Downhole Well testing tools
ISO Standard

Led by David McCalvin,
Consultant
David McCalvin, Consultant

Background

- Experienced in well completion tools
  - 16+ years with service companies
  - 16+ Yrs Oil Company
  - API/ISO standards participation throughout

  Current standards participation
  - Member of ISO TC 67/SC4 WG4 steering committee
    - 14 active stds / 7 under development/revision
  - Lead on ISO/API Barrier valve standard
  - ISO liaison to 15551 (ESP systems), 15136-1-2-3 (PCP products)
  - Active participant to ISO 10432 (safety valves), WG4 Authoring guidelines
ISO Standard Discussion

• **Why start with an ISO standard structure?**
  – Recognized worldwide as the technical source
  – Referenced by many national standards regulators
  – Instant creditability when approvals are complete
  – Structure of the standard is pre-determined and much of the required text is available (directives and guidelines)
  – Global input and approvals facilitate wide use
  – Periodic reviews/refinements are required
  – Final approvals are one country one vote
  – Often adopted/followed by API, Norsok, international operators etc
Downhole Well Testing Tools
ISO standard motivations

- **Governments are seeking standards for pressure retaining tools**
  - Active team of industry experts can bring the most practical, safest, set of requirements within the ISO structure, rather than multiple new national versions
  - Multiple standards raise costs and technical challenges of familiarity and personnel training
  - Unified terminology and evaluation methods add to effectiveness of applications and design validations

- Contributions from **Operators and Suppliers**
Downhole Well Testing Tools
ISO standard development process

• **New Work Item Prep** (complete)
  – Requires 5 countries participation, a leader and an outline of contents; 6 mo.+

• **New Work Item** (approved 30-Aug-2011)
  – Task group leader officially has the task of authoring the standard; 1yr+

• **Committee Draft** (in process)
  – Provided to WG for review prior to sending for formal comments; 8 mo. +

• **Draft International Std** (comments/vote)
  – Revised with comment responses etc; 6 mo.+

• **Final Draft Int. Std** (revised per comments)
  – One country one vote, minor comments action not required et al; 6 mo.+

• **International Std** (after ISO, editing/legal etc)
Downhole Well Testing Tools
ISO task group

• **General Operating Guidelines**
  – Attendees/contributors are required to be peer accepted, global industry experts that are dedicated consistent to see the standard to completion
  – A balance of suppliers and operators, one key contributor each (supporting members welcome where required)
  – Hold meetings at members facilities every two months for a minimum of two full days
  – All decisions are by consensus of the attendees, the absence of sustained opposition is “consensus”
  – Seek to cover 85/90% of the products defined, while allowing technology evolutions
  – A keeper of the document and minute recorder will be appointed for accurate record keeping
Downhole Well Testing Tools
ISO standard; preliminary “Scope”

This International Standard provides the requirements for downhole well test tools as they are defined herein for use in the petroleum and natural gas industries. Included are the requirements for

- design
- design validation
- manufacturing
- functional evaluation
- repair
- redress
- handling
- storage

Tools utilized in Downhole Well Test operations include:

- tester valves,
- circulating valves
- packers
- safety joint
- jars
- samplers
- gauge carriers
- gauges
- ancillary tools
Downhole Well Testing Tools
ISO standard; preliminary “Scope”

Definition used for a downhole well test:

“A downhole well test is a temporary completion of a well to safely acquire dynamic rate through time, formation pressure and formation fluid data.”

This document covers the downhole tools used to perform the drawdown or injection and buildup or falloff of the formation and measurement of the pressures.
Downhole Well Testing Tools
ISO standard; preliminary “Scope”

This International Standard does not cover the operational job procedures or planning requirements of the surface equipment, the subsea safety equipment, perforating equipment and processes, pup joints and couplings, tubulars or work string, conveyance or intervention systems, installation, control systems such as computer systems. Also not included are products covered under ISO 10432 and ISO 10423.
Downhole Well Testing Tools
ISO standard; preliminary “Outline”

- 2. Normative References
- 3. Terms and Definitions
- 4. Symbols and Abbreviations
- 5. Functional Specification
  - 5.1 Functional requirements
    - 5.1.1 Functional characteristics
    - 5.1.2 Well parameters
    - 5.1.3 Operational parameters
    - 5.1.4 Performance envelope
    - 5.1.5 Environmental compatibility
    - 5.1.6 Compatibility with related well equipment
  - 5.2 Product types
  - 5.3 Design validation grades
  - 5.4 Quality grades
- 6. Technical Specification
  - 6.1 Technical characteristics
  - 6.2 Design criteria
    - 6.2.1 General
    - 6.2.2 Design requirements
  - 6.3 Materials
    - 6.3.1 General
    - 6.3.2 Metals
    - 6.3.3 Non-metals
  - 6.4 Performance envelopes
  - 6.5 Design documentation
  - 6.6 Design verification
  - 6.7 Design validation
    - 6.7.1 General
    - 6.7.2 Manufacturer requirements
    - 6.7.3 Special feature validations
  - 6.8 Design changes
    - 6.8.1 General
    - 6.8.2 Requirements and limits
    - 6.8.3 De-rating limits
  - 6.9 Functional evaluations
Downhole Well Testing Tools
ISO standard; preliminary “Outline”

7. Supplier/manufacturer requirements
   - 7.1 General
   - 7.2 Documentation
     - 7.2.1 General
     - 7.2.2 Supplied documentation
   - 7.3 Product identification
   - 7.4 Quality requirements
   - 7.5 Material
     - 7.5.1 General
     - 7.5.2 Material specification requirements
     - 7.5.3 Material documentation
   - 7.6 Additional processes
     - 7.6.1 General
   - 7.7 Traceability
     - 7.7.1 Heat lot traceability
     - 7.7.2 Job lot traceability
     - 7.7.3 Serialization
   - 7.8 Quality controls
     - 7.8.1 General
     - 7.8.2 Non-destructive examinations (NDE)
     - 7.8.3 Component dimensional inspection
     - 7.8.4 Thread inspection
     - 7.8.5 Visual surface defect inspection(s)
   - 7.9 Shear device evaluation
   - 7.10 Assembly and functional test
   - 7.11 Manufacturing non-conformities
   - 8. Storage/shipping/handling, repair/redress

Annexes

A. Design validation grade requirements
B. Functional verification grade requirements
C. Field inspection/repairs/redress/quality requirements
D. Requirements for safety joints/gauge carriers/ jars/ slip joints
E. Requirements for tester valves/circulation valves/ tubing string testers
F. Requirements for Sample containers
G. Requirements for gauges/telemetry/electronic measurements and/or control devices
H. Operational recommendations (Informative)
Downhole Well Testing Tools
ISO standard; Action Plan

1. Complete the content of the NWI
2. **NWI request for approval** 22 May 2011 in Stavanger, approved 30-Aug-2011
3. Task group membership assembled
4. Plan one year of meetings with dates and locations
5. At the first “official“ meeting decide on the “scope” and general content (complete)
6. Coordinate with related ISO/API teams to reduce overlaps in coverage and efforts
7. Keep the meetings fun and productive, helping the global industry
ISO/TC 67 statements

**Mission:**
To create value-added standards for the oil and natural gas industry

**Vision:**
Global standards used locally worldwide

**Goals:**
- Prepare standards required by this industry
- Prepare standards that could be adopted worldwide by bodies such as ABNT (Brazil), API (USA), CEN (Europe), GOST R (Russian Federation), GSO (Gulf Region) and SAC (China)
- Prepare standards that are recognized by regulators
- Publish standards that enable companies to minimize their specifications
- Deliver standards to the target dates on the agreed work programme