

## Technology for Drilling Efficiency

*An Open Invitation for Proposals from Technology Developers*

### *Aims*

ITF members invite credible proposals from the international research and development community who would like to source partners and funding to research, develop, trial and implement potential solutions that will help achieve improved efficiency of drilling operations. The specific areas of interest are:

- Managed pressure drilling
- Drill-bit condition monitoring
- Well bore strengthening

### *Justification*

ITF members, major operating and service companies in the oil and gas sector, met recently at an international ITF Technology Challenge Workshop (TCW) and identified the current challenges they are facing as an industry.

The challenges identified are market sector specific and defined by the industry.

### *Who Should Respond*

The invitation is open, and encourages, responses across all relevant industry sectors from small and medium sized enterprises, academic and research institutions, and large industry players alike. This is an open invitation to any organisation seeking partners and funding for **innovative technologies** in the oil and gas industry to submit high quality proposals for **research, development, and / or field trial**.

### *Benefits of Participation*

- Access to the key global players in the oil and gas sector
- Exposure of your scientific and technological expertise
- Potential 100% funding for your research and development
- A proven confidential, collaborative, and standard contractual process
- Funding for any stage of the research, development, and demonstration cycle

### *How to Participate*

Your contact points and outline method for submitting a proposal are provided in this document but you can immediately learn how to submit a proposal by going to our website <http://www.oil-itf.com/index/submit-a-proposal>

Alternatively you can ring us and talk to one of our analysts about your idea, +44 (0)1224 222410.

### *Key Words and Potential Technology Areas*

Drilling; managed pressure drilling; rotating control; continuous circulation; control systems; automated control; condition monitoring; drill bit technology; harsh environment engineering; down-hole tools; wellbore strengthening; high speed data transfer; vibration management; predictive analysis; rock mechanics; drilling fluids; water-based and oil-based drilling mud; chemicals; down-hole control lines; wireless technology; battery technology; novel power generation systems; power storage systems; accumulators; sensors; high performance electronics; wellbore strengthening; borehole stress; borehole irregularities; ultrasonic technology; fibre optics; harsh environment connection systems.

*(NB. The above list is not necessarily exhaustive).*

Readers who are not familiar with the industry may find using some of the above terminology on a *Wikipedia* search on the internet would lead to some useful initial descriptions of the industry and associated techniques. It will also provide other links that would be equally useful.

## Drilling Efficiency Challenges

The safety and economics of drilling offshore wells is important as we drill more wells in deeper water. Drilling-related problems often require better information on the drilling process, more equipment reliability, and greater accuracy. Many issues including stuck pipe, lost circulation, and excessive mud cost, show the need for better drilling technology. If we can solve these problems, the economics of drilling wells will improve, and we can also enable the industry to drill wells that were previously uneconomical.

The three prime areas of concern have been identified by ITF members as follows:

- Managed Pressure Drilling (MPD) from floaters
- Tool condition monitoring
- Wellbore strengthening

### *Managed Pressure Drilling (MPD) From Floaters*

Managed pressure drilling (MPD) is a relatively new technology that enables a driller to use a surface choke and a rotating control device or similar to more precisely control annular pressures and bottom hole pressure. MPD will also allow drilling at or above formation pressure, without any influx from the formation. MPD techniques will assist the drilling process where there are depleted and more challenging fields.

Tools required to undertake MPD from a Floater include, Continuous Circulation System (CCS), choke and an associated automated choke control system, and Rotating Control Devices (RCD). Currently RCDs are available for operations from floaters but are not specifically suited for floater application.

#### **The Challenges**

- Make equipment more suited for the application and specifically for through rotary table applications and full-bore access for BOP<sup>1</sup> tests
- Equipment improvements for the next generation of MPD riser and RCD systems for floater deployment
- Combine MPD and casing drilling techniques
- Provision of increased capacity systems but with smaller footprints
- Optimisation of RCD systems and improve their reliability
- Better 'plug and play' systems to increase efficiency

---

<sup>1</sup> BOP – Blow Out Prevention

## ***Tool Condition Monitoring***

The harsh environment<sup>2</sup> of the well bore constantly requires evaluation and monitoring of drilling equipment. Having the right data, supplied to the right people, at the right time will lead to improved efficiencies through drilling automation.

### **The Challenges**

- Fully automated control systems with true predictive capability
- Better information of the drill bit condition
- High speed data transfer, and more accurate MPD control
- More robust and reliable tools to cope with the harsh environment
- Better management of vibration

## ***Well Bore Strengthening***

Lost circulation<sup>3</sup> is one of the larger contributors to drilling non-productive time. Technologies that reduce drilling non-productive time can significantly reduce operating costs. Technology solutions designed to improve wellbore strength and reduce drilling non-productive time caused by lost circulation require an approach that includes both prevention and remediation methods.

The goal of wellbore strengthening is to improve the ability of the wellbore to contain higher pressures without losing circulation. Proposed solutions should address improvement of current methods and put forward new methods and materials for wellbore strengthening and remediation of lost circulation.

### **The Challenges**

- To develop a greater understanding of the root cause and possible mechanisms of both the loss and the treatment from both rock mechanics and drilling fluids perspectives.
- Propose new methods to maintain borehole stress and how to raise the stress level to that of an intact wellbore when borehole irregularities cause losses.
- Methods for strengthening the formation whilst drilling (e.g. 'designer muds').

---

<sup>2</sup> The harsh environment in well bore could see pressures up to 20,000psi and temperatures of 220°C in a HPHT environment

<sup>3</sup> Lost circulation is explained at this link [http://en.wikipedia.org/wiki/Lost\\_circulation](http://en.wikipedia.org/wiki/Lost_circulation). Other drilling fluid related issues are also explained in the following link [http://en.wikipedia.org/wiki/Drilling\\_fluid](http://en.wikipedia.org/wiki/Drilling_fluid).

## ITF's Role & Approach

**The Industry Technology Facilitator (ITF)** is a not for profit organisation owned by, and with access to funds from major oil and gas operating and service companies that comprise its membership. 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 supported over **150** projects worth **£50 million** in funding. ITF's key objectives are to identify technology needs, foster innovation and facilitate the development and implementation of new technologies.

A fundamental element of ITF's role as an internationally recognised champion for facilitating research, development and deployment of technology innovation within the upstream oil and gas industry is to engage with key industry sources. ITF uses a proven process, working in collaborative participation with both its Members and industry to identify technology needs and potential solutions.

**The ITF process**, illustrated below as a step-by-step course of actions, endeavours to bridge the gap between the industry's large global players and development community with the ultimate aim of implementing new technology solutions:

**STEP 1** - Understand and Identify Technology Needs

**STEP 2** - Engage the Development Community / Invite Proposals

**STEP 3** - Evaluate Proposal Submissions

**STEP 4** - Secure Funding

**STEP 5** - Assist the Launch of JIPs

**STEP 6** - Facilitate the Implementation of Technologies

ITF has contractual confidentiality arrangements with all its Members and 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.

Proposals submitted under this Theme will be reviewed for financial sponsorship by **all ITF Members** therefore this is an excellent opportunity to gain a global audience in seeking support for your technology. The focus of all ITF themes is to identify technologies which bring clear benefits to sponsors but which require assistance in **research, development, and / or field trial**.

For details of ITF's full Portfolio of Members, please visit our Website - [www.oil-itf.com](http://www.oil-itf.com)

## ***Technology Challenge Timeline***

The ITF Technology Challenge follows a staged timeline from the initial workshop through to launch of successful projects. The following list of tasks describes the key milestones and their associated date:

- Programme Start: Technology Challenge Workshop    May 2010
- Call for Proposals Issued    Aug 2010
- ***Deadline for Receipt of Proposals***    ***08 Oct 2010***
- Publish to Members for Review    Nov 2010
- Member Review and Voting    Dec 2010
- Technical Clarification Meeting    Jan 2010
- Members finalise commitment to sponsor    Feb 2010

## Process for Submitting a Proposal

### 1. Register Interest with ITF

Register your interest as early as possible by sending an email to Mark Anju at [m.anju@oil-itf.com](mailto:m.anju@oil-itf.com).

### 2. Visit the ITF Website - [www.oil-itf.com](http://www.oil-itf.com)

On the ITF Home page, click on the "How to Submit a Proposal" button or follow [this link](#) to access all the information required to submit a proposal.

### 3. Read the 'Project Application Guidance' Document

This document is available to view or download from the 'ITF Downloads' / 'Proposal Submission' section of the ITF Website. Reading this document prior to submitting a proposal is essential. If you require further clarification or are unsure if your proposal is suitable for submission, please call ITF (Contact Information below).

### 4. Download and Complete the 'Project Application Form'

This form is available to download from the 'ITF Downloads' / 'Proposal Submission' section of the ITF Website.

### 5. Download and Complete the 'Project Presentation Template'

This template is available to download from the 'ITF Downloads' / 'Proposal Submission' section of the ITF Website.

### 6. Email the Completed 'Project Application Form' and 'Project Presentation Template' to ITF

Email the Completed 'Project Application Form' in Microsoft Word format (not PDF) and the 'Project Presentation Template' in Microsoft PowerPoint format (not PDF) to Mark Anju at [m.anju@oil-itf.com](mailto:m.anju@oil-itf.com) by **no later than 8 October 2010**. Proposals received after this date may not be processed.

## Qualifying Technologies

In order to qualify for potential sponsorship, technologies submitted in response to this Call for Proposals must:

- be applicable to at least one of the identified requirements
- be novel or innovative
- demonstrate a clear business case for support
- have a clear and demonstrable path to commercialisation and implementation

**Note:** Proposals submitted to any other ITF Call in the past nine months or any previously unsuccessful applications should not be resubmitted without first consulting ITF (contact information provided later in this document).

## Qualifying Organisations

Proposals are invited from any organisation including SME's, academia, research institutions, large organisations, consortiums or alliances. Proposals may be submitted by a national or international organisation, and equal opportunities will be extended to all proposers. Please keep in mind however that should your proposal be taken forward, you will be required to participate in meetings and make presentations to interested parties in the UK and in the English language (teleconference and video conference are acceptable).

## ITF Contact Information

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:

***Technology challenge manager and primary contact point for this Call:***

**Mark Anju - ITF Technology Analyst**

Email: [m.anju@oil-itf.com](mailto:m.anju@oil-itf.com)

Tel: +44(0)1224 222420

Other members of team available for your support:

**David Liddle - ITF Operations Director**

Email: [d.liddle@oil-itf.com](mailto:d.liddle@oil-itf.com)

Tel: +44(0)1224 222413

**Keith Mackie - ITF Technology Analyst**

Email: [k.mackie@oil-itf.com](mailto:k.mackie@oil-itf.com)

Tel: +44(0)1224 222418

**Colin Sanderson – ITF Technology Analyst**

Email: [c.sanderson@oil-itf.com](mailto:c.sanderson@oil-itf.com)

Tel: +44(0)1224 222416

**Cristina Puig – ITF Technology Analyst**

Email: [c.puig@oil-itf.com](mailto:c.puig@oil-itf.com)

Tel: +44(0)1224 222415

**Contact Address for all of the above:**

ITF

The Enterprise Centre

Exploration Drive

Bridge of Don

Aberdeen

UK

AB23 8GX

Tel: +44 (0)1224 222410 (Switchboard)

For more information on ITF please visit the ITF Website - [www.oil-itf.com](http://www.oil-itf.com)