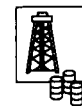


# OIL & GAS TECHNOLOGY



## The North Sea: Leading in offshore O&G production technology

OIL AND GAS production is paramount to the European Community's industrial, economic and social well-being. The North Sea has proved to be a stable production area, on the doorstep of the EC, and greatly contributes to the secure supply of vital hydrocarbons.

But the North Sea has also become highly valued as a centre of technological expertise in recent years, and the EC sees this aspect as of great importance: hence the European Commission's participation in August at the Offshore Northern Seas conference and exhibition at Stavanger (*see page 2*), to emphasise the vigour and excellence of European industry in developing and promoting innovative technologies.

This edition of the Newsletter focuses,



### EDITORIAL

therefore, on offshore technology, which represents the major part of the hydrocarbons sector of THERMIE, the Community's European energy technology promotion programme.

The Commission intends to continue to encourage and promote innovative technologies in this sector, whether they come from Community-sponsored firms or from companies without public support. Special emphasis is placed on helping Small- to Medium-sized Enterprises (SMEs), which often encounter difficulties in penetrating the market with demonstrated technology.

Recent geopolitical changes might have diverted professional interests to onshore exploitation, and particularly to the medium- to long-term opportunities in Russia and other CIS states, but it is obvious that the introduction of improved technologies in offshore production will remain one of the industry's chief concerns in the foreseeable future.

## Offshore service submarines under way in Germany

SUBMARINES have a number of advantages for installing, inspecting and maintaining subsea installations. They operate independently of surface environmental conditions and work close to subsea installations, and with their submarine-borne ROVs and tools unencumbered by long umbilicals and guide wires, they make operations depth-independent and more efficient.

Thyssen Nordseewerke have therefore developed three service submarine concepts: two for operations in the North Sea in water depths up to 450 m, and one for deeper waters (1500 m) offshore Brazil and in the Gulf of Mexico.

The submarines provide a 1 atmosphere environment for the work crew, whereas all tools and subsea equipment are carried in a wet cargo bay provided with a handling system for installing components and deploying tools. The tasks would be performed by remote control without diver intervention.

A number of IMR and intervention jobs have been investigated and planned for:

ROV intervention, module change-out, pigging, wirelining, and flowline/umbilical installation among others.

New technology was developed for energy supply, life support, dynamic positioning and submarine control navigation.

## UK develops safe subsea submersible pump

TECHNICAL PROBLEMS installing electrical submersible pumps (ESPs) in subsea completed wells have been resolved in a recent joint industry project.

ESPs installed at depth in wells, and submerged in well fluids, have been used for many years to maintain or enhance production from oil wells.

To date, this technique has been used solely in land- or platform-based wells, but due to the increasing requirement to cut production costs and exploit marginal fields, an increasing number of wells are being completed subsea and tied back to surface production facilities.

This project resolved the technical issues regarding the safe passage of high

The project was supported by the German Ministry for Research and Technology and the European Community, which latter provided 2.73 million ECU under the THERMIE programme for the third phase.

electrical power through the subsea tree and downhole to the ESP, and commissioned the prototype build and test of wet mateable electrical connectors. Workover of the system will be conducted from a rig using existing rig-based technology and equipment.

SISL, which runs the project, is a joint venture company between Stolt Comex Seaway and ABB Vetco Gray working in co-operation with Lasalle Engineering and Reda UK.

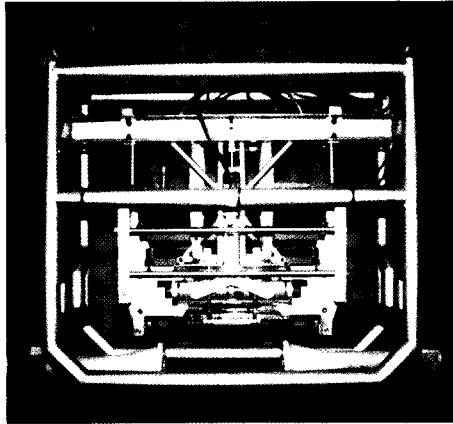
Financial and technical support were given by Amerada Hess, Amoco, Chevron, Elf, EE Caledonia and Texaco, together with 320,000 ECU from the EC under the THERMIE programme.

### British system halves subsea connection time

CUSP, a multi-purpose subsea connection system, has been developed in the UK for pull-in and pressure connections of rigid or flexible flowlines (including bundles), electro-hydraulic umbilical connections, remote installation of valves allowing full retrievability, and pipeline repair situations (see photograph).

The system has been designed to reduce drastically the complexity of these subsea operations, bringing considerable savings in hardware and offshore vessel times. The system is based around a connector unit that fine-aligns the pipeline ends, and clamps and seals in one operation requiring only one linear hydraulic operation. One secondary linear hydraulic operation makes up electro-hydraulic stab connectors for umbilical connections.

There is no requirement for extra pipe alignment tooling. The simultaneous connection of several lines is possible due to the cellular construction of the installation tooling.



Alpha Thames Engineering received EC THERMIE support to the value of 350,000 ECU throughout the development and demonstration stages of its CUSP system, and is currently finalising negotiations for the manufacture of the system, which will be available at the beginning of 1993. A considerable market potential is forecast based on predicted savings to operators of upwards of 70,000 ECU per connection.

### Concrete coating of pipelines improved by Danish company

HIGH QUALITY concrete coating has been applied to 12m joints of 40 inch pipe at Vibrodens' concrete coating facility at Esbjerg, Denmark.

The patented application method employs a slipforming technique allowing the concrete to be vibrated, thus producing a dense, durable concrete cover with a specific gravity between 2400 and 3700 kg/m<sup>3</sup>. Cement content is 300-400 kg/m<sup>3</sup>.

Reinforcement is by welded cage made from smooth or deformed bars of 6-12 mm diameter as required. The vibration ensures perfectly embedded reinforcement.

The Vibrodens method has been developed to take advantage of the important effect of vibration to produce a dense and durable concrete coating with perfect adhesion to anti-corrosion coating. The use of a steel cylinder for the slipforming process yields a smooth concrete surface with negligible absorption, of less than 0.5%.

The mechanised procedure results in clean and uniform production without any waste.

Bend test, impact test, absorption test and adhesion test have been certified.

The method entails considerable savings in cement and iron ore consumption.

### Heavy crude raised by diluent lift in the Sicily Channel

A METHOD of improving the productivity of heavy crude wells by diluent lifting has been evaluated and tested successfully in the offshore Vega field, Sicily Channel, Italy.

The Vega field has been in production since 1987 by a fixed drilling/production platform, but part of the reservoir is too far from the existing platform to be developed using the existing facilities.

A comparative analysis concluded that wet subsea completion with diluent lift would be an economical and simple way to develop the farthest area of the field.

Heavy naphtha was selected as the optimum diluent, for its compatibility with the crude and its effect on viscosity and density. It will be injected in the bottom well both to improve productivity and reduce the viscosity of the crude, so easing transportation to the existing platform.

A downhole jet pump has also been included in the system, in order to improve both the mixing of the diluent with the crude, and the wellhead pressure.

The study and experimental activities were carried out by Edison Gas and Agip, with funding by the EC under the THERMIE programme of 650,000 ECU (40 per cent of the full cost).

### CONFERENCE, EXHIBITION and WORKSHOP DIARY

#### Offshore Northern Seas

Stavanger Norway  
25-28 August 1992

ONS is a major international forum for the discussion of policy, technology and environmental issues relating to the exploration, production and refining of petroleum resources. The conference and exhibition are expected to attract in the region of 25,000 visitors, the majority of whom will be engineers, managers, geologists and geophysicists.

This is the 10th ONS, and it will provide an excellent opportunity for the European Community to promote its THERMIE programme. It will also be an exciting marketplace for the participating Community companies who will be exhibiting their own developed technologies on the EC stand.

Come and visit us on Stand J 941.

#### Natural Gas Policies and Technologies (Part 2)

Athens Greece  
14-16 October 1992

INFRASTRUCTURES and technologies will form the main theme of this EC conference, and will give participants an excellent opportunity to become familiar with the most recent technological advances in the field of natural gas, especially in countries where it has not yet significantly penetrated the energy market.

More than forty papers from all over Europe, as well as from important gas producing and consuming countries, such as Iran, the USA, etc, will be presented. The contributors come from a wide spectrum within the gas sector: government, international and regional gas companies, industries, technological institutes, etc.

Because of the importance that gas infrastructures and technologies hold not only for the European Community, but also for third countries, both producers and users of natural gas, the conference has been attracting among others, a considerable number of participants from Eastern and Central Europe, the former Soviet Union, northern Africa, and the Gulf region.

For further information please contact: Mr S Pavlidis, Conference Organiser, LDK Consultants (see OPET details on rear page).

CONFERENCE, EXHIBITION and WORKSHOP DIARY *continued***Oil Reservoirs Modelling and Management Workshop****Lisbon Portugal**  
**23rd October 1992**

RESEARCH into reservoir description and water injection optimisation by Portuguese company Partex-Cps, with EC support, will form the focus of this one-day workshop, together with accompanying demonstrations of developed software packages.

Reservoir description critical tasks to be tackled by stochastic models and the impact on reservoir management and optimisation of oil recovery will be addressed, with a presentation and discussion of Partex's Geomat software package.

The optimisation of aquifer performance for full scale water injection projects will also be discussed, with a demonstration of Partex's software tool incorporating the Peaceman correction, production split by aquifers, pump selection and several

options for optimisation.

This workshop is prepared for decision-makers and technicians involved in petroleum geology, reservoir description,

reservoir engineering and numerical simulation.

For further information please contact Mr Jose Luis Pena at EVE (see OPET details on rear page).

**Oil & Gas Technology in a Wider Europe**  
**4th EC Symposium****Berlin Germany**  
**3-5 November 1992**

THIS EC SYMPOSIUM will provide an opportunity to learn about Europe's latest oil and gas technologies, and to meet key industry personnel from throughout Eastern Europe and the former Soviet Union.

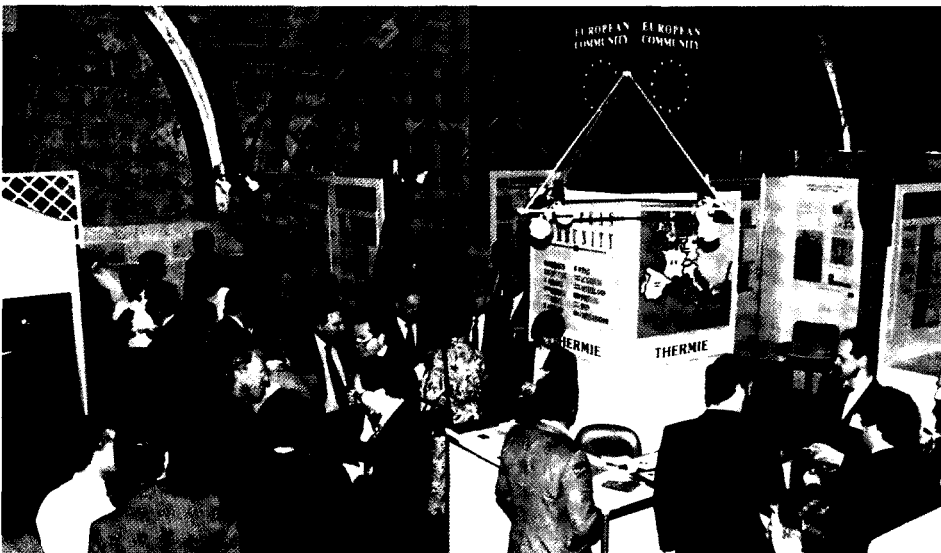
The symposium is being held in Berlin, Germany, to emphasise the Community's proximity to the new markets of the emerging democracies of Eastern Europe, and to provide a forum for discussion between the technology producers and their potential customers throughout Europe.

Parallel technical sessions during the symposium will address the following topics: Seismic and Basin Modelling, IOR and Reservoir Management, Production Equipment and Systems, Drilling, Underwater Technology and Pipelines, Offshore Structures, and Safety and Environment.

The programme also includes round table discussions and poster sessions.

For further details of registration and information on the full social and accompanying persons' programme, please contact: Miss Jane Kennedy, PSTI (see OPET details on rear page).

## CONFERENCE and EXHIBITION REPORTS

**MOEX: The Mediterranean Oil & Gas Exhibition and Conference****Malta • 28-31 January 1992**

STATUS REPORTS on current and future oil and gas exploration and production activity were provided at this conference, which concentrated on the technical, practical and operational aspects of exploration, production, the environment and general safety matters.

The Director of the EC's Energy Technology Directorate, Mr Rolf Meijer, gave a presentation to the opening session of the MOEX conference describing *The Energy Policy in the European*

*Community in view of the Single Market.*

The Commission's exhibition stand (seen in the photograph above) was visited by many people interested in learning about the Community's technology programme, and showed models, posters and videos, along with publications and databases.

With almost 170 exhibitors, MOEX '92 - the first in a regular biennial series - attracted a large number of people from over 20 countries, bringing together operators, contractors, suppliers and service companies from the entire Mediterranean region, the European Community countries, and beyond.

**Natural Gas Policies and Technologies (Part 1)****Vilamoura Portugal**  
**2-3 April 1992**

THE CREATION of conditions for the sufficient and secure supply of natural gas throughout Europe was regarded as a priority by participants at this EC conference.

Known reserves are likely to grow in the future, but the required investment to extract and distribute the gas will only be committed if the market is appropriately large enough, with co-operation between buyers.

The rapid connection to the supply network of countries that have recently opted for gas, such as Portugal and Greece; the development of connections between the EC and other supplier-countries; and the link-up with Central European countries' gas industries were seen as further priorities by the delegates, who included representatives of the Commonwealth of Independent States (the former Soviet Union), Algeria and Iran, as well as those of the EC.

Problem areas hindering the expansion of the natural gas market were identified as high transport costs requiring major infrastructure and investment, and the ability of only big companies to operate in the market.

It was noted that natural gas today accounts for 20 per cent of EC energy needs, but will rise to 23 per cent by 2010.

### 24th Offshore Technology Conference

**Houston Texas USA**  
**4-7 May 1992**

A SATISFYING and very optimistic outlook from the EC's participating companies was evident during OTC.

All of the EC participants reported an excellent flow of interesting and interested people through their stands, with a worthy list of follow-up contacts and meetings to take place. Indeed, one participant managed to conclude an agency agreement at the exhibition.

From the EC viewpoint, OTC is now firmly established in the event calendar,

### NEFTEGAZ 92

**Moscow Russia**  
**19-27 May 1992**

THE FIRST major hydrocarbons-sector exhibition and conference in the newly-formed Commonwealth of Independent States attracted a good number of participants and exhibitors. The Community stand hosted five companies whose EC-supported projects covered

and the EC Pavilion within the central area of the stand enjoyed a particularly busy exhibition, with much EC energy-related literature distributed to a wide and international cross-section of the delegates.

The 1992 participation at OTC by the European Community involved companies from seven of the member countries.

A final comment, which gave the Europeans at OTC a particular lift, was based on the interesting observation that the European aisles appeared to be almost twice as busy as the American aisles.

reservoir engineering and drilling, completion and production technology.

The large number of visitors to the stand included many representatives of institutes related to oil and gas activities, as well as representatives from Russian producer centres. All were keen to learn more about the THERMIE Programme, and the Technical Assistance Programme for the CIS, and much use was made of copies of EC Flag Brochures translated into Russian.

### The OPET Network

OPETS FORGE THE LINK between the technology innovator and the enduser. This role is an important part of the THERMIE Programme, promoting European energy

technology through a range of dissemination activities including market studies, workshops, conferences, seminars, trade exhibitions, publications and databases.

The activities of the OPET Network

### 4th Conference on the Petroleum Geology of North West Europe

**London UK**  
**29 March-1 April 1992**

THE European Community's stand at the Barbican exhibition was a resounding success and points the way to greater EC participation in sectorial hydrocarbon technology exhibitions.

There was a high level of interest in the THERMIE Programme amongst the 2,000 delegates and visitors, and also in the innovative exploration technologies being demonstrated by European companies on the stand.

The visitors, although fewer in number than at a large oil and gas show, were mostly senior oil industry personnel for whom the technologies exhibited were of direct relevance, to the extent that all the stand participants reported firm contacts which may lead to product sales.

The success of the Barbican exhibition has opened the way to greater EC involvement in other oil and gas shows focusing on specific technologies and targeted audiences in Europe.

promote improved efficiency and competitiveness and contribute to European technology transfer, not only within the Single Market but also outside the European Community

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