ISCWSA 61st – Stavanger, Norway

Introduction – Hans Dreisig

Safety Intro – Equinor Staff

Program Agenda – Andy McGregor

Technical Presentation – David Erdos – Redefining Well Intercepts, Field Test Results of a New Rotating Magnet Ranging While Drilling Tool

Field test results from a geothermal well are presented comparing wireline ranging measurements to measurements from a new ranging while drilling tool validating the performance of the ranging while drilling tool at distances of 60 meters of separation. A rotating magnet was located in a secondary wellbore and a sensor and processing unit were connected to the MWD located in the primary wellbore, the ranging results were computed downhole, and the results were telemetered to surface over mud pulse telemetry. An overview of the tool design and challenges involved are presented along with the field test results.

- Question – Ed Stockhausen – Since you have surveys in both wells, once you intercept can you back correct surveys to both wells after? Essentially, let's say you had certain survey errors in one well and different survey errors in a different well, once they converge at intercept what can we learn?
    - Answer – Erdos, the problem is somewhat binary, you either intercept or you don't. You could back calculate what the error sources were and could theoretically close the loop on the survey error sources and corrections.
    - Follow Up – Georgy Rassadkin – algorithmically processing the data, there is no requirement to correct the surveys past the ranging results of a confirmed intercept. Quite often in a two vertical well intercept, just a bulk correction to one set of surveys is enough when compared to the ranging results. However, when we look at horizontal intercepts, we have integrated survey corrections into the ranging results. This allows us to provide corrections to the either the target or relief well or both in combination to the ranging data to improve the result of position uncertainty.
- Question – Adrian Ledroz – Can you elaborate on the downhole computations, instead of sending the raw data you are sending computed data from downhole?
    - Answer – Erdos, we sample the sensors over 100 samples per second for several thousand samples and then we compute Frequency Domain Analysis, effectively perform a FFT, Amplitude and Phase analysis, and the output of the computation is telemetered to surface.
- Question – Phil Harbidge – in the Northern Hemisphere, can you run IIFR or IFR with the surface automatically?
    - Answer – Erdos, I suppose you could, but the benefit of ranging is that you don't have to rely on dead reckoning, you can actually calculate a distance and direction to a nearby wellbore.
    - Follow Up – Harbidge, I suppose the SNR is probably much greater than the interference you have?

- Answer – Erdos, Typical interference is DC, AC ranging shots makes this negligible as you can know understand the direction of this signal.
- Follow Up – Harbidge, In Norway we will have an increase in Geothermal wells, are you ready for that?
- Answer – Erdos, Yes

Sub Committee Update – Phil Harbidge – QAQC

- Need examples for testing survey corrections, synthetic wellbore positions that are corrupted with known survey error and then tested in correction software to show how much of the errors can be removed.
- Wired pipe in Norway will be the normal rather than the exception for drilling in the near future.
- eBook needs to be published, need help from the DE's from Operators (volunteers)
    - Depth, Gyro, MWD, and sub chapters – with technical writing still need to be compiled.
- Redundant backups for the body of work (files, presentations, etc.) for the website. SharePoint through SPE? We need to find a way to ensure the storage of all of our documents is not lost.
- Gravity Reference Model is not well defined in current EM revs, there is on going work in this space.
- Webmaster Update slide and stats.
- Train the trainers initiative.
- ISCWSA website metrics, live demo.
- Need to work on the Search Engine Optimization (SEO) for the key words or tag words for document searches on the ISCWSA website, currently the results returned from a query are sub-par.
- 2,043 Members in SPE WPTS currently
    - No Questions.

Technical Presentation – Makito Katayama – Downhole RSS Calibration, Downhole automatic calibration of rotary steerable system for real-time precision surveying

Traditionally, when using an RSS, the Measurement While Drilling (MWD) tool is installed above. This handles the necessary surveying and communication with the surface for trajectory control. SLB has developed a new RSS concept. By incorporating Mud Pulse and Telemetry directly into the RSS itself, this new system enables surveying, communication, and steering solely with a single tool, allowing for a very compact solution to be deployed. One of the key technical enablers within this system is the surveying capability. Since the RSS contains a relatively complex mechano-electric system, it needs to provide measurements in harsh magnetic and vibrational environments. For example, when powering on the RSS, the mud pumps are running this drives the mud motor which rotates the RSS. Because of this, there are significant vibrations from the rotating pipe, and magnetic distortions caused by eddy currents in the conductive pipe, as well as measurement biases from various magnetic emitting devices, which need to be considered. These factors make it challenging to achieve sufficient measurement accuracy for surveying. SLB has developed a new algorithm. This algorithm required to model each physical phenomenon with the combination of physical models, and solution was provided by the combination of

Kalman filter and nonlinear optimizations to achieve maximum performance with minimal computational cost. By incorporating this algorithm into the RSS itself, it is possible to analyze and correct the complex and abundant measurement noise observed underground in real-time, without having to send it to the surface for processing. The telemetry system can then deliver an accurate survey to the surface. The survey performance has been evaluated through field tests around the world, in. The surveying results from nine field tests have proven to satisfy the survey performance defined by MWD Revision 5 error model by comparing them with Drop Gyro's and other MWD tools.

- Question – Hansen, what about the massive amount of interference when you take a survey near the bit, could you explain how you are suppressing the interference coming from the bit.
    - Answer – Katayama, from a sensor measurement point of view observability is low to distinguish where the interference is coming from (bit or other parts of BHA). Basically, the compensation is to the error terms we can observe from downhole.
    - Follow up – Hansen, so you are basically using the same analytical coefficient for everything?
    - Answer – Katayama, yes.
- Question – Ed Stockhausen, From a quality control view can the MWD understand the potential problems and what to look for, and additionally what about the exclusion zone (drilling near magnetic East/West).
    - Answer – Katayama, need to take additional steps for estimation. Comparative analysis, downhole computed, and some steps have to be taken from changes in parameters to increase observability into error terms.
    - Follow up – Stockhausen, what about memory data?
    - Answer – Katayama, Yes, it's possible but for this presentation we focused on real time data.

Sub Committee Update – Mahmoud ElGizawy – Education (Carol Mann sitting in for Mahmoud)

- Mission statement reminder
- Webinar and SPE Live planned for 2025 (one each)
    - July 14th and Nov 5th are the planned dates.
    - Need more ideas submitted for topics in these sessions.
- Jonathan Lightfoot's distinguished lecturer tour is wrapping up soon Adrian Ledroz is next up for us.
- Hits and Misses workshops will be rebranded to "Hitting Targets and Avoiding Hazards"
    - This will be ready in about a year or so, and we will look for some one day workshops for further discussion.
- Scholarship proposal for ISCWSA course is being reviewed for future students.
- Young professional outreach needs to continue, please engage the younger community.
- Large updates have been made to the eBook for Wellbore Positioning, please share this information amongst your groups and peers.
- Course Update has had 141 graduates to date so far.
- Recognitions and Awards, Hall of Fame page is now live in the Education SC page. Eventually it will be separated out on its own page.

- WPTS Directional Drilling Competition, kicks off on April 1st and cash prizes will be offered for the top three finishers.
- Petro Bowl Competition, anyone can submit wellbore positioning questions.
    - No Questions.

Coffee Break – Resume at 10:20

Technical Presentation – Marianne Houbiers – Pitfalls in survey QAQC

In this presentation I want to show an example of a recent MWD directional survey run where it was discovered too late that there was an issue with magnetic interference, resulting in a lateral shift of the wellbore. Only at the end of the run, single-survey FACs were starting to fail the acceptance limits. The well was not horizontal east-west. Subsequently, it turned out that the previous run also had issues. Could one have discovered this earlier?

- Question – Angus Jamieson, I think that we have known for a while that relying just on FAC is a potential hiding big problems. Running a Rotational Shot in situations where you don't have enough variation in attitude may not actually help. It will take out some of the uncertainties on X and Y, the reason that the Bz bias is lost as you know is that it is maybe hundreds of nT but it is in a field that is tens of thousands of nT, it is difficult to observe (when calculating BTotal because with RSS, Bx and By are dominate). The main issue with the rotational shot is that the Z value is not varying, and so it can still be lost in the calculation. The one thing that we can do is run a simulation before we take any observation and help determine areas of sensitivity. Something some companies are doing is running MSA with the inclusion of the background field magnetic information, along with an uncertainty component (sensitivity analysis). Then you could run MSA with the extremities on the uncertainty in the background field and then create from that an inherited uncertainty on your final correction and that could really draw attention to the bad geometry (predicted where Z axis is smaller) and so drilling south on an inclination equal to the dip angle you are still at 90 degrees to the earth field and Z axis will be small and a large bias will be lost in the sum of the squares.
    - Answer – Houbiers, agreed that we need a standard practice.
    - Follow Up – Yes, even better though would be for us not to use FAC but to run an analysis on the geometry that you expect to measure.
    - Follow Up – Andy McGregor, well plans allowed with some azimuthal change to increase the observability is not common but could be beneficial.
- Question – Brett Van Steenwyk, what was the transition from Run1 to Run2
    - Answer – Houbiers, 6 days in between runs, maybe some small changes to the BHA, and some due to a magnetic storm (Solar).
    - Follow Up – Van Steenwyk, sometimes when you get some of these results if we look at a simpler example, say accelerometer values. If you have a shift in scale factors with respect to a shift in the total gravity value, what you call the physical process is up to you I suppose but gets to the same result.

    - Answer – Houbiers, we included the gravity vector into the MSA and it didn't change much
- Question – Marc Willerth, the combined vector magnitude of the QC and another thing that is good for the QC is looking at the direction of error vector in that space. It is something that could help improve, another one is in a search of good tolerances, trying to find and looking for a change in the QC, you can't solve all of these problems with just FAC, but looking for the changes in FAC if most of these error terms we believe are systematic.
- Question – Georgy Rassadkin, E/W Horizontal wells FAC not useful, the entire error may be hard to spot, how often do you run into an exclusion zone issue where you can't run MSA?
    - Answer – We don't avoid E/W, but add a Gyro when necessary.

Technical Presentation – Aril Sassen, Benny Poedjono – Cleaning Drilling Fluids for Magnetic Debris and its Consequence for Surveying

Magnetic debris in a drilling fluid have a significant influence on the ability of the drilling fluid to maintain its function. Down hole logging can suffer from poor signal to noise ratios. Directional drilling in areas close to the magnetic North Pole, such as in the Barents Sea, Northern Canada, or Russia, can suffer because of magnetic contamination in the drilling fluid. Magnetic particles in the drilling fluid introduce additional errors to the magnetic surveying compared to those normally included in the ellipsoid of uncertainty calculation. On many offshore drilling rigs, there are mounted ditch magnets to remove metallic swarf from the drilling fluid. These magnets are normally inefficient in removing magnetic fines. In the presentation, we show how a combination of strong rod magnets and flow directors significantly improve the performance of the ditch magnets. This combination, together with proper routines for cleaning the ditch magnets clean the drilling fluid to an acceptable level. By the combined use of flow directors and such ditch magnets more than five times as much magnetic contamination from the drilling fluid as normal compared with other proper ditch magnet systems. In the presentation, it is shown how the accuracy of directional drilling and well position was improved on the North Sea Ivar Aasen field (https : // doi . org /10.1115/1.4049290). The drilling fluid was cleaned using the improved drilling fluid cleaning process.

- Question – Phil Harbidge, relevancy for ERD wells (exclusion zone) offset wells, offset targets, hazards, etc. This can affect the outcome of where the well is placed if you don't manage it.
    - Answer – Poedjono, that is a good observation, proper planning stage for the mud, cleaning (ditch magnet) which should be an integral part of the drilling rig. In US Land we see ConocoPhillips taking this stance, typically it is not part of the rig it is an add on that must be considered.
    - Follow Up – Harbidge, The Barite additive, what data is there to ascertain the magnetic composition and weighting. How can you relate that to when you are drilling.
    - Answer – Poedjono, lab testing only confirms the particle concentration, need to understand the supplier. Typically, there is two sources of Barite providers one in Malaysia and one in Viet Nam. Viet Nam is typically not as controlled.
- Question – Hans Dreisig, is there a standard for testing of the magnetic mud?

        - Answer – Saasen, it is straightforward to test controlled mud, as soon as we test contaminated mud some of the results are impossible and these are the findings of this project.
    - Question – Robert Wylie, it is not impossible for testing, relative permeability of wet mud samples has some projects that have been studied, specifically when we look at Barite magnetic particles or other, Hematite materials back in the 80's were used for a mud weighting additive which is a huge potential problem.
        - A – Poedjono, Barite and Hematite are typically sourced from the same site and inadvertently mixed.

Administration Report – David Gibson – Membership Update (none)

Administration Report – OWSG Update – Matt Weber

- Operational Wellbore Survey Group is the new name of the OWSG
- API/RP 78 is sent out for ballot now, please review this if you need to.
    - Question – Phil Harbidge, some of the chapters MWD, Gyro, Drilling Survey Record moved to the Appendix? It should remain in the main body of the document.
        - Answer – Andy McGregor, unknown, there is a difference in the practice part of what you should do versus the theory part and the supporting educational material, and risks associated with doing or not doing something that is recommended.
    - Question – Koen Noy, when is the deadline for the ballot?
        - Follow Up – Wylie, is the 29th of March
        - Follow Up – Carol Mann, review is original contributors or invited participants.
    - Follow Up – Wylie, Reach out to Lightfoot, he is coordinating with the API as our technical lead.

Technical Presentation – Guanren Wang – Overview of the largest geomagnetic storm in the last 20 years.

On the 10th of May 2024 the largest geomagnetic storm since October 2003 occurred. Lasting over 24 hours, the storm exceeded the highest level of G5 – on an internationally recognized global storm scale - several times within the period. The aurora – usually visible in high latitude locations - were observed at much lower latitudes. Huge deviations in magnetic Declination were recorded at high, mid and even low latitudes. Numerous reports of effects on communications and GNSS positional accuracy were made (up to 60 m in Canada). In Alaska, compass variation of over 12° were observed, while in central North Sea areas swings on the order of 5° occurred over the course of a few hours. These have strong implications for the quality and accuracy of MWD surveys in operational directional drilling. In this talk, we give an overview of the May 2024 storm. We review international efforts in forecasting the event as well as the magnetic field recordings at INTERMAGNET observatories and discuss possible impact on ISCWSA IFR uncertainties and drilling operations.

- Question – Makito Katayama, from a scientific explanation of the field vs storm interaction and variation could you explain in more detail?
    - Answer – Wang, The energy extends from higher latitudes to lower latitudes, and the fact that the geomagnetic field changes in time and spatially and when you add this external factor to it like a G5 solar storm, you witness perturbations to local field variations, which is the main point of the presentation.
- Question – Phil Harbidge, observatories across the latitudes, is it an instantaneous storm across the systems, are we missing anything across the uncertainty models (IFR1, IFR2)?
    - Answer – Wang, purpose of the talk even at lower latitudes, we are expecting more storms in the future (1.5 years) using IFR2 even at lower latitudes could be advantageous.
    - Follow Up – Harbidge, what error sources would we understand better with more data?
    - Answer – Wang, these are complex current systems, declination would be improved even at lower latitudes using IIFR (IFR2) from observatories during survey corrections.
    - Follow Up – Andy McGregor, the EM assumes a random time varying variable component.
- Q – Phil Harbidge, for the Operators, is it worth to take the NPT to wait on the storm vs continuing the drilling and delivering a bad result on well placement?
    - Answer – Wang, may be more cost effective to run IIFR during the storm active days.
    - Follow Up – Poedjono, is the storm critical, keep drilling and retake surveys after the storm if possible.
    - Follow Up – Ledroz, with GWD you can continue drilling and avoid the NPT.

Technical Presentation – Tyler Milford – Well Intercept for CCUS Well Applications

Missing the abstract for the presentation material

- No questions

Lunch Break – Resume at 13:30

Angus Jamieson – Wellbore Survey Quiz

- Answers to the Quiz
  - Anagram Round
    - Erdos Miller
    - Shell International
    - Weatherford
    - Helmerich and Payne
    - Conoco Phillips
  - Gyro Rotor
    - North
  - Declination Question
    - 48 Degrees
  - Previous Meetings
    - Florence
    - Dubai
    - Paris
    - Denver
    - Calgary
    - Amsterdam
  - Where on the Map
    - Greenland
  - Where is the TVD at Mudline?
    - 348’
  - How much TVD Error
    - 32’
  - On plan, which well is dangerous?
    - Red
  - GWD Correction
    - D
  - How much stretch
    - 6’
  - Acronyms
    - Surface Readout Gyro
    - Logging While Drilling
    - Non-Mag Drill Collar
    - Rotary Kelly Bushing
    - Below Drill Floor
    - Lowest Astronomical Tide

Subcommittee Update – Marc Willerth – Error Model

- Rev 5 vote on what the final name is as follows: We are going to just call it Revision 5
- No Questions

Technical Presentation – Brett Van Steenwyk – Anti-Collision via Passive Ranging, Passive Ranging: Some Observations of a Non-Distribution Approach

Objective/Scope: is to raise awareness of what passive magnetic ranging (PMR) can do when implemented using a monopole model (MM). This monopole model is actually made a part of a limited magnetic multistation. This MM is a natural extension of the multistation concept, correcting a magnetic survey for drillstring interference (DSI), plus when the interference source is off the drillstring. The presentation explores convergence properties and delineation of major case types. Case types include single pole approach, approach to an oblique well, and an approach to a largely parallel well. It is believed that the effective range depends on the case type. Methods, Procedures, Process: It is desirable to automate this process as much as possible; however, not all user inputs can be eliminated. An automated "brute force" approach is used to avoid having poles get caught in local minima. Unfortunately, the user must guess the number of relevant poles in a solution, though aided by confidence rankings and quality values associated with each pole. PMR reliability also depends on the density (w.r.t. MD) of high quality MWD surveys as well as real-time monitoring of geomagnetic reference fields. Having more than one survey every 30m of MD is very desirable, and "continuous" MWD could be used in optimizing the numbers of static surveys while reducing rig time. Results, Observation, Conclusions: It is well known that some interpretation is needed to guess the proximity of a nearby well from a map of inferred pole locations. What poles can be grouped together into a presumed wellpath, and which ones are inherently singular? An example of fitting a circular arc to pole data will be shown, but this is just a first step. Novel/Additive Information: Raising awareness on how PMR works, as well as detailing its pros and cons to know where it will bring value to the industry. The range is potentially greater than the 5m to 15m in the ebook, depending on the objective.

- Question – Tyler Milford, you are plotting your what your ranging determination is?
    - Answer – Van Steenwyk, Yes as I add each survey point onwards.
    - Follow Up – Tyler, 50nT to 100nT in magnitude, does that have some effect?
    - Answer – Van Steenwyk, those magnitudes do have some effect in (ghosting) it could be based on the operator's discretion.
    - Follow Up – Tyler, with that magnitude being extremely small, I would think those are in a Far Field vs Near Field measurement or difference.
    - Answer – Van Steenwyk if each station must be paired with an oppositely charged pole.
    - Follow Up – Milford, you need to be within the near field so that you can identify each joint.
    - Answer – Van Steenwyk, that would be building up the model from the actual casing record – Conversation will be taken offline as time was expired for further questions.

Sub Committee Update – Darren Aklestad – Collision Avoidance

- Attendee updates – 44 in person, 18 online (30+ different companies represented)
- Surface Margin adjustment to rule in progress.
- Reporting Minimum Standards, publish date to be determined.
- CA Benchmarking
    - Focus on Probable Collision methods, usage, recommendations, and pass fail criteria.
        - Question – Andy McGregor, all the meetings running together as one big technical meeting seems to work very well, this may be easier to organize moving forward.
        - Answer – Aklestad, We may be at the point where we can start to overlap, it may be the way to move forward and de-silo some of these discussion and where some of the ownership should reside for some decisions.
        - Question – Craig DGI, impressed with the breakout session discussing some new topics and bringing more discussion from different perspectives.
        - Answer – Aklestad, EM and AC were missing out on QAQC, and I think with more overlap this will be beneficial for all the groups working together.

Coffee Break return 15:20

Technical Presentation – Marc Willerth – Estimating Likelihood of Directional Drilling Success Through a Practical Application of Projection Uncertainty Models

No abstract

- Question – Hans Dreisig, how does this affect AC considerations, if you are more than 10 meters from the plan, you must give someone a heads up and confirm this is allowable and safe.
    - Follow Up – (Name), we have some rules (tunnels) for the DD to follow and deviate in case we have any AC risks, typically we allow 50 feet.
    - Follow Up – Willerth, a big part of the story is not that they just get off plan, it is that it is their intent. If you look at the results, what was the strategy that was deployed and is that strategy what we want to execute on? You might actually hit a well off-plan if the intent is to drill off-plan.
    - Follow Up – McGregor, In US Land 50 feet off the plan during the curve is not unusual behavior. The concern is geared more towards staying ahead of the curve not necessarily collision avoidance or risk.
    - Follow Up – Stockhausen, landing long there is some T&D issues, in the past I have designed plans for multiple tangents in the curve to give the DD and Geo-steering team some key decision points for steering and landing the well properly. We should all be able to work together as a team to mitigate issues like this.
    - Follow Up – Willerth, we have explored the well planning aspect of it, but technically the location and shape of these transitions are a function of the well plan.

- Question – Ryan Kirby, what is the intent of this model, and I am assuming this is mathematical/physics based? What about things like change in compressive rock strength, and zones of TVD where we know we are going to lose motor yield, and the tribal knowledge of the DD's in the region understanding this, and I think that is why they try to get ahead of plan in certain regions, but it is not necessarily reflected in the well plan. Is this model designed to help reinforce better pre planning decision making or more about the real time execution and service delivery aspect?
    - Answer – Willerth, our intent is to say we can enable the pre-job aspect of it and the plan you use should be the best execution path, and deviations from that (that are ok) should be planned in. Being given a line to follow, in the DD's mind the plan is to be 50 feet above that line that doesn't make sense. If you know you have zones of yield loss you should build that in the plan to account for those deviations, some companies have no slide zones for example. Given the frequency of occurrence of this happening and especially when they have so many other wells nearby that didn't have issues, the goal here is to maximize the chance of success relative to the well plan.

Sub Committee – Benny Poedjono – Well Intercept

- Review objective of WISC eBook
- Question – Phil Harbidge, are we going to publish in a different language? Norwegian proposed translation, or other?
    - Answer – Poedjono, we need to keep it in simple English for the moment.

Administration Report – Robert Wylie – Treasurer's Report

- ISCWSA 60, 90 Registrations, net profit of $3500
- ISCWSA 61, 64 Registrations, net profit of $8500
- Question – Phil Harbidge, there is interest in Norway in an onsite training course and there will be other interested parties in different regions prior to our next meeting.
    - Answer – Wylie, AkerBP had a training course from ISCWSA, looking for some online courses as well. It isn't a true substitute for the Wellbore Positioning Course, but tailored more for a customer specific request.
    - Follow Up – Andy McGregor, could it a substitute for the online course or some kind of credit?
    - Answer – Wylie, no, but it does help you move through the course faster, IADD has asked about a certification course on Directional Drilling, they are looking at our involvement level and materials from the Wellbore Positioning side of things. We are following up with them as well.

Technical Presentation – Matt Edge – Unpacking CRS, controlling CRS usage in Wellbore Data Exchange.

When integrating wellbore survey data with other geospatial datasets, geodetic operations are applied to accurately translate the relative wellbore positions to absolute positions related to the Earth. Various corrections are required to ensure the appropriate migration is performed between geographic space and projected space. The potential errors introduced when operations are incorrectly applied vary in significance. Point scale issues may result in small errors; angular corrections larger; and incorrect CRSs the largest. The hydrocarbon industry manages seismic positioning data thoroughly using common exchange formats. Wellbore data is more ad hoc because of the varying reporting formats used by drilling contractors. Thus, metadata may be lost during data exchange, resulting in wellbore surveys being harder to replicate with high confidence. CRS usage is often non-standard because of specifications imposed by project teams, regulators, seismic contractors and software. In Norway, CRS usage is controlled but nuanced. At higher latitudes, certain UTM zone usage does not always follow the usual pattern. Mispositioned surveys create mis-ties with associated seismic trace data, possibly leading to ineffective interpretation and uneconomically planned or executed drilling. Effects are exaggerated at higher latitudes; convergence increases in sensitivity towards the poles. In the Barents Sea, the rate of change of convergence is an order of magnitude greater than in equatorial regions. The need to integrate legacy data will not reduce due to progressive analysis, such as for CCUS. Ensuring that trajectories are managed correctly is imperative. Tying well data with low geospatial integrity to deep seismic can mask errors due to the broadening of seismic reflectors with depth. We will explore potential errors from the mismanagement of CRSs. Guidance will be given on effective strategies to conserve positioning integrity at different stages of the data lifecycle.

- Question – Robert Wylie, this is an important topic and it will start to get a lot more attention. Others are incorporating geodetic data as well, does it look adequate compared to P7/17?
    - Answer – Edge, there is a geomatics committee that is managing that side and is looking at how users are bringing data in, data needs to be maintained properly in both coordinate reference systems (CRS) and the transformations needed. There has been some data pulled in by the committee to prove some principals, and the data needs to maintain the CRS which is why we are bringing this up now. We want to encourage the community that data that is siloed up now, once it is being pushed out into the world you have the potential to lose some of that data if structures like (CRS) are not followed. The link to the original data is so important.
    - Follow Up – Wylie, the other thing to mention was the scale factor being along the edge of some of your charts. For an individual well it could be meters, looking at multiple wells and AC there could be a significant difference (a few km apart for example), where do you recommend placing the scale factor.
    - Answer – Edge, combining different data sets is important you are attacking it from multiple directions. The scale factor used from the Geodetic point of view to convert your local coordinates to absolute coordinates (N, E, TVD), the P7/17 format has flags built in to capture certain fields to indicate where things like this were calculated. So long as we understand how calculations were performed and properly documented we can increase the accuracy of some of these results.
- Question – Darren Aklestad, talking about P7/17, who is using it?

- Answer – resulted in multiple conversations without microphones so it was difficult to record minutes during this follow up session.

Closing Remarks – Hans Dreisig

- Next meeting will have some elections coming up:
  - Director At Large, Program Chair, and Membership Chair. We need to start nominating some new folks that could be good additions to these positions.
- Deciding on the next venue and location will take place soon, and we will follow up with the group.
  - End