Survey QAQC Sub-Committee Update

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October 3rd, 2019

Speaker Bio

- Phil HARBIDGE - PathControl, General Manager
- Based in Kuala Lumpur, MALAYSIA
  - MSc. Petroleum Geochemistry, Uni Newcastle Upon Tyne
  - BSc. Geology and Applied Geology Uni Glasgow, UK
- 19 years Active Industry Wellbore Positioning Experience
- Relief & Intercept Well Ranging Interpretation, Wellplacement, Collision Avoidance, Risk Assessment, Well QAQC & Optimization
- SPE, Wellbore Positioning - ISCWSA Webmaster, QAQC Sub-committee Chair,
  - Worked :
  - Civil Engineer Practice, Offshore Marine Surveyor
  - Halliburton, Baker Hughes and Schlumberger Service Companies

Survey QAQC Sub-Committee

SURVEY QA/QC SUB-COMMITTEE

Mission

To define practices that promote the task of defining the required data which may be used to validate and potentially enhance a wellbore's position and uncertainty.

About

This sub-committee has taken on a project to optimize and issue a cut-down performance-based set of three documents:

- Gyro QA/QC
- MWD QA/QC
- Along Hole Depth QA/QC

The second project scope is "Define and Communicate the Essential Data Required to Verify and Potentially Enhance a Wellbore."

Over ten years ago, the QA/QC Sub-Committee published two SPE Papers on survey quality control procedures that are required to ensure a valid error model is applied to the survey data.

SPE 103734 is on 'Internal' survey quality checks and was presented at the IADC/SPE Asia Pacific Drilling Technology Conference, Bangkok in November 2006.

SPE 105558 is on 'External' survey quality checks and was presented at the SPE/IADC Drilling Conference and Exhibition, Amsterdam in February 2007.

Survey QAQC Sub-Committee
API RP78 Project

- Depth
- Gyro
- MWD

Survey QAQC E-Book

- Depth
- Gyro
- MWD
- Survey QAQC Checklist

Survey QAQC Sub-Committee Recap

- *Reviewed and finalized Gyro QA/QC document ready for review by API body*
- *Reviewed and finalized Along Hole Depth Docs*
- *Held Conference Call Meetings in 2019 to finalize MWD QA/QC, Depth Docs*

- *Review API RP78 cut down document feedback – Three Conference Call meetings 8 Hours MWD, Depth*

Survey QAQC Sub-Committee Ongoing Scope

- *Next SC meeting TBC Mar 2020*
- *Technical writer to format and issue final version of three documents, (ISCWSA funded project) – ISCWSA COMMITTEE to Vote at next ISCWSA main meeting*
- *Review Full uncut three documents and compile them into a single WBPTS E-Book* ***Depth – MWD & Gyro QAQC***

Survey QAQC Meeting Agenda

- 13:00 – 13:15 Introductions and Recap
  - Recap Time line to delivery
  - Team member diversity Operator, DD/ MWD & R&M Service Providers
- 13:15 – 16:30 work session A
  - #1 Depth
  - #2 Gyro
  - #3 MWD
- 16:30 – 17:00 Summary, Assign Tasks and Wrap-up

Survey QAQC Meeting Update

Along-hole Depth QA-QC

Qualifying statement :
The consumer and service provider shall have an agreed Standard Operating Procedure, (SOP) which defines data delivery specifications and operational responsibilities. Along hole depth data, including equipment and system calibration data shall be documented, auditable and traceable. The depth SOP shall include contingencies where out of specification depth is reported.

1. Error Model

Along-hole depth data shall include a measurement error requirements statement provided by the depth data supplier in accordance with the reported Error Model.

2. Depth Measurement References

Along-hole depth measurements shall be referenced to a common geodetic reference datum that is identifiable to all users of depth measurement during well construction and thereafter. The depth measurement well reference point datum shall be surveyed to provide an elevation measurement relative to the field datum.

2.1. Geodetic Reference Da

API RP78 MWD QA/QC

1. Error Model
   - 1.1. Magnetic survey tools and measurements shall be associated with an error model based on sensor performance, tool alignment, magnetic interference, local geomagnetic, gravity fields, and depth accuracy.
   - 1.2. Minimum pass/fail criteria (limits) for Calibration, Verification, and/or QA/QC tests shall be linked to the survey error model.
   - 1.3. Survey reports shall specify the error model attached to the survey data.
2. Instrument Calibration
   - 2.1. Magnetic calibrations shall be performed in a magnetically stable and controlled environment
   - 2.2. Magnetic calibrations shall be followed by acceptance tests as described below
   - 2.3. Calibration temperature stations shall be sufficient to ensure instrument sensor performance over the expected operating temperature range, refer to 2.4 below

NOTE IN MINUTES SURVEY QAQC Andy McGregor to Advise

API RP-78 Gyroscopic Data QA/QC

Refer to Survey QA/QC Subcommittee E-Book for details.

1 Calibration acceptance
Calibration QC results and limits shall be explicitly stated in the calibration report and shall be in accordance to the error model at appropriate confidence level. It should specify the temperature range and the tool modes.

2 Verification at the service base
At an interval relevant to the instrument type, the survey instrument shall be tested at the service base for the operation modes expected to be used in the field. The tolerances on the test shall be according to the error model.

3 Surface test at wellsite
The survey instrument shall be tested at the wellsite on the operation modes expected to be used in the field. The tolerances on the test shall be according to the error model.

4 Overlapping checkshots at start/end of each tool run – Applicable to all survey tools
Each time a new survey log is started, overlapping surveys to previous survey logs should be acquired to verify survey agreement to the expectation of the specified error models.

5 Rotation check shots - Applicable to all survey tools
A set of rotation shots should be collected at least once per section.

6. Survey Practices - Applicable to all survey tools
Each survey tool shall have a standard operating procedure which ensures compliance with the requirements of the tool error model. The survey tool shall be run in accordance with this standard operation procedure.

7 Internal Gyro QC
Internal functioning of the tool and noise levels shall be verified at each gyrocompass station.

Survey QAQC Objectives Project#2

- Remaining Tasks
  - Group MWD QAQC Conf. Calls Q4 2019 - Q1 2020
  - Compile three API RP 78, (60, 34, 35) page docs plus QAQC check list into a new e-book format for publishing on SPE ISCWSA website
  - Assess ability to tackle remaining 11 API RP 78 docs for formatting
- ISCWSA51 to combine Scope of CA & EM and Survey QAQC SC

Conclusion