0.05	0.05
Sharjah Condensate	–0.09	–0.09	0.00
Souedie	–0.12	–0.10	0.02
Syrian Light	–0.18	–0.11	0.07
Tapis Blend	–0.40	–0.26	0.14
Upper Zakum	–0.14	–0.06	0.08
Widuri	–0.56	–0.38	0.18
Zarzaitine	–0.28	–0.22	0.06
		Mean difference %	**0.093**

Table 2: Effect of table corrections on net standard volume loss figures for individual crude oils

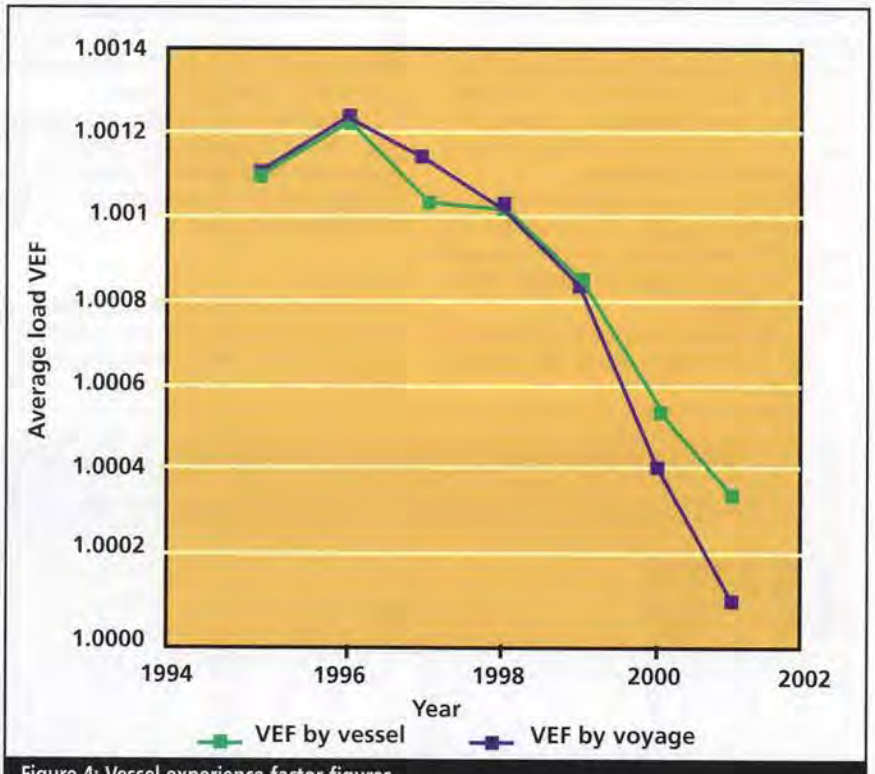

Figure 4: Vessel experience factor figures

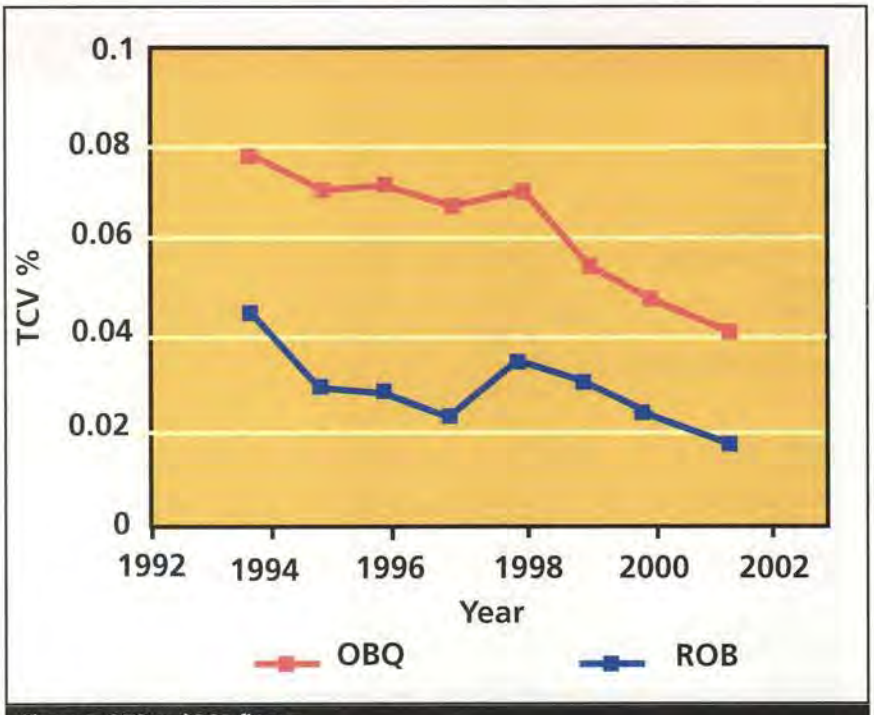

Figure 5: OBQ and ROB figures

reduced OBQ-ROB difference indicates that ROB clingage volume has reduced. This has stabilised at around 0.02%. Again this could be due to increasing use of double hull vessels or perhaps a combination of this and more effective crude oil washing.

Conclusions

The 2001 data indicates that the loss reductions seen from 1989 through to 1995 have reversed with a small, but significant, increase in average NSV loss for 2001 from –0.195% to –0.213%. This increase is related to changes in the gross (TCV) measurement rather than water determination.

The global loss pattern is continuing to change rapidly in relation to ship/shore comparisons and this would seem to be due mainly to improvements in vessel design.

The database increased significantly in 2001 in terms of volume and voyage numbers.

Panel membership

All additional data adds to the value of the database and the information which is derived from it. The Panel has a target of 50% of seaborne crude trade which it hopes to achieve by 2005.

The Panel meets twice a year and meetings are held in conjunction with those of the sister panel, PM-L-4(B), The Oil Transportation Measurement Panel. The next meetings will be held in Philadelphia, US, on 12–14 November and will be hosted by Sunoco.

Prospective new members are welcome and are encouraged to contact John Phipps at the Institute of Petroleum for further details. T: +44 (0)207 467 7130, e: **jp@petroleum.co.uk**

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believe that they will reduce costs by grouping purchases, the more positive their overall attitude to bundled offerings becomes (see **Figure 2**). Linking cheaper fuel to bigger bundles is therefore likely to increase the chance of upselling beyond cars and servicing to finance and insurance.

'But what about the hypermarkets?' It's a fair question – they sell fuel, they're accomplished retailers, and have a reputation for price leadership on diversified products. Surely they'll put together a stronger proposition than the oil companies can? Not this time, for three reasons:

- Firstly, the concessions won by carmakers at the eleventh hour were largely aimed at countering the threat posed by hypermarkets and e-tailers entering the market as resellers. The classic hypermarket strategy of piling high and selling cheap remains stifled by the car-manufacturers' prerogative to demand standards that are, essentially, characteristic of a dealer showroom facility.
- Secondly, multi-marque dealers looking to establish themselves as motoring brands in their own right would do better trading on oil company names (globally recognised motoring brands) than hypermarket names. Datamonitor's research found that the greatest non-dealer competition would come from autocentres such as Kwikfit, and motoring organisations such as the AA. Neither of these companies can deliver fuel discounts without help from a partner.
- Thirdly, if the hypermarkets' traditional strategy is unviable, there is little point in their entering the market at all. They already have a bundled services concept to sell their fuel by; they don't need another.

Fighting back

So, who will step up to take the fight back to be the hypermarkets? Shell appears to be the strongest contender, having strong market presence across the European Union, one of the world's best-known brands, and an existing portfolio of applicable consumer products such as autofinance and roadside assistance.

Frankly though, all of the top ten European operators have the brand strength to win business in at least one of their markets. Whoever can take this idea to its conclusion is likely to at least secure unprecedented levels of loyalty – and potentially much more besides.

The sky's the limit

Utilising its broad road tanker support network and extensive experience of the fuel pipeline networks around Europe, *P&O Trans European* recently expanded its business with a new aviation fuel and terminal division offering a refinery-to-aircraft refuelling outsourcing service.

The sky's the limit for air travel over the next two decades as the aviation industry prepares for a surge in demand. The UK Government recently issued a far-reaching air travel consultation with its own figures suggesting that the current 180mn terminal passengers per year will rise to a staggering 400mn by 2020.

A third, shorter runway for Heathrow Airport, which, with its fifth terminal, is set to become the world's busiest air terminal, and more runways at Stansted are just two of the options that will drive the growth in air travel. More controversially, an unprecedented complete newbuild of airports at strategic points around the UK is being hotly debated in a bid to accommodate the anticipated demand.

Air travel is currently proving to be as popular as ever. Figures from all the existing airports reveal terminal footfall is now back up to the same level as this time last year, pre-September 11. So where is this demand coming from? The short answer is the consumer excitement for the so-called low-cost airlines that have mushroomed in recent years. Sky watchers will see a meteoric growth in these services over the next three years.

Feet on the ground

But while all eyes are on the skies, the EU has its feet firmly on terra firma. To accommodate this growth in air travel and ensure that consumer prices remain competitive, Brussels has taken a closer view of activities on the ground by introducing Airport Ground Handling Regulations. These regulations prescribed that from 1 January 2001 any airport with more than 2mn passengers or 50,000 tonnes of freight per year must put its ground handling services – from security to baggage handling – out to competitive tender.

Specialised services

This has already stimulated interest from companies with core handling competences outside the existing operations at the airport to bid to run those services. A leading player in the new specialised aviation and terminal services is P&O Trans European. Utilising its broad road tanker support network and extensive experience of the fuel pipeline networks around Europe, the P&O Trans European team is well placed to capitalise upon the new business opportunities.

The service is headed up by Lee White, a well-respected industry expert who offers broad experience of fuels logistics and the management of airport and terminal services for a diverse customer portfolio. Before joining P&O, White headed up the aviation supply chain arm of another leading airport fuel provider. There is a myriad of health and safety and CAA (Civil Aviation Authority) regulations that need to be met and continually tested and reviewed – White and all P&O Trans European personnel working on the business are extensively trained and totally conversant with all the latest regulations and legislation as well as fully understanding the dynamics of this diverse market place.

Securing new business

Under White's stewardship P&O Trans European has already made significant progress in securing new business. In the most recent example, he and his team brokered a strategic alliance with Q8 Aviation to help expedite Cardiff International Airport's expansion plans. From 1 May 2002 the two companies started to manage and market the aviation supply chain – from refinery to aircraft wing via a purpose-built fuel storage terminal at Cardiff – as part of the airport's major outsourcing of ser-

Signed, sealed and delivered – Martin Taylor, Managing Director of P&O Trans European (left) and Richard Crowe, Operations Manager for Q8 Aviation, sign their strategic alliance for Cardiff International Airport

P&O Trans European's new new aviation fuel and terminal division is headed by Lee White (pictured)

vices. Q8 Aviation is marketing the service with a view to increasing business users at the airport. P&O Trans European refuelled its first aircraft at Cardiff International Airport, an Air 2000 A321 Airbus flight destined for Paphos in Cyprus, on 1 May 2002.

Jon Horne, Managing Director at Cardiff International Airport, says: 'We are a growing concern with a focus upon seizing a greater share of all sectors of the market. As part of securing growth, competitive and first-class ground handling services are essential. The addition of P&O Trans European and Q8 Aviation makes a major contribution to this goal.'

Ross Baker, Managing Director of Q8 Aviation says: 'We are delighted with the addition of Cardiff International Airport to our growing number of Q8 Aviation-supplied UK locations. This is consistent with our strategy of continued growth in the UK airport marketplace'.

Future benchmark

Unusually for this sort of third-party solution, P&O Trans European is not only designing and building the purpose-built fuel storage terminal at Cardiff, but it also owns and manages it – an arrangement that is regarded as providing a modern benchmark for future added-value outsourced projects. Indeed, the company is already is discussions with other oil companies and airports in the UK and Europe to provide similar services.

The pan-European division offers customers – oil companies and airports – a complete and comprehensive third-party aviation and terminals management service. The offering covers every aspect of the fuel supply-chain, from P&O Trans European designing and building the fuel terminals, through to the refuelling of aircraft on the tarmac.

The division provides for the professional outsourced management of all types of fuel handling and terminal operations through the control of every stage of the downstream journey of the refined fuel. In so doing, the division adds value by driving significant cost and efficiency savings into its customer's business.

Last year P&O Trans European secured extensive business at East Midlands Airport. 'This is a specialised and highly-competitive market that we entered at the right time with the right level of expertise,' explains White. 'The industry is currently undergoing a significant amount of change, and many companies are actively looking for ways to outsource non-core activity.'

'Many companies now prefer to concentrate on upstream activities and consider the onward journey, whether by vehicle or pipeline, to be no longer core to their business. They would prefer to hand the downstream supply-chain to a company with a proven track record in that side of the business,' White says.

P&O Trans European has a strong heritage in the petrochemical sector, including being the largest third-party provider of fuel to petrol stations in the UK. With highly-trained personnel in all health and safety as well as procedural requirements for the movement of hazardous goods, the 'airside' activity builds upon the strong synergies that exist between P&O Trans European and the oil companies. 'Customers want efficiency, transparency and simplicity in reporting, and they need to be confident that when they transfer their risks to a third-party service provider that company understands their business and what it is they are trying to achieve,' states White.

'The P&O brand is very strong in the marketplace because customers recognise that the company is professional and clear in its strategy of wanting to develop long-term partnerships with them. You don't achieve this position by simply offering something off-the-peg. Therefore, everything we do is designed with a specific customer in mind and that is what makes the business dynamic and exciting. We want to be able to offer the customer something that he cannot get elsewhere; a truly value-added service that challenges conventional thinking and delivers real commercial benefit.'

'This area will continue to grow and grow because airports are simply going to become busier places. Figures for passenger and freight flights are set to increase and this is before the new super Airbuses capable of carrying up to 600 passengers have taken to the skies,' adds White.

In the meantime, the current proliferation of low-cost airlines will keep companies such as P&O Trans European more than busy. The recent merger of EasyJet and Go, which has recorded a 62% increase in passenger numbers from this time last year, and the emergence of Ryanair which reported a 68% rise in pre-tax profits, are testament to the fact that the no-frills operators are plugging a gap in the market. The larger airlines are responding with their own low-cost operations that earlier this year saw the successful birth of BMI Baby which flies out of East Midlands Airport. More recently, MyTravelite, another new service offering one-way European flights for less than £30 out of Birmingham International Airport, has proved the case that the market for 'no frills and no fuss' air travel booked via the Internet is far from saturated.

In 2000, the low-cost operators accounted for around 9mn passengers per year, but this is expected to rise to around 32mn by 2020, according to the UK Department of Transport's own figures. These statistics suggest that this sector is set to really take off between now and 2005, growing by 15%/y.

Although this figure is expected to slow to around 7%/y up to 2020, this sector will continue to be the fastest growing of all air travel sectors – a trend precipitated by the introduction of new routes and the heavy marketing of special promotional offers via the web.

This is all fuel for thought for White: 'There is so much business out there for the right quality providers that can add value to services on the ground and in the air. I want to make sure that P&O Trans European continues to ride in the growth slipstream.'

Suitability of various automated and automatic standard test methods for determining the freezing point of aviation turbine fuel

Photo: Michael Johnson Photography

The following is a report from* John Phipps, *IP Technical Manager–Standardization, on an IP study that has shown that, at present, the ONLY suitable automatic equipment for measuring jet fuel freezing point is the Automatic Phase Transition method IP 435/ASTM D 5972. This method provides good prediction of the manual method (IP 16/ASTM D2386) results. All other automatic methods are currently NOT suitable.

The UK Ministry of Defence (MoD) Standard 91-91, Issue 4, 14 June 2002,* Turbine Fuel, Aviation Kerosine Type, Jet A-1 NATO Code: F-35 Joint Services Designation: AVTUR *now only permits these methods.

As part of the specification and quality control procedure for aviation fuels a test is carried out to determine its freezing point. The test method used is the IP 16/ASTM D 2386 manual test method – a lengthy test that requires considerable operator time. In order to optimise operator time, automated and automatic instruments using optical and electromechanical technology were developed to determine the freezing point. Standard test methods were developed for these instruments and they have been used extensively by industry. They were widely used and were listed in the Ministry of Defence Standard 91-91, Issue 3, November 1999 Turbine Fuel, Aviation Kerosine Type, Jet A-1 NATO Code: F-35 Joint Services Designation: AVTUR, as alternative test methods to the IP 16 manual test method. Laboratories certifying aviation fuel for release were allowed to certify batches using these test methods.

The test methods called up as alternatives in Issue 3 were:

- ASTM D 4305 *Filter flow of aviation fuel at low temperatures*
- ASTM D 5901 *Freezing point of aviation fuel (automated optical method)*
- ASTM D 5972 *Freezing point of aviation fuels (automatic phase transition method)*

(The last two were adopted as IP test methods and given the designation IP 434 and IP 435 respectively.)

The referee test method remained the manual test method, IP 16/ASTM D 2386/ISO 3013 *Petroleum products – Determination of the freezing point of aviation fuels.*

Rigid quality control

As part of the industry's rigid quality control requirements, aviation fuel is re-tested when it is re-batched en route to the airfield from the point of manufacture (the refinery) after transportation in non-dedicated systems. In the summer of 2001 there were two known instances of jet fuel having been certified by a refinery, using one of the automated/automatic freezing point methods, subsequently being found to be off-specification with respect to freezing point during re-certification when tested using the manual method.

QinetiQ, who manage the specification on behalf of the UK MoD, made an immediate investigation and, with the Institute of Petroleum, a jointly co-ordinated series of checks were carried out by seven laboratories. The results showed that there could not be complete confidence that the results generated by ASTM D 4305, D 5901 and IP 468 *Determination of the freezing point of aviation turbine fuels – Automatic optical method* were equivalent to the referee manual test method IP 16/ASTM D 2386/ISO 3013 *Determination of the freezing point of aviation fuels.*

The initial findings of this investigation were thus conveyed to the Specification Regulator. With flight safety in mind, QinetiQ immediately issued a 'letter to industry', dated 22 March 2002, stating that ASTM D 4305 and D 5901 would not be included as alternative freezing point methods in the pending revision of Defence Standard 91-91 and that IP 468 would not now be introduced as an additional alternative test method.

It also stated that these methods should no longer be used for the certification of jet fuel to the then current issue (Issue 3) of Defence Standard 91-91 or any of the other fuels-related Defence Standards with immediate effect. This letter was sent to all aviation fuel manufacturers and other standardization bodies throughout the world. Defence Standard 91-91 was reissued in June 2002 (Issue 4) and only allows IP 435/ASTM D 5972 as an alternative test method to IP 16.

Extensive work programme

A more extensive IP-funded programme of work was then initiated. This involved 39 laboratories testing seven samples using IP 16, IP 468, IP 434, IP 435 and IP Proposed Method CG *Determination of the freezing point of aviation turbine fuels by the automated pulsed light beam method.*

Before embarking on this more extensive study the instrument manufacturers were alerted to the potential problem and given the opportunity of revamping their equipment software and firmware and, in some cases, hardware, to enable their instruments to detect contamination of aviation fuels by higher boiling petroleum products.

The samples that were tested comprised of a hydrocracked jet fuel plus blends of this containing 0.25%, 0.5%, 1% and 2 % V/V, of a medium gas oil (MGO), and a hydrotreated jet fuel and a blend of this containing 5% V/V gas oil (GO). The samples were all blind coded (see **Table 1**).

Test results

The test results were collated and analysed by QinetiQ and the data generated supported the findings of the preliminary investigation. Full details of the test results can be found in the *IP Freezing Point Robustness Study Report*, a copy of which is held in the IP Library.

1) *IP 16/ASTM D 2386 Determination of the freezing point of aviation fuels*
   A total of 18 laboratories tested using this method. Of these, 11 were able to detect contamination by gas oil in jet fuel at 0.25% volume. The majority of the other laboratories were able to detect contamination at 0.5%. There were surprisingly few laboratories that had difficulty in performing the test (given that most do not perform this test on a regular basis). A number of laboratories were unable to cool the neat hydrocracked sample (D) sufficiently to detect the freezing point.
2) *IP 434/ASTM D 5901 Determination of the freezing point of aviation fuels by the automated optical method*
   Ten laboratories tested using this method, but only eight reported results. Two reported that the instrument gave 'Questionable Output' messages. Some laboratories found that the instrument was unable to cool sufficiently to detect the freezing point of the neat hydrocracked jet fuel sample. The contaminated samples largely gave a result of 'Questionable Sample', but the few numerical results obtained were not close to the manual results. Several results of 'Questionable Sample' were generated for the second neat jet fuel (hydrotreated) sample, suggesting that the sensitivity was set too high.
3) *IP 468 Determination of the freezing point of aviation turbine fuels – Automatic optical method*
   Ten laboratories tested using this method. Good agreement with the manual test was found for the two neat jet fuel samples. Most of the results for the 0.25 % and 0.5% contaminated samples were 'Questionable Sample'. Several numerical results were generated but these did not agree well with the manual results. For samples where there was gross contamination (ie greater than 1% gas oil) the equipment gave results that were broadly in line with the manual determinations.
4) *IP 435/ASTM D 5972 Determination of the freezing point of aviation turbine fuels by the automatic phase transition method*
   Eight laboratories tested using this method. The results were generally in line with the manual testing with the exception of one laboratory that failed to detect contamination below 1%. Overall, the results were comparable with the manual testing and, at the moment, the equipment is therefore considered suitable to be retained in the specification (see also below).
5) *IP PM CG Determination of the freezing point of aviation turbine fuels by the automated pulsed light beam method*
   Seven laboratories tested using this method. These results were very poor with little or no correlation with the manual method. (This test method was not one of those approved as an alternative to IP 16 in Defence Standard 91-91 Issue 3).

Sample code	Base fuel	Contamination V/V %
A	Hydrocracked jet	1.00 (MGO)
B	Hydrocracked jet	0.25 (MGO)
C	Hydrocracked jet	2.00 (MGO)
D	Hydrocracked jet	0
E	Hydrocracked jet	0.5 (MGO)
F	Hydrotreated kerosine	5.00 (GO)
G	Hydrotreated kerosine	0

Table 1

Final conclusions

The instrument used for the IP 435/ASTM D 5972 *Determination of the freezing point of aviation turbine fuels by the automatic phase transition method* gave results that were comparable with the manual testing. However, concern has been raised over the number of different software versions/revisions that may exist for this equipment. This is being discussed with the manufacturer separately. At present this method is considered suitable to be retained in the Defence Standard 91-91 specification as an acceptable alternative to the IP 16 referee method.

A number of other instruments that were the basis for the development of the standard test methods for determining the freezing point of aviation fuel are not considered suitable for consistently detecting the presence of contamination by higher boiling petroleum products.

The precision and accuracy of standard automated and automatic freezing point test methods were determined using instruments of a specific specification, and instrument manufacturers must be aware that changes to the software/firmware and in some cases hardware of their instruments could affect the precision and accuracy of such methods.

Future work

The IP will facilitate discussion on how to ensure that instrument manufacturers are aware of the potential problem that may arise if they change the specification of their instruments. This will be extended to include a reference to the software of an instrument on which the IP Standard Test Method is based. This is a departure from the norm, as usually such information is not given.

The IP will also review IP 16 with the intention of providing guidelines for critical steps within the test method to assist the user in achieving accurate and repeatable results.

Both ASTM International and instrument manufacturers have been made aware of the results of this study. ASTM International has decided to embark on a similar study within the US.

Acknowledgements

The IP gratefully acknowledges the support which was given by QinetiQ, BP Oil International, TotalFinaElf, the participating laboratories and the instrument manufacturers in this work.

Metal working fluids – a new approach to managing risks

Martin Stear, Principal Specialist Inspector (Occupational Hygiene) of the UK Health and Safety Executive's (HSE) Chemical Risk Assessment and Control Unit, **reviews the health risks associated with metal working fluids and outlines new guidance that aims to improve company management of such fluids, minimising the risks while maximising the benefits their use brings.**

There are an estimated 50,000 engineering workshops in the UK, employing between 100,000 and 200,000 workers. The companies with these workshops range from SMEs (small- to medium-sized enterprises) right through to the multinationals. Manufacturing ranges from one-off single components with a high degree of operator input, through to fully automated plants manufacturing large components such as car engines.

A wide range of machining methods are used to shape and cut the part being manufactured to the desired form. These all create heat and therefore require cooling and lubrication. The family of fluids that provide this cooling and lubrication is called metal working fluids (MWFs). MWFs also prolong the life of the tool and reduce downtime, carrying away debris and protecting the surfaces of the work pieces. The fluids are held in a machine sump, pumped to the machining point and run back to the sump. MWFs can be divided into two main categories: neat mineral oils and water-mix fluids. The water-mix fluids can vary considerably in composition, but may be further classified into mineral oil emulsions, semi-synthetic and synthetic fluids.

Health concerns

The main health concern associated with MWFs is dermatitis. Around 200 cases of contact dermatitis – related to exposure to cutting oils and coolants – are reported to EPIDERM (a scheme under which dermatologists report cases of occupational skin disorders) every year. However, the true number of cases is almost certainly higher.

There is also an association between exposure to these fluids and respiratory effects, which include bronchitis and asthma. In recent years (1992–1997), an annual average of 22 new cases of occupational asthma related to exposure to cutting oils have been reported through SWORD (Survey of Work-related and Occupational Respiratory Disease). There has been no firm trend either up or down since 1992. It is not known to which fluid type(s) these cases are related and, because of the confidentiality arrangements within which SWORD operates, it is not possible to investigate this aspect further.

MWFs are an important part of the machining process, yet are often treated with little regard. The machine sumps containing these fluids are sometimes used as rubbish dumps for unwanted food debris (see **Figure 1**) or cigarette stubs, and are even occasionally used as urinals. These abused fluids become a rich breeding ground for bacteria. Biocides are often added to combat this, but the surviving bacteria quickly grow while the dead bacteria release endotoxins that can produce a variable flu-like response and reduce lung function in humans. Exposure to the endotoxins may also exacerbate symptoms in those with pre-existing asthma. Bacteria and endotoxin contamination in MWFs may also contribute to allergic contact dermatitis. Heavy bacterial contamination in MWFs can deplete oxygen in the sumps, allowing sulfate-reducing bacteria to grow and release hydrogen sulfide, causing the 'rotten egg' or 'Monday morning' smell when machines are started after sumps have been left static for some time.

Metal machining produces metal waste, swarf and fines, which wash back into the fluid sump. These are carried back to the machine tool with the next cycle where they get onto surfaces and the worker's hands. Fines appear to be nothing more than fine metal dust, but they are actually tiny sharp pieces of metal (see **Figure 2**), like tiny daggers that can scratch the worker's skin as well as the machine tool or component. Depending on the alloys used, toxic metals such as chromium, nickel and cobalt can leach into the fluid from the swarf and fines, finding their way into the mist that the worker breathes. The fluid can be too acidic or alkaline, contain too much concentrate or additives and so on. All this can lead to dermatitis and respiratory ill health.

Exposure study

MWFs are relatively complex mixtures that may contain oil and additives such as biocides, rust inhibitors etc – all designed to maximise the performance of the fluid. Fluid suppliers regularly carry out research and development on new fluids, which aim to improve performance and even reduce the amount of mist produced.

The concerns outlined above largely came to light in the late 1990s when the UK Health and Safety Executive (HSE) carried out, in conjunction with the Health and Safety Laboratory (HSL), a study of occupational exposure to MWFs at 31 engineering companies. The HSE's National Engineering Group was the driving force behind the work and its inspectors selected a wide range of sites to reflect the broad spectrum of companies using MWFs. There were SMEs, but there were also multinationals with major engineering workshops. New air-sampling techniques were used to measure workers' exposure to mineral oil and water-mix metalworking fluid mist (published as *Methods for the Determination of Hazardous Substances (MDHS) 84* and *95* respectively). Information was also collected on the fluids and processes used, as well as on control procedures, in order to ascertain current practice in controlling exposure. In addition, fluid samples were taken from machine sumps to measure for bacteriological content, endotoxins, fines levels and other contaminants.

The highest mineral oil personal sampling result out of the 40 taken was 3.7 mgm^{-3} 8-hr TWA (time weighted average), with 90% of results less than 2.8 mgm^{-3} 8-hr TWA. The results (298 samples) for personal exposure to water mix MWF mist ranged as high as 13 mgm^{-3} 8-hr TWA, with 90% of results

less than 0.8 mgm^{-3} 8-hr TWA. High bacteriological contamination and endotoxin levels were found in many sumps, up to 1.9 x 10^8 colony-forming units/ml and up to 1.8 x 10^6 endotoxin units/ml respectively.

Survey conclusions

So why do so many users manage their fluids so badly? Is it simply because they are not seen as an important part of the machining activity? Or that good fluid management requires time that many companies, particularly SMEs, have not got?

One general conclusion from the survey was that management of sump conditions was variable, but frequently poor. There were a number of pointers to poor control, many of which can have an impact on performance as well as health concerns, for example:

- Control of fluid strength was outside optimum performance limits, and on-site estimates of actual strengths were often very wide of the mark.
- Schedules for the replenishing and cleaning sumps were often sporadic and arbitrary.
- Fluid monitoring was inadequate.
- Swarf and fines removal was irregular (there were reports of operators putting their bare hands into sumps to scoop out fines).
- Contamination of water-mix MWFs by tramp oil (eg escaped lubricating oil from machines) was found.

Information on recent incidences of ill health were also collected as part of the study. The most common reports (13) were of dermatitis or skin irritation, followed by effects on the respiratory tract (irritation, wheezing), and in one case chronic flu-like symptoms. These reports were anecdotal and relied on workers/supervisors being willing to report health issues and, therefore, under-reporting of such cases was likely. That said, the reports recorded represented approximately half of the sites visited.

There were, however, some positives. Although there were varying degrees of poor fluid management across most companies, there were a handful that were effectively managing their fluids. These companies showed that metal working fluids can be managed and this can not only reduce the risk of ill health, but also increase the profitability of the business.

The results of this study were reported to the Advisory Committee on Toxic Substances (ACTS) as part of the review of the Occupational Exposure Standard (OES) for oil mist. The current occupational exposure limit for mineral oil mist comprises OESs of 5 mgm^{-3} 8-hr TWA and 10 mgm^{-3} 15-min TWA. However, ACTS concluded at its March 2000 meeting that this OES should no longer apply to mineral oil MWFs, given the potential for substantial variability in their composition and for contamination during industrial use.

Figure 1: Machine sump containing metal working fluids and unwanted food debris

The Committee also felt that it was not possible to derive revised OES values for mineral oil MWFs due to the absence of evidence for a level of inhalation exposure that would not cause any health effects and that would be applicable to all possible compositions of such fluids. (ACTS recommended, though, that the OESs should remain in place for other – non-metalworking – applications of mineral oil). The Committee further concluded that no occupational exposure limit could be derived for water-mix MWFs, for the same reasons.

New standards and guidance

If, after consultation, the UK Health and Safety Committee (HSC) agrees to remove MWFs from the scope of the OES there would be a need for a new source of standards for control. That will come in the form of a major new package of guidance – the *Metal Working Fluids Good Practice Reference Manual*. The guidance pack will include laminated task sheets for operators and a guidance value for airborne neat oil and water-

Figure 2: Electron micrograph of a metal fine – a tiny sharp piece of metal, like a tiny dagger that can scratch a worker's skin, the machine tool or component

mix MWF mist levels and sump fluid contaminants, such as bacteria. There will also be a poster, monitoring charts and much more, all aimed at making this a user-friendly package of guidance. This approach will also address dermatitis, not just airborne mist. If the proposal to remove MWFs from the scope of the current OES is accepted, this change is likely to appear in *EH40/2003: Occupational Exposure Limits 2003*.

The good practice guidance has been developed with the help of industry trade bodies who represent the fluid and machine suppliers, the relevant trade union, employer representatives, as well as Envirowise, a government programme that provides practical environmental advice for business.

The organisations who have helped develop and who endorse this good practice guidance are:

- Amicus – Amalgamated Engineering and Electrical Union
- the British Lubricant Federation Metalworking Fluid Product Stewardship Group
- Engineering Employers Federation
- Envirowise
- Institute of Petroleum
- the Machine Tool Technologies Association

HSE Deputy Director General Justin McCracken will launch the new guidance packs at the first of a series of seminars being organised by the HSE and the Engineering Employers' Federation, starting in October 2002. Each of the seminars will have presentations from the above organisations, covering the importance of fluid management and current good working practices. There will also be updates on new fluid and machining developments. At each seminar, a local business will present their story of how they are effectively managing these fluids and the associated benefits. The dates of the events are:

Birmingham	15 October
Barleythorpe (nr Leicester)	16 October
Sheffield	17 October
Glasgow	23 October
Cardiff	24 October
Leeds	30 October
Washington (nr Newcastle)	31 October
Newmarket	5 November
London	6 November
Belfast	12 November
Manchester	14 November

For booking details please contact Abigail Clow, Event Coordinator, EEF, Broadway House, Tothill Street, London SW1H 9BR, UK. F: +44 (0)20 7976 8056; e: **aclow@eef-fed.org.uk**

Standards addendum

Petroleum Measurement Manual, Part X: Meter Proving Section 7: Calibration of Reference Meters Used for Gantry Proving

This section of the *Petroleum Measurement Manual* was published as two sub-sections:

- 7.1: Small Volume Prover Method (1996)
- 7.2: Volumetric and Gravimetric Tank Method (1999)

Both sub-sections refer to the fact that a reference meter should be calibrated on each specific type of product that will be measured by the gantry meters to be proved by the reference meter. Despite this, it is acknowledged that reference meters have sometimes been calibrated on products similar to those on which they will subsequently be used, and a fixed correction applied to the meter factor to account for the change in performance of the meter.

Recent research, sponsored by the Institute of Petroleum, has demonstrated the magnitude of the errors that may be generated by following this approach.

Reference PD meters are, on occasions, calibrated on gas oil and then used on ultra low sulfur diesel (ULSD), with a meter factor correction of 0.1% applied to obtain the meter's performance on ULSD. Tests on six reference PD meters showed significant variations in performance between individual meters, with the result that the use of a fixed correction of 0.1% would have produced metering errors of up to 0.07% at 2,250 l/min (the maximum flow rate), with larger errors at lower flow rates.

Similar performance variations between individual meters were noted with motor spirit. Such variations will lead to significant errors when a reference PD meter is calibrated on a motor spirit substitute and a fixed meter factor correction applied to establish its performance on motor spirit.

The recommendation in the original documents, that a reference meter should be calibrated on each specific type of product on which it will subsequently be used, is therefore reinforced by the results of recent IP research.

In-transit inspection of rig risers

ABB reports that it recently undertook what it claims was the first ever cost-effective and efficient inspection of drilling risers while a rig was in transit. The time-saving technique was employed onboard the *Belford Dolphin* drillship while en route from Trinidad to Brazil. Dolphin Drilling was required to provide riser inspection information prior to spudding a well for Kerr-McGee. Some 140 joints, pups and telescopic joints, as well as the spider and gimbal, were inspected by two teams of three on two shifts in just 16 days.

The RADAR (riser active data acquisition recorder) technology was jointly developed in the US by ABB and Global Automated Systems in order to provide an economical, safe and efficient way of undertaking internal inspection of riser tubes, choke and kill lines and other metal pipes. It is claimed to be three times faster than conventional inspection methods and is said to offer savings of around $3,000 per joint. An average of six flanged riser joints (each 90-ft long) of a typical 21-inch drilling riser can be inspected in a 24-hour period without the need to strip the outside of the riser or incur any special handling problems, states ABB.

'Life-cycle wear measurements of drilling riser components can be measured against acceptable tolerances, helping to minimise risk by placing marginal equipment out of service, or in a less stressful situation,' comments ABB. 'Planned repairs, maintenance and/or part replacement can be scheduled to help avoid costly rig shutdowns due to failure.'

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Fork lifts for new generation rigs

Finning (UK) has secured a contract to supply Caterpillar fork lift trucks to the Hyundai Heavy Industries operation on the Maersk XL1 and XL2 platforms offshore Norway, new generation jackup rigs specifically designed for harsh weather environments.

A total of four Cat® fork lift trucks will be in operation on the two new platforms, with two Cat EP30K four-wheel electric trucks and two Cat DP30K diesel trucks. The DP30K trucks will be required to work within Zone 2 hazardous areas, so they have been modified by Pyroban® to meet customer requirements and European law. They are fitted with Pyroban's new System5000D™, which uses an active gas detection approach to diesel engine safety, supported by mechanical protection techniques including temperature limitation.

Both the truck models offer excellent visibility for the operator through a panoramic mast. A tilting steering column also provides operators with a comfortable driving position, states Caterpillar.

Finning is also providing Hyundai Heavy Industries with dedicated service back-up to ensure minimum downtime.

T: +44 (0)1543 461461
F: +44 (0)1543 461700

New probe resists the power of steam

Accurate and effective level measurement in applications involving saturated steam, such as boilers, de-aerators and boiler feed water heaters, can be a problem for traditional level measurement devices. For example, density and dielectric changes, along with conductivity fluctuations, can impair the accuracy and reliability of displacer and capacitance level measurement tools.

Magnetrol International has introduced a new probe specifically developed to meet such challenges. Its Eclipse 705 with 7MS probe is reported to be the first guided wave radar (GWR) level measurement device unit to have obtained official approval for use in saturated steam applications.

The Eclipse 705 is said to be capable of withstanding process conditions of 110 bar at 320°C. Use of materials such as 316 stainless steel, alumina and PEEK ensure that the probe can handle the high temperatures, high pressures and corrosive nature of steam applications.

The unit is reported to be lightweight and easy to handle, allowing for quick, simple configuration. Unaffected by changes in specific gravity, the tool is therefore a good alternative to torque tube displacer transmitters and DP transmitters, states the manufacturer. There is the additional benefit of the unit incorporating no moving parts, thereby reducing maintenance and associated costs.

T: +44 (0)1444 871313
F: +44 (0)1444 871 317
e: **sales@magnetrol.co.uk**

Petrol storage goes above ground with SuperVault

A new approach to petrol storage in Europe is now available under the terms of an exclusive licensing agreement between US-based BMT and fuel storage specialists Ledbury Welding & Engineering. Traditionally petrol has been required to be stored below ground. However, such a set up has inherent drawbacks in relation to potential ground contamination and accessibility for fire control. Add to these the disruption and high costs of excavation and the associated civil works, the advantages of safe, above ground storage are clear.

However, in the past, above ground petrol storage has utilised cumbersome concrete structures, vulnerable to damage and limited in capacity due to the problems of excessive weight and associated transportation restrictions. The new SuperVault MH is reported to resolve these issues and is claimed to offer true secondary containment within a relatively lightweight unit. It circumvents the monitoring problems associated with underground installations where the earliest indication of a problem is when the leak detector activates, usually signifying that ground contamination is already underway. Above ground tanks can also be re-sited as operational requirements change.

Widely in use across the US on both commercial and retail sites, the SuperVault comprises a steel inner storage tank with a steel outer tank. The interstitial space is filled with a lightweight, cement based insulation. The units are certified as multi-hazard rated and have a four-hour fire rating. Furthermore, it is reported that following exposure to a hazard the unit can be recertified and returned to service rather than having to be replaced.

T: +44 (0)1531 632222
F: +44 (0)1531 634718

Lightweight de-sander for Saudi ops

Piping and vessel sealing solution specialist Vector International recently developed a lightweight de-sander unit, in conjunction with another leading UK company, for a project in Saudi Arabia where strict requirements over weight and size would have made using conventional components impossible.

The de-sander unit was required to remove sand from a gas pipeline which would otherwise cause unacceptable internal corrosion, eventually leading to the need for pipe replacement – a costly exercise that needed to be avoided. The unit also needed to be mobile so that it could be moved from pipeline to pipeline, hence the requirement for it to be small and lightweight.

Vector designed and manufactured two pressure vessels (one housing the cyclone through which the gas is pumped to remove the sand, the other to collect the sand so it can be disposed of) and flange connections for the de-sander. It also designed the system of valves and connectors required to attach the de-sander to the flowline.

At the Saudi plant the gas flowline had a pressure of 6,500 psi – the de-sander needed to be capable of operating at the same pressure so as not to compromise normal production.

Manufactured in low alloy steel, the finished unit measured just two metres tall – notably smaller than other designs that had been considered, comments the company.

Wall thickness of the vessels was a key factor in making them as lightweight as possible while still allowing the unit to withstand 6,500 psi pressure. The use of compact flanges also allowed the design to be 25% lighter than if conventional flanges had been employed, claims Vector.

In addition to the pressure vessels, the company also designed and built four block elbows to be fitted into bends on the flowline in order to help reduce internal corrosion. Such a design allows the gas to flow around a 90° bend while the sand within the gas continues forward into a blind flange that takes the brunt of the corrosion rather than the bend itself.

T: +44 (0)1639 822555
F: +44 (0)1639 822623
e: info@vectorint.co.uk

Petrol playtime

Little Tikes has unveiled two new toys for the fuel retailers of the future! Pictured is the Electronic Sounds Pumper that features three weatherproof electronic buttons with six sounds, together with a pretend nozzle and credit card swipe. Also available is the Petrol Pumper, a fuel pump whose nozzle is designed to fit the petrol cap of the toy manufacturer's vehicles

T: +44 (0)1628 894200
www.littletikes.com

Membership News

NEW MEMBERS

Mr G K O Abiodun, Nigeria
Mr A G Adaralegbe, Babalakin & Company
Mr R Allen, Wrexham
Mr I Bahatiar, Engen Petroleum Ltd
Mr R E Baroudi, Ministry of Energy & Water, Lebanon
Mr K G Beer, Deloitte & Touche
Mr K J Bhangui, Ashbee Metal Cladding
Mr P Brown, Uckfield
Mr A Crossan, Glenrothes
Dr F Fee, F.C. Fee International Inc
Mr B Fitzgibbon, Forecourt Dimensions Ltd
Mr K Greenhalgh, Freelance Euro Ltd
Mr D P Heath, Stockton-on-Tees
Mr G Kerr, EPM Solutions Ltd
Mr E G Little, South Glamorgan
Mr D F McIvor, Rhomax Engineering
Mr A Ogden, Hawke Cable Glands
Mr S A Oyebola, London
Mr M Rylance, Aberconwy
Mr S Shereef, Kuwait Aviation Fuelling Company
Mr F R Siddiqui, Supreme Maritime Surveyors
Mr D R Waller, York
Mr B Weera-Wardana, Sefton Investments Ltd

STUDENT

Mr D Williams, West Indies
Mr E M Ulo, Nigeria

NEW CORPORATES

Stewart Inter Sea SA, Caddick Road, Knowsley Business Park, Knowsley, Merseyside, UK.
T: +44 (0) 151 548 8989 (direct) T: +44 (0) 151 548 7777 (ext 268)
F: +44 (0) 151 549 1954
e: oilops@alexstewart.com www.alexstewart.com
Representative: Paul Marsh, Managing Director
Petroleum cargo surveyors and analysts who provide a service to national oil companies, oil majors, traders, shipowners and insurers. The organisation has offices worldwide, many with laboratory facilities, and offers services for quantity and quality ship and shoreside inspection for petroleum products, crudes, condensates, petrochemicals and liquid gases.

Other services include: expediting by senior-qualified ex-marine staff; expert witness; bunker surveys; P&I club services for hull surveys; cargo damage and other structural damage; tank cleaning supervision en-passage for change of grade; on/off hire surveys; tank farm calibration; NDT for pipelines and related machinery in refineries and oil/gas fields and offshore structures.

SBL (Software Box Ltd), East Moor House, Green Park Business Centre, Goose Lane, Sutton on the Forest, York YO61 1ET, UK.
T: +44 (0)1347 812100 F: +44 (0)1347 81120
www.softbox.co.uk
Representative: Faye Atkinson, Corporate Sales Manager
SBL is a value-added, vendor independent reseller of computer software, hardware and peripherals. It offers expertise in volume-licence management and services the educational, corporate and government sectors. With GCAT accreditation, SBL delivers best of breed IT security products from anti-virus, network management, back-up to secure remote access together with a complimentary portfolio of services and training.

Branch Activities

ESSEX

Contact: *Arnold Carlson T: +44 (0)1268 794615*

9 Oct: 1730: 'ATEX – Legislation on Electrical Safety' by Mehdi Laftavi, Director, The Centre for Maritime and Industrial Safety Technology.

13 Nov: 1930: Ladies' Evening – 'Hanging Baskets', a talk and demonstration by Andrea Hatfield, followed by a light buffet supper.

LONDON

Contact: *Ian K Robinson T: +44 (0)1932 78377*

22 Oct: 1800: Update on mergers of IP, IGEM and InstE, by Lawrence Slade, IP Marketing Director, and Neil Brenton, IP Council and Chairman London Branch.

ABERDEEN

Contact: *Alan Higgins e:* alan.higgins@virgin.net

8 Oct: 1800: Talk by James Milne, Chairman, Balmoral Group at the Marcliffe of Pitfodels Hotel, followed by a hot buffet supper.

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aberdeen branch

ANNOUNCEMENT

For the first time in over 20 years, the Aberdeen Branch has changed the venue for its meetings. The new venue is the Marcliffe of Pitfodels Hotel and the winter season commences on the 8 October with a talk by James Milne, Chairman, the Balmoral Group (see above for details).

All members, friends and guests will be made very welcome. Subsequent meetings will be held on the second Tuesday of each month at the same venue.

Full details are on the Aberdeen Branch page of the IP website. **www.petroleum.co.uk**

Discussion Group

ENERGY, ECONOMICS, ENVIRONMENT

Formula One Lubricant Developments

Wednesday 23 October 17.00 for 17.30
Institute of Petroleum, 61 New Cavendish Street, London W1G 7AR

Speaker: **Les Dash, Shell UK**

Contact: **Laura Viscione e:** lviscione@petroleum.co.uk

DEATHS

We have been notified, over the past few months, of the deaths of the following members:

	Born
Mr J A L Cosh	1927
Mr R A A Duncan	1920
Captain C E Hulse MBE	1920
Mr W D M Ingram	1930
Mr J D McLay	1927
Mr D J Neil	1938
Mr J M Pirie	1914
Mr E H Sadler	1923
Mr S Succamore	1928

IP THE INSTITUTE OF PETROLEUM

new publications

API/IP 1542: Identification markings for dedicated aviation fuel manufacturing and distribution facilities, airport storage and mobile fuelling equipment

The new edition of this joint API/IP standard provides a marking and colour-coding system for product identification for dedicated aviation fuel handling equipment which, if adopted, can help to promote safe and efficient manufacturing and marketing operations in the petroleum industry. This seventh edition of the standard has been produced jointly by the American Petroleum Institute (API) Aviation Technical Services Subcommittee and the IP Aviation Committee. It replaces the sixth edition entitled *API 1542 Airport Equipment Marking for Fuel Identification*, published in 1996. It includes a new section on the marking of drums used for the loading, storage and dispensing of aviation fuels. The identification system described in this publication is suitable for worldwide adoption and is an essential reference for all involved in aviation fuel handling.

ISBN 0 85293 331 2 £44.00 25% discount for IP Members

Occupational health provision

Health is a combination of physical, psychological and social well being and encompasses a spectrum of states ranging from ill health and disability to optimum wellness. The role of Occupational Health (OH) teams is to enable the employing company to actively help staff to optimise their health; not just prevent them from becoming ill. Applications of the recommendations contained within this document will enable all companies to use their Occupational Health (OH) teams in a way that will deliver maximum value to the company and employees. The intent of this new publication is to provide guidance to management and staff in the oil and gas industry about the role and function of occupational health support within their companies.

ISBN 0 85293 373 8 £35.00 25% discount for IP Members

Guidelines for the management of integrity of bolted pipe joints Published jointly by UKOOA and the Institute of Petroleum

Leaking joints are a main cause of hydrocarbon releases on United Kingdom Continental Shelf (UKCS) offshore sites. The consequential costs of shutdowns and repair can be very high. There are other significant risks, notably to occupational safety, major incident safety and the environment. The aim of these guidelines is to provide operators with a framework for the management of bolted joints and to assist individual companies to develop their own processes to meet the principles of the guidelines; this should help reduce both the frequency and severity of loss of containment incidents.

ISBN 1903003148 £62.00 50% discount for IP and UKOOA Members

The guidelines were drafted by a UKOOA working group, but commissioned and jointly funded by UKOOA and IP. They complement the existing IP/UKOOA guidelines for the management, design, installation and maintenance of small bore tubing systems.

ISBN 085293 275 8

Available for sale from Portland Customer Services, inc. postage in Europe (outside Europe, add £6.00 per order). Contact Portland Customer Services, Commerce Way, Whitehall Industrial Estate, Colchester CO2 8HP, UK. Tel: +44 (0)1206 796351. Fax: (0)1206 799331. e: sales@portland-services.com

NEXT MONTH'S FEATURES...

The November issue of *Petroleum Review* will feature a unique CD-Rom from the Institute of Petroleum and Deloitte Petroleum Services. This free CD-Rom will contain the latest information on events and services available from your Institute as well as showcasing the Deloitte Petroleum Services Gas toolbox. We will also be investigating some of the major issues in the European gas market. A more detailed discussion of this sector will take place during a Gas Workshop being held at the Institute of Petroleum in November with Deloittes and many representatives from leading organisations in this sector, prior to a more detailed analysis being published in *Petroleum Review* early in the New Year.

Other articles of interest that will be featured include the annual Asia-Pacific round-up as well as a report on the recent World Petroleum Congress in Rio de Janeiro. We will also be covering the IP Autumn Lunch.

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The Institute of Petroleum is very pleased to announce its 89th

Annual Dinner

Wednesday 19 February 2003 at 18.45 for 19.30
at the prestigious Grosvenor House Hotel
Park Lane, London

This is a unique event in the petroleum industry calendar, which brings together over 1,500 of its leading figures and also provides an opportunity to meet with old friends and acquaintances.

Last year, the IP President Charles Henderson, Chairman, TotalFinaElf said:

'The atmosphere, as ever, is one of great enjoyment, pleasure at catching up with old friends, but also a need to extract the maximum business benefit from being there.'

Other attendees agreed:

'The Annual Dinner offers an enjoyable occasion to network at high-level, with colleagues in the industry and beyond'
ExxonMobil

'The IP Dinner is a premier event on the industry calendar — an enjoyable occasion that brings together a prestigious group from within the industry and from outside it'
ChevronTexaco

Philip Watts
Chairman, Royal Dutch Shell
Guest of Honour and Speaker

Philip Watts has been Chairman of the Shell Transport and Trading Company plc and of the Committee of Managing Directors of the Shell Group since July 2001. He has been a Managing Director of Shell Transport and a Group Managing Director since 1997. Since joining Shell in 1969 he has worked in Indonesia, the UK, Norway and the Netherlands.

For more information on this event please visit our website:

www.ipweek.co.uk

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TICKET APPLICATION FORM

Please photocopy this page and send completed form to the Conference Department, The Institute of Petroleum, 61 New Cavendish Street, London W1G 7AR, UK Fax: +44 (0) 20 7580 2230

I wish to order ..... ticket(s) @ £193.00 + 17.5% VAT (£33.78) each = Total £ .....

Title: ..... Forename: ..... Surname: .....

IP Membership No: ..... Company: .....

Address: .....

..... Postcode: ..... Country: .....

E-mail: .....

Tel: ..... Fax: .....

Please note: This year, for your convenience, there will be no additional surcharges for credit card payments.

I will pay the total amount by: ☐ Sterling Cheque or Draft on a bank in the UK, and I enclose my remittance, made payable to the Institute of Petroleum, for £ .....

☐ Visa ☐ MasterCard ☐ Euro Card ☐ Diners Club ☐ American Express

Card Number: ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Valid from: ☐☐ / ☐☐ Expiry: ☐☐ / ☐☐

Credit card holder's name and address:

Forename: ..... Surname: .....

Billing Address: .....

.....

Postcode: ..... Country: .....

Signature: ..... Date: .....

Data Protection Act 1998

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 bought by Individual Members and Corporate Members of the Institute of Petroleum (IP), and by purchasers of the IP Week Pass.

b) Individual Members may apply for a maximum of five tickets. Corporate Members may apply for individual tickets, or for one or more complete tables of 10 places.

c) All tables seat 10. Purchasers of less than 10 tickets will be seated with other guests.

d) 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.

e) Applications should be made by completing this form and sending it to The Institute of Petroleum, with the full remittance including VAT. (Extra charges may apply - see item 'g'.) Orders received by Friday 1 November 2002 will be included in the primary table allocation. Applications received after 1 November 2002 will then be considered on a first-come first-served basis.

f) 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 IP Members. (Extra charges may apply - see item 'g'.)

g) For bookings requiring additional administration (eg: incorrect payments, requests for invoices, etc.), or if payment is not received before 3 January 2003, an extra charge of £20 per ticket will be made.

h) Upon IP 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.

i) Tickets for tables in the primary allocation will be mailed during the week of 11 November. Please note that the IP 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 IP affairs, and a waiting list will operate. Full refunds will be made as appropriate.

j) 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 6 January 2003. No refunds will be paid or invoices cancelled after this date.

k) Successful applicants should submit their guests' names, in writing, to the IP by Wednesday 29 January 2003 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.

l) Please notify the Institute of Petroleum in writing of any special dietary requirements by 7 February 2003. An additional charge may be incurred.

IP THE INSTITUTE OF PETROLEUM

www.ipweek.co.uk

IP WEEK 2003

17 – 20 February, London

The Institute of Petroleum's IP Week is the focal point in Europe each year when leading figures in the oil and gas industry meet in London for an intensive round of conferences, industry and trade association events, company meetings and social functions. The Institute's own programme of events forms the core of these activities.

The week will include conferences focusing on:

- **Finance and Oil Price**
- **Refining and Marketing**
- **Future of Gas**
- **Exploration**
- **Oil Supply**
- **Bunkers**
- **Climate Change**

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

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IP ANNUAL LUNCH

Tuesday 18 February, Dorchester Hotel, London

The IP 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.

Guest of Honour and Speaker:

David O'Reilly, Chairman and CEO, ChevronTexaco

IP ANNUAL DINNER

Wednesday 19 February,
Grosvenor House Hotel, London

The Institute of Petroleum's 89th Annual Dinner is a unique event in the international petroleum industry, which brings together over 1500 of its leading figures and provides an opportunity to meet with old friends and acquaintances.

Guest of Honour and Speaker:

Philip Watts, Chairman, Shell

EXHIBITION

17–20 February, London

Maximise on business and promotional opportunities connected with IP Week 2003 by participating in the oil and gas information services exhibition. The exhibition will be held alongside IP Week 2003 events.

The AAPG is honoured to announce its second presentation of the APPEX-London prospect and property exhibition at the IP Week programme. Information on exhibiting or viewing at APPEX-London will shortly be available at either www.ipweek.co.uk or at www.aapg.org.

THE REST OF THE INDUSTRY WILL BE THERE, PLAN NOW TO JOIN US IN LONDON !

For more information on any IP Week 2003 event, contact the IP Conference Department:
Tel: +44 (0)20 7467 7100 e: events@petroleum.co.uk or see: www.ipweek.co.uk