PETROLEUM REVIEW

IP THE INSTITUTE OF PETROLEUM

August 1994

Independent bulk storage

A survey of European bulk storage capacity

Western Europe

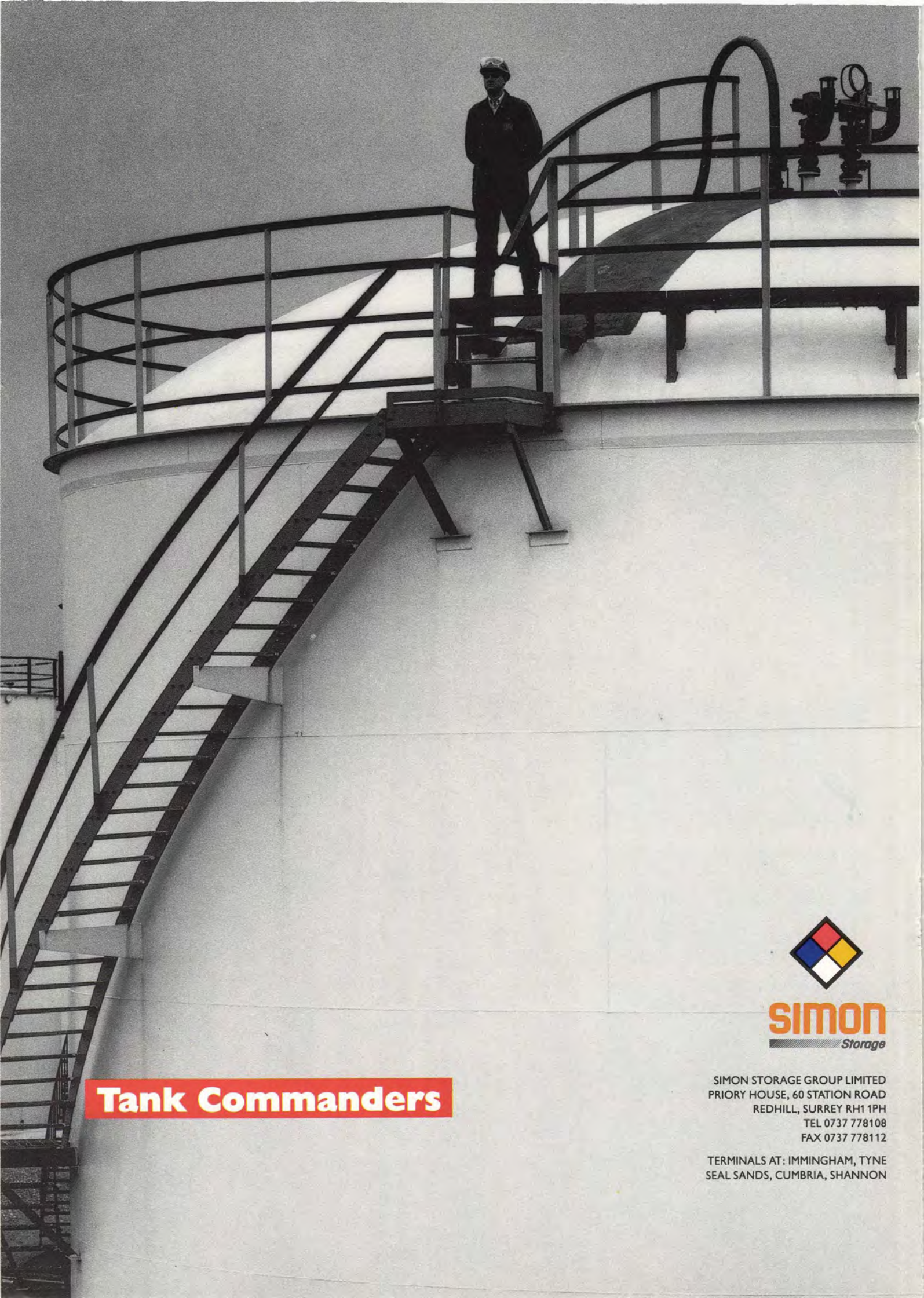
Bulk storage faces retrenchment

United States

New requirement for ethanol in reformulated gasoline

Middle distillates

The effects of microbial contamination



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CONTENTS

COVER PHOTO
Courtesy of Rotterdam Port Authority

NEWS IN BRIEF

27 June
Bond Helicopters and Helikopter Service of Stavanger have formed an alliance creating the world's largest civil operating group.

29 June
An offshore worker, who witnessed the horrors of the Piper Alpha explosion from a nearby accommodation vessel, has received £100,000 in an out-of-court settlement. Mr James Dalziel was claiming damages against Elf Enterprise Caledonia for post-traumatic stress.

30 June
The UK government has welcomed an International Energy Agency review, which it claims has largely endorsed Britain's energy policy. The Paris-based agency urges Britain to stop any remaining subsidies to the coal industry and introduce further competition, particularly into the gas market.

Kuwaiti oil minister, Abdulmohsen al-Mudej, has called for a 200,000 b/d increase in his country's OPEC production quota. He warned other OPEC members that Kuwait was still financially strained by Gulf War costs.

1 July
China is planning to double capacity at the east coast Zhenhai oil refinery, making it the largest refinery complex on the mainland.

Wood Mackenzie has identified 39 new field developments in southeast Asia, which could account for a third of oil and gas production in the region by the turn of the century.

2 July
Enterprise Oil lost its £1.6bn hostile bid for rival exploration company, Lasmo, after achieving only 23 percent of the shareholding vote. Combined with the 9.8 percent stake acquired at the end of June, this still gave Enterprise control over less than a third of the company.

BHP is looking to make a 'substantial acquisition' in the near future, according to Managing Director John Prescott. Boosted by record annual profits of A$1.28bn, the company is said to be examining both South America and Asia closely.

3 July
Lukoil has revealed plans to offer 15 percent of its shares to foreign investors during its second round of privatisations. A further 20 percent will go to the Russian public.

A major upturn in the VLCC spot market has been predicted by the consultancy, Petroleum Economics. By 1996, world tonnage surplus is expected to fall to below 40m dwt for the first time in over 20 years.

4 July
BP Norway is to shed 100 jobs by the year-end, mostly amongst onshore workers. Another 50 staff could be axed in 1996.

Norske Shell's Draugen oil platform is to undergo repairs costing up to NKr20m, just 10 months after it began production in the Norwegian sector of the North Sea. Faulty seals on the gravity base structure, built by Norwegian Contractors, are causing pressure problems.

5 July
Texaco has announced drastic re-structuring plans, involving the loss of 2,500 jobs worldwide and the disposal of several hundred smaller US oilfields in order to cut overheads by $300m a year.

Brown & Root announced it has acquired a 49 percent stake in the Algerian company, Condor Engineering.

6 July
Imports of crude oil into India are set to fall by over 20 percent during the year ending March 1995. Imports will drop to 24m tonnes, while production will rise by 5m tonnes to 32m tonnes, according to the Centre for Monitoring the Indian Economy.

Brazilian union leaders claimed that strike action has brought eight out of Petrobras's 10 refineries to a standstill. Workers are demanding a 50 percent pay rise to offset rising inflation.

7 July
Chevron, Agip and the state oil company, Hydro-Congo, have been given the green light to develop the Kitina oil discovery off the coast of West Africa. The Congolese field has estimated recoverable reserves exceeding 100m barrels of light crude.

Peru has revealed plans to privatise Petroperu by splitting the company into 11 business units. 60 percent of most of these units will then be offered to the private sector via auction in October.

Sedco and Sonat have both clinched alliances with Texaco for the provision of drilling rigs in the North Sea over the next two years.

11 July
Mitsubishi Oil has announced a second oil find in the Nine Dragons basin, offshore southern Vietnam. The new discovery will add over 4,000 b/d to the 10,000 b/d oil zone.

Iran could stop exporting oil within the next 15 years if its domestic consumption continues at its present rate of over 1m b/d. Deputy Oil Minister Ardeshir Fathi-Nejad said it now constituted one-third of the country's oil production.

12 July
Pengassan, the union repre-senting senior oil staff in Nigeria, has joined other oil workers striking over the detention of opposition leader, Moshood Abiola. Nupeng, the largest oil union, called its members out on 4 July.

Brent futures rose to $18.56 a barrel, the highest level for over a year. The surge reflected fears of a disruption in supply from strike-hit Nigeria.

Ishikawajima Harima Heavy Industries is to build an oil storage and offloading barge for the Liverpool Bay development, after being awarded the $60m contract by Hamilton Oil. Fabrication will take place in the company's Brazilian yard.

ARCO has signed a $1.3bn production-sharing deal in an existing Algerian oilfield with Sonatrach. The aim is to double recovery rates in the eastern Rhourde el Baguel field.

13 July
Yemen's northern government is considering plans to build a second refinery in Aden, according to deputy prime minister, Abdul-Qader Bagammal.

Amoco announced it is to increase its investment in Colombia later this year by funding an exploration well in the 100,000-hectare Cano Caranal Association Contract.

14 July
OK Petroleum has bought the other half of Texaco's Swedish retail arm, Texaco Marketing AB, for an estimated $64m but the 400 service stations involved will continue to operate under the Texaco logo. The Swedish firm has been a 50 percent shareholder since 1989 .

UKOOA is to fund a programme involving environmental groups, local authorities, government departments and the private sector, which will acquire environmental data on Britain's coastline.

15 July
Allowing Iraq back into the inter-national oil market would cause crude oil prices to plummet to $10-$12 a barrel and undermine the stability of Algeria, said a senior US official.

Two days of talks between Britain and Argentina over developing potential oil reserves around the Falkland Islands failed to resolve any of the major issues. The two countries will meet again in September but Argentina will not accept any proposals that would require local companies paying royalties to Britain.

19 July
A Siemens-led consortium, consisting of German and Turkish companies, has won a £400m contract to build Kazakhstan's first combined-cycle power plant.

Poland has announced cautious new privatisation plans, which would allow Warsaw to keep control of the country's pipeline and rail petrol distribution system.

21 July
Stena Offshore has announced that it is to merge with the French offshore services group, Coflexip, in a $340m deal.

NEWSDESK

Gas independents 'may offer universal tariff'

Fears that a liberalised domestic gas market would create major price differentials within the United Kingdom are the result of 'scaremongering' by British Gas, according to one independent gas supplier, particularly since new competitors might well decide to introduce their own cross-subsidies.

'To gain a competitive edge, we may well introduce a single selling price all the way from Cornwall to St Fergus,' *Petroleum Review* was told.

The independents are angry at apparent moves on the part of the government to drop proposals for a new Gas Act from the Queen's Speech next autumn.

There are several possible reasons for this, say industry sources. Warnings by British Gas that rural customers will pay more under the new system have alarmed some Conservative MPs. It has also been suggested that the government wishes to give priority to the privatisation of the Post Office.

A request by British Gas that the 1996 target date be put back by six months may also have contributed to thoughts of delay. British Gas says it needs more time for sophisticated new information technology systems to be put in place.

As *Petroleum Review* went to press, a final decision over shelving the Gas Bill had yet to be made. 'What is and isn't in the Queen's Speech is traditionally kept secret,' said a spokeswoman for the Department of Trade and Industry. 'It will depend partly upon how much parliamentary time there is.'

The independents, however, are adamant that there is no good reason for the deadline not to be met and continue to lobby furiously. Mr Norman Ellis, Chairman of Kinetica, recently wrote to 200 MPs asking for their support.

'The fact that British Gas wants a delay in implementation doesn't prevent the Gas Bill being debated during the 1994/95 parliamentary session,' said one independent.

'There appears to be unease over price differentials but as far as we are concerned everyone will be a winner,' said Kinetica's Strategic Planning Manager, Ian Martin. 'The differential nationwide will be no more than four percent, whereas we are offering reductions of around 10 percent.'

Mr Martin also warned that delay could have an adverse effect on some of the electricity companies. 'A number have positioned themselves in the industrial and commercial market as a launchpad into the domestic market,' he said. 'It remains to be seen how long they can hold out.'

One possible solution would be to circumvent legislation by lowering the 2,500 therm threshold for competition to 1,000 therms, with British Gas left as a supplier of last resort. This option has been suggested by Ofgas although a spokesman stressed the regulator would rather see the Bill go through Parliament as planned.

New estimate doubles Camar reserves

Recoverable oil reserves in the Camar field, off the coast of Indonesia, could be twice as high as original estimates.

According to Mr Ted Ellyard, managing director of Stirling Resources, this extra capacity would come largely from the northern lobe of the field, as yet virtually untapped.

Original estimates for the field, which is situated 100 kms north of Surabaya City in the East Java basin, put reserves at around 30 million barrels, six of which have already been produced.

Stirling Resources is due to take a stake in the field from Enterprise Oil in what will be the Western Australian company's first offshore oil production venture. However, a conditional agreement to acquire a 20 percent interest back in March ran into trouble when one of the existing joint venture participants elected to acquire some of the Enterprise share. As *Petroleum Review* went to press, negotiations were still ongoing but Mr Ellyard predicts that, at the very worst, his company will gain a 10 percent interest.

In March, oil production stood at 2,800 b/d, down from a peak of 10,000 b/d in 1991. The field is now shut in but production is due to begin again in September using existing wells. New wells, which will tap the northern lobe, are due to be drilled during 1995.

According to Stirling, there is also considerable scope for the development of potential gas reserves, estimated at 40 billion cubic feet, which could be supplied via a pipeline to Surabaya City.

The company believes that considerable savings can be made by buying in a new storage vessel. 'We predict we can cut costs by at least half', said Mr Ellyard.

British Gas teams up with US firm

British Gas has joined up with a US trading company in order to benefit from America's experience of deregulation in the energy market.

British Gas and Natural Gas Clearinghouse (NGC) have formed a joint venture company – Accord Energy – which is set to become a key player in the marketing of energy resources in Britain. It should also give a boost to the development of a natural gas spot market.

'Accord combines the traditional strengths and resources of British Gas with NGC's commercial skills,' said its new chairman, Russell Herbert, who is also managing director of BG Global Gas.

Initially, the company will focus upon buying and selling short-term gas in the wholesale market. In the long-term, however, it will aim to market and trade internationally in a whole range of energy products.

Accord is 51 percent owned by British Gas and 49 percent owned by NGC.

Free Esso petrol for the disabled

Esso is offering free petrol to people with cerebral palsy who live in the West Midlands.

The £20,000 pilot scheme, which also applies to carers, could eventually go nationwide, according to a spokesman. Free petrol grants can be obtained through the branch network of the Spastics' Society, to which claimants must be affiliated.

Joint venture to explore Caspian Sea

The Inchke-More area of the Caspian Sea is set to become the first commercial oilfield offshore Russia, claims JPK Expro, following an agreement to form a joint venture with two Russian companies.

As *Petroleum Review* went to press, final terms were still being negotiated but the venture was expected to operate under a production-sharing agreement with the Russian government.

The two Russian partners are the state oil company, Dagneft, and RusCaspNeft, itself a joint venture between Lukoil and Rosneft.

JPK Expro won the tender to develop and explore the area in 1993 and has since completed a detailed technical and economic feasibility study.

NEWSDESK

BP to develop Czech retail network

BP plans to develop as many as 30 filling stations in the Czech Republic, via a joint venture company.

BP Cerpaci Stanice CR has been formed with two capital market investment funds – the Czech and Slovak Investment Corporation and the New Europe East Investment Fund.

The new company will extend BP's existing four filling stations in Prague to an initial network of 12 by 1996, focusing both on Prague and Brno.

A fifth filling station is already under construction in Brno and is scheduled to open this month. As many as 30 stations are planned in all.

BP also has plans to increase its retail chain in the former East Germany from 60 to around 100.

'Alba teething troubles are almost over'

Teething troubles on the Alba oilfield, which have caused production to seesaw from 10,000 b/d to 30,000 b/d over the past few months, are almost over.

According to Chevron, a four-day shutdown this summer rectified all the problems, bar one.

'We still need to work on software modifications for the computerised emergency shutdown valves and fire and gas detection systems,' said a spokesman. 'At the moment the computers are over-reacting and shutting down plant unnecessarily.'

New software will be installed during another 12-hour shutdown, scheduled for October.

The field is now on track to achieve its plateau production target of 75,000 b/d later this month.

Isle of Man considers tapping into natural gas pipeline

The Isle of Man government is having a detailed examination made of future energy prospects which could result in the island being connected to a source of natural gas.

The Energy Commission, which it established in January this year, is about to appoint a consultant to make a study of the island's energy uses and to provide a report. The Commission expects to be able to make its first proposals next year.

There are three fuels now in use on the island: LPG, oil and electricity. Unexpectedly, a fourth – natural gas – has become available in the form of a long-distance natural gas pipeline which passes the island 12 miles offshore. Built by the Republic of Ireland, the pipeline came into operation late last year and delivers gas to Dublin from Scotland.

However, the formation of the Commission and the study which is about to begin are not the direct result of the pipeline. There has been a desire to take a wider look at energy policy for some time now, and indeed the Commission will also study the possibility of using windfarms as a source of power.

Douglas Gas Company, one of the Island's two LPG suppliers, believes that even if natural gas was introduced, some 15 percent of its customers would still need to use LPG because of their remoteness. These customers are on small tank systems, or use bottled gas.

Moreover, considerable investment has been made in refurbishment of the LPG distribution systems and up-to-date storage. According to Douglas Gas, the replacement of LPG by a new fuel would cause large-scale losses in capital investment. Although they say they are not against natural gas, the LPG supply companies would not pay the cost of connecting the island to the offshore natural gas pipeline.

A switch to gas would be impractical in the foreseeable future, according to some energy specialists on the island, unless power generation were to become gas-fired and the price of gas established. At present, it is all oil-fired and over the years the government-owned Manx Electricity Authority has vigorously pursued a policy of replacing older generating plant.

Six years ago, long before there was any possibility of a natural gas pipeline passing offshore, it opened a new diesel-generated power station using medium fuel oil at Douglas and is now nearing the completion of another with a new diesel-driven plant at Peel.

There is said to be no standard equipment available for the conversion to natural gas of this type of oil-fuelled generating plant and a switch to gas which entailed special engineering work on a plant would be costly.

The insertion of a T-junction to bring gas ashore from the offshore pipeline is technically feasible but would cost some £2.3 million – a large sum for the island whose population of 70,000 is supported only by a small amount of industry.

Unlike the Irish government – and British Gas when it lays a natural gas pipeline to northern Ireland – the Isle of Man would not receive any EC funding if it made the connection, nor would the UK government be prepared to help with the bill.

AMEC sheds 200 jobs after Heidrun

AMEC Process and Energy has been forced to cuts its construction workforce by over 200 now that the massive Heidrun utilities module is complete, despite the fact that it is already working on three other contracts.

'Heidrun was such an enormous contract, employing over 500 workers,' said Marketing Director George Marvin, 'that it is difficult to replace'.

The company is currently working on Phillip's Judy-Joanne 10,000-tonne integrated deck and a 3,000-tonne module for Denmark's Tyra West.

According to industry sources, AMEC also clinched the design and construction contract for Shell's 2,400-tonne Pelican process module back in January. Fabrication has already begun, despite the fact that the deal has yet to be announced.

All three contracts together are estimated to be worth around £90 million.

An attempt last month to halve the number of staff cuts by introducing a job-sharing scheme was rejected by the unions, according to AMEC.

The 10,600-tonne Heidrun module left Wallsend in Newcastle by submersible barge on 5 July. Inshore hook-up will take place in Norway. The installation will then be towed to the Heidrun field where production is due to begin in August 1995.

The Heidrum utilities module has been built to last 50 years

Tough times in store for Europe

By Susannah Cardy

Whilst the independent tank storage operators embrace increasingly far-flung areas of the world, their traditional heartland of Western Europe continues to suffer from low rates and divestment. 'We will have to pay close attention to our costs', admitted one operator, 'if we are to remain profitable'.

Rotterdam may be the largest port in the world but Mr Jan Brouwer, President of Paktank International, finds he is spending an increasing amount of his time in the tiny port of Muuga these days.

Paktank has already built a 57,000 m^3 terminal for heavy fuels at the harbour in Tallinn, Estonia. Capacity is set to double by the end of the year, with phase two allowing for the storage of light products too.

Investing in the former Soviet Union is, of course, a high-risk business. 'It's good money but politically very, very dangerous. Tomorrow the border could close or the railways could become too expensive and then we'd have a nice new site sitting idle,' said Mr Brouwer.

But, despite all the finger-crossing, for the moment at least the rewards are plain to see.

'Singapore throughputs are three or four times higher than those of Rotterdam,' stated Mr Brouwer. 'But compare Singapore with Estonia and you find that Tallinn's throughputs are three to four times as high again.'

The philosophy of the world's largest independent bulk storage company is 'Far East first, followed by niche market areas' – of which Tallinn is a prime example. Its interests extend as far afield as Africa and Latin America. So where does that leave the Amsterdam-Rotterdam-Antwerp (ARA) ports of Western Europe?

'We have a very good, solid position in Rotterdam and we want to keep that,' said Mr Brouwer, 'but it's a mature region with no growth in the oil markets.'

Some localised expansion has taken place in the area. Last year, for example, Paktank increased its

Botlek

share in the joint venture Maasvlakte crude oil terminal (MOT) by 1.5 million barrels. But turn the clock back to the 1970s and it becomes clear how grand the plans for storage capacity in Rotterdam once were. 'When the terminal was designed in 1973, the original idea was to eventually increase its capacity from 36 tanks to 120,' said Mr Brouwer. 'Yet in 1994, MOT still has just 36 tanks.'

The operators are more interested in divestment nowadays. Paktank recently scrapped half its oil tankage capacity at NOM-Pernis, bringing the total down to 158,000 m^3. Van Ommeren tells a similar tale. As Petroleum Review went to press, the firm had just finalised a deal to sell off 600,000m^3 of ageing petroleum facility in the port of Amsterdam to an AIC-owned company. The sell-off is part of a company drive to concentrate activities within Rotterdam and Antwerp. Overall, Van Ommeren has reduced its cost base in the Netherlands by 15 percent over the past year, largely through the shedding of 100 jobs.

And there are difficult times to come, according to Mr Paul Govaart, Director of the European and Asian arm of Van Ommeren. 'We will have to continue to pay close attention to our costs in order to remain profitable, although I don't expect any major restructuring programmes for now.'

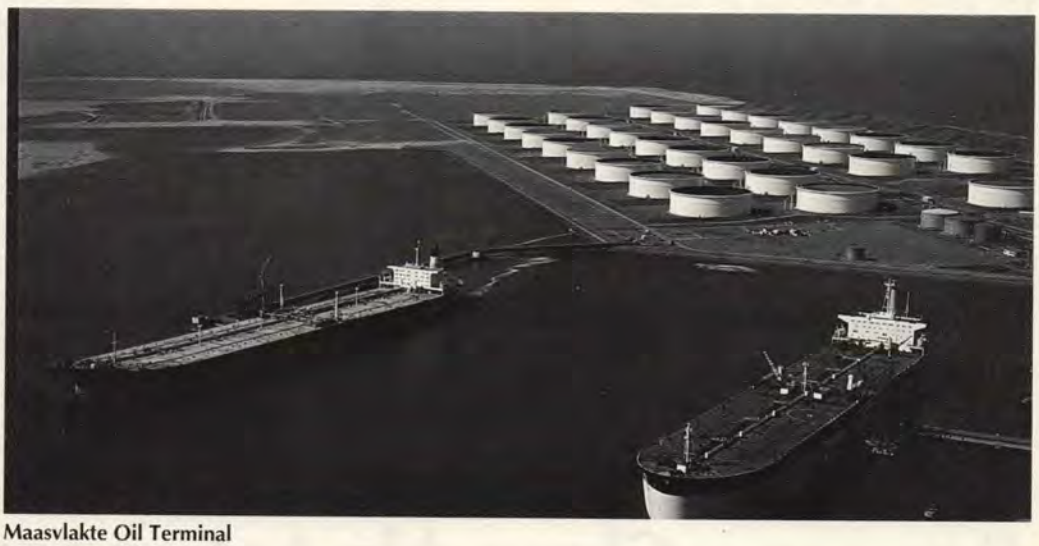
The major stumbling-block in Western Europe is still, of course, the rates, which continue to scrape along the bottom of the barrel. At 2.50 guilders per cubic metre for gasoil, 4.50 guilders for gasoline, they have stubbornly refused to rise in real terms for the past decade.

'The problem is that the existing infrastructure dates back to the early 1970s', said Mr Govaart. 'At that time, the structure was based upon an OECD consumption in Europe of about 1 billion tonnes, whereas nowadays the level is no higher than 700 million. Aside from times of crisis, we have been confronted with over-capacity for the past 20 years.'

The market, however, is nothing if not unpredictable and, in recent months, this unpredictability has worked largely in the operators' favour. Last winter, they benefited from a particularly large contango (higher prices on the futures market) in gasoline and this summer a slump in gasoil prices created another contango – again wider and longer-lasting than other years.

'In the first half of the year, we had much more gasoline than is normal,' said Mr Brouwer. 'Now we are nicely-covered in terms of gasoil, with a capacity of around 90 percent.' Van Ommeren also confirmed that its availability for gasoil storage was 'pretty tight right now'. The other side of the coin is low storage capacity when a particular product is in high demand – during the summer for gasoline and the winter for gasoil. Paktank, for example, had some empty gasoil tanks at the beginning of the year.

Paktank does have the advantage, however, of being the only independent to store crude – the most reliable commodity in terms of volume. The firm is currently operating at almost 100 percent capacity, although competition from the majors is on the increase. 'In former times they were our clients, but now things are a little different,' according to Mr Brouwer. 'For example, Mobil closed its Amsterdam refinery down 15 years ago, buts its tank storage is still there.'



Maasvlakte Oil Terminal

'Singapore throughputs are three or four times higher than Rotterdam's'

The change in customer base for the bulk storage companies of the ARA is well-documented. With the majors optimising their own systems and the replacement of the physical with the paper trader, utilisation is down and there are less contractual customers around. The exception is strategic government stock, which now represents 20 percent of Paktank's custom. Yet its low rotation puts this sector of the market at the bottom of the heap in terms of payback. 'Its dead stock,' said Mr Brouwer, 'but where you've got a terminal with big tanks, and with no direct connection to the sea, strategic stock is a good alternative.'

And what about the Middle East? The bulk storage industry in Western Europe has produced few surprises of late, so the news last summer that Saudi Aramco had acquired a 34.35 percent stake from Texaco in storage facilities at Rotterdam's Maatschap Crude Oil Terminal sent shockwaves through the industry. One year on, most view it as an isolated incident. 'Is it a signal? Well, we're not really sure,' said Mr Vonder Ray, Account Manager at the Rotterdam Port Authority. 'We thought more Middle Eastern countries would follow when Kuwait Petroleum took over the Gulf refinery at Europoort in 1982, but they didn't.' Paktank, which still leases 5 million barrels worth of capacity to Saudi Aramco, also plays down the development. 'I'm not saying it is a very positive move from our point of view, but I'm not overly worried,' said Mr Brouwer. The sheer volume of tankage required, together with the deepwater facilities offered by Paktank are enough, he believes, to ensure that Saudi Aramco will continue as a major customer for the foreseeable future.

The operators remain stoic too about the effects of environmental legislation in Western Europe. Yes, ground pollution controls will eventually happen and yes, the customers should be paying for environmental legislation but aren't as yet. On a more global level, however, the operators believe environmental constraints could have a positively beneficial effect. The Clean Air Act, for example, is creating some strange product flows as refineries in the United States are forced to close. 'The West European refineries in the coastal regions which are able to ship overseas may profit from this,' said Mr Govaart.

Despite its maturity, the operators insist that Western Europe will retain its major trading and refining position for many years to come. 'Its infrastructure, location and deep-water facilities

guarantee a reasonable future,' said Mr Brouwer. 'One year volume will be a little better, another a little worse, but it won't be spectacular.' Any real growth, they say, will be restricted to a number of well-located sites in the Mediterranean region.

But despite this levelling out, there are a few encouraging developments in the pipeline. J Eron, the trading arm of Goldman Sachs, is currently constructing a 55,000 b/d gas condensate splitter adjacent to Van Ommeren's Europoort facility. The splitter, which is due for completion at the end of the year, will use the operator's facilities for the import of raw materials, storage and shipping of products. 'We're always very active in searching for market niches such as this', said Mr Govaart.

Another source of hope for growth, albeit rather slim, is the supply gap in the Former Soviet Union. With Russia now failing to provide the Polish and East German chemical industries with the crude they require, the Rotterdam Port Authority has spied the potential for further business. 'There's a battle going on at the moment over who will supply the area,' said Mr Ray. 'Rotterdam has the advantage of being a deep-water port but Trieste and Genoa also have a very good chance because they already have trans-Alpine pipelines to the Eastern block.' Germany represents a further threat to Rotterdam's chances. 'Technically speaking, the best option would be to extend the Rotterdam pipelines into eastern Germany but this would mean Bonn favouring Rotterdam over Hamburg, where unemployment is high,' said Mr Ray. 'It's a game with very high stakes.'

The biggest push for the future at Rotterdam, however, is in chemical storage. 'When the chemical industry was growing – we were growing,' said Mr Brouwer. 'Lately, it has been in a state of crisis, but I believe chemicals have reached the bottom and are on their way up again.' Chemicals are the spearhead of Rotterdam Port Authority's drive to attract new business to the area. At least 1,000 hectares of land are to be reclaimed from the sea in the western port area by the year 2010 and the authority is hoping to fill at least part of the area with chemical operators. The plan is to steal business from Germany, where environmentally-driven legislation is deterring new activities in this sector. 'They have very old complexes, the housing quarters are close to sites and there have been accidents in the past few years which have damaged the industry's reputation,' said Mr Ray. 'In Rotterdam we believe we have very good conditions for companies, with plenty of feedstocks, high standards and segregated housing and industry.'

'The supply of crude to Eastern Germany is a game with very high stakes'

Van Ommeren company policy is also to expand in chemicals and chemical-related business but Rotterdam is fairly low down on the list of priorities. 'We've opened up our second chemical island in Singapore and we still have ample room for expansion there,' said Mr Govaart.

Mention the Far East to the likes of Paktank and Van Ommeren and faces light up. 'We have been actively scanning India, Indonesia, Malaysia and Thailand and I am pretty confident that we will be announcing some projects in the not too distant future,' said Mr Govaart. Paktank has opened up an office in Hong Kong, has two potential projects in south China and likes nothing better than to talk of its plans for Thailand, where a 130,000m^3 terminal is due for completion early next year.

Paktank and Van Ommeren may have their headquarters in Rotterdam, but their attention is undoubtedly focused on altogether more exotic locations.

Beware – Clean Air Act approaching

By CJ Blake Jr, Senior Vice President, GATX Terminals

For over 20 years, the US petroleum industry has been one of the most battered and criticised groups in the history of American business. Several of the denouncements have been somewhat justified, while others have been ill-founded. Meanwhile, the industry has made less than impressive lobbying efforts both in its attempts to influence federal and state lawmakers as well as to educate the general populace.

In fact, the US oil industry has had a fine track record on most other accounts. Yes, there have been mishaps but huge sums have been spent in remedial efforts to mitigate damage. Yes, there were queues at service station in the early and mid 1970s but none since. Motor fuels have been readily available when and where the driving public has required them and they have been cleaner burning and less polluting. Yes, there have been very stringent regulations aimed at cleaning up and protecting the environment and everyone has responded by spending incredible amounts at their refineries, service stations and distribution facilities to meet the letters of the law. Meanwhile, in real terms, the price per gallon of gasoline is less today than it was 20 years ago. Still, the perception of the industry in the eyes of the American public is exceptionally negative.

Now comes the Clean Air Act (CAA) and its looming compliance date of 1 January 1995. New, cleaner and more costly reformulated gasolines must be marketed in the nine US metropolitan areas with the highest levels of atmospheric ozone. About 30 percent of US gasoline is sold in these areas. Some 85 other areas with less of an ozone problem than the original nine may, if they chose, decide to join the Federal programme through state plans. How many of these areas will choose to 'opt in' still remains to be seen. If all these second-tier regions adopt the same standards as the primary group, as much as 50 percent of gasoline marketed in the United States will be 'non-conventional'. In addition to the above, 40 other metropolitan areas with high levels of carbon monoxide must begin selling gasoline during the winter months with predeter-

mined and higher amounts of oxygenates. During summer months, gasolines with vapour pressures lower than marketed today must be introduced next year. The US Environmental Protection Agency (EPA) has also mandated that 15 percent of all oxygenate contained in gasoline must be alcohol based (ethanol or ethyl tertiary butyl ether) in 1995 and 30 percent in 1996. This is one element of the Clean Air Act which has raised the ire of the oil industry and it is expected to file suit against the EPA in the very near future.

Even though the compliance date for the first stage of the Clean Air Act looms perilously near, very few decisions have been announced as to who will market what and in what area. Confusion reigns supreme!

Effect on distribution

One of the sub-groupS within the industry that will be severely affected by the new rules are those entrusted to move and store product physically in its journey from the refinery to the service station. Those owning terminals, pipelines, trucks, railcars, ships and barges which are engaged in the distribution of vehicular motor fuels will undoubtedly be affected by the new CAA regulations. Refined product fungibility is one of the key elements in the historical development and maturation of the US supply network, especially in pipelines and terminals. The expected conflict between CAA mandated product segregation and a pipeline/terminal network developed and sized to transport fungible commodities will result in a myriad of operating problems, a loss of flexibility and efficiency, increases in interface and an incredible increase in administration and control activities. Failure to control the distribution of non-complying gasoline will result in huge financial penalties, the EPA warns. All parties in the distribution chain will be presumed liable if non-complying fuels are detected by the regulators and any such party could be responsible for all costs associated with correcting the specification deficiency over and above the penalty levied by the EPA

Although not much has been written or documented on the subject, another non-quantifiable impact of the Clean Air Act will be the additional product handling caused by the non-fungibility of the various grades and types of reformulated fuels. Due to the projected smaller batch sizes and tenders, extra handling of products in pipelines and terminals is sure to increase, as will the amount of interface (the material separating batches of specific product as it moves through delivering pipelines) created. This element certainly runs counter to the assumed benefits of the CAA in that the more a certain volume of product is handled and stored, the more emissions are created.

There are several other elements of the CAA which are certain to impact the US clean petroleum logistics network. (Examples: Blending regulations, dyeing requirements, rules governing imports, compliance audits, quality assurance/quality control elements, record keeping requirements among others). These are too complex and detailed to report here. Suffice it to say that the fallout from the CAA will, to a great degree, change the way motor fuels will be supplied and delivered throughout much of the United States. Operationally, few, if any of the expected changes are expected to be positive.

With less than six months before the first major compliance date, many significant decisions from the oil industry and state governments have yet to be made or announced. Meanwhile, the logistical support sub-industry group cannot take all the appropriate steps necessary now to be ready to handle the new demands placed upon it by its users from 1 January next year. If, as stated, confusion reigns supreme at this writing, it will only get worse as we draw closer to the year-end.

This piece started by criticising the industry for its poor lobbying track record. It was unable effectively to lobby the bureaucrats who drew up the CAA legislation to make the process more simplified. The act and all that it requires is now expected to cost the industry approximately $37 billion during this decade, according to the National Petroleum Council. A portion of this will be passed onto the consumer through higher gasoline prices and, because of the lack of effective consumer education regarding the CAA, the typical US motorist is unaware that higher costs loom just around the corner. We will give the reader one guess who that motorist will blame and it will not be the lawmakers. His or her ire will once again be targeted at the oil companies and any educational attempts will be viewed as knee-jerk reactions to the bad publicity that is sure to result.

Others must learn

The European oil industry is now grappling with new EEC mandates and new country-specific environmentally oriented regulations. It is a Herculean task just to keep up on the legislative front and even more difficult in many cases to effect the required changes. The industry must be heard by the lawmakers and both groups should work as close together as possible and forge the conventions governing the environmental protection and remediation aspects of the business. Simultaneously, the industry throughout the world must do all in its collective power to improve its image and to educate the consuming public. As environmental awareness increases in several parts of the world, many governments and industry participants have a special opportunity to monitor events in the United States. They can copy our successes, avoid our mistakes and still attain the same degree of environmental effectiveness cheaper and quicker than we have. Above all, government, industry and the population at large must work together to clean and protect our precious environment.

Reforming the reformulated gasoline rules

By PS Adam

Seemingly inconsistent and contradictory policies regarding reformulated gasoline (RFG) continue to befoul the atmosphere in which refiners must attempt to implement provisions of the US Clean Air Act. At different times since the current administration came to power, steps the Environmental Protection Agency (EPA), the White House and the State Department have taken concerning RFG have prompted strong opposition from domestic and foreign refiners as well as environmentalists.

Now, both the domestic oil industry and 'green' lobbyists are up in arms concerning recent EPA decisions on RFG. Environmentalists feel that the administration is undermining provisions of the Clean Air Act aimed at reducing pollution in major US urban areas. At the same time US petroleum industry representatives contend, not without reason, that recent EPA rulings strongly favour refiners overseas and agribusiness interests at home.

But the situation could change drastically, and not in the Clinton administration's favour, if the courts compel the EPA to reverse current decisions – a distinct possibility, at least according to US petroleum industry representatives.

Tough industry stance

The Clean Air Act requires petroleum refiners to reduce the pollutants in their gasolines between 1995 and 2000. The starting point, known as Phase 1, for the reduction is a 1990 baseline set by each company using its own data and any one of three formulas. After the year 2000 Phase II starts and a single statutory baseline will apply to all refiners. While the process sounds simple, in reality it has been anything but.

A recent EPA decision regarding the required use of 'renewable' oxygenates, meaning ethanol, in grades of reformulated gasoline has brought long-running petroleum industry federal government disputes over RFG to a flashpoint. But there is more to the issue than just the use of grain versus wood alcohol-based oxygenates. There are two different, but somewhat interrelated, EPA rulings which are matters of contention between the industry and authorities, as well as a proposed rule change in the Clean Air Act. Each will have its own separate impact on US refining operations. They are:

- An EPA mandate, announced 1 July, that one-third of the gasoline sold in the most polluted cities in the United States must contain oxygenates derived from corn or other 'renewable' resources (see Petroleum Review February 1994).
- A proposed EPA rule change in the Clean Air Act made earlier in the year which would allow Petroleos de Venezuela, and presumably other foreign refiners, to meet less stringent air pollution requirements for gasoline exports to the United States than do their US counterparts for domestically produced grades, and a surprise announcement, also made by the EPA earlier this year, requiring a much larger reduction in ozone-forming NO_x emissions from gasoline than the industry had been led to expect.

With respect to the technical aspects of NO_x emissions reduction, this is a relatively straightforward and not an excessively expensive technical matter. Refiners can meet this requirement fairly readily by altering slightly the chemistry of oxygenated fuels – using 'higher' ethers, those with carbon chain composition of C_6 or greater.

According to Phase II of the reformulated gasoline programme, however, beginning in the year 2000, US refiners will have to meet NO_x emission standards which are below 1990 levels. At the same time, it appears that foreign refiners will be held to NO_x emissions set at 1990 levels, giving them a definite cost advantage over their US counterparts.

The EPA pronouncement which pertains to the 'renewable' sourced ethanol content of domestic RFG will also have a great impact on refinery economics and relative costs. This ruling is the source of more intense and immediate concern – it goes into effect next year and has prompted an outpouring of displeasure from industry participants. Charles J. DiBona, President of the American Petroleum Institute, characterised the ethanol decision as 'outrageous'. The tone of the rest of his statement was also unusually harsh: 'This ... decision is a triple threat – bad for the environment, bad for the economy and bad for consumers'.

Industry groups are not only talking tough about the recent EPA decisions, they have started to take action. The American Petroleum Institute and the Independent Refiners Coalition are in the process of engaging counsel to advise them concerning the feasibility of bringing suits to force the EPA to backtrack on the ethanol and import rulings.

Ethanol and political economics

The EPA's July ruling calls for at least 15 percent of oxygenates in RFG to come from renewable sources in 1995 and 30 percent in 1996. Approximately 10 percent of the US gasoline pool will be affected. Cities where these grades of gasoline are required include Baltimore, Philadelphia and New York. In an attempt to improve air quality a number of other urban areas, including Washington, have voluntarily opted to participate in the reformulated fuels programme.

From the consumer's perspective, RFG will cost an estimated 3-5 cents per gallon more than current conventional gasoline blends and will not affect vehicle performance. The petroleum industry understandably favours oxygen additives derived from methanol, usually derived from natural gas.

Several studies have concluded that using ethanol-based oxygenates will be

more expensive than methanol. The EPA's 'renewable' requirement will, however, cost US refiners approximately $25 million a year according to government estimates – a figure confirmed by industry sources. This is on top of the investment bill refiners will have to foot to meet RFG requirements, estimated at $10-30 billion.

It is far from certain, however, that ethanol-based oxygenates are more environmentally benign than their wood alcohol-based counterparts. In fact, the opposite may be the case. EPA officials claim that the use of ethanol-based oxygenates will result in a 15 percent reduction in organic compounds and toxic pollutants. Mary Nichols, an Assistant EPA Administrator, has acknowledged, however, that ethanol use probably will not reduce greenhouse gas emissions in the short term because the production of corn requires substantial amounts of energy, some of which results in greenhouse gas releases. And the Sierra Club, a noteworthy environmental organisation, has characterised the ethanol decision as 'a bad one which emphasised politics over policy'.

But the 'renewables' requirement is a windfall for US Midwestern farm interests, particularly the agribusiness giant Archer Daniels Midland, a lavish donor to both US political parties. This company is responsible for more than 75 percent of the ethanol produced in the United States. According to administration calculations, the requirement will boost demand for US corn by 250 million bushels a year and bring at least $250 million in additional annual income to farmers.

Venezuela – special case

With respect to EPA's suggested change to the Clean Air Act concerning gasoline imports, the US National Petroleum Council has estimated that allowing foreign refiners to import lower quality gasoline will put domestic refiners at a cost disadvantage ranging from 7 to 13 cents a gallon. The administration has weighed this cost to refiners, and consumers, against those of a trade dispute, which Venezuela, a major US trading partner, has threatened. It has also considered the environmental fall-out and decided for Venezuela and against the domestic petroleum industry and environmental interests. If allowed to stand, the move risks opening the way to imports of 'dirty' gasoline from other countries.

The Venezuelan import issue goes back to 1992; during the reformulated gasoline rulemaking process, Petroleos de Venezuela asked the EPA to allow it to establish its own 1990 refinery baseline for reformulated gasoline rather than adhere to the US industry average. (Baselines are the starting-points from which improvements must be made to meet reformulated gasoline requirements under the Clean Air Act.)

Venezuelan gasoline in 1990 did not yet yield environmental benefits equal to the average gasoline produced in the United States because of its high olefin and sulphur content. When the EPA published the reformulated gasoline rule in late 1993, it refused the Venezuelan request citing concerns about enforcing foreign baseline and the impact such baseline would have on the environment. It would, in any case, be difficult for the EPA to enforce a foreign baseline since it has no jurisdiction outside the United States.

After the reformulated gasoline rule was issued last year the Venezuelan government threatened to challenge the ruling before a resolution panel of the General Agreements of Tariffs and Trade (GATT), which stipulates that regulations 'should not apply to imported or domestic products so as to afford protection to domestic production'. The White House and State Department became alarmed. They convened a secret meeting of State Department officials, the EPA and White House officials last March. As a result, the EPA withdrew the rule and Venezuela dropped its threat to sue.

Citgo, a subsidiary of Petroleos de Venezuela, will now be allowed to import approximately one billion gallons of 'dirty' gasoline between 1995 and 2000. It is currently available at 6,200 Citgo stations as well as hundreds of independent outlets. The limit of 69,000 barrels a day is based on 1990 levels – a record year for Venezuelan exports to the United States. Venezuela's five refineries will be allowed to set their own baseline.

The agreement will clearly have an adverse impact on the environment while eroding the competitiveness of domestic refiners who would continue bearing the costs of meeting more restrictive standards. According to the API the average olefin and sulphur content of the Venezuelan reformulated gasoline will be two to three times higher than permitted under the existing rules.

EPA's model predicts that the higher olefin level will lead to a 22 to 24 percent increase in NOx emissions per gallon over what would have occurred under the existing rule. Virtually all Venezuelan gasoline goes to metropolitan areas of the US Northeast, many of which already have serious air quality problems and are either required to participate in the RFG programme or have opted into it.

If the proposed change is approved, Venezuela could increase the amount of high-olefin gasoline brought into the United States by 60 percent over last year. The EPA has set a precedent that could open the door for other foreign oil companies to demand the right to apply their own, often unverifiable, baselines for the reformulated gasoline they export to the United States. The agency concludes in the preamble to the final reformulated gasoline rule 'Foreign refiners would collectively exceed the US average gasoline parameters resulting in dirtier US air'.

Reformulating the rules

There is, however, strong opposition to the proposed rule change in Congress. Fifteen senators in a bipartisan letter told President Clinton that 'This decision is wrong as a substantive matter and will have a detrimental impact on air quality in the United States'.

It is unlikely, though, that the administration will change its mind. Its position with respect to Venezuelan imports is consistent with the prevailing orientation toward international trade generally. A number of US jobs depend on trade with the Latin American petroleum giant, which would be adversely impacted by a trade dispute. Venezuela is the second-largest US trading partner in South America, a relationship worth about $4.4 billion to the United States per year. Under GATT provisions, Venezuela could have retaliated to recoup an estimated $100 million in lost gasoline sales by reducing imports of auto parts and crops from the United States. And the administration has the support of some consumer groups who fear that the tougher baseline would cause a spike in gasoline prices along the East Coast.

With respect to the ethanol decision, administration policy is consistent with President Clinton's long-standing position as a member of the Governors' Ethanol Coalition which strongly favoured a mandated level of grain alcohol in national fuel programmes. The realpolitik of corn comes into play in its stance; the administration needs the support of the Midwestern agricultural swing states if it is to be re-elected in 1996.

But the oil industry means business; it may well take strong action to attempt to force a reversal of these EPA rulings. If it cannot get Congress to act, the industry could do so in the courts. Representatives could formally contest the EPA decisions under provisions of the Clean Air Act and/or the Administrative Procedures Act. Preliminary moves are afoot to do just this.

The oil industry was able to defeat a BTU tax earlier in the Clinton presidency and thus forced the administration to adopt other approaches to balancing the US federal government's books. Now, compelled to modify drastically its ambitious legislative agenda, with its standing in the polls eroding, the administration can ill afford to suffer another defeat at the hands of a major industry. But in choosing to pursue the policies the way it has, with respect to gasoline and air pollution, the Clinton administration might have set itself up for just such a humiliation.

The effects of microbial contamination on middle distillate fuels

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

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

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

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

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

Effects of microbes on filterability of automotive gasoil

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

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

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

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

Calibration of this apparatus was achieved with a series of fuels of known filterability, none of which included microbial contamination, but which spanned the range between fuels of excellent filterability to those which are known to cause problems in the market. The basis of the work reported here is therefore to assess how microbially-contaminated fuels compared with fuels of known filterability in this rig. A filamentous fungus, its spores, a yeast and a bacterium were introduced individually at a range of levels to a fuel of good filterability. The effects of these additions on filterability are shown in Figure 1. In this table 'good filterability' is defined as the performance of a clean summer DERV, whereas 'poor filterability' was obtained

when this fuel was mixed with 30 percent of a high acid blending component; a combination known to cause premature filter blockage in vehicle tests. The discriminating power of the rig is good in that there is a factor of eight difference in the volume of fuel required to reach a defined pressure drop in the two cases. The hatched bars represent the scatter obtained from replicate runs. It is noteworthy that the greatest scatter was observed with the fungal hyphae which can be expected to have the greatest variation in particle sizes. The numbers of cells that are required to block filters is related to size. Thus more bacteria are needed than fungi and yeasts which are much larger.

On a dry weight basis (ie biomass), however, the amounts of bacteria, yeasts and fungal spores that resulted in poor filterability were comparable (0.1 - 0.7 mg per litre). Fungal hyphae gave a higher value (10 - 20 mg per litre) to give equivalent blocking. This possibly reflects the likelihood that filtration of fungal hyphae results in a pad of hyphae collecting at the filter surface, whereas the other more unicellular organisms are more likely to penetrate the filter pores more effectively. The most important finding was that relatively large numbers of organisms needed to be introduced into the fuel, in the order of 103 - 104 per ml or greater, before poor filterability resulted. These values are considerably higher than those that have been suggested by others in the industry to be adopted as quality standards (Institute of Petroleum workshop, 'Current Problems of Microbial Spoilage of Bulk Distillate Fuels', held in November 1992).

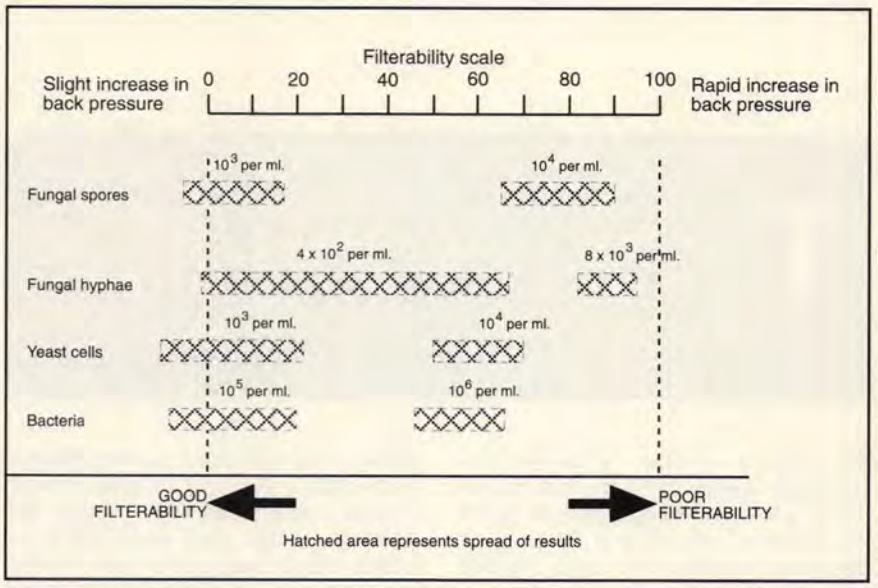
One Shell company has adopted criteria for microbes and fuel quality which are of the same order as the results described here. Several years experience has demonstrated a reasonable correlation between reported and proven problems and these values.

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

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

Detection of microbes in fuels

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



Need for speed

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

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

Conclusions

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

Saudi storage – betweeen a rock and a hard place

By John Roberts

There are few projects whose first public acknowledgement consists of an official statement that the project is in fact dead. But then, nothing to do with Saudi Arabia's rock storage saga is ever quite as it seems.

The Saudi authorities originally conceived of a project to store vast quantities of oil as a strategic reserve, from which they could pump in the event of disruption to either their own oilfields or those of their neighbours. That was in the years following the Iranian Revolution and the feared cut off of oil exports through the Strait of Hormuz. Since then, much has changed. The East-West pipeline from the Eastern Province oilfields to Yanbu has proved its worth within the Kingdom, whilst a host of other pipelines were built to connect Iraq to Western markets, bypassing the strait.

During the pipeline building era of the 1980s the Kingdom studied rock storage in depth. Engineering consultants and companies from France, Canada and the Nordic countries all contributed to studies and assessments intended to determine the practicality of storing up to 1.5 billion barrels of crude oil. Sources in Sweden, Finland and Norway told this writer in 1983 that the Saudis were considering a set of storage facilities that might hold as much as one billion barrels – the equivalent of several months exports – and that the cost would probably total between $4-5 billion. In the end, the programme is considerably less grandiose in terms of volume but the cost to the Saudi treasury appears just as large.

Although personnel involved in various studies provided details of the Kingdom's continuing interest in the project, for more than six years after the first reports of Saudi interest in rock storage appeared in 1981, neither the Saudi government nor any of the companies which had carried out preliminary work on the project was prepared to acknowledge publicly their role in the project. It was only in 1987 that Swedish Finance Minister Kjell Olof Feldt publicly stated that the project was indeed in existence, when he announced that actual construction of the caverns by two leading Swedish contractors, was being put 'on ice'. Later that year a decision was taken to proceed with the project but few details were published. Estimates of the project were put at around $3.9 billion and agreements were reached on payment in oil. What was not clear was just what it was that the Saudis intended to construct.

'Now that work is actually in progress, the Saudis are no longer quite so secretive about it'

Construction begins

The expertise found in the Nordic countries concerns storage of both crude oil and product in giant underground caverns carved out of the rock. Norway, Sweden and Finland possess between them more than 30 million cubic metres of underground fuel storage facilities. It was therefore natural for Saudi Arabia to look to these countries for expertise, particularly since rock formations near Yanbu were considered similar to those in the Nordic countries. Actual construction work on the Saudi caverns appears to have begun in about 1988/89. But again, little public information was given on the subject.

Then came the Kuwait crisis. The Saudi authorities were anxious, during the run-up to Desert Storm, to show that they, too, were playing their part in providing the Allied forces with the fuel necessary to wage a comprehensive war with Iraq. In January, just 48 hours before the Allies began their aerial bombardment of Iraq, a US scientist involved in the Saudi project was authorised to disclose some basic details.

The project was described by Leo Stavincha, of the South West Research Institute in San Antonio, Texas as a strategic petroleum reserve. This reserve, he said, was considered 'very necessary to the security of Saudi Arabia' and unlike the US Strategic Petroleum Reserve, was geared to the storage of product. 'You can talk about strategic storage now,' this writer was told by one informant. 'The Saudis are now more mature about the idea.' The new idea, the source said, 'is for storing product fuel – not crude oil. We don't need to store crude oil. But we saw how vulnerable the refineries are.'

During the crisis, the goal was to store key product required for the war effort, notably Jet A-1, the standard aircraft fuel, JP-4, the jet fuel most used by US warplanes and tanks in the

Kuwait crisis; diesel No. 2 and high octane gasoline.

The source specified that the work was indeed being carried out by Skanska Cementgjuteriet, one of the two companies named in 1987 as being involved in negotiations with the Saudi authorities to construct the storage caverns, the other being Armerad Betong Vagforbattringer. The two companies joined forces for the project, creating a company known as the ABV Rock Group. But what was not known until several years later was that Saudi interests had apparently purchased a considerable stake, believed to be a majority stake, in the ABV Rock Group, via two Bermuda-registered companies, Ross Contracting and Trading and Eastbrook Ltd. Consultancy services were undertaken by Jacobsen and Widmark, a company which had earlier told this writer that it had indeed a role in the project but which had referred all questions concerning that role to Scandinavia's pre-eminent expert on the subject, Karl-Olaf Morfeldt.

Storage locations

By 1993, work was known to be proceeding at five locations, while a sixth had been identified as a further site. These were: Al-Kharj, south of Riyadh; Bahrah, near Jeddah; Medina, in the Hijaz and Khamis Mushait near the border with Yemen. Site surveys were reported to have been completed at Qassim in Central Arabia and at Hafr al-Batin, near the Iraqi border.

For some time, it had been clear that this was primarily a military project, although sources said that fuel storage would cover civilian as well as military needs. Petroleum Argus reported in 1993 that the project was by then costed at no less than $10 billion and that the envisaged storage capacity was 30 million barrels. This year, Petroleum Argus reported that excavation at Al-Kharj was completed last year and that facilities for actually storing the product were currently being built. The facility should be completed in 1996. Excavation at Bahrah was reported to be well under way and that project should be ready in 1998. Work at Medina, Khamis Mushait and Qassim was reported to be still at a preliminary stage.

There are some indications that the project is being taken at a slow but steady pace. Originally, it was envisaged that the Saudis would allocate either 300,000 b/d or 350,000 b/d of oil to payment for the project, with completion envisaged in around three years. Yet actual physical construction has now been continuing for about five years and the timetable for completing Al-Kharj and Bahrah would seem to indicate that construction of all six facilities will not be completed until early next century.

Allocations to the project also appear lower than initially expected. Current reports speak of the Saudis assigning 200,000 b/d to the project. The choice of sites illustrates the project's military importance. Al-Kharj is one of the Kingdom's major air bases. Khamis Mushait and Hafr al-Batin are the sites of the two military bases guarding Yemeni and Iraqi frontiers respectively. The other three sites are on, or close to the existing pipeline network.

Now that work is actually in progress, the Saudis are no longer quite so secretive about it. And, whenever the work is finally completed, it should mean that if ever Saudi Arabia and its friends have to mount a latter-day version of Desert Storm, then the refuelling facilities will be there, even in the event of a direct assault on the Kingdom. And, in a civilian context, it should also mean that Saudi Arabia will be able to regulate both its internal and external product markets more effectively – though construction of such facilities is, admittedly, an extraordinarily unusual and expensive way of approaching the subject of commercial market stabilisation.

Who will fill South Africa's spare tanks?

By Susannah Cardy

Can Africa's newest democracy shed its siege mentality and seize the opportunity to develop into a new international centre for storage?

On 15 December 1993, less than one week after the United Nations lifted its oil embargo against South Africa, Energy Minister George Bartlett revealed one of his country's best kept secrets. South Africa, he said, has the capacity to store a massive 180 million barrels of oil, enough to keep the country supplied with oil for two years.

Despite previous extravagant claims by the government over the size of its reserves, the announcement came as a surprise to many. Most 'guesstimates' had put the level at around 60 million barrels.

Nine months later and vast sections of South Africa's storage facilities have been rendered superfluous. To date, stocks have dropped to 70 million barrels of oil – equivalent to eight months' supply. The Strategic Fuel Fund (SFF), a government-run agency responsible for procuring 80 percent of South Africa's crude oil during the sanction years, is now faced with the tantalising prospect of transforming a once-vital national asset into an international commercial facility. But old habits die hard and some believe that nothing short of a takeover will be enough to inject true commercialism into the bulk storage industry.

Nevertheless, the SFF is already moving in the right direction, with plans to lease out storage facilities to interested parties from the Middle East. 'At present, we are busy negotiating both with oil producing countries and traders,' SFF general manager Kobus van Zyl told *Petroleum Review*.

Half empty tanks

Its success depends partly upon how much the new government continues to subscribe to strategic stock. It remains to be seen whether South Africa can completely shed its traditional siege mentality but oil levels have already been slashed and tanks are now less than half full. Many believe, however, that the government should go further.

The International Energy Agency, for example, recommended recently that South Africa adopt a 90 day supply policy. Others believe even this is unnecessarily high. 'There is potential to reduce the stockpile quite considerably,' said Mr Angus Quail, General Manager of Corporate Planning for Engen. 'Bearing in mind South Africa's sources of indigenous synthetic fuels, three months' of market demand for crude would be quite adequate.'

'The need to circumvent UN sanctions has resulted in the development of a government-run cloak and dagger operation'

A decision has yet to be made on exact levels but the SFF is hopeful that strategic stocks could eventually drop to under 30 million barrels.

The government stockpile, however, is just one of many hurdles to be cleared in the run-up to a successful international storage service. South Africa's petroleum industry is on the eve of a major deregulation drive and many believe this is an essential prerequisite. In particular, they regard the SFF as a serious barrier to development.

Takeover

Island View Storage, the largest independent terminal operator in South Africa (although not as yet involved in petroleum products) is one company tipped to attempt a takeover. 'The need in the past to circumvent UN sanctions has resulted in the development of a government-run cloak and dagger operation, shrouded in secrecy and with subsidies for certain companies,' said Managing Director Rodger Graham. 'We now have the opportunity for the storage industry to be run in a normal, commercial way.'

He believes the redundant capacity could be of service, not just to the producing countries but as a redistribution facility for the whole of the southern tip of Africa. He also points to the fact that the South African oil companies are significantly increasing their refining capacity.

Island View's positive outlook contrasts with that of the SFF, which is distinctly cautious about claims that South Africa is about to transform into a major storage centre. 'That is not our intention,' said Mr Van Zyl. 'We don't foresee an investment programme to build up our tanks unless it turns out to be very profitable.'

Whoever eventually takes control of the spare capacity, will not want all of it. The storage is divided between three terminals: two coastal and one inland. The Ogies facility in the Transvaal may be the largest, with a capacity of 117 million barrels of crude oil, but it is unsuitable for commercial purposes. An inland site connected to Durban by pipeline, it consists of a series of underground concrete tanks built into an old coal mine and, according to industry sources, is in need of refurbishment. The terminals of interest are the two coastal facilities, the largest of which is on the west coast at Saldanha Bay. This has a capacity of 45 million barrels and is currently half empty. The other coastal terminal, which can accommodate 12.6 million barrels almost all of which could be leased out, is situated in Cape Town.

Perhaps not quite a second Rotterdam then, but there is clearly a major opportunity here. Despite the multitude of issues clamouring for the new government's attention at this time, it seems unlikely that these tanks will be left idle for long.

BULK STORAGE '94

TRENDS IN BULK STORAGE

Once more *Petroleum Review* produces its annual survey of independent bulk storage in Western Europe. We thank all those companies which replied to our request for information and hope that those who chose to ignore us this time will reconsider next year.

European storage represents a substantial proportion of the world total. However, the recession has taken its toll, companies have merged and overcapacity has led to divestment, as shown by a comparison of this year's survey with last year's figures. Despite these changes, operators believe that Western Europe will retain its trading and refining supremacy for years to come, even though new constraints, such as environmental legislation, are obviously on the way; it is already being introduced in the United States (see page 352). Trends in the European storage heartland – Antwerp, Rotterdam and Amsterdam – are analysed in this issue of *Petroleum Review* (see page 350).

However, the position is anything but static both in Europe and elsewhere. New storage, for instance, is being opened at Tallinn, Estonia by Paktank, while most companies are looking at Singapore and other possible sites in the Far East. In this issue of *Petroleum Review*, we consider the likely fate of the storage overcapacity in South Africa now that sanctions have ended (see page 360) as well as new storage facilities being built by Middle East oil producer Saudi Arabia, perhaps as a strategic reserve (see page 358).

Petroleum bulk storage owned by independent companies in Western Europe

COUNTRY	CAPACITY (CUBIC METRES) 1994	% OF TOTAL
Belgium	1,556,000	4.6
Denmark	354,000	1.0
Eire	34,500	0.1
France	6,886,000	20.5
Germany	6,005,000	17.9
Italy	480,000	1.4
Malta	174,000	0.5
Netherlands	12,849,000	38.2
Portugal	87,000	0.3
Spain	197,000	0.6
Sweden	1,173,000	3.5
Switzerland	346,000	1.0
United Kingdom	3,450,000	10.3
Total	**33,591,500**	**100.00**

BULK STORAGE '94

Barrow Storage Co. LTD

Head Office: 15 Fitzwilliam Square, Dublin 2, Eire.
Tel: **(010) 3531 6763524.** *Fax:* **(010) 3531 6614704.**
Three installations: One at Marshmeadows, New Ross, Co. Wexford, Eire. Storage for 16,000 cubic metres of petroleum products, including LPG. The berth on the River Barrow provides for vessels up to eight metres draught. Tankage includes 4,500 cubic metres tank which is heated and insulated. One at Dundalk with 2,500 tons of gasoil and kerosene. A sea fed chemical storage plant in Tivoli, Cork with 2,000 tons of caustic liquor soda and plans for further chemical, oil and LPG extensions.

Bominflot Tanklager GMBH

Tankweg 1, 21129 Hamburg.
Tel: **(49) 40 740007 0.** *Fax:* **(49) 40 740007 32.** *Telex:* **217671.**
Seventy-six tanks with a gauging volume of 242,000 cubic metres available for storage of mineral oils, chemicals, alcohols, vegetable oils, greases, paraffins, waxes and fertilizers. The A1 tank space is equipped with a Vapour Recovery Unit, security devices to prevent overfilling and is provided with double bottoms. The A111 tank space is equipped with heating coils, security devices to protect from overfilling, partly with double bottoms and in most cases it is insulated. The size of the tanks is between 50 and 25,000 cubic metres.

There are six berths with maximum tonnage at 80,000 dwt, maximum length is 260 metres and maximum draught is 9 metres. There is a discharging and charging station. For tank vehicles there are six platforms with volume metres, scales and four other discharging/charging stations.

BTP Storage LTD

Hayes Road, Cadishead, Manchester M30 5BX, UK.
Tel: **(061) 775 3945.** *Telex:* **669938.** *Fax:* **(061) 775 3970.**
Part of the BTP plc group of companies. The installation occupies a 20 acre site on the north bank of the Manchester Ship Canal. Total tank capacity of over 100,000 cubic metres with a range of tanks up to 6,000 cubic metres capable of handing most types of petroleum and chemical products. Blending, packaging, drumming and weighbridge facilities available. Rail sidings for up to 1,000 tonnes. Berth: maximum draught 24.5ft approximately 6,000 tonnes. Easy access to the M6 and M62 motorways.

Chemical Manufacture & Refining LTD

Sunderland Tank Storage Division, Hendon Dock, Sunderland, Tyne & Wear, SR1 2ES, UK.
Tel: **(091) 565 4018.** *Fax:* **(091) 565 3648.**
The terminal can receive ships of up to 6,000 tons dwt capacity and has mild steel and stainless steel import lines. 36,000 cubic metres of storage are contained in twenty tanks. Products stored include petroleum refinery products, petrochemicals and chemical solvent by-products. Nearby associated company has large distillation units for processing of specification and contaminated cargoes. Drumming off facilities, drum storage and bonded facilities also available.

Compagnie Industrielle Maritime (CIM)

36, rue de Liege, 75008 Paris.
Tel: **Paris (1) 43 87 33 49.** *Telex:* **280330 CIMDGPA.** *Fax:* **Paris (1) 43 87 43 08.**
Contacts: Mr B. Salaün (Sales Manager) Direct Line: Paris (1) 43 87 43 14. Fax: Paris (1) 42 94 02 81.
Mr C. N. Malcolm (CIM Repre-sentative), Tel: (071) 491 3911.
CIM is an independent French company which owns and operates a modern and highly sophisticated storage, transhipment and break-bulk facility capable of handling crude oils, distillates and all clean petroleum products. The complex, which is situated in France at Le Havre and Antifer, has a total capacity of some 5.2 million cubic metres. At Antifer, only crude oil tonnage in excess of 250,000 tons dwt is handled with the port being able to handle the world's largest tankers. At Le Havre, the smaller crude oil carriers (under 250,000 tons dwt), light distillates and all other clean petroleum products are handled.

There is a pipeline link allowing cargo to be transferred from Antifer to Le Havre (where it can be back-loaded after storage if required). All cargoes stored and handled are in a Customs Bond Warehouse and CIM prides itself on maintaining their clients' confidentiality.

CIM now owns all equipment at the Antifer Terminal, which consists of four tanks of 150,000 cubic metres each, and two of 22,500 cubic metres each with an overall capacity of 645,000 cubic metres. Access is by sea. Sea berths with draughts of 98ft and 82ft respectively. Facilities for discharging ULCC-type vessels up to 550,000 MT and for transhipments.

Comos Tank BV

Octaanweg 14, 1041 AN Amsterdam, Netherlands.
Tel: **(20) 587 2121.** *Telex:* **13121.** *Fax:* **(20) 587 2150.**
A subsidiary of VTG Vereinigte Tanklager und Transportmittel GmbH. Operates a terminal with an overall capacity of 700,000 cubic metres for storing all petroleum products and bulk chemicals. Tanks range from 3,500 to 40,000 cubic metres, some coated or insulated and equipped with heating-coils. Blending facilities for gasoline, heavy fuel oil and gas oil and facilities for leading, product washing and butanising are available. Three jetties for seagoing vessels and eight jetties for barges. Distillation towers for processing are available to ensure efficient storage and transfer.

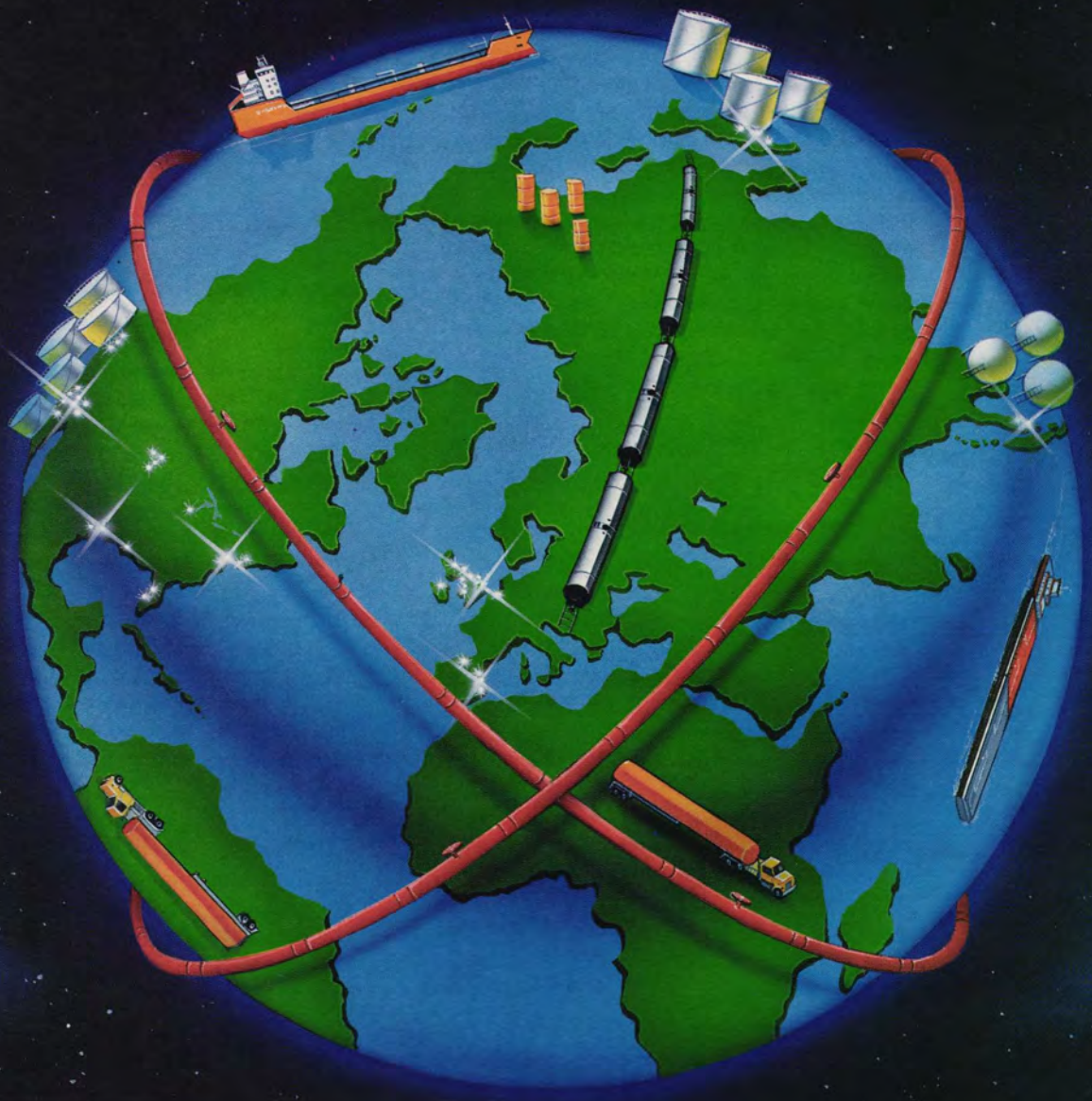
Decal SPA

Port Marghera (Venice), Italy.
Terminal Manager: Ing. De Belli *Malcontenta Fusina, Venice, Italy.*
Tel: **(39) 41 547 107.** *Fax:* **(39) 41 698 175.** *Telex:* **410556 decal i, 3122.**
Seventy seven tanks with a total capacity of 250,000 cubic metres for chemicals and petroleum products. Chemical storage 150-6,000 cubic metres each. Petroleum product 2,000-15,000 cubic metres each. Services include: Vessel loading/unloading, barge loading/unloading, product heating, product cooling and product blending.

Depots Petroliers de Fos SA

Z.1 Secteur 81-Audience 818, 13270 Fos-sur-mer, France.
Tel: **(33) 42 47 65 00.** *Telex:* **430235.** *Fax:* **(33) 42 05 11 54.**
DPF, a company in which Van Ommeren Tank Terminals

GATX Terminals



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Combine that with our decades of experience and you'll discover why GATX is the world's leading independent bulk liquid storage and distribution company. GATX Terminals give you more than just convenience.

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All UK Terminals Comply with Quality Assurance Standards BS5750 Part 2, E. N. 29002 and ISO 9002

ILTA

has a share, has one installation in France, at Fos-sur-Mer. The terminal has 780,000 cubic metres in 40 tanks. 100,000 cubic metres dedicated to dirty products in tank ranging from 5,000 to 10,000 cubic metres. Most of them are insulated and equipped with propellers. Tank connections enable any kind of blending. 680,000 cubic metres dedicated to clean products, mostly gas oil, gasoline, jet fuel and MTBE. Facilities offered by DPF make it the most interesting terminal in West-Med to achieve any kind of blending from lead, butane or MTBE injections in the gasolines range to changing cold properties, sulphur content, flash point in the middle distillates range. Seagoing vessels (3 berths up to 71 feet), coasters (1 berth up to 21 feet) and barges (1 berth up to 10 feet) can be handled in all products. Pipeline connections enable cargo to be transferred from any local refinery to DPF and from there to the Rhône valley and to Switzerland. DPF is handling about 250 trucks and one block-train per day.

DS-Mineralöl GMBH

Cuxhavener Str. 42/44, PO Box 106149, D-28061 Bremen.
Tel: **(49) 421 396 99-0.** *Fax:* **(49) 421 396 99-79.** *Telex:* **(41) 246 448 dsd.**

DS-Mineralöl GMBH, part of the DIERSCH & SCHRÖDER group of companies, operates storage installations in Bremen and Nordenham at the river Weser with a total capacity of 180,000 cubic metres. These modern facilities offer every possibility for a comprehensive distribution system for mineral oil products, mainly middle-distillates and molasses. In addition DS-Mineralöl GMBH operates 50,000 cubic metres storage capacity for middle-distillates in Greifswald and Wismar on the Baltic Sea.

Dupeg

Terminal: Tankweg 4, D-21129 Hamburg, Germany.
Tel: **(+49 40) 740 440.** *Telex:* **0217656.** *Fax:* **(+49 40) 740 1703.**

Dupeg Tank-Terminal in the Port of Hamburg specialises in handling liquid cargoes. The handling facilities at Waltershof Petroleumhafen are some of the most modern in Europe.

On average, some 150 different liquid cargoes are stored each year in more than 100 tanks which can take virtually any kind of cargo, eg petrochemicals, chemicals, turpentine products, industrial alcohol, alcoholic beverages, acids, alkalis, vegetable and animal oils and fats.

One third of the total tank capacity of 102,000 cubic metres is fitted out with special linings and the qualitative treatment of products, eg mixing, filtering, clarifying or standardising, is part of the service Dupeg Tank-Terminal offers.

Individual tanks of 20 to 10,000 cubic metres, including 26 stainless-steel tanks totalling 17,500 cubic metres. By the end of 1994, on completion of the second stage, another 10 tanks with a capacity of about 13,200 cubic metres will have been added to a total of 36 stainless-steel tanks with 30,700 cubic metres.

Dupeg's operational management system is designed to comply with the DIN ISO 9002 quality control standards. In accordance with the terms of the International Marine Pollution Convention MARPOL, Dupeg Tank-Terminal serves as the recipient for chemical slops from ships calling in at the Port of Hamburg.

Transport links include: two pontoon bridges for ocean-going ships of up to 35,000 GRT (depth of water: 10 metres). Container ramps and lighter berths for handling barelled cargoes. Own sidings complete with tank wagon filling station. Linked to European motorway system via neighbouring A7 Autobahn.

Eurogas Terminals BV

Head Office/Terminal: PO Box 410 4380 AK Vlissingen, The Netherlands.
Tel: **(0) 1196 12820.** *Telex:* **55684.** *Fax:* **(0) 1196 13444.**

The terminal has 130,000 cubic metres capacity for storage of LPG and chemical gases, six spheres of 3,369 cubic metres each, and two refrigerated tanks of 55,500 cubic metres each. There are three jetties for sea-going vessels and barges (draught up to 52ft). Board/board operations for a wide range of gases for vessels/barges are possible.

Furthermore, there are facilities for the purging of vessels/barges/trucks/trains with nitrogen including flaring off. There is an open connection to the sea via the Westerschelde and there are good connections to the interland by rail, road and water.

A 10 inch piggable pipeline can easily be connected to the existing ethylene and/or propylene grid system in the ARA-area and beyond.

Practical and theoretical training for third parties in the LPG industry and the consultancy for design/operations/start-up for LPG storage plants are continued in 1994.

Felixstowe Tankstore

FTD House, The Dock, Felixstowe, Suffolk, IP11 8RY UK.
Tel: **(0394) 676112.** *Telex:* **98341.** *Fax:* **(0394) 673590.**

One hundred and eighty tanks, mild and stainless steel, totalling 105,000 cubic metres storage capacity equipped to handle a comprehensive range of liquid, edible, chemical and petroleum products. Alcohol, hydro-carbon and IDA bonds available.

FETSA

Federation of European Tank Storage Associations, *Av. E. van Nieuwenhuyse 4, Bte 8, B-1160 Brussels.*
Postal Address: *c/o VOTOB PO Box 443 2260 AK Leidschendam, N1. Tel:* **3170 337 8750.** *Fax:* **3170 320 3903.**

FETSA embraces national associations of independent tank storage operators in seven EU member states, representing a total of 70 companies – with affiliates – owning 168 terminals with a total volume of about 36 million cubic metres of storage capacity.

FETSA is active in the interface with international government institutions and other federations with relevant adjacent interests.

Fox Petroli SPA

Via Senigallia N. 29, 61100 Pesaro, Italy.
Tel: **(39) 721 403465.** *Fax:* **(39) 721 403505.**

Total storage capacity of about 130,000 cubic metres of oil products (clean and dirty). Terminal in Pesaro Harbour for loading and discharging vessels. Services available: Tank-Truck loading/unloading, heated and insulated tanks and pipes, tanks equipped with recirculating systems, petroleum products dyeing, blending of oils and fuels, heat supply, tank-truck weighing, bunkering of barges with tank-trucks and custom services.

Gamatex N.V.

Head Office: Haven 623, Scheldelaan 450, B-2040 Antwerpen, Belgium.
Tel: **(3) 5684511.** *Telex:* **32459.** *Fax:* **(3) 5684595.**
Gamatex is a 50/50 joint venture between GATX Terminals Corporation and Van Ommeren Tank Terminals and has one installation in Belgium.

Antwerp: The terminal offers 143 tanks with a total capacity of 486,100 cubic metres for mineral oils, petrochemical liquids and chemical gases. There are five jetties for seagoing vessels (draught 45ft) and five for barges. Access is by sea, rail and road and pipeline. Tankage is insulated, coiled, coated and stainless steel with steam, warm-water and oil heating. Tanks for chemical products are equipped with dedicated pipelines and pump and most of them with vapour return. Pre-pump, blending, drum filling and nitrogen blanketing are also available .

GATX Terminals LTD.

Nicholson House, High Street, Maidenhead, Berks SL6 1LQ, UK.
Tel: **(0628) 771242.** *Telex:* **847862.** *Fax:* **(0628) 771678.**
A wholly owned subsidiary of GATX Terminals Corporation of Chicago, USA. GATX Terminals Limited operates eight terminals in the UK. Subsidiary: Manchester Jetline Limited. Associates: Tees Storage Company Limited; Unipen Limited; Wymondham Oil Storage Company Limited. GATX is BS 5750 part 2/ISO 9002 accredited.

Avonmouth, Bristol: Fifty-three tanks with a total capacity of 135,232 cubic metres, from 311 to 6,924 cubic metres in size, for high and low flash petroleum products, chemicals and oils and fats. Dock facilities comprise of seven berths at the Royal Edward Dock (depth 9.8m, maximum length 210m, maximum beam 29m), five piggable docklines (three 10 inch lines, one 24 inch line and one 8 inch stainless steel line). Distribution is through fully automated top and bottom road loading facilities. Wensat pipeline connection. Easy access to M4 and M5 motorways.

Belfast: Thirty eight tanks with a total capacity of 50,116 cubic metres from 498 metres to 5,000 cubic metres in size for high and low flash petroleum products, chemicals. A new jetty capable of handling vessels with 18,000 tonne cargoes is now operational (overall length 150m, maximum beam 29m and depth 9.5m). There are two 8 inch stainless steel and one 6 inch mild dockline. All docklines are piggable. Distribution through fully automated top and bottom loading facilities. Easy access to M1 and M2.

Bromsgrove, Worcestershire: Nineteen tanks with a total capacity of 15,781 cubic metres in tanks ranging from 53 to 1,350 cubic metres for high flash petroleum products. This is a rail-fed terminal capable of handling 1,400 tonne block trains. Distribution through self service road loading facilities. East access to M40, M42, M5 and M6.

Eastham (Sites 1 and 2) Merseyside: Site 1: Seventy seven tanks with a total capacity of 267,136 cubic metres in tanks ranging from 35 to 10,800 cubic metres in size, suitable for high and low flash petroleum, lubricating oils and chemical products. Mild and stainless steel tankage, with and without coils and lagging. There are 7 piggable docklines (two 6 inch stainless steel lines, one 10 inch stainless steel line, one 10 inch mild steel line, two 12 inch and one 14 inch).

Site 2: Eighty five tanks with a total capacity of 91,912 cubic metres in tanks ranging from 30 to 3,950 cubic metres in size, suitable for high and low flash petroleum, lubricating oils and chemical products. Mild and stainless steel tankage, with and without coils and lagging. There are 12 shipping lines on site (7 mild steel and 5 stainless steel, ranging from 6 to 10 inch). There is also a semi-automatic drum filling facility.

Dock facilities consist of three berths in the QEII Dock (depth 10.1 m, length 204m, beam 27.4 m) and one berth bank of the Manchester Ship Canal for high flash prod-

GATX terminal at Bromsgrove

ucts. Both sites are capable of receiving and redelivering product by road. rail, barge and sea vessel. There is easy access to M53, M56, M6.

Grays, Essex: Fiftytwo tanks ranging in size from 1,700 to 20,800 cubic metres capacity and providing a total capacity of 310,749 for high and low flash petroleum products. There are two jetties (Wouldham Nos. 1 and 2, draft 11.3m, length 229m and unrestricted beam) with five piggable docklines (three 10 inch, one 12 inch and one 14 inch). Distribution through fully automated top and bottom road loading facilities. Easy access to M25.

Runcorn, Cheshire: Four tanks with a total capacity of 40,000 product tonnes for heated liquid sulphur. Dock facilities comprise one berth on the Manchester Ship Canal. Distribution is through road loading on two automatic weighbridges. Easy access to M53, M56 and M6.

Leith, Scotland: Thirty four tanks with a total capacity of 72,902 cubic metres in tankage ranging from 55 to 13,400 cubic metres capacity in size for both high and low flash petroleum products and chemical products. Dock facilities comprise one berth (max. length 198m, max. beam 30.5m, draft 9.5m). There are two new 10 inch mild steel petroleum docklines and two stainless steel docklines. Road loading is being upgraded to allow fully automated top and bottom loading facility. Access to M8, M9 and M90.

Glasgow, Scotland: Whilst this site currently has only 5000 cubic metres capacity for high flash petroleum products, further development to expand the terminal to 54,000 cubic metres capacity for high and low flash petroleum products is underway. This new fully automated terminal should be operational in early 1996.

Wymondham, Norfolk: Joint venture between Mobil Oil and GATX Terminals Limited. Eight tanks with a total capacity of 39,200 cubic metres ranging in size from 4,100 to 5,200 cubic metres. This terminal is pipeline fed and stores high and low flash petroleum products on a commingled basis. Distribution through fully automated road loading facilities. Easy access to A11.

Manchester Jetline Limited: Joint venture between GATX Terminals Limited and Penspen Engineering Consultants. The MJL pipeline system allows jet fuel to be transported to Manchester Airport. It started operating at the beginning of 1994. The system is such that most UK refineries could pump fuel to Manchester Airport if required.

Gebr Broere BV

PO BOX 150, 3300 AD Dordrecht, Netherlands. A division of Royal Pakhoed NV, Rotterdam.

Tel: **(78) 528528.** *Telex:* **29024/29393.** *Fax:* **(78) 179141.**

Operates two storage terminals in the Netherlands.

Dordrecht: 200,000 cubic metres capacity for chemical and petroleum products; tank sizes from 150 to 6,600 cubic metres. Tankage is mild steel, some insulated and coated; nitrogen blanketing facilities. Access by road, rail and sea via three deep-sea tanker jetties and four coastal tanker and barge jetties.

Rotterdam-Botlek: (operated by Tank Terminal Rotterdam BV, daughter company): 325,000 cubic metres capacity for the storage of chemical and petroleum products; tank sizes from 670 to 15,000 cubic metres. Tankage is mild steel, stainless steel, some insulated and coated; nitrogen blanketing facilities. Two deep-sea jetties for tankers up to 60,000 tonnes and two jetties for barges and coastal tankers up to 5,000 tons complement the road and rail access facilities.

General Tank Storage NV

Haven 275, Leon Bonnetweg 28, 2030 Antwerpen, Belgium.

Tel: **(3) 541 12 80.** *Telex:* **31643.** *Fax:* **(3) 541 31 63.**

General Tank Storage NV (G.T.S.) a member of the LB Chimie group, is a BSI 9002 qualified company situated in the Port of Antwerp 4th Dock.

G.T.S. specialises in storing liquid chemical and mineral and vegetable oils either in bulk or in drums and IBC's. Its total tank capacity is 185,000 cubic metres. On a 30 acre sire with 1,854 ft of waterfront, 6,560 ft of rail and direct access to the motorway system, all forms of transport are catered for.

Together with on-site customs and control bodies, our own forwarding department provides quick and efficient completion of all formalities. Substantial investment in recent years, including the construction of a new, ultra-modern tank farm has enabled G.T.S. to take up a position at the forefront of the tank storage firms. With regard to safety and environment too, G.T.S. has acquired a leading position in the Port of Antwerp. Its efficient water purification plant includes high-tech treatment of Marpol I&II waters as well as water from inland navigation and from industry.

The central position of G.T.S. permits problem free distribution throughout Europe by road, rail and water transport.

Haltermann GMBH

Head Office: Ferdinandstraße 55/57, 200 95 Hamburg, Germany.

Tel: **(40) 33318-0.** *Telex:* **2161815.** *Fax:* **(40) 33318-214.**

Operates four terminals in Europe.

Hamburg-Wilhemsburg: Total capacity of 120,000 cubic metres, with tanks varying in size from 50 to 5,000 cubic metres, for all vegetable oils, petroleum products, solvents and chemicals. Some tanks are heating-coiled and insulated. Drumming and blending facilities are available. Access for ships, barges, road and rail tank cars and liner trains; two berths including a 33ft draught jetty.

Haltermann NV (Belgium): Ketenislaan 3 B-2748 Beveren/Kallo Linker Oever.

Tel: **(3) 7500211.** *Telex:* **33705.** *Fax:* **(3) 7750261.**

All petroleum products, solvents, chemicals and vegetable oils can be stored in this 60,000 cubic metre capacity terminal. Tanks vary in size from 300 to 3,000 cubic metres. Some are stainless steel and coated with heating coils and insulation. Drumming and blending facilities are available, as is an associated custom processing plant. Access by road, rail and sea for vessels up to 28ft draught.

Haltermann A/S (Denmark): Søndre Molevej, DK-4600 Køge (near Copenhagen).

Tel: **(53) 653370.** *Telex:* **43565**. *Fax:* **(53) 657009.**

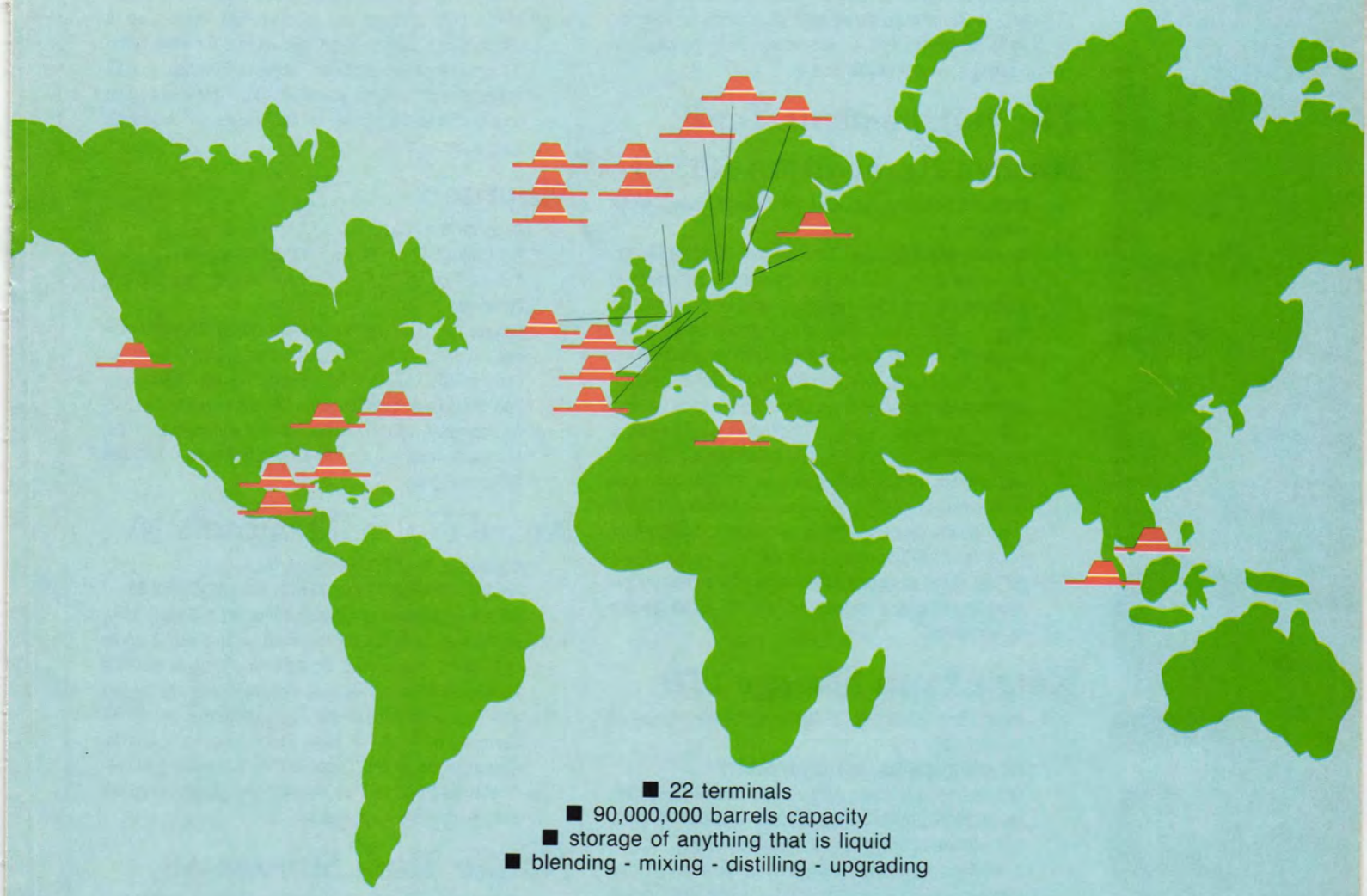
Tanks ranging in capacity from 20 to 4,000 cubic metres make up this 15,000 cubic metres capacity facility. All petroleum products, solvents and chemicals can be stored. Some tanks heating-coiled and insulated; drumming facilities. Distribution by road, rail and sea, with berths for 12,000 tons dwt tankers.

Haltermann A/B (Sweden): Petroleumgatan 5, S-21124 Malmö.

Tel: **(40) 181220.** *Telex:* **32544.** *Fax:* **(40) 938485.**

This 20,000 cubic metre capacity terminal has tanks ranging in size from 20 to 2,000 cubic metres for all petroleum products, solvents and chemicals. Some tanks are stainless steel, coated, heating-coiled and insulated. Distribution by road, rail and sea.

PAKTANK-tankstorage



■ 22 terminals
■ 90,000,000 barrels capacity
■ storage of anything that is liquid
■ blending - mixing - distilling - upgrading

PAKTANK-offices:

Paktank AB
Baldersgatan 4
S-411 Gothenburg
tel. (31) 803950
telex 20894
fax (31) 159000

Pakterminal Ltd.
Port of Muuga
Maardu TEE 57
EE0103 Tallinn
Estonia
tel. (372) 6-319733
fax (372) 5-249694

Paktank GmbH
Duisburgerstrasse 15-17
41460 Neuss/Rhein
tel. (2131) 91000
telex 8517726
fax (2131) 910099

VTG-Paktank Hamburg GmbH
Brandsende 2-4
2000 Hamburg 1
tel. (40) 322843
telex 2163506
fax (40) 322630

Paktank Méditerranée S.A.
B.P. 87, 2048 Ariana, Tunisia
tel. 216-1-885534-885679-885900
telex 14895
fax 216-1-885860
tel. Rotterdam (10) 4002130/
4002318

Paktank Corporation
Houston, Texas
77027
2000 West Loop
South, Suite 2200
tel. (713) 623-0000
telex 775149
fax (713) 6234480

Paktank Nederland B.V.
Blaak 333
3011 GB Rotterdam
P.O. Box 102,
3000 AC Rotterdam
tel. (10) 4002911 - telex 22163
fax: Crude and product storage
(10) 2130060
Chemical storage (10) 2130061

Thai Tank Terminal Ltd.
14th Floor, Sino-Thai Tower
32/37 Asoke Road,
Sukhumvit 21
Bangkok, 10110, Thailand
tel. 226012612
telex 21393 Napetro th
fax 22601263

Tankstore Pte. Ltd.
Six Battery Road 15-08
Singapore 0104
tel. (65) 2258600
telex rs 55343 pt sing
fax (65) 2251497

Paktank Asia Pacific Ltd.
Room 1901
Jubilee Commercial Bldg
Gloucester Road 42-46
Wanchai
Hong Kong
tel. (852) 5276408
Fax (852) 5276842
Telex 80698 FURN HX

PAKTANK

A LOT MORE THAN JUST STORING YOUR PRODUCTS

IBL Bulk Liquids

110 Lime Street, Hull HU8 7AS, UK.
Tel: **(0482) 20736/7.** *Fax:* **(0482) 226162.**
132 Storage tanks ranging from 50 to 830 cubic metres with a total capacity of 25,000 cubic metres. Specialises in the storage of non-hazardous chemicals, lubricating oil, additives and vegetable oils. The wharves are situated on the Hull River at Hull Forge Wharf and at 50-52 Lime Street, Hull. Facilities for receiving ex-road tankers or containers and good access to main roads leading to the M62. A 20 metre public weighbridge platform for weighing up to 60 tonnes and a road tanker steam-heating and cleaning service available on site.

The Independent Tank Storage Association (ITSA)

Executive Secretary: H.H. Cail, 24 Chiswick Quay, London W4 3UR, UK.
Tel: **(081) 995 3393.** *Fax:* (0900-1800hrs) **(081) 995 3393.**
The Association exists to give information and advice to government and other regulatory bodies in connection with the practical, safety and environmental health aspects of the bulk liquid storage business. Membership is open to all companies operating in the United Kingdom whose main business is storage of bulk liquids for third parties. A minimum capacity of 50,000 cubic metres is required for full membership and all companies with over that amount are currently members of ITSA. Associate membership is available to those with less than 50,000 cubic metres capacity. ITSA is a founder member of the Federation of European Tank Storage Associations (FETSA) aimed at representing the industry and its particular characteristics in discussions with the EC on developing legislation.

King's Lynn Storage LTD

Head Office: PO Box No. 2, Melton Constable, Norfolk NR 24 2QR, UK.
Tel: **(0263) 860812.** *Fax:* **(0263) 861491.**
Terminal: Estuary Road, King's Lynn, Norfolk PE30 2HH, UK. Tel: **(0553) 764382.** *Telex:* **817018.** *Fax:* **(0553) 767942.**
The activities of King's Lynn Storage are twofold:
1. Having sold its main storage terminal to its principal customer, Kuwait Petroleum (GB) Ltd during 1990, it manages the 15,000 cubic metres terminal on behalf of KPGB.
2. King's Lynn Storage Limited's own terminal comprises 10 storage tanks ranging from 55 cubic metres to 2,200 cubic metres with a capacity of 4,000 cubic metres. It is served from Bentinck Dock, King's Lynn, where KLS has access to 3 berths by agreement with Associated British Ports. The port can accommodate vessels up to 3,000 tonnes dwt. One 6 inch fully pigged product line leads from the berths to the terminal which is approved for the storage of petroleum products and chemicals. There are facilities for the discreet delivery of all products to road tank wagons. Office and warehouse space is available to meet customer's requirements.

La Petrolifera Italo Rumena SPA

Head Office: 40136 Bologna, Viale Aldini 190, Italy.
Tel: **(51) 331567.** *Telex:* **511549.** *Fax:* **(51) 332451.**
Terminal: Porto Corsini-Ravenna: Total storage capacity of about 100,000 cubic metres for petroleum products. Tanks between 500 and 15,000 cubic metres for low and high flash products. Storage and handling facilities for lubricants. Total storage capacity for chemical products 70,000 cubic metres. Tanks between 250 and 5,000 cubic metres for low and high flash products. Some tanks of stainless steel, some rubber or specially coated; nitrogen blanketing facilities; modern hot water system for accurate temperature control. Each tank has its own pump and line to loading racks and its own loading point, to avoid any risk of mixing or contamination. Two vessel berths, both of which can accommodate vessels up to 190 metres (623ft) in length and up to 8.5 metres (28ft) draught. Twentyfive pipelines, between 6 inches and 12 inches diameter (some insulated and of stainless steel) from berths to the storage tanks. Vessels can discharge several products simultaneously.

Mavrac

Route du Port Pétrolier, 13117 Lavera, France.
Tel: **(33) 42 44 42 44.** *Fax:* **(33) 42 44 42 00.**
A subsidiary of LBChimie Group, MAVRAC operates two terminals:
Lavera: 120,000 cubic metres capacity for chemical storage. Access by rail, road and sea (11.8m draught). Certified ISO 9002 by Lloyd's Register Quality Assurance.
Port Saint Louis du Rhône: 20,700 cubic metres capacity for chemicals, petrochemicals, animal and vegetable oils. Access by road, rail (1,000 tonne block trains) and sea (7.9m draught).

Noord Natie Terminals NV

Stadswaag 7-8, B-2000 Antwerp, Belgium.
Tel: **(3) 232 99 40.** *Telex:* **31677.** *Fax:* **(3) 233 39 36.**
Situated in the port of Antwerp. There are 189 tanks ranging from 30 to 8,300 cubic metres, with a total capacity of 225,000 cubic metres for various bulk liquids including mineral and lubricating oils, vegetable and animal oils and fats and non-dangerous chemicals. All tanks equipped with heating coils. Three mooring berths for seagoing vessels and a special dock for handling barges. Direct road and railway connections. Three weighing bridges. Drumming installation.

Nordic Tank Storage AB

Brännolljegatan, Skarvikshamnen, S-418 34 Gothenburg, Sweden.
Tel: **(31) 640130.** *Telex:* **27580.** *Fax:* **(31) 545449.**
Nordic Tank Storage AB operates five terminals in Sweden.
Gothenburg: 113 tanks from 50 to 25,000 cubic metres with a total capacity of 541,000 cubic metres for petrol, gas oil, light and heavy fuel oils, bunkering oils, lubricating oils, chemicals, vegetable oils etc., blending and conditioning, as well as the storage of international oil consignments in transit. Access by sea, road and pipeline. Five tanker berths where we can handle vessels up to 280 metres in length with a draught of up to 13 metres. Our network of pipes is connected to the pipeline system of the refineries and the oil companies.
Gävle: 24 tanks from 25 to 35,000 cubic metres with a total capacity of 196,000 cubic metres for petrol, gasoil, light and heavy fuels, bunker oil, lubricating oils, chemicals, vegetable oils, etc., blending and conditioning, as well as the storage of international oil consignments in transit. Access by sea, road and pipeline. We can handle vessels up to 200 metres in

MORE THAN ONE MILLION CUBIC METERS OF BULK LIQUID STORAGE IN SWEDEN

NORDIC TANK

TO MAKE MONEY

The ideal storage location
while you await the perfect
sales opportunity

Nordic Tank Storage AB

Head Office: S-40330 Gothenburg, Sweden.
Phone: +46 31 61 6190. Fax: +46 31 61 6170. Telex: 27696 Nordi S

Tank terminal, Gothenburg:
Brännoljegatan
Skarvikshamnen
541834 Gothenburg
Phone: +46 (0)31-64 01 30
Fax: +46 (0)31-54 54 49
Telex: 27580 CISTERN S

Tank terminal, Gothenburg:
Ryahamnen
541834 Gothenburg
Phone: +46 (0)31-64 01 30
Fax: +46 (0)31-54 64 60

Tank terminal, Helsingborg:
Naftagatan 7
S-252 27 Helsingborg
Phone: +46 (0)42-14 82 30
Fax: +46 (0)42-14 82 30

Tank terminal, Norrköping:
Gästgivarehagen
S-602 38 Norrköping
Phone: +46 (0)11-16 14 33
Fax: +46 (0)11-16 30 40

Tank terminal, Trelleborg:
Södra Nyhamnsgatan
S-231 61 Trelleborg
541834 Gothenburg
Phone: +46 (0)410-169 25

length with a draught up to 10. 4 metres.

Heisingborg: 12 tanks from 50 to 10,000 cubic metres with a total capacity of 34,000 cubic metres for petrol, gasoil and vegetable oils etc. Access by sea, road and pipeline. We can handle vessels up to 200 metres in length with a draught up to 10.4 metres.

Norrköping: 36 tanks from 30 to 3,000 cubic metres with a total capacity of 14,000 cubic metres for chemicals, petrol, gasoil etc. Access by sea, road and pipeline. We can handle vessels up to 190 metres in length with a draught up to 8.4 metres.

Trelleborg: 9 tanks from 20 to 3,500 cubic metres with a total capacity of 12,000 cubic metres for gasoil, fuel oil, lubricating oils, chemicals, molasses etc. Access by sea and road. We can handle vessels up to 175 metres in length with a draught up to 7 metres.

Nordic Tank Storage AB has an exclusive marketing agreement regarding the following terminals for petroleum products and chemicals:

Kalmar	33,000 cubic metres
Nynåshamn	40,000 cubic metres
Söderhamn	26,000 cubic metres
Sundsvall	16,000 cubic metres
Umeå	13,000 cubic metres
Västerås	12,000 cubic metres
Härnösand	8,000 cubic metres

Oil Rail Terminals (Leeds) LTD

South Accommodation Road, Leeds LS9 ORT, UK.
Tel: **(0532) 480574.** *Telex:* **5535.** *Fax:* **(0532) 400762.**
Head Office: Haynes Road, Cadishead, Manchester M30 5BX.

Part of the BTP plc group of companies. Thirty-two acre site only one mile from M1 and M62 motorways. Liner trains of up to 2,000 tonnes are received in modern sidings and discharged at 500 tonnes per hour. Equipped with high-speed, self-service road vehicle loading bays. Products stored in mild steel tanks ranging from 600 to 6,000 cubic metres. Total tank capacity of over 20,000 cubic metres in ten tanks. Complete range of low and high flash petroleum fuels.

Oil Tanking GMBH

Admiralitätstraße 55, D-20459, Hamburg, Germany.
Tel: **(49) 40 370990.** *Fax:* **(49) 40 37 099199.**

Oiltanking has a total storage capacity of 5.3 million cubic metres. The company operates seven seaport terminals, designed for rapid handling, in Amsterdam, Ghent, Copenhagen, Hamburg, Houston, Malta and Singapore. All terminals occupy key positions in the international oil storage business and are backed by a dense network of nine German inland terminals. Deepwater terminals and inland storage facilities can be combined, permitting a wide variety of solutions for individual problems. The Amsterdam terminal in particular plays an important role in the distribution of high and low flash products in North-West Europe and the UK. Vessels up to 85,000 dwt are handled at this terminal and their cargoes redistributed on coasters and barges. Extensive product treatment facilities for the blending, leading, upgrading and downgrading of gasoline are also available.

The Malta facility is the first public terminal to be located so near to the primary trade route between the Suez Canal and Gibraltar, with connections to ports in Europe, the Middle East, Africa, the US and the Black Sea. Oiltanking Malta is located in the Malta Freeport complex on Marsaxlokk Bay, so in-route products may be shipped in, stored, blended and shipped out duty-free at Malta. The first of three terminal phases is completed with 174,000 cubic metres for clean products while the second phase with 135,000 cubic metres of black products and 50,000 cubic metres for clean products is scheduled to go on-stream mid-1994.

Taking into account the importance of Ghent concerning the storage of chemicals, the storage capacity at our Ghent terminal for such clean products will be increased by 93,000 cubic metres. Installation of the tanks varying from 800 to 12,000 cubic metres has already begun and first operations will start mid-1994.

Further investments are made in the German market.

In the centre of the west German industrial region of Ruhrgebiet, Oiltanking acquired its ninth German terminal at Duisburg. Located at the Rhine near to the Dutch border, the site offers excellent connections to other German regions and the Benelux countries. Activities under Oiltanking's management start mid-1993. In the first phase a total storage capacity of 15,000 cubic metres for gasoline and 20,000 cubic metres for gasoil is available. The second phase with another 18,000 cubic metres for gasoline is planned to go on-stream at the end of 1994.

The location of Oiltanking Gera in Thuringia/East Germany affords good storage opportunities in this region. The storage capacity has been increased by 50,000 cubic metres for gasoline and 14,000 cubic metres for gasoil, totalling up to 104,000 cubic metres by mid-1995.

In September 1993 Oiltanking acquired from Cepsa France a 58,000 cubic metre storage terminal in Annay-sous-Lens situated on the Canal de la Deule in Northwest France. This terminal can accomodate all petroleum products and can be supplied by barges up to 3,000 tonnes ex A-R-A and Atlantic coast refineries.

In March 1994 Oiltanking acquired a 51 percent interest in Ebytem S.A., a 480.000 cubic metre oil storage terminal approx. 650 km southwest of Buenos Aires, Argentina. This terminal has an annual throughput of about 14.5 million cubic metres of crude oil coming in by pipeline from the Neuquen Basin or by tankers at the terminal's two deep water mono-buoys. The terminal supplies all of the crude oil requirements of the large YPF refinery in the Buenos Aires area.

Germany

Hamburg: Forty one tanks, sizes 2,000 to 26,000 cubic metres. Total capacity 418,000 cubic metres. Low/high flash petroleum products and heavy fuel oil storage. Sea, barge, rail and road. Berth for tankers up to 85,000 dwt.

Berlin: Thirty tanks, sizes 1,600 to 25,000 cubic metres. Total capacity 349,000 cubic metres. Low/high flash petroleum products. Barge, rail and road.

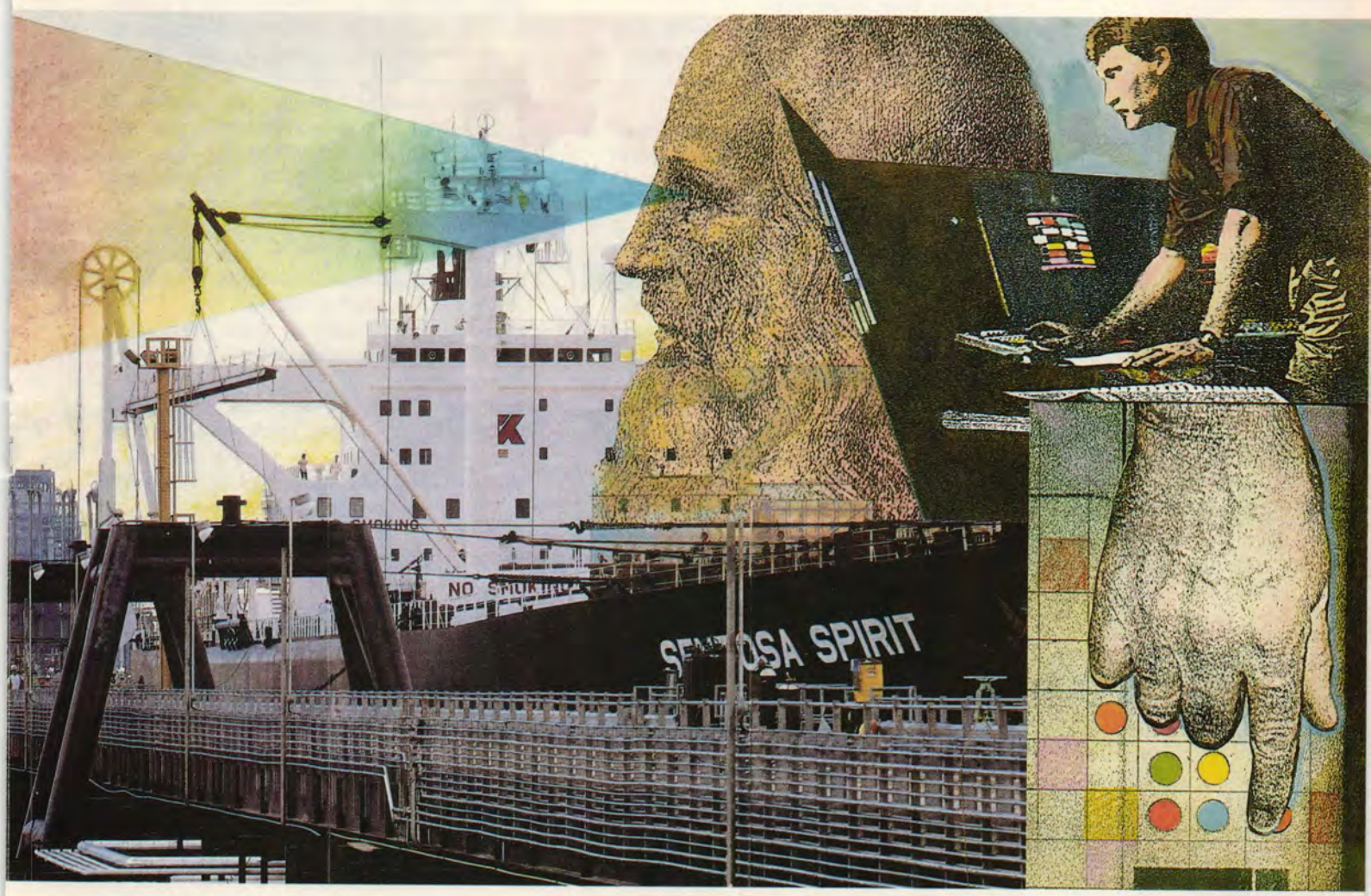
Karlsruhe: Thirty nine tanks, sizes 600 to 20,000 cubic metres. Total capacity 177,000 cubic metres. Low/high flash petroleum products and LPG storage. Barge, rail and road.

Bendorf: Twenty two tanks, sizes 2,000 to 20,000 cubic metres. Total capacity 145,000 cubic metres. Low/high flash petroleum products. Barge, rail and road.

Frankfurt: Twenty five tanks, sizes 95 to 5,000 cubic metres. Total capacity 50,000 cubic metres. Low/high flash petroleum products and chemical products. Barge, rail and road.

Honau: Twelve tanks, sizes 5,000 to 20,000 cubic metres. Total capacity 115,000 cubic metres. Low/high flash petroleum products. Barge, road and pipeline.

Duisburg: Six tanks, sizes 5,000 to 20,000 cubic metres. Total capacity 35,000 cubic metres. Low/high



We Wouldn't Mind If Da Vinci Paid A Visit.

In fact, we think Leonardo would be quite impressed with the new technologies of today's Oiltanking terminals. Since he foresaw automation, we'd show him the hydraulic, articulated loading arms. And point out the advantages of our computerized control rooms: better in/out efficiencies, contamination-free product handling. Then we'd invite him to sit in as our professional engineering teams explore even more ways to customize the best of modern science to better serve our customers. Da Vinci might admire Oiltanking technology. You, however, can profit from it.

Oiltanking

The Art And Science Of Uncommon Service

Europe
Tel: 49-40-370-990
Fax: 49-40-370-99199

The Americas
Tel: 713-457-7900
Fax: 713-457-7991

Far East
Tel: 65-473-1700
Fax: 65-479-4500

flash petroleum products. Barge, rail and road.

Hamm: Eight tanks, sizes 3,000 to 15,000 cubic metres. Total capacity 76,000 cubic metres. Low/high flash petroleum products. Barge, rail and road.

Gera: Four tanks, sizes 10,000 cubic metres. Total capacity 40,000 cubic metres. High flash petroleum products. Rail and road.

The Netherlands

Amsterdam: Fifty three tanks, sizes 690 to 40,000 cubic metres. Total capacity 800,000 cubic metres. Low/high flash petroleum products, heavy fuel oil, crude oil, components, feedstocks and molasses. Sea, barge, road, rail and pipeline. Berth for tankers up to 85,000 dwt.

Belgium

Ghent: Thirty eight tanks, sizes 3,000 to 47,250 cubic metres. Total capacity 600,000 cubic metres. Low/high flash petroleum products, feedstocks, chemical products, fertilisers and edible oils. Sea, barge, rail and road. Berth for tankers up to 65,000 dwt.

Denmark

Copenhagen: Thirty nine tanks, sizes 1,600 to 16,500 cubic metres. Total capacity 339,000 cubic metres. Low/high flash petroleum products, heavy fuel oil and slop oil. Sea, coaster and road. Berth for tankers up to 40,000 dwt.

Malta: Eleven tanks, sizes 500 to 35,000 cubic metres. Total capacity 174,000 cubic metres. Low/high flash petroleum products, components and feedstocks. Berth for tankers up to 120,000 dwt.

Omni-Tank GMBH

Marienstraße 20 40212 Düsseldorf.
Tel: **(0211) 350515.** *Fax:* **(0211) 357697.**

Breisach: 23,400 cubic metres. 15 tanks ranging from 100 to 5,000 cubic metres for storing petroleum products. Access for barges and road tank cars.

Essen: 112,000 cubic metres. 39 tanks ranging from 600 to 12,000 cubic metres for petroleum products, chemical and petrochemical liquids and solvents. Insulated, coiled and coated tanks are available and equipped with dedicated pipelines, heating and blending facilities. Access by road, rail and barge.

Hanau: 48,000 cubic metres. 23 tanks for gasoline, gas oil, jet fuel and petrochemical liquids. Blending facilities are available. Access by road, rail and barge.

Karlsruhe: 51,000 cubic metres. 19 tanks ranging from 650 to 3,000 cubic metres for petroleum products and petrochemical liquids. Access by road and rail tank cars (liner trains) and barges.

Speyer: 796,000 cubic metres. 57 tanks ranging from 2,000 to 60,000 cubic meters for all petroleum products, chemicals and petrochemical liquids, liquefied gases and solvents. Blending facilities are available. Access by road, rail (liner trains), barge and pipeline (CEPS).

Paktank International BV

PO Box 7300, 3000 HH Rotterdam, The Netherlands.
Tel: **(10) 4002911.** *Telex:* **22163.** *Fax:* **(10) 4139829.**

The world's largest independent tank storage company, providing bulk storage and related facilities to the chemical and oil industries. Around 13 million cubic metres of tank storage capacity at terminals in Western Europe and further capacity in the USA, Tunisia and Singapore (including capacity of partners). All Panocean terminals with the exception of those in the UK are now owned by Royal Pakhoed NV, our parent company. Broere and ACS Antwerp are also 100 percent owned by Royal Pakhoed NV.

The Netherlands

Botlek (Rotterdam): 1,576,000 cubic metres capacity; access by sea, road, rail and pipelines; 39ft 6in draught sea berths, storage for petroleum products, chemicals and specialised liquids.

Europak (Rotterdam): 1,973,000 cubic metres; sea, pipelines; 68ft; crude oils and petroleum products. Able to receive vessels up to 72ft via the Maasvlakte terminal.

Laurenshaven (Rotterdam): 926,000 cubic metres; river, pipelines; petroleum products.

NOM/Pernis (Rotterdam): 150,000 cubic metres; sea, road, rail; 38ft 10in; petroleum products, chemicals, aromatics.

Maasvlakte Oil Terminal CV (Rotterdam): 4,400,000 cubic metres; sea, pipelines; 72ft; crude oils.

Sweden: Goteberg; 75,000 cubic metres; sea, road, rail; 36ft; petroleum products, chemicals, lubricating oils, molasses, latex.

Sodertalje: 117,500 cubic metres; sea, road, rail; 32ft; petroleum products, asphalt, chemicals, vegetable and animal oils and fats.

Malmo: 24,000 cubic metres; sea, road, rail; 36ft asphalt, petroleum products, chemicals.

Germany

Neuss: 58,000 cubic metres; river, road, rail; petroleum products, chemicals.

Tollerort and Hohe Schaar (Hamburg) and Kiel: See under VTG Paktank Hamburg GMBH.

USA: 1,350,000 cubic metres; chemicals.

Singapore: 830,000 cubic metres; oil storage.

Estonia (Tallinn): 57,000 cubic metres; oil storage (construction completed 1st phase). 40,000 cubic metres; oil storage (to be completed end of 1994).

Thailand: 87,000 cubic metres; chemical and naptha storage (operational). 40,000 cubic metres; chemical and naptha storage (to be completed end of 1994).

Tunisia: 300,000 cubic metres; oil products.

Pinnacle Storage

Choats Road, Dagenham, Essex RM9 6PU, UK.
Tel: **(081) 593 7211.** *Fax:* **(081) 593 1632.**

Owned by Transport Development Group plc (TDG) and formerly known as London & Coastal Oil Wharves Ltd.

Dagenham terminal: Situated between London and the Dartford Tunnel, this is the nearest major public storage terminal to London. The terminal now operates 236 tanks with a total capacity of 110,900 cubic metres. As well as the 26 new tanks commissioned in 1987, the company has recently acquired additional capacity at Dagenham including 58 tanks of less than 100 cubic metres capacity. Jetty facilities for vessels up to 228 metres LOA with additional berths for smaller vessels and barges. Full range of chemical storage facilities includes stainless steel tanks and pipelines, lined, insulated and heated tanks, and inert gas blanketing. The terminal handles a wide range of vegetable oils, edible oils and technical oils as well as chemicals and fuels. Facilities for bunkering vessels, blending products and filtering.

The terminal has a modern workshop, weigh-bridge, radio communications, fully computerised stock accounting and easy access to the M25.

Chemical analysis services: Include the testing of petroleum and chemical products to ASTM, IP and BSI standards. Laboratory NAMAS accredited.

PL Transtore LTD

Riverside House, East Street, Birkenhead, Wirral, Merseyside L41 1 BY, UK.

Tel: **(051) 647 4111.** *Fax:* **(051) 666 2136.**

PL Transtore Ltd is a subsidiary of Acatos and Hutcheson PLC. As an independent company our dedicated tank farms can accommodate a variety of diverse bulk liquids. Our 3 piggable discharge lines feed mild steel tanks which are lagged and fully serviced, and range in size from 50 to 1000 tonnes with a maximum capacity of 20,000 cubic metres. Processing Divisions can offer the facility of custom designed plant for rotary vacuum filtration, separation, acid refining, drum filling and depackaging. Laboratory services use the latest analytical techniques and equipment. We also operate a fleet of modern stainless steel roadtankers which are available on long-term contract or spot hire and can carry low/medium hazard and edible (SCOPA Registered) products.

Powell Duffryn Terminals LTD

Commercial Enquiries: C. Scott, Commercial Director, Powell Duffryn House, London Road, Purfleet, Essex, RM16 1PR UK.

Tel: **(0708) 865701.** *Telex:* **913229.** *Fax:* **(0708) 868983.**

Operates three terminals in the UK.

Barry (South Wales): High and low flash tankage, for petroleum and chemical products, with a total capacity of 113,000 cubic metres. Tank sizes from 20 to 14,400 cubic metres; mild steel – many lined, lagged and coiled, using stainless steel fittings when required. Three tanker berths with a minimum depth of 9.8 metres (32ft), served by over 15 pipelines in stainless or mild steel, lagged and traced as required. Blending and drumming, weigh-bridge, road and rail facilities. This location is ideal for supplying the industrial areas of South Wales, the South of England, the Midlands and the North-West.

Ipswich (Suffolk): High and low flash storage; tanks from 50 to 10,000 cubic metres with a total capacity of 89,000 cubic metres for petroleum and chemical products. Many tanks lined, lagged and coiled. Three tanker berths with a minimum depth of 7.9 metres (26ft), using both stainless and mild steel pipelines. White oil road loading bays being upgraded to include bottom loading facilities.

Purfleet (Essex): Two jetties: the main seven berth private jetty with a minimum depth of 10.5 metres (35ft) can accept vessels of up to 45,000 tonnes displacement or a maximum length of 800ft; a smaller chemical jetty upstream. High and low flash tankage for petroleum and chemical products, with a total capacity of 269,000 cubic metres. Tank sizes from 50 to 15,000 cubic metres, stainless or mild steel;,many lined, lagged and coiled, using stainless steel fitments when required. Fourteen stainless and mild steel main pipelines; many are lagged and traced for temperature control. Full trainloads on 100 tonne rail cars and all types of road tankers, weighbridge, blending and drumming.

All three terminals offer terms for dedicated or commingled petroleum product storage. Purfleet and Barry are registered to BS5750, part 2, while Ipswich is due to be assessed shortly.

Propetrol

Head Office: 65 Quai Jacoutot, BP 13, F-67013 Strasbourg Cedex, France.

Tel: **(33) 88 45 90 10.** *Telex:* **880078.** *Fax:* **(33) 88 45 90 20** and **(33) 88 45 90 30.**

Contact: Mr E. Elkouby (Directeur Commercial).

Propetrol, a subsidiary of the Petrofrance group of companies, is an independent petroleum and chemical storage company with terminals in:

Strasbourg (two locations), Village Neuf (near Basle), Gergy (near Chalon-sur-Saône) and Villeneuve-La-Garenne (8 km north of Paris).

Together these terminals represent a total storage capacity of about 190,000 cubic metres of bulk petroleum products, 50,000 cubic metres of bulk liquid chemicals and petrochemicals and over 6,000 sq. metres of warehousing for the storage of drummed and packaged chemicals.

All terminals are located on major waterways: Rhine, Saône and Seine Rivers, with complete rail and motorway access.

Services available: Tank-truck loading/unloading, heated and insulated tanks and pipes, tanks equipped with recirculating systems, tanks equipped with innerfloating screens, inert gas blanketing (nitrogen), petroleum products dyeing, blending of oils and fuels, heat supply, tank-truck weighing, bunkering of barges with tank-trucks and customs services.

Powell Duffryn Terminal Ltd

Pusback u.Morgenstern Petrotank

Neutrale Tanklager-Ges.mbH u. Co. KG, Barkhausenstraße. 35-43 D-27568 Bremerhaven.
Tel: **(49) 471 9 4690.** *Fax:* **(49) 471 9 4690-90.**

Petrotank is an independent company in northern Germany, which owns and operates storage installations at Bremen, Bremerhaven, Nordenham-Blexen, Oldenburg (river Weser), Hannover, Hildesheim, Braunschweig (Mittelland-Kanal) and Trier (river Mosel). Total capacity about 176,000 cubic metres. Seagoing vessels are possible at: Nordenham-Blexen: draught max 32ft, LOA 170m. Bremen: draught max 31ft, LOA 150m.

There are barge, rail and truck facilities available in the other terminals.

Storage of heavy fuels, gas oil, Urea and other liquid products.

Ross Chemical & Storage Co LTD.

Dock Road, Grangemouth, Scotland UK. FK3 8UB
Tel: **0324 474774.** *Fax:* **0324 485476.**

Grange Dock, Grangemouth: Sixty tanks ranging from 800 to 2,650 cubic metres for fuel oils, motor spirits, petrochemicals, aviation fuel and molasses. Served by a common user jetty with mild and stainless steel jetty lines. The jetty is capable of handling ships up to 20,000 tonnes dwt. Distribution by road from both top and bottom loading racks.

Simon Storage Group

Priory House, 60 Station Road, Redhill, Surrey RH1 1PH UK.
Tel: **(0737) 778108.** *Telex:* **58218 SSSTOR G.** *Fax:* **(0737) 778112.**

Simon Storage manage storage investments in the UK and Eire for Simon Engineering plc, some of which are in joint venture with the Van Ommeren Tank Terminals. All enquiries regarding the operating companies should be addressed to Simon Storage.

Aviation and Plant Services: Simon Storage also provide comprehensive facilities management services for the oil industry including aviation into plane services, terminal, oil and gas pipeline management, onshore oilfield operation. The company now has in excess of 1,200,000 cubic metres under its management.

Cumbrian Terminal: Prince of Wales Dock, Workington, Cumbria.
Tel: **(0900) 605151.** *Telex:* **64331 CSTORR G.** *Fax:* **(0900) 67986.**

31,581 cubic metres for petroleum products and chemical storage. Transport by road, rail and sea. Ships Agency: Workington – can handle 10,000 tons dwt vessels and provides excellent port facilities for deliveries to or from North West England and Southern Scotland.

Immingham Terminals: Immingham Docks, Nr. Grimsby, South Humberside.
West: Tel: **(0469) 572615.** *Telex:* **52291 ISCOL G.** *Fax:* **(0469) 577019.**
East: Tel: **(0469) 571241.** *Telex:* **527931 ISCEA G.** *Fax:* **(0469) 41012.**

Operates two installations at Immingham Dock (East and West). More than 300 tanks with a total capacity of 570,000 cubic metres, making it the largest independent bulk storage terminal in the UK. Included in this figure are pressure storage for gases, stainless steel, lined, lagged and steam heated tanks. More than 60 jetty lines, including six stainless steel, provide for excellent segregation of grades. Use is made of two jetties: Eastern and Western. The terminal is connected to the Humber refineries and chemical plants by pipelines. The jetties have 35ft draught and can accommodate up to 35,000 tonnes dwt tankers, coasters or barges. Transport by road, rail, sea and pipeline. The company has land available for expansion to meet customers' special requirements at Immingham. New tankage under construction.

Seal Sands Terminal: Seal Sands, Middlesbrough, Cleveland, TS2 1UB.
Tel: **(0642) 546775.** *Telex:* **58218 SSTOR G.** *Fax:* **(0642) 546076.**

Over 100 tanks with a total capacity of 196,400 cubic metres for petroleum products, chemicals including molten sulphur, VCM and LPG's and a wide range of edible or specialist products. Two jetties, one taking vessels up to 30,000 tonnes dwt. The terminal is connected to local chemical plants by pipeline. Transport by road, rail and sea. Block trains handled.

Shannon Terminal: Foynes Harbour, Foynes, Co. Limerick, Eire.
Tel: **(010353) 69 65506.** *Fax:* **(010353) 69 65601.**

One installation. 14,000 cubic metres for petroleum and chemical products on the River Shannon. The jetty can accommodate 20,000 tonne tankers and facilities are included for the loading to road tank wagons and the supply of products to barges at the jetty. Land available for expansion of the terminal.

Tyne Terminal: Northumberland Dock, North Shields, Tyne and Wear, NE29 6DY.
Tel: **(091) 296 0999.** *Telex:* **53180 VELVA G.** *Fax:* **(091) 258 6996.**

Total capacity 54,704 cubic metres. Fifty mild steel tanks, ranging in capacity from 300 to 8,600 cubic metres for chemicals, gasolines and oils. Blending facilities. Many tanks are coiled. Ethanol bonded storage available. Some tanks are coated with epoxy or phenolic resin-based paints. Additional land is available for further development and construction to suit particular client requirements. Access by sea and road. Three berths at North Shields provide for vessels up to 10 metres draught. There is rapid access to major road networks for road tankers. Licences to handle chemical wastes. New tankage under construction.

Sogestrol

Head Office: Route de la Chimie, 76700 Gonfreville l'Orcher, France.
Tel: **(33) 3553 3770.** *Telex:* **190582.** *Fax:* **(33) 3553 3694.**

Jointly owned by the SOGESTRAN Group and LBChimie.

Two terminals, with a total capacity of 340,000 cubic metres, located in the industrial area of Le Havre Port, near chemical and petrochemical plants, and reserved exclusively for chemicals and petrochemicals and all dangerous liquids. Tanks are insulated, coated, heated, refrigerated, of mild and stainless steel, with traced insulated lines. Nitrogen facilities. Tanks from 5,000 cubic metres have a floating roof. Access by road, rail, sea, river. Connections with certain local plants.

Terminal No. 1: 161 tanks from 50 to 15,000 cubic metres. Three jetties, draught of 38ft for 50,000 ton ships, length 250 metres. Reception from and delivery to ships, barges, road containers, rail cars and drums. Drumming and pipelines to local industries.

Terminal No. 2: 52 tanks from 315 to 4,900 cubic metres including 9 tanks from 315 to 2,200 cubic metres

Solid in liquids.

Our facilities are as steady as a rock. We're solid in liquids. It means we are a partner you can rely on. We meet your requirements in the storage and handling of petroleum products, chemicals, molasses and edible oils and fats. But there's more. Solid in liquids also reflects our drive to achieve higher standards in our service to you. Some are clearly visible. Others hide from sight. You won't be surprised to hear that we are annually investing a great deal of time and money in safety and environmental measures.

Solid in liquids also implies being where you expect us to be. With a total terminal capacity of over 10 million cbm in Europe, North America, Mexico and Asia, we provide a global network with a local touch.

In short, solid in liquids means you can rely on us.

Van Ommeren Tank Terminals, Westerlaan 10, 3016 CK Rotterdam, The Netherlands.
Telephone +31 10 4642346. Telefax +31 10 4642819. Telex 21435 vo nl.

Van Ommeren
Tank Terminals

South Western Tar Distilleries Ltd – Totton Works

of stainless steel. Three jetties, draught of 38ft for 40,000 tonne ships. Reception from and delivery to ships, barges, road containers and rail cars. Drumming station connected to tanks; facility to drum directly to road containers and rail cars. The terminals are both certified ISO 9002 since February 1992 by Lloyd's Register Quality Assurance. SOGESTROL is jointly owned by the SOGESTRAN Group and LBChimie.

Sotrasol

157, avenue Charles de Gaulle, 92200 Neuilly Sur Seine, France.
Tel: **(1) 47 47 51 00.** *Fax:* **(1) 46 41 03 27.**
A subsidiary of LBChimie Group, SOTRASOL operates two terminals:
Tarnos (Port de Bayonne): 101,000 cubic metres capacity for chemical liquids, crude oil, liquid fertilisers, animal and vegetable oils and fats. Seventeen tanks from 640 to 15,000 cubic metres, some stainless steel, some with heating coils or insulation. Nitrogen blanketing facilities. Access by road, rail and sea (two jetties with draught up to 28ft). The terminal is certified ISO 9002 since July 1992 by Lloyd's Register Quality Assurance.
Le Havre: One hundred tanks from 30 to 5,000 cubic metres, with a total capacity of 105,000 cubic metres for mineral oils, chemical products with a flash point of over 100°C, liquid fertilisers, molasses, natural and synthetic latex and vegetable and animal oils and fats. Tanks are partly stainless steel, some heated and insulated. Access is by road, rail and sea (three berths, maximum draught 38ft). Certified ISO 9002 by Lloyd's Register Quality Assurance.

South Western Tar Distilleries LTD

High Street, Totton, Southampton SO4 4TN UK.
Tel: **(0703) 663444.** *Fax:* **(0703) 873429.**
Located at Totton in the Port of Southampton, SWTD has over 125 tanks in a range of sizes up to 7,000 cubic metres. Total storage capacity is 36,000 cubic metres with planning permission for further expansion during 1994. Some tanks are stainless steel and a wide range of products are handled ranging from low flash products up to and including fuel oils and bitumen up to and including crude oil and other low flash products.
A comprehensive blending service is also offered for aqueous and solvent products together with a complete drumming service.
The site has its own rail sidings and jetty facility with capacity to take up 2,000 tonnes of high and low flash

products and is immediately adjacent to the M27, M271 and M3 motorways.
A smaller storage facility (5,000 cubic metres) is also available at Hertford.

Stockage International Compagnie (S.I.C)

103, quai Emile Cormerais, B.P. 53, 44801 Saint Herblain Cedex, France.
Tel: **(33) 40 46 26 48.** *Fax:* **(33) 40 46 52 52.**
A subsidiary of LBChimie Group, SIC operates one storage in Nantes with a capacity of 30,000 cubic metres for liquid chemicals, animal oils, vegetable oils and molasses. Certified ISO 9002 by Lloyd's Register Quality Assurance.

Tanquipor, LDA

Head Office and Installation: Parque Industrial da Quimigal Lavradio- 2830 Barreiro-Portugal.
Tel: **(01) 2073794.** *Fax:* **(01) 2075941.**
Office: Avenida Infante Santo, 23-1 Esq., 1300 Lisbon, Portugal.
Tel: **(01) 3969117.** *Fax:* **(01) 3970717.**
The tank terminal, located in the Port of Lisbon, has a total capacity of 87,000 cubic metres for storing ammonia, chemicals and petroleum products. Maximum draught at the jetty is approximately 32ft at high tide.

Tanklager Gesellschaft Mannheim MBH

Essener Str. 64, D-68219 Mannheim, P.O. Box 81 04 06, D-68204 Mannheim.
Tel: **(49) 621 89 98 0.** *Fax:* **(49) 621 80 14 17.**
The Tanklagergesellschaft HOYER mbH, Mannheim, was founded in 1959 and operates large scale, modern, independent tank depots at Mannheim-Rheinau and at Mannheim-Handelshafen.
Mannheim, the second largest river port in Europe, lies in the heart of Germany – ideally situated for inland tank storage. Apart from the Rhein-Main area and South Germany, Mannheim allows economical access to Eastern France and North Switzerland.
Both the tank storage depots have access to waterways, rail terminals and the motorway network.
The tank storage depot Mannheim-Rheinau has a total of 224,000 cubic metres tank space, and the storage depot in Mannheim-Handelshafen has over 68,000 cubic metres. The tank space of both of these can be extended by a further 50-80,000 cubic metres.
The capacity of the individual tanks is between 50 and 22,000 cubic metres.
Modern cargo handling area with 8,000 sq.metres storage space at Mannheim-Handelshafen are particularly suitable for the storage and transhipment of lubricants. Large open plan storage areas with ramp access are available for the storage of drums.
All tanks are equipped with a separate pipeline system, which ensures the independent treatment of each product to a high standard.
Besides black steel tanks, the TLG storage depots at Mannheim-Rheinau and at Mannheim-Handelshafen can also offer stainless steel tanks, tanks with special cladding, insulation and facilities for nitrogen supply.
In addition to expert storage of a wide variety of products, such as fuel oils, chemicals, molasses, vegetable and animal fats, TLG offers all other services connected with its handling and transportation: customs clearance, quality control, weight control, tank checking and drum filling.
Delivery and despatch can be made by ship, rail or road. TLG offers direct transhipment by ship/tank car as well as a complete rail service.
Ever since the opening of the storage depots, special attention has been paid to safety aspects. The most modern facilities guarantee swift and safe transhipment.
The years of experience which the TLG team have in handling a variety of products, together with modern technology, ensures safety – safety for the products and safety for the environment.
Well trained staff deal with even the most unusual problems in a professional manner.

Tees Storage Company LTD

Seal Sands, Middlesbrough, Cleveland TS2 1UA, UK.
Tel: **(0642) 546767.** *Telex:* **58477.** *Fax:* **(0642) 546222.**
Jointly owned by Royal Pakhoed Holding NV and GATX Corporation. Operates a terminal at Seal Sands in the UK.
128 tanks from 55 to 8,500 cubic metres, with a total capacity of 200,000 cubic metres. Mild steel coated and stainless for petroleum and chemicals. One sphere of 6,650 cubic metres for Vinyl Chloride Monomer. Road, sea and pipelines to neighbouring plants. Provision for rail. Drumming facilities. Three jetties for ships up to 40,000 dwt. Maximum length 760ft, maximum draught 36ft. 30 docklines (15 stainless steel).


Seal Sands terminal

Terminales Quimicos de Santander, S.A.

Santa Cruz De Marcenado, 31-1º 28015 – Madrid, Spain.
Tel: **(34) 1 547 30 27.** *Fax:* **(34) 1 542 13 91**
Operates one terminal in Santander (Spain). 58 tanks from 50 to 1,300 cubic metres. High and low flash chemicals, petroleum products and vegetable oils. Heating: N2 blanketing, insulated and coated tanks. Total capacity 32,000 cubic metres. Expansion of 33,000 cubic metres under construction for start-up in February 1995. Access by rail, road and sea with 40 ft draught private jetty.

Terminales Quimicos, S.A. (Terquimsa)

Plaza de Colon Nr.2. Torre-I 9º - A 28046 Madrid, Spain.
Tel: ***(34) 1 310 11 76.*** *Fax:* ***(34) 1 308 33 04.***
Located at Tarragona Port with a capacity of 130,000 cubic metres for chemical and petroleum products, vegetable oils. Automatic drumming, bonded storage. Heating, refigeration, gas blanketing, coated and SS tanks. Transhipment facilities.

Van Ommeren Bragtank AG

Head Office: Westquaistraße 12, CH 4019 Basle, Switzerland.

Tel: **(61) 631 44 22.** *Telex:* **963180.** *Fax:* **(061) 631 16 92**

Van Ommeren Bragtank AG, a member of the Van Ommeren group, has one installation in Switzerland.

Basle: The terminal has 63 tanks with a total capacity of 346,000 cubic metres. All mineral oils can be stored. There are six jetties for barges. Access is by river, road and rail. Steam and oil heating is provided and there are bunkering facilities for barges.

Van Ommeren Tank Terminals (VOTT)

Head Office: 10 Westerlaan, 3016 CK Rotterdam, The Netherlands.

Tel: **(10) 464 2346.** *Telex:* **21435 VONL.** *Fax:* **(10) 464 2819.**

VOTT is part of Royal van Ommeren NV, with a worldwide capacity of 11,528,000 cubic metres. It has 30 terminals situated in 15 countries.

THE NETHERLANDS:

Amsterdam: 600,000 cubic metres capacity; access by road, rail, sea and inland waterways; 41 ft draught berths, storage for petroleum products, molasses and animal and vegetable oils and fats.

Botlek (Port of Rotterdam): 940,000 cubic metres capacity; access by road, rail, sea and inland waterways and pipeline; 41 ft draught; storage for chemicals, petrochemicals and petroleum products; pipeline connections to adjacent refineries, CEPS and Van Ommeren Tank Terminal at Europoort.

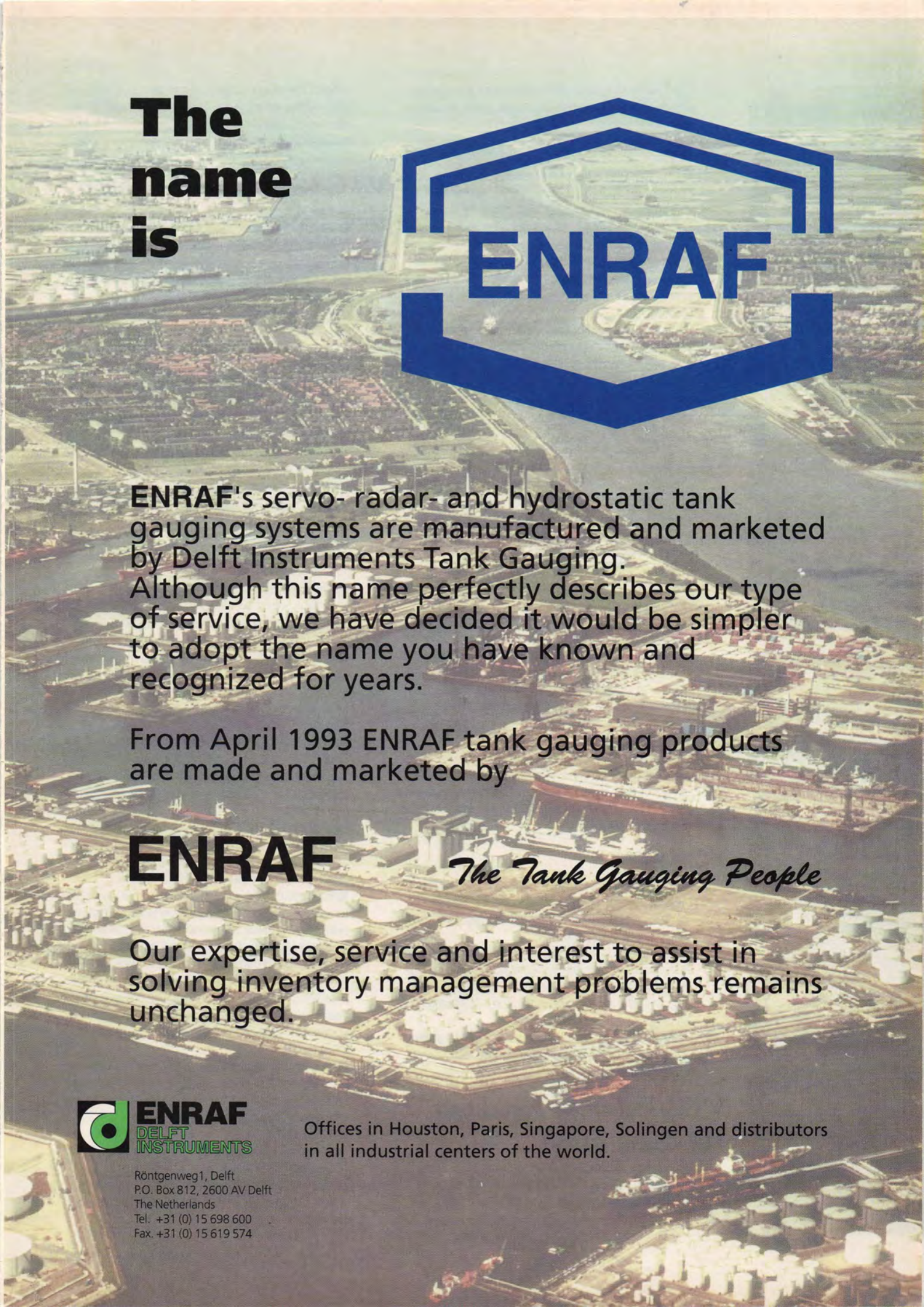
Europoort (Port of Rotterdam): 750,000 cubic metres capacity; access by road inland waterways, sea and pipeline; 71 feet draught; storage for petroleum products; pipeline connection to CEPS, Van Ommeren Tank Terminal Botlek and adjacent refineries.

Vlaardingen (Port of Rotterdam): 435,000 cubic metres capacity; access by road, rail, sea and inland waterways; 40 ft draught; storage for animal and vegetable oils and fats, petrochemicals and molasses.

BELGIUM

Antwerp: Gamatex is a 50/50 joint venture between GATX Terminals and operates one terminal in Antwerp, Belgium. The terminal offers 147 tanks with a total capacity of 486,000 cubic metres for clean mineral oils, chemicals, edibles and pressurised gases. There are 5 jetties for barges and seagoing vessels (draught up to 13.5 metres). Access is by sea, rail and road. Pipeline access is available. Tankage is insulated, coiled, coated, stain-

Van Ommeren tank terminal at Botlek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Fax. +31 (0) 15 619 574

less steel and heatable. All chemical tanks are equipped with dedicated lines, pumps and loading racks for railcars and trucks. Prepump, blending, drumfilling and nitrogen blanketing are available.

FRANCE

Fos-sur-Mer: DPF, a company in which Van Ommeren has a share has one installation in France, at Fos-sur-Mer. The terminal has 40 tanks with a total capacity of 780,000 cubic metres. All mineral oils can be stored. There are five jetties for seagoing vessels (up to 72ft) and one for coastal vessels (21 ft). Access is by sea, rail, pipeline and road. Blending facilities are provided (MTBE, lead, butane).

GERMANY

Hamburg: The terminal has 300 tanks with a total capacity of 711,000 cubic metres for storing mineral oils, petrochemical liquid, liquid fertilisers, animal and vegetable oils and fats, and molasses. There are four jetties for sea-going vessels and barges (draught up to 44ft), seven berths for barges and coasters. Access is by road, rail and sea. Product lines are partly stainless steel. Tankage is insulated, coiled and coated, provided with steam and oil heating and partly equipped with nitrogen blanketing. Prepump facilities, drumfilling plant, blending and dyeing facilities for gasoline and fuel oil and molasses are also available.

SPAIN

Barcelona: Located at the Port of Barcelona's Flammables Area, it has access by road, sea and in the near future, by railroad. Operates with 75 tanks ranging from 30 to 2,000 cubic metres, total capacity 35,000 cubic metres, equipped for practically any kind of chemical and petrochemical product. Drumming and warehouse facilities available. Suitable for transit operations and ship to ship transfers, using the free zone facilities.

UNITED KINGDOM

London: This terminal on the river Thames has 134 tanks with a total capacity of 348,000 cubic metres suitable for storage of clean low flash petroleum products and chemicals. Access is by sea (draught 36 ft), rail and road (bottom loading facilities).

VOTOB

Vereniging van Onafhankelijke Tankopslagbedrijven, Vlietweg 16, Leidschendam. Postal address: PO Box 443, 2260 AK Leidshendam Netherlands. Tel: **3170 337 8750.** *Fax:* **3170 320 3903.**

VOTOB embraces seven member companies in the Netherlands, active in the storage of liquid bulk commodities and products, including gases. Together the members offer 20 installations in the ports of Amsterdam, Dordrecht, Rotterdam and Flushing.

VOTOB is active in the interface with national government institutions and other associations with relevant adjacent interests.

VTG-Paktank Tanklager Hamburg GMBH

Brandsende 2-4 20095 Hamburg, Germany.
Tel: **(40) 32 58 43 0.** *Telex:* **2163506.** *Fax:* **(40) 32 26 30.**

Hohe Schaar (Hamburg): 427,000 cubic metres; sea, road, rail; 48ft; crude oils, petroleum products, chemicals.

Tollerort (Hamburg): 32,000 cubic metres; sea, road, rail; 29ft; petroleum products, chemicals, lubricating oils, latex, vegetable and animal oils and fats.

Kiel: 8,000 cubic metres; sea, road; 30ft; petroleum products.

VTG Vereinigte Tanklager und Transportmittel GMBH

Head Office: Neue Rabenstraße 21, D-20354 Hamburg, Germany.
Tel: **(40) 441 91 0.** *Fax:* **(40) 441 91 546.** *Telex:* **2170080 VT D.**

VTG, a member of the PRE-USSAG Group, is one of the largest independent tank storage companies in Europe. VTG operates large modern tank installations at seaports and inland with a total capacity of around 4 million cubic metres. Storage facilities are complemented by 25,000 rail tank wagons, special purpose wagons and tank containers for the transport of petroleum products, chemicals, gases and bulk goods. An inland tank shipping service operates on all major European waterways.

Berlin: 225,000 cubic metres, 85 tanks ranging from 50 to 20,000 cubic metres for all petroleum products, solvents and petrochemicals; access for barges, road and rail tank cars and liner trains.

Cologne: 101,000 cubic metres, tank volumes range from 50 to 25,000 cubic metres.

Duisburg Ölinsel: 270,000 cubic metres, 212 tanks varying in size from 100 to 9,000 cubic metres. Insulated, coiled, coated and aluminium tanks are available and equipped with dedicated pipelines, heating, blending, nitrogen blanketing, vapour-return and dry air ventilation facilities. petroleum products, chemical and petrochemical liquids, liquefied gases and solvents. Distribution by road, rail, barge and pipeline.

Duisberg Parrallel-hafen: 38,000 cubic metres. Tank volumes 15 to 4,500 cubic metres for all petroleum products and chemicals. Access by tanktrucks and barges.

Ebrach: 5,000 cubic metres for storing petroleum products. 12 tanks.

Hanover: 320,000 cubic metres. 22 tanks ranging from 500 to 70,000 cubic metres for crude oil, petroleum products, chemicals and solvents. Access for road and rail tank cars, liner trains and barges; crude oil pipeline.

Munich: 155,000 cubic metres, ranging from 30 to 45,000 cubic metres for storing petroleum products, chemical and petrochemical liquids and solvents. Blending facilities for gasoline are available. Access by railtank cars and tanktrucks.

Regensburg: 70,000 cubic metres, 60 tanks varying in size from 100 to 9,000 cubic metres. All petroleum products, chemical and petrochemical liquids and solvents. Heating, blending and mixing facilities. Distribution by road, rail and barge. Operation of the BP terminals.

Mainz-Gustavburg: 256,000 cubic metres, 33 tanks ranging from 8 to 40,000 cubic metres for all petroleum products, solvents and petrochemicals. Access by barge, road, rail tank cars, liner trains and pipeline (RMR).

Amsterdam: Comos Tank BV.

Düsseldorf: Omni Tank GmbH.

Hamburg: VTG-Paktank Hamburg GmbH.

Further details of these three companies are given under their separate headings.

Over the last 89 years BEN — Motor and Allied Trades Benevolent Fund has cared for tens of thousands of people. Not just direct employees and pensioners of our industry, but their dependants too, young and old alike.

During that time there have been many changes. Different companies have come and gone, unions evolved beyond recognition and the welfare state has been in continual flux.

But one thing has remained constant — the care and attention BEN has given to those who look to us for support, whether it be emotional or financial (including residential and nursing care).

So why the BENelephant? It's a symbol of our memory: how we never forget those who worked in our industries, and will always remember that many people will need our help in the future.

Now that's worth shouting about.

If you would like more information about BEN, please call us on 0344 20191.

Time for this little elephant to blow its own trumpet

Ben

MOTOR AND ALLIED TRADES BENEVOLENT FUND

Lynwood, Sunninghill, Ascot, Berkshire SL5 0AJ Tel: 0344 20191 Fax: 0344 22042

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A burning issue

How effective is fire-fighting foam? Mr Tony Briggs casts serious doubts over the adequacy of tests to evaluate their performance.

Landing on an offshore helideck is not for those of a nervous disposition. To then be told that foam systems, which provide fire protection on those helidecks, may be inadequate, does nothing for peace of mind. Yet this pronouncement was made by a manufacturer of these systems late last year[1]. So how did the need for this warning ever arise?

It is useful to sketch in the background. The perception of which foam is 'best' for a given situation varies amongst fire-fighters. The nature of the fire, with visibility obscured by smoke, plant and wreckage, often coupled with the rapid development of life-threatening situations, leads to vivid but perhaps subjective impressions. The bravery, skill and persistence of fire-fighters interact with and may actually obscure the qualities of their apparatus and foam agents. The century-long development of fire-fighting foams has led to a variety of foam agents and of the equipment for using them; differing interactions between the combinations are an important part of an effective choice.

To help decision-making, fire-fighting demonstrations are offered by manufacturers. However, they are limited by the difficulties of exposing petrol-type fuels on a large scale and the understandable avoidance of the summer holiday season. Fire-fighting a kerosene-type fuel from up-wind on a spring day is a profoundly different experience to tackling a petrol/light-ends fire on a hot, still summer's day. Nevertheless, an experienced fire officer can be expected to make a competent if non-optimal choice of equipment and agent.

Foam agent

The mysterious mixtures which comprise foam agents need fire tests to evaluate their performance. Modern formulations in 'sensible' storage conditions should be stable for years, but a fire-fighting team ought to use foam agent for practice and replacement foam should be at least as good. How then can quality be judged? For many users, particularly where justice must be seen to be done, performance standards are necessary. The vagaries of weather and expense rule out full-scale tests so large cost-conscious foam users, typically quasi-government departments, have in the past developed what were essentially national fire tests. These are now potentially to be replaced by ISO Standard 7203 3. Most of these tests, including ISO, can be accommodated in a largish aircraft hangar-type of building. However, for the smaller UK Ministry of Defence (MOD) tests[2], a 'living-room' with a one-metre-diameter hole in the 'ceiling' suffices, though a small 'barn' would be preferable. The worry is that larger tests will be less frequently performed because of expense.

Consistency of tests

Are these smaller, traditional tests adequate? Broadly, 'yes' (for extensive detail see references 3,4 and 5).

IP THE INSTITUTE OF PETROLEUM

THE TANKER MARKET ENTERING A NEW ERA?

5 October 1994
To be held at the Institute of Petroleum

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

Papers will be presented on the following topics:

An Overview of the Tanker Market

A Charterer's View of the Tanker Market

The Role of the Independent Tanker Owner

Establishing and Financing a Tanker Company in the UK

The Braer Incident
Lessons to be Learnt and Regulatory Implications

Developments in the Classification and Survey of Tankers

An Oil Major's Perspective

The Tanker Insurance Market – Current Issues

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

IP THE INSTITUTE OF PETROLEUM

Environmental Management Implications for the Oil Industry

19 October 1994
To be held at the Institute of Petroleum

Papers will include:

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

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

However, a long-term problem arises with the composition of real-life fuels; ask refinery managers how they reach the required octane rating of their petrol and you will probably get more answers than refinery managers. Thus, year to year, the same batch of fire-fighting product is likely to give differing test results - not too significant in the array of variables faced by a fire-fighter but disturbing to the pass/fail criteria of a Standard. Military fuels are usually produced to tight specifications but are almost impossible to buy on a 'retail' basis. A consensus, leaning somewhat on tradition, has led ISO to plump for a commercial product containing, primarily, heptanes. Heptanes are found in petrol (though one of the heptanes has, by definition, an octane rating of zero for octane-rating tests). On a freezing day, a match held over a pool of petrol will lead to instant burning. Heptane is unlikely to ignite in these conditions. This mix of heptanes is a 'soft option' compared with petrol but this does not preclude, in principle, the building in of safety margins to compensate provided that test results are relateable.

Where things went wrong over the development of the ISO tests was in re-consideration of the consequences of the impact of foam on burning fuel. Impact, usually inevitable, leads to the intermingling of fuel and foam. Fuel will tend to diffuse through the foam blanket. As foam is destroyed by the fire, this fuel will ignite and accelerate foam destruction. The more vigorous the impact the worse this becomes. Most of the test methods have impact velocities below five metres/second (m/s) but in real-life situations, impact velocities may exceed 10m/s. Thus the author was disconcerted to find, in small-scale higher-velocity tests, that the best foam for a heptane fire was the worst on an Avgas fire. (Further tests showed motor petrol to be a more searching fuel than Avgas!) In a substantial series[6] of comparative larger/ISO-scale fire tests using a foam velocity centred around 7m/s, the published results, using ISO equipment (re-arranged to yield the greater impact velocity), showed that results on heptane fires were not relateable to those on the comparable gasoline fires; the order of merit of foams was different. It was found that additions of toluene, (which constitutes up to 25 percent of petrols), to real-life fuels, for example Avgas (which contains around 9-10 percent toluene) worsened the performance of some foams. A further potential inadequacy of heptane as a representative fuel became apparent.

Fluoro-additives

Certain components of foam agents are expensive but are well worth it in terms of life-savings and cost-savings – the Milford Haven refinery fire in 1983, for example, cost at least £25 million. One such species of expensive agent is the varied fluorine-containing compounds.

The penetration of foam by fuel can be reduced by the incorporation of certain fluorine-containing compounds. This brings us to another disconcerting test result. In foam agents in which the fluoro-compounds were progressively replaced by a cheaper foam agent, the fire-extinction performance on a petrol fire was greatly reduced by omission of only 25 percent of fluoro-compound; extinction of the heptane fire was not greatly affected by a 50 percent reduction![7] This raises the possibility that the use of heptane as the ISO test fuel will enable manufacturers to reduce firefighting capability while claiming conformity with an apparently prestigious Standard.

Full strength?

Other components of foam agents are individually less expensive - but all cost more than water. Some small-scale buyers are almost certainly being sold half-strength foam agent - at rather more than half-price.

Maintaining quality : BS 5750/ISO 9000

The full test procedures of even the small-scale Ministry of Defence Standards are likely to exceed £1,000 per sample, though they could be abbreviated. The ISO-scale must cost much more. Despite the published tests by Corrie[4], the MOD 0.25m fire tests are still assailed for their small scale. Yet rumour has it that quality control of fire-fighting foam agent is in some cases dependent upon a 'traditional' fire test a tenth of the MOD tests (0.02m) - with heptane as fuel! The chances of this resembling a real-life situation seem to be very slender.

BS 5750/ISO 9000 are designed, by elaborate monitoring, to ensure consistent quality. But does the BSI provide the sometimes very specialised expertise to evaluate the test criteria proposed by a manufacturer? I am not aware of any barrier to the use of this 'traditional' 0.02m test method in a BS5750 claim. In which case, is it possible that BS 5750 could be used to ensure consistently mediocre product?

Questions remaining

There is no shortage of opposition to the views expressed in this paper. However, so far there have only been vehement assertions coupled with vague descriptions of firefighting conditions to counter the published refereed data produced by Briggs and Webb[6]. It is not claimed that one test method can evaluate all performance characteristics of a firefighting foam but the test programmes of Reference 6 raise specific questions which need specific answers:

1. The most hazardous commonplace fuel is petrol. Where is the data which consistently relates firefighting foam performance on heptane to that on petrol?
2. If ISO 7203 makes no claim for fire-fighting performance on petrol-type fuels, is it of any value to practising fire-fighters faced, for example, with an overturned burning petrol tanker? (It is broadly true that volatile fuels present the greatest challenge to fire-fighting foams.)
3. Where is the published data which demonstrates that the ISO/heptane fire test method will evaluate the full value of fluoro-additives?
4. If my understanding is correct, the Euro-Standard, which is very similar to ISO 7203 will be legally enforceable as a Europe-wide Standard. Why was there no British-based representative of the petroleum industry on this Committee?
5. Have the members of the oil industry evaluated ISO/CEN in terms of their fire protection needs?
6. Is it reasonable to reassure fire-fighters, who may be risking their lives, with assertions of 'long tradition of success' when, as with many traditions, perhaps it has been a case of 'muddling through?'

Conclusion

My aim in writing this paper has been to draw attention to the scope for down-grading the better existing products. There is a great deal more to petrol and other petroleum products than heptane.

Mr Tony Briggs was formerly a member of staff at the Fire Research Station and at the Home Office Fire Experimental Unit. This paper expresses his own personal viewpoint.

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Negotiations on Energy Charter Treaty almost complete

By Simon Koomen, Deputy Head, International Energy Policy Division, and Laurens Knegt, Deputy Director General for Energy, Dutch Ministry of Economic Affairs

Following three years of highly intensive negotiations between some 50 countries, discussions on the Energy Charter Treaty are now almost complete. The Energy Charter Treaty regulates cooperation on energy matters between all European countries, the former Soviet republics in Asia, the United States, Canada, Australia and Japan. It establishes a basis for national legislation in the countries concerned.

In mid-June, the negotiating partners reached agreement on a broad range of issues under the chairmanship of Charles Rutten. Now, following consultations in the various capital cities, the final treaty provisions can be definitively formulated.

The Charter

The Energy Charter Treaty is the provisional result of a process begun in mid-1990 when the Dutch Prime Minister Ruud Lubbers put forward a proposal at the Dublin Summit for cooperation on energy between Eastern and Western Europe. This proposal was based on a strategy which was ultimately designed to go beyond cooperation on energy alone and was prompted by the rapid changes taking place in the former Eastern Bloc countries. The fundamental idea behind the plan was that cooperation between East and West was desirable as a means of promoting political and economic stability. Given the extent and intensity of the process of change in the East, certain choices had to be made to achieve this stability.

The energy sector seemed the most appropriate area in which to realise this cooperation rapidly and on a large scale. The aim was to foster a climate which would encourage investors to invest in Eastern Europe. This would create a win-win situation in which Eastern European countries would acquire capital, management expertise and technology, while Western countries would gain future suppliers of oil and gas.

The European Commission subsequently adopted the 'Lubbers plan'. In the summer of 1991, negotiations on the European Energy Charter duly began. The Charter was intended to express the political will to undertake cooperation. Within six months, negotiations had been completed and the Charter was signed in The Hague on 17 December 1991, a few days after the disintegration of the Soviet Union. All the former Soviet republics therefore signed independently.

'The Energy Charter Treaty regulates co-operation on energy matters'

Negotiations on the Energy Charter Treaty

The Charter is a declaration of political intent. However, investors require security and it was recognised at the outset that the Charter alone would not be enough to give potential investors the confidence they need. Consequently, while the Charter was still being negotiated, further talks had already begun on how to turn it into a binding agreement under international law. At the time, it was hoped that the Treaty might be concluded very rapidly – in fact it took far less time to negotiate than many other multilateral treaties.

Even so, negotiations did take considerably longer than expected for a number of reasons. One important reason was that the Treaty deals with a large number of often widely divergent matters. These include investment protection, liberalisation of trade as far as possible in conformity with the rules, promotion of fair competition, environmental protection, access to natural resources and maximum freedom for the transit of energy. The Treaty also contains a range of rules for settling disputes, both between Contracting Parties themselves and between an investor and a contracting party.

Furthermore, it was not easy to obtain overall agreement in a negotiating process involving so many countries with such different interests. It was therefore not possible to obtain firm commitments from all the partners on all issues. Consequently, in order to gain consensus in such cases, it was necessary to make do with 'best effort' commitments. It was obviously also impossible to achieve the ideal solution for business and industry in every respect.

Another major problem was that various issues were already being discussed in other international forums. This applied, for example, to the rules on trade, which were being discussed simultaneously in the context of the GATT Uruguay Round. The same applied to rules on investment protection, which had been the topic of OECD negotiations for many years. These discussions mainly revolved around conflicts of interest between the various Western countries. Investment protection and free trade are a permanent source of discussion between the United States and the European Union. Both parties tried to influence the

GATT and OECD talks on these issues through the Energy Charter Treaty negotiations. This resulted in time-consuming discussions and delays. On the other hand there was also some conflict of interests between various Eastern European countries, notably with regard to the provisions on transit.

Another difficulty which had to be overcome was the position of Norway. In all negotiations on energy, Norway has always adopted a tough position, as shown during negotiations on its accession to the IEA and more recently in its treaty of accession to the European Union. However, the pressure which the chairman exercised on the negotiating process led in this instance to a more flexible Norwegian stance, eventually enabling a compromise to be reached. The Norwegians had mainly been unhappy with the formulations concerning sovereign rights, state participation and non-discriminatory access to natural resources.

'The Charter is a declaration of political intent'

Finally, the Charter conference also encountered difficulties with regard to the speed at which the former Communist countries will be able to implement the provisions of the Treaty, since many of the Treaty provisions require them to alter their national legislations. As this will take some time, these countries are allowed to implement a transition phase for some of the articles.

The investment and trade regime

The fact that the system of legislation in the countries of Central and Eastern Europe is not yet sufficiently ready to absorb the Treaty provisions also had considerable repercussions on the investment regime. For business and industry, the article on promotion, protection and treatment of investments is undoubtedly one of the most important in the Treaty. It distinguishes between the treatment of established investors (post-investment) and new investors (pre-investment). Negotiations on this topic were based on the assumption that in both situations, 'national treatment' should apply. National treatment means that all investors will be treated in the same way by a government, regardless of their nationality. In mid-1993, Russia stated that it would take some years before there would be sufficient clarity in its investment regime to apply the rule of national treatment in the pre-investment phase. The conference therefore decided to negotiate this 'pre-investment' situation as quickly as possible in a second, supplementary treaty.

For the post-investment phase, the rule of national treatment is set down in the Treaty as a firm requirement. This constitutes a first important step towards investment protection and this bodes well for the second Treaty. The Energy Charter Treaty also includes various other investment articles which contain firm requirements. These include rules governing the authorised entry of key personnel to manage investments in other countries, rules on compensation for losses resulting from war and the like, rules on expropriation and on the freedom to make transfer of payments. These types of provision are not entirely new to the international investment regime. What is new is that such investment provisions have now been included for the first time in a multilateral treaty. Nevertheless, if other international investment agreements are more favourable to an investor, these more favourable rules will take precedence.

Point of departure for the negotiations on trade provisions was the need for as large a measure of freedom as possible. Initially, the aim was to go beyond the GATT rules as regards the energy sector. However, during the process, it became clear that this would not be feasible. This was partly due to the existence of parallel discussions concerning greater liberalisation of trade in the context of the Uruguay Round.

There was also the added complication that some of the negotiating partners (notably the CIS countries) were not GATT members. The partners therefore eventually agreed to apply the GATT rules. These rules already of course apply to GATT members; non-members will be regarded as though they are already bound by the GATT rules in terms of trade in energy.

Follow-up

During the next few weeks, some remaining Treaty provisions will be definitively formulated. These provisions cover, for instance, the way in which sub-national authorities are bound by the Treaty in federal states such as the United States and Canada, and the consequences of EU legislation introduced to regulate the internal market. Once this has been done, a decision can be taken this summer concerning the Treaty secretariat. The secretariat will need to be small and efficient in order to avoid unnecessary bureaucracy, in accordance with the spirit of the Treaty. Opinions are still divided as to where the secretariat should be based. However, once this hurdle has been overcome, the text of the Treaty can be initialled.

'Another difficulty which had to be overcome was the position of Norway'

After this, the Ministers will probably be able to sign the Treaty formally in Lisbon in October. Naturally, each country will itself be required to decide whether or not to sign. Almost all the signatories to the Charter are expected to sign, although the US situation is at present uncertain. Clearly, US enthusiasm for the Treaty has lessened following the decision to draft a supplementary treaty on pre-investment. Since ratification by the various parliaments will be a lengthy process, most countries are expected to apply the Treaty provisionally as soon as it is signed.

However, the process does not end there. On 1 January 1995, negotiations on the supplementary treaty will begin. These talks, which are due to end in three years time, concern national treatment during the pre-investment phase. They are not expected to be easy, since in international terms this rule is applied less uniformly, including within Western countries. Moreover, the new Charter Conference will also be required to discuss other topics, such as the Swiss/Swedish proposal to include equipment under the Treaty. It will also be required to study the consequences of the Uruguay Round for the Treaty, since important topics for the energy sector, such as services and government procurement are not yet covered.

Some work will also have to be done on specific sectoral protocols. These protocols will also contain legally-binding texts. An Energy Efficiency Protocol has already been completed and is likely to be ready for signing at the same time as the Energy Charter Treaty. The status of the nuclear protocol, which is also near completion, is now uncertain. A similar binding draft treaty, the Nuclear Safety Convention, should perhaps be given preference.

Finally, the various governments will, where necessary, be required to translate the rules contained in the Energy Charter Treaty into their own national legislation. In this way a national and international policy and legal framework will come into existence which will help to bring about the confidence needed in business and industry. This confidence must pave the way for investments in the energy sector in Central and Eastern European countries which will offer a reasonable opportunity for profit yet without running unacceptable non-economic risks. This throws the challenge back to business and industry.

IP INFORMATION SERVICE NEWS

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Neutralising underground storage tanks

A range of hydrophobic hard foam products which provide 'permanent neutralisation of redundant underground fuel storage tanks' is now available in the United Kingdom from Tanksafe.

Commonly used on the Continent, both RG22 and RG8 (for use when tanks are to be removed) are said to hold many environmental and financial advantages over traditional methods such as slurry filling.

RG22 is produced from urea formaldehyde resin and has the capacity to rapidly absorb the whole range of hydrocarbons, together with other substances such as acetone, benzene, trichloroethylene and fluorobenzene.

The tank residues which sweat from the tank's walls are absorbed and stabilised by the foam during injection. This eliminates all risks to the environment, according to the supplier.

The foam will absorb escaped hydrocarbons in the case of a leaking tank. Once hardened, it maintains a stable and durable state.

On site, application does not require particular precautions, other than the standard safety procedures prescribed when working on underground storage tanks which have contained hydrocarbons. Air and vapour is evacuated through the vent pipe. It is not necessary to disconnect all lines and remove the tank lid and cleaning is not required.

The resin is mixed with a hardener, under a pressure of seven bar, in the mixing chamber of the injector and injected into the tank. The foam expands and fills up the tank entirely, leaving no pockets or empty spaces. When the tank is full, the openings are capped and the manhole chamber is filled with foam.

Once expanded and hardened, the foam resists to pressures of up to 2.2 tonnes per m^2. It contains 22-25 kg of solid material per 1,000 litres. The rest is air which means that, when removing the foam, the waste quantity is low and easy to dispose of.

Neutralising storage tanks with foam

PC-compatible IP66 computer

Micro Control Systems has launched a PC-compatible computer sealed to IP66 standard for use in hostile environments.

The IP2000 has been achieved with advanced, low-power, PC-on-a-chip technology. With no need for fans and filters, reliable operation is guaranteed, claims the company, and there is no routine maintenance requirement.

System integrators can cost-effectively tailor the computer to a wide range of quality control applications. This is achieved through a range of expansion cards, interfaced via the PC104 bus and providing serial and parallel I/O and networking facilities. There is a choice of high-capacity internal storage options, including EPROM and SRAM-based silicon disks, and a shock-mounted hard disk.

The IP2000

New cable research and development centre

A state-of-the-art 4,000 sq ft cable and connecting system research and development centre has been opened by Centrilift.

The centre has been set up to develop products to cope with the rapidly growing area of challenging environments.

In addition, the facility offers complete failure analysis and reliability services, high voltage electrical testing, high temperature/high pressure tests. Extensive proprietary database and record keeping is maintained for historical analysis, as well as current and projected trends.

In the teardown/reliability sector, returned field samples are systematically taken apart and analysed to enable a full study of the effects of the downhole environment on the various materials.

High voltage (up to 150 KVAC and 200 KVDC), withstand and breakdown tests are performed on cables and splices to provide direct comparisons of materials, following actual field or simulated downhole conditions. Each high voltage test unit is fully-automated and designed to perform stepped voltage tests at a variety of time intervals.

For high temperature/high pressure testing, a pair of autoclaves is used to simulate downhole conditions to a maximum of 500°F and 5,000 psi.

Vessel sampling made simpler

The Dopak process sampling system based on single-handed operation and sealed sample collection is now widely used throughout the petrochemical industry.

A further addition to the range is the System 32, which is now available from supplier, Newson Gale. This allows accurate representative samples to be taken from process vessels under vacuum or pressure.

A typical application is sampling through a dip-tube in the top of a vessel. The dip-tube can be purged with nitrogen, thus ensuring accurate and representative samples.

The sample can then be drawn up from the vessel using either a site vacuum source or a Dopak venturi system. The product is sampled into a self-sealing container and taken to the laboratory for analysis.

The entire operation is carried out using only one handle, which is designed to ensure greater operator safety and reducing the chance of valve sequence errors.

A wide choice of standard and exotic wetted materials are offered, enabling compatibility with aggressive, corrosive and difficult process liquids.

Small seals for pressure gauges

A range of cost-effective diaphragm seals is now available from Allison Engineering Ltd, for use in conjunction with 3D 'direct drive' pressure gauges.

The 3D design – which features a single helically-wound Inconel Coil without the need for amplifying gears – requires only 0.2cc volumetric displacement for full actuation. An ordinary C-bourbon style gauge requires 50 times this figure, claims the company.

'Because of this a diaphragm seal may be utilised, which is much smaller in size and cost than conventional designs.'

Two types are offered – the Model GP140 which is an external design available in 316 Stainless Steel, Hastelloy C, or Monel and the Model GP400 which fits integral within the stem of the gauge and features a material combination of 316 Stainless Steel and either a Viton or EPDM Elastomer. This is most suitable for various liquid services including freeze protection, or the ultimate in dampening.

Small diaphragm seals now available for 3D direct drive pressure gauges

New signal conditioner

Rochester Instruments have announced a new signal conditioner, which offers 'exceptional noise immunity allowing for use in the most demanding of industrial environments'.

Suitable for head or field mounting, the SC4400 is said to provide excellent accuracy and stability, typically 0.1 percent of span and a wide operating temperature range from -20°C to +80°C. The company claims that the two-wire conditioner offers the lowest lift-off voltage available (just 10v) and enables low-cost barrier selection.

The transmitter can be set up and integrated for any input type and range using windows via a PC, or through an adapted Psion organiser without the need for a separately-powered configuration box. A handheld configurator allows transmitter parameters to be modified at the process without breaking the output loop.

The conditioner can be mounted on any type of temperature connection head or alongside the process on a DIN rail. The lid design enables installation in hazardous areas without further protection, or alternatively the unit can be positioned in a weatherproof enclosure.

Explosion-proof machine safety sensors

Relec Electronics has announced the availability of explosion-proof safety switch sensors for its Elobau machine safety system.

The new sensors are designed and approved for use in the immediate vicinity of machines handling volatile materials, such as those found in petrochemical plants.

Used on hinged guards and at other critical access points, the sensors are designed to prevent machine operation when personnel are at risk from safety. The sensors will function when in close proximity to the relevant magnet. A central control unit monitors switches within the sensors through a set of electro-mechanical relays which are interlocked and cross-monitored with each other.

A major feature of the Elobau design is the use of coded magnets to activate the sensors, thereby making it virtually impossible to manipulate or bypass safety interlocks. Use of a non-contacting method also makes for ease of installation and alignment.

Up to 25 sensors can be managed by a single central controller in large system applications and there is a smaller two-sensor control unit for use in simpler installations.

The complete machine safety switch system, including sensors, control units, interface units and power amplifiers, has been tested and approved to DIN VDE 0660/209. This standard specifies all the necessary requirements for proximity type machine safety systems.

Mobile life support system

Factair has launched its new Mobile Life Support System, which provides continuous breathable air for up to eight operatives working in confined spaces or hazardous environments.

The BA60D incorporates an oil-flooded screw compressor, powered by a water-cooled diesel engine, air treatment filters and a CO and CO_2 removal unit. It is designed to produce air 400,000 times cleaner than we normally breathe.

Safety features built into the unit are: safety start; automatic high-pressure reserve air which is activated on the loss of the low-pressure supply; continuous gas monitoring of the air intake; visual and audible alarms; as well as all the standard devices needed for a machine to work in controlled areas.

The machine has integral drip trays and all condensate is collected in a sealed section of the chassis which can be emptied once a day and disposed of safely.

The unit is also small, compact, and road-towable.

Air for up to eight operatives

ISO 9000 buried?

A completely new method of tracing user and product in the installation of UPP Pipework Systems has been announced by PetroTechnik.

When UPP pipework is installed using the thermo-welded coupling method, a light pen attached to a welding set can read coded information from pipe, fittings and the installer's personnel to show where, when, how and by whom an underground pipework installation of the system was carried out.

This information can be printed out on a serial or line printer on site, or can be downloaded to a PC.

TECHNOLOGY NEWS

Data access initiative

The Common Industry Data Access Initiative (CIDAI) is designed to rationalise geotechnical data management practices in Britain.

Currently, each oil company keeps individual copies of the geotechnical data to which it is entitled. By providing a 'Common Entitlements Index', the Initiative will reduce the need for multiple copies and thereby minimise data storage and reprographic costs. The Index will also facilitate data trading, brokerage and the release of information. By enabling the exchange of digital data, the Initiative will also provide a framework for sharing the costs of moving towards a high-quality on-line digital data set for the industry.

A consortium has been formed to progress the initial phase of the project which will focus on well log data. The contract award for this first phase is scheduled for September. Amerada Hess has been appointed Consortium Co-ordinator.

Solution to mismatched pipes

Hydra-Tight has increased its range of mechanical pipeline coupling systems having developed a wide range of options to overcome pipeline misalignment problems, mismatched pipe endings and space restrictions.

Based on the company's Morgrip weldless mechanical pipe coupling, the new systems are designed to provide easy, permanent installations.

The couplings can also be removed and re-used with new seals and are suitable for new constructions as well as repair applications.

The standard straight pipe to pipe connector uses a double-ended modular Morgrip coupling which can be from one inch up to 48 inches in diameter with pressure ratings up to 10,000 psi (680 Bar), providing a weldless coupling for joining plain pipe to pipe. This can take nominal misalignment but is primarily for pipe that is accurately laid.

However, for misalignment up to 10° in any direction, an agreement with Taper-Lok UK, allowing the use of their misalignment flange in conjunction with the Morgrip provides an answer to the problem of connecting misaligned pipe and can compensate for short pipe lengths. The resultant connector can be used to connect pipe to pipe or pipe to flange combinations.

A further option incorporates a single-sided Morgrip coupling connector fitted with an integral flange adapter. This enables a plain pipe length to be connected to an existing API type flanged pipe.

There is also a similar development which again uses only one half of a Morgrip coupling, but which is lighter and more compact that the flange adapter. Called the pipe adaptor, it enables a coupling to be used on plain pipe with a special flanged union on the other pipe end.

Mobile water treatment service

Ecolochem International is a new firm specialising in mobile water treatment.

Sister company to Ecolochem Inc, claimed to be America's largest mobile water treatment services company, this new firm is now offering the same service to Europe.

A variety of water treatment systems are provided, including reverse osmosis, de-mineralisation, de-oxygenation, filtration, activated carbon adsorption and ion-exchange softening.

The company claims it can dispatch a water treatment plant by road from the nearest depot in a matter of hours. A range of permanent on-site water treatment systems and equipment for cost-effective water treatment is also provided.

Ecolochem's mobile water treatment plant ready for dispatch

Solids-free drilling fluids

A new family of versatile drilling and completion fluids which, unlike conventional fluids, contain no barite weighting material has been launched.

Clear-Drill™ is an extension to the range offered by Baker Hughes INTEQ and is applicable to most types of well, particularly slim hole, extended reach and production zone drilling.

Densites from 1.2 SG (10 lb/gallon) to 2.35 SG (19.6 lb/gallon) are achieved by the utilisation of a range of highly-soluble organic acid salts which are compatible with other drilling and completion fluid polymers/additives.

The resulting fluids are said to offer excellent performance with low plastic viscosities and minimal downhole pressure losses, in both high and low temperature applications.

'They are non-corrosive, non-damaging to the reservoir, capable of flowing through prepacked screen and gravel packs, offer superior filter cake removal during clean-up and are environmentally acceptable', claims Baker Hughes INTEQ.

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Captain G Gray, Haa, Aywick, East Yell, Shetland, ZE2 9AX
Captain A G Greenwood, 1 Trafalgar Place, Gosport Street, Lymington, Hampshire, SO41 9AN
Mr M Gregory, Ro-Dor Limited, Stonefield Park, Martins Lane, Chilbolton, Stockbridge, Hants, SO20 6BL
Mr D H Grocott, D.H. Grocott Limited, 613 Crewe Road, Wistaston, Crewe, CW2 6PR
Mr S M Gwinnutt, 43 Elgie Road, Glenwood, Durban, South Africa.
Dr R L Handley, 29 St Peters Road, St Margarets, Twickenham, Middx, TW1 1QY
Mr A P Harding, 26 Carters Road, Epsom, Surrey, KT17 4WE
Mr P S Harris, 44 Springfield Avenue, St Michaels, Tenterden, Kent, TN30 6NJ
Dr A D Hearle, Shell Marketing (Oman) Limited, PO Box 38, Postal Code 116, Mina Al Fahal, Oman.
Mr I L Hignett, Orchard Cottage, Chewton Keynsham, Bristol, BS18 2ST
Mr L J Hinrichs, The Stables, Pitfour Castle, St Madoes, Perthshire, PH2 7NJ
Mr C Hipolito, Gasodata, Estrada De Chelas, 160-B, 1900 Lisbon, Portugal.
Mr P Hitchens, Nikko Europe plc, 55 Victoria Street, London, SW1H 0EU
Mr J H N Horne, Intermark (Europe) Limited, Oldhouse Farm, Wakes Colne, Colchester, Essex, CO6 2DR
Mr M Hosaka, Abu Dhabi Oil Company Limited, PO Box 630, Abu Dhabi, United Arab Emirates.
Dr M Hutter, Gymnasiumstrasse 47, 1180 Vienna, Austria.
Mr V E Ingledew, Sgt's Mess, RAF SEK Kong, BFPO 1
Mr R H Ise, Lyondell Citgo Refining Co. One Houston Center, Suite 1300, PO Box 4454, Houston, Texas 72210-4454 USA.
Mr R Janan, Jawaby Oil Company, 15-17 Lodge Road, London, NW8 7JA
Mr D L Johnson, 51 Hayfield Terrace, Muirpark, Denny, Stirlingshire, FK6 5PA
Dr L Juchniewicz, Ingenieurgesellschaft mbH, Beim Zeugamt 6, 21509 Glinde, Germany.
Mr K M W Kani, 47 Lauderdale Drive, Richmond, Surrey, TW10 7BS
Captain C Kelly, Chapel Cottage, 87 High Street, Burringham, Scunthorpe, South Humberside, DN17 3NE
Mr C F Kershaw, Oak Bank, Pearce Lane, Wingerworth, Chesterfield, Derbyshire, S45 6RA
Mr M R P Kohut, 160 John O'Gaunts Way, Belper, Derbyshire, DE56 0DG
Mr E H Koscielski, 4 Yew Tree Lane, Appleton Thorn, Warrington, WA4 4QZ
Mr W D Lamb, Graham Miller Group, PO Box 25781, Safat 13118 Kuwait.
Mr R L Linnell, Shell UK Oil, Shell-Mex House, Strand, London, WC2R 0DX
Miss A E Little, Petrolite, Minto Drive, Altens, Aberdeen, AB1 4LW
Mr J M McDonald, 92 Gerrards Lane, Sutton Leach, St Helens, Merseyside, WA9 4PY
Mr J G McIlroy, Hardy Oil & Gas, Commonwealth House., 2 Chalkhill Road, London.
Mr D N Miles, Risk & Investment Management Group, PO Box 17691, Jeddah 21494, Saudi Arabia.
Mr S M Mills, Mars & Company, 12-18 Grosvenor Gardens, London, SW1W 0DH

Around the Branches

Southern Branch
10 September: Ball Event 1994, Winchester Guildhall.

20 September: Tour of Crude Supply and Road Tanker facilities. BP Hamble

West of Scotland Branch
15 September: West of Scotland Annual Golf Tournament, Ralston Golf Club.
For further details, contact: W H Beaton, 63 Carlton Place, Glasgow G5 9TW, Tel: 041-420 1322

INSTITUTE NEWS

Mrs J A Morgan, Farm Cottage, Felmersham Road, Carlton, Bedford, MK43 7NA
Mr M Morris, BP Exploration, 4/5 Love Walk, Stockley Park, Uxbridge, Middx, UB11 1BP
Mr W M Mundia, Systems Research Consultants Ltd, PO Box 75510, Nairobi, Kenya.
Mr W R G Musgrave, 67 Emsworth Drive, Eaglescliffe, Stocton on Tees, Cleveland, TS16 0NP
Capt S K N Naqvi, Oil Lab & Marine Surveyors Co. Ltd, PO Box 6400, Sharjah, United Arab Emirates.
Mr D Nelson, Human Resources, Conoco (UK) Ltd, Rubislaw House, Rubislaw Drive, Aberdeen, AB2 4AZ
Mr H G Newbury, Subsea Offshore Ltd, Greenwell Base, Greenwell Road, Aberdeen.
Mr P G Obee, Thomas Howell Group (Saudi Arabia), Ltd., PO Box 7974, Riyadh 11472 Saudi Arabia.
Mr P A Orton, 5 Queens Gardens, Aberdeen, AB1 6YD
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Mr H Pritchard, Pritchard Associates, 12 Carr Manor View, Leeds, LS17 5AQ
Mr T Protonotarios, 135 Greenhill, Prince Arthur Road, London, NW3 5TY
Mr J S Richards, Bechtel, PO Box 739, 245 Hammersmith Road, London, W6 8DP
Mr J T Robson, Cornwall County Fire Brigade, Brigade HQ, Station Road, Truro, Cornwall, TR1 3HA
Mr P Saunders, Clovemead Ltd, Brunel House, Vale Owen Road, Orford Green, Warrington, WA2 8NZ
Mr T N Sear, Edgmount, Portley Wood Road, Whyteleafe, Surrey, CR3 0BP
Mr W T Silvester, 24 Knightcott Road, Banwell, Weston-Super-Mare, Avon, BS24 6UA
Mr H B Sisk, Waterstown, Sallins, Co. Kildare, Ireland.
Mr J Smith, 93 Studley Road, Redditch, Worcestershire, B98 7HF
Mrs L Smith, Fina plc, Fina House, Ashley Avenue, Epsom, Surrey, KT18 5AD
Mr D Sowerbutts, 5 Albany Park Drive, Winnersh, Wokingham, Berkshire, RG11 5HZ
Dr F Spathopoulos, 150 Woodfield Way, London, N11 2NU
Mr P V Steed, London, Muse, Stancil & Co. 3 Berkeley Square, London, W1X 5HG
Mr T M Sylva, Joint Oil, Serv. Ltd, Blk 1 7th Close, Elekahia Estate PO Box 12402, Port Harcourt Nigeria.
Mr H Tair-Meragueb, 59 Clarence Gate Gardens, Glentworth Street, London, NW1 6QS
Mr T Taylor, Thomas Sands & Partners, Commercial Wharf, 6 Commercial St, Manchester, M15 4PZ
Mr L A Tett, PO Box 12, Dursley, Glos, GL11 4PA
Mr A D Thompson, AT Enterprises, 30 Wilmot Way, Banstead, Surrey, SM7 2PY
Mrs P M Trott, Densigns, Petroleum Developments Ltd, Suite No 1 Morland House, Morland Av, Stoneygate, Leicester, LE2 2PF
Mr J S Tudhope, Pengarth, 9 Raikes Avenues, Skipton, North Yorkshire, BD23 1LP
Mr S E Ugboaja, c/o Marine Mutual Services, Allenby House, 1A Temple Road, London, NW2 6PJ
Mr G Ulloa, Calle 31 No 16-B, CD Del Carmen, Campeche, Mexico.
Mr R Vanderpelen, Kasteellan 18, Ternat 1740, Belgium.
Mr T D Vickers, 19 Verity Crescent, Canford Heath, Poole, Dorset, BH17 7TP
Dr I Walker, 17 Treadwell Road, Epsom, Surrey, KT18 5JP
Mr N G Walters, Retail Technology Services, Pleasant Place, Holm Oak Green, Cardington, Bedford, MK44 3SU
Mr R C Weeks, Geotechnical Instruments (UK) Ltd, Sovereign House, Queensway, Leamington Spa, Warks, CV31 3JR
Mr S R Whileman, 14 Greenwood Avenue, Rownhams, Southampton, Hants, SO16 8JS
Mr W G Whyte, Partner, King Sturge & Co. 32 Castle Street, Edinburgh, EH2 3HT
Mr R Wilmot, Home Platt, Smarden, Ashford, Kent, TN27 8RB
Mr K G Warner, 25 Green Hills Road, Norwich, Norfolk, NR3 3ET
Mr C B Waterhouse, 246 Ongar Road, Brentwood, Essex, CM15 9DX
Mr J Welsh,Lubrizol Ltd, Dock Road South, Bromborough, Wirral, Merseyside, L62 4SH
Mr M A Wilkinson, Bechtel Ltd, 245 Hammersmith Road, London, W6 5DP
Miss S M A Wong, Chemical & Biochemical Eng Dept. University College, London, Torrington Place, London, WC1E 7JE

NEW COLLECTIVE MEMBER

Furmanite International, Furman House, Shap Road, Kendal, Cumbria LA9 6RU
IP Nominated Representative: Mr Alan Petrie
Furmanite International Limited supply a range of specialist services using multi-disciplined teams to carry out under pressure engineering including leak sealing, hot tapping, pipeline intervention and pipe freezing. Teams are also available to supply on-site machining and controlled bolt tightening services. Service is available world-wide.

STUDENTS

Mr A Adekomaiya, 12 Monteagle Court, Stanway Street, London, N1 6RJ

AWARD WINNERS

Mr M D Cann, 91 Crossway, Three Bridges, Crawley, West Sussex, RH10 1QU
Mr D J Lackenby, 46 Ballycorr Road, Ballyclare, Co. Antrim, Northern Ireland, BT39 9DD

UK Deliveries into Consumption (tonnes)

Products	*†May 1993*	**May 1994*	*†Jan-May 1993*	**Jan-May 1994*	*% Change*
Naphtha/LDF	188,234.0	210,609.0	1,239,780.0	1,241,352.0	0
ATF – Kerosene	660,169.0	637,646.0	2,650,360.0	2,717,341.0	3
Petrol	1,959,009.0	1,925,221.0	9,719,654.0	9,309,290.0	-4
of which unleaded	1,026,589.0	1,094,226.0	4,961,944.0	5,227,429.0	5
of which Super unleaded	119,966.0	122,507.0	598,600.0	581,579.0	-3
Premium unleaded	906,623.0	971,719.0	4,363,344.0	4,645,850.0	6
Burning Oil	138,389.0	108,449.0	1,173,927.0	1,351,796.0	15
Derv Fuel	939,629.0	1,025,715.0	4,744,283.0	5,072,017.0	7
Gas/Diesel Oil	540,362.0	565,660.0	3,380,410.0	3,356,080.0	-1
Fuel Oil	808,807.0	840,136.0	4,421,462.0	4,232,836.0	-4
Lubricating Oil	62,592.0	66,575.0	335,188.0	320,605.0	-4
Other Products	577,154.0	676,266.0	3,140,872.0	3,260,946.0	4
Total above	**5,874,345.0**	**6,056,277.0**	**30,805,936.0**	**30,862,263.0**	**0**
Refinery Consumption	523,025.0	545,104.0	2,575,946.0	2,630,100.0	2
Total all products	**6,397,370.0**	**6,601,381.0**	**33,381,882.0**	**33,492,363.0**	**0**

*† Revised with adjustments *preliminary*

FORTHCOMING EVENTS

August

16th-18th
Brighton: 'Heat Exchange Engineering '94'. Details: Ron Cordeiro
Tel: 081 948 9896

23rd-26th
Norway: 'Offshore Northern Seas'. Details: Conference Secretariat, , PO Box 410, Gunnar Warebergsgt. 134001 Stavanger, Norway.
Tel: 47 51 53 55 45/46
Fax: 47 51 55 22 70

29th-31st
Netherlands: 'Eurock '94, Rock Mechanics in Petroleum Engineering'. Details: Hugo Johnson, Society of Petroleum Engineers, 4 Mandeville Place, London, W1M 5LA.
Tel: 44 71 487 4250
Fax: 44 71 487 4229

29th-1st September
Perth, Australia: 'Third International Conference on Environmental Issues and Waste Management in Energy and Mineral Production'. Details: Co-ordinated Functions Pty Ltd., PO Box 1305, West Perth, WA 6872 Australia.
Tel: 61 9 324 2555
Fax: 61 9 324 2666

September

5th-9th
Italy: 'XIII Imeko World Congress, From Measurement to Innovation'. Details: XIII Imeko World Congress Secretariat, Lingotto Congressi, Expo 2000 Spa, Via Nizza 294-10126 Torino, Italy.
Tel: 39 11 66 44 111
Fax: 39 11 31 21 697

5th-9th
Perth, Australia: 'Fourth Large Open Pit Mining Conference, Managing Risk for Open Pit Mines'. Details: The Secretary, Fourth Large Open Pit Conference, PO Box 6477, East Perth WA 6892, Australia.
Tel: 61 9 222 3095.
Fax: 61 9 325 2280

6th-8th
Paris: 'Strategic Management and International Partnerships with the Former Soviet Union. How to get it right' Details:CIBD, Kennedy House, 115 Hammersmith Road, London, W14 0QH.
Tel: 44 71 603 1000
Fax: 44 71 602 4000

8th
Aberdeen: 'EDI for the Energy & Utilities Sector'. Details: The EDI Association, 148 Buckingham Palace Road, London, SW1W 9TR.
Tel: 071 824 8848
Fax: 071 824 8114

12th-15th
Reading: 'Separations for Biotechnology'. Details: Society of Chemical Industry, 14/15 Belgrave Square, London, SW1X 8PS.
Tel: 071-235 3681
Fax: 071 823 1698

15th-16th
Southampton: 'ICE Technology '94'. Details: Liz Johnstone, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO40 7AA.
Tel: 44 0703 293323
Fax: 44 0703 292853

18th-23rd
Oxford: 'Natural Gas: The Commercial Challengers'. Details: Anita Gardiner, The Alphatania Group, London.
Tel: 44 71 613 0087
Fax: 44 71 613 0094

18th-28th
France: 'PEL's 26th International Petroleum Executive Seminar'. Details: Miss L A Bolton, Education Administration, Petroleum Economics Ltd, Piercy House, 7 Copthall Avenue, London, EC2R 7BU, UK.
Tel: 44 071 638 3758
Telefax: 44 071 638 3708
Telex: 225573 PETEC G

19th-21st
Manchester: 'Valves and Actuators – Applications and Developments'. Details: Lorraine Cookham, Independent Technical Conferences Ltd, PO Box 452, Kempston, Bedford, MK43 9PL.
Tel: 44 (0)234 854756
Fax: 44 (0) 234 841375

19th-24th
Berlin: 'THERMIE Exhibition - Promotion of European Energy Technology'. Details: OPET-CS Communications Documentation Section.
Fax: 32 2 7715611

21st
Hertfordshire: 'Microbiological Methods for the Petroleum Industry, A "Hands-On" Workshop'. Details: Caroline Little, The Institute of Petroleum.

22nd-23rd
London: 'UK and International Oil & Gas Taxation'. Details: Customer Services Manager, IIR Ltd, 28th Floor, Centre Point, 103 New Oxford Street, London, WC1A 1DD.
Tel: 44 71 412 0141
Fax: 44 71 412 0145

27th-28th
London: 'Achieving Cost-Effective Maintenance'. Details:IIR Ltd, Industrial Division 28th Floor, Centre Point, 103 New Oxford Street, London, WC1A 1DD.
Tel: 071 412 0141
Fax: 071 412 0145

26th-28th
Cyprus: 'Middle East Strategy to the Year 2007'. Details: APS Europe/TT, PO Box 2501, London, W5 2LR.
Fax: 44 81 566 7674

27th-28th
Aberdeen: 'Human Factors in Offshore Safety, Their Importance in Safety Case Preparation'. Details: Louise Pasha, Business. Seminars International.
Tel: 44 71 490 3774
Fax: 44 71 490 8932

27th
London: 'Pipeline Seminar to Focus on the Problems of the 1990s'. Details: SEN, 2 Marlborough Street, Farringdon, Oxon. SN7 7JP.
Tel: 0367 242525
Fax: 0367 241125

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

28th-29th
London: 'Creating Value through Improved Strategic Decision Making in Upstream Oil & Gas'. Details: Lucinda Middleton.
Tel: 44 71 637 4383
Fax: 44 71 631 3214

29th
London: 'Requalification and Decommissioning of Ageing Offshore Installations'. Details: Gareth Edwards.
Tel: 071 973 1243.

October

3rd-6th
Perth, Australia: 'The "Good Oil" on Oil Spill Prevention'. Details: Spillcon '94, Conference Secretariat, C/- Thomas Cook Conference and Incentive Travel Management, 14th Floor, 257 Collins Street, Melbourne, Victoria 3000, Australia.
Tel: 61 3 650 2555
Fax: 61 3 650 3995

5th
London: 'The Tanker Market/Entering a New Era?'. Details: Caroline Little, The Institute of Petroleum.

FORTHCOMING EVENTS

5th-7th
Poland: '1st Silesian International Conference on Coalbed Methane Utilisation'. Details: Jan Surówka Fewe, ul. Powstanców 41A, 40-024 Katowice, Poland.
Tel/Fax: 483 155 2729

7th
Malaysia: 'Gastech '94 – The 16th International LNG/LPG Conference & Exhibition'. Details: Gastech Secretariat, London RAI, Glen House, 200/208 Tottenham Court Road, London, W1P 9LA.
Tel:44 71 436 9774
Fax: 44 71 436 5694

12th
London: 'Waste to Energy Projects'. Details: Sarah Ashmore/Liz Hide.
Tel: 071 637 4383
Fax: 071 631 3214

10th-14th
Thessaloniki Greece: 'European Wind Energy Association Conference and Exhibition'. Details: The Secretary, Organising Committe EWEC '94. 19th km Marathonos Ave. 190 09 Pikermi, Attica, Greece.
Tel: 01 6039900/3627069
Fax: 01 6039904/5, 361 4709

11th-12th
Austria: '1994 International Conference on Trading and Transportation of Oil and Gas in the Former Soviet Union'. Details: Business Seminars International Ltd, The Old Court House, Hurst Green, East Sussex, TN19 7QP.
Tel: 44 71 490 3774
Fax: 44 580 860304

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

17th-18th
London: 'Oil & Money'. Details: Brenda Hagerty, International Herald Tribune, 63 Long Acre, London, WC2.
Tel: 44 71 836 4802
Fax: 44 71 836 0717

18th-19th
London: 'Update on Sour Service: Materials Maintenance & Inspection in the Oil & Gas Industry'. Details: Nadia Ross, IBC Technical Services Ltd.
Tel: 071 637 4383
Fax: 071 631 3214

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

19th
London: 'Environment Management Systems – Implications for the Oil Industry'. Details: Caroline Little, The Institute of Petroleum.

24th-25th
London: 'International Polypropylene Conference'. Details: Ms M Peacock. Conference Department (C446), The Institute of Materials, 1 Carlton House Terrace, London, SW1Y 5DB.
Tel: 071 839 4071/235 1391
Fax: 071 823 1638

25th
Aberdeen: 'Developing Partnerships in the Oil Industry'. Details: Robin Bowden.
Tel: 041 332 2827

25th-27th
France: '12th International Conference on Jet Cutting Technology'. Details: Ms Tracey Peters, Conference Organiser, BHR Group Ltd, Crabfirld, Bedford, MK43 0AJ.
Tel: 44 234 750422
Fax: 44 234 750074

30th-1st November
London: 'Tecon International '94 Living with Technology'. Details: Marianne Hadley, Conference Line, 5 Leopold Road, Wimbledon, London, SW19 7BB.
Tel: 081 944 0444.
Fax: 081 944 0866.

November

1st-3rd
Birmingham: '8th ProcAnEx Exhibition'. Details James (Exhibitions) Ltd, 6 Anne Mount, 44 Madeley Road, London, W5 2LU.
Tel: 081 998 4684
Fax: 081 998 8733

1st-3rd
Birmingham: 'ProcAnEx Conference'. Details: Nadine Hutchins, PIJ, 32 Vauxhall Bridge Road, London, SW1V 2SS.
Tel: 071 973 6404
Fax: 071 233 5052

3rd
London: 'Education and Training Conference, Life after Re-engineering'. Details: Caroline Little, The Institute of Petroleum.

7th-10th
Philippines: 'Water Philippines '94'. Details: Mr Howard Phillips.
Tel: 44 923 228577
Fax: 44 923 221346

8th-10th
Birmingham: 'IWEX '94, International Water and Effluent Treatment Exhibition'. Details: Mr Paul Tweedale.
Tel: 44 923 228577
Fax: 44 923 221346

10th
London: 'IFEG Conference "Beyond the Bookshelf"'. Details: Caroline Little, The Institute of Petroleum.

12th-15th
Egypt: 'Twelfth Petroleum Exploration and Production Conference'. Details: Mr Ahmed Ragheb, E.G.P.C., PO Box 2130 – New Maadi Cairo, Egypt.
Tel: 202 353 1571
Fax: 202 3531457
Telex: 92049 PETMISR UN

15th-17th
Amsterdam: 'Holland Offshore Congress '94'. Details: IRO, Association of Dutch Suppliers in the Oil & Gas Industry, PO Box 7261, 2701 AG Zoetermeer, Netherlands.
Tel: 31 79 411981
Fax: 31 79 419764

15th-17th
Amsterdam: 'Energy Economy '94'. Details: Energy Economy '94 c/o Amsterdam RAI, PO Box 77777, 1070 MS Amsterdam, Netherlands.
Tel: 31 20 549 1212
Fax: 31 20 646 4469

15th 17th
Harrogate UK: 'Liquidex '94'. Details: Ms Kit Stones, The Conference Team, 17 Spriong Road, Kempston, Bedford, MK42 8LS.
Tel/Fax: 0234 343384

15th-17th
Amsterdam: 'Petrotech '94 Emphasis on Environmental Investments'. Details: RAI Press Department, Hans Verweij, Europaplain, Netherlands-1078 GZ Amsterdam.
Tel: 31 20 549 1212
Fax: 31 20 646 4469

16th-18th
London: Techniques for Cost Effective Exploration and Production. Details: Petex Ltd, 17-18 Dover Street, London, W1X 3PB.
Tel: 071 495 5800
Fax: 071 495 7808

16th
London: 'Phase 1 Development of the North Gas Field Project in Qatar'. Details: Gareth Edwards.
Tel: 071 973 1243

IP THE INSTITUTE OF PETROLEUM

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

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

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

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

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

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

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

IP THE INSTITUTE OF PETROLEUM

EXPLORATION AND PRODUCTION DISCUSSION GROUP

EVENING TALK

Wednesday 14 September 1994
5.00 pm for 5.30 pm

Middle East exploration and production – can it meet future demands?

Speaker: Dr Manouchehr Takin,
Centre for Global Energy Studies, London

This meeting will be held at the Institute of Petroleum. Please tell Sjoerd Schuyleman if you plan to attend.
Tel: 071 467 7132 Fax: 071 255 1472

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CIM Locations	Total Capacity m3	Tank size range m3	Number of tanks	Products stored	Comments
LE HAVRE	3,320,000	60,000 to 150,000	38	Crude oils	9 jetties, Max Draught 70ft. VLCC up to 250,000 MT Barge and pipelines Transhipment. Direct link to open sea
ANTIFER	655,000	20,500 to 151,000	2 4	Crude oils	2 jetties. Max Draught 98ft and 82ft. ULCC up to 550,000 M.T. Transhipment. Relay connected to Le Havre facilities above through pipeline. Re-loading on site.
LE HAVRE	1,165,000	600 to 61,000	83	Refined Products Petrochemical Feedstock	Naphta. G.O. Gasoline. Premium. Jet. Kerosene. Deballasting equipment Connected with TRAPIL pipelines.

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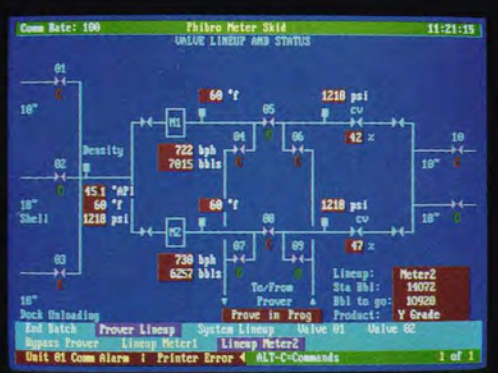

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