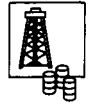


OIL & GAS TECHNOLOGY

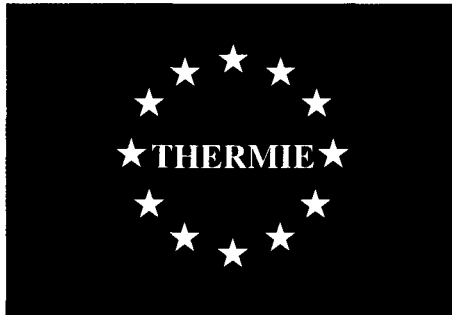


THERMIE PROGRAMME: promotion of energy technology in Europe

THERMIE explores new markets for European offshore technologies

THE EUROPEAN COMMUNITY is committed to the world-wide promotion of innovative technologies developed by European companies. As part of this objective the Directorate-General for Energy is participating for the first time at the Offshore South East Asia Conference and Exhibition which is being held at the prestigious World Trade Centre in Singapore. The European Union's (EU) presence reflects the importance of South East Asia as a rapidly growing market for European technology.

Technologies developed by eight European companies, ranging from a diverless sealine repair system to a self-retrieving offshore anchor, will be exhibited on the EU stand. The



EDITORIAL

participating companies include Saipem (Italy), DORIS Engineering (France), AGIP (UK) Ltd, Serimer (France), STN ATLAS Elektronik (Germany), GeoPro (Germany), R&S Renewable Energy System and Neddrill (both of The Netherlands).

The technologies on show at OSEA, together with those discussed in this issue of *Oil & Gas Technology Newsletter*, will increase the cost-effectiveness of all oil fields and in some cases will make it worthwhile to bring some marginal fields into production. The technologies described here include a technique for enhanced hydrocarbon recovery, a submersible for offshore maintenance, a downhole inspection caliper, and an innovative pipe connector.

Further information on these and other EC-funded hydrocarbons projects can be obtained from one of the OPETs (Organisations for the Promotion of Energy Technologies) listed at the end of this newsletter.

Development of a manned submersible for offshore maintenance

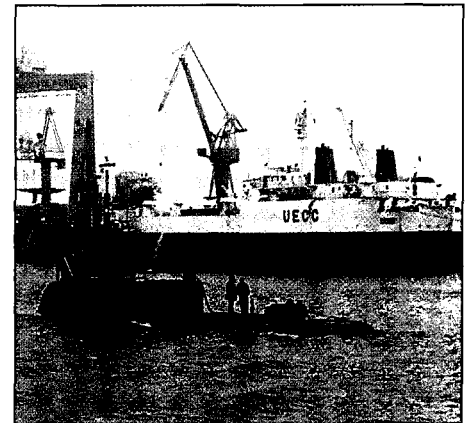
THE GERMAN COMPANY Thyssen Nordseewerke is developing a manned offshore submersible as part of a subsea oil and gas production system for inspection, maintenance and repair of subsea installations. Its operational profile is very different from that of conventional naval submarines, being characterised by great operating depth (over 400 m), long diving periods (up to 21 days), exact 3-D

positioning and low manning levels. As current technology could not meet these requirements, new key systems had to be developed. In a project supported by THERMIE, five key systems of the submersible and their integration in a basic submarine design were investigated including:

- energy system (closed cycle diesel system)
- propulsion and dynamic positioning system
- life support system
- navigation, communication and control system
- crane and work module.

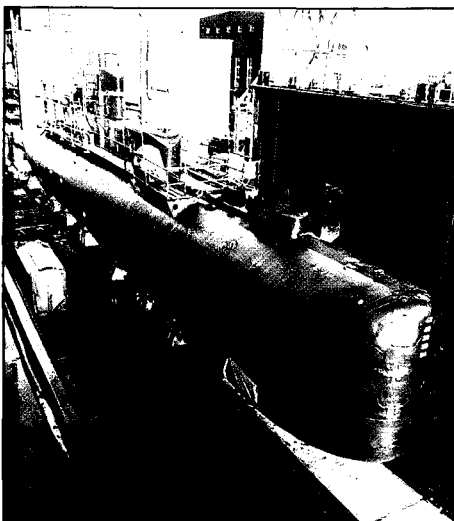
The project has progressed in four phases. To date a 250 kW closed cycle diesel system has been tested and installed in the Submarine Ex-U 1, and seatrials have been successfully undertaken. A prototype regenerative CO₂ adsorption system, developed by Dornier, has also been successfully tested. The final phase of the project to optimise further the closed cycle diesel system will be completed by the beginning of 1995.

As the trend towards sea bed installations for oil and gas production increases, the investment and operating



Ex-U1 leaving Emden for sea trials

costs of subsea installation will depend to an appreciable extent on repair and maintenance procedures. The submersible as a base for inspection, maintenance and repair operations has good prospects in the subsea market as it is safer (no weather hazards) and more economical than surface vessels. As such, the submersible will mainly be of interest to oil companies operating subsea oil and gas production systems. However, the submersible is a multipurpose vessel and could also be used for oceanographic, salvage or subsea work.



Launching of the submarine Ex-U1

Downhole ultrasonic inspection caliper

THE UK COMPANY AEA Technology has developed an ultrasonic caliper for the inspection of production tubulars which offers many advantages over the mechanical calipers widely used by the industry as:

- it is non-contacting;
- gives better area coverage;

- measures wall thickness.

Interest in this technology has resulted in support from Amerada Hess, Lasmo, Phillips, Total and the UK Government. The prototype caliper was built by Sondex and Exal/Expro provided test facilities and wireline crews for operational testing.

The caliper is designed to operate at

logging speeds of 20 m/min with 100% coverage of wall thickness and ID profile on an inspection grid of 5 mm by 5 mm square. The caliper will pass through a 54 mm aperture and measure ID in the range of 90-180 mm and wall thickness in the range of 4-12 mm. The caliper will operate on 6,000 m of mono-conductor wire line at pressures up to 10,000 psi and temperatures of 170 deg C.

Development of the prototype caliper is being supported by the THERMIE programme. The prototype is currently being evaluated, upgraded and tested via a series of onshore and offshore production well tests. The first series of onshore tests were carried out at the BP Wytch Farm site where two 1,600 m wells were successfully logged. The first offshore test was conducted in May of this year on the Phillips Maureen Alpha platform where a 3,000m water injection well was logged. An array of low frequency transducers has been added to the caliper for ID measurement in low pressure gas and will be evaluated during the next series of trials.

Further onshore and offshore trials with BP and Total will be completed by the end of 1994.

Caliper in operation at BP Wytch Farm



Enhanced hydrocarbon recovery improves profitability

THERE ARE MANY HYDROCARBON deposits where development is uneconomic due to low pressure, relative size and remoteness from existing production facilities. Havron Energy Systems has developed a technology which enables small deposits to be brought on-line to existing or proposed facilities within approximately 30-40 km. This will enhance the throughput and hence improve the economics of all fields. In addition, it will increase the efficiency of oil or gas recovery.

The facility comprises a Remote Multiphase Pumping Station (RMPS) for use in a hostile, remote marine offshore environment and is based on a highly stable, high integrity buoy structure developed from an existing design. The station operates unmanned and sets new standards of reliability by the application of existing aerospace technology.

The RMPS is suitable for water depths of 80 m or more. At depths of less than 80 m the various systems employed would remain applicable but the buoyant structure would need re-design to reflect the different regime. In very deep water the concept remains the same but various technical changes would be necessary to reflect this, particularly in the riser system. Below depths of 300 m, costs would not

necessarily escalate on a linear basis.

In many parts of the world, and the North Sea in particular, the cost of facilities to develop relatively small accumulations of hydrocarbons can make projects uneconomical. The use of RMPS either in its simplest form or with the addition of further Enhanced Oil Recovery (EOR) techniques enables these fields to be profitably developed. RMPS can increase the throughput of existing production

facilities which are already paid for. It will enable small accumulations to be tied in to existing pipelines or to shore, all without the vast capital and operating expenditure costs associated with conventional floating or fixed production facilities. It represents a significant advance in lower costs, increased oil recovery, extension of existing facilities and enhanced safety.

Further details are available in flag brochure No.172.

Innovative connector reduces installation costs

IN A THERMIE funded project Hunting Oilfield Services is developing further an existing patented connector, used originally as a pipe connector for conductors, for use on large diameter pile applications. In addition to EC support, the project has attracted backing from Amoco, Conoco, and Exxon.

The talon connector developed by Hunting is innovative as:

- the fast assembly of the two halves (a male "pin" and female "box") can be completed by using either a pile hammer to force mating or by hydraulic pressure to expand the box and contract the pin, whilst squeezing with a clamp tool;
- the connector teeth consist of a series of annular rings and grooves which allow a

'no-orientation' requirement to be utilised;

- there is no danger of any back-off (loosening) occurring as no helix exists;
- there is no diameter restriction of the design - 30 inch is common with inquiries for up to 120 inch diameter.

There are two main reasons for developing a very large diameter pile connector. Firstly, when a jacket is launched offshore, high insurance charges apply until the jacket foundation piles are in place. The use of talon connectors reduces the pile assembly time and therefore the insurance/installation costs. Secondly, the high fatigue resistance of these connectors over welded joints is well known therefore the long-term structural integrity is assured.

Within the European Technology Promotion Programme (THERMIE), the European Commission Energy Centre in Tyumen has collected since 1993 information and data upon Oil & Gas Production Associations from Western Siberia.

They are now available in the:

« Western Siberia Oil & Gas Directory »

(You will find on the reverse the summary and one page of the Directory)

This Directory is a very useful tool due to the accuracy and the amount of information contained as well as the know - how in the Siberian Oil and Gas sector of the E.C. Energy Centre in Tyumen.

In accordance with the European Commission - Directorate General for Energy (DG XVII), this Directory is available to companies at a price of 400 French Francs.

Please, fill in the order form and return it back to GEP.

On receipt of your payment, an invoice will be sent together with your order.

WESTERN SIBERIA OIL & GAS DIRECTORY ORDER FORM

To be sent to :

GEP - 45, rue Louis Blanc 92038 Paris la Défense Cédex France

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Fax : (33) 1 47 17 67 47

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Mention :Western Siberia Directory

- FOREWORD
- THE THERMIE PROGRAMME
- OPET IN THE HYDROCARBONS SECTOR
- COUNTRY CHARACTERISTICS
- TYUMEN EC ENERGY CENTRE
- GENERAL GUIDANCE FOR WORKING IN TYUMEN
- WESTERN SIBERIA OIL AND GAS MAP
- OIL AND GAS PRODUCTION (1993 FIGURES)
- TYUMEN OBLAST ADMINISTRATION
- ORGANISATION OF OIL AND GAS COMPANIES IN WESTERN SIBERIA
- PRODUCTION ASSOCIATIONS AFFILIATED TO LUKOIL
- OTHER SHAREHOLDING OIL COMPANIES
- PRODUCTION ASSOCIATIONS AFFILIATED TO ROSNEFT
- GEOLOGICAL ASSOCIATIONS
- GASPROM
- GEOPHYSICAL ASSOCIATIONS
- RESEARCH INSTITUTES
- EQUIPMENT MANUFACTURERS

KONDPETROLEUM shareholding company

The shareholding company Kondpetroleum performs exploration, drilling, development and production of oil and gas fields in the Western part of the Tyumen region (Western Siberia)

Annual production of oil 1990 = 12.6 million tons and 1 billion cubic m of gaz.
1991 = 9.8 million tons
1992 = 8.0 million tons

Kondpetroleum includes :

2 oil and gas production companies: Krasnoleninskneft, Talinskneft
1 drilling association
1 workover company

ADDRESS 626790 Tyumen Oblast, Nyagan city
Telefax: (m)54 735338 neft

KONDRATYUK	Alexei Terentieievich	GENERAL DIRECTOR	5 12 25
TEMNOV	Gennady Nikolaievich	CHIEF ENGINEER	5 21 86
TATARNIKOV	Boris Nikolaievich	CHIEF GEOLOGIST	5 17 43
RADIMOV	Lev Victorovich	DEPUTY GENERAL DIRECTOR (DRILLING)	5 11 93
KUZMICHEV	Nikolai Dimitnevich	TECHNICAL DEPT HEAD	5 24 42
TCHARYKOV	Valentin Fyodorovich	EXPLORATION DEPT HEAD	5 25 64
BULGAKOV	Ramil Rishatovich	OIL PRODUCTION DEPT HEAD	5 23 89
PROKOPENKO	Tatiana Ivanovna	ECONOMICS DEPT HEAD	5 10 53
BARINOV	Vyacheslav Nikolaievich	HEAD OF GEOLOGICAL DEPT.	5 20 80
KUZNETSOV	Boris Anatolievich	ENGINEER & TECHNOLOGY SERVICE DEPT	5 26 04

KRASNOLENINSKNEFT oil and gas production company Nyagan

SKUBYSH	Andrei Nikolaievich	CHIEF	5 22 45
TCHUIKO	Alexandre Innokentievich	CHIEF ENGINEER	5 11 94

Environmental benefits of crude vapour recovery

DURING THE HANDLING of crude oil, evaporation of the lighter components in the oil takes place which results in environmental pollution. In a project supported by THERMIE, the Danish company Cool Sorption has investigated the effectiveness of its Cold Liquid Adsorption (CLA) plants in a refinery.

The aim of the pilot plant was to:

- assess plant efficiency in relation to the various components present in crude vapour;
- examine the effect of condensation on crude vapour;
- determine any problems associated with safety and connections on ships;
- identify any negative effects such as corrosion of components.

The tests were carried out in collaboration with Shell at the Danish crude oil export harbour at Fredericia. The Finnish company Neste assisted by installing connection equipment on two of its ocean tankers.

The tests showed that Cool Sorption's CLA process is able to recover vapour from crude oil with the same high efficiency for each component as for gasoline vapour. This means that crude vapour can be recovered with absolute safety and without any restrictions on capacity limits. As such, the process should be particularly cost-effective for large installations.

These plants will be manufactured and sold by Cool Sorption A/S.

SME directory

As part of its activities to assist European small and medium sized enterprises (i.e. companies with less than 500 employees), the EC is producing a directory of SMEs active in the upstream oil and gas sector. The aim of the directory is to encourage joint ventures between SMEs as well as SMEs and oil companies. SMEs will be listed in the directory according to nationality and area of activity, as follows:

- 1 Geophysics & Prospecting
- 2 Drilling
- 3 Production Systems
- 4 Engineering, Consultancy, Fabrication, Construction & Modification
- 5 Materials & Equipment Suppliers/Manufacturers
- 6 Secondary & Enhanced Recovery
- 7 Environmental Influence On Offshore
- 8 Auxiliary Ships & Submersibles
- 9 Pipelines
- 10 Transport
- 11 Natural Gas Technology
- 12 Storage
- 13 Research & Development
- 14 Miscellaneous

The directory will be available free of charge. Any SME wishing further information or wanting to be included in the directory should send their details together with their areas of activity to Jane Kennedy at the UK OPET PSTI.

CONFERENCE, EXHIBITION and WORKSHOP REPORTS

THE EU PARTICIPATED with a large stand at this year's ONS Conference and Exhibition which took place in Stavanger 23-26 August. Companies representing six of the Member States exhibited their near-market energy technologies including Stolt Comex Seaway, S2M, Alpha Thames Engineering Ltd, HRH Ltd, Thorn Security, Marcon Engineering B.V, PROMAC BV, HTC a/s and Rosen Engineering GmbH. Many visitors came to the stand including King Harald of Norway and the Norwegian Prime Minister Gro Harlem Brundtland. In total 35,000 visitors attended the ONS exhibition during the 4 days.

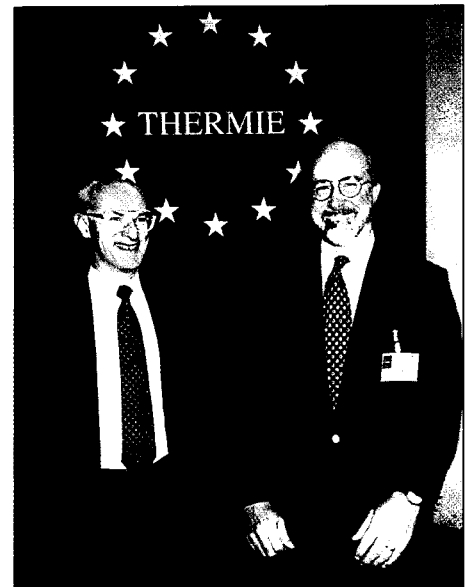


Mr Dick van Asselt of the EC (DG XVII-D3) welcomes King Harald of Norway and the Prime Minister Gro Harlem Brundtland to the EU THERMIE stand.

The 6th THERMIE Exhibition took place at the Martin-Gropius-Bau in Berlin during the 19-24 September. The event stressed THERMIE's aims to promote new, clean and efficient energy technologies in order to achieve the main objectives of the EU. The important role of hydrocarbons technologies was emphasised, particularly in relation to small and medium sized enterprises which have an important part to play in the development of innovative technologies.

Concentrating on subsea technology and offshore engineering, the IOCE Exhibition and Conference is a targeted event with a high proportion of visitors and delegates from the senior levels of the oil companies and service industry. Approximately 2,500 people attended IOCE '94 in Aberdeen (4-6 October), consisting mostly of senior engineers and managers. A large number of enquiries relating to the possibility of THERMIE funding for demonstration projects were dealt with by the Commission and OPET staff manning the European Union stand. The five participating companies on the EU stand all reported new business contacts while several gained firm sales leads.

A one-day workshop on Multiphase Flow Technology held on 7 October 1994 attracted 30 high calibre delegates from the



Rolf Meijer (DG XVII - Head of Contracts and Management of Resources) and Pedro Sampaio Nunes (Head of Energy Technology) attending the THERMIE Exhibition

oil and gas industry. The workshop examined advanced computational modelling skills in complex multiphase pipeline technology developed by AEA Technology of the UK and ALFAPI of Greece. Papers from the workshop are available from Jane Kennedy at PSTI.

New Publications

SIX NEW EC BROCHURES are now available from PSTI. Flag brochure 186 describes "CUSP" an innovative technology for the connection of underwater systems and pipe/flowlines. Originally designed by Alpha Thames, CUSP is now licensed to and manufactured solely by Babcock Energy Ltd. RISC, a joint British, Dutch and Italian project is examined in flag brochure No.187. The project aims to provide the offshore industry with a rational methodology for the scheduling of inspections of fixed offshore platforms based on reliability techniques.

Flag brochure No.189 discusses wet welding techniques developed by the German organisation GKSS. The project has shown that wet welding techniques represent a viable option for the repair of offshore structures.

Developments in well site gas analysis are described in brochure E-4. The UK company HRH Limited has made a number of innovative advances in the measurement of gas derived from drilling mud, allowing more accurate measurement of mud gas to be made.

Brochure E-5 describes an innovative operational modelling system for the precise knowledge and forecasting of marine and aquatic areas, developed by the German company Hydromod. The system, called OPMOD, allows oil companies to predict the behaviour of oil spills

and therefore respond quickly to the situation. OPMOD has many uses and can predict the effects of any catastrophe affecting regional seas or coastal waters.

Various innovations in drilling technologies developed by Andergauge Ltd are described in brochure E-6. These new systems can help reduce

the high costs associated with drilling.

A 16-page maxibrochure on subsea diverless intervention systems in the offshore oil industry is now available. The report, which examines the main needs and business potential for technological development in this sector in the next 10-15 years, can be obtained from the Italian OPET FAST.

CONFERENCE, EXHIBITION and WORKSHOP DIARY

IADC/SPE Drilling Conference, Amsterdam, 28 February - 2 March 1995

The EU will participate at this important sectorial event at which the latest innovations in drilling technology will be on show. The EU stand will feature a number of European companies exhibiting their technologies. For further information contact Mr G Hutjes at the Dutch OPET IRO.

Middle East Oil Show Bahrain, 11 - 14 March 1995

Due to the current low oil prices, there is a need in the Middle East for new cost-effective technologies. The Directorate-General for Energy will participate for the first time at MEOS in Bahrain, promoting innovative European technologies which have market potential in the Gulf. For further information contact Mr P Bollinger at the Portuguese OPET CEEETA-Partex.

Workshop on Improved Reservoir Monitoring in HPHT wells, Bahrain, March 1995

This workshop, which will be held during MEOS '95, will present a compilation of high pressure high temperature experiences by highlighting leading edge technologies and discussing and identifying future needs and requirements to improve HPHT well economics. For further information contact Mr G Hutjes at IRO.

Offshore Mediterranean Conference Ravenna, 15 - 17 March 1995

The EU will participate with a stand at OMC '95, an important conference and exhibition for the Italian offshore industry. A half-day workshop will be held in parallel with the conference on GASTRACK, a fibre optic gas detection system for offshore platforms. Further information can be obtained from Rosaria Gandolfi at the Italian OPET FAST.

OPET - Organisations for the Promotion of Energy Technology

The Role of the EC's OPET Network is to encourage the development of an energy strategy and the implementation of innovative technology within Europe. The Network also fosters the growth of smaller enterprises and cross-border collaboration within the European Union.

The benefits for Europe which follow from these actions include securing the energy supply, building an industrial base and improving the potential for exports of energy technology, whilst at the same time protecting the environment.

To achieve these objectives, the OPETs are involved in a range of

activities including market studies, workshops, conferences, trade exhibitions and publications.

The activities of the OPET Network promote improved efficiency and competitiveness, and contribute to European technology transfer not only within the Single Market but also outside the European Union.

OPETs are there to help and advise. For further information on the technologies described in this newsletter please contact the appropriate office.

OPETs in the hydrocarbon sector: contact details

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LDK: Consultants, Engineers & Planners, 7 Sp Triantafyllou Str, GR-113 61 Athens
GREECE Tel: +30 1 862 96 60 Fax: +30 1 861 76 81 Ms E Koulouvaris

IRO: Association of Dutch Suppliers in the Oil and Gas Industry, Engelandlaan 330, PO Box 7261, 2701 AG Zoetermeer
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