



Minutes of the 33<sup>rd</sup>  
Meeting of the



**Industry Steering  
Committee on  
Wellbore Survey  
Accuracy**

and

**SPE Wellbore  
Positioning Technical  
Section**

Copenhagen, Denmark

March 4<sup>th</sup> 2011

**Meeting Venue:**

Maersk Olie og Gas A/S

Esplanaden 50,

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\* **Chair**

\*\* **Minutes**

**Copenhagen 33<sup>rd</sup> ISCWSA meeting 4<sup>th</sup> March 2011**

Simon McCulloch, Maersk, ISCWSA Chairperson opened the meeting.

Axel Christensen gave an introduction and welcome from Maersk.



The Industry Steering Committee on Wellbore Survey Accuracy, also known as the SPE Wellbore Positioning Technical Section, will hold its 33rd meeting on Friday, 4 March 2011 in Copenhagen. The location will be Maersk Oil's headquarters at Esplanaden 50.

**07:45-08:30 Coffee (07:45-08:20) + Welcome & Introductions (08:20-08:30)**

Time	Speaker	Affiliation	Title
08:30-09:00	Peter Clark	Chevron	"Shale gas well positioning challenges"
09:00-09:30	Benny Poedjono	Schlumberger	"The Deadhorse Geomagnetic Observatory"
09:30-10:00	Adrian Ledroz	Gyrodata	"Improving the quality of uncertainty calculations for gyro surveys"

**10:00-10:15 Coffee**

10:15-10:40	Susan MacMillan	British Geological Survey	"Using local observations of the geomagnetic field to improve crustal field estimates from global models"
10:40-11:05	Carol Mann	Dynamic Graphics	"3D representation of clearance scans"
11:05-11:30	Harry Wilson	Baker Hughes	"In praise of survey redundancy"
11:30-11:45	Steve Grindrod	ISCWSA	Error Model Committee Update
11:45-12:00	Shola Okewunni	ISCWSA	"Mission Accomplished?"

**12:00-13:15 Lunch (12:00-13:00) + Administration & Voting (13:00-13:15)**

13:15-13:45	Bill Allen	BP	"Relief well experiences on Maconda"
13:45-14:15	John Thorogood	Drilling Global Consultant	"Accidents, incidents and the human factor"
14:15-14:45	Robert Everts	Shell	"Pitfalls in Geomatics"
14:45-15:00	Harry Wilson	ISCWSA	Collision Avoidance Workgroup Update

**15:00-15:15 Coffee**

15:15-15:35	Nils Olsen	DTU Space, National Space Institute	"Time changes in the geomagnetic field and their impact on directional drilling"
15:35-15:55	Inge Edvardsen	BHI Norway	"A QC test that is sensitive to axial interference at 90/90"
15:55-16:15	Stefan Maus	NOAA/NGDC & CIRES	"Release and validation of the High Definition Geomagnetic Model 2011"
16:15-16:35	Tim Allen	Sperry Drilling	"A quick method of identifying magnetic mud using MWD surveys"

**16:35-17:30 AOCB and Goodbye**

Attendees introduced themselves to the audience.

**Peter Clark, Chevron**

Presented on: Shale Gas well positioning challenges

Jim Towle, SDC asked Peter what is the cost of drilling shale ranging technology?

Robert Wylie, NOV asked if Peter how important it was to manage anti-collision of vertical wells against horizontal wells?

Patrick Knight, Halliburton asked Peter what was the vertical section for the wells Peter was describing.

Pete stated the wells were approx 10k ft long.

Rob Shoup, Gyrodata stated that a lot of these wells are air drilled and have TOTCO surveys and when the fluid flows this will confirm intersection.

**Benny Poedjono, Schlumberger**

Presented on: The Dead Horse Geomagnetic Observatory

Ellen Clarke, BGS asked if there was there any consideration given to fact that existing base stations were close to the new Dead Horse observatory.

Patrick Knight, Halliburton stated that real time data is generally available to public.

Ellen Clarke confirmed it is available to general public.

Benny Poedjono stated that we (the industry) have no access, and we do not know the status of the observatory data accuracy.

Philip Gurden, Baker Hughes asked how far the measurements of DEAD Horse observatory were from the application site of the data and asked if distance was a consideration?

Benny Poedjono confirmed this was considered and yes, they (the measurements) were close.

Robert Wylie, NOV suggested that there was a small dip offset in one of the plots of (magnetic dip) data shown.

Benny agreed that there was a slight dip seen in the data example. Benny also stated that the specification of the values shown were accurate to about 30-40nT and stated that the crustal data was not applied to the example. Benny also stated that they had not determined the crustal value for this and had not applied the crustal correction in the example shown and also recommended repeated measurements over approximately 2-3 years to calculate the crustal field for this field location.

### **Adrian Ledroz, Gyrodata**

Presented on: Improving the Quality of Ellipse of Uncertainty Calculations in Gyro Surveys to Reduce the Risk of Hazardous Events like Blowouts or Missing Potential Production through Incorrect Wellbore Placement

Angus Jamieson, Tech21 asked Adrian that as a result of work done, and did he change the uncertainty model structure before the work was done?

Adrian answered that work was done to acquire more data.

Angus then asked Adrian when would he advise to use the uncorrected gyro model?

Adrian replied that in certain cases where there was not enough tool face rotation or other similar parameter then the uncorrected model should be used.

Simon McCulloch, Maersk asked who was guilty of unproven error models and overly optimistic models?



Roger Ekseth, Gyrodata stated that they had not seen great changes (error ellipse size values) since the last model (uncorrected gyro model), due to previously using a small dataset, and with the now large data set used it defined the new corrected error model.

Roger explained that some providers have presented error model performances of 2% or more better than other models and that he had seen services chosen because of the small uncertainty difference. Roger also stated that the error model will only ever give a best guess of a survey service and not exact performance and that it should be treated with caution.

Harry Wilson, Baker Hughes stated that as users of existing models, (Baker Hughes), will there be new models available and will they be backwardly compatible?

Adrian told Harry that he will report back to him on the error model compatibility question.

Harry asked for confirmation that no new terms were used or included, only redefinition of the existing term values.

Adrian confirmed yes this is true.

**Susan Macmillan, BGS**

Presented on: Using local observatories of the geomagnetic field to improve the crustal field estimates from global models

Jim Towle, SDC asked if most of what is described was also incorporated in IFR (In-Field Referencing)?

Ellen Clarke, BGS replied yes and also explained that it was also incorporated in IIFR (Interpolation In-Field Referencing) and all magnetic sources including external field and when you buy an IFR service all data is included in the IFR product.

Jim Towle asked if there is qualification of data for a wellpath and if some components were not included is this specified in the service report?

Ellen replied yes.

Andrew McGregor, Tech21 asked when BGS processed geomagnetic data, are they using Fourier Transform or another method?

Susan Macmillan, BGS replied generally they use the Fourier Transform method.

Angus Jamieson, Tech21 stated that it is important to point out any weakness in the method and explained that when a marine survey vessel is doing the survey, that True North is determined at 20mili degrees per sec and that this data is then fed into an inertial navigation system. And when measurements are taken in a single plane, good vector data can be derived but this data is not able to be downward continued.

Ellen replied that this is not strictly true and the main problem is that there is lacking additional data. Ellen then added that when adding other data such as the conversion data, this would allow downward continuation.

**Carol Mann, Dynamic Graphics**

Presented on: 3D Representation of Clearance Scans

Shola Okewunmi, Chevron asked how will the real time visualization help us to drill wells?

Carol Mann replied that real time visualization will help and said that they (DGI) are working on a real time automated clearance scan, data system. Carol further explained that the graphical example shown was a “start clearance monitoring” mechanism tool.

Shola Okewunmi, Chevron asked if it can it be integrated into operators as a real time application?

Carol replied that real time survey data can be WITSML fed to an operator.

Shola asked if data can be used in the planning stage and in the operator data system?

Carol, replied yes, and it can also be used for planning and monitoring while drilling.

Jim Towle, SDC asked if you can plot the uncertainty of a MWD cylinder to represent the well plan?

Andy Sentence, Dynamic Graphics Inc. replied that MASD (Minimum Allowable Separation Distance) is the tube demonstrated and if the wellpath were to cross this MASD boundary, then you are failing your AC (Anti-Collision) rule(s), and this is a way of showing you how close you can drill to something.

Hans Dreisig, Maersk suggested that if showing a shift of say 0.25 degrees azimuth could improve the monitoring, and can this method be used to highlight situations where for example a directional driller may have to be in a certain location and the system highlights the large dog leg severity that would be required to drill out of bad anti-collision situation?

**Harry Wilson, Baker Hughes**

Presented on: In Praise of Survey Redundancy

Palle Jensen, Maersk stated that in defense of land surveyors, surveying locations they are well defined and have good practice for surveying locations.

Harry agreed that land surveying is a self checking process and stated that there are instances of errors occurring.

Robert Estes, Baker Hughes stated that no is GPS readily available at the same time as the presented case show in the video.

Jim Towle, SDC stated that he does a lot of relief well drilling and that surface location needs to be defined and that typically the surface locations are found to be 10-20 feet from the 1960s surveyed position.

Harry stated that this example emphasizes the need for survey data redundancy in down hole surveying. Harry continued that unfortunately this, (obtaining survey redundancy) is time consuming and costly but is more important for down hole surveys than compared to land surveying and it is an industry problem where there is lack of awareness of the importance of survey positioning in oil and gas wells.

Philip Gurden, Baker Hughes stated that the example highlites the industry need to re-survey and verify surface positions.

Harry added this is true for all survey measurements not just surface location.

Roger Ekseth, Gyrodata stated that he was shocked at the lack of standard of surveying in the oil and gas field and that he wrote an article on the problem and noted that many parties were not interested in the concept and benefit from survey validation. Roger explained that for example a drilling engineer may spend weeks requesting upper management to pay for a gyro verification survey. There was more time and money consumed in the justification process than actually taking the verification survey itself and if one well was saved as the result of a verification gyro survey that this would offset the cost of all the gyro surveys in the field. Roger also noted that some different surface positions were found when verification surveys were actually carried out.

**Steve Grindrod, Copegrove**

Presented on: Error Model Management Committee

Harry Wilson stated that bias verses non bias depth stretch models compared at 3 standard deviations showed that it was safer than the results of other standard deviations i.e. 1 and 2.

Benny Poedjono, Schlumberger stated that he was concerned about the declination terms.

Steve said that the BGM (British Geological Survey, Global Geomagnetic Model) look up table values have been defined and Stefan Maus had volunteered to work on keeping same terms and review the numeric values and improve on the present values.

**Robert Wylie, NOV,**

Presented on: The treasury report

Robert reported that the account was in the black with a good balance.

Robert mentioned that the ISCWSA was affiliated with the SPE.

Bill Lesso, Schlumberger asked Robert if the SPE charged the ISCWSA as an affiliated group?

Robert replied that there is no charge.

**John, Thorogood, Drilling Global Consultant**

Presented on: Accidents incidents and the human factor

**Robert Everts, Shell**

Presented on: Pitfalls in Handling Spatial Data

Benny Poedjono Schlumberger, asked if the data in the global Shell database is government approved and official?

Robert Everts, replied yes and said for example Russian data is not allowed to use when certain transformations are involved. For example Pukov 1942 transformation data is not allowed to be used in the database.

**Harry Wilson, Baker Hughes**

Presented on: Collision Avoidance Workgroup Update

Hans Dreisig, Maersk stated that when you are anti-collision scanning and where you deviate from plan, all anti-collision assumptions are out of the window.

Harry replied that the policy and procedure (service company or operator policy) should cover that situation.

Hans stated that however the focus is strongly on the well targets and other objectives.

John Thorogood, Drilling Global Consultant stated that he suggests that specifying mitigations etc, could place the group on the edge of a very slippery and dangerous slope.

John explained that he would like to participate in this conversation in the workgroup and said that we owe it to the team on the rig to define hard lines on what is acceptable and what is not.

Harry added that he originally resisted for Baker Hughes to not have an anti-collision policy as the operators have their own health safety and the environment and anti-collision policy but that they have gone ahead despite this.

Garry Skinner, Baker Hughes stated that the main problems seen are when start drilling and it is safe to drill ahead and then we drift into a collision monitoring zone and we do not start collision scanning. Garry added that when not already scanning from the start of drilling a well, often it will not be done the rest of the well. Garry suggested using as simple a system as possible for communicating this information.

**Nils Olsen, DTU Space, National Space Institute**

Presented on: Time Changes in the Geomagnetic field and its impact on directional drilling

Palle Jensen, Maersk asked if typical IFR (In-Field Referencing) data campaigns are no longer needed? Nils replied that he believes that there will always be a need for IFR data but it will be improved by this modeling.

Benny Poedjono, Schlumberger asked where the magnetospheric contribution data had come from?

Nils replied that the data was modeled.

Benny asked what did we need to predict these values?

Nils stated that we need time and position, and that we need actual regular daily variation data. Nils explained that we could use monthly mean or yearly data to model this and if you only require daily variation values from the model then a fixed value could be used from averaged data over one year.

For storm activity modeling we would need one minute data to produce good geomagnetic storm model values.

Peter Clark, Chevron, asked if you have any alert system for alerting the MWD supplier (MWD service companies) to be aware (of a magnetic storm)?

Nils said yes, and said that part of the intension of the meeting today was to determine the industry needs from such a modeling service.

Harry Wilson, Baker Hughes asked if he Niels was going to offer a commercial service and stated that he thinks this is an alternative to the observation method, and that it is also an interpolation method for IFR measurement?

Patrick Knight, Halliburton asked if Niels had a recommended value for the error term that the ISCWSA could use for the ISCWSA magnetic model?



Niels replied no.

Patrick then asked if the modeling includes seasonal variations?

Niels replied yes.

**Inge Edvardsen, Baker Hughes,**

Presented on: Proposal for Alternative MWD Magnetic QC-Test

Benny Poedjono, Schlumberger asked why the data example was fixed at 50000nT and why 150nT at 1 sigma value was used, and was it a worst case scenario?

Harry Wilson, Baker Hughes stated that you could use any combination of values and that the main point is that a combination of the  $B_h$ ,  $B_v$  and  $B_z$  will outperform the old tests.

Angus Jamieson, Tech21 asked what formula was used to calculate the  $B_z$  limit?

Inge stated that he would have the nominal values for  $B_t$  and Dip and then you can calculate what the  $B_z$  value should be based on reference values used.

**Stefan Maus, NOAA/NGDC)**

Presented on: Release and validation of the Definition High Definition Geomagnetic Model 2011

Angus Jamieson, Tech21 asked if we were using the HDGM (High Definition Geomagnetic Model) compared to BGGM to determine secular variation over a few years and would we see a bias as BGGM uses less crustal data?

Stefan replied, no and said that he believes that there is very close secular variation and that the two models would agree but the models could show a difference if SWARM data delivery is delayed.

Susan Macmillan, BGS suggested that the reason for the difference would be related to the fact that most of the data is relevant to hydrocarbon bearing locations.

Stefan agreed and also stated that the data is also rarely affected by external magnetic interference sources.

Susan agreed and said that much data was taken and assessed to determine the error estimate.

Stefan suggested that parties could share the data used to determine the error estimation.

Patrick Knight, Halliburton asked if the model was available and commercial?

Stefan said yes and it was commercially usable.

**Tim Allen, Halliburton Sperry-Sun**

Presented on: A quick method for identifying magnetic mud

Simon McCulloch, Maersk asked that for the BT (total magnetic field) uncorrected surveys, whether they had been axial magnetic interference corrected?

Tim replied that assumptions would be made in this example and that axial magnetic interference was not affecting the scale offset.

Philip Gurden, Baker Hughes asked if OD and ID (outside and inside diameters) of the tools was looked at when studying similar examples and asked what conditions did you have for the example shown?

Tim answered that they were probe based tools in the example shown.

Runar Abelseth, Baker Hughes stated that tests of mud he had done, a sensor was put in 10 liters of the mud sample and stated that the correction was not easily done but that identification (of a mud which contains magnetically susceptible material) can be done by testing a mud sample.

**Bill Allen BP,**

Presented:

<http://www.youtube.com/watch?v=P8JQV3pTTY>

<http://www.youtube.com/watch?v=HwJRY5N08hk&NR=1>

**Shola Okewunmi, Chevron**

Presented on: Mission Accomplished?

Simon McCulloch, Maersk, Chairperson Any Other Business:

Simon McCulloch, Maersk added that when he stops the role of chairperson, he wanted to be more involved in training.

Simon recommended that Steve Mullen become the lead of the Education group for the ISCWSA.

Steve Mullen, Gyrodata agreed and said that he attended the wellbore positioning technical session in Amsterdam at the ATCE meeting. Steve Mullen added that we have a lot to do in terms showing what we (ISCWSA) do and we also need to produce training material. Steve Mullen suggested that the SPE short courses, applied technology workshops and joint industry projects, such as the survey handbook which is due to be released before the end of 2011. Steve Mullen stated that the applied technology workshop held in the south of France was perhaps too much, but added that collision avoidance workshops may be done soon. Steve Mullen asked the audience to contact him with any suggestions or questions about technical workshops. Steve Mullen's e-mail address is [Steve.mullen@gyrodata.com](mailto:Steve.mullen@gyrodata.com).

Simon added that if there were any offers for sponsorship in the next meeting please contact Simon as soon as possible. Shola Okewunmi stated that Chevron may offer sponsorship if the meeting were to be held in South East Asia.

Simon showed a slide detailing that Ross Lowdon, Schlumberger will hold the position of ISCWSA secretary and Philip Harbidge, Schlumberger will hold the position of webmaster starting at the next ISCWSA meeting.

**Bill Allen, BP**

Presented on: Well Relief and Intervention work group

Bill explained that the group action is to bring in ranging entities and produce a recommendation document.

Simon McCulloch closed the meeting.