Call for Proposals

Unlocking the Hydrocarbon Potential

(Output from Theme Day, Perth, Western Australia)

Background to the Theme

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.

ITF uses a thematic approach working in collaborative participation with its members and industry to identify common areas of interest and technology needs. This Call for Proposals has resulted from the output of an ITF Theme Day held in Perth, Western Australia, on 11th March 2008. This intensive facilitated workshop brought together ITF members, local operators, service companies, small and medium-sized enterprises, and research and academia players to discuss the challenges now facing this region in unlocking the hydrocarbon potential.

This Call aims to stimulate proposals from both local and global development expertise to meet operator needs which can be deployed both within the region and for similar applications throughout the world. ITF and its members will assess, and our members will fund those proposals of highest interest. The ITF process seeks to bridge the gap between the large global players of our industry and the development community with the ultimate aim of deploying new technology solutions.

Key drivers for 2008, identified by ITF members, are the desire to produce fields in a more cost effective and efficient manner. The focus of all ITF themes is to bring forward technologies, with clear benefits to sponsors, which require assistance in **research, development, and/or field trial.**

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 highlighted key information in order to allow for innovation and flexibility in interpreting the most appropriate technical solutions.

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 **£31 million** in direct JIP support, with projects linked to an estimated **£20 million** of equity investment, and over **£20 million** in trials funding.

ITF accesses funds from the 19 major oil and gas operating and service companies that are ITF members. Proposals submitted under this call will be reviewed for financial sponsorship by **all ITF members**. This is an excellent opportunity to gain a wide audience in seeking support for your technology.

ITF has contractual arrangements on confidentiality with ALL its members (operators and service companies) and ITF will enter into a parallel agreement with all developers submitting proposal applications. Proposals will be submitted to our members only for the purpose for which they are provided, i.e. assessment for funding support and implementation.

(Note: our members are listed on our website - www.oil-itf.com)

An Open Invitation for All Technology Developers and Suppliers

Increasingly a number of hydrocarbon developments are becoming expensive to develop because of their location in deep water and remoteness from civilisation. Hence the industry is always seeking to produce these fields in a more cost effective and efficient manner.

This is your opportunity to help define the technical challenges which face the industry and thus directly help improve these production issues.

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

- Remote Hydrocarbon Developments
- Subsea Production Enhancement
- Flexibles, Flowlines and Pipeline Technology
- Flow Assurance
- Integrity, Maintenance and Reliability
- Large Floating Structures

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 not only in the Australasian region but to 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 info@oil-itf.com.

NB. There are inevitable overlaps with this Call and some recent ITF Calls, e.g. Asset Integrity; developers submitting to any ITF Call in the past nine (9) months should not submit any previously submitted proposal, or unsuccessful applications without first consulting ITF.

Qualifying Technologies

To qualify for this call, your technology must:

- Be applicable to issues identified
- Fulfil at least one of the items within this invitation
- Be novel or innovative
- Demonstrate a clear business case for support
- Have a clear and demonstrable path to commercialisation and implementation

Qualifying Organisations

Proposals are invited from any organisation including SME, academia, research institute, large organisation, consortium, or alliance. Proposals may be submitted by a national or

international organisation, and equal opportunities will be extended to all proposers. Please bear in mind however that should your proposal be taken forward, you will be required to partake in meetings and make presentations to interested parties in the United Kingdom or possibly Perth, Western Australia and in the English language (teleconference and video conference are acceptable).

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 **MS Word** format (**NOT PDF**) to Keith Mackie at k.mackie@oil-itf.com **NO LATER THAN 23rd JUNE 2008.**

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 global oil & gas operating companies and 5 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 and developing basins.

To date, ITF has launched over 115 Joint Industry Projects representing a direct investment of over £32 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
Keith Mackie *	Technology Analyst	k.mackie@oil-itf.com	+44(0)1224 853411
Adele L'Etang	Technology Analyst	a.letang@oil-itf.com	+44(0)1224 853407
Ryan McPherson	Technology Analyst	r.mcpherson@oil-itf.com	+44(0)1224 853410
*" * " Denotes that Keith Mackie is the appointed Theme Manager for this programme and should be your first point of contact.*			

ITF, The Enterprise Centre, Exploration Drive, Bridge of Don, Aberdeen, UK, AB23 8GX

Theme: Unlocking the Hydrocarbon Potential

Call for Proposals

Specific Technology Needs

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

Remote Hydrocarbon Developments

Background:
Many hydrocarbon developments are increasingly being found in remote parts of the world, far from civilisation and developed infrastructure support. Technologies are required to help overcome these challenges in the following areas:

Requirements:

- Subsea Processing
  - Subsea gas processing
- Gas Monetization
  - Hydrocarbon conversion linked to export strategy
  - CNG / GTL (including floating GTL)
  - Localised, Floating, and mid-scale LNG (including use in harsh, remote locations)
  - Nomad gel
  - Standardised liquefaction components
- Environment
  - More reliable and cost effective met-ocean data gathering
  - Environmental baseline data and monitoring capability
- Automation
  - Autonomous operations
  - Unmanned facilities
- Processing
  - In situ processing
  - Condensate issues
  - Compact processing plant
  - Compression efficiency
- Power
  - Long distance power distribution
  - Local power generation

Subsea Production Enhancement

Background:
Increasingly subsea techniques are being deployed as developments move into deeper water. These techniques are constantly developing but need to be enhanced in terms of efficiency and effectiveness. Some of the challenges the industry constantly wrestles with are:

Requirements:

- Subsea Processing
  - Subsea separation
  - Subsea pumping
  - Compression (pressures)

  - Water separation
  - Subsea sampling from production stream
  - Gas compression
  - Control fluids for 170degC
- Smart Wells
  - Fibre optic communication system
  - Autonomous smart wells
  - Instrumented reservoir
  - Enhanced down-hole technology
  - Integrated production modelling
- Power
  - Power supply and distribution
  - Localised subsea power generation
- Intervention techniques
  - Smaller and lighter components/structures (<250 tonne)
  - Improved installation methods at remote sites (depths 100 – 1500m)
  - Light vessel intervention techniques

Flexibles, Flow-lines, and Pipeline Technology

Background:
Flexibles, flow-lines, and pipelines play a large part in the development of all offshore (and onshore) hydrocarbon discoveries. Nevertheless, these key elements still provide the industry with issues that need addressing, some of these issues are identified:

Requirements:
- Integrity and Reliability
  - Life extension
  - Reliability of flexibles
  - Integrity management for 40 year field life
  - Corrosion and erosion control
  - Monitoring and sensing of pipeline operating parameters
- New Materials
  - Composite pipeline
  - Composite material risers
  - Alternatives to exotic/expensive pipelines
- Limitations Pipe/Flex
  - Subsea pressure protection systems
  - Flexible flowline limitations (diameter, temp, pressure, etc)
  - Cryogenic applications for flexibles
  - Large diameter flexibles
  - Gas mitigation in umbilicals
- Pipeline Stability
  - Design of umbilicals to include installability cases
  - Seabed and shelf stability
- Operations
  - Deep water pipeline intervention
  - Installation
  - Shore-towed bundles (pipelines)
  - Pipelay issues, bathymetric escarpment
  - Light vessel intervention
- Dense Gas
  - Long pipelines
  - Dense gas pipelines

Flow Assurance

Background:
Flow assurance is one of the industry's biggest challenges as it seeks to develop remote fields and tie-back developments to infrastructure over ever increasing distances. Some of the defined challenges which the industry is currently facing are identified:

Requirements:

- Hydrates
  - Mitigate hydrate formation
  - Hydrates prediction and monitoring (prevention and management)
  - Alternatives and/or improvement of chemical technologies (e.g. MEG)
- Long Distance Issues
  - Long offset (all aspects)
  - Long distance, large multiphase flow issues up steep shelf
- Sand Control
  - Sand control and management
- Wax
  - Wax prevention, remediation, and/or management
- Thermal Control
  - Heat control
  - Improved thermal options
- Slug Control
  - Slugging prediction (prevention / management)
- HPHT issues
- Monitoring
  - Monitoring and sensing

Integrity, Maintenance and Reliability

Background:
As infrastructure ages it is increasingly important to monitor for its integrity and reliability; hence, more effective, reliable and cost effective techniques are needed:

Requirements:

- Long Field Life
  - Longevity – 40 year design life
  - Prediction of remaining life
  - Corrosion and corrosion management
  - Simulation
- Corrosion
  - Corrosion prediction (prevention / management)
  - Corrosion protective coatings (e.g. nano-coatings)
  - Anti-fouling techniques
- Met Ocean
  - Met Ocean design criteria
  - Extreme environment operability
  - Met Ocean data
  - Climate change – understanding and application to protect integrity in future
- Automation
  - Subsea electrical / electronics
  - Remote monitoring and learning systems
  - Integration of maintenance / reliability and engineering information

systems
- Standardisation
  - Common processes onshore and offshore
  - Standardised procedures / standards / management systems
  - Knowledge Management
  - Subsea integrity process
  - Industry designed test specification as a baseline to new product introduction
- Improved underwater inspection techniques
  - Subsea retrievable sensors
  - Subsea sampling from production stream
- Large subsea pigging
- Well integrity fluids trapped in annulus

Large Floating Structures

Background:
As we move into deeper water floating production systems bring a host of new challenges, some of which are listed below:

Requirements:
- Substructure
  - TLP's – self installing
  - 'Big Cat' FLNG / FGTL
  - Storage solutions
- Moorings
  - Mooring technologies
  - Anchoring at foundations
- Met Ocean
  - Weather monitoring
  - Suitability to local conditions
  - Cyclone and extreme storm survival
- Risers
  - Steel catenary risers
  - Shallow water flexible risers
- Offloading
  - Enhanced offloading capabilities
- Topsides
  - Reduced footprints of processing
- Safety
  - Emergency procedure management (e.g. weather lock-down)

Some acronyms used in this proposal are:

CNG = Compressed Natural Gas
LNG = Liquid Natural Gas
GTL = Gas to Liquids
FLNG = Floating Liquid Natural Gas
FGTL = Floating Gas to Liquids
HPHT = High Pressure High Temperature
TLP = Tension Leg Platform