AUGUST 1991

The Institute of Petroleum

PETROLEUM REVIEW

Independent bulk storage

A survey of European bulk storage capacity for oil and chemicals

Papua New Guinea

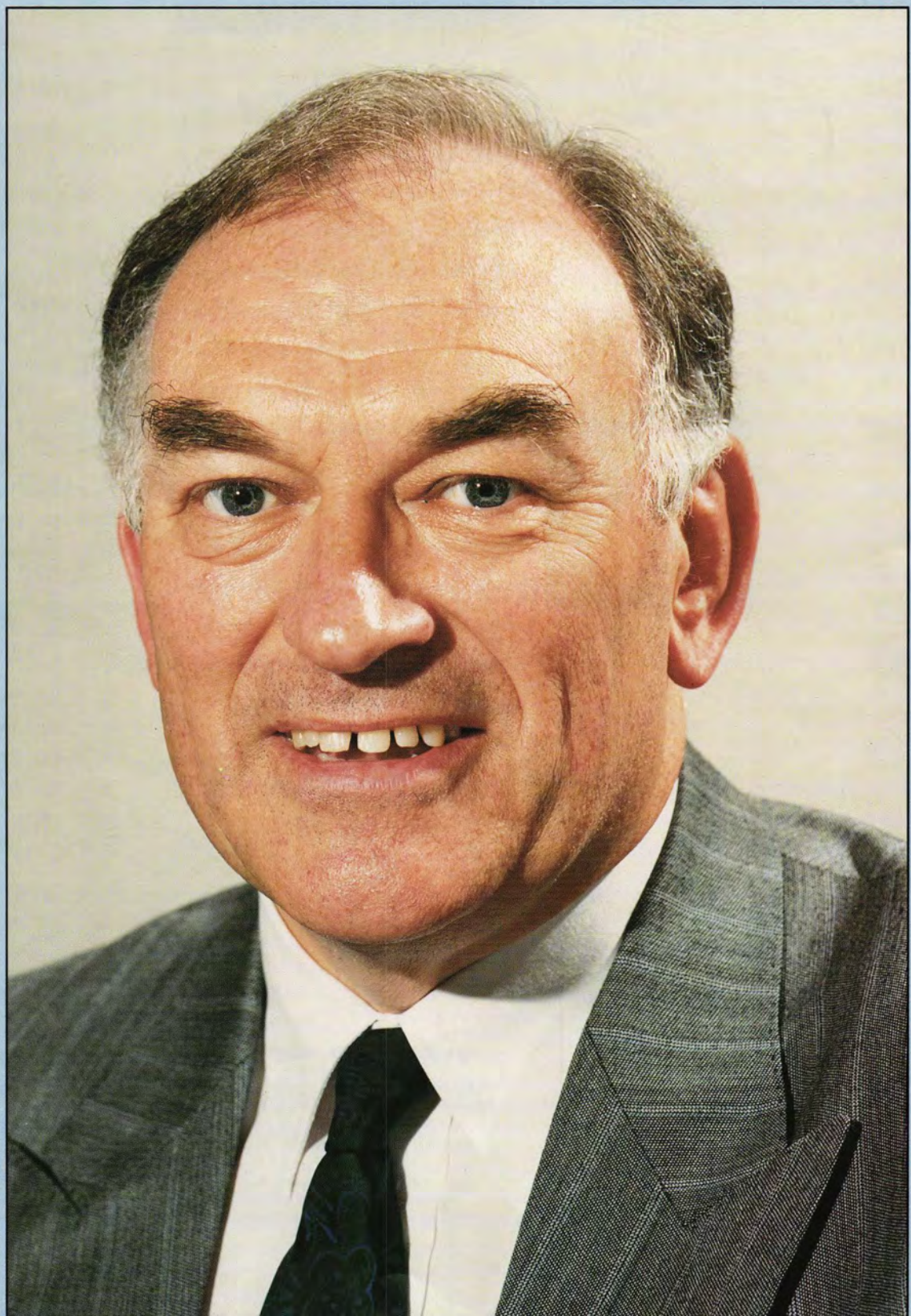
Promising production hopes by William Scholes

Offshore Europe

A preview of the Offshore Europe Exhibition and Conference to be held in September at Aberdeen

Measurement

Minimum displacement necessary for accuracy when determining custody transfer volumes by tank gauging



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MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

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Cover photo of Ian Ward, the new IP Director General. Photo by Jon Whitbourne.

. . . news in brief

15 June

Statoil, the Norwegian state oil company, announced that it has acquired 12.5 percent of the voting shares in Saga Petroleum, the largest privately-owned Norwegian oil company.

The Norwegian government has given Elf Aquitaine clearance to take over the Norwegian Oil Consortium, the independent oil group, for $193.5m.

Portugal is selling 51 percent of the state oil company, Petrogal as part of its privatisation programme.

18 June

Shell Eastern Petroleum has rationalised its oil trading operations in the Asia-Pacific region by setting up the Shell Eastern Trading Company (Sietco).

The representative in London of Dr Roger Billings of Kansas, who has developed the first cars powered by hydrogen, has predicted that the new cars may be in production in Britain by the end of the year.

19 June

John Browne, chief executive of BP Exploration, has predicted that its North Sea oil production will remain at more than half a million barrels per day for the rest of this century.

21 June

Mr Hamoud al-Roqba, the Kuwait oil minister, said that most of Kuwait's oil wells will be capped by March 1992 and the emirate will then be capable of producing and refining enough oil to meet its own needs.

25 June

Amerada Hess has confirmed that development plans for the North Sea's Scott field are to be upgraded with a significant extension to the reservoir.

Cuba has bought its first major oil port into operation at Matanzas, east of Havana.

26 June

The Davy construction company is being bought by the Trafalgar House group for £114m.

The Ranger Oil share of gas from the Anglia field, fuel intended for a joint venture power station with PowerGen, has been sold to National Power.

Tidewater Inc and Zapata Gulf Marine, two major US corporations, are to merge giving them a combined fleet of about 575 vessels, serving the offshore oil and gas industry worldwide.

Agippetroli of Italy has established a joint venture in China's Zhukai special economic zone to build and operate a shipping port for petroleum products.

27 June

The Offshore Safety Association has been formed which aims to provide an information service to those concerned with oil and gas industry safety.

Norway has begun the construction of a 2,500 km pipeline, to be completed over the next five years, following increased gas sales to the Continent.

The Amoco Corporation has reached an agreement with the Soviet Union for the development of an oilfield in the Caspian Sea, 90 miles offshore from Baku, the Azerbaijan capital.

An international consortium led by Texaco has made three new discoveries of crude oil in wildcat wells off the northwest coast of Angola.

28 June

The Royal Bank of Scotland reported that daily North Sea oil production fell in May to about half the level of last autumn and to the lowest level for two years.

29 June

Nissho Iwai, the Japanese trading house, plans to set up a petroleum exploration venture with the Japan Petroleum Exploration Co and Indonesia Petroleum to develop oilfields in Vietnam.

The Norwegian Kvaerner group has won the $64m contract to build the module support frame for the Brage platform.

30 June

A large new oil find in Colombia may boost BP's oil reserves by up to 10 percent.

1 July

Spain's largest power generation company, the state-owned Empresa Nacional de Electricidad, is to increase its stake in the Cia Sevillana de Electricidad power company to 33.5 percent in a £256m deal.

2 July

Mobil announced that a full investigation will be carried out into the accident on the Beryl Alpha platform in which three men were injured.

The John Wood Group of Aberdeen has acquired a significant stake in the Arabian Oil Equipment service of Abu Dhabi, which will establish the group in the Middle East.

3 July

Norwegian oil production reached a record 1.94m bpd this year. Exports of crude oil by the state oil company, Statoil, exceed 1m bpd, making it the largest non-Opec exporter, ahead of BP, Shell and Exxon.

Two new discoveries in the central North Sea were announced by BP.

5 July

Total have agreed to build a $440m oil refinery in the port of Dalian in Liaoning province, near Daqing, China's largest oilfield.

BP announced a North Sea oil find of 130m barrels on the Mungo field, near three previous finds and about 30 km south-east of the Forties field.

Opec produced 22.6m bpd of oil in June, up from 22.4m bpd in May according to a report by the International Energy Agency.

9 July

British Gas has announced that it has agreed to acquire a 24 percent stake in Gasversorgung Sachen Anhalt, a gas distribution company in eastern Germany, in a £5 m deal.

After a 12 year ban, Nigeria has awarded two oil exploration blocks in the delta of the Niger to BP.

10 July

Marathon Petroleum announced that the first gas production had started from the Ballycotton field in the Celtic Sea.

BP and Ecopetrol, the Colombian state oil company, have made an oil discovery in Colombia in excess of 1bn barrels. The discovery has come at a time when the countries existing reserves were falling.

11 July

British Gas is to buy a 24 percent stake in a new gas distribution company set up in Germany at a cost of £5m.

Lasmo, the British independent, announced encouraging drilling results on the Pine field in the North Sea — Block 16/12a.

12 July

A contract worth £17m to refurbish and modify a North Sea drilling rig from Chevron's Ninian Central oil platform has gone to Dutch company Mercon Steel Structures.

British Gas has set aside $200m to invest in joint venture power stations in Southeast Asia.

The Institute of Petroleum

Remediation of Industrial Sites

22 October 1991

A one-day conference

to be held at The Institute of Petroleum, London

The remediation of polluted industrial sites has now become a major environmental issue. Technologies for the clean-up of soil and ground water contaminated by petroleum products and chemicals, include bioremediation techniques that can leave sites intact. It is proposed to hold a conference to discuss the development application of these techniques and hopefully cover some case histories. Speakers will be drawn from academia, industry and restoration companies.

For further information, and a copy of the registration form, please contact

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

Telephone: 071 636 1004. Telex: 264380. Fax: 071 255 1472.

EXPLORATION AND PRODUCTION DISCUSSION GROUP MEETINGS

The following meetings have been arranged:

Thursday, 19 September	Future Outlook for the Offshore Drilling Industry
Thursday, 17 October	Development of Russian Oil and Gas Reserves
Thursday, 28 November	Risk Sharing with Contractors on an EPIC Project

All these meetings will be held at the Institute of Petroleum starting at 5.30 pm. (Tea and biscuits available for 5.00 pm).

For further information, please contact Mr A E Lodge at the Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR. **Tel: 071 636 1004.**

Piper memorial opened

The Queen Mother unveiled a memorial in Aberdeen last month to the 167 men who died during the Piper Alpha disaster three years ago.

Before the ceremony the Queen Mother met some of the 1,000 or so friends and relatives who had gathered at the bronze memorial in the city's Hazelhead Park to pay tribute to the men who died on the Occidental-run platform in 1988.

The 13ft memorial which depicts three life-size oil workers was designed by Scottish artist, Sue Jane Taylor, and stands on a granite plinth, inscribed with the names of the men that died, in the park's newly constructed rose garden. Rev Alan Swinton, Chaplain to Aberdeen Royal Infirmary, said it had taken three years 'to have in place in Aberdeen some fitting tribute to the men who died.'

Huge oil discovery in Colombia

BP Exploration has announced that it has made a significant oil discovery in the Llanos foothills of Colombia, 160 kilometres north-east of the capital, Bogota.

The company said it had tested oil from two pay zones at different depths in its Cusiana 2A well and would be testing additional zones in the coming months.

The discovery is in the 378 square kilometre Santiago de las Atalayas licence which BP operates with a 40 percent stake. Total has an interest of 40 percent, with Triton Energy holding the remaining 20 percent.

BP said it had tested two intervals in the Guadalupe formation, at a depth of between 14,100 and 14,600 feet. They flowed at rates of 2,800 and 2,240 barrels of 30–37 degree API oil and 3.3 and 7.3 million cubic feet of gas a day, through a half-inch choke.

The higher Barco formation, at a depth of between 13,870 and 14,070 feet, tested 1,640 barrels of 38 degree API oil and 11.5 million cubic feet of gas a day, also through a half-inch choke.

Crucial factors

Two factors will be crucial for the continued successful development of the North Sea at a time when the world faces the prospect of uncertain and probably depressed oil prices, warned Dr Chris Fay, Managing Director of Shell UK Exploration and Production.

The first was to ensure that the tax regime matched changing circumstances. The second was to break the tendency of construction activity to go in fits and starts, and instead secure a steady momentum of development.

'As North Sea development matures further, becoming more diverse, complex and innovative, the need for close and constructive dialogue and understanding between the Government and the oil companies will increase.'

He said one of the more worrying consequences of the swings in oil price was the tendency for North Sea construction activity to go in fits and starts.

'The current hype and overheating is dangerous.' warned Dr Fay. 'The North Sea is inherently a high-cost producing area and economically cannot sustain the added burden of overheating and inflation rates currently in the order of 20 percent. Collectively, we need to try and break this cycle and secure the essential ingredients for successful North Sea development — steady, sustained momentum.'

Davy finds purchaser

Trafalgar House has agreed to buy out the ailing construction company Davy for £114 million, following the announcement last month that the engineering firm had made losses on the Emerald producer contract.

Davy put itself up for sale after running into financial difficulties over the floating production platform for the Emerald field, currently being fitted out at Invergordon.

The two companies have been linked before. In 1982 approaches were made to combine the two businesses.

Trafalgar House chief executive Sir Eric Parker, said: 'Trafalgar House has long recognised the excellent fit between Davy's business and Trafalgar House's strategy for its engineering and construction division.'

Sovereign interest

Sovereign Oil & Gas PLC has announced that it has completed the $30 million purchase of a 5 percent interest in the Victor gas field from Mobil North Sea Limited's affiliate, Superior Oil (UK) Limited. The acquisition, which will be effective from last January, has been approved by the Secretary of State for Energy.

Dr David Biggins, Managing Director of Sovereign, said: 'We are pleased to complete this acquisition which will significantly increase the company's gas reserves, widen our North Sea production bases and provide a stable source of income'.

A similar agreement to purchase a 5 percent interest has been negotiated between BP Exploration and Statoil.

HRH Princess Alexandra, Patron of BEN — Motor and Allied Trades Benevolent Fund, officially opened Town Thorns, BEN's fourth residential centre last month.

The Princess toured the £8m building and met residents and their families before unveiling a commemorative plaque at a reception attended by over 400 people, including senior representatives from the motor and allied trades.

Oil-bearing salt domes found

A unique North Sea province of oil-bearing salt domes could benefit British Petroleum's oil reserves to the tune of 660 million barrels.

Interest has been created in the domes following a successful appraisal well on the Mungo field in adjacent blocks 23/16 and 22/20 which proved up a field which could contain estimated reserves of up to 130 million barrels.

Mungo was just one of a collection of six adjacent oil and condensate fields which make up the Diapir province — called after the oil-bearing salt domes that give the area its unique characteristics — some 30 kilometres south east of the Forties.

BP Exploration chief executive John Browne said: 'we can now look seriously at an integrated development scheme.'

The other finds in the province are: Monan (22/20) and Medan (23/22a) with 60 million barrels, Marnock (22/24), a gas condensate field with reserves of 170 million barrels. Machar, 100 million barrels of oil and gas and Erskine, a gas condensate field with 200 million barrels of reserves.

Total Chinese venture

Total-CPF is to set up a joint venture with Chinese partners to build a $440 million refinery in northern China.

The partners are to make an initial investment of $280 million in building on a 200-hectare site in the port of Dalian, where the port terminal can handle tankers of 150,000 to 200,000 tonnes.

Located near China's largest oilfield, Daqing, the plant is hoped to have an annual capacity of five million tonnes once the refinery is in operation in late-1994.

Total will take a 20 percent stake in the project, one of the largest French investments in China.

The facility will refine equal quantities of Arabian light and heavy crude oils from the Middle East, and the products will be aimed mainly at the Japanese, Korean, Taiwan and Hong Kong markets.

Soviet bid

Amoco is to develop an oilfield in the Azerbaijan sector of the Caspian Sea after the first-ever international bidding competition held in the Soviet Union.

In the competition, jointly organised by the Azerbaijan Republic and the Soviet oil and gas ministry, Amoco outbid other western oil companies including British Petroleum for the field which is located 90 miles offshore from Baku.

Scott upgrade

Amerada Hess is to upgrade its Scott field development plans following the discovery of a significant extension south of the reservoir.

The company may consider integrating additional subsea completions to the plan after well 15/21a–43 boosted previous reserve estimates of 450 million barrels of oil, 40 million barrels of condensate and 290 billion cubic feet of gas.

Oil in harmony

Talks between the oil producers and the International Energy Agency ended last month with a degree of harmony unimaginable a few years ago. Aimed at ending almost two decades of mutual distrust, the two sides have agreed to meet again at technical and political level.

There were 23 governments and nine international organisations represented; consumer nations generally sent junior delegates, while producer countries tended to be represented by ministers.

The two-day meeting decided that energy experts should meet for talks to be organised by the IEA, and agreed on multilateral government consultations. The date, agenda and other details of such talks were still to be decided.

First independent

Oiltanking will start operations during this autumn with the first independent tank terminal in the eastern part of Germany. The capacity of the terminal will be 40,000 cubic metres. The terminal is located at Gera/Thüringen with direct connection to the highways to Erfurt, Chemnitz, Dresden and Leipzig. The terminal will be supplied via existing rail connections.

It is also planned to handle gasoline at this terminal starting mid-1992. For this purpose the storage capacity will be increased.

Offshore Europe — 'largest ever'

The 10th — and largest ever — Offshore Europe Exhibition and Conference will be held 3–6 September at the Aberdeen Conference & Exhibition Centre, Bridge of Don.

The first managed by a new partnership — the Society of Petroleum Engineers (SPE) and Spearhead Exhibitions Ltd — this premier offshore oil and gas technology event is held under the patronage of the United Kingdom Offshore Operators' Association.

A busy time at Offshore Europe 1989.

Because of these closer links between the conference and the SPE, this year's exhibition is a particularly strong three-day meeting. More than 130 papers have been selected by an international conference committee and nearly 1,500 companies from 20 countries are to exhibit their latest offshore products and services.

Offshore Europe, which started in 1973, is held biennially, alternating with the Norwegian Offshore North Sea Exhibition which took place in Stavanger last year.

In 1989 more than 24,000 visitors from 62 countries attended the Scottish event, some 60 percent of the visitors being key company personnel who either had purchasing power or recommended or approved equipment purchases.

New skills

'The harsh environment of the North Sea and its highly competitive development continues to stimulate evolution of new skills and technology,' said SPE European Region Director John A Colligan, of Shell International Petroleum Mij. BV in The Hague. 'The interest in this year's conference is a testament that the importance of this region to offshore operations worldwide has not diminished. We are expecting oil and gas managers and engineers from more than 60 countries to attend.'

Many leading suppliers to the North Sea and other Eastern hemisphere regions will exhibit the equipment, tools, services and materials that make successful operations there possible. Also many exhibitors have indicated that they plan to unveil new products or services as well as show new hardware that can substantially improve offshore production efficiency and the work environment. 'The highly competitive atmosphere of the North Sea region has made it the birthplace of a new — and offshore — industry, and has provided the impetus for the evolution of new skills and technologies,' Mr Colligan said. 'New technologies are necessary to enable operators to develop future oil provinces. The current oil market has resulted in a renewed emphasis on techniques which will not only reduce production costs, but also increase yield.'

Technical programme

Talking about the conference, he said that its interests reflected those of offshore regions throughout Europe and, indeed, the world.

'Offshore Europe provides one of the best opportunities for exchanging the kind of technology today's professionals need the most,' he said.

To back up this exchange, the SPE will be holding a comprehensive 21-session technical programme covering drilling engineering and design, protection of the environment, subsea systems, drilling technology and equipment, environmental muds, flow measurements, mud and cement, case histories, North Sea operations and innovations, riser technology and facilities, horizontal wells, formation evaluation, remedial well treatment, sand control, safety procedures in drilling and production, reservoir modelling, completions, integrity of platform design and business aspects of offshore operations.

'Largely as a result of the strong international make-up of our programme committee, many technical papers will focus on projects outside the North Sea,' added programme chairman Ken Hull of Mobil North Sea Ltd in Aberdeen. 'This year's conference includes the largest technical programme we have had to date — one-third larger than anything held before.'

Some IP members from the Scottish branches are to help the IP staff who will be running the Institute of Petroleum stand at the Offshore Europe 1991 exhibition.

The four Caledonian branches — Aberdeen, West of Scotland, Shetland and Edinburgh and South East Scotland — have all been invited to provide assistance to Alan Lodge and Jackie Little from the IP London office who are manning the display.

Like the last exhibition in 1989, the idea is to promote the benefits of Institute membership.

On show will be a plethora of IP booklets, conference brochures, details of IP activities, as well as application forms and information about how to join the Institute.

Pride of place will be given to the Institute's codes of safe working practice and its other publications and, of course, its monthly journal, *'Petroleum Review'*.

New IP Director General

Mr Ian Ward has been appointed as the next Director General of the Institute of Petroleum. He succeeds Ted Williams, the first Director General, who retires in September after five years in the post. Mr Ward takes up the appointment on 1 August.

Mr Ward comes to the IP direct from a long and varied career with BP. His last job was Operations Manager, Distribution of BP Oil Europe, where he had responsibility for the primary and secondary transportation, storage and handling of bulk petroleum products in 14 European countries.

Equipped with a BSc degree in Botany from the University of Hull, he first entered the oil industry in 1964 by joining Shell Mex and BP in the retail market. After the break-up of Shell Mex and BP, he joined BP in 1973.

He subsequently held several appointments in retail, aviation and distribution within the United Kingdom before being made Manager, Personnel Division, BP Oil UK Ltd. During his time in this post from 1986–89 the company's relocation of its head office to Hemel Hempstead took place — Mr Ward played a key role in planning and implementing this project.

He is a fellow of the Institute of Logistics and Distribution Management and a member of the Oil Industries Club.

An approach to lower flammability limits and flash points

By Dr T H Farmer

There has been comment recently concerning the reporting, in the literature, of different lower flammability limits (LFLs) for certain solvents. Rarely are the methods of determination quoted although this is desirable for all flammability properties (flash points, auto-ignition temperatures, etc.). Minor variations in the LFLs are usually unimportant as engineers normally design to a maximum level of 25 percent of the LFL. However, it is disconcerting to see different figures quoted and relatively few laboratories are equipped to determine LFLs.

Perhaps, the most popular reference procedure is that inducing the upward propagation of flame in a 7.5 cm diameter tube. Flash points are obviously closely related to LFLs although the geometries of cups are different from the 7.5 cm diameter tube and the flame is propagated predominantly horizontally. One might expect that the vapour concentration at the flash point would be slightly higher than the vapour concentration corresponding to the LFL. Calculation of the former should, however, give a fair estimate of the LFL.

In the mid-1960s it was observed (**Ref. 1**) that solvent xylene (a mixture of xylene isomers with ethyl benzene and traces of toluene and paraffins) flashed (IP 170) under standard pressure conditions at a vapour pressure of 8.75 mm. In the 1970s this observation was developed to calculate the flash points of a number of compounds (**Ref. 2**). In brief, the reference vapour pressure (8.75 mm) was 'corrected' by multiplying with a factor which was the ratio of the average xylene heat of combustion to the compound heat of combustion (vapour to vapour). From the 'corrected' vapour pressure the corresponding temperature was read from the vapour pressure/temperature curve for the compound, this temperature being the calculated flash point. The vapour concentration corresponding to the 'corrected' vapour pressure was the calculated LFL. **Table 1** shows the results of a number of calculations. (In this procedure the 'flash' conditions relate to the evolution of 12,000 cals from 22.4l of the flash point mixture.)

It is observed that there is reasonable agreement between the calculated and reported values for the flash points and LFLs, although chlorinated hydrocarbons exhibit some discrepancies. In order to understand these discrepancies the basic simple principles of flame propagation need to be considered. These are:

a) The initiating source should be

Compound	*Calcd F.Pt. V.P. mm*	*Calcd F.Pt. °C*	*Literature F.Pts. °C*			*Calcd LFL % v/v*	*Lit. LFLs*	
			Ref 5	**Ref 6**	**Ref 7**		**Ref 5**	**Ref 6**
***n*-Pentane**	11.7	−48	−46	< −40	−50	1.5	1.3	1.5
***n*-Hexane**	9.8	−25	−22	−22	−22 to −26	1.3	1.3	1.1
***n*-Heptane**	8.5	−4	−2	−4	−4 to +4	1.1	1.0	1.2
***n*-Octane**	7.5	15		13	12 to 22	1.0		1.0
***n*-Decane**	6.1	47		46	46	0.8		0.8
Benzene	12.1	−9	−11	−11	−11 to −12	1.6	1.4	1.3
Toluene	10.2	6	4	4	4	1.3	1.3	1.2
Ethyl Benzene	8.75	23		21	15 to 23	1.2		1.0
***o*-Xylene**	8.75	30		32	17 to 32	1.2	1.0	1.0
***m*-Xylene**	8.75	27		29	25 to 29	1.2	1.0	1.1
***p*-Xylene**	8.75	25		27	25 to 27	1.2	1.0	1.1
Methanol	58.8	12	6	11	11	7.7	6.7	7.3
Ethanol	30.6	14	14	13	12 to 14	4.0	3.3	4.3
***i*-Propanol**	20.9	13	12	12	12	2.8	2.0	2.0
***t*-Butanol**	15.7	11	9	11	9 to 11	2.1	2.4	2.4
***n*-Octanol**	7.7	83	85	81	80 to 81	1.0		
Acetone	22.8	−18	−17	−18	−18 to −20	3.0	2.2	2.6
Methy Ethyl Ketone	16.7	−9	−7	−6	−9 to −1	2.2		1.8
Ethyl Acetate	18.3	−3	−5	−4	−4 to −2	2.4	2.3	2.5
Acetic Acid	47.0	47	45	43	40 to 43	6.2		5.4
Acetonitrile	31.7	4	6	6	2 to 5	4.2		
Pyridine	14.2	20	20	20	17 to 20	1.9	1.8	1.8
Methylene Chloride	93.9	(−7)	N.F.	N.F.	N.F.	(12.4)		
Ethylene Dichloride	36.1	9	17	13	13 to 17	4.8	6.2	6.2
Trichloroethylene	40.5	(12)	N.F.	N.F.		(5.3)		
***n*-Hexadecane**	3.8	131			135	0.5		

Table 1: Flash points and lower flammability limits

of adequate energy (ie temperature).

b) The reaction with the oxygen in the air needs to produce sufficient energy to allow the reaction to continue (ie sufficient vapour must be present).

c) There must be sufficient oxygen present at the required vapour concentration to produce the required energy.

It is known that although certain chlorinated hydrocarbons do not have a flash point when tested by an appropriate method, they do have a LFL if the initiating source is of high energy. In these cases the heat evolved is greater than 12,000 cals/22.4 l reflecting the higher temperature necessary for the propagation of flame. (The above calculation procedure is based on the requirements of compounds containing high proportions of carbon and hydrogen. It is to be expected that chlorohydrocarbons will require more vigorous conditions for combustion.)

The oxidation equations for chlorohydrocarbons are more complex than those for hydrocarbons. In general, carbon dioxide, water and hydrogen chloride are the products, although, where the chlorine content of the molecule is high, chlorine may be formed (**Ref. 3**):

$$ClCH_2.CH_2Cl \xrightarrow{O} 2CO_2 + H_2O + 2HCl$$

$$CHCl_3 \xrightarrow{O} CO_2 + HCl + Cl_2$$

Consideration of the temperatures (and therefore the vapour concentrations necessary) for flame propagation enable the flammability or non-flammability in air of a compound to be determined theoretically. Air is assumed to contain 21 percent volume for volume (v/v) oxygen. **Table 2** summarises the results of such an investigation, the approximate flame temperatures being taken from tables assuming a 10 percent heat loss through radiation (**Ref. 4**). Non-flammable compounds such as carbon tetrachloride and perchloroethylene possess this property because there is insufficient oxygen in the vapour/air mixtures at the required vapour concentrations to permit complete oxidation and achieve the temperatures necessary for flame propagation.

Complex hydrocarbon mixtures, eg standard white spirit, pose a problem. The above approach may be employed to calculate the flash point from gas liquid chromatography data assuming no azeotrope formation. However, the consideration of the LFL is not as simple. The LFL corresponding to the flash point relates to the situation where the vapour is evolved from the liquid phase and therefore has a composition determined by the volatile 'fronts'. Where there is, for example, a 'fugative' emission the vapour composition will correspond to that of the liquid product. In this instance, the LFL might be estimated by reference to hydrocarbons boiling at the Initial boiling point, 50 percent distilled and the Dry Point.

Compound	*22.4 l Flam. mixture K. Cal. heat evolved*	*Flam./Non-Flam.*		*Estimated flame temperature*	*ECSA Flam. mixture % v/v**
		Marsden **Ref 5**	*Calcd. (from oxygen requirement)*		
CH_2Cl_2	12.6	Non-Flam.	Flam.	1,450°C	13
$CHCl_3$		Non-Flam.	Non-Flam.		
CCl_4		Non-Flam.	Non-Flam.		
$CH_2Cl{\cdot}CH_2Cl$	15.3	Flam.	Flam.	1,750°C	
$CH_3{\cdot}CCl_3$	15·0	Non-Flam.	Flam.	1,700°C	7.5
$CCl_2{:}CHCl$	18·1	Non-Flam.	Flam.	2,050°C	8
$CCl_2{:}CCl_2$		Non-Flam.	Non-Flam.		—
					*LFL **Ref 8**

Table 2: Chlorinated Hydrocarbons

Conclusions

1) The flash points of pure compounds may be calculated, with reasonable accuracy, from vapour pressure and heat of combustion data. The vapour pressure corresponding to the flash point gives a fair estimate of the LFL.

2) The 'abnormal' behaviour of highly substituted chlorinated hydrocarbons may be explained by the high temperatures required to initiate and continue flame propagation. To produce flammable conditions higher concentrations of vapour are required than would be expected from the consideration of compounds which are predominantly composed of carbon and hydrogen. When testing such products there is possibly a case for a flash point apparatus with a high energy source of ignition. ■

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Murco uses the railway to enter a new market

By Geoffrey Mayhew

A purpose-built rail-fed products distribution terminal was brought into operation on 2 May 1991 on the northeast outskirts of Bristol by Murco Petroleum Limited, which has spent some £4.5 million on the development.

The opening of the terminal has introduced a new competitor to a highly populated market 50 miles around it.

In safety, environmental and technical terms, the construction of the terminal has entailed the installation of the most advanced techniques, involving the cooperation of authorities such as the Health and Safety Executive.

'We have been using rail as a means of distribution since 1968, having one rail terminal near Reading and a second near Coventry,' said Barry Sales, Director and General Manager, Murco Petroleum Limited. 'Economically, this third rail terminal at Westerleigh (Bristol), is strategically placed. It is being supplied by rail from our refinery at Milford Haven and should enable us to become the low cost option in the Bristol area.'

Murco began applying for planning consent for a rail terminal at Westerleigh some eight years ago. The site covers seven acres alongside a railway line that is no longer in public use. In one direction the line terminates at a motorway, the M4, which is at the southern end of the terminal.

The company has an agreement to pass trains along the line under British Rail control between the nearby main-line junction and the terminal. Included in the scheme was the construction of two new rail sidings alongside the line at the terminal. These are longer than usual because BR has recently acquired a fleet of more powerful locomotives designated as Class 62. This has meant that Murco could raise the payload from 16 wagons of 100 tonnes gross to 26 wagons. The sidings and the overhead gantries have been built to accept trains of 32 tank wagons, so that Murco can take advantage of any further improvements in BR's haulage capacity in the future.

The storage at the terminal is for 8,500 tonnes of product in seven individual tanks, which are painted a brown, earth colour to blend with the countryside together with foundations for an extra three.

'One of the advantages of rail is that we can programme supplies to come in daily and there is no requirement to have great amount of stocks in storage,' said Mr Sales. 'That helps environmentally as well as economically.'

Deliveries to customers from Westerleigh are by road. Among the planning consents — and requirements — was the upgrading of a road leading to the site, which Murco carried out.

The development of a new terminal on a 'green-field' site was examined closely at several stages by the authorities, such as the National Rivers Authority, the Health and Safety Executive, planning authorities and the fire brigade.

Fire precautions

As part of the facilities that cater for a potential fire emergency a dry main was constructed round the site. Two diesel pumps can charge the whole with water in less than one minute. Two large tanks store the water against such an emergency and these are recharged through a dedicated 8 inch high pressure water line.

Several fire-fighting systems are installed. Fire monitors are situated at the vehicle loading bays to drench the area in foam instantly if fire breaks out. On the rail siding gantries there are five oscillating fire monitors. In addition the site has a mobile foam monitor and a manoeuvrable fire-fighting truck which can direct foam to a height of 60 feet.

The storage tank bunds are surfaced with an impermeable layer of Volclay. This will contain any tank spillage. The bund areas are also linked to an elaborate drainage system beneath the site which leads to three large interceptors. This will permit the recovery of any spillage of product which might occur.

The discharge of a train of 26 wagons is completed within three-and-a-half hours. The loading of a road vehicle is also quick. There are five top loading bays and one bottom loading bay, providing 23 loading points. The terminal is fully automated, using a system supplied by Rosemount Limited.

'When Murco started rail operations in 1968 we were on the brink of 500 tonne loads,' said Mr Sales. 'At Westerleigh we are delivering 1,650 tonnes each time. The train sizes are three times what they were.

'In our experience, British Rail has been able to control its unit costs. Murco is reasonably sure that it will continue to be competitive, and that has led to this investment for a new rail terminal to serve an area where we did not market before.

'The Bristol area is an attractive, growing market. But it is a high cost one for most companies to supply. It is one of the few highly populated regions which does not have a convenient supply source — for example, like London and the Thames Estuary refineries; Birmingham and the oil products pipelines; the northeast and northwest with their refineries.

'In relation to our refinery at Milford Haven, Westerleigh is strategic. It is more economic than feeding a terminal by water in the Avon estuary, and can be competitive with existing pipelines serving the area.

'Many miles from the Avon docks, we do not have port rates to pay. Nor do we require large tankage and facilities, which also lock up capital in stock. We have entered the markets for the products we provide and we look forward to developing a good market in Bristol and the southwest.' ■

Minimum transferred volume necessary for accuracy when determining custody transfer volumes by tank gauging

By Srini Sivaraman, Exxon Research & Engineering Co, and
Richard M Sheppard, Buckeye Pipe Line Co

More than 80 percent of crude receipts and approximately 30 to 50 percent of product sales are still based on tank gauging (manual or automatic) of vertical cylindrical storage tanks. However, there are a number of factors that could distort such volume determination resulting in large discrepancies.

Factors which affect volume determination are discussed here, together with recommendations to minimise the overall uncertainty.

Factors which affect volume determination

The factors which affect volume determination by tank gauging are as follows:

1) Level measurements (L).
2) Reference height variations (RH).
3) Product temperature measurements (Tp).
4) Calibration procedure variations (C).
5) Bottom/datum plate movement (B/Dp).
6) Tank shell temperature variations (Ts).

The effect of each of these parameters depends on specific conditions. In some instances, some of these contributors may be non-existent. For the purpose of analysis, four different cases are considered. The most commonly encountered uncertainties for all six parameters, to the best possible or attainable level, for tank gauged volumes are summarised in **Table 1.**

Analysis

1) Effect of level (L).

The uncertainty in level measurement of ±3mm is a combination of the uncertainties of measurement of both the opening and closing gauges. The combined opening and closing uncertainties will affect the volume determination. As the volume transferred into or out of the tank increases, the effect of the uncertainty of level determination decreases. **Table 2** presents the uncertainty of level as a function of transferred volume.

2) Effect of reference height (RH).

Variation in the reference height of a tank, based on the limited data available appears to be unpredictable and does not follow a uniform pattern. The magnitude of such variation can range from a low of 3mm to as much as 25mm. For the purposes of evaluating its effect, it has been assumed that the combined RH variation of both the opening and closing gauges is ±6mm; the variation has been treated in the same manner as the uncertainty of level. Detailed and rigorous evaluation is not considered necessary for the objectives set forth. **Table 2** presents the uncertainty of reference height as a function of transferred volume.

3) Effect of product temperature uncertainty (Tp).

Uncertainty in product temperature measurement causes errors in volume correction factors and, in turn, causes errors in volume calculations. An uncertainty of ±1°C will cause an uncertainty of approximately ±0.1 percent.

Table 1: Four case studies

	L	*RH*	*Tp*	*C*		*B/Dp*	*Ts*
				C^1	C^2		
	±3mm	±6mm	±1°C	±1%	±0.5%	0.1%	±10°C
Case 1 (extreme)	L	RH	Tp	C^1	—	Dp	Ts
Case 2 (Median)	L	RH	Tp	C^1	—	—	Ts
Case 3 (normal)	L	—	Tp	C^1	—	—	Ts
Case 4 (best practical)	L	—	Tp	—	C^2	—	Ts

Table 2: Effects of level and reference height variations

Change in level (metres)	Level variations ± 3 mm Vol % (±)	RH Variations ± 6 mm Vol % (±)
2	0.2	0.4
4	0.1	0.2
6	0.07	0.14
10	0.04	0.08
12	0.03	0.06
14	0.03	0.06
16	0.03	0.06

Table 3: Case 1

Change in level (metres)	Tank diameter in metres: 15	30	45	60	75	90
	Overall uncertainty ±% of volume					
2	0.5	0.5	0.5	0.5	0.5	0.5
4	0.3	0.29	0.28	0.28	0.28	0.28
6	0.25	0.23	0.23	0.23	0.23	0.23
10	0.21	0.20	0.20	0.20	0.20	0.20
12	0.20	0.19	0.19	0.19	0.19	0.19
16	0.18	0.19	0.19	0.19	0.19	0.19

Table 4: Case 2

Change in level (metres)	Tank diameter in metres: 15	30	45	60	75	90
	Overall uncertainty ±% of volume					
2	0.48	0.49	0.47	0.47	0.47	0.47
4	0.28	0.27	0.27	0.27	0.27	0.27
6	0.22	0.21	0.21	0.21	0.21	0.21
10	0.17	0.17	0.17	0.17	0.17	0.17
12	0.17	0.16	0.16	0.16	0.16	0.16
16	0.15	0.16	0.16	0.16	0.16	0.16

Table 5: Case 3

Change in level (metres)	Tank diameter in metres: 15	30	45	60	75	90
	Overall uncertainty ±% of volume					
2	0.26	0.26	0.25	0.25	0.25	0.25
4	0.20	0.18	0.17	0.17	0.17	0.17
6	0.16	0.16	0.16	0.16	0.16	0.16
10	0.16	0.15	0.15	0.15	0.15	0.15
12	0.15	0.15	0.15	0.15	0.15	0.15
16	0.14	0.15	0.15	0.15	0.15	0.15

Table 6: Case 4

Change in level (metres)	Tank diameter in metres: 15	30	45	60	75	90
	Overall uncertainty ±% of volume					
2	0.26	0.24	0.23	0.23	0.23	0.23
4	0.17	0.15	0.15	0.15	0.15	0.15
6	0.13	0.13	0.13	0.13	0.13	0.13
10	0.12	0.12	0.12	0.12	0.12	0.12
12	0.08	0.12	0.12	0.12	0.12	0.12
16	0.08	0.12	0.12	0.12	0.12	0.12

Note: Shaded areas indicate recommended operating range.

4) Effect of calibration procedures (C^1,C^2).

Tank calibration procedures range from conventional manual methods to sophisticated optical technologies. Based on generally accepted industry guidelines, an uncertainty of ±0.1 percent of calibration table volume is considered appropriate for the manual method (C^1) and ±0.05 percent for optical technologies (C^2).

5) Effect of bottom/datum plate movement (B/Dp).

Based on limited field data, it is estimated that bottom/datum plate movement can effect the determination of volume by as much as 0.1 percent. For simplification of analysis, it has been assumed that this effect will be similar over the entire height of the tank. (It is fully recognised that this may not necessarily be a valid assumption in all cases and that the actual effect could be smaller in some cases.)

6) Effect of tank shell temperature (Ts).

In the development of a tank capacity table, one fixed shell temperature is used. The shell temperature correction factor is integrated into the capacity calculation.

During gauging, the shell temperature is computed as the mean of product and ambient temperature. Variations in ambient or product temperature will alter Ts and thus the capacity. An average variation in the value in Ts is assumed to be ±10°C (corresponding to ±10°C variation in both ambient and product temperature). This equates to an approximate variation of ±0.02 percent in volume.

7) Evaluation of overall effect.

In calculating the overall effect, it is implied that all parameters are independent and that the correlation between any two is nil. The overall net uncertainty is calculated statistically on tank volume transfers for the four cases under consideration. The net uncertainty takes into account tank diameters from 15 metres to 100 metres diameter and product transfers ranging from 2 to 16 metres difference in dip. The overall uncertainty is expressed as a percentage of the volume transferred into or out of the tank.

Comments

From **Table 3 Case 1** it is apparent that, when all parameters are present, the minimum transferred volume must be greater than 10 metres to obtain an overall uncertainty of ±0.2 percent or better. If the individual uncertainties of the six parameters are higher than the criteria under consideration, the actual transferred volume cannot be less than 10 metres to ensure an overall uncertainty of ±0.2 percent or better.

From **Table 4 Case 2,** a similar conclusion can be drawn for tanks with no bottom deformation. The minimum transferred volume is somewhere between 6 and 10 metres.

From **Table 5 Case 3,** with zero bottom deformation and zero variation in reference height, the minimum transferred volume is reduced significantly to 4 metres to achieve an overall uncertainty of ±0.2 percent or better for volume determination.

Finally, from **Table 6 Case 4,** representing best practical measurements, the minimum transferred volume required is around 3 metres.

Conclusions

Before a group of tanks is selected or designated for custody transfer service, it is important to verify if the tanks are subject to reference height variations and/or bottom/datum plate movements. Once the contributing parameters are established, it is important to maintain minimum transfer volume criteria to ensure that the volume determination by tank gauging has an uncertainty comparable to alternate measurement systems.

If minimum transfer volume criteria cannot be maintained for whatever reasons, then the use of the tank(s) for custody transfer is questionable; alternate measurement systems should be considered.

Product sales by tank gauging are generally prone to gross uncertainties due to the fact that the parcel size is generally small and the minimum transfer volume criteria cannot be maintained. Under these circum-

stances, alternate systems such as metering (with proving facilities), or road vehicles and rail tanks (with up-to-date calibrations) offer themselves as alternatives for custody transfer measurement systems.

A Calibration Certificate or Calibration Table does not ensure that a tank is suitable for custody transfer measurement. It is important to ensure that all correction factors (ie shell temperature expansion, tilt correction, hydrostatic head correction) are applied in accordance with the existing standards.* Also, in the opinion of the authors, one should take additional measures to test for reference height variations,‡ and datum/bottom plate movements.† Selection of tank(s) for such tests may be based on statistical grouping techniques.

In closing, vertical cylindrical storage tanks can offer a reliable standard of measurement for custody transfer, provided that minimum transfer volume criteria are maintained into and out of the tanks, at all times, and provided other factors which may influence the uncertainty of the measurements are verified as being negligible. ■

Acknowledgement
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Prospects for Papua New Guinea

By William A Scholes

Papua New Guinea, a country composed of more than 600 islands and a population speaking 700 distinct languages, poses some unique challenges to oil and gas companies. The country is one of the most rugged and unspoilt in the world; with few roads and no rail system air is the only realistic mode of transport available. The discovery of oil and gas reserves is of immense importance to the 3.6 million population — over 50 percent of whom are under the age of 15.

The oil province extending across the central southern highlands is also of world significance according to Oil Search Ltd chairman Sir Tristan Antico speaking in Port Moresby, the capital of PNG.

Sir Tristan said the province included areas covered by PPL 101, PPL 100 (**Figure 1**) — which contains the $A1 billion Kutubu joint venture — and PPL 56, where Command Petroleum's South-East Gove 1 well recently flowed up to 3,600 barrels of oil a day (b/d). 'I think one could say we have discovered a province of oil which extends from the far north of PPL 101 right down to the Gobe well,' Sir Tristan said at the annual meeting.

'We have . . . an oil province of 300kms. This is something of world significance . . . and I think it augurs well for the future of the oil industry in PNG.'

Command's South-East Gobe 1 followed another promising discovery earlier this year by Kutubu joint-venture operator Chevron Niugini Pty

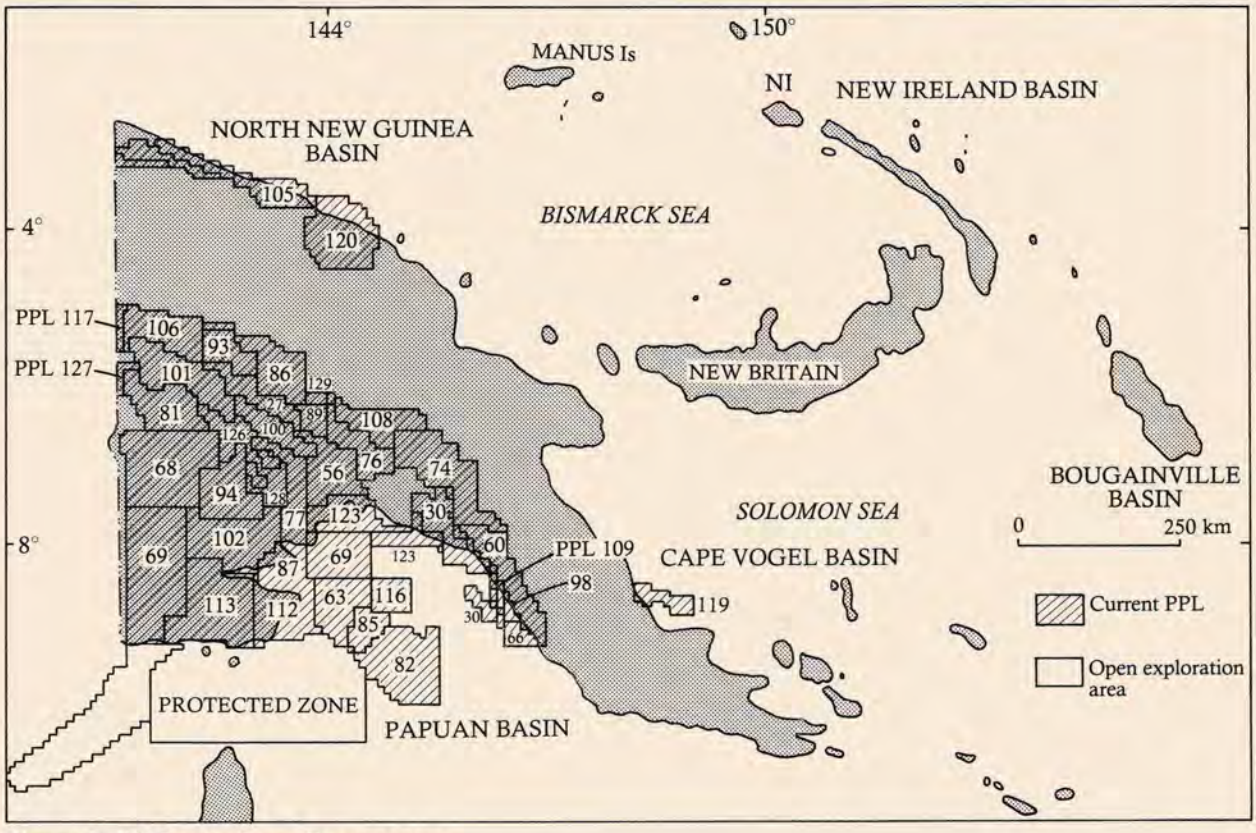


Figure 1: PNG petroleum licence map

Ltd at South-East Mananda, in the north of PPL 100, which flowed 5,290b/d.

Sir Tristan said that after a year of consolidation and investment in 1991, Oil Search in 1992 could expect to have its first significant income as the Katubu project came on stream in the third quarter.

While PNG's political situation remains somewhat gloomy in view of the protracted Bougainville problem, the partners in the country's first oil production venture are finding even more glitter in their resources.

The recently issued annual report of Oil Search Ltd which has spent several decades exploring for oil, says the Kutubu oil project has proven reserves assessed at about 200 million barrels. 'This represents an approximate 50 percent increase over the figure quoted in last year's report,' the company noted. The project is larger both in terms of oil reserves and planned production than any Australian operation outside Bass Strait.

Kutubu pipeline

The 171km Kutubu pipeline in the PNG Highlands is an integral part of Chevon Niugini's development of the Hedinia-Iagefu oilfield—a remote area of the Southern Highlands of central PNG. From the central processing facility at Moro, the 500mm diameter export pipeline will transport oil to a loading platform to be built in the Gulf of Papua (**Figure 2**).

McConnel Dowell in joint venture with Spie Capag of France is developing the 170km onshore portion of the pipeline. The cross-country pipeline will be built through a region which is sparsely inhabited, covering extremes of terrain.

For the first 100km from the coast the route crosses swampy country with numerous crossings before climbing steeply to reach the crest of the Hedinia range and the central processing facility.

The entire route is covered by dense tropical rainforest with an underlying geology of limestone pinnacles and cavities. The nature of the terrain and the 6m average annual rainfall will require the construction of 100km of access road.

Currently the only means of access to the site is by way of helicopter or by sea, with jetties being established at the Kopi base camp to off-load equipment supplies and pipe.

Trevor Morgan, director of McConnell Dowell and chief executive of McConnell Dowell's Australian Construction Division, which is managing the project, said it was one of the most challenging pipeline projects ever undertaken in the world.

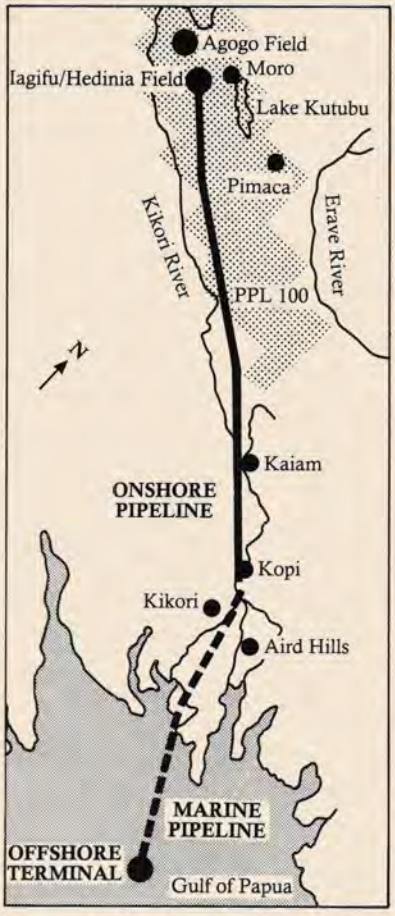


Figure 2: Kutubu Pipeline Project

'Although we have constructed large pipelines in Australia and will be using similar techniques, the degree of difficulty of construction through New Guinea's terrain and the resultant costs are much higher. The cost of laying one kilometre of pipe in New Guinea is of the order of 10 times the cost involved in laying the same amount of pipeline across typical terrain in Australia,' he said.

The project due for completion in 14 months has started with the mobilisation of $US40 million worth of equipment being shipped from Europe, Britain, the United States, Singapore, Australia and New Zealand. A temporary camp has been established at Kopi while construction proceeds on a permanent camp.

Further camps will be established as construction of the access road progresses. There are currently 40 McConnell Dowell personnel on the project, some located in Brisbane, others in Port Moresby and Kopi.

Oil finds

The discovery lies only 15 km from the Kutubu pipeline project. The South-East Gove 1 well has since been completed for production.

Following the completion of exploration work at South-East Gobe 1, the discovery rig was moved 25km east to another structure and commenced drilling at Anesi 1 (in PPL 56).

Partners are Command 20 percent, Southern Highlands Petroleum 50.5 percent, (a Japanese consortium) MIM Holdings 15 percent, Base Resources 7 percent, Nomeco PNG Ltd 5 percent and Mountains West Exploration 2.5 percent.

John Doran of Command said that if the follow-up drilling programme of the wildcat South-East Gobe 1 well was successful, the company could develop the field to coincide with the start-up of Chevron's Kutubu oil development nearby. He said if Gobe's potential was proven it could come on stream in the third quarter of 1992 in line with the Kutubu project.

Analysts said Command and its joint-venture partners were likely to come to an arrangement with the Chevron-led consortium for the use of the pipeline, probably through a tariff system. Mr Doran emphasised it was early days for development proposals and the partners would be guessing on the size of the reserves the field might hold.

The Kutubu Project will consist of a well field producing crude oil from the Iagifu-Hedinia, Usano and Agogo oilfields and an export pipeline 261km in length terminating at an offshore loading facility. Total cost of the project will be $A1 million. Production will commence in the third quarter of 1992 and maximum production rate will be about 128,000 barrels of oil/day.

PDL2 incorporates 12 graticular blocks within PPL100 covering a total of approximately 1,020 sq km (85 sq km per graticular block) covering the Agogo, Iagifu, Hedinia, Usano, and SE Hedinia fields. Production will be from the lower Cretaceous Toro Sandstone (primary reservoir) and the Digimu Sandstone in the Upper Jurassic Imburu Formation.

The Kutubu venture has been allowed to flare natural gas from the project for a period of up to 11 months from the date continuous production begins. By this time the licensee is required to have installed gas compression and injection facilities in accordance with the Approved Proposals. The amount of natural gas to be flared shall not exceed an average of 150 million cubic feet per day.

If it is found necessary, further injection wells will be drilled and facilities installed to inject either water from a surface source or gas from SE Hedinia or elsewhere to maintain reservoir pressure.

The approved facilities for PDL2 include a 508mm (20 inch) diameter buried pipeline 261km in length with a nominal flow capacity in excess of 150,000 barrels per day (b/d) under gravity.

The onshore portion of the pipeline follows the Hegigio-Kikori River system and is 171km in length. The marine portion consists of 50km in the main river channel of the Kikori and Nakari River and 40km of offshore pipeline laid in the Gulf of Papua to the marine terminal, a platform erected in 20m of water, 35km south of Cape Blackwood.

A loading platform will extend 2.5km between the platform and the subsea pipeline end manifold connected to a mooring buoy and floating marine hoses.

Primary pipeline control will be at the offshore platform with a secondary control centre at the central production facility in PDL2.

Mainline control valves will be installed at a number of locations, including the central processing facilities, the upstream side of the Mubi, Ai'oi and Kikori River crossings, downstream of Kopi (160km station) and at the marine terminal.

Construction of the pipeline will be centred on the Kopi staging area established on the Kikori River downstream of its confluence with the Sirebi River (Middletown). Materials for the pipeline will be brought into the Gulf of Papua by ocean barges then transhipped onto coastal vessels for transport to Kopi. The total capacity of the pipeline can be increased to around 270,000b/d with the addition of two pump stations.

Infrastructure

In order to bring the Kutubu field on stream as quickly as possible the development will utilise the Moro airstrip, located 4 km south-west of Lake Kutubu. The airstrip has been upgraded to Hercules standard so that materials and equipment for the field facilities, brought into PNG through the Lae port, can be flown in from Nadzab where a staging area will be established adjacent to the airfield.

A 19km road will run south from the Moro airstrip to the central processing facilities. Additional infield roads are being constructed to individual operations areas and facilities.

Additional infrastructure for the project includes a mini-refinery and Poroma-Moro road. The mini-refinery or topping plant to be built in the Iagifu-Hedinia area will process 1500b/d to yield 300b/d of diesel and 300b/d of jet fuel for use during construction. When the Kutubu Project is finalised the products from this plant can be used for operations and the excess could be used to supply the local Highlands market.

Government plans

The PNG government plans to forward sell its share of production from the Kutubu oil export project.

Prime Minister Namaliu said the government would continue negotiations with Japanese authorities which were willing to give low-interest loans or advance money against future oil sales.

'Through the forward sale concept, a large part of the total dividends payable to the State (from its nominee joint-venture company), now estimated at $A806 million would be made available in 1992,' he said.

'The aim of forward selling the State's share of the oil production is to allow PNG to immediately realise benefits from the Kutubu oil project, even before production starts.

PNG Cabinet authorised Minerals and Energy Minister, Patterson Lowa, to finalise an agreement with Japanese authorities. The government, through its nominee company, Petroleum Resources Katubu Pty Ltd, has taken up a 22.5 percent interest in the joint-venture project.

Other joint-venture partners are project operator Chevron Niugini Pty (19.37 percent), BP (19.37 percent), Ampolex Group (16.45 percent), BHP Petroleum (9.96 percent), Oil Search Ltd (7.76 percent) and Mitsubishi (4.84 percent).

Tax-friendly PNG is now drawing major explorers. Exxon recently joined Du Pont in a big farm-in deal to drill prospective PNG acreage held by the three Perth-based junior petroleum companies.

Exxon subsidiary Esso Australia and Du Pont are earning a 70 percent interest in the tenements by drilling four exploration wells and refunding $A1.34 million in exploration costs to the three Australian juniors. The four-well agreement would see current equal partners First Australian Resources, Trident Petroleum and Victoria Petroleum dilute their states to a free-carried 6.67 percent as Esso and Du Pont earn 35 percent. Du Pont has become the operator and on-site activities are being run by its subsidiary, Conoco Australia.

Electricity supply

The huge Porgera gold mine will be hit by at least an extra $A8.11 million in electricity costs because a landowner dispute has delayed power supplies to the project.

The Porgera joint-venture partners were counting on power supplies from the Hides gas field, 70km away, to be flowing by September, when Stage 2 of the mine will be commissioned.

But, while the power station's first stage and cross-country transmission lines will be finished this summer, a land dispute has delayed completion of the nearby gas field and the 8km pipeline to the power station. The dispute, in which various clans are claiming the right to revenues from the gas field, is now subject to a PNG government inquiry.

Two fuel generators originally destined for Hides will be taken to Porgera and run on diesel to allow Stage 2 to stay on schedule. The cost of transporting the equipment and the margin between gas and diesel costs will run to $A8.11 million by next January. This cost is likely to run beyond that as the new schedule for connection of gas to the Hides power station is no more certain than some time in the first half of 1992.

Porgera now has 15 megawatts of diesel-generated power, but more will be needed in September to supply the new pressure oxidation plant which will take the gold recovery rate from the present 70 percent to more than 90 percent. The two additional generators being installed will deliver another 13.4MW.

When completed, Hides BP Development Operating Co Pty Ltd, 95 percent, Oil Search Ltd 5 percent will produce 64MW — enough power to meet Porgera's needs when the mine reaches its full production capacity. BP's Port Moresby office said that half of the 8km gas pipeline between the field and power station had now been completed.

BP's corporate affairs manager in PNG, Fred Haynes, said work at Hides had also been delayed by particularly bad weather. Revenues due to local landowners are being held in trust until the Land Titles Commission decides which are the rightful claimants.

Further discoveries

Papua New Guinea's emerging petroleum industry received another boost with the discovery of oil at

Mananda, about 30km to the north-west of the Kutubu development.

Oil Search reported that the south-east Mananda-IX exploration well flowed oil at 5,290b/d. The shows were the best yet from the Mananda prospect in the PDL2 licence area in the Southern Highlands. The prospect has been drilled intermittently since the early 1970s.

Oil Search's Port Moresby-based technical adviser, Dr Bob Williams, said the Mananda prospect was proving to be more complex than originally thought and was likely to consist of several smaller oil-bearing structures.

Brisbane-based oil explorer Pacarc Niugina NL hopes it is near a big petroleum discovery after the spudding of its $A23 million Muller 1-X exploration well.

The PPL93 joint venture's Muller prospect is a four-way dip anticline in the western part of the Papuan Fold Belt, and will be drilled to a depth of 2165 metres.

Mobil Exploration Niugini Inc, which is funding the work, has a 50 percent stake in the venture. Pacarc has 45.83 percent and Scottish company Cairn Energy Plc holds the remaining 4.17 percent. Strike potential has been estimated at 200 million barrels of oil and gas condensate and 1.2 trillion cubic feet of natural gas. However, a similar well drilled last year failed to peform as hoped despite the highly favourable geological structure.

Offshore PNG has unlimited possibilities. Canadian-owned International Petroleum Corp Ltd (IPC) is holding discussions with the Papua New Guinea government and a prospective natural gas customer for possible development of its Pandora gas field in the Gulf of Papua.

Although most industry sources in Australia are somewhat sceptical of an early start for Pandora, IPC's recently issued 1990 annual report has raised the possibility that development could commence as early as 1992–93.

The report said: 'The most likely scenario for the short term is a partial development of the existing proven reserves, which would only require the drilling of two additional wells initially. The gas would be sold at the wellhead to a floating methanol plant at a rate of 75 million cubic feet a day.' The report, which suggests offshore gas production could start within two years, says discussions had been held with several prospective buyers. 'The option to supply gas for a 20-year period to a floating methanol plant is being looked at closely by the group.'

However, it is not all smooth going for the infant PNG petroleum industry. An initial punt by junior explorers Mosaic Oil and Intrepid Oil to make it into the big time through a successful discovery in the Forelands region of PNG failed.

Mosaic's chairman, Charles Copeman, said that the Langia-1 well, sunk at a cost of about $A15 million, had proved to be a 'duster' but added that bitumen encountered during the drilling programme had proved that the technical assessment had been correct.

Both Mosaic and Intrepid have pinned hopes of a significant discovery in the Papuan Basin to take the companies out of the minor league. The lack of success has not fazed Mosaic, according to Copeman, who said another five wells would be drilled in the PPL94 permit area, which lies below the Kutubu project.

He said the company still attached a high degree of probability to one of the wells turning up trumps. He said valuable technical data had been collected from the Langia-1 well, and other survey work conducted in the permit area had boosted the venture partners' confidence. ■

INDEPENDENT STORAGE

Gulf war year sees a small rise in capacity

According to statistics received for this year's 1991 survey, the total capacity of independent bulk storage in western Europe increased to 31,706,633 cubic metres, marginally up by 6,591 cubic metres on the 1990 figure of 31,700,042 cubic metres.

During a year dominated by the Gulf war, most of the increase occurred in the Netherlands, where 164,000 cubic metres of storage was gained.

France (21,000 cubic metres), Spain (24,086 cubic metres) and Sweden (37,500 cubic metres) followed this upward trend, but elsewhere, capacities fell. Independent storage in Belgium, Denmark, Germany, Italy and the United Kingdom actually reduced in all by 239,995 cubic metres, while in Eire, Malta, Portugal and Switzerland, capacities remained the same.

Statistics of Petroleum Bulk Storage Owned by Independent Companies in Western Europe

COUNTRY	CAPACITY (m^3) 1991	% OF TOTAL	CAPACITY (m^3) 1990
Belgium	2,226,100	7.0	2,337,500
Denmark	344,000	1.1	358,000
Eire	28,500	0.1	28,500
France	6,464,000	20.4	6,443,000
Germany	5,456,400	17.2	5,494,400
Italy	112,500	0.4	182,500
Malta	245,000	0.8	245,000
Netherlands	10,200,977	32.2	10,036,977
Portugal	87,000	0.3	87,000
Spain	207,761	0.7	183,675
Sweden	1,636,500	5.2	1,599,000
Switzerland	346,000	1-1	346,000
UK	4,351,895	13.7	4,358,490
TOTAL	**31,706,633**	**100.0**	**31,700,042**

INDEPENDENT STORAGE

This year, 48 companies have replied to *Petroleum Review's* independent storage survey

ALDER SpA

Riva Cadamosto 6, 34147 Trieste, Italy.

Tel: **(040) 820290/822220.** *Telex*: **460374 Alder I.** *Fax*: **(040) 815365**.

The chemical terminal nearest to Central Europe on the Adriatic Sea. Thirteen tanks for flammables, total 6,500 cu. metres and eleven tanks for corrosive chemicals, total 6,000 cu. metres. Private berth for up to 10,000 tons dwt tanker ship, 24 ft. Access by road, rail. Out of custom area.

ANTWERP GAS TERMINAL VOF

Land Van Waaslaan 3, 9130 Kallo, Belgium.

Tel: **(3) 755 10 09**. *Telex*: **73153**. *Fax*: **(3) 755 03 25**.

The terminal is situated on the left bank of the River Schelde behind the Kallo Lock. Four berths are provided, two for ships and two for barges. Vessels up to 75,000 cu. metres can be accommodated. Tankage consists of two fully refrigerated tanks of 50,000 cu. metres each, designed to handle propane and butane and eight pressurised spheres of 3,300 cu. metres each, designed to handle propane, propylene, butanes, butadiene, butylenes and VCM.

The terminal can offer a full range of services including receipt and despatch by ship, pipe, barge, rail and road tanker, ship to ship transfers and refrigerated to pressurised movements via fired heaters.

The terminal is strategically positioned to give ready access to a large market area via road, rail, canals, rivers and coastal movements.

BARROW STORAGE CO LTD

Head Office: 25 Fitzwilliam Square, Dublin 2, Eire.

Tel: **010 3531 763524**. *Fax*: **010 3531 614704**.

Three installations: One at Marshmeadows, New Ross, Co. Wexford, Eire. Storage for 16,000 cu. metres of petroleum products, including LPG. The berth on the River Barrow provides for vessels up to 8 metres draught. Tankage includes 4,500 cu. metres tank which is heated and insulated. One at Dundalk with 2,500 tons of gas oil 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.

BRAGTANK AG

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

Tel: **(61) 65 44 22**. *Telex*: **963180**. *Fax*: **(061) 651692**.

Bragtank, 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 cu. 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.

BRITISH FUELS LTD

Daniel Adamson Road, Weaste, Salford M5 2DX, UK.

Tel: **(061) 736 8111**. *Telex*: **668620**. *Fax*: **061 745 8162**.

Provides storage facilities of 12 tanks, each of 2,000 tonnes, with a total capacity of 24,000 tonnes, for residual and distillate oils. Mild steel tanks, lagged tanks with coil heating and facilities for storing low flash point liquids. Access by road (into standard or specialised petroleum liquid storage); rail (offloading of 1,000-tonne liner trains); and sea (offloading of up to 6,000 tonnes from sea-going tankers).

BTP STORAGE LTD

Hayes Road, Cadishead, Manchester M30 5BX, UK.

Tel: **(061) 775 3945**. *Telex*: **669938**. *Fax*: **(061) 775 3970**.

Part of the British Tar Products 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 cu. metres with a range of tanks up to 6,000 cu. metres capable of handling 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 8,000 tonnes. Easy access to the M6, M62 motorways.

CHEMICAL MANUFACTURE & REFINING LTD

Sunderland Tank Storage Division, Hendon Dock Sunderland, Tyne & Wear, SR1 2ES, IS

Tel: **(091) 564 1889.** *Telex*: **537371.** *Fax*: **(091) 514 0628.**

The terminal can receive ships of up to 6,000 tons dwt capacity and has mild steel and stainless steel import lines. 36,000 cu. metres of storage are contained in twenty tanks. Products stored include petroleum refinery products, petrochemicals and chemical solvent byproducts. Nearby associated company has large distillation units for processing off specification and contaminated cargoes. Drumming off facilities, drum storage and bonded facilities also available.

COMOS TANK B.V.

Octaanweg 14, 1041 AN Amsterdam, Netherlands.

Tel: **(20) 587 2121**. *Fax*: **(20) 587 2150**. *Telex*: **13121**

A subsidiary of VTG Vereinigte Tanklager und Transportmittel GmbH. Operates a terminal with an overall capacity of 700,000 cu. metres for storing all petrochemical liquids and solvents. Tanks range from 3,500 to 40,000 cu. metres, some coated or insulated and equipped with heating-coils. Blending facilities for gasoline and gasoil and facilities for leading, product-washing and butanising are available. Three jetties for seagoing vessels and eight jetties for barges, together with rail and road tanker filling platforms, ensure efficient storage and transfer.

COMPAGNIE INDUSTRIELLE MARITIME (CIM)

36, Rue de Liège, 75008 Paris.

Tel: **Paris (1) 43 87 33 49**. *Telex*: **280330 CIMDGPA**. *Fax*: **Paris (1) 43 87 43 08**.

Contacts: Mr B Salaün (Crude Oil and Marketing Manager) *Direct line*: **Paris (1) 43 87 43 14**. Mr CN Malcolm (CIM UK Representative) *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, straight run fuels, distillates and all clean petroleum products. The complex, which is situated in France at **Le Havre** and **Antifer**, has a total capacity of some five 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 and CIM prides itself on maintaining their clients' confidentiality. CIM has repurchased all assets owned by SOGESPA. Consequently SOGESPA no longer exists and CIM now owns all equipment at the Antifer Terminal, which consists of two crude oil terminals with an overall capacity of 955,000 cu. metres. Six tanks of 150,000 cu. metres each, and two of 22,500 cu. metres each. Access is by sea and pipeline. Seaberths with draughts of 98ft and 82ft respectively. Facilities for discharging ULCC-type vessels up to 550,000 MT and for transhipments.

DEPOTS PETROLIERS DE FOS SA

2.1 Secteur 81-Audience 818, Fos-sur-Mer, 13270 France.

Tel: **(33) 42 47 65 00**. *Telex*: **430235**. *Fax*: **(33) 42 05 11 54**.

DPF, a company in which the Van Ommeren-Ceteco Group has a share, has one installation in France, at Fos-sur-Mer. The terminal has thirty-six tanks with a total capacity of 719,000 cu. metres. All mineral oils can be stored. There are five jetties for sea-going vessels (up to 72ft) and one for coastal vessels (21ft). Access is by sea, rail, pipeline and road. Blending facilities are provided (MTBE, lead, butane).

DUPEG

Terminal: Tankweg 4, D-2103 Hamburg 95, 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 sophisticated 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 cu. metres is fitted out with special linings and the qualitative treatment of products, eg mixing, filtering, clarifying or standardizing, is part of the service DUPEG Tank-Terminal offers.

Individual tanks of 20 to 10,000 cu. metres, including 9 stainless-steel tanks totalling 7,000 cu. metres. A new extension programme will include 27 stainless-steel tanks with a total volume of 23,775 cu. 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 barrelled cargoes. Own sidings complete with tank wagon filling station. Linked to European motorway system via neighbouring A7 Autobahn.

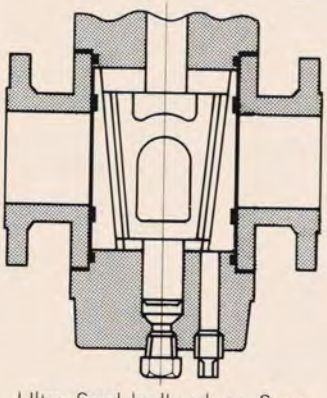
ENEMALTA CORPORATION

Petroleum Division, PO Box 6, Hamrun, Malta.

Tel: **871443.** *Telex:* **1735/1219.** *Fax:* **243055.**

GATX's Leith Terminal.

A Double Block and Bleed Thoroughbred from a Famous Stable



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Now comes the thoroughbred double block and bleed valve – the General Twin-Seal plug valve. Following the acquisition of General Valve (UK) Ltd, Hindle Cockburns are now licensed to manufacture and market the Twin-Seal and other General Valve products in Europe, Africa and the Middle East.

The Twin-Seal is a non-lubricated plug valve, that maintains its very high level of upstream and downstream sealing by eliminating seat wear during rotation of the valve. The seals retract prior to cycling ensuring that there is no rubbing during the opening or closing operation.

The General Twin-Seal has become the industry standard throughout the world for Double Block and Bleed performance because of the 'bubble-tight' integrity of its sealing system.

For further details contact:-

HINDLE COCKBURNS

Victoria Road, Leeds, LS11 5UG.
Tel (0532) 443741. Telex: 55257.

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Twenty-four tanks with a total capacity of 245,000 cu. metres. Eight tanks ranging in size from 10,000 to 20,000 cu. metres and 16 tanks from 5,000 to 10,000 cu. metres. Reception tank for clean ballast, maximum 4,500 tons. Gas oil, jet/kerosene, low viscosity fuel oil. Three berths for vessels up to 50,000 tons dwt; maximum draught 36ft; maximum length 750ft. Separate pipelines for each product, 12-inch to 18-inch. Simultaneous receipt/loading of products possible. Twenty-four hour, seven day service. Centrally situated in the Mediterranean. State-owned. responsible for all import storage and distribution of petroleum products of Malta.

EUROGAS TERMINALS CV

Head Office/Terminal: Frankrijkweg 4, 4455 TR Nieuwdorp, The Netherlands.

Tel: **(0) 1196 12820**. *Telex*: **55684**. *Fax*: **(0) 1196 13444**

A subsidiary of Thyssen Bornemisza Group, Monaco.

The terminal has 130,000 cu. metres capacity for storage of LPG and chemical gases, six spheres of 3,369 cu. metres each, and two refrigerated tanks of 55,500 cu. metres each. There are three jetties for seagoing 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 hinterland by rail, road and water.

Eurogas has expanded its services with the possibility of a practical and theoretical training at the terminal and with a consultancy for design/engineering/operations/start-up.

In 1991 Eurogas has started the construction of a pipeline from the Eurogas terminal to Antwerp/Rotterdam to create the possibility to supply petrochemical industry with large quantities of LPG.

FLEET STORAGE CO LTD

Fleet Lane, Woodlesford, Leeds, West Yorkshire LS26 8AD, UK.

Tel: **(0532) 824396.** *Telex:* **55495.** *Fax:* **(0532) 827431.**

Situated adjacent to the Aire and Calder Canal some six miles south of Leeds. Has 15 tanks ranging from 350 to 3,000 cu. metres with a total capacity of 13,000 cu. metres. Storage available for both high and low flash petroleum products and heated fuel oils. All current tankerage of mild steel construction. Input handled by company's own fleet of rivercraft up to 550 tonnes cargoes from the Humberside area. Road input also available. Delivery to road vehicles by self-service meters rated at 2,000lpm through six loading bays. Vehicle parking, washing and bunkering facilities are also available.

GAMATEX NV

Head Office: Scheldelaan, Kanaaldok B 2, B 2040 Antwerp (Lillo), Belgium.

Tel: **(3) 5684511**. *Telex*: **32459**. *Fax*: **(3) 5684595**.

Gamatex is a 50/50 joint venture between GATX Terminals Corporation and Van Ommeren-Ceteco and has one installation in Belgium.

Antwerp: The terminal offers 143 tanks with a total capacity of 486,100 cu. metres for mineral oils, petrochemical liquids and chemical gases. There are four jetties for seagoing vessels (draught 43ft) and two for barges. Access is by sea, rail and road. 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. Prepump, blending, drum filling and nitrogen blanketing are also available.

GATX TERMINALS LIMITED

Nicholson House, High Street, Maidenhead, Berks SL6 1LQ, UK.

Tel: **(0628) 771242**. *Telex*: **847862**. *Fax*: **(0628) 771678**.

Formerly Unitank Storage Company and now a wholly owned subsidiary of GATX Terminals Corporation of the USA. Operates eight terminals in the UK. Subsidiary: Manchester Jetline Limited. Associates: Tees Storage Company Limited; Unitank Pencol Limited; Wymondham Oil Storage Company Limited; Fima Unitank SDN BHD, Malaysia.

Avonmouth, Bristol: Fifty-six tanks with a total capacity of 142,600 cu. metres, from 311 to 6,900 cu. metres in size, for high and low flash petroleum products, chemicals, molasses and oils and fats. Dock facilities comprise seven berths at the Royal Edward Dock (depth 32ft, maximum length 690ft, maximum beam 95ft), five piggable docklines (three 10 inch lines, one 24 inch line for molasses and one 8 inch s/s line) and 18 dedicated m/s lines. Distribution is through fully automated top and bottom road loading facilities. Wensat pipeline connection. Access to British Rail network. Easy access to M4 and M5.

Belfast: Forty tanks (including 3 × 5,000 cu. metres floating roof tanks currently under construction) with a total capacity of 50,290 cu. metres from 95 cu. metres to 5,000 cu. metres in size for high and low flash petroleum products, chemicals, latex and oils and fats. There is one jetty on the Musgrave Channel (depth 30ft. maximum length 600ft, maximum beam 100ft), two 8 inch s/s docklines and separate lines for fuel oil, latex and tallow. All lines are piggable. By late 1991 distribution will be through fully automated top and bottom loading facilities. Easy access to M1 and M2.

Bromsgrove, Worcestershire: Rail-fed terminal. Nineteen tanks ranging in size from 35 to 1,350 cu. metres with a total capacity of 16,000 cu. metres, for high flash petroleum products. Capable of handling 1,400-tonne block trains. Distribution through self-service road loading facilities. Easy access to M5 and M6.

Eastham, Merseyside: Seventy-nine tanks with a total capacity of 276,700 cu. metres from 50 to 10,800 cu. metres in size in mild and stainless steel and aluminium, for high and low flash petroleum products and chemicals. Dock facilities consist of three berths in the QEII Dock (depth 33ft, maximum length 670ft, maximum beam 90ft) with seven piggable docklines (two 6 inch s/s lines, one 10 inch s/s line, one 10 inch m/s line, two 12 inch and one 14 inch). Distribution is through self-service road loading capable of handling 550 gallons per minute and rail sidings capable of loading and discharging 1,000-ton block trains. Easy access to M53, M56 and M6.

Grays, Essex: Fifty-two tanks with a total capacity of 311,000 cu. metres from 1,700 to 20,800 cu. metres in size, for high and low flash petroleum products and some chemicals. There are two jetties (Wouldham Nos. 1 and 2, depth 37ft at low water, maximum length 750ft, beam unrestricted) with

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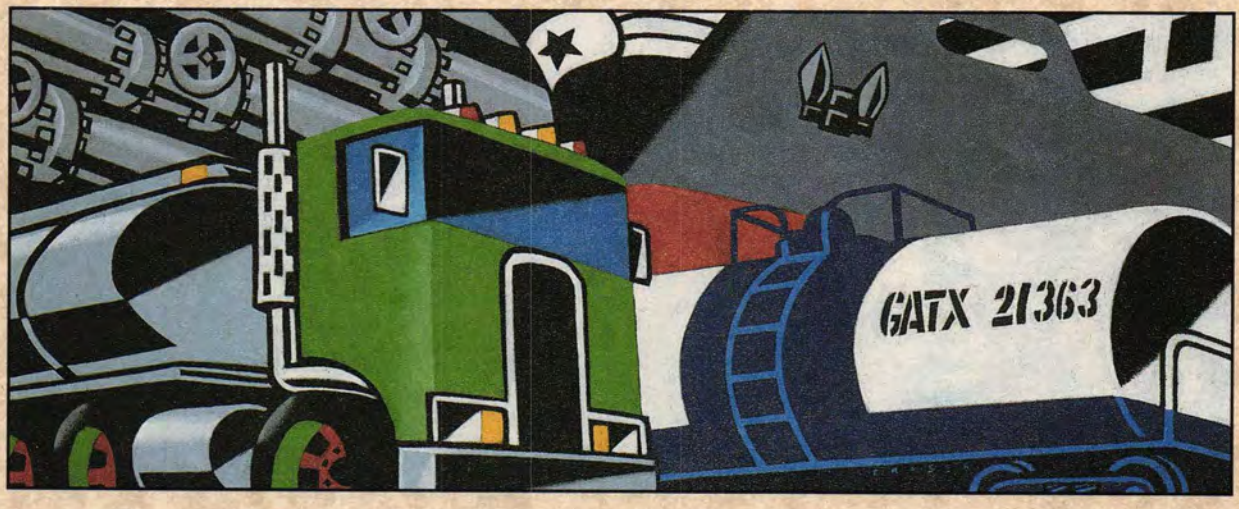

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five piggable docklines—three 10 inch, one 12 inch and one 14 inch. The road loading facilities are currently being converted to a fully automated system and a new vehicle marshalling area is under construction. Rail sidings capable of loading 1,000-ton block trains. Easy access to M25.

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

Leith, Scotland: Thirty tanks with a total capacity of 67,900 cu. metres, from 55 to 13,400 cu. metres in size for high and low flash petroleum products and chemicals. Dock facilities comprise one berth (depth 31ft, maximum length 650ft, maximum beam 100ft) with three mild and two stainless steel docklines. All lines are piggable. Distribution is through self-service road loading and rail. Access to M8, M9 and M90.

Wymondham, Norfolk: Eight tanks with a total capacity of 39,200 cu. metres from 4,100 to 5,200 cu. metres in size. High and low flash petroleum products on a co-mingled, throughputting basis. Distribution through fully automated road loading gantries at 55 GPM. Easy access to A11.

Manchester Jetline Limited: is proceeding with a project to supply Manchester airport with jetfuel by pipeline. The pipeline has already been laid. Once the project is complete the majority of UK refineries will be able to pump to the Airport.

GEBR BROERE BV

PO Box 150, 3300 AD Dordrecht, Netherlands.

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

Operates two storage terminals in the Netherlands.

Dordrecht: 200,000 cu. metres capacity for chemical and petroleum products; tank sizes from 150 to 6,600 cu. 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 cu. metres capacity for the storage of chemical and petroleum products; tank sizes from 670 to 15,000 cu. metres. Tankage is mild steel, stainless steel, some insulated and coated; nitrogen blanketing facilities. Two deep-sea jetties for tankers up to 60,000 tons and two jetties for barges and coastal tankers up to 5,000 tons complement the road and rail access facilities.

GENERAL TANK STORAGE NV

Kaai 275-4de Havendok, 2030 Antwerp, Belgium.

Tel: **(3) 5411280**. *Telex*: **31643**. *Fax*: **(3) 5413163**.

General Tank Storage NV is a storage company for liquid chemicals, mineral, vegetable and animal oils and fats.

There are 180 tanks ranging from 17 to 5,200 cu. metres, made from stainless or mild steel (with special coating on request). Total capacity is 175,000 cu. metres.

95 percent of the tanks are provided with heating coils. If required, heating, nitrogen (blanketing), mixing, etc can be delivered.

GTS is specialised in:
—storage of high-heat products
—storage of oil additives
—storage of difficult chemicals
—filtering/blending
—drumming.

Facilities include more than 450 metres of wharf (36 feet deep), 1,800 metres of railway line, numerous loading points and 5 weighbridges.

An extensive network of pipes, allows unloading of up to 15 different parcels simultaneously. The customs and independent surveyors have offices at GTS and the company has its own forwarding department. These permanent facilities ensure a quick and efficient despatch of products.

The GTS terminal is an ideal point from which to distribute goods in the northern part of West Europe. Its central location in the Antwerp harbour means maximum convenience for ships or lighters, particularly if bunkering is involved. GTS is located at less than 1 mile from the main motorway network.

HALTERMANN GmbH

Head Office: Ferdinandstr 55/57, D2000 Hamburg 1, Germany.

Tel: **(40) 33380**. *Telex*: **2161815**. *Fax*: **(40) 3338214**.

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P.O. Box 102, 3000 AC Rotterdam
tel. (010) -4002911
telex 22163
fax (010) -4139829

Paktank Méditerranée S.A.
B.P. 87, 2048 Ariana
Tunisia
tel. 216-1-766629 –
766909 – 235825
telex 14895
fax 216-1-767470

Paktank Singapore Terminal (Pte) Ltd
The Chartered Bank Building 15-08
6, Battery Road, Singapore 0104
tel. 2258600
telex rs 55343 pt sing.
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FORTHCOMING EVENTS

August

11th–16th
Edinburgh: 'The First International Offshore and Polar Engineering Conference'. Details: International Society of Offshore and Polar Engineers, PO Box 1107, Golden, CO 80402-1107. Fax: 1-303-420-3760.

12th–16th
London: Course on 'Petroleum Exploration and Development Economics'. Details: DCA Consultants Ltd, Rosewall Cottage, Main Road, Aberuthven, Perthshire PH3 1HB. Tel: (0764) 63936.

19th–23rd
London: Course on 'Modern Safety Management'. Details: International Loss Control Institute, PO Box 1898, 4546 Atlanta Highway, Loganville, Georgia 30249, USA. Tel: (404) 466 2208. Fax: (404) 466 4318.

29th–30th
Brisbane, Australia: 'Queensland Coal Symposium'. Details: Mrs Pauline Weaver, Conference Secretary, The Australasian Institute of Mining and Metallurgy, PO Box 122, Parkville, Victoria, Australia 3052. Tel: (03) 347 3166. Fax: (03) 347 8525.

September

1st–13th
Divonne-les-Bains, France: 23rd International Petroleum Executive Seminar (IPES 1991). Details: Dr Bob Gale, Petroleum Economics Limited, Piercy House, 7 Copthall Avenue, London EC2R 7BU. Tel: (071) 638 3758. Fax: (071) 638 3708. Telex: 22573 PETEC G.

2nd
Aberdeen: Conference to review the legislation, structure, development plans and prospects of the Soviet oil and gas industry. Details: Arguments and Facts International Conferences, PO Box 35, Hastings, East Sussex TN34 2UX. Tel: (0424) 444142. Fax: (0424) 717498.

2nd–6th
Oxford: Short Course in 'Retail Marketing — Planning, Economics and Future Developments'. Details: The Registrar, The College of Petroleum Studies, Sun Alliance House, New Inn Hall Street, Oxford OX1 2QD. Tel: (0865) 250521. Fax: (0865) 791474.

3rd–5th
Budapest: '5th International Symposium and Exposition on Gas Turbines in Cogeneration, Repowering and Peak-Load Generation'. Details: International Gas Turbine Institute, 6085 Barfield Road, Suite 207, Atlanta, GA 30328, USA. Tel: (404) 847 0072. Fax: (404) 847 0151 or (404) 843 2517.

3rd–6th
Aberdeen: 'Offshore Europe 91'. Details: Spearhead Exhibitions, 55 Fife Road, Kingston upon Thames, Surrey KT1A 1TA. Tel: (081) 549 5831. Fax: (081) 541 5657.

4th–6th
Bradford: Course on 'Particle size measurement and sampling'. Details: Dr L Svarovsky, Reader in Chemical Engineering and Powder Technology, Department 1DP. Tel: (0274) 733466. Fax: (0274) 727859.

5th–6th
London: Ernst and Young/ ABN-AMRo Bank International Oil and Gas Tax Conference. Details: Jim Marshall, National Tax Partner, Oil and Gas, Ernst and Young, Becket House, 1 Lambeth Palace Road, London SE1 7EU. Tel: (071) 928 2000. Fax: (071) 928 1345.

9th–13th
London: Course on 'Accredited Safety Auditor'. Details: International Loss Control Institute, PO Box 1898, 4546 Atlanta Highway, Loganville, Georgia 30249, USA. Tel: (404) 466 2208. Fax: (404) 466 4318.

10th–12th
Quebec City, Canada: Conference on 'Trans-shipment' including oil and chemical shipment. Details: The Mariport Group, Suite 215, 3425 Harvester Road, Burlington, Ontario, Canada L7N 3N1. Tel: 416 333 8171. Fax: 416 333 1162.

12th–13th
Glasgow: Interdisciplinary Forum on 'Buildings, Energy and the Environment'. Details: Geraldine Oliver, Information Manager, The Watt Committee on Energy, Savoy Hill House, Savoy Hill, London WC2R 0BU. Tel: (071) 379 6875. Fax: (071) 497 9315.

16th–19th
Oxford: Seminar on fire fighting foam 'Foam System Selection and Design Criteria'. Details: Resource Protection Ltd, Suite 3, Lloyd Berkeley Place, Pebble Lane, Aylesbury, Bucks HP20 2JH. Tel: (0296) 399311. Fax: (0296) 395669.

16th–20th
Oxford: Workshop on 'Natural Gas: The Commercial Challenges'. Details: The Alphatania Partnership, 82 Rivington Street, London EC2A 3AY. Tel: (071) 613 0087. Fax: (071) 613 0094.

1991 EUROPEAN SEMINAR ON THE REFURBISHMENT OF BULK LIQUID STORAGE TANKS

30 September and 1 October 1991, Novotel, London

A two-day conference addressing cost-effective strategies for upgrading ageing tanks within a safe and environment-friendly framework.

Conference highlights

- **Safeguarding the environment**
- **Repair methodology**
- **Preparation of tanks for inspection**
- **NDT inspection techniques**
- **Tank bottom external corrosion and data interpretation**
- **Hot spray epoxy coatings for tank lining**
- **Potential microbial hazards and practical solutions**
- **Examination of tank farm pipework**
- **Handling spillages and leaks**
- **Present and future lining systems**
- **Case histories — the inspection and refurbishment of storage tanks in Northern Europe and the Middle East.**
- **Tank reflooring**
- **EEC legislation**

Further details from IIR, 11th Floor, Alembic House, 93 Albert Embankment, London SE1 7TY. Tel: (071) 587 1117. Fax: (071) 587 3703.

FORTHCOMING EVENTS

16th-20th
London: Course on 'Modern Safety Management'. Details: International Loss Control Institute, PO Box 1898, 4546 Atlanta Highway, Loganville, Georgia 30249. Tel: (404) 466 2208. Fax: (404) 466 4318.

17th-19th
Birmingham: International Water Exhibition 'IWEX '90'. Details: Paul Tweedale, Turret Group plc, Turret House, 171 High Street, Rickmansworth, Herts WD3 1SN. Tel: (0923) 777000. Fax: (0923) 771297.

18th-19th
Sutton Coldfield: Symposium on 'Offshore Safety and Reliability'. Details: SARSS 91, The Safety and Reliability Society, Clayton House, 59 Piccadilly, Manchester M1 2AQ. Tel: (061) 228 7824. Fax: (061) 236 6977.

19th-20th
London: Course on 'North Sea Risk Analysis'. Details DCA Consultants Ltd, Rosewall Cottage, Main Road, Aberuthven, Perthshire PH3 1HB. Tel: (0764) 63936.

20th
Oxford: Seminar on 'Gaseous Extinguishing Agents — Applications and Protection Alternatives'. Details: Resource Protection Ltd, Suite 3, Lloyd Berkeley Place, Pebble Lane, Aylesbury, Bucks HP20 2JH. Tel: (0296) 399311. Fax: (0296) 395669.

23rd
London: Talk on 'Regulation in the Electricity and Gas Industries'. Details: Mary Scanlan, The British Institute of Energy Economics, 37 Woodville Gardens, Ealing, London W5 2LL. Tel: (081) 997 3707. Fax: (081) 566 7674.

23rd-24th
London: Conference on 'After the Conflict: A New Era for the Oil Industry?' Details: Karen-Anne Holliday, Conference Organisation, Centre for Global Energy Studies, 17 Knightsbridge, London SW1X 7LY. Tel: (071) 235 4334. Fax: (071) 235 4338.

24th-27th
Bradford: Course on 'Solid-liquid Separation'. Details: Dr L Svarovsky, Reader in Chemical Engineering and Powder Technology, Department of Chemical Engineering, University of Bradford, Bradford, West Yorkshire BD7 1DP. Tel: (0274) 733466. Fax: (0274) 727859.

26th
London: Conference on 'The Power and Efficiency of Marine Propulsion'. Details: Caroline Little, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR. Tel: (071) 636 1004. Fax: (071) 255 1472.

26th-27th
Brussels: International Congress on 'The Lubricants for the Future and the Environment'. Details: Mr Thibou, Congress Department, BFB Consultant, 23 Rue Haigneaux, 5300 Nameche, Belgium. Tel: 32 (0) 81581177. Fax: 32 (0) 81581179.

26th-27th
London: Conference on 'Ensuring Environmental Audit Credibility — Focus on Proposed EC ECO Audit Scheme'. Details: Profex, Buckingham House, The Broadway, Stanmore, Middlesex HA7 4BR. Tel: (081) 954 9546. Fax: (081) 954 5772.

29th-2nd October
London: Conference and exhibition on 'The Way Ahead — Hydrocarbons for the 1990s'. Details: AAPG International Conference, PO Box 979, Tulsa, OK 74101-0979, USA.

30th-1st October
London: '1991 European Seminar on the Refurbishment of Bulk Liquid Storage Tanks'. Details: Stephanie Hodder, Institute for International Research, 11th Floor, Alembic House, 93 Albert Embankment, London SE1 7TY. Tel: (071) 587 1117. Fax: (071) 587 3703.

October

1st–2nd
Oslo, Norway: 'Petroleum Tax Conference — Oil and Gas Tax Reform 1992'. Details: Norwegian Petroleum Society (NPF), PO Box 95, N-5049 Sandsli, Norway. Tel: 47 5 22 48 85. Fax: 47 5 22 89 70.

1st-3rd
Bradford: Course on 'Hydrocyclones'. Details: Dr L Svarovsky, Reader in Chemical Engineering and Powder Technology, Department of Chemical Engineering, University of Bradford, Bradford, West Yorkshire BD7 1DP. Tel: (0274) 733466. Fax: (0274) 727859.

1st-3rd
Esher: 'Firex South Conference and Exhibition'. Details: Paramount Exhibitions and Conferences, 17–21 Shenley Road, Borehamwood, Herts WD6 1RT. Tel: (081) 207 5599. Fax: (081) 207 2598.

1st-4th
London: Workshop on 'Petroleum Investment in Eastern Europe and the Soviet Union'. Details: Centre for Petroleum & Mineral Law Studies. Tel: (0382) 23182 ext 4299. Fax: (0382) 22578.

3rd
London: Seminar on 'Coriolis Mass Flowmetering — Recent Developments and Industrial Applications'. Details: Sira Communications Ltd, South Hill, Chislehurst, Kent BR7 5EH. Tel: (081) 467 2636. Fax: (081) 467 7258.

7th-10th
Warwick: Course on 'Managing Major Emergencies'. Details: Petroleum Training Federation, Room 326, 162-168 Regent Street, London W1R 5TB. Tel: (071) 439 2632. Fax: (071) 287 5483.

9th
London: Conference on 'Automotive Combustion — Environmental and Health Implications'. Details: Caroline Little, The Institute of Petroleum.

10th-11th
Paris, France: Seminar on 'Déréglementation des Systèmes de Production, de Transport et de Distribution d'Électricité'. Details: Centre de Géopolitique de l'Énergie et des Matières Premières, Institut de Recherches Internationales, Université de Paris-Dauphine, Place du Maréchal de Lattre-de-Tassigny, 75775 Paris Cedex 16. Tel: (1) 45 05 14 10 (Poste 24 85). Fax: (33-1) 47 04 76 71.

20th-25th
Buenos Aires, Argentina: 'The 13th World Petroleum Congress'. Details: Mrs Pauline Ashby, The Institute of Petroleum, 61 New Cavendish Street, London W1M 8AR. Tel: (071) 636 1004. Fax: (071) 255 1472.

Hamburg-Wilhemsburg: Total capacity of 150,000 cu. metres, with tanks varying in size from 50 to 5,000 cu. 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.

Speyer/Rhine: Total capacity of 100,000 cu. metres, with tanks ranging in size from 250 to 3,000 cu. metres, for all petroleum products, solvents, chemicals and vegetable and edible oils. Some tanks stainless steel and coated; some with heating coils or insulation. Blending facilities and an associated custom processing plant available. Distribution by road, rail, liner train and barge.

Haltermann N.V. (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 cu. metres capacity terminal. Tanks vary in size from 300 to 3,000 cu. 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 cu. metres make up this 15,000 cu. 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 cu. metres capacity terminal has tanks ranging in size from 20 to 2,000 cu. metres for all petroleum products, solvents and chemicals. Some tanks are stainless steel, coated, heating-coiled and insulated. Distribution by road, rail and sea.

HANSAMATEX KÖHN & KUYPER (GMBH & CO)

Head Office: Rethedamm 15, D 2102 Hamburg 93, Germany.

Tel: **(40) 751960**. *Telex*: **2163363**.

The major shareholder of Hansamatex is Van Ommeren Germany and a minority share is held by the Ulrich H Kohn GmbH.

Hamburg: The terminal has 300 tanks with a total capacity of 758,000 cu. metres for storing mineral oils, petrochemical liquids, 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. Pre-pump facilities, drum filling plant, blending and dyeing facilities for gasoline and fuel oil are also available.

IBER TANK SA

Muelle de Inflamables, 08039 Barcelona, Spain.

Tel: **(3) 335 4066**. *Telex*: **53975**. *Fax*: **(3) 335 6283**.

Located at the Port of Barcelona's Flammables Area, direct access by road (Highway A-2), by sea (two 33ft jetties), and, in future, rail (under construction). Operates with 67 tanks, ranging from 30 to 2,000 cu. 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.

IBL BULK LIQUIDS

110 Lime Street, Hull HU8 7AS, UK.

Tel: **(0482) 20736/7**. *Telex*: **592230**. *Fax*: **226162**.

132 storage tanks ranging from 50 to 830 cu. metres with a total capacity of 25,000 cu. 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. An 80 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 & Fax: **(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 cu. metres is required for full membership. Associate membership is available to those with less than 50,000 cu. metres capacity. All companies with over that amount are currently members of ITSA.

KING'S LYNN STORAGE LIMITED

Head Office: P O Box No 2, Melton Constable, Norfolk NR24 2QR. *Tel*: **(0263) 860812**. *Fax*: **(0263) 861491**.

Terminal: Estuary Road, Kings Lynn, Norfolk PE30 2HH. *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 cu. metres terminal on behalf of KPGB.
2. King's Lynn Storage Limited's own terminal comprises 10 storage tanks ranging from 55 cu. metres to 2,200 cu. metres with a capacity of 4,000 cu. 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 tons 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. There is available office and warehousing space to meet customers' 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 cu. metres for petroleum products. Tanks between 500 and 15,000 cu. metres for low and high flash products. Storage and handling facilities for lubricants. Total storage capacity for chemical products 70,000 cu. metres. Tanks between 250 and 5,000 cu. metres for high and low 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. Twenty-five 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. Draught to be increased to 34ft by the end of 1991.

LONDON AND COASTAL OIL WHARVES LTD

Head Office: Hole Haven Wharf, Haven Road, Canvey Island, Essex SS8 0NR, UK.

Tel: **(0268) 682206**. *Telex*: **99104**. *Fax*: **(0268) 510095**.

Canvey Island Terminal: More than 100 tanks ranging from 45 to 20,320 cu. metres with a total capacity of 354,000 cu. metres. The full range of petroleum products is stored, including fuel oil, lubricating oils and automotive products. Jetty facilities are capable of handling vessels of up to 219 metres LOA. Delivery can be made from any tank to road tank wagons, water-borne vessels or drums. The installation is connected via UKOP to North London, London Airport (Heathrow), Birmingham and to the Government Pipeline and Storage System (GPSS). A large part of the company's throughput of gasolines, gas oils, aviation fuels and kerosenes is despatched by pipeline. Chemical storage facilities include stainless steel pipelines, lined, insulated and heated storage tanks and inert gas blanketing.

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 cu. 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 cu. 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.

Both terminals have modern workshops, weighbridges, 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 BS standards, now available at both terminals.

MATEX NEDERLAND BV

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

Telex: **21435 VO NL**. *Fax*: **(10) 464 2819**.

Commercial Department *Tel*:
Mineral oils **(10) 464 2337**
Chemicals **(10) 4729 799**
Edible oils **(10) 460 8600**

Matex Nederland BV is a member of the Van Ommeren Ceteco Group and operates four terminals in the Netherlands. The Matex worldwide storage capacity is 10,008,000 cu. metres. The 21 terminals are situated in 15 countries all over the world.

Matex Amsterdam B.V. Amsterdam: There are 198 tanks with a total capacity of 600,000 cu. metres for storing

GATX's Grays Terminal.

mineral oils and molasses. Mooring facilities consist of four jetties for seagoing vessels (draught up to 41ft) and seven for barges. Access is by road, rail and sea. There are 15 tanks of 8,500 cu. metres, all with floating roofs. Insulated coiled tanks equipped with steam and warm water heating are also available. Special services include equipment to standardise and filter molasses and an inert gas supply.

Matex Botlek Rotterdam: This terminal has 317 tanks with a total capacity of 940,000 cu. metres for storing mineral oils, petrochemical and chemical liquids. There are six jetties for seagoing vessels (draught up to 41ft) and 7 for barges. Access is by sea, road and rail. Insulated coiled, coated aluminium and stainless steel tanks are available and are equipped with nitrogen-blanketing and vapour-return facilities. Product lines are partly stainless steel, multipurpose and piggable. There are two 16-inch pipelines to the Rotterdam Europoort installation and pipeline connection to adjacent refineries connected as well as to the NATO pipeline system. Also available are blending facilities such as fuel oil (bunkers) and dyeing and a drumming plant, also for ICB's. ISO 9002 approved terminal.

Matex Europoort B.V., Rotterdam: The terminal has 34 tanks with a total capacity of 750,000 cu. metres for storing mineral oils. Mooring facilities consist of one finger-pier for two VLCC-type vessels (draught 71ft), one jetty for vessels up to 45,000tons and five berths for barges. Access is by sea and road. All tanks are coiled, 24 have floating roofs, 7 have innerfloaters and all operations are directed from the fully automated control room. Special services include washing, leading, blending and butanising facilities for leaded and unleaded gasoline. There are two 16-inch pipelines to the Rotterdam-Botlek terminal and pipeline connections to adjacent refineries connected to the NATO pipeline system.

Matex Vlaardingen: There are 364 tanks with a total capacity of 438,000 cu. metres. Products stored: vegetable and animal oils and fats, molasses and oleochemicals. Mild steel aluminium and stainless steel tanks coiled and insulated. There are three jetties for seagoing vessels, 10 for barges (all draught of 39ft). Access is by road, rail and sea. Drumming facilities, weighing tanks and pre-pump containers for quality inspection are also available. ISO 9002 approved terminal.

NOORD NATIE TERMINALS SV

Head Office: Stadswaag 7-8, B-2000 Antwerp, Belgium.

Tel: **(3) 2329940**. *Telex*: **31677**. *Fax*: **(3) 2333936**.

Situated in the port of Antwerp. There are 167 tanks ranging from 30 to 8,000 cu. metres, with a total capacity of 190,000 cu. metres for various bulk liquids including mineral and lubricating oils, vegetable and animal oils and fats, non-dangerous chemicals and molasses. All tanks equipped with heating coils. Two mooring berths for sea-going vessels and a special dock for handling barges. Direct road and railway connections. Three weighing bridges. Drumming installation.

NORDIC TANK STORAGE AB

Grönsakstorget 2, S-411 17 Gothenburg, Sweden.

Tel: **(31) 131950**. *Telex*: **27696** NORDIC S. *Fax*: **(31) 131955**.

Sweden: Nordic Tank Storage AB run about 1.4 million cu. metres independent tankspace for bulk liquid products in Sweden. This capacity is divided into 20 different terminals covering the whole coast of Sweden, appr. 300 tanks are operated. Nordic Tank Storage AB is the biggest independent tankstorage company in Sweden.

Gothenburg: The biggest independent terminal within Scandinavia. Operates 74 tanks ranging from 60 cu. metres to 25,000 cu. metres with a total capacity of over 500,000 cu. metres. The full range of petroleum products is stored, including gasoline, gas oil, fuel oils, lubricating oils and automotive products. Jetty facilities are capable of handling vessels up to 240 metres in length and up to 40ft draught with additional berths for smaller vessels and barges. The installation is connected to every terminal located in the oil harbour of Gothenburg where the big international oil companies have their own terminals and is also connected to BP and Shell refineries. Delivery can be made from any tank to road and railway tank wagons, waterborne vessels or drums. Each tank has its own pump and line to loading racks and its own loading point, to avoid any risk of mixing and contamination. Pump capacity up to 1,000 cu. metres per hour. Some tanks from 6,000 cu. metres have a floating roof. All tanks are equipped with a modern system for accurate temperature and level control. Ten pipelines between 6 inch and 20 inch diameter from berths to the storage tanks. Also available, blending facilities for gasoline, gas oil and fuel oils.

Possibilities to store in transit.

OIL RAIL TERMINALS (LEEDS) LTD

South Accommodation Road, Leeds LS9 0RT, UK.

Tel: **(0532) 480574**. *Telex*: **55435**. *Fax*: **(0532) 400762**.

Head Office: Hayes Road, Cadishead, Manchester M30 5BX.

Part of the British Tar Products group of companies. Thirty-two acre site only one mile from the M1 and M62 motorways. Liner trains of up to 1,000 tonnes are received in modern sidings and discharged in two hours. Equipped with high-speed, self-service road vehicle loading bays. Products stored in mild steel tanks ranging from 600 to 6,000 cu. metres, with a total capacity of 21,000 cu. metres. Complete range of low and high flash petroleum products.

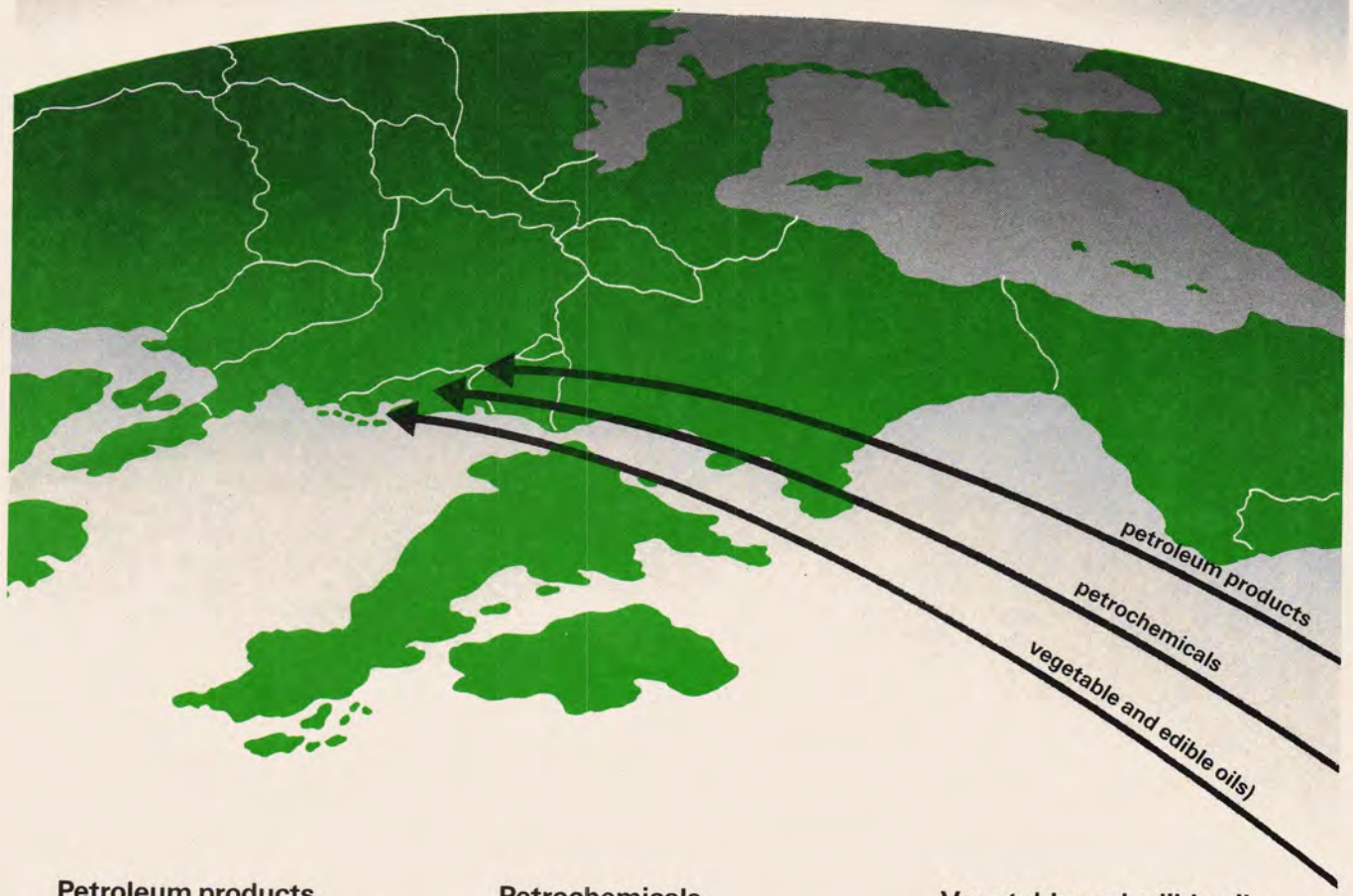
OILTANKING GMBH

Headoffice: Admiralitätstraße 55, D-2000 Hamburg 11.

Tel: **(40) 37 0990**. *Fax*: **(40) 37 099 199**. *Telex*: **216 32 32**.

Oiltanking has a storage capacity of approximately 4 million cu. metres. The company operates six seaport terminals, designed for rapid handling, in **Amsterdam, Copenhagen, Ghent, Hamburg, Houston, Singapore**. One additional terminal with 175,000 cu. metres is under construction. Completion will be in early 1991. All terminals occupy key-positions in the international oil storage business and are backed by a dense network of inland tank terminals. Seaport tank 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 tons dwt are handled at this terminal and their

Matex entries to Europe



Petroleum products

- Capacity 1,500,000 cbm at Matex Europoort, Matex Botlek and Matex Amsterdam
- No length and draught limitations
- Product dedicated and piggable pipelines
- Pipeline connections to Rotterdam refineries and CEPS
- Washing, leading, blending, butanising and upgrading
- Floating roof tankage
- Insulated tanks
- Vacuum distillation

Petrochemicals

- Capacity 700,000 cbm at Matex Botlek
- No berthing limitations
- Tanks varying from 150 - 13,000 cbm
- Stainless steel, aluminium coated and mild steel tanks
- Product dedicated and piggable mild steel and stainless steel pipelines
- Drum filling facilities
- Loading facilities for road and rail tank cars
- Supply of nitrogen/steam

Vegetable and edible oils

- Capacity 635,000 cbm at Matex Vlaardingen and Matex Amsterdam
- All tanks equipped with heating coils
- Drum filling facilities
- Aluminium tanks with stainless steel pipelines
- Loading facilities for road and rail tank cars
- Tanks varying from 150 - 5,500 cbm

matex **Matex Nederland BV**

Matex Nederland BV, PO Box 845, 3000 AV Rotterdam, telephones: 10 - 464 27 06 (petroleum products), 10 - 464 28 29 (vegetable and edible oil), 10 - 472 97 00 (petrochemicals), telefax 10 - 472 20 30 (petrochemicals only), 10 - 464 28 19 (other departments), telex 21435 vo nl access code matex+

cargoes redistributed on coasters and barges. Extensive product treatment facilities for the blending, leading and up- and downgrading of gasoline are also available.

Germany

Hamburg: Forty-one tanks, sizes 2,000 to 19,000 cu. metres. Total capacity 418,000 cu. metres. Low/high flash petroleum products and heavy fuel oil storage. Sea/barge/rail/road. Berth for tankers up to 85,000 tons dwt.

Berlin: Thirty tanks, sizes 1,500 to 25,000 cu. metres. Total capacity 348,000 cu. metres. Low/high flash petroleum products. Barge/rail/road.

Karlsruhe: Thirty-five tanks, sizes 600 to 2,000 cu. metres. Total capacity 180,000 cu. metres. Low/high flash petroleum products, chemical products and LPG-storage (Gastanking GmbH). Barge/rail/road.

Bendorf: Twenty-two tanks, sizes 2,000 to 20,000 cu. metres. Total capacity 146,000 cu. metres. Low/high flash petroleum products. Barge/rail/road.

Frankfurt: Thirty-three tanks sizes 100 to 5,000 cu. metres. Total capacity 51,000 cu. metres. Low/high flash petroleum products and chemical products. Barge/rail/road.

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

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

Duisburg: Six tanks, sizes 5,000 to 10,000 cu. metres. Total capacity 35,000 cu. metres. Low/high flash petroleum products. Barge/road.

The Netherlands

Amsterdam: 47 tanks, sizes 4,000 to 40,000 cu. metres. Total capacity 804,000 cu. metres. Low/high flash petroleum products/heavy fuel oil/crude oil/components/feed stocks/molasses. Sea/barge/road/rail (projected). Berth for tankers up to 85,000 tons dwt.

Belgium

Ghent: Thirty-eight tanks, sizes 3,000 to 46,250 cu. metres. Total capacity 600,000 cu. metres. Low/high flash petroleum products/feed stocks/chemical products/ fertilisers/edible oils. Sea/barge/rail/road. Berth for tankers up to 65,000 tons dwt.

Denmark

Copenhagen: 39 tanks, sizes 1,600 to 16,000 cu. metres. Total capacity 329,000 cu. metres. Low/high flash petroleum products/chemical products. Sea/coaster/road. Berth for tankers up to 40,000 tons dwt.

OMNI TANK GMBH

Marienstraße 20 D-4000 Düsseldorf 1
Tel: **(0211) 350515**. *Fax*: **(0211) 357697**.

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

Essen: 112,000 cu. metres. 39 tanks ranging from 600 to 12,000 cu. 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.

Honau: 48,000 cu. metres. 23 tanks for gasoline, gasoil, jet fuel and petrochemical liquids. Blending facilities are available. Access by road, rail and barge.

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

Speyer: 796,000 cu. metres. 57 tanks ranging from 2,000 to 60,000 cu. metres 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. Over 7 million cu. metres of tank storage capacity at terminals in Western Europe and further capacity in the USA, Tunisia and Singapore.

The Netherlands

Botlek (Rotterdam): 1,576,000 cu. 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 cu. metres; sea, pipelines; 68ft; crude oils and petroleum products. Able to

Paktank NOM Terminal.

receive vessels up to 72ft via the Maasvlakte terminal.

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

NOM/Pernis (Rotterdam): 319,163 cu. metres; sea, road, rail; 38ft 10in; petroleum products, chemicals, aromatics.

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

Sweden

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

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

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

Germany

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

Tollerort and Hohe Schaar (Hamburg) and Kiel: See under VTG-PAKTANK HAMBURG GMBH.

PANOCEAN STORAGE & TRANSPORT LTD

Head Office: Chester House, Chertsey Road, Woking, Surrey GU21 5BJ, UK.

Tel: **(0483) 726241**. *Telex*: **859343**. *Fax*: **(0483) 725459**.

Provides storage and transportation services for handling and distribution of liquid products in bulk.

Operates bulk liquid storage installations in Belgium, Holland and UK, and the USA, with a total capacity of some 1.51 million cu. metres, handling chemicals, petroleum fuels, lubricating oils, latex and vegetable and animal oils. Has its own access by sea, road and rail as well as ancillary service possibilities in supplying nitrogen, large-scale drumming and canning.

Belgium

Eurotank (Antwerp): 469,000 cu. metres capacity. Tanks range in size from 100 to 50,000 cu. metres; stainless steel, aluminium, heated, coated and insulated. Facilities for blending and drumming together with dry cargo warehouse space.

Hemiksem (Antwerp): 120,000 cu. metres capacity. Tanks range in size from 33 to 5,500 cu. metres; stainless steel, aluminium, heated, coated and insulated. Facilities for blending, drumming and canning together with dry cargo warehouse space.

Netherlands

Botlek (Rotterdam): 206,600 cu. metres capacity. Tanks range in size from 365 to 10,000 cu. metres. Specialised tankage includes various categories of coated and insulated tanks with both mild steel and stainless steel heating coils.

Pernis (Rotterdam): 350,000 cu. metres capacity. Tanks range in size from 15 to 7,300 cu. metres. Specialised tankage includes aluminium, heated and coated tanks. Facilities for drumming, blending and clarifying.

United Kingdom

Birkenhead (Merseyside): 45,000 cu. metres capacity. Tanks range in size from 50 to 2,000 cu. metres; heated, coated and insulated. Facilities for blending and drumming.

Eastham (Merseyside): 85,000 cu. metres capacity. Tanks range in size from 50 to 3,500 cu. metres. Specialised tankage includes coated and temperature controlled tanks.

Hull (North Humberside): 14,520 cu. metres capacity. Tanks range in size from 20 to 1,200 cu. metres. Carbon steel insulated tanks.

PL TRANSTORE LTD

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

Tel: **(051) 647 4111**. *Telex*: **9312134171**. *Fax*: **(051) 666 2136**.

We are an independent Company situated on the River Mersey within the Birkenhead Dock System.

Our modern installation can accommodate ocean-going vessels and with the aid of three piggable discharge lines can handle a maximum of 20,000 tonnes.

All tanks are lagged and served by individual line, heating is by low pressure steam coil.

We also operate a modern fleet of stainless steel roadtank cars, fitted with pumps and compressors for both contract and spot hire.

As a small Company we are able to offer a variety of specialist services to suit the needs of our Customers.

POWELL DUFFRYN TERMINALS LTD

Commercial enquiries: C Scott, Sales Manager UK, Powell Duffryn House, London Road, Purfleet, Essex RM16 1PR.

Tel: **(0708) 865701**. *Telex*: **21725**. *Fax*: **(0708) 868983**.

Operates three terminals in the UK as follows:

Barry, South Wales: High and low flash tankage, for petroleum and chemical products, with a total capacity of 205,000 cu. metres. Tank sizes from 60 to 14,400 cu. metres; mild steel—many lined, lagged and coiled, using stainless steel fittings where required. Eight tanker berths with a minimum depth of 9.8 metres (32ft), served by over 20 pipelines in stainless or mild steel, lagged and traced as required. Blending and drumming; weighbridge; 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 cu. metres with a total capacity of 89,000 cu. 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; blending; road facilities.

Purfleet, Essex: Two jetties: the main seven-berth private jetty with a minimum depth of 10.6 metres (35ft) can accept vessels of up to 45,000 tons 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 cu. metres. Tank sizes from 50 to 15,000 cu. 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.

PROPETROL

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

Tel: **(33) 88 45 90 10** and **(33) 88 60 06 67**. *Telex*: **890619** and **880078**. *Fax*: **(33) 88 60 66 30** and **(33) 88 61 07 47**.

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** (three 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 200,000 cu. metres of bulk petroleum products, 32,000 cu. metres of bulk liquid chemicals and petrochemicals and over 7,000 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.

PROQUIMICA SA

Head Office: Calle Orense 20, 28020-Madrid, Spain.

Tel: **(1) 5560752**. *Telex*: **43250**. *Fax*: **(1) 5560348**.

Terminal: Muelle de Inflamables 08004-Barcelona, Spain.

Tel: **(3) 3355812**. *Telex*: **53962**. *Fax*: **(3) 3355741**.

An independent company, associated with Powell Duffryn Terminals, with an installation in the port of Barcelona for the storage and handling of chemical, petroleum petrochemical and edible products.

Barcelona: 60,000 cu. metres for high and low flash, corrosive and other special liquid products in bulk. Tanks ranging from 50 to 3,000 cu. metres. Two berths (12 metres draught) operating 24 hours a day. Heating, blanketing, heat traced pipes, stainless steel tanks and pipes, coated tanks, blending, drumming facilities. Access by sea and road, rail under execution, ship to ship facilities. Authorised to store gases. Logistic and technical advice. In bond operations.

QUIMATEX LDA

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 cu. metres for storing ammonia, chemicals and petroleum products. Maximum draught at the jetty is approximately 32ft at high tide.

THE ROSS CHEMICAL & STORAGE CO LTD

Dock Road, Grangemouth FK3 8UB, Scotland.

Tel: **(0324) 474774**. *Telex*: **777750**. *Fax*: **(0324) 485476**.

Grange Dock, Grangemouth: Sixty tanks ranging from 800 to 2,650 cu. metres, with a total capacity of 100,000 cu. metres, for fuel oil, motor spirit, petrochemicals, aviation fuel and molasses. Served by a common-user oil jetty with mild and stainless steel jetty lines. The jetty is capable of handling ships up to 20,000 tons dwt. Distribution by road. Office facilities and land available for expansion.

SIMON STORAGE GROUP LTD

Knowles House, Cromwell Road, Redhill, Surrey, RH1 1RU, UK.

Tel: **(0737) 778108**. *Telex*: **888744 SIMONSTO G**. *Fax*: **(0737) 778112**.

Simon Storage manage the bulk storage interests in the UK and Eire of Simon Engineering plc and Van Ommeren Ceteco NV. All enquiries regarding the operating companies should be addressed to Simon Storage.

Distribution Services/Facilities Management

Simon Storage provide aviation refuelling, into plane services, together with terminal and pipeline management on a contract management basis.

Cumbrian Terminal:

Prince of Wales Dock, Workington, Cumbria.

Tel: **(0900) 605151**. *Telex*: **64331 CSTORR G**. *Fax*: **(0900) 67986**.

31,581 cu. metres for petroleum products, liquid sulphur and chemicals 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) 571037**.

Killingholme: *Tel*: **(0469) 40381**. *Telex*: **52291 ISCOL G**. *Fax*: **(0469) 41012**.

Operates three installations: two at Immingham Dock (East and West) and one at Killingholme. More than 300 tanks with a total capacity of 900,000 cu. metres, making it the larg-

GATX's Grays Terminal.

est 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 three jetties: Eastern, Western and one at Killingholme. 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 tons 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 both Immingham and Killingholme. New tankage under construction.

Seal Sands Terminal:
Seal Sands, Middlesbrough, Cleveland TS2 1UB.

Tel: **(0642) 546775**. *Telex*: **58218 SSTOR G**. *Fax*: **(0642) 546076**.

Wholly owned by Simon Engineering plc. Over 100 tanks with a total capacity of 196,400 cu. metres for petroleum products, chemicals including molten sulphur, VCM and propylene and a wide range of edible or specialist products. Two jetties, one taking vessels up to 30,000 tons 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: **(010 353) 69 65506**. *Fax*: **(010 353) 69 65601**.

One installation. 12,500 cu. metres for petroleum and chemical products on the River Shannon. The jetty can accommodate 20,000 ton 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.

Thames Matex:
Oliver Road, West Thurrock, Grays, Essex RM16 1EH.

Tel: **(0708) 863399**. *Telex*: **25207 TMATEX G**. *Fax*: **(0708) 866525**.

Wholly owned by Van Ommeren Ceteco. An excellent and modern installation on London's orbital motorway (M25), providing storage for a full range of petroleum products and a wide range of chemicals. Jetties can accommodate up to 50,000 tons dwt vessels. Comprehensive road loading facilities ensure rapid turnround times for loading vehicles. There are 348,000 cu. metres of storage in 120 tanks, a substantial number of which have floating decks. One hundred and five road loading points, many linked to on-line computer facilities. Rail facilities include handling capability for block trains and own shunting locomotive. Re-loading to barges and coasters at up to 500 tonnes per hour. Fully computerised stock accounting with direct links to customers equipment by arrangement. Plans exist for further expansion.

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 cu. metres. Fifty mild steel tanks, ranging in capacity from 300 to 8,600 cu. 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: **(3) 3553 3770**. *Telex*: **190582**. *Fax*: **(3) 3553 3694**.

Two terminals, with a total capacity of 340,000 cu. 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 into each tank. Tanks from 5,000 cu. 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 cu. metres, with a total capacity of 230,000 cu. 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 630 to 4,900 cu. metres, with a total capacity of 140,000 cu. metres. One jetty, draught of 27ft. for 9,000 ton ships. Reception from and delivery to ships, barges, road containers, rail cars and drums. Drumming station connected to tanks; facility to drum directly to road containers and rail cars.

New Extension: New building stainless steel tank from 390 to 740 cu. metres, representing 10,000 new cu. metres. Plus a new jetty for 40,000 ton ships and a new building construction of 15,000 + 10,000 cu. metres in normal steel (terminal No 2).

SOTRASOL

36 rue de Liège, 75008 Paris, France.

Tel: **(45) 22 22 70**. *Telex*: **280330**. *Fax*: **(45) 22 14 70.**

Tarnos (Port de Bayonne): 100,000 cu. metres capacity for chemical liquids, crude oil, liquid fertilisers, animal and vegetable oils and fats. Seventeen tanks from 640 to 15,000 cu. 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).

Le Havre: One hundred tanks from 30 to 5,000 cu. metres, with a total capacity of 105,000 cu. 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). Planned extension; 1,000 cu. metres.

TANKFREIGHT LTD

Copthall Bridge House, 1 East Parade, Harrogate HG1 5LN, UK.

Tel: **(0423) 506181**. *Telex*: **57608**. *Fax*: **(0423) 522360**

Tank terminals at **Felixstowe** and on **Humberside** offer 130,000 cu. metres bulk storage capacity equipped

to handle a comprehensive range of liquid, edible, chemical and petroleum products.

Felixstowe Tankstore: FTD House, The Dock, Felixstowe, Suffolk IP11 8RY.

Tel: **(0394) 676112**. *Telex*: **98341**. *Fax*: **(0394) 673590**.

One hundred and eighty-two tanks, mild and stainless steel, totalling 105,000 cu. metres storage capacity equipped to handle a comprehensive range of liquid, edible, chemical and petroleum products, alcohol, hydrocarbon and IDA bonded areas.

Humber Tankstore: Gunness Wharf, Scunthorpe, South Humberside DN15 8SY

Tel: **(0724) 783690**. *Fax*: **(0724) 782278**.

Forty-five tanks, mild and stainless steel, totalling 23,000 cu. metres storage capacity equipped to handle a comprehensive range of liquid, edible, chemical and petroleum products, alcohol bonded area.

TEES STORAGE CO LTD

Erimus House, Queen's Square, Middlesbrough, Cleveland TS2 1QX, UK.

Tel: **(0642) 230000**. *Telex*: **58477**. *Fax*: **(0642) 230107.**

Jointly owned by Pakhoed Holding NV and GATX Corporation of Chicago. Operates two terminals in the UK.

Middlesbrough: Fifty-eight tanks from 30 to 6,500 cu. metres, with a total capacity of 80,000 cu. metres. Mild steel coated and stainless for petroleum and chemicals. Road, rail and sea. Jetty facilities at South Wharf for ships up to 7,500 tons dwt. 12 dock lines (six stainless steel). Based at the Middlesbrough terminal is a 1,500 tonne chemical tank-barge for inter-river transfers and overside cargo.

Seal Sands: 110 tanks from 55 to 8,500 cu. metres, with a total capacity of 175,000 cu. metres. Mild steel coated and stainless for petroleum and chemicals. One sphere of 6,650 cu. 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 tons dwt. Maximum length 760ft; maximum draught 36ft. 24 docklines (15 stainless).

TERMINALES PORTUARIAS, S.A.

Head Office: Port of Barcelona. Muelle de Inflamables. 08039 Barcelona. Spain.

Tel: **(3) 3350500**. *Fax*: **(3) 3358529**. *Telex*: **54061**.

Installations in the ports of **Barcelona, Tarragona, Bilbao** and **Valencia** for the storage of chemical and petrochemical products and vegetable oils. A joint venture between GATX Terminals Corporation and Petrofrance.

Barcelona Terminal: 49,530 cu. metres capacity in eighty-nine tanks ranging in size from 50 to 2,650 cu. metres. Two berths with 39ft (13 metres) draught. Services include drumming, liquid and dry goods storage (1,080 sq. metres of dry storage), bonded storage, heating, refrigeration, gas blanketing, and coated and stainless steel tanks. Surface access via Barcelona Expressway system. Rail side access to the Installation.

Bilbao Terminal: 18,930 cu. metres capacity in 51 tanks ranging in size from 50 to 890 cu. metres. One berth with 20ft (6.1 metres) draught. Services include drumming, heated and coated tanks, gas blanketing. Surface access via E50 Coastal Highway.

Valencia Terminal: 33,715 cu. metres capacity in 23 tanks ranging in size from 305 to 2,150 cu. metres. One berth with 39ft (12 metres) draught. Services include drumming and gas blanketing. Surface access via E101 Valencia-Madrid Highway and E26 Coastal Highway.

Tarragona Terminal: 28,280 cu. metres capacity in thirty tanks of 650 to 1,305 cu. metres. Two berths with 41ft (12 metres) draught. Services include heated, coated and stainless steel tanks, gas blanketing. Surface access via local major arteries. Rail side access to the Installation.

VAN OMMEREN CETECO NV

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

Tel: **(10) 464 9111**. *Telex*: **21435**.

The Van Ommeren Ceteco Group is the second largest independent tank storage company in the world with a capacity of over 10 million cu. metres, 6.2 million cu. metres of which is in Europe.

Through its 50 percent ownership of Chemicals and Oil Storage Management Group, Van Ommeren is associated with Cumbrian Storage, Immingham Storage, Irish Bulk Liquids Storage and Velva Liquids. It also has UK interests through its wholly-owned subsidiary, Thames Matex (for details of these companies, see under Simon Storage Group Ltd.).

In the Netherlands the Van Ommeren Group wholly owns three companies: Matex Europoort B.V., Matex Amsterdam B.V. and Nieuwe Matex B.V. (which consists of the two terminals Botlek and Vlaardingen). Details of these companies can be found under their separate headings.

In Belgium, France, Spain, Germany and Switzerland there are five other companies in the Van Ommeren Group, some wholly owned and some associated companies: Gamatex NV, Dépôts Pétroliers de Fos, SA, Ibertank SA, Hansamatex Köhn & Kuyper (GmbH & Co), Bragtank AG. Details of these five companies can be found under their separate headings.

Outside Europe the Van Ommeren Group has associated terminals in the USA, Canada, Korea, Bangladesh, Pakistan, Singapore and Mexico.

Van Ommeren's storage facilities are complemented by the group's inland tank shipping services which operate in The Netherlands, Switzerland, Germany and Belgium.

VTG-PAKTANK TANKLAGER GMBH & CO. KG

Brandsende 2–4 2000 Hamburg 1, Germany.

Tel: **(40) 322843**. *Telex*: **2163506**. *Fax*: **(40) 322630**.

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

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

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

VTG VEREINIGTE TANKLAGER UND TRANSPORTMITTEL GMBH

Head Office: Neue Rabenstrasse 21, 2000 Hamburg 36, Germany.

INDEPENDENT STORAGE

Tel: **(40) 441910**. *Telex*: **2170080 vt d**.

VTG, a member of the PREUSSAG 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 cu. metres. Storage facilities are complemented by 22,000 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 cu. metres, 85 tanks ranging from 10 to 20,000 cu. metres for all petroleum products, solvents and petrochemicals; access for barges, road and rail tank cars and liner trains.

Duisburg: 290,000 cu. metres, 200 tanks varying in size from 15 to 9,000 cu. 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, pipeline.

Ebrach: 5,000 cu. metres for storing petroleum products.

Hanover: 314,000 cu. metres. 28 tanks ranging from 500 to 70,000 cu. 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 cu. metres, 49 tanks ranging from 50 to 47,000 cu. metres for storing petroleum products, chemical and petrochemical liquids and solvents. Blending facilities for gasoline are available. Access as above.

Regensburg: 77,000 cu. metres, 60 tanks varying in size from 100 to 9,000 cu. 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:

Köln: 101,000 cu. metres, 31 tanks ranging from 25 to 25,000 cu. metres for storing petroleum products, chemicals and solvents. Access by road, rail, barge and pipeline (RMR).

Mainz-Gustavsburg: 256,000 cu. metres, 33 tanks ranging from eight to 40,000 cu. 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: OminTank GmbH

Hamburg: VTG-Paktank Hamburg GmbH

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

Algeria: a giant gas exporter

By Naji Abi-Aad, Energy Consultant

With its huge natural gas reserves and basic export facilities, Algeria can be expected to play an essential role in supplying the world gas markets through the coming decades. Plans for even further expansion are on the drawing board. But the future of these plans — including the proposed western gasline to Spain — is in the balance due to the political destabilisation of the country since the resurgence of Islamic fundamentalism.

In this article Naji Abi-Aad outlines how Algeria intends to increase its gas exports if financing can be secured from international investors.

Gas reserves

Algeria's proven natural gas reserves were recently estimated by Sonatrach, the state-owned company, at around 3,600 billion cubic metres, representing some 2.8 percent of the world total. An active exploration programme projected for the 1990s is expected to add to the reserves and to raise the reserves-to-production ratio (production equals gross output minus reinjection) from the current 52–58 years.

These natural gas reserves constitute around 70 percent of the country's total recoverable hydrocarbon reserves. Only about 15 percent of total gas reserves is found in associated form, mainly in the Hassi Messaoud oilfield. The Hassi R'Mel field alone contains as much as 2,400 billion cubic metres of proven reserves. This field is considered one of the world's largest. Other natural gas fields in Algeria include Stah (218 billion cubic metres), Gassi Touil (195 billion), Tin Fouye Tabankort (156 billion), In Amenas (155 billion), In Salah (71 billion) and Rhourde Nouss (372 billion).

Gas production and consumption

Gross production of natural gas had steadily grown from 90.6 billion cubic metres in 1985 to 119.65 billion in 1989 and an estimated 122 billion in 1990. Increasing volumes of natural gas were marketed and reinjected into oilfields over the period 1985–90, while gas flared or lost in shrinkage had slightly fluctuated up and down **(Table 1).**

	1985	1986	1987	1988	1989	1990(*)
			(million cubic metres)			
Produced:						
Gross	90,670	96,530	110,910	117,220	119,650	122,000
Marketed	36,470	37,560	43,170	46,290	48,400	50,000
Reinjected	41,170	46,500	55,600	60,470	59,640	60,000
Flared	8,530	7,500	6,300	5,750	6,120	6,000
Shrinkage	4,500	4,970	5,840	4,710	5,490	6,000

Source: OPEC Annual Statistical Bulletin
(*) Estimate)

Table 1: Natural gas production, 1985–90

By 1995, natural gas gross production is expected to reach 130 billion cubic metres/year, while by the year 2000, Sonatrach hopes to be able to produce as much as 160 billion cubic metres/year.

The domestic demand for natural gas had increased from around 16 billion cubic metres in 1985 to some 18 billion in 1989 and an estimated 19 billion in 1990. Most of the locally-consumed gas is utilised as fuel and feedstock by industry and for power generation. In fact, around 90 percent of the electricity generation capacity in the country is gas-fuelled.

The share of natural gas in Algeria's total primary energy requirements grew from 15 percent in 1980 to around 41 percent in 1989. It is projected to reach 50–55 percent by the end of the century.

Indeed, one of Sonatrach first priorities consists of encouraging wider domestic use of gas with the aim of freeing more oil and petroleum products for export. A plan to stimulate higher gas consumption has been launched involving a system of tariffs, a distribution network and the establishment of more gas consuming industries. An interesting development in this respect has been the promotion of compressed natural gas (CNG) instead of gas oil by the heavy transportation sector.

Gas export

According to first estimates, Algerian natural gas exports totalled around 31 billion cubic metres in 1990, compared with 21·4 billion in 1985. During this period, the volume of gas exported by pipeline increased from 9.2 billion cubic metres to an estimated 12.4 billion, while natural gas exported in liquefied natural gas (LNG) form grew from 12.2 billion cubic metres to an

estimated 18.6 billion, representing 60 percent of total natural gas exports in 1990. Italy remains Algeria's biggest gas market, absorbing some 36 percent of its total natural gas exports in 1990, followed by France, Belgium and Spain **(Table 2).**

Import commitments by Algeria's customers will boost its annual gas exports to around 40 billion cubic metres by 1992. Sonatrach target is to further increase its annual foreign supplies to 50 billion cubic metres by 1995, and to 60–65 billion by the year 2000. The company's efforts are concentrated on the three main gas markets — the Arab Maghreb, the US and European markets.

	1985	1986	1987	1988	1989	1990(*)
	(billion cubic metres)					
Destination:						
In LNG Form	12.20	11.85	13.80	15.11	17.05	18.60
of which France	7.50	7.60	9.27	9.13	8·96	9.20
Belgium	2.50	3.00	2.73	3.00	3.63	4.00
Spain	1.50	1.25	1.70	2.21	2.71	3.00
United States	0.70	—	—	0.57	1.30	2.10
Others	—	—	0·10	0.20	0.40	0.30
By Gasline	9.20	9.58	11.75	12.00	12.37	12.40
of which Italy	9.00	9.28	10.85	10.95	11.16	11.20
Tunisia	0.20	0.30	0.90	1.05	1.21	1.20
Total	21.40	21.43	25.55	27.11	29.42	31.00

Source: Sonatrach
(*) Estimates

Table 2: Natural gas exports, 1985–90

Export facilities

The Algerian gas industry is basically oriented for export. There is installed gas export capacity of 48.2 billion cubic metres/year, of which 30.6 billion could be exported in LNG form, and the remaining 17.6 billion by the Mediterranean pipeline.

LNG liquefaction plants

As early as 1964, the development of the Hassi R'Mel gas field prompted the construction of the first gas liquefaction plant. This plant, code-named GL4Z, at Arzew, was the first cautious but concrete step in the long journey that would ensure Algeria a place on the world map as a major LNG exporter.

In fact, GL4Z plant with its 1.8 billion cubic metre annual capacity, proved to be the seed that would grow into the immense Arzew liquefaction complex. Between 1978 and 1981, the larger GL1Z and GL2Z plants came into production, with an annual capacity of 10.5 billion cubic metres each.

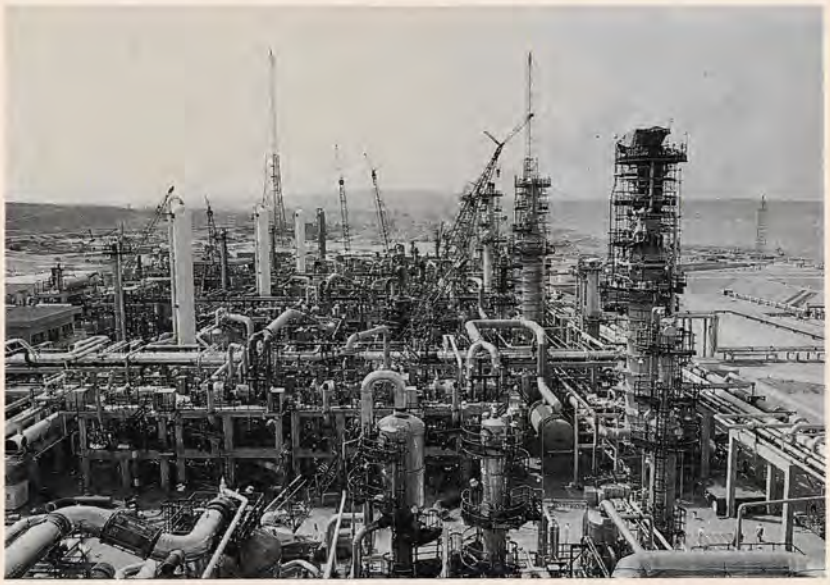
Another coastal town, Skikda, is also an important liquefaction centre for local and export supplies. The Skikda plant, code-named GL1K, currently comprises three separate production units built between 1972 and 1981 with a total capacity of 7.8 billion cubic metres/year.

The two liquefaction centres are linked by giant 40-inch pipelines to the Hassi R'Mel field. The 44.3 billion cubic metre/year gasline network to Arzew, and the 13.5 billion cubic metre/year line to Skikda are now projected for revamping, while a second line to Skikda with a 7 billion cubic metre/year capacity and 42 inches in diameter is currently under construction.

As part of a programme to upgrade and modernise the liquefaction plants, three contracts were signed in February 1990 between Sonatrach and Bechtel, Kellogg and Gaz de France/Sofregaz. The Bechtel group was contracted to revamp the GL1Z complex in Arzew, Kellogg the GL2Z plant in Arzew, and Gaz de France/Sofregaz the GL1K complex in Skikda as well as the GL4Z plant in Arzew.

The three-phase revamping programme consists of auditing the existing facilities, then restoring their effective capacity, and possibly expanding it to a total of 36 billion cubic metres/year. The programme will cost an estimated $600 million and will be implemented within five years.

In anticipation of an increase in LNG world demand towards the end of the century, Sonatrach is currently planning to build a new liquefaction facility, possibly within the framework of a joint venture with a foreign company.



Liquefaction plant at Arzew.

LNG export agreements

As at the beginning of 1991, seven companies had agreements to import Algerian LNG. They include Gaz de France (9.15 billion cubic metres/year), Enagas of Spain (2.5–3.5 billion), Distrigaz of Belgium (3.5–4.5 billion), Panhandle of the United States (4.5 billion), Distrigas of the United States (6–7 billion), British Gas (0.6 billion) and Tokyo/Osaka Gas (0.3 billion).

In addition, LNG export agreements were signed in 1989–90 for future deliveries with Botas of Turkey (2.2 billion cubic metres/year from 1992), DEP of Greece (0.6 billion from 1992), and Shell International Gas of the US (2.3 billion from 1993).

Sonatrach is hoping to step up its LNG exports to the United States to 10–12 billion cubic metres/year by

1992 and subsequently to 14–15 billion, if sufficient tanker capacity is available. Negotiations are currently taking place with Columbia Gas System and Southern Natural Gas for the possible supply of around 4 billion cubic metres/year from 1992. On the other hand, Sonatrach is considering bringing laid-up methane carriers back into service to boost its maritime transport capacity to 665,000 cubic metres. That would make the Algerian LNG carrier fleet the third largest in the world, behind those of Shell and the Energy Transportation Company.

In another development, talks began in 1990 for the possible supply of Algerian gas or LNG to Yugoslavia, Czechoslovakia, Hungary and Austria as a result of the difficulties facing the Soviet gas industry. Last October approval was given to a proposal to conduct a more extensive study, following an initial feasibility study.

Meanwhile, an agreement for carrying out a joint study for the construction of an LNG regasification terminal on Yugoslavia's Adriatic coast was concluded between three Yugoslav companies — Petrol, Ina-Naftaplin and Inergopetrole — and the Czech concern Metalimex, Hungary's DKGT and OMV of Austria. The terminal would have a capacity of 8–10 billion cubic metres/year of gas, of which 1–3 billion would be marketed locally in Yugoslavia, 4 billion in Czechoslovakia, 2 billion in Hungary and 1 billion in Austria.

Gas pipeline exports

Algeria has only one export gasline which connects its Hassi R'Mel field with Italy through Tunisia. Several other new pipelines are currently under consideration.

The trans-Mediterranean gasline (Transmed) was officially inaugurated in 1983. This 17.6 billion cubic metre/year, 48-inch gasline consists of three sections: a 549-km two parallel lines from Hassi R'Mel to Oued SafSaf at the Tunisian border, a 360-km line crossing the Tunisian territories linking Oued SafSaf to Cap Bon, and a 3-line, 158-km, 24-inch undersea Mediterranean section connecting Cap Bon with Mazzaea del Vallo in Sicily.

Under an agreement signed in 1977, Sonatrach undertook to deliver to the Italian oil company, ENI, 300 billion cubic metres of natural gas through the Transmed over 25 years starting in 1983, at an annual rate of 12.5 billion cubic metres.

A new contract between Sonatrach and ENI, signed last December, provides for the delivery of 530 billion cubic metres of natural gas over a 25-year period starting in 1994/95, with minimum annual liftings set at 19 billion cubic metres. The price of the gas to be supplied under the new contract will be adjusted periodically and will be aligned on those prevailing in the European market.

The 1990 agreement with ENI also provides for a fourth 24-inch line to be added to the submarine section of the pipeline and a fifth line to be laid in the event that Sonatrach concludes contracts for gas export through pipelines with the European countries with which it is currently negotiating. This, together with the installation of three compression stations along the Algerian section and the doubling of the capacity of the Tunisian section, could ultimately increase the capacity of the Transmed gasline to 30 billion cubic metres/year.

In another development, Algeria, Tunisia and Libya signed in March 1988 a tripartite agreement for the creation of a Tunis-based joint company named the Société Transmaghrébine de Gaz Naturel. This company is responsible for studying, constructing and operating a 400-km, 4 billion cubic metre/year gasline running from Oued SafSaf in Algeria to Zuwara in Libya, passing through Feriana, Gafsa, Zarzis and Ras Jedir in southern Tunisia.

The gasline, projected for completion in 1995, would be used to supply 3 to 3.5 billion cubic metres/year of Algerian natural gas to Libya, under an agreement signed at the same time, while some volumes would also be delivered to Tunisia.

Plans for exporting Algerian gas by pipeline to Morocco, Spain and further to France and Germany were taken a step forward last December when Omegaz-Etudes was set up to conduct studies on the project known as the 'western gasline'. The gasline is to be built in two stages, the first entailing the construction of a line for transporting gas to Morocco and Spain, and the second for which negotiations are still going on providing for its extension north of the Pyrenees.

The start-up of the first phase is scheduled for 1995. The volumes are 1–2 billion cubic metres/year for Morocco, 3–5 billions for Spain and 1 billion for Portugal. In the later phase, the pipeline is to be extended as far as France and possibly Germany, enabling a further 8 billion cubic metres/year to be supplied there by the year 2000. The volume of gas to be carried by the pipeline will total some 16 billion cubic metres/year.

Also in October last year, the Spanish gas company, Enagas, signed a letter of intent with Sonatrach for the purchase of a maximum of 6 billion cubic metres/year of gas starting in 1995. According to the Algerian authorities, the signing of that agreement which was due to be finalised in the first half of 1991, is essential for the gasline project to go ahead.

The European Community indicated that it might provide both technical and possibly financial support for the construction of the planned gasline which, for a capacity of 16 billion cubic metres/year, is estimated to cost $7–8 billion. The gasline could also benefit from the financial support of the World Bank and the European Investment Bank. ■

LPG pipeline between Haoud el Hamra and Arzew.

HSE safety advice for employees at petrol filling stations

The Health and Safety Executive (HSE) has published a free leaflet to help those working in petrol filling stations. In launching the leaflet, HSE has recommended to employers that it should be included in any training package provided for staff employed in filling stations.

Entitled 'Petrol filling stations — control and safety guidance for employees', the leaflet is designed to give brief practical guidance to employees on key aspects of their duties under health and safety and petroleum legislation. It draws attention to the dangers of petrol and the need to take correct action in the event of a dangerous incident. It also provides guidance on the essential knowledge and training employees require, in particular, to ensure that petrol is dispensed safely.

The leaflet complements HSE's guidance booklet HS(G) 41 — Petrol Filling Stations: Construction and Operation — published in 1990, which was primarily targeted at licensing authorities and petrol filling station operators. It summarises, in checklist form, the information in HS(G) 41 which is particularly relevant to filling station employees in their day to day work.

While preparing the leaflet, the HSE consulted with the Institute of Petroleum and other representatives of the petroleum industry and associated bodies together with petroleum licensing authorities, all of whom will be involved in its distribution.

'Petrol filling stations — control and safety guidance for employees' (IND(G)104(L)) is available free from trade associations, licensing authorities or the HSE Public Enquiry Points in London and Sheffield. Tel: 071-221 0870 or 0742 752539.

New Irish policy provides framework for exploration

In this article Irish Energy Minister Mr Robert Molloy TD, outlines his plans for the future of his country's petroleum industry.

Speaking at the Institute of Petroleum's Irish Branch's annual Bryony Berry Award ceremony he said in part:

Over the next couple of months the final stages of the development of the Ballycotton gas field will be completed by Marathon Petroleum and the gas is expected to come on stream in July. Although the field is small relative to the Kinsale Head gas field, its development has a significance over and above its particular energy supply potential. It is the first commercial development of hydrocarbons offshore Ireland since the 1970s and has proved that it is possible to commercially develop small scale hydrocarbon reserves here. It will also be the first time that a subsea wellhead completion has been the basis for a hydrocarbons production system in this country.

I am happy to say that preparation, consideration and approval of the plan of development for Ballycotton and Marathon's completion of the project will have taken just two years from the field's discovery. I am hopeful that further drilling in the Celtic Sea will give rise to other discoveries of gas in commercial quantities which will be developed to the benefit of both producer and consumer alike. However, our horizons are not limited to gas development and production. In this regard, in the coming months, Atlantic Resources and its partners will conclude their assessment of the feasibility of producing oil from the Helvick field, located on Block 49/9 in the Celtic Sea off Waterford. If they decide to go ahead with the project they will submit a plan of development to me for approval. It could be that Irish oil will be brought ashore for the first time in commercial quantities within the next twelve months or so.

Frontier areas

It is clear however that our prospects of making further significant finds of either oil or gas depend on the level of exploration off our coasts. I am anxious to do all I can to provide encouragement in this area. On 19 April, I announced that a licensing round will be held in mid-1993 covering offshore blocks in the Erris and Slyne Troughs which are located in the Atlantic off the west coast to the north east of the Porcupine. These are so-called 'frontier' areas in that very little exploration work in these basins has been carried out so far and the water depths present a challenge to those who might contemplate drilling activity. However, I feel that more attention to these areas is warranted because of their untested potential.

It may be some years from now before we see any drilling resulting from this licensing round but in the meantime exploration is continuing in other areas of our continental shelf. I expect three wells to be drilled this year in the Celtic Sea. This level of activity is generally on a par with that of recent years. I hope that those companies involved will meet with success.

In tandem with announcing the 1993 frontier licensing round, I have also indicated that I have asked my department to review our offshore licensing terms. These were last reviewed four years ago and I am anxious that they be brought up-to-date and that we identify any ways in which we can further encourage exploration effort. While we intend to look again at all aspects of our regime it is my intention that this review will place particular emphasis on the special circumstances of frontier acreage.

Corporation tax

I recently announced that the government has decided to include petroleum taxation legislation in the Finance Bill, 1992. The legislation will provide that the standard rate of corporation tax will in future apply to profits arising from hydrocarbons production. The standard rate corporation tax currently stands at 40 percent. In addition, the legislation will provide for a limited adjustment to 'ring fence' provisions to enable losses and expenses incurred in onshore minerals exploration and mining activity to be offset against tax liabilities on profits generated by hydrocarbons production.

Irish Energy Minister Robert Molloy TD (left) presents the Bryony Berry Award to Malachy McKibb (right). Centre is Derek Johnston, Chairman of the IP's Irish branch.

The introduction of petroleum taxation legislation within a firm timeframe, a review of our licensing terms and announcement of our intention to hold a 'frontier area' licensing round in mid-1993 should, when taken together, be viewed by the industry as a package of important, positive and progressive measures. I expect that they will strike a positive chord with exploration companies and will generate increased interest in Ireland as a location for exploration activity which will become apparent as time moves on. I would like to think that our actions are well timed and that the measures which we are now carefully putting in place will provide a framework for intensified exploration effort offshore Ireland for much of the coming decade.

Energy supplies

In the area of energy supplies, the government are conscious that as of now our gas reserves are scheduled to be depleted by early in the next decade. While we may be optimistic about the results of further exploration and about future gas finds we must, nonetheless, be pragmatic and take steps to ensure security of supply so that the gas industry in this country may be sustained and developed. Accordingly, the government have given priority to a proposal for a gas interconnector pipeline to the United Kingdom. Planning for this project is well advanced and it is expected that first deliveries of gas through the pipeline will be in the winter of 1993/1994.

While the main objective of the interconnector is to ensure security of gas supply an interconnecting pipeline will also represent a link to large UK market and eventually to the continental gas market. Finally I would like to say a few words about the recent Fair Trade Commission Report on the supply and distribution of motor fuels. I know that this holds very great importance for many members of the Institute of Petroleum here in Ireland. Monday's publication of the report by my colleague the Minister for Industry and Commerce is one of the most significant developments to face the industry for quite some time. I know that its publication will be welcomed by oil companies operating in Ireland and I have no doubt that the industry is assessing the full implications of the report and the steps announced by the Minister for Industry and Commerce to implement the commission's findings. ■

'It is clear, however, that our prospects of making further significant finds of either oil or gas depend on the level of exploration off our coasts'

. . . technical report

The Institute Consultant List now has about 270 members offering consultancy services in 44 categories of expertise. During the first four months of operation about 300 individual category lists have been supplied to enquirers mainly from the United Kingdom but also from France, Netherlands and Spain.

Exploration and Production

A fifth draft of a Code of Practice on 'Well Control during the Drilling and Testing of High Pressure Wells' has been produced. This draft has a new chapter which provides guidance on the use of choke and kill flexible hoses, which are an integral part of the blowout prevention equipment required for well control purposes.

The Institute will be mounting a display stand at Offshore Europe 91 in Aberdeen from 3 to 6 September 1991.

After consultation with the Offshore Safety Division of the Health and Safety Executive and UKOOA, it has been decided to postpone the one day conference on offshore safety from 21 November 1991 to 7 April 1992.

The final draft of the Oil Muds Code of Practice has been produced.

Standardization (Test Methods)

Discussions have been held with BSI on the terms of the agreement for the IP to take over responsibility for the operations of the BSI Technical Committee PTC/13. A Technical Assistant has been recruited to help with this work and it is envisaged the hand over will commence on the 1 September.

IP members formed part of a strong UK delegation to the CEN Technical Committee TC 19 'Test methods and specifications for petroleum products' meeting on 27–29 May 1991. Among the many items discussed was the flashpoint method to be used for the automotive diesel fuel specification. Following much discussion a Task Group was set up under UK convenorship.

Refining and Marketing

The drafting of a Fire Precautions Code continues. A full draft now exists with the exception of a major chapter on Process Plant Design. However, there is still work required on some areas of the first drafts.

It has been agreed that certain sections of the Refining Safety Code will be revised and issued separately, section by section. A Working Group is being set up on the first item which will be Work Permit Systems. Other areas identified as high priority for revision are Bulk Storage and Transfer Facilities, various aspects of Safety Management, and Maintenance.

The new Electrical Code of Safe Practice is to be published on 1 August.

The IP Electrical Committee and Panel C have provided representatives on the HSE working groups recently set up to review HS (a) 41, which relates to petrol filling station construction and operation.

Panel A is preparing a code of safe practice for contractors at retail outlets.

Written comments have been made on the Local Authorities Co-ordinating Body on Trading Standards' proposed conditions of licence for petrol filling stations.

Panel C have made representations to the Ministry of Transport on the inappropriateness of high-level outline marker lights on road tankers.

The Aviation Chairman attended the API ATSC meeting in Seattle to represent the interests of the Aviation Committee.

Panel D which is preparing the vapour recovery guidelines has made a number of technical submissions to CONCAWE and others to support the oil industry's response to the draft EC Stage 1 Directive. It is anticipated that European industry agreement on a road tanker bottom loading code will be needed to meet the requirements of the proposed Directive. The IP tanker code proposed by BSI to CEN could be the basis for discussion.

Measurement

The publication: *Recommended UK Operational Practice for the Proving of Gantry Meters Fitted with Electronic Heads,* will be forwarded to Wiley in July for publishing.

The Final Draft of PMM Part 1: *Calculation of Oil Quantities* has been produced. This is a very large document and a Working Group has been set up to review the draft with publication scheduled for 1992.

The programme for the Fourth Oil Loss Conference, which deals with the control of losses in refineries and is scheduled to take place on 30/31 October, is now largely finalised.

Health and Environment

The draft report on soil and groundwater contamination by hydrocarbons has been produced for the IP by consultants and will be reviewed by a working group. The objective is to produce a Code of Practice which will standardize procedures for the measurement of any oil contamination on petroleum sites.

A Code of Practice for Occupational Hygiene Audits is reaching the final draft stage.

The Institute is to provide sponsorship for an international symposium on the Health Effects of Gasoline to be held on 5–8 November in the United States. A paper on The IP Epidemiological Study of Refinery & Oil Transportation Workers will be presented at this conference.

John Hayes, Technical Director

Novel petroleum waste use

A world breakthrough to help grow wheat and rice in the desert, using an invention to recycle petroleum and nuclear waste, has won an Egyptian scientist the African Environmental Invention Award.

Dr Reda Aly Ibrahim Azzam says the waste from petroleum refineries, petrochemical processes and nuclear power plants is turned into a gel, which helps render soils suitable for any staple food. The successful growth of rice and wheat in desert areas using the gel, is proof that the invention sharply increases the productivity of sandy soils. The 'reclaimer-ameliorator-polyremic gel (RAPG)', helps stabilise sand, preserve moisture, prevents biodegradation, improves climate and controls soil erosion.

Dr Azzam works at the Inshas Nuclear Research Centre in Cairo, where he heads the project for Sandy Soil Reclamation and Arid Lands Plantation. He says the gel is affordable and within the means of the rural community.

RAPG is designed to co-ordinate with soil particles, to hold water up to 750 times its dry weight and to immobilise soil micro-organisms. It also transfers chemical fertiliser from soils to plants.

RAPG at low concentrations is particularly good for drainable and friable soils suitable for growing medical herbs and tubers.

High concentration rates of RAPG are good for paddy fields and tropical plants and interim levels particularly suit vegetables and fruits.

In the desert RAPG prevents sand movement and fixes dunes.

The first production version of the latest Steelman range of industrial locomotives, has been delivered to Conoco Oil Refinery Ltd, Killingholme.

The Conoco Steelman is a special refinery version, built to the requirements of EEMUA/OCMA standard MEC 1 and equipped with the latest 'dry' flame proofing system.

Contaminated soil clean-up method

Portable and static plant able to carry out remediation treatment of soil contaminated by petroleum hydrocarbon leakages, spillages and run-offs has been introduced to the United Kingdom by West Sussex company, General Combustion Ltd.

Known as the Genco soil remediation system, the US-designed equipment is available in trailer-mounted and fixed versions with throughputs of up to 25 and 75 tonnes per hour respectively.

Both models follow similar operating principles. Soil, contaminated by a non-recycled petroleum product such as petrol, diesel, aviation fuel or gas oil, is loaded mechanically into the plant and conveyed into a rotary drum drier. Here, moisture and the hydrocarbon contaminants are evaporated at a temperature of about 180°C.

The volatile compounds then pass through a dust filtering system (bag house) before being thermally oxidised in an afterburner, with residual gases leaving the burner stack at a temperature close to 900°C.

Remediated soil from the rotary drum drier is discharged from the unit via a cooler where it is mixed with the filtered dust from the bag house.

Comprehensive instrumentation is provided in a separate control house to monitor and regulate all stages of the process, with automatic shut-down incorporated as an emergency back-up.

Commercial operations in the United States have shown that contaminated soil treated by the Genco soil remediation system has a typical final concentration of less than 50 parts per million (ppm) of petroleum hydrocarbons and less than 5ppm aromatics.

Forties contract

John Brown, the Engineering Division of Trafalgar House, has awarded a £3 million contract to Lewis Offshore, Stornoway.

The contract is for the construction of the eight steel piles required for BP Exploration's Forties system riser platform. Work will start immediately on the piles which will weight a total of 3,000 tonnes. They are expected to be delivered in July 1992.

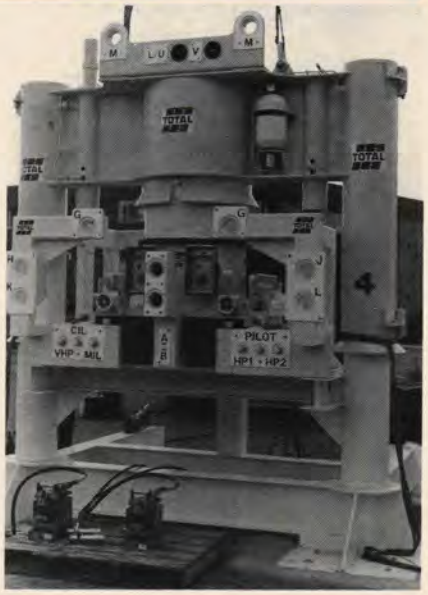
John Brown is responsible for the execution of the Forties system riser project and has already placed contracts worth £51 million.

As a result of attracting new third-party business into the recently enlarged Forties Pipeline System, BP Exploration is upgrading its offshore facilities by installing the new £100 million riser platform. The riser platform has to be in place in time for the Bruce field coming on stream in 1993, followed by the Scott and Nelson fields a few months later.

Saab has introduced a new version of its tank level gauge product. Called the TankRadar L/2, it is available from UK distributor FMA Limited.

The gauge's radar transmitter, mounted on the tank roof (or on a still pipe) emits a radar wave towards the fluid surface. This is reflected and gives the distance above the fluid.

Remotely operated control



GEC Avionics has delivered an interesting subsea production control system to Total's Alwyn North extension.

In line with Total Oil Marine's operating philosophy, which aims to minimise diver involvement in maintenance activities, all the GEC Avionics equipment is designed to be recovered and reinstalled using only remotely operated vehicles (ROV) intervention techniques.

Pictured here is the subsea control equipment during stack-up testing at Nailsea — the control module being lowered onto its landing base with the running tool.

The permanent landing base (PLB) is located between two of the Christmas tree guide posts. An interface plate accommodates the six incoming ROV-installed hydraulic connections from the main hydraulic jumper together with temporary parking positions for the inductive electrical jumpers. The PLB front structure is arranged with five ROV docking positions.

The subsea control module (SCM) installation and retrieval is achieved by the running tool, attached to the SCM with an ROV-operated latch. The tool locates the Christmas tree guideposts. SCM final orientation is achieved by alignment pins on the permanent landing base and an ROV-operated soft-landing arrangement controls the final landing.

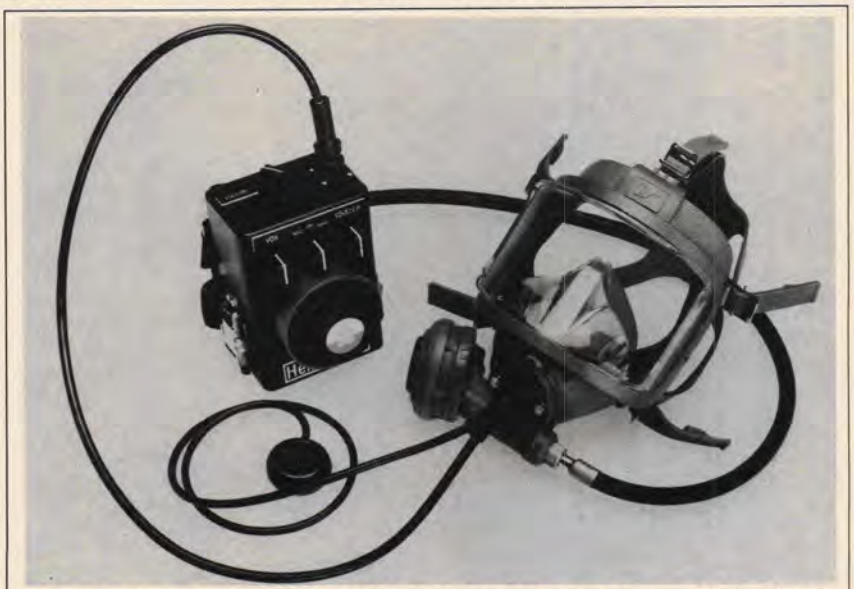
The ANE is a subsea development of three wells situated 5·6kms south of the Alwyn North NAA platform, 140kms east of Shetland — and in 160 metres of water.

Erosion test project inverters

AEA Petroleum Services, a part of AEA Technology at Harwell, Oxon, is using two AC inverters from Control Techniques Drives on its erosion and corrosion of well bore tubing project. Damage to well bore and pipes from water, gas corrosion and sand erosion costs the oil industry millions of dollars each year.

The experiment investigates the limiting speeds of multi-phase flow in relation to the degree of material loss in the bore due to erosion and corrosion. The experimental results will enable engineers to establish at what point material damage rates become unacceptably high. The 45 feet high test rig pumps nitrogen, water and sand in varying proportions and speeds to assess this.

Control Techniques provided two AC inverters of 37kW and 55kW which give accurate speed control of the pump and compressor thus allowing complete and precise linear control of flow rates. The Midlands Drive Centre at Oldbury supplied a custom built control panel with features for simple operation.



Helle Engineering Ltd of Dyce, Aberdeen have recently supplied what is believed to be the world's first diver throughwater communications system with an encryption capability.

The system prevents unauthorised listening to diver conversations by scrambling speech. The encryption system is specifically coded in the factory with a different algorithm for each end user application.

Resistance pigs

Six 'Hi-Friction' pigs manufactured by iNPIPE PRODUCTS will be used by BP Exploration on their 36″ export gasline from the Cleeton field in the North Sea.

The pigs' function is to provide a safe barrier between the gas and the work site. BP Exploration intend using a train of three pigs, launching them from the sphere trap on the Cleeton platform. The pigs will be driven some 300 metres, to a point beyond the installation position of the subsea isolation vale. The cumulative resistance on the pigs will withstand a differential of 8 bar between the upstream gas and the open pipeline. After the installation the pigs will be reverse pigged back to the sphere launcher.

Institute News

1992 IP Diary

Orders are now being taken for the 1992 IP Diary. The leather covered diary has the IP crest (as above) reproduced at the top with the date and gives ample space for a company logo to be embossed underneath. The diary will be available in late Autumn.

The colour of the cover will be burgundy.

The diary contains 32 pages of specially printed copy, including oil industry statistics collected by the Institute of Petroleum.

The cost for a single diary is £6.50 (incl. p&p and VAT) and £7.50 overseas.

Discounts are available for bulk orders as follows:

25–49 diaries: £4.75 + VAT each
50–999 diaries: £4.50 + VAT each
1000+ diaries: £4.25 + VAT each

Embossing of company logos is available at extra charge.

Enquiries and orders should be made to:

Susan Ashton, Institute of Petroleum,
61 New Cavendish Street, London W1M 8AR
Telephone: 071 636 1004. Fax: 071 255 1472
Telex: 264380

Please reserve for me ..... copies of the 1992 IP Diary

I enclose my cheque for £..... made payable to

The Institute of Petroleum

NAME .....

COMPANY .....

ADDRESS .....

.....

TEL No .....

SIGNATURE .....

DATE .....

Shetland Branch

The Shetland Branch took advantage of a beautiful summer's evening to tour the Port of Sullom Voe. The port, the United Kingdom's second largest in terms of annual tonnage shipped, is operated by Shetland Islands Council. Capt Keith Radley, Deputy Director of the Ports and Harbours Department and member of the branch, gave a briefing and organised tours of Port Control.

All 36 members present enjoyed a trip on one of the pilot boats which have a service speed of 20 knots. They were rewarded with memorable sights of a VLCC towering above them, as well as seals and their pups on islets in the harbour.

Jim Dickson (right), Shetland Islands Council Pollution Officer, prepares to take a party on board pilot boat *Sullom Spindrift*.

New Collective Members

Tankfreight Limited (Petroleum Division)
Copthal Bridge House, 1 East Parade, Harrogate, N Yorkshire HG1 5LN. Tel: 0423 506181. IP Nominated Representative: Mr J Michael Blackburn, Director.
Tankfreight is a distributor of bulk liquids and a tanker fleet operator, its Petroleum Division providing distribution and contract hire vehicles to the oil industry. The company is a subsidiary of NFC plc, Bedford.

Afmemco International Limited
PO Box 5310, Nicosia, Cyprus. Tel: 461981. IP Nominated Representative: Mr Mohammed Attellessey, Director.
Afmemco International Limited is a management consultancy and manpower development group, whose major clients are mostly oil and gas production and petrochemical companies in North Africa and the Gulf. Offices are also located in Egypt, the United Kingdom and Libya. Afmemco conducts training and development courses both in its own centres and in-house.

Iran Bazdid Company Limited
Suite 301, No 8 Vanak Street, Vali-Asr Ave, Tehran 19919, Iran. Tel: 684 822/689433. IP Nominated Representative: Mr Hasan Motiei, Director, Hydrocarbons.
Iran Bazdid Company Limited is the representative of Caleb Brett International in Iran, a division of Inchcape Inspection & Testing Services in London. It is recognised by the Iranian Ministry of Petroleum as an authorised inspection company for the inspection of hydrocarbons exported or imported by Iran.

Institute News

Benevolent Fund

The Institute of Petroleum has a Benevolent Fund for the provision of financial and other relief or assistance to persons in need who are or have been members of the Institute and the wives, widows, families and dependent relatives of such persons as the Management Trustees in their absolute discretion think fit. If members of the Institute are aware of any such persons, even if their membership of the Institute has ceased, they are asked to inform Mr AEH Williams at the Institute. Applicants would be asked to complete a form giving details of their financial circumstances which would be treated in strict confidence. Help might be given for temporary difficulties, such as the cost of convalescence following illness.

Deaths

We report with much regret the deaths of the following members:

	Born
AL Adams, Weybridge, Surrey	1922
R Barnard, Bangkok, Thailand	1935
CS Cooke, Tarvin, Cheshire	1933
LJ Cotterill, Stratford-upon-Avon	1916
RA Jacobs, Harare, Zimbabwe	1956
DE Jones, Epsom, Surrey	1931
AD McDowell, Harrow Weald, Middx	1917
DH McNeile, Tiverton, Devon	1923
IS Morton, Barnt Green, West Midlands	1916
M Murray, Winchelsea, East Sussex	1904
R Sefton, Stanmore, Middx	1905
JF Weaving, Hove, Sussex	1923
FV West, Grimsby, South Humberside	1932
PJ Woollatt, Shell UK Oil, London	1941

New Members

Adams, BM, Conoco Ltd, Ocean Terminal, Immingham Docks, Immingham, Nr Grimsby DN40 2PB

Allen, MW, Dunelm, 6 Fore Street, Framlington, Woodbridge, Suffolk IP13 9DY

Bartle, GA, 305 Handsworth Road, Handsworth, Sheffield, Yorkshire S13 9BN

Bensley, A, 184A Castlenau, Barnes, London SW13 9DH

Blizzard, K, 187 Balden Road, Harborne, Birmimgham B32 2ES

Byrne, IW, The National Energy Foundation, Rockingham Drive, Linford Wood, Milton Keynes, MK14 6EG

Coe, DP, 24 Deerbarn Road, Guildford, Surrey GU2 6AT

Da Silva Lemos, A, c/o Mr AJ Whitrow, Manager, Trading Sonangol Ltd, Merevale House, Brompton Place, London SW3 1OE

Emam, M, 9 Second Avenue, Hendon, London NW4 2RR

Fernandes, CAS, Arabian CBI Ltd, PO Box 1218, Dammam 31431, Saudi Arabia

Freeman, AA, 294 Noak Hill Road, Laindon, Essex SS15 4DE

Greig, DP, 19 St Hilda Avenue, Hurndean, Hants PO8 0SF

Harries, DJ, Somerton Cottage, Hundleton, Pembroke, Pembrokeshire SA71 5RX

Hartley, AM, 19 Brackley Road, London W4 2HW

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Deliveries into Consumption

UK deliveries into inland consumption of major petroleum products —Tonnes — May 1991

Products	*May 1990†*	*May 1991**	*Jan–May 1990†*	*Jan–May 1991**	*% change*
Naphtha/LDF	172,490	259,900	1,278,660	1,482,590	15.9
ATF—Kerosine	578,970	510,860	2,575,650	2,195,600	−14.8
Motor Spirit	2,140,250	2,125,930	10,059,440	9,806,650	−2.5
of which unleaded	703,660	863,140	3,143,580	3,862,180	22.9
of which Super unleaded	81,000	102,850	346,190	449,870	29.9
Premium unleaded	622,660	760,290	2,797,390	3,412,310	22.0
Burning Oil	110,050	160,860	933,830	1,125,340	20.5
Derv Fuel	912,160	908,350	4,397,950	4,399,770	0.0
Gas/Diesel Oil	584,520	621,120	3,597,530	3,705,150	3.0
Fuel Oil	1,287,280	1,037,970	5,784,996	4,997,100	−13.6
Lubricating Oil	71,813	69,830	341,958	327,320	−4.3
Other Products	478,707	600,930	2,725,776	2,568,730	−5.8
Total above	6,336,240	6,295,750	31,472,430	30,608,250	−2.7
Refinery Consumption	507,480	528,420	2,477,190	2,499,830	0.9
Total all products	6,843,720	6,824,170	33,949,620	33,108,080	−2.5

†Revised *Preliminary

. . . people

Mr Gordon Casely, above, has been appointed Public Affairs Co-ordinator of Conoco (UK) Limited, based in Aberdeen. The former journalist was previously Assistant Director of the Confederation of British Industry in Scotland.

Halliburton Geophysical Services Inc, worldwide suppliers of seismic products and services, has announced several management changes. **Mr James Kerr** has been promoted to Vice President of HGS Far East Service Operations; **Mr George Steel** has taken on the position of Vice President of HGS Europe, Africa and Middle East Service Operations and **Mr Stephen Wood** takes on the post of Vice President of HGS Western Hemisphere Service Operations. **Mr Bob Albers** is now Director of HGS Products.

Puffin Oil Ltd, a company with interests in UK on-shore oil and gas exploration leases, has invited **Mr Ronnie Aitken** and **Mr Nicholas Stacey** to join the Board of Directors.

Mr James Wildasin has been appointed Vice President and Group Executive for North Sea, Middle East and West Africa operations, McDermott Marine Construction. Mr Wildasin first joined McDermott International Inc in 1971 and has most recently been Vice President and General Manager, London Engineering.

Texaco Ltd has appointed **Mr Guy Birmingham** as the new General Manager of their Pembroke plant. Mr Birmingham has considerable experience of refineries in the Netherlands and Saudi Arabia and is at present the Plant Manager of the Convent refinery on the Mississippi river. He succeeds **Mr Reidar Fauli,** who is moving to Texas.

Mr Dirk Van Der Meer has been appointed the 12th President of CEC and will serve for the recently extended term of office of three years (previously two years) until June 1994. He succeeds **Mr C Moretti,** who has retired.

Mr Robert White, Chairman and President of Mobil North Sea operations, has been elected chairman of the Board of Management of the Petroleum Science and Technology Institute. He replaces **Mr Robert McKee** who has taken up a position in Houston, Texas.

Ultramar PLC announced the appointment of **Mr Nick Di Tomaso** as a Director. Mr Di Tomaso joined Ultramar in 1983 as President of Ultramar Canada Inc, and more recently he was Group Senior Vice President, Refining and Marketing of American Ultramar Limited.

The new chairman of Ranger Oil is **Mr Simon Reisman,** a minister in the Canadian government until his retirement in 1975. His predecessor, **Mr Jack Pierce,** died on 8 June (obituary in *Petroleum Review,* July 1991). In acknowledging the sale by Westcote Energy Inc of its 10.5 percent shareholder interest, Ranger Oil noted that **Mr Michael Phelps** will remain a Director.

Maxol Energy Ltd have a new Group General Manager, **Mr Tom Noonan,** above, who will be responsible for the overall management of all its subsidiaries, including Maxol Ltd, Maxol Oil Ltd (Northern Ireland), Maxol Lubricants Ltd, Maxol (UK) Lubricants Ltd and Ola Teoranta. He joined Maxol in 1980 as Personnel Manager. Mr Noonan is also a member of the Social Welfare Tribunal and Deputy President of the Society of the Irish Motor Industry.

Aberdeen's International Drilling and Downhole Technology Centre (IDDTC) has announced the completion of its Board of Directors. The board is headed by Chairman **Alistair Lindsay,** assisted by the IDDTC Managing Director **Dr David Curry.** The service and supply sector is represented by **Mr Jimmy Hay,** above, the former General Manager of BP Exploration in Aberdeen, **Mr Marvin Gearhart,** founder of the Gearhart Corporation, **Mr Mike Schaafsma,** the Shell UK Exploration and Production Well Engineering Manager, **Dr Ali Daneshy** who is the Director of Halliburton's European Research Centre and **Mr Ramsey Spence OBE** of the John Wood Group plc and chairman of the IP Aberdeen branch. Also on the Board are **Mr Mike Fleming,** head of Scottish Enterprise's Oil and Gas Group, and Councillor **Stuart Burnett.**

Brabant Resources plc, the UK-based oil and gas exploration and production company, have announced that **Mr Cameron Boyle** has been appointed as non-executive Director. Mr Boyle has wide experience of the oil industry and was instrumental in the stock market flotation of Brabant last October, while a Director of County Natwest Wood Mackenzie.

Mr John Doyle, the Managing Director of WS Atkins, London, is to assume total responsibility for the operations of Atkins Oil and Gas, a division of WS Atkins Consultants. The London and Leatherhead operations of Atkins Oil and Gas will be combined under **Mr Neil Atkins. Mr Nigel Barltrop** will retain responsibility for the specialist structures group but will also take on the ASAS software system.

Dr Gerald Owen will be taking on responsibility for LNG transportation and energy investments at Burmah Castrol in addition to his current responsibilities as Lubricants Asia Director. He will succeed **Mr Michael Cooper** who has been appointed Director General of the British Diabetic Association.

The US Geological Survey (USGS), Department of the Interior, has honoured **Mr Michel Halbouty** with the John Wesley Powell Award for 'citizen achievement'. The John Wesley Powell Award is presented by the USGS to persons outside the federal government for voluntary actions that result in significant gains or improvements in the efforts of the USGS to fulfil its motto of providing 'Earth Science in the Public Service'.

Air Vice Marshall Sandy Hunter, the Commander of British Forces in Cyprus, has presented **Mr Costas Eroas** with a commendation for outstanding skill, exceptional determination and loyalty. Mr Eroas, a member of the IP, has been employed at the British Air Base in Akrotiri, Cyprus as a senior petrol, oil and lubricant specialist for over 20 years.

Mr Mike Wood, above, has been appointed to the Board of Directors of Diagnostics and Measuring Systems with responsibility for marketing.

Following the Fuchs (UK) plc takeover, **Mr Adrian Parsons** has been appointed the Group Managing Director of the Century Oils Group plc. Mr Parsons continues as Chief Executive of Silkolene plc and as a Director of Fuchs (UK). **Dr Manfred Fuchs, Sir Charles Ball Bt** and **Dr Gerhard Vogel** were appointed Directors of Century Oils Group plc.

Enterprise Oil

Enterprise Oil plc is one of Britain's leading independent oil companies with a market capitalisation of around £2.5 billion. It has a considerable domestic and international portfolio including interests in eighteen producing fields, eleven active development projects and others which are rapidly moving into the development phase.

Overseas offices are well established in Norway, Italy, Indonesia and Vietnam and the Company also has exploration interests in many other countries.

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Enterprise Oil plc, 5 Strand, London WC2N 5HU. Tel: (071) 930 1212 ext. 5228.

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Direct Line - 01 43 87 43 14

CIM Locations	Total Capacity m3	Tank size range m3	Number of tanks	Products stored	Comments
LE HAVRE	3,380,000	60,000 to 150,000	40	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	22,500 to 150,000	4 (at 150,000) 2 (at 22,500)	Crude oils	2 jetties, Max Draught 98 ft and 82ft. ULCC up to 550,000 MT. Transhipment. Relay connected to Le Havre facilities above through pipeline. Re-loading on site.
LE HAVRE	925,000	600 to 30,000	69	Refined Products Petrochemical Feedstock	Naphta. G.O. Gasoline, Premium, Jet, Kerosene, Deballasting equipment. Connected with TRAPIL pipelines.