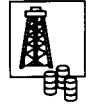


OIL & GAS TECHNOLOGY



THERMIE PROGRAMME: promotion of energy technology in Europe

Subsea technology innovation, promotion and transfer in focus

THIS SIXTH ISSUE of the Oil & Gas Technology Newsletter focuses on subsea technology, a field where European companies have acquired a leading market position and technical reputation.

Offshore oil production represents a quarter of the world total, and is achieved through cost-effective and safe production systems by dynamic operators.

North Sea exploitation is a major example of this achievement. Its growing production during the last decade has been made possible through the innovative efforts of the industry, despite a difficult economic environment.

Subsea technologies have been at the core of this revolution, enabling reserves to



EDITORIAL

be exploited through floating production systems and tie-backs to existing facilities.

The technologies developed can then be transferred to other areas of the world,

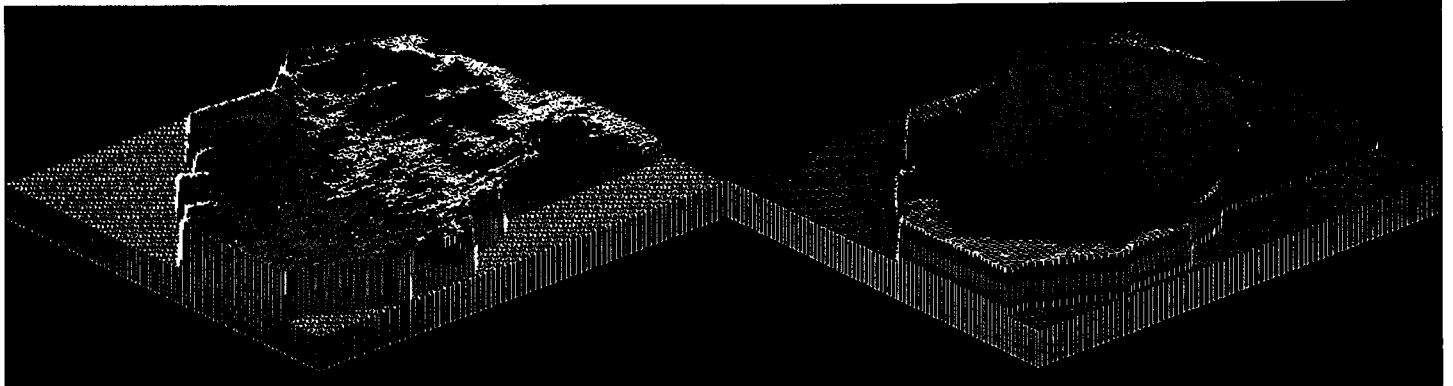
such as the Far East and South America.

The European Commission supports Community companies by granting funds and by organising special events such as workshops and exhibition stands.

The presence of the THERMIE Programme at OMC in Ravenna on March 11 - 13 1993 (see page 3) is also in recognition of the importance of this Mediterranean offshore area. Although around 80% of EC oil and gas production is located in the North Sea, the Mediterranean area offers, both within the Community area and outside, opportunities for further subsea technology innovation, with emphasis on deep waters.

The European Commission aims to participate in these advances.

Classification of the sea floor at full steaming speed



Print-outs of a navigation computer screen enhanced 3-D image of Pollenza Bay on the Spanish coast, recorded at 10 knots and showing (LEFT) seagrass (green), sand (yellow), gravel (magenta) and rock (red), and (RIGHT) the same area colour-coded by depth.

AUTOMATIC SEABED identification can now be successfully achieved at full steaming speeds, thanks to the development of both hardware and software which process echosounder signals to provide simultaneous data on sea depth and the nature of the seabed.

Virtually all ocean-going vessels, particularly those involved in survey work, are equipped with an echo-sounding system whose primary purpose is the continuous accurate measurement of the ocean depth.

The software operates on two indices: one from the first echo return (E1 - mainly dependent on seabed roughness) and one

from the second echo return (E2 - mainly dependent on seabed hardness). In combination, these are then used to identify the nature of the seabed surface material, *ie* silt, sand, clay, gravel, or rock.

Display of the data is achieved on any navigational PC-based plotting system, the vessel's track across the screen being coloured according to seabed type.

The software has many applications in the oil and gas survey world: site surveys (an excellent QC tool for complementary survey geophysical equipment); anchor-holding studies, environmental clear-up of

drilling muds/oil spills *etc.*

The main participants in the development of this system are: Irish Hydrodata and Micro Marine (Systems), both of Cork, Ireland; the University of Surrey Physics Department and AUGER, a geophysical unit at the University College of North Wales, both of the UK. The EC contributed 35 per cent of the 1.6 million ECU project value under the THERMIE Programme.

The market-ready product is manufactured in Cork, Ireland, under the trade name RoxAnn, and is now available for hire or purchase.

Commission of the European Communities - Directorate-General for Energy

CET - XVII/87

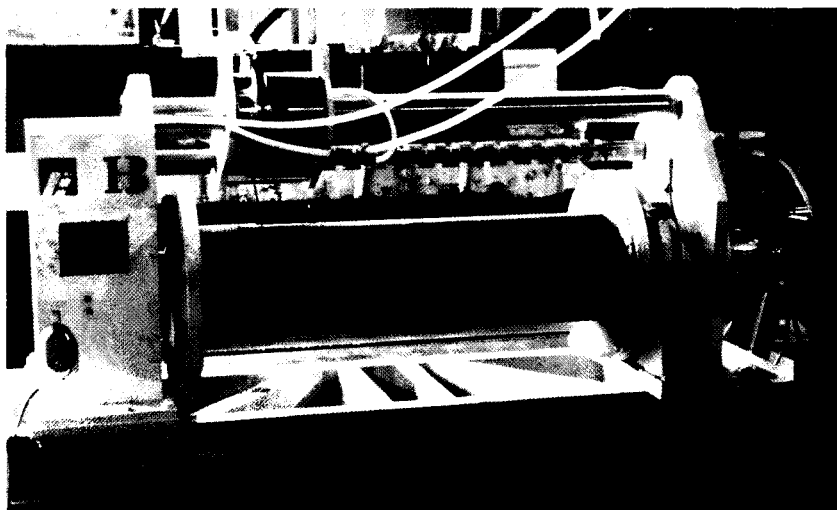
Subsea wireline unit made simple and effective

AN OPEN high-speed wireline unit which operates exposed to the subsea environment has been developed by the Danish company LICEngineering with Baxter Hansen, UK, as subcontractor.

The system has no pressure housing, and can be deployed from a small support vessel, where the only connection between the unit and the vessel is the umbilical. The wireline operation is thus totally isolated from any motion of the surface vessel, enabling such operations as tubing surveys to be carried out.

There is no need for major mobilisation, and maintenance costs are greatly reduced as a consequence.

The design makes use of as much existing equipment as possible, such as wireline BOPs, subsea lubricator and stuffing box. The winch is hydraulically powered, made of corrosion-resistant materials, and has water-lubricated bearings, whilst the gear box and slip rings are pressure-balanced, enabling the unit to operate at any depth.



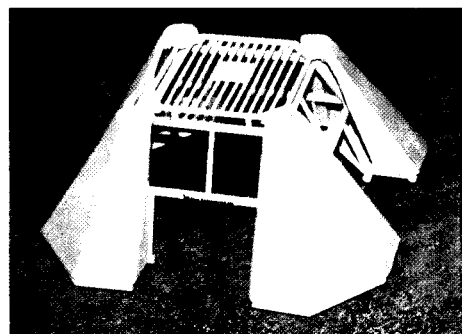
The winch being made ready for the high-speed shallow water spooling test.

The unit is specifically designed for electric line operations, but is also capable of slick line work.

The operational criteria set for the system were to:

- enable logging and tubing survey operations to be carried out;
- be capable of operation in open seas up to 1,000m water depth;
- be capable of wirelining on wells up to 7,600m deep; and
- be capable of development to operate at any water depth and on guidelineless wells.

Hybrid structure to protect subsea wellheads



This model of the hybrid concrete and steel subsea protection structure was made for Shell, and evolved out of Aker Engineering's experience with the Oseberg, Berg and Lille Frigg subsea projects in Norway.

A NOVEL gravity subsea protection structure has been designed which takes advantage of the low cost of concrete to provide a smooth outer surface for the free passage of trawl gear and anchor cables. No piling into the seabed is necessary, with consequent saving on installation cost.

Aker Engineering of the UK has developed a design for a structure which can not only

use concrete, but can be installed by smaller vessels such as diving support vessels, thereby avoiding the usual main disadvantage of concrete of the increased installation weight which requires expensive crane vessels to lift the units into position.

The structure has a tubular steel frame which is lowered to the seabed, followed by four precast concrete corner units which provide the on-bottom stability against sliding and overturning. The frame has been designed so that there are no acute angles in which trawl boards can become trapped.

For a typical Central North Sea situation with a snag load of 50 tonnes, a total structure weight of 89 tonnes is likely.

Divers and ROVs gain easy access to the interior via a four-metre square opening on each side. This means that the structure is suitable for placing over existing wellheads and flowlines, or for new installations. It may also be retrieved for re-use.

The design concept is now fully developed, ready on the market, and is currently receiving interest from some oil companies.

One of the unknown factors was whether the wire could be accurately spooled and controlled at high speed with the considerable hydrodynamic disturbance from the rotating winch.

This case was proven during a shallow water test where conditions were worse than would be experienced in the field.

Support funding of this 1.5 million ECU wireline unit development project was provided by the Danish Industrial Liaison

Council and the EC, with 35 per cent made available under the THERMIE programme.

LICEngineering A/S is currently seeking to license the design or produce units for wireline operators.

Costs reduced through subsea well testing

SUBSEA well testing technology can reduce oil field development costs by the elimination of the dedicated test line connecting the subsea installation with the main platform.

The SWTS (Subsea Well Testing System) being developed by Tecnomare, jointly with Spamprogetti, Italy and the BHR Group, UK, is composed of a two phase separator, a gas and liquid metering system, and a data acquisition and control system.

The gas and liquid metering uses two series of venturimeters installed in parallel and combines some data processing by the control system. Capacitance probes for the water cut measurement and a combination of DP cells and gamma densitometer, for the measurement of average liquid and gas density, are installed on the liquid metering line.

The focal point of the system is the data acquisition system which correlates the various measurements to provide the operator with the instantaneous and average values of the well production characteristics (water cut, flowrates, GOR etc).

Completion of prototype tests in simulated conditions is expected by June this year.

The project value is 2.1 million ECU, with 35% contributed by the EC under the THERMIE Programme.

Umbilicals extended in unbroken long lengths

AN INNOVATIVE stranding method now enables the manufacture of electric, hydraulic or combined electric/hydraulic umbilicals in unbroken long lengths up to 20km.

Combined electric/hydraulic umbilicals, used to connect central and satellite platforms or to control facilities which are installed on the sea-bed, contain electrical and optical communication cables, power cables, and high pressure hoses or stainless

steel tubes for hydraulic power transfer or fluid transport.

The production of unbroken long lengths of these umbilicals by the conventional planetary stranding method is unsatisfactory, but Norddeutsche Seekabelwerke of Germany has developed a modification of the existing method using continuous alternating stranding directions which meets the requirements.

Two 800m umbilicals have been

successfully produced, one with high pressure hoses and one with stainless steel tubes as the hydraulic elements.

Extensive testing was successfully carried out on the umbilicals, which proved the suitability of the new stranding method under manufacturing, laying, installation and service conditions.

The total project value was 500,000 ECU; and received 35% support under the THERMIE Programme.

CONFERENCE, EXHIBITION and WORKSHOP DIARY

Moscow International Oil & Gas Business '93 Conference (21-22 April 1993), and Exhibition (NEFTE-GAS '93) (20-23 April 1993) Moscow Russia

THE EUROPEAN COMMUNITY considers this conference to be of great importance to the promotion and transfer of European energy technology, and the involvement of the European oil and gas related industry.

The conference will address the key issues and business opportunities arising from the consolidation of change, reform and progress in the oil and gas industry in Russia and the newly-independent Republics.

Two representatives from the EC's Directorate-General for Energy will be actively participating: Mr Patrick Lambert will give a keynote speech on Policy and

Reform: Economic, Financial and International, and Mr Perry Argyris will give a presentation on Oil and Gas Business Development.

Above all, this will be a unique working business conference, with access to decision-makers and key representatives of the oil and gas industries of the Former Soviet Union.

Further, the EC will have a stand at the associated NEFTE-GAS exhibition, with THERMIE information, posters and models, and representatives available for discussions on new European hydrocarbons technologies.

OMC '93 Ravenna Italy

11-13 March 1993

THIS CONFERENCE will include representatives from governments, oil companies, and the contract and service industries. Subjects under discussion will focus attention on oil and gas offshore exploration and field development; floating and underwater production systems; oil and gas transportation; and inspection, maintenance and safety.

An EC stand at the associated exhibition will provide information on the THERMIE Programme.

An EC workshop, Automated Offshore Platforms, will run parallel to the OMC; it takes place at the Pala De Andre in Ravenna, after the OMC technical sessions on Saturday, 13 March, from 09.00 to 16.00hrs.

Further information from: Rosaria Gandolfi, FAST (see OPET details on rear page).

CONFERENCE, EXHIBITION and WORKSHOP REPORTS

IOCE : International Offshore Contracting & Subsea Engineering

Aberdeen UK
13-16 October 1992



Discussions on the EC stand at IOCE resulted in product sales.

THE DECISION by the EC to promote the THERMIE Programme and targetted European near-market technologies at this important sectorial trade show brought a positive response from the two thousand international delegates and visitors.

Four European companies from the offshore sector were invited to exhibit on the EC stand, including contractors with THERMIE-supported projects and small-to medium-sized enterprises which would

otherwise have found it difficult to participate in the show.

The specific nature of the event led to an interaction between the targetted technologies and a selective audience which was highly successful, and which will encourage EC participation at other sectorial hydrocarbons exhibitions.

A parallel workshop on Structural Requalification and Diagnostics, sponsored by the THERMIE Programme, was attended by a specialised audience composed of engineering managers, maintenance managers and decision-takers of oil companies, engineering companies and field contractors.

Natural Gas Policies and Technologies Part 2

Infrastructures & Technologies
Athens Greece
14-16 October 1992

BOTH parts of this EC conference brought together representatives of countries with an established natural gas industry, to pass on their expertise to countries such as Greece, Ireland and Portugal.

New technologies were presented for the utilisation of gas in the industrial, commercial and domestic sectors, and in power generation. Papers also included

technological aspects of transmission, distribution, LNG storage, terminal construction and operation.

Finally, consultants and gas companies discussed strategies for the successful development of the necessary infrastructure: planning, organisation, financing and regulation.

The conference provided a useful common forum with representation from all sectors – the producers, the potential clients and consumers, and the new markets, the investors and suppliers.

Oil & Gas Technology in a Wider Europe

Berlin Germany
3-5 November 1992

THIS PREMIER EVENT in the THERMIE calendar of dissemination activities was a showcase for near-market technologies developed within the Community, and was attended by a large delegation from Eastern Europe and the CIS.

Over fifty papers were presented at the technical sessions, with keynote speeches and

a thought-provoking round table discussion involving senior politicians, industrialists and bankers from the Community and the former communist bloc.

The participants, who numbered in excess of three hundred, had a unique opportunity to learn of many of the latest technological advances in the oil and gas industry, plus the chance to meet their counterparts in Eastern Europe.

Offshore South-East Asia Conference & Exhibition

Singapore • 1-4 December 1992
MORE THAN 11,000 trade visitors set an attendance record at the ninth OSEA biennial event, where EC Director (a.i.) for Energy Technology, Mr Rolf Meijer, gave a keynote speech at the conference on energy technology co-operation.

He noted how the spread of new technology has been one of the main keys to international trade and economic development, and that the integrating economies of Western Europe

have been at the forefront of developments in the energy fields.

Mr Meijer said the EC now devotes major financial resources on the promotion and dissemination of energy technology both within the EC and in countries in many parts of the world, including SE Asia.

The associated exhibition attracted in total 1,331 companies from 38 countries, with the European Community Pavilion hosting 140 companies from member states.

EUROPEC '92

Cannes France
16-18 November 1992

MAJOR EUROPEAN AND USA oil companies were represented at this exhibition and conference.

THERMIE Programme promotion of hydrocarbon technologies and funding for innovatory projects aroused great interest among the visitors to the EC stand, who numbered more than 600 representatives of oil and gas companies from both West and East Europe, USA and North Africa.

Advances in Natural Gas Processing

Rueil-Malmaison France
26 November 1992

GAS INDUSTRY experts at this THERMIE-supported workshop, held at the Institut Français du Pétrole, presented a progress report on recent gas technologies and exchanged ideas with participants.

The OPET Network: Organisations for the Promotion of Energy Technology

The EC's THERMIE Programme was launched in 1990 to encourage greater use of European energy technologies, and created the OPET Network as the prime means of promoting near-market innovative technologies and developing an industrial base within the Community's energy sector.

To achieve these objectives, the OPETs are involved in a range of activities including market studies, workshops, conferences, trade exhibitions and publications.

THERMIE's increasing role in Eastern Europe and the Former Soviet Union has been acknowledged by a widening of the

Hydrocarbons OPET Network with the inclusion of a number of OPETs new to this sector.

OPETs are there to help and advise. For further information on the THERMIE Programme, contact the OPETs listed below, or contact PSTI for details of an OPET nearer you.

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