Survey QAQC Activity Report

Phil Harbidge

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- MultiStation Analysis **Pit Falls presentation Marianne Houbiers**
- MultiStation Analysis workshop **- MWD magnetic survey data in the MSA instability zone or SC no go zone**
- Wired Pipe **whats next for Advanced Wellbore Positioning QAQC**
- Mike Calkins **- Chi squared test and implementation 10 minute update**
- **Minimum directional survey data set needed to quality control and quality assure**
- Roll out of new **ISCWSA Rev 5.0 / 5.1* PUMs are we keeping with with QAQC**
- Roll out of new **ISCWSA Collision Avoidance Rules QAQC**
- **Further project suggestions from the group**
- **Wrap up - actions**

MultiStation Analysis workshop more

- Marriane - slides, discussion Add actions to improve planning process
  - Mud OBM vs WBM
  - Flow On vs Flow Off
  - multistation analysis stability
  - Drill String interference
  - SC no go zone
  - How to use the analysis to build a better QC survey program data integrity envelope
  - Implement envelope for CA, TS, Geosteering and combine with all position mitigation program activities.
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more

- Industry DI Calculator - combine with Az error Calculator - multistation analysis stability Calculator for SF XY & dbl correction - this being case specific for Magnetic Dipe, Bte, survey Interval, Geomagnetic field BGGM / IFR1 / IFR2 AND ZOE RSS MTF AND SC No Go Zone.
- With another empty tab suggesting BHA Sag correction per station
- The process includes assumptions in the BHA loadout DI / nm spacing / mud interference likelyhood / mode of survey / ability to correct for known contributing uncertainties
- Record of the plan and actual Uncertainties planned for vs actual (dvs, SF CY, geomag ref, tool reliability BG miss, Ref Geomag Gravity Ref and always capturing into the lessons learnt with a range of available actions and how effective they were.

more

- Risk Assess and Practicality Review of available technology and support structure.

- Options to reduce uncertainty
- Options to improve uncertainty manipulating the data acquisition for each part of the survey program
- Execution Phase
  - Implement the hand over protocol
- Define and manage by standardisation of WRP / Tie on / Survey plan / Execute after implementing uncertainty reducing protocol
  - Testing at each survey program part

Wired Pipe Deployment what's new?

- Wired Pipe Uncorking the bottle - unleashing data into the surface system - what's new ??

- Higher volume data , data redundancy
- Cherry picking vs intelligent filtering
- Ability to drill with Physical Twin less reliance on Digital Twin
- Challenges
- increased volume - higher load on processing data management system
- StarLink sattelite comms to town - exposure to down time black out events

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Wired Pipe Uncorking the bottle - unleashing data into the surface system - what's new ??

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Challenges

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- StarLink satellite comms to town - exposure to down time black out events, more??

Wired Pipe Deployment

New access to Rotational 6 axis survey while drilling

continuous surveys & multi sensor raw data

- 1, 2, 5, 10, 15, vs old 30/ 38 / 40 m drilling stand stationary data.
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- Geosteering decisions with real time tortuosity measurements
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- Engineering decisions steering, WOB Vibration, and Optimization using real-time higher def input data to optimise earlier while drilling, for next phases of the well construction process.
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Wired Pipe Deployment

- Depth model now becomes Depth actual for pressure, temp, ballooning, stretching from the ASM along string measurements. Improving the waypoint methodology capability In the real time adding ability to meet and exceed the required specified uncertainty for targeted attributes of the well. Key marker fmn, pre reservoir, top, mid and bottom of pay zone, other zones of interest

Wired Pipe Deployment

- ALL GEO WELLBORE POSITION AND ENGINNERING DATA AT SCALE (PHYSICAL TWIN)
- STATEMENT "Improved reliability leads to optimization improved safety and efficiency / reduced cost / maximized learning while drilling.
- Questions & Answers from audience.

Wired Pipe Deployment

Agenda I a.

- RED highlights are inconsistent with the rest of the API terminology. Basically we are correct and API other chapters are inconsistent with our documentation

- 1hr MWD Chapter review – Morten G

  a. Recap on SHALL / SHOULD / MUST / MAY comments for including in our E-Book
  b. MWD (& Gyro) pre run setup data examples (4 different company documents) Compile a list of example diagrams and forms for the major service companies to share
  c. QC data template examples
  d. Survey sensor Calibration data content examples
  e. Survey tool calibration report example

- 1hr Gyro chapter review – Barry S

  a. QC data template examples
  b. Survey sensor Calibration data content examples
  c. Survey tool calibration report example
  d. More..

Agenda II

- 1a. **Add introductions to each chapter**
- Use existing intros content in API document, condense/re-word for eBook DRAFT version Phil and Gary made a while ago :
- *"The intention is for this document to form an operationally focused guidance document to help users achieve minimum industry recommended practice requirements.*
- *This is a non commercial document, which has been written in response to industry needs and has been authored by members of the Industry Steering Committee on Wellbore Survey Accuracy – Quality Control and Quality Assurance Sub-Committee and is a public access document. Please contact ISCWSA Education Committee Chair Mahmoud ElGizawy for suggested changes or additions to this document. "*

Agenda III

- ***State the intended audience :***
    a. *Survey sensor and calibration facility manufacturers*
    b. *Survey data service providers and data users*
    c. *Oil, gas and water operating companies*
    d. *Government authority employees*
    e. *Education bodies*
- “
- 1b. **Assess the "must" statements in the documentation (see attached)**
    - "Must" statements not conducive for educational material for general audience, so change out the “Must” and “Shall” statements to “should” and “may”
- 1c. **Turn DSR document into e-Book content**

Agenda IV

- 1d. **Peer-review documents for eBook audience/intent (currently written for API)**
- See files the 4 attached, named after the team who last edited prior to writing the API RP-78 docs. These docs have been submitted to the API team and are in progress.
- The objective of in-person meetings is to review/edit these documents for an e-Book audience. Once these documents are edited/peer-reviewed, they will be passed along to the Education subcommittee to be converted into a “Manula” e-Book. After they are on Manula, further editing would take place (trimming of content, addition of graphics, etc.) before public release.
- **Phil Harbidge will run the in person QAQC Subcommittee meetings 2nd April 25 and bi monthly meetings 45minutes, contact details : phil.harbidge@halliburton.com**

Ongoing Meetings

- Monthly Online – TEAMS meetings
- 5 meetings before October 2023 ISCWSA 58

Thanks to

Manufacturer & Calibration Experts: BenchTree, Scientific Drilling, Halliburton, Gyrodata, Schlumberger, Baker Hughes, Weatherford and JAE, ICE FIELD TOOLS

Operator Experts: Chevron, Oxy, ConocoPhillips, BP, Devon Energy, ExxonMobil, Shell, TotalEnergies, Aker BP

Service Company Experts: Baker Hughes, Halliburton, Depth Solutions, Schlumberger, Weatherford, Gyrodata, Scientific Drilling, Mostar Drilling, SuperiorQC, Independent Consultants, EOG Resources, PathControl, Pacesetter Directional ….

Drilling Data Quality and Uncertainty Description Subcommittee Activity Report

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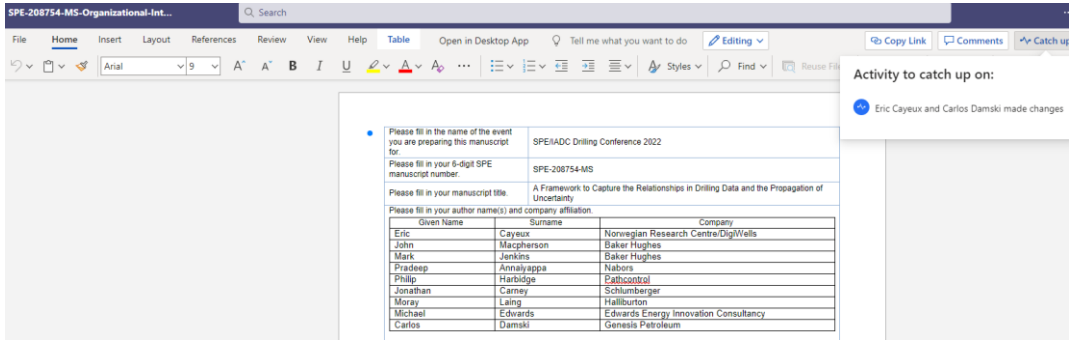
SPE Affiliated “DDQUD” - (DSATS - DUPTS - WPTS Subcommittees)

- Standardize the Industry
  - Drilling Data Quality
  - Drilling Data Uncertainty
- Published Free to Public Paper SPE-208754-MS Peer Reviewed
- Publish use cases DSABOK & SPE Paper use cases worked up into Semantic Graph and Data Lake

Paper presented at SPE/IADC Drilling Conference 2022

SPE-208754-MS



Drilling oil and gas wells is a complex process involving many disciplines and stakeholders. This process occurs in a context where some pieces of information are unknown, or are often incomplete, erroneous or at least uncertain. Yet, during drilling engineering and construction of a well, drilling data quality and uncertainty are barely addressed in an auditable and scientific way. Currently, there are few or no placeholders in engineering and operational databases to document uncertainty and its propagation.

USER STORIES // DATA MODELS FRAMEWORK // SEMANTIC NETWORK // DATA LAKE // UNCERTAINTY PROPAGATION INFLUENCE DIAGRAMS and GRAPH THEORY





Questions?