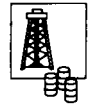


OIL & GAS TECHNOLOGY

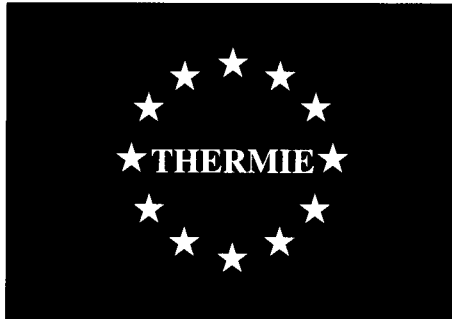


European companies lead the way with new exploration technologies

OIL EXPLORATION IS A HIGH RISK activity requiring large sums of money, particularly for drilling operations. This is compounded by the remoteness of potential new sites and the increasing exhaustion of known reserves. As such the level of exploration is highly dependent on the price of crude oil.

The European Commission recognises that in order to achieve commercially viable exploitation and secure the Community's oil supplies into the next century, it is important to encourage the development of new technologies.

This issue of *Oil & Gas Technology* outlines some of the innovative exploration technologies which are receiving support from the EC's THERMIE programme, such as geoscience



EDITORIAL

workstations, infra-red analysis of source rock samples, seismic data acquisition systems, and a slimhole drilling and coring system. Although at different stages of development, all of these projects are near-market and will play an important role in

oil exploration activities in the coming years.

These and other exploration-orientated oil and gas technologies from Europe will be promoted by the European Commission at the *AAPG International Conference and Exhibition*, to be held at The Hague, in The Netherlands on 17-20 October 1993. THERMIE supports not only EC-funded projects but also those developed under national programmes and private schemes; four of the eight companies participating on the EC stand at AAPG fall into this category. In addition a workshop hosted by the European Commission, in parallel with AAPG, will demonstrate a range of exploration software technologies which have been developed within the Community.

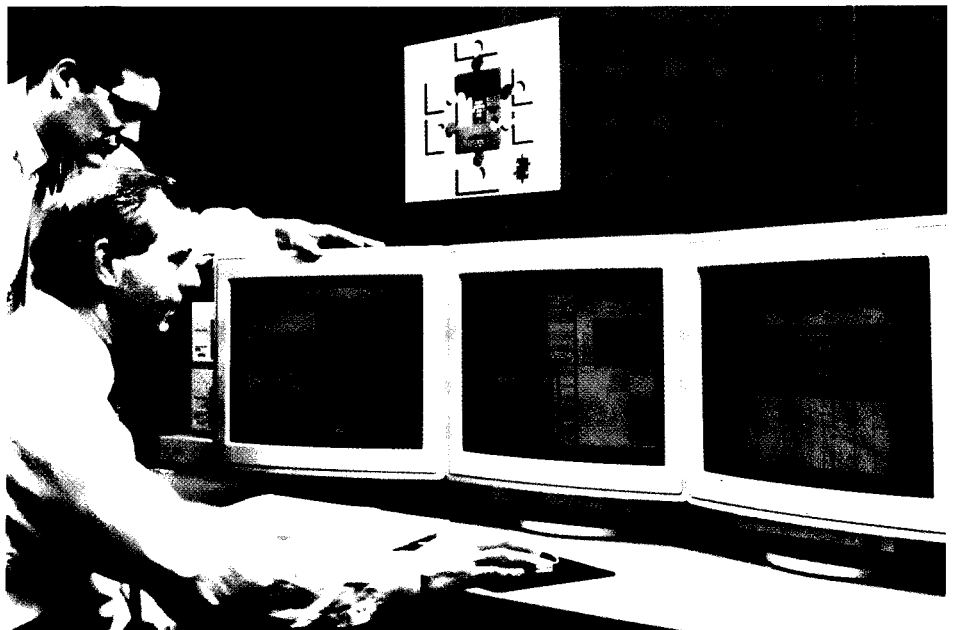
VAST - Visualisation Analysis and Simulation Toolkit

GEOSCENE, produced by Oilfield Systems in the UK, is a geoscience workstation which provides a suite of powerful interpretation tools for:

- loading, storing and displaying data, information and images of a petroleum field or basin;
- interpreting and modelling this data to produce descriptions and models for decision-making;
- communicating results through montage and quality hard copy.

The Visualisation Analysis and Simulation Toolkit (VAST) is one of several new modules incorporated into GeoScene 2.0. It incorporates a coherent multi-parameter object oriented description of the reservoir which provides users with a totally consistent 3D representation of one or more surfaces, both in cross-section and plan view, for developing an interpretation of the subsurface.

Users can combine well and seismic picks and a variety of other information into



consistent 3D interpretations. Several interpretations can be displayed simultaneously on GeoScene's multi-screen viewing area. Changes to interpretations are consistently and automatically

communicated to all relevant tools including both the cross-section and plan views. Easy-to-use tools are provided for reviewing, loading and exporting data in a variety of formats. Careful attention to the

Commission of the European Communities - Directorate-General for Energy

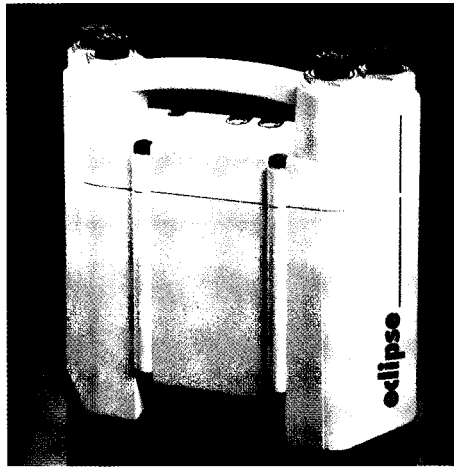
ECLIPSE - an innovatory seismic data acquisition system

ECLIPSE is a revolutionary seismic data acquisition system which can be used for conventional deep exploration in the oil and gas industry. The system is suitable for 2-dimensional and 3-dimensional surveys and can be used in conjunction with impulsive and vibrator sources.

ECLIPSE features excellent recording specifications including 24 bits resolution with minimal analogue filtering, and light-weight, low-cost field units and cable. Furthermore it is equipped with intelligent geometry handling which does not require cost-intensive merging of geometry and seismic data for processing.

One of the benefits of ECLIPSE is that it keeps the different types of equipment used in the field to a minimum, namely remote units and cable reels.

The field units are designed with low power components and an intelligent power consumption scheme which ensures long periods of recording between charging. The central unit is an open UNIX based workstation incorporating an



Eclipse Field Unit

intuitive user interface with object orientated design and implementation.

In addition to its applications in deep exploration, ECLIPSE can be used for shallow, high resolution surveys in mineral and coal exploration. It also has applications in the environmental sector.

ECLIPSE has been developed in a joint effort by DMT Applied Geophysics of

Germany, TNO Applied Geoscience and TNO Applied Physics of The Netherlands. The system, which was co-funded by the Commission of the European Communities THERMIE programme, will be field tested in November this year.

VAST - cont. from p1

user interface makes the tools easy to use thus masking the complexity of the underlying applications.

GeoScene operates under UNIX, using X-Windows and Motif on standard computer hardware, including Sun SPARCstation, Silicon Graphics and Hewlett Packard Series 700 workstations.

GeoScene and VAST were developed with funding from the Commission of the European Communities, five UK-based oil companies, and the UK Department of Trade and Industry. The VAST project alone amounted to 356,000 ECU of which 40% was provided by the EC under the THERMIE programme.

EUROSLIM: a new system for the exploration manager

In a project supported by the Commission of the European Communities THERMIE programme, a Belgian and a French company are collaborating to develop a complete slimhole drilling and coring system which includes rig, mud system, instrumentation, and a complete downhole

high performance package. The system has been designed to provide onshore exploration managers with a cost-effective, fast and reliable technique for obtaining high quality information.

One of the key elements in the EUROSLIM system is a new high torque connection

which is used on all items, i.e. drillpipes, drillcollars, stabilisers, core barrels, drillbits and core heads. During 1993 tests have been successfully carried out at two sizes (4³/₄ inches and 3³/₈ inches) on 2,150 metre wells. Both systems should allow drilling to depths of 3,500metres.

With the new thread, high torque PDC-drillbits and core heads may be used not only on slimhole drilling and coring sizes, but also when drilling higher diameter surface phases.

The core barrels are modular, wire-line, and accept heavy duty spiral stabilisers similar to those used when drilling, together with the new drillpipes and drillcollars. Wire-line coring, combined with low invasion core heads, allows the exploration manager to obtain high recovery of good quality cores, due to the low pulling time compared to the conventional technology.

The total cost of the project is 11.1 MECU of which the European Commission has contributed 1.7 MECU.

The collaborators, DB Stratabit and Forasol, expect the complete system, including surface and downhole equipment, to be in operation by early 1994.

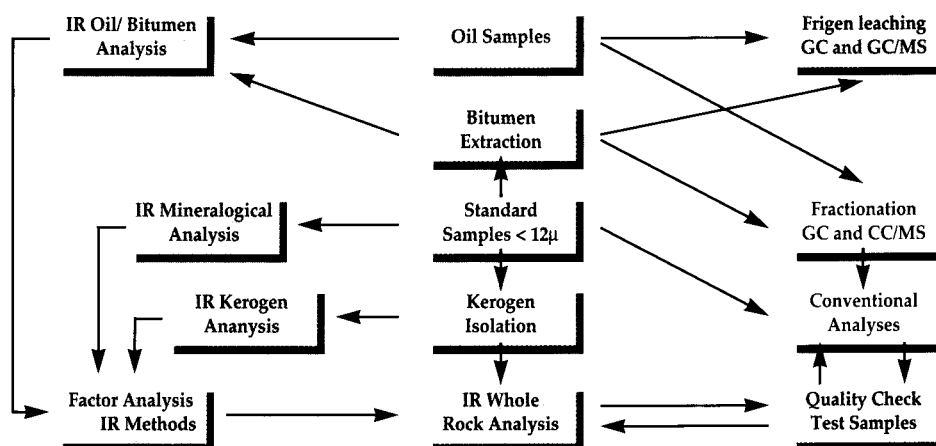
EUROSLIM drilling and coring system



Development of a new method for the determination of hydrocarbon source rock and crude oil characteristics

INFRA-RED ANALYSIS on isolated kerogen samples allows a number of important organic geochemical parameters to be determined. However, compared to pyrolysis techniques the method is more time-consuming due to the procedure required for isolating kerogen. The project thus addressed the problem of calibrating the organic amplitudes within the IR-spectra of the samples without prior isolation of kerogen in order to reduce overall analysis time to a level competitive with pyrolysis techniques.

More than 200 source rock samples of different type and thermal maturation were collected and analysed by a number of conventional techniques. Almost 100 pure mineral standards were collected as well. Artificial mixtures of minerals and kerogen were made and quantified by IR-spectroscopy with the aid of extinction coefficients and factor analysis. From the latter a number of IR-methods were developed for various rock and kerogen types. The flowsheet describes the major analytical steps.



A number of innovations were developed during the project including:

- fast procedures for sample preparation;
- IR-methods based on factor analysis for the rapid determination of mineralogical compositions, the prediction of kerogen properties without kerogen isolation and IR-bitumen methods for the prediction of maturity of the associated source rocks.

The project was performed by members of three European institutions: Technical University of Berlin/Germany (project leader), Bundesanstalt fuer Geowissenschaften und Rohstoffe (BGR) Hannover/Germany and University of Aberdeen/Scotland. The total cost of the project was ECU 740 000 of which 30% was funded by the Commission of the European Communities (DG XVII).

CONFERENCE, EXHIBITION and WORKSHOP DIARY

KIOGE '93

Kazakhstan • 5-8 October 1993

THE NEW and developing markets of the oil and gas industry in the Central Asian Regions, present enormous opportunities for companies wishing to expand their business within these regions. KIOGE '93 will provide an opportunity for companies involved in upstream and downstream activities, in both onshore and offshore markets, to meet and establish contacts with buyers and sellers in the market.

The European Commission will be participating at this event through LDK OPET. Five European companies have been invited to exhibit on the EC's stand during this event offering an ideal opportunity to promote their products to a wide audience, including government delegations from Azerbaijan, Tajikistan, Uzbekistan, Turkey, Iran and Kazakhstan.

THERMIE Exhibition

Brussels • 11-16 October 1993

REDUCING ENERGY consumption within Europe is possible through the application of innovative energy technologies. Forty such technologies,

models and prototypes, will be exhibited for the first time to the general public at the THERMIE Exhibition in Brussels. In addition, the contribution of energy technologies to the political, economic and strategic goals of the EC will be explained.

Deep Offshore Technology 93'

Monaco • 8-10 November

THE 7TH DEEP OFFSHORE TECHNOLOGY International Conference and Exhibition, sponsored by GEP, SOCIDOC and "Offshore Magazine", will take place at the Monte-Carlo Convention Centre (CCAM), Monaco from 8-10 November 1993. The Conference will bring together the leading executives and top technical experts in the international deepwater petroleum industry. The theme of this year's conference is "Managing Economic Opportunities Today and Tomorrow".

The technical programme will include keynote speeches and expert assessments of the latest advances in deep offshore exploration and production. The EC stand will provide delegates with information on THERMIE activities in this area and the current call for proposals.

AERION '93 and IEA Natural Gas Conferences

AERION '93, to be held in Athens between 4 and 6 November 1993 at the Linea Expo Center, is the first European professional exhibition of its kind where all the latest developments in the natural gas sector will be presented.

Organised by LDK on behalf of the Commission of the European Communities, AERION '93 will provide an excellent meeting place for equipment manufacturers, gas companies, financial organisations and end users in the European gas sector.

In conjunction with the gas equipment exhibition, a one-day workshop on Efficient Industrial Natural Gas Equipment will take place on 5 November. This workshop will focus on new and improved natural gas technologies including industrial gas burners and boilers, gas cogeneration systems, and gas-fired space heating and air-conditioning.

The EC will also be involved in the International Energy Agency's conference on *Natural Gas Technologies* to be held in Kyoto from 31 October to 3 November 1993.

Offshore Europe Conference and Exhibition • Aberdeen • 7-10 September 1993

THE EUROPEAN COMMISSION joined 1,800 other exhibitors from 20 countries at Offshore Europe 93, to tell the oil and gas industry that Europe is at the forefront of developments in this sector.

Dr von Scholz, Head of the EC's Energy Technology Unit (Strategy-Dissemination-Evaluation) was on hand to meet visitors to the European stand and to hear for himself how THERMIE was helping small and

medium sized enterprises (SMEs) in the oil and gas industry.

As part of its active campaign to assist SMEs, eight companies were invited to participate on the EC stand who otherwise would have found it difficult to exhibit without Community assistance. THERMIE supports all EC hydrocarbon technologies including those developed under national programmes and private schemes; four of the companies participating on the EC stand came into this category. All were grateful for the opportunity to present their products to the 25,000 delegates who attended the event and a number of new business contacts were made, some from as far away as Australasia. Most of the SMEs reported firm sales leads and some actual sales on the stand.

A number of serious enquiries were also received regarding THERMIE funding under the current Call for proposals which closes on the 1 December 1993.

New Hydrocarbons publications

THREE NEW FLAGBROCHURES describing EC-funded hydrocarbons technologies will be published in the near future.

The Strachan and Henshaw RA-D project examines the automation of the drilling process from first principles, with the aim of reducing manning levels and improving operator safety. A proof of concept rig has been built and is operational in Aberdeen.

Herion in Germany have developed a diver assistance vehicle-ROV which can also be easily converted into a work ROV. This increases operational capacity for a wide range of field applications and reduces total investment cost.

Snamprogetti in Italy have analysed hydroelastic phenomena on submarine pipelines in order to develop new design procedures for determining critical span lengths across uneven seabeds.

Full details on these projects will be available in the flagbrochures, which will be published in November 1993.

The *European Oil and Gas Demonstration Project Inventory* of non-EC supported projects will be published in the Autumn of 1993. This publication complements the EC's inventory of EC supported projects and eventually the two will be combined to give a complete directory of European oil and gas technologies.

OPET: Organisations for the Promotion of Energy Technology

THE ROLE OF THE EC'S OPET NETWORK is to encourage within Europe the development of an energy strategy and the implementation of innovative technology. The Network also fosters the growth of smaller enterprises and cross-border collaboration within the Community.

The benefits for Europe which follow from these actions include securing the energy supply, building an industrial base and improving the potential for exports, 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 Community.

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

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