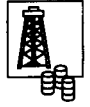




OIL & GAS TECHNOLOGY

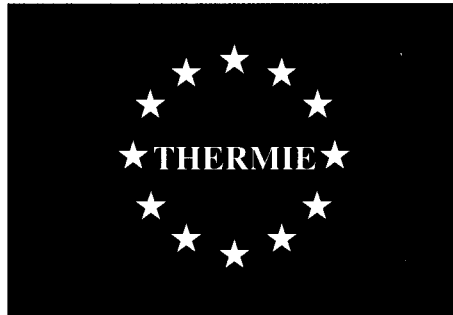


THERMIE PROGRAMME: promotion of energy technology in Europe

Innovation - the key to reducing offshore production costs

AS THE NORTH SEA and Mediterranean hydrocarbon provinces have matured, so the average size of new discoveries has declined. Exploiting these smaller oil and gas accumulations will increasingly depend on new, innovative technologies many of which are developed by small and medium sized enterprises (SMEs). However, the major oil companies have severely reduced their financial support for new technologies in recent years as oil prices have continued to stay low.

Since the first oil crises in 1973 the European Commission has taken a proactive role in supporting hydrocarbon technologies to ensure Europe's security of



EDITORIAL

supply. EC support for innovative technologies continues today through the THERMIE Programme, ensuring that vital expertise and commercial advantage are

not lost to non-EC competitors.

This issue of the newsletter examines four technologies developed in Ireland, The Netherlands, France and Italy which have the potential to reduce the offshore industry's production costs.

A further 11 innovative technologies will be exhibited on the European Union's stand at Offshore Europe '95 being held in Aberdeen from 5-8 September. In addition to projects which have received direct THERMIE funding, the EU stand will feature innovative technologies developed by SMEs which otherwise could not afford to exhibit at this event, Europe's premier showcase for the latest technology developments.

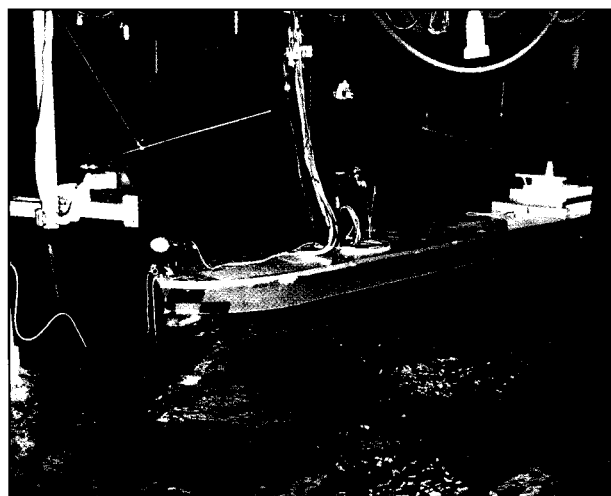
Wave Feed Forward Dynamic Positioning

FOR A SHIP to be dynamically positioned at sea, environmental forces such as wind, current and waves have to be counteracted. Wind is usually the major contributing force for small ships while for larger ships, such as tankers, the drift forces due to waves can be of the same order of magnitude as the wind loads.

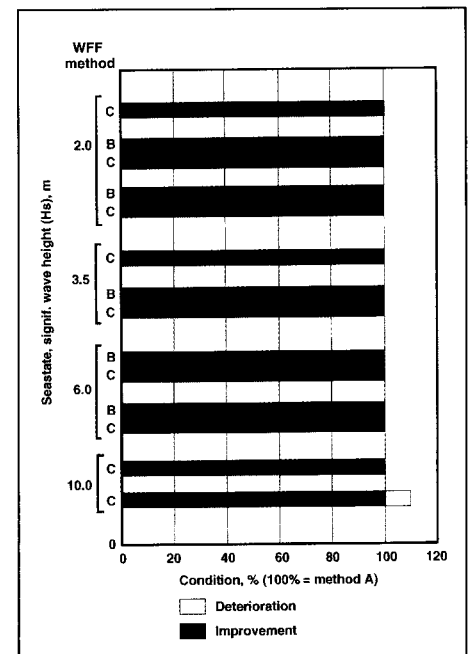
Feed forward in dynamic positioning control is a technique which uses real-time estimates of an environmental force component to operate thruster control for

immediate counteraction. In a project supported by THERMIE, a sophisticated calculation technique to make a real-time estimate of the wave drift force on a ship has been developed and demonstrated on model scale at the Maritime Research Institute (MARIN) in The Netherlands. The technique is based on the fact that wave drift forces are mainly generated by relative water motions at the hull: at the lee side of the ship the relative water motions are low, while at the weather side wave diffraction effects make the relative water motions much higher than the waves. The result is a net drift force due to the mean pressure difference (over the wave oscillations) between weather side and lee side.

Equipment, such as IR sensors and pressure gauges, measure the relative motion at the hull of the ship. Prior to the installation of such probes their optimum location has to be investigated (by calculations). In the model tests only three measurement locations on the hull were shown to be sufficient



Tank testing



WFF Method

for a good result (method B in the diagram). Otherwise, instrumentation all around the hull (a minimum of 10 locations) would be required (Method C).

In the model tests, significantly improved positioning was obtained for the same power consumption.

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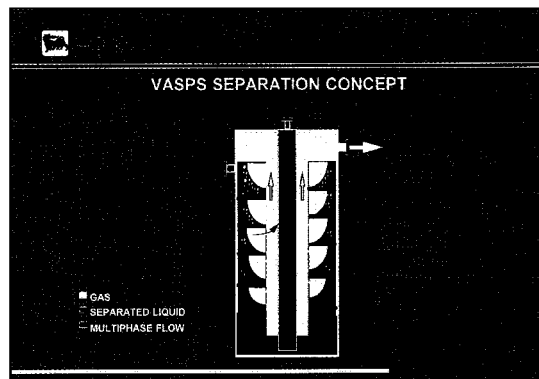
Vertical annular separation and pumping system

VASPS (Vertical Annular Separation and Pumping System) is an innovative concept for two phase subsea separation which allows a high capacity integrated separation and pumping system to be installed within a 30 inch conductor in a dummy well. This compact configuration is facilitated by the use of a helical flow path within the unit. This solves most of the problems associated with the design, fabrication and installation of pressure vessels subject to very high internal and

external pressure. The installation, maintenance and repair of the unit are designed to be accomplished using existing drilling equipment and established practices.

A large scale surface prototype of the VASPS separator (a unit approximately 10m high and 20 inch diameter) with a predicted design capacity of 80 m³/hour (12,000 bbl/day) has been designed and installed at Agip Spa Multiphase Test Loop at Trecate in northern Italy. The unit has been tested at different conditions by varying oil/gas/water flow rates. Over 90 different tests have been performed which confirm that the unit works as a good separator.

The primary application for VASPS is for remote subsea production. VASPS is installed downstream of one or more producing wells to boost the production to the nearest surface facility. The concept is



VASPS Separation concept

particularly attractive for deepwater applications where the hydrostatic back pressure is relatively high and also where the influence of external hydrostatic pressure in mechanical design is considerable.

The VASPS project, funded by THERMIE, is managed by Agip (UK) Ltd with Brasoil (UK) Ltd, Mobil North Sea Ltd and BP as project participants.



VASPS

Reducing offshore production downtime

'DAMPS', Downtime Analysis for Marginal Field Production Systems, is a software package which predicts the most likely downtime or lost production of a marginal field production system. The analysis of historical data of existing systems shows that downtime results from three factors: environmental, operational and component. Of these the environment is by far the largest contributor, caused by conditions exceeding the operating criteria originally designed into the production system.

The aim of the project, undertaken by FORBAIRT (the Irish Science and Technology Agency), was to develop software which would calculate hawser tension from its various causative factors and to incorporate a physical model testing routine into the simulator. These include:

- wave heights, periods and directions
- swell, period and direction
- wind, speed and direction
- current, speed and direction
- ship freeboard (wind effects)
- ship draught (waves, swell and current effects)
- other factors (thruster effect, damping effect of mooring etc).

The DAMPS system provides a risk assessment technique which predicts the annual downtime for offshore oil and gas production systems. As such it is an important new tool for system designers and operators in optimising the design and maintenance of offshore systems. The model testing routine is expected to ensure the commercial viability of DAMPS and already the package has been well received by a number of operators who have used it to determine both exploration and production efficiency.

Further details on this project are available in flag brochure No.175.



Model testing

Column stabilised production platforms

UNLIKE DRILLING PLATFORMS which involve highly standardised procedures and equipment, floating production systems must fit an array of special requirements and equipment in a combination which is specific to each oil or gas field. The French company Seamet International, together with Alfapi of Greece and Noble Denton Associates of the UK, has developed a set of pre-designed main components for column stabilised production platforms. The aim is to allow the easy assembly of the main components into a complete platform design, able to suit

any specific offshore oil and gas field development strategy.

The project concentrates on individual systems employed on production platforms, namely the primary structure, ballast and bilge piping system, anchor lines, riser interface, production processing plant, auxiliaries, servicing rig, living quarters, helideck etc.

The project focused on the following features:

- the steel structural pattern, which can provide a significant weight saving and a high level of standardisation

- the "zoning" and "modular concept" which can help to improve productivity in construction and operation
- a highly professional arrangement of key functions based on up-to-date knowledge within the industry.

The system developed allows users to see the various ways in which a fully equipped platform configuration can be constructed and gives information on performance and cost appraisal for each alternative. As a result this tool can achieve significant savings when alternatives for new oil and gas offshore field development projects are being considered.

For operators this may be particularly useful for preliminary design and cost assessments, as well as the development of the basic design and specification. The tool will also be of use to platform constructors as they will be able to make preliminary construction management plans, cost assessments and possibly offer an off-the-shelf design to potential clients.



Enzo Millich, Head of Unit for Oil and Natural Gas Technology at the European Commission's Directorate-General for Energy, officially opened Offshore House on the Aberdeen Offshore Technology Park 20 April 1995. During his address, Mr Millich took the opportunity to stress to Aberdeen's oil community that while the EC supported the hydrocarbons sector through programmes such

as THERMIE and JOULE, the industry itself should play a greater role in political lobbying to ensure that funding in this sector, so vital to Europe's economy, was maintained.

From left to right: Bruce Robinson, Scottish Enterprise; Enzo Millich, European Commission Directorate-General for Energy; Maitland Mackie, Grampian Enterprise; Kourosh Bassiti, Scottish Enterprise.

CONFERENCE, EXHIBITION and WORKSHOP REPORTS

AN EC WORKSHOP on **New and Advanced Technologies for the Development of Marginal Fields** (Athens, 31 March) attracted 42 high calibre delegates from the oil and gas industry. The event stressed the importance of marginal fields, particularly in the North Sea and Southern Europe, as these will be responsible for a large part of Europe's future production. Presentations were given on the Greek and Italian experience of developing marginal fields and various innovative technologies including slimhole drilling, horizontal well technology, NOMAD production systems, and Prime subsea processing systems. Event proceedings are available from LDK Consultants (Fax: +30 1 856 3180).

A one-day workshop on **Western Technology and Safety for Enhanced CIS Oil & Gas Production** (Moscow, 6 April) addressed new concepts using traditional technologies, well stimulation in Western Siberia and small scale regional refining.

The **Offshore Technology Conference** (Houston, 1-4 May 1995) continues to be the world's premier oil and gas trade show attracting 33,000 visitors during the week. Twelve companies exhibited on the EU stand, which attracted over 1,000 delegates. All of the companies reported numerous enquiries with a significant number of firm sales leads. A one-day workshop,

organised by IRO to coincide with OTC, examined the highly topical subject of **Platform Abandonment**. Thirty delegates discussed the latest technologies for removing platforms with specific emphasis on the North Sea.

An EC workshop on **Seismic Applications in Reservoir Monitoring** (Vienna, 14 May) examined new and advanced seismic applications currently available for reservoir monitoring. The presentations included 4-D seismic and the application of the VSP technique. Event proceedings are available from LDK Consultants (Fax: +30 1 856 3180).

During May IRO, in conjunction with the EC Energy Centre Tyumen, organised four training courses run by ENSPM of France for Russian geologists and reservoir engineers. Each of the courses (seismic development, reservoir engineering, economics and management of E&P, petroleum chemistry) were fully subscribed and well received by the attendees.

EAGE 95 (Glasgow, 29 May to 2 June) is the premier event in Europe relating to oil and gas exploration and geoscience technology. This year's event attracted 3,000 high calibre delegates consisting mainly of senior personnel. The EU stand attracted approximately 600 visitors, providing the participants on the stand

with a large number of business contacts from Europe (East and West) and the USA.

An EC seminar on **European Technologies and Standards to Improve Transmission Pipeline Integrity** (Tallinn Estonia, 8-9 June) attracted 75 professionals from Estonia, Latvia, Lithuania, Russia, Belarus, Ukraine and Western Europe. Presentations from both East and West European companies described the current pipeline situation in the Baltic States as well as new technologies for pipeline inspection, leak detection and repair, coating and corrosion protection. For further information contact the EC Energy Centre Tallinn (Fax: +372 524 7857).

O>N on the INTERNET

As part of the EC's aim to reach a larger audience with information on the projects funded by the THERMIE Programme, this newsletter is now available world-wide on the INTERNET. O>N can be accessed via PTERIS (Petroleum Technology and Research Information System) which is produced and maintained by The Petroleum Science and Technology Institute in Aberdeen.

Readers can access O>N on the world-wide web at the address <http://www.psti.co.uk/psti.html>. Requests to be put on the EC's mailing list for O>N can be communicated directly to the Editor via PTERIS.

CONFERENCE, EXHIBITION and WORKSHOP DIARY

Offshore Europe, Aberdeen, 5 - 8 September 1995

The Offshore Europe exhibition and conference is Europe's premier showcase for the very latest technology developments. The EU stand will feature 11 innovative European technologies giving exhibitors an excellent opportunity to sell their products to a world market - in 1993 Offshore Europe attracted 28,000 visitors from 71 countries. For further information contact Amy Middlemass at PSTI (Tel: +44 131 451 5231).

EC Workshop on Improved Reservoir Monitoring in HPHT Wells, Delft, 12 September 1995

This workshop will be held in conjunction with the OAPEC event on "New Technologies Applied to Hydrocarbon Production" which is running from 12-15 September. Details of the EC event can be obtained from Guus Hutjes at IRO (Tel: +31 79 41 19 81).

Oil and Gas Tyumen, 12 -15 September 1995

The EC will participate at this event for the second time, featuring hydrocarbons technologies developed within the Community which are appropriate to the Russian market. The EC offers small,

innovative companies the opportunity to exhibit their products in a forum which would otherwise be too expensive to attend. Companies interested in participating on the EU stand should contact Jane Kennedy at PSTI (Tel: +44 1224 706600).

Decontamination of Polluted Areas, Tyumen, October 1995

A workshop on the decontamination of polluted areas will be held in Western Siberia in October. Details of the event can be obtained from Comerint (Tel: +39 6 51 9901. Fax: +39 6 51 99 07 44).

AERION '95, Athens, 1-3 December 1995

AERION '95 is the 2nd International Gas Exhibition organised by LDK Consultants with support from the Public Gas Corporation of Greece (DEPA S.A), the EC (DG XVII), EUROGAS (European Union of the Natural Gas Industry) and ETBA (Hellenic Industrial Development Bank).

Sixty companies from Greece and abroad have already reserved stands and will exhibit a wide range of technologies covering all aspects of the gas industry. The EC's THERMIE and SYNERGY Programmes will also participate at the exhibition.

A number of related events will be held in parallel with the exhibition including:

- a THERMIE workshop on "Financing Schemes for the Implementation of and Conversion to New Natural Gas Technologies;
- Natural Gas Technology Prospects Information Fora.

Further details on the exhibition and parallel events can be obtained from John Panayiotopoulos at LDK Consultants (Tel: +30 1 856 3181).

Reader Reply Card

The *Oil & Gas Technology Newsletter* is distributed to 9,500 readers in 150 countries world-wide, promoting innovative European near-market technologies through the articles, information on conferences, exhibitions and workshops. For effective distribution it is necessary to keep our mailing list up to date. A Reader Reply Card is enclosed with this issue of the Newsletter for this purpose. Please complete and return the card, and help us to direct news of technological advances in the European oil and gas industry to where it will be most useful.

Thank you.

THERMIE: next call for proposals in September 1995

The first phase of the EC's THERMIE Programme ran from 1990 - 1994 and had a budget of 700 MECU. From 1995 the bulk of THERMIE activities will be carried out with a budget of 530 MECU, as the demonstration component of the Non-Nuclear Energy Programme (Joule - THERMIE).

The next call for THERMIE demonstration projects will be in September 1995 with a deadline of December 1995. Details of the

forthcoming call can be obtained from the appropriate OPET office.

Disseminating information on THERMIE funded projects which are ready to penetrate the market continues to be an important aspect of the EC's strategy. By encouraging the adoption of new energy technologies the EC aims to secure supply, build an industrial base and improve the potential for exports, while at the same time protecting the environment.

OPETs in the hydrocarbon sector: contact details

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PORTUGAL Tel: +351 1 395 56 08 Fax: +351 1 395 24 90 Mr P Bollinger

CESEN: Viale Brigata Bisagno, 2 - 16129 Genova
ITALY Tel: +39 10 550 45 80 Fax: +39 10 550 46 18 Ms M Fabianelli

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DENMARK Tel: +45 33 11 83 00 Fax: +45 33 11 83 33 Ms H Hansen

EVE: Ente Vasco de la Energia, Edificio Albia 1, San Vicente, 8 - Planta 14, E-48001 Bilbao
SPAIN Tel: +34 4 423 50 50 Fax: +34 4 424 97 33 Mr J Reig

FAST: Federazione delle Associazioni Scientifiche e Tecniche, Piazzale Rodolfo Morandi 2, I-20121 Milano
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GOPA: Consultants, Hindenburgring 18, D-61348 Bad Homburg
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IRO: Association of Dutch Suppliers in the Oil and Gas Industry, Engelandlaan 330, PO Box 7261, 2701 AG Zoetermeer
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LDK: Consultants, Engineers & Planners, 7 Sp Triantafyllou Str, GR-113 61 Athens
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