Call for Proposals

Subsea Challenges 2007

A Collaborative Approach to Investment in Technology

ITF has an impressive track record in delivering finance to help develop new initiatives for oil and gas technologies from early stage joint industry projects (JIPs) through to field trials and commercialisation. Since 1999 ITF has raised over **£30 million** in direct JIP support, with projects linked to a further **£20 million** of equity investment, and over **£20 million** in trials funding.

ITF accesses funds from the 17 the major oil operating and service companies that are ITF members. Proposals submitted under this call will be reviewed for financial sponsorship by ITF members and selected non-member operators. This is an excellent opportunity to gain a wide audience in seeking support for your technology.

In a spirit of open collaboration, our preference is to receive proposals that all ITF members can view and potentially participate. Under special circumstances proposers may be able to request that specific companies are excluded from seeing their proposals. (Note: our members are listed on our website site www.oil-itf.com)

An Open Invitation for All Technology Developers and Suppliers

This is an open invitation for all organisations seeking sponsorship for ***innovative subsea technologies*** to submit proposals for ***research, development and field trial*** of technology in the following areas:

- Enhanced Subsea Recovery
- Integration of Established and New Energy Systems
- Smart Subsea
- Ultra-Deepwater
- Subsea Processing
- High Pressure, High Temperature Environments
- Long Tie-backs

A list of specific technology challenges that are of interest to ITF members may be found later in this document.

ITF Member companies have assets and operations throughout the world. We are therefore inviting proposals for technologies that may be applicable to the North Sea and any other geographical area.

Those interested in submitting a proposal should respond registering their interest as early as possible by sending an e-mail to David Hedges, d.hedges@oil-itf.com.

Qualifying Technologies

To qualify for this call, your technology must:

- Be applicable to upstream oil and/or gas production or associated services
- Fulfil at least one of the items within the expressed needs for technology within this invitation.
- Be novel or innovative
- Demonstrate a clear business case for support
- Have a clear and demonstrable path to commercial realisation

Qualifying Organisations

Proposals are invited from any national or international organisation (SME, university, large organisation, consortium or alliance); equal opportunities will be extended to all. If your proposal creates sufficient interest you will be required to attend meetings and make presentations in the United Kingdom and in the English language.

Background to the Subsea Theme

ITF uses a thematic approach working in collaborative participation with its members to identify common areas of interest and technology needs. This Call aims to stimulate proposals from the development community, which ITF and its members will assess, and our members will fund those of highest interest.

One key theme for 2007 identified by ITF members is the application of **Subsea Technology.** The focus of this theme is to bring forward technologies, with clear benefits to sponsors, which require assistance in **research, development or field trial.**

ITF is also interested in receiving ideas for feasibility studies, which will attract a lower level of funding. Please contact us if you are considering a submission of this type and we will advise you how to proceed.

How the Technology Needs were Defined

A central part of ITF's work is to take views from a number of industry sources (such as end users, service providers, and suppliers) to identify key technology challenges that would bring about a substantial increase in production, improve recovery rates or extend the life of a facility.

This consultation includes taking views from individuals and through ITF run workshops. One such workshop, held in partnership with **Subsea UK**, established an interest in collaboration and in seeking proposals with a view to making a commitment to invest. All topics included in this call are therefore attributable to an expression of interest by ITF members.

It is not the aim of ITF, or its members, to prescribe specific technology solutions but to stimulate innovative proposals that fit with identified needs. The descriptions for each topic have therefore been made generic to allow for flexibility in interpreting the most appropriate technical solutions.

Process and Schedule

The Proposal Application Form is available for downloading on our website at www.oil-itf.com. Using the Guidance Notes (also to be found on our website), please complete the form and return it electronically in Word format (NOT PDF) to David Liddle at d.liddle@oil-itf.com **NO LATER THAN MONDAY the 17th SEPTEMBER 2007.**

In addition, we request that you complete a two slide PowerPoint presentation as detailed in the Guidance Notes, which backs up your proposal submission in a concise form.

NB. Please read the Guidance Notes carefully before completing the Proposal Application Form as failure to provide the necessary information in relation to your technology may result in premature disappointment.

Proposals received after the deadline may not be processed. Therefore please ensure your submission reaches ITF before the specified deadline.

About the Industry Technology Facilitator (ITF)

ITF (The Industry Technology Facilitator) is a not-for-profit organisation owned and supported by 14 major oil & gas operating companies and 3 service companies (the 'members'). ITF is the vehicle through which the members fund joint industry projects that meet the technology needs of the upstream oil and gas industry. ITF has the remit to facilitate the **research, development, and application** of new, high impact technologies that will increase overall hydrocarbon recovery from mature basins.

To date, ITF has launched over 100 Joint Industry Projects representing a direct investment of £30 million.

For further information about ITF click on www.oil-itf.com.

ITF Contacts

If you would like to discuss any matters related to this call or any other issue related to ITF, please contact any of the following people:

Contact	Role	E-mail	Telephone
David Liddle	Technology Manager	d.liddle@oil-itf.com	+44(0)1224 853403
Lynette Carroll	Technology Analyst	l.carroll@oil-itf.com	+44(0)1224 853410
David Hedges	Technology Analyst	d.hedges@oil-itf.com	+44(0)1224 853409

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ITF 2007 Subsea Challenges Themes

Call for Proposals

Specific Technology Needs

(Any proposal submitted to ITF must address one or more of these identified needs.)

Enhanced Subsea Recovery

***Background**:*
Recovery rates for subsea completions are frequently only 70% of the equivalent rates from platform-drilled wells. There is therefore a need to find cost-effective techniques to increase these recovery rates.

- Improved modelling, validated with real data, of:
  - Thermal analysis
  - Recovery rates
  - Water cut
- Instrumentation capable of seeing beyond the near-well-bore region
- Improved subsea pumps
- TTRD/MPD*, heavier intervention
  - Multi-laterals and intelligent control
- Subsea desalination
- 4D seismic to target new zones
- Down-hole compression/separation
- Methods to make heavy oil more viable
- New approaches to artificial lift

*TTRD = Through Tubing Rotary Drilling; MPD = Managed Pressure Drilling

Integration of Established & New Energy Systems

***Background**:*
Renewable energy systems are now beginning to share the seas with fossil fuel production facilities as offshore wind farms are joined by wave and tidal energy systems. Although at first sight these are very different industries, there are potential synergies moving forward. As examples consider:

- *The re-use of existing oilfield infrastructure as the basis for wind farms (eg the Beatrice Windfarm demonstration project)*
- *Using 3-5 5MW wind turbines (or the equivalent in wave power generators) could power a typical subsea compression system*
- *Carbon dioxide sequestration and injection into aging reservoirs, both disposing of an unwanted greenhouse gas and enhancing recovery*

Through this call, we are seeking proposals for innovative projects which will link renewable energy systems with their conventional counterparts, in an offshore environment.

Smart Subsea

***Background**:*
By Smart Subsea, we mean enhancing subsea operations through automation, optimisation and monitoring, preferably through modular, integrated systems based on open protocols. Among other benefits which would be sought are early warnings of problems and the ability to make timely decisions on intervention.

- More reliable in-well connections; electrical (wet mate) and fibre optics
- Monitoring systems for integrity and reliability to avoid the need for intervention
- Sand monitoring for small particle sizes and quantities; identify screen failures
- Identification of the location of water breakthroughs
- Smart data: integrating data acquisition with actions
- Integration of well and subsea data
- Down-hole flowmeters

Ultra-Deepwater

Background
Estimates of global ultra-deepwater reserves exceed 200 billion barrels much of which lies outside regions subject to the geopolitical drivers that threaten supplies today. However new challenges arise in the exploitation of these reserves, including the sheer physical size and weight of the components required; and fatigue on tree connectors, which can limit the number of interventions available. For the purposes of this call, ultra-deepwater is defined as oil and gas resources in water depths greater than 1500 metres.

- Design of lightweight risers
- Design of tree connectors with extended fatigue life
- New materials for the above, taking into account likely occurrence of sour gas
- Fatigue predictions for subsea components in ultra-deepwater
- Design for high-current environments
    - Improved understanding of deepwater currents

Subsea Processing

***Background**:*
This component of the call is to propose new solutions which would allow the transfer of much of what is currently carried out on platforms on the seabed. In addition to cost reduction, it would benefit by reducing the number of people stationed in dangerous environments. Solutions are required in the areas of:

- Suitable power generation systems and interconnects
- Improved processing systems for subsea use
- Improved subsea process pumps
- Subsea water injection and treatment
- Subsea drilling: or is this too difficult?

High Pressure, High Temperature Environments

***Background**:*
Currently defined as pressures above 690bar and temperatures above 150degC. Although completions have been achieved at higher temperatures and pressures, they cannot yet be performed routinely. Issues include:

- Start-up problems
- Metallurgy
- Calculations of stresses, fits and clearances
- Suitable sealing systems
    - E.g. Improved elastomers
- Intervention techniques
- Handling of products at surface
    - E.g. Salt, Scale, H2S, etc.

Long Tie-backs

***Background**:*
Long tie backs can potentially make stranded reserves economic to exploit by making use of existing infrastructure. In addition, long tiebacks may prove to be the key to developing fields in Artic and Antarctic environments. Although the longest European tieback is 143km (Snohvit, Norway), the current technical limit is believed to be around 200km: there are opportunities which would require tiebacks of 400Km or more. The issues to be overcome include:

- Flow assurance, including cold flow
    - Improved prediction and simulation
    - Increased inhibitor efficiencies
    - Improved chemical injection for long tie-backs
- World shortages of steel: should the pipelines be designed to be re-usable?
- Improved methodologies for stress calculations, taking into account differential expansions, e.g. at start-up and steady state.
- The ultimate goal: how do we get 'subsea-to-beach'?