Minutes of the 30th Meeting of the

Industry Steering Committee on Wellbore Survey Accuracy

and

SPE Wellbore Positioning Technical Section

Convention Centre,
Marriott Hotel,
New Orleans, Louisiana
USA
October 8th 2009

Attendees:

Darren	Aklestad, Lee	Schlumberger	aklestad@slb.com
Bill	Allen	BP	william.allen@bp.com
Charles Milton	Asfahl	Applied Physics Systems	casfahl@comcast.net
John	Barlow	GE Oilfield Technology	jbarlow@alumni.rice.edu
Neil S	Bergstrom	SDI speaker	neil.bergstrom@scientificdrilling.com
Kenneth W	Braud	Bench Tree Group	ken.braud@benchtree.net
Andrew G	Brooks	Pathfinder Energy Services	andrew.brooks@pathfinderlwd.com
Clinton	Chapman	Schlumberger	clinton.chapman@slb.com
Peter J	Clark	Baker Hughes	peter.clark2@bakerhughes.com
Mahmoud	El Gizawy	Schlumberger	melgizawy@slb.com
William C	Elks	ExxonMobil Development Co	william.c.elks@exxonmobil.com
Robert A.	Estes	Baker Hughes	robert.estes@bakerhughes.com
Morten	Gjertsen	Baker Hughes	morten.gjertsen@bakerhughes.com
Lisa Shava	Grant	Shell E&P	lisa.grant@shell.com
Steve J	Grindrod	Copsegrove Developments Ltd	steve@copsegrove.co.uk
** Phil	Harbidge	Baker Hughes	phil.harbidge@bakerhughes.com
Aubrey	Holt	Bench Tree	aubrey.holt@benchtree.net
Adrian G	Ledroz	Gyrodata Inc	adrianl@gyrodata.com
Colin	MacDonald	Halliburton - Landmark	colin.macdonald@halliburton.com
Ludovic	Macresy	DrillScan	ludovic.macresy@drillscan.com
Carol Eve	Mann	Dynamic Graphics, Inc.	carol@dgi.com
Kevin	McClard	PDT	winsurv3d@sbcglobal.net
* Simon	McCulloch	Maersk	asm047@maerskoil.com
David Philip	McRobbie	Weatherford International Ltd	davemcrobbie286@btinternet.com
Mark	Michell	Devon Energy	mark.michell@dvn.com
Ian	Mitchell	Halliburton	ian.mitchell@halliburton.com
Jeffrey	Mohammed	Baker Hughes	jeffrey.mohammed@bakerhughes.com
Stephen	Mullin	Gyrodata Inc.	stevem@gyrodata.com

Attendees continued…

Erik	Nyrnes	StatoilHydro ASA	enyr@statoilhydro.com
Shola	Okewunmi	Chevron	shola@chevron.com
Wayne	Phillips	Schlumberger	phillips3@slb.com
Benny	Poedjono	Schlumberger	poedjono1@slb.com
Linda A	Renner	Tech 21 Engineering Solutions / Weatherford	lrenner@sbcglobal.net
Paul F	Rodney	Halliburton Sperry Drilling	paul.rodney@halliburton.com
Nestor Eduardo	Ruiz	Gyrodata	neruiz@infovia.com.ar
Huzefa	Shakir	Halliburton	huzefa.shakir@halliburton.com
Anas	SIKAL	DrillScan	anas.sikal@drillscan.com
Michael	Terpening	Schlumberger	mterpening@slb.com
John L	Thorogood,	Drilling Global Consultant LLP	jlt-spe@drillinggc.com
Brett	VanSteenwyk,	Scientific Drilling	SteenwykBH@aol.com
Henry (Harry)	Wilson	Baker Hughes INTEQ	harry.wilson@bakerhughes.com
Robert	Wylie	NOV	robert.wylie@nov.com

*** Chair**
**** Minutes**

New Orleans October 8th 2009

Simon McCulloch - Maersk Qatar, Chairman - ISCWSA

Simon thanked Schlumberger for sponsoring the 30th ISCWSA, New Orleans meeting.

Simon asked the attendees if they would object to being recorded for minute purposes. No objection was raised by the attendees.

Peter Clark, Baker Hughes
Presented on Surface Location Uncertainty

Surface Location Uncertainty - Revisec

Simon McCulloch, Maersk asked Pete Clark, Baker Hughes to describe examples of common surface location mistakes.

Pete Clark, Baker Hughes replied that data organisation was a common problem and that facilities are inappropriately aggregated together was common problem causing errors in slot uncertainty, where for example, exploration wells are placed on the same facility as platform slots and this setup has no accommodation for surface uncertainty. Pete Clark, Baker Hughes explained that errors are seen where slot location could have been easily measured and where this was not done this is a mistake, finally the biggest mistake is where the uncertainty is set to zero.

John Thorogood, DGC stated that he felt that at least one research project from a work group and possibly also a paper needed to be released on work around the target sizing aspect of surface uncertainty. John Thorogood, DGC stated that surface uncertainty is often overlooked by the industry and this area probably needs to have a paper released.

John Thorogood, DGC also stated that often in the past, the locations of pads, slots and platforms were meticulously surveyed and documented, and that if you spoke to the right person, that you can often get all the information needed to setup the directional survey database correctly. John Thorogood, DGC asked what had been published so far.

Pete Clark, Baker Hughes stated that surface uncertainty material had only been published internally as a Baker Hughes guidance document within Baker Hughes.

John Thorogood, DGC asked that the surface uncertainty material be considered for publication as an SPE paper preferably before January 25th 2010.

Pete Clark, Baker Hughes added that it was an important point that John Thorogood, DGC had raised and that the actual data is very often available, and the service companies are often asked to request surface uncertainty information and that it is important to speak to the correct person or people to be able to get the correct surface location and uncertainty information.

Bill Allen, BP shared that BP have recognised that in a recent event a gross error occurred. For a land drilling project, a conductor was driven. The drilling team welded a plate on the side of the conductor indicating the well name of the conductor. The survey crew went out and put a new

conductor in about 50 feet away from the original conductor position. And a plate with the same well name was fixed to the newly driven conductor. This rig then came out and set up on the first conductor. The new conductor was assumed to be at the old conductor location but this was not correct. So nobody (the operations team) did anything wrong, but, this error was discovered, and the same (incorrect location record) error happened again to another well about 3 months later. Bill Allen, BP stressed that in this case the work team did not follow through on changes, they did not process manage the change.

Simon McCulloch, Maersk added that within this room this will be well recognised. Simon, Maersk added that previously he had the role of auditing large company databases, and although they may have had very well defined manuals and standards stating that this (assign appropriate uncertainty values), has to be done, they still had zero or incorrect values assigned. Simon, Maersk stated that this occurred in both operators and service companies and that the message just isn't getting out to the world.

Darren Aklestad, Schlumberger stated that in the best practice guidance notes, the surface uncertainty should be treated as an error source.

Darren Aklestad, Schlumberger questioned how big the surface uncertainty problem really is?

Darren Aklestad, Schlumberger explained that if you treated separate error sources for separate geodetically placed positions they are probably done (measured and defined) using the same method. And as a result the errors will be correlated between the locations and therefore zero could be assigned because the errors would probably washout after being applied and if the relative uncertainty, (relative horizontal surface uncertainty) is very small and that assigning zero may be not be a problem if you are looking at your relative uncertainties?

Peter Clark, Baker Hughes replied as we have put a focus on the uncertainty of the wellpath (ISCWSA uncertainty error models), we have clarified that situation, and we still have the starting uncertainty to deal with and the target sizing uncertainty and so as we have dealt with one, the other has come to light.

Chuck Asfahl, Applied Physics Systems asked what is a split slot?

Peter Clark, Baker Hughes explained that a split slot is where there is a single slot and two wells are run into it and that commonly there are a series of guides where the wells are run into.

Erik Nyrnes, StatoilHydro and Harry Wilson, Baker Hughes

Presented on Minimum Requirements for Multi-Station Analysis

Presentation New Orleans_08102009.p

Benny Poedjono, Schlumberger asked what happens if the wells hit the no go zone, if a well hits directly East and West (high inclination angle), what is your recommendation?

Benny Poedjono, Schlumberger then asked a second question, for this assumption (Multi-Station Analysis assumption), does it assume a cylindrical wellbore or does it assume a bend and turn in the wellbore?

Erik Nyrnes, StatoilHydro stated that there is a requirement for average direction from horizontal East - West and that the multistation analysis process can be applied for both tangent and turn - build wellbore sections.

Benny Poedjono, Schlumberger asked again specifically what is the recommendation for wellbores drilling directly in the no go zone because you have the limits at East and West 25 degrees, as per the slide on enhanced referencing slide 13 and 14 of 17 “Magnetometer Specific Requirements” from Erik Nyrnes’s presentation?

Erik Nyrnes, StatoilHydro answered that indeed if the wellbore is within the no go zone, then it, (the multistation analysis process) will not be applied.

Benny Poedjono, Schlumberger asked again, so what will we do in such a situation, (wellbores drilling directly in the no go zone)?

Erik Nyrnes, StatoilHydro answered that they will have to ensure that they have a turn before they reach the critical direction.

Simon McCulloch, Maersk asked if you start off with an azimuth inclination which is outside the no go zone, then would it be possible to swing (high angle East / West) into the no-go zone and apply the multistation analysis process?

Erik Nyrnes, StatoilHydro confirmed that for a data run, if the average distance from the no-go zone is outside the no-go zone then the multistation analysis process could be applied.

Simon McCulloch, Maersk asked for clarification on whether the correction could be applied for axial, scale factor?

Erik Nyrnes, StatoilHydro confirmed Yes, if the data has enough spread, this is possible.

Simon McCulloch, Maersk, asked for clarification on possible causes of scale factor error and asked if this error could be a result of calibration error on the magnetometer, for example a calibration error on a Bz sensor?

Erik Nyrnes, StatoilHydro confirmed Yes, there could be an induced magnetism on the magnetometer, causing the scale factor error.

Harry Wilson, Baker Hughes, added that the Bz scale factor error cannot be solved for the ISCWSA error model if you are only model referencing the global model, i.e. BGGM. And you should not apply Bz scale factor unless you have got IFR data, and only then if you have got IFR data of particularly good condition, only then could it (Bz scale) be corrected for. Harry Wilson, Baker Hughes added that it is very rare to be able to solve for Bz scale factor.

Andy Brooks, Pathfinder stated that these requirements were explained in terms of choosing which error terms you can solve. And asked if you could also apply these requirements in order to make a decision as to which surveys you include in one group of processing, in other words, if you included maybe too many surveys in a group, perhaps your noise would start to go outside the limits?

Erik Nyrnes, StatoilHydro asked Andy Brooks to repeat the question.

Andy Brooks, Pathfinder asked, whether you could use these requirements to make a decision as to which survey stations are included in a calculation and when you should stop adding surveys to a group?

Andy Brooks, Pathfinder, then asked so you could use the requirements to decide when it is time to, lets say when you need to stop adding surveys to a group and maybe start a new group of surveys, the noise test would give you that information.

Erik Nyrnes, StatoilHydro answered Yes.

Ludovic Macresy, DrillScan, on behalf of Youssef Amghar TOTAL, from an operator point of view, you have on the market many multistation analysis propositions. The multistation analysis services are based on their own multistation criteria. Some are more complicated than others. The proposed criteria are to be used to validate these data propositions which is a great effort and is what TOTAL is looking for.

Ludovic Macresy, DrillScan asked what are you going to do about the paper SPE 125677 and asked if the proposed multistation analysis requirements could be used to determine which surveys are to be included into a survey log?

Erik Nyrnes, StatoilHydro replied, Yes

Ludovic Macresy, DrillScan asked from operator point of view different application are the requirements to be industry certified?

Erik Nyrnes, StatoilHydro replied Yes

Ludovic Macresy, DrillScan asked if a multistation analysis proposal requirements could be ISCWSA certified because it respects your requirements (requirements specified in SPE 125677 paper).

Erik Nyrnes, StatoilHydro again replied Yes.

Ludovic Macresy, DrillScan asked again if another multistation analysis proposal with it's requirements and are not as per SPE 125677, could they be checked?

Harry Wilson, Baker Hughes answered Yes, and that is the point, the operator must request the requirement for MSA, the SPE 125677 requirements are the minimum requirements . If the data meet these requirements then these data are valid.

Ludovic Macresy, DrillScan asked is it for the service company requirement to specify if multistation analysis requirement is valid and are met, should there be authentification to ensure that the requirements are met, how should this work?

Erik Nyrnes, StatoilHydro replied, these requirements are the StatoilHydro requirements.

Harry Wilson, Baker Hughes added that the operator should demand the equivalent to the SPE 125677 requirements if not then specify their own multistation analysis requirements.

Brett VanSteenwyk, Scientific Drilling asked what if you don't have enough data to estimate your uncertainties, can you still estimate the uncertainties?

Erik Nyrnes, Statoil Hydro replied Yes, you can estimate the uncertainties in the parameters.

Harry Wilson, Baker Hughes continued

Presentation on Minimum Requirements for Multi-Station Analysis

Simon McCulloch, Maersk

Asked the audience to offer any further applications for position of ISCWSA Program Chair

No further applications for the position were made.

Simon McCulloch, Maersk then introduced Bill Allen, BP to give his two minute speech to introduce himself as a potential ISCWSA program chair.

Simon McCulloch, Maersk then introduced Darren Aklestad, Schlumberger, to give a two minute introduction on behalf of Ross Lowdon, Schlumberger who was absent from the meeting.

Colin MacDonald, Landmark

Presented on Dealing with legacy survey tools in new model environment

LegacyModels.ppt

Benny Poedjono, Schlumberger asked Colin to confirm that for the 30% of wells in the North Sea and 20% were in Texas and Oman. What was the actual number of wells in the 20%, (Texas wells), and was it 20% of all the wells in the data set looked at?

Colin MacDonald, Landmark, confirmed that the 20% Texas wells were 20% of the total well dataset looked at.

Benny Poedjono, Schlumberger asked do you know how many wells are in the dataset?

Colin MacDonald, Landmark, confirmed that the dataset contained 1000 vertical wells.

Benny Poedjono, Schlumberger asked of the 1000 vertical wells looked at, did they have an actual survey?

Colin MacDonald, Landmark, confirmed Yes, the study dataset contained 1000 vertical wells with actual surveys.

Simon McCulloch, Maersk

Presented on Survey programs for extended reach drilling

Simon_ISCWSA30_2003.ppt

Simon McCulloch, Maersk stated that Industry sag models currently being used (ISCWSA error models) are wrong and do not correctly represent the actual BHA misalignment for certain wells.

Simon McCulloch, Maersk stated that he thought the error model value 0.08 should be closer to 0.04 for the BHA sag misalignment for exclusive wells where rotary drilling at horizontal and extended reach, therefore considerably reducing TVD uncertainty in extended reach wells.

Simon McCulloch, Maersk asked if a Gyro MWD tool could be run above 65 degrees inclination.

Harry Wilson, Baker Hughes responded to Simon McCulloch's question on whether GyroMWD could be run at greater than 65 degrees inclination, Yes is the answer we could do that.

Simon McCulloch, Maersk responded that the GyroMWD was specifically meant to be run to avoid wells which were 20 feet away.

Harry Wilson, Baker Hughes responded that is probably what you could not do. The error model would tell you how good or bad the survey will be.

Benny Poedjono, Schlumberger asked what accuracy is the gyro at this high angle?

Harry Wilson, Baker Hughes responded that the error model shows the uncertainty.

Harry Wilson, Baker Hughes also stated that typical North seeking gyros will have systematic errors and quite a large random error component. So not only will you have accumulative large uncertainty but you will also have noise while you are trying to steer the well.

Harry Wilson, Baker Hughes said that the other thing you (Simon McCulloch, Maersk) talked about was the apparent conservatism of the 0.08, the standard sag corrected term. Harry Wilson, Baker Hughes explained that Baker Hughes has done extensive sag correction analysis of inclination verses RCLS (rotary steerable near bit). Harry Wilson, Baker Hughes stated that Baker Hughes sag correction is good to plus or minus 0.03 degrees however the problem with sag correction on it's own is that it is error prone, and in particular gross error prone. And if there is no second check, you can not quality check it.

Simon McCulloch, Maersk replied that this was also his concern. Where every aspect of a magnetic MWD survey is or can be checked by an independent survey management company, but there is difficulty that nobody knows the ins and outs of another companies BHA and it is very difficult to have an independent quality control check of the sag correction.

Harry Wilson, Baker Hughes replied that a near bit inclination will quality check it (near bit inclination measurement will check the BHA sag misalignment).

Simon McCulloch, Maersk replied do you mean this is a pure inclination check, is the near bit inclination uncorrected.

Harry Wilson, Baker Hughes replied Yes, and that it would be a bad thing to do to reduce the sag BHA misalignment component without applying some form of quality control approval.

Simon McCulloch, Maersk replied that he thought that Baker Hughes have some experience of correcting another operators sag.

Bill Elks, Exxon Mobil added, we have, Exxon Mobil did it in Sakhalin with Baker.

Harry Wilson, replied to Bill Elks, Exxon Mobil, saying Yes we did. And he that he (Harry Wilson) believed that those wells could not have been drilled if we could not have achieved the improved TVD control through this method.

Bill Elks, Exxon Mobil replied that he thought the wells would have been drilled but they would not have met the geological objectives.

Harry Wilson, Baker Hughes replied to Simon McCulloch, Maersk's earlier question by stating that Baker Hughes have attempted to quality control check sag correction of third party data and it has been difficult. As you can not easily get the level of detail of the BHA component makeup to check properly.

Simon McCulloch, Maersk added, having tried to do this (quality control check sag correction of third party data) he said that it is almost impossible to do.

Bill Allen, BP noted that in Simon McCulloch, Maersk's presentation, that you explained how you compare the MWD surveys to each other for validation and comparisons showed very little disagreement. In the event you had disagreement what would you do? And would you be able to apply the same scrutiny to gyro run data?

Simon McCulloch, Maersk replied that gyro surveys were compared. Simon added that the survey management MWD validated surveys were the preferred surveys for the some of the well survey sections. And Simon stated that particularly for horizontal well sections they were not getting particularly good TVDs for pump down gyros. So since the last few years for every well the surveys beyond the 9-5/8" casing they reverted to using MWD surveys quality control checked by the survey management company with sag applied.

Bill Allen, BP asked if that (Gyro survey QC) was done to the extent of the detail used for quality control applied to the MWD surveys?

Simon McCulloch, Maersk replied that the gyro providers supply a large dataset and they do apply quality control at the rigsite and in town.

Peter Clark, Baker Hughes asked how the survey comparison is done by the drilling engineer/ and asked if Simon could elaborate on how that us done?

Simon McCulloch, Maersk replied, in preparation for getting a gyro survey, we will have a concatenated survey to the 9-5/8" shoe. For example a well will be vertical hole with a centroller survey to the guide, then 16" gyro MWD gyro, then magnetic MWD, then 12-1/4" MWD magnetic surveys. That would give us our position (concatenated survey position). Create a plan which is the concatenated survey as just explained with the uncertainty models assigned. Then run the 9-5/8" gyro then enter the gyro survey into the planning software and produce a traveling cylinders plot to see how much the position has moved. So the quality control for this process checks all survey points all the way from top to bottom and this method can identify if the 9-5/8" shoe shows very good agreement between the surveys, but would also show any data drift from surface to the bottom. The quality control criteria are based on how well the ellipses overlap.

Bill Allen, BP suggested gyro centrollers are good to use but they can have errors. He has seen examples where the centrollers have had misalignments.

Simon McCulloch, Maersk agreed that in some instances gyro centrollers have had errors.

Harry Wilson , Baker Hughes

Presented an update on the Collision Avoidance Workgroup

Meeting minutes are posted on the ISCWSA website

Harry Wilson, Baker Hughes asked Shola Okewunmi, Chevron if he agreed to form a group to follow up on his observation that there was a lack of clarity on how to define uncertainty properties and in uncertainty reports.

Shola Okewunmi, Chevron agreed, he would form a work group for this effort.

Brett VanSteenwyk, Scientific Drilling

Presented on MWD LWD magnetic ranging as an anti-collision tool

Btot_Slides_ISCWSA_Oct09.ppt

Lisa Grant, Shell stated that Shell has been drilling on some of their platform projects with wells in close proximity using a magnetic ranging service as a means of proximity detection. Lisa explained that Shell has been in discussion with magnetic ranging companies as to what happens when you have a collection for example of five or six wells around you. Do you create an apparent (ghost) well around you that is not actually there because all of the fields combine? Have you found that you can detect the difference between a ghost well and the actual different wells? Because we were concerned that we could range from a well that was not there.

Brett VanSteenwyk, Scientific Drilling, replied, that doing multiple targets is very difficult. The chances are that only one well will dominate the magnetic signal. As you move away from the centre spot and move towards one well the signal will tend to be dominated by one well.

Lisa Grant, Shell, asked if Brett had any data to show this effect?

Brett VanSteenwyk, Scientific Drilling, replied No.

Brett referred the question to Neil Bergstrom - Scientific Drilling. Neil Bergstrom - Scientific Drilling stated that in about six cases drilling a pair of well side by side, and when drilling a third well he has seen a very complicated (magnetic ranging) signal when you are equidistant between the two existing wells. However because the signal falls off very quickly with distance you will almost always be in a situation where one of the signals dominates. If you look at the magnetic signature over a short distance it is pretty easy to pick out the signal where there are multiple wells verses the one well that is dominating. There is no easy answer when looking at data from more than one source.

Brett VanSteenwyk, Scientific Drilling asked Neil do you know when you get multiple signatures from multiple wells do you have a sense of determining single wells from a multiple well magnetic signal?

Neil Bergstrom, Scientific Drilling, said that in cases where there was a suspected problem dataset with multiple (magnetic) sources, they said that they could not do the interpretation, as there was too much going here on and we couldn't sort out which well it is coming from (magnetic signal) and we can not figure out this data. But this is only seen in maybe one or two ranging cases in a hundred.

Shola Okewunmi, Chevron asked if for well twinning operations, have SDI targeted SAGD (Steam assisted Gravity Drilling) operations or any other work to twin wells parallel within a couple of meters?

Neil Bergstrom, Scientific Drilling, answered we have done some parallel wells, we have not been actively involved in SAGD, we do have proposals out for test cases using SAGD. The separation tolerance for SAGD is very close. And one of the limitations of the ranging methods is that if you are using the MWD magnetic sensor that is far back from the bit, then even if you are ranging is quite accurate, you are still having to project all the way up to the bit. And this pushes the limit of what is required for doing SAGD.

Shola Okewunmi, Chevron asked, how sensitive do you predict being able to range to a slotted liner and magnet placed in the liner? Also do you have any minimum recommended weight of material?

Neil Bergstrom, Scientific Drilling, answered No, we have not seen any difference between a slotted liner than a continuous liner. The result is much less dependent on the distance from source than it is the weight of material.

Shola Okewunmi, Chevron asked again if there are no material limitations?

Neil Bergstrom, Scientific Drilling, answered Yes, the material must be ferromagnetic. If it is stainless steel or any other kind of exotic alloy then you can not use a magnetic range service to range from it.

Simon McCulloch, Maersk asked how far the bit the magnetic sensors were. And if it was possible to put the magnetic sensors immediately behind the bit.

Chuck Asfahl - Applied Physics Systems suggested they have already run sensor closer to bit, azimuth deteriorates but can be used for ranging service

Benny Poedjono, Schlumberger suggested that Schlumberger has used a close to bit sensor slim drive service to allow sensor readings closer to bit.

Dave McRobbie, Tech21 commented that the question was asked whether it is possible to resolve the signal in a multi slot platform, it is almost certainly impossible and should not be done. In an investigation more than 20 years ago a total destruction of a platform with fatalities occurred where the operator had refused to use the planned single shot gyro survey tool for kicking off the well. They used a magnetic steering tool to kick off the well instead of the planned gyro. Drilling from an outside slot there was a lot of inclination data available. They stoked the pipe in with magnetic interference. They decided to drill ahead on magnetic highside. Using the magnetic toolface, they did not detect that they had turned due to the effect of magnetic interference from the nearby wells on the highside reading. They drilled towards the centre of the platform, closer to the nearby wells. As the drilling well approached the middle of the platform, the surveys showed a magnetic dip and total magnitude to pass quality control. They assumed that they had drilled clear of the nearby wells. But they then actually drilled into a well and blew the whole platform up.

Benny Poedjono, Schlumberger asked if you could still use an active ranging method?

Dave McRobbie, Tech21 replied that he would question using magnetic ranging for a multi-well platform using active or non active ranging.

Simon McCulloch, Maersk called the audience to Vote for the next ISCWSA Program Chair

Vote for the next program chair was cast.

Steve Grindrod, Copsegrove Ltd.

Presented on Update on Error Model Workgroup - Part one, Look up table BGGM values

SPE 119851 BGGM Uncertainty.ppt

Meeting minutes are posted on the ISCWSA website

Steve Grindrod, Copsegrove Ltd. asked the audience if they agreed to implement the improvement in accuracy by using the BGS provided lookup tables?

Harry Wilson, Baker Hughes suggested that to adequately model directional MWD you need a look up table. So we need to add geomagnetic terms that do not have the same weighting functions as the previous published model. Primary vote is for or against using a model that supports geomagnetic data that originates in a table rather than from a model. If we do not use a model including lookup tables then the model will be too optimistic.

Harry Wilson, Baker Hughes, stated that the error model maintenance group voted Yes to implementing MWD model including the lookup table values.

Simon McCulloch, Maersk stated that the assembled group present is at complete liberty to not agree with the decision and not implement an MWD model including the proposed lookup table values.

Dave McRobbie, Tech21 added that after a review of existing models in terms of wellplanning in the industry and found that there were potentially over 200 different error models. And that this proposal is to add new models to the already relatively large list of available models and this would be adding to the problem.

Steve Grindrod, Copsegrove Ltd. Responded, that because the model would actually be using the lookup tables, the tables are produced on one degrees latitude and longitude, in a sense you are actually getting a custom error model for every location. And that is why we are saying we need to recall the error model values for it.

Dave McRobbie, Tech21 responded that you are actually playing with the numbers and you still don't know if the data you are using is actually reflective of the location you are dealing with. If there is a problem you need to be addressing it properly.

Steve Grindrod, Copsegrove Ltd. responded these values (look up table values) are actually more representative than the values we have currently. And the problem with the values we have currently is (BGGM) is that they were taken from the 1993 study and were pinned to Lerwick and essentially we have a very good model for the North Sea or Lerwick and for other areas in the World it is not so good a very good model. Again we assumed in the existing ISCWSA model, that we have constant DIP and constant total field value, and we know that is not realistic. And there are health and safety implications because we have identified that it is a thick tailed distribution and at these high confidence levels we are potentially, significantly underestimating the uncertainties in the error model.

Shola Okewunmi, Chevron asked if Steve Grindrod, Copsegrove Ltd. could illustrate on the implementation in the software, to make it clearer to the audience on how to handle the issue of new error models and what you suggest.

Steve Grindrod, Copsegrove Ltd. explained that in his own software, what he has done instead of using the numeric values, he has an input for BGGM to be used. So when the program loads up the data, the program picks the latitude and longitude and the confidence level. The program then picks up the three values for that particular location. The program then puts them into a duplicate copy of the error model file. The program then runs that as though it is one sigma. So the actual calculation engine in this case has not changed.

Benny Poedjono, Schlumberger commented he agrees with Steve Grindrod. He stated that the penalty you could pay if you do not use the correct data BGGM is that collision avoidance will be wrong and from a health and safety point of view we have to do it, (implement the look up table values). Also one of the key issues for the BGGM is that they do not have enough stations and the BBGM can be very poor. If a satellite is down in a year then that years BGGM could be very poor. We need to take this into consideration.

Steve Grindrod, Copsegrove Ltd. added that the tables are predicted to last for about another five years. He also said that there are problems that for some of the geomagnetic measurements coming from satellites the quality is starting to degrade and at least one of them might die shortly. They may not be able to replace this satellite before it dies, if this is the case then the accuracy will degrade and there will be another set of table which will be slightly worse than the current table values.

Harry Wilson, Baker Hughes added he wanted to reiterate an earlier point. If we do not want to the added complexity which is severe and a justified concern and there may be many implications we have not yet figured out in terms of implementation or usage. So the proposal is to implement the look up table values or alternatively stick with what we have with the current ISCWSA generic error model.

Harry Wilson, Baker Hughes also stated that in doing this for the generic and all non IFR models we would have to up the term value?

Steve Grindrod, Copsegrove Ltd. added if you are ignoring the confidence level issue then you would have to up the term (error model) value. For example for a North Sea well you would jump from 0.48 to 0.72 value for your error model term to be safe.

Benny Poedjono, Schlumberger added that is the penalty you would pay for not implementing the correct error term and you would not be safe and it would be wasting money.

Anas Sikal, DrillScan asked if the data follows a distribution at all?

Steve Grindrod, Copsegrove Ltd. answered, you could probably derive something that would actually fit it. But the way data was produced is by percentage confidence level at 68.3%. From the test data, they have only taken 68.3% of the data and come up with the model value at that level. So by going to these confidence levels there is no assumption about the mathematical description of the error distributions.

Anas Sikal - DrillScan asked if we could assume that these is some distribution fitting of this data, then the implication in our software would much easier to deal with in our software although with some inaccuracy but it would be a step forward from what we have now.

Steve Grindrod, Copsegrove Ltd. agreed that this could be possible but the fundamental math in the MWD ISCWSA model assumes that you have Gaussian distribution data.

Steve Grindrod, Copsegrove Ltd. offered to audience to vote for implementing BGGM lookup table values or not.

Simon McCulloch, Maersk asked the audience all those agree say yes by raising your hand.

Robert Wylie, NOV interjected that a question was asked by Dave McRobbie, Tech21, regarding the collision avoidance recommendation that goes with this decision, and Dave McRobbie, Tech21 asked if the committee was roughly equally split or was there a clear majority. Please can the subcommittee answer that question before proceeding?

The collision avoidance committee responded that they had 100% agreement to implement the look up table values.

41 audience votes were cast and were for the implementation of the look up tables in the MWD ISCWSA error model.

One vote against the implementation of the look up tables in the MWD ISCWSA error model.

Steve Grindrod, Copsegrove Ltd.

Presented on Update on Error Model Workgroup - Part two toolface independent terms of the ISCWSA error model

Toolface Independent.ppt

Andy Brooks, Pathfinder, asked if we will be recommending one of the two flavors of toolface independent error model. The first being systematic and the second random. Which one are we going to recommend implementing?

Steve Grindrod, Copsegrove Ltd. answered, that in most cases there is not a lot of difference between them. The systematic version is slightly more conservative.

Andy Brooks, Pathfinder added that the systematic conservative version would be his recommendation.

Steve Grindrod, Copsegrove Ltd. stated that the group would suggest to implement the Systematic terms to the ISCWSA model.

Brett VanSteenwyk, Scientific Drilling asked what was the underlying assumption used to eliminate toolface?

Steve Grindrod, Copsegrove Ltd. referred Brett's question to Andy Brooks, Pathfinder.

Andy Brooks, Pathfinder, reference Torgeir Torkeldson's and Jon Bang, paper SPE63275, on which this is based on.

Simon McCulloch, Maersk

Asked for the audience to vote on the implementation of systematic toolface independent terms to the ISCWSA model.

Simon McCulloch, Maersk, confirmed that the majority voted for the implementation of systematic toolface independent terms to the ISCWSA model.

Paul Rodney, Halliburton asked to be able to review the proposal before he voted.

Dave McRobbie, Tech21 suggested that he did not fully understand and had not reviewed the proposal and wanted to register his reservations in implementing the terms majority result on rest of audience voted in favor to implementing the TF independent terms to the ISCWSA error model.

Steve Grindrod, Copsegrove Ltd. read out the response from the witsml team on ISCWSA proposal to include the models in the witsml system.

Steve Grindrod, Copsegrove Ltd. proposed to audience that perhaps the group should not continue to work with the witsml group for import export error model functionality between our directional software products and the ISCWSA should maybe do the work ourselves.

Steve Grindrod, Copsegrove Ltd. explained that Landmark Compass ipm formats do not completely describe the models well enough. The gyro service providers use a model template, from the Gyro paper which is good enough for industry use. The model and term naming conventions need to be standardised. Simon Verity, Sysdrill sent an e-mail to Steve Grindrod, Copsegrove Ltd.

Steve Grindrod, Copsegrove Ltd. asked the audience if the group (ISCWSA) should submit to witsml as a place holder for future publishing ISCWSA witsml format?

The audience showed a clear majority voting in favor that group should submit to witsml as a place holder for future publishing ISCWSA witsml format.

Announcement for the ISCWSA Program Chair

Shola Okewunmi, Chevron announced that Bill Allen, BP had won by majority vote for the position of program chair. Congratulations Bill.

Simon McCulloch, Maersk, stated that there is a proposal for holding next meeting in Doha, Qatar or Austin Texas, USA

Simon McCulloch, Maersk described that Maersk Qatar Oil were willing to sponsor a meeting in Qatar.

Aubrey Holt, President Bench Tree in Austin, Texas described his company as a third party repair and calibration facility for survey equipment. With a facility in the North of Austin Texas.

Simon McCulloch, Maersk asked the audience to vote for Austin Texas or Doha, Qatar for the next ISCWSA meeting.

A majority vote from the audience was in favor of Austin Texas for next meeting.

Benny Poedjono, Schlumberger

Presented on Anti-Collision in the real world

Bill Allen, BP asked whether the wells which were granted exemption were still live or had an associated HS&E risk?

Benny Poedjono, Schlumberger answered no.

Bill Allen, BP referred to the chart of wells that seemed to be granted exemption but also had HSE risk.

Benny Poedjono, Schlumberger confirmed that the HS&E risk was eliminated.

Pete Clark, Baker Hughes asked where the 0.8 in the MASD definition presented by Benny Poedjono, Schlumberger came from? I.e. (0.8 x clearance dist + R1+R2)

Darren Aklestad, Schlumberger agreed that the 0.8 x clearance dist was a safety cushion.

Simon McCulloch, Maersk asked if Schlumberger have looked at the implementation the policy and how many operators do not have a policy and asked to use the Schlumberger policy?

Benny Poedjono, Schlumberger explained that Schlumberger applied their own and the operators policy. Some independent companies use the Schlumberger policy only. Benny explained, that often the clients ask Schlumberger how come you are the only one asking for this, (asking to use a collision avoidance policy), and no one else asks for this information..

Harry Wilson, Baker Hughes suggested that Baker Hughes has experienced when approaching clients, clients have expressed concern at service companies suggesting that an anti-collision management system with policy and procedures is to be used for a project. And in some cases Baker Hughes have had to walk away from work where clients have not been able to demonstrate that HSE would be managed to an acceptable level.

John Thorogood - Drilling Global Consultant LLP (DGC), added that he had to protest that it is not just Schlumberger that have their own internal policy and procedures, all other operators have their own policy and procedures.

Benny Poedjono, Schlumberger confirmed that it was not his intention to state that the other service companies did not have their own policy and procedures.

Ludovic Macresy, DrillScan

Presented on Analysis of Misalignment and Sag terms

John Thorogood - Drilling Global Consultant LLP (DGC), expressed his concern at considering that sag existed at verticality for BHAs in vertical wells.

Ludovic Macresy, DrillScan explained that he would address this later.

Chuck Asfahl - Applied Physics Systems, asked if the sag findings have been confirmed by using NBI data?

Ludovic Macresy, DrillScan, confirmed Yes.

Benny Poedjono, Schlumberger asked how the comparison Gyro surveys were run?

Ludovic Macresy, DrillScan, said that the gyro was standard as service company. It was centralised and fully quality controlled according to standard operating procedure. The Gyro dataset was sent back to the gyro company for post run quality checks.

Benny Poedjono, Schlumberger asked if there were any further datasets.

Ludovic Macresy, DrillScan replied yes, and he has looked into other data comparisons and he has seen some issues looking at the other dataset.

Harry Wilson, Baker Hughes stated that this is only one dataset and it looks like we are trying to invent data terms to make those data match. The point is that within the group, none of the members think that sag behaves as per the sine Inclination term, which incidentally is the way it is currently modeled. So this example it is incorrect or over simplistic to use the simple Sine Inclination sag weighting function. When we run sag correction algorithms on multiple BHAs and plot the outputs, the sag corrections values are heavily weighted applied early on or at the low inclinations is significant. So outside of the one gyro comparison, we need something other than a simple sin inclination weighting.

Ludovic Macresy, DrillScan, agreed.

Robert Wylie, NOV

Presented the ISCWSA group accounts

Robert Wylie, NOV Presented on the cost of meetings and current funding strategy

Current balance will be approx 4000-4500 USD depending on dispute with previous hotel vendor, Hilton hotel Amsterdam.

Simon McCulloch, Maersk asked if the operators and service companies could comment on where we, (the ISCWSA) are going

John Thorogood, Drilling Global Consultant LLP (DGC), discussed that SPE has changed with more technical sections. He explained that the SPE has a resource for SPE mail distribution and booking standard packages for meetings. SPE organised a half day venue, no catering was needed.

Bill Elks, Exxon Mobil stated that with respect to education and training within the industry, Exxon Mobil joined the JIP to try to put together some laymen's terms for surveying. Bill explained that he has worked for Exxon Mobil for many years and it was not until approximately 6 years ago that they started to instigate any kind of survey policy within the company. This occurred due to a few well collisions in 2002. Since then they have put together some company guidelines. Bill explained that visibility and awareness is key in the industry. Bill acknowledged that there are a token few people in the world who actually do the mathematics for the industry.

Lisa Grant, Shell, explained that she is a Shell subject matter expert for survey for Shell and has colleague Mike Cauley in Aberdeen. Lisa explained that Shell are also very stretched for covering the entire globe. Lisa explained that anything that she can get out of this group, she would be very grateful for bringing into the field within Shell.

Shola Okewunmi, Chevron explained that Chevron aims to be a clear leader. To do this they must spread the word in the industry. One challenge he would like to bring to all the attendees in the meeting and bring something to move industry understanding forward. Could you offer a mini forum or mini workshop. Can we bring in the other vendors into the group to collectively move forward. Maybe we need to introduce more mathematicians into the group (ISCWSA).

Lisa Grant, Shell, explained that a laymen terms approach to educating Shell engineers has been very beneficial and already has caused a change in the day to day thinking of target sizing.

Mike Terpening - Schlumberger suggested if anyone is available the following week in Houston, that there is another industry meeting APSG, (American Petroleum Survey Group). This is more of a geodesy focused group and it deals with more positioning type problems in the industry, with laymen terms.

Harry Wilson, Baker Hughes suggested that it may be valuable to form an operators group. This might promote attendance for other operators, and also may have a real purpose for allowing the operators to describe their needs.

Shola Okewunmi, Chevron suggested that the first operator's group subject forum should be target sizing.

John Thorogood - Drilling Global Consultant LLP (DGC) suggested that the operators sub group should define an operator's work flow. The agenda should be what work flow, best practice for an operator for the well design process, e.g. this is in the BP surveying practice manual. A workshop defining end user work flow.

Lisa Grant, Shell agreed, that for example, Shell have complex standards and the laymen engineers find the internal policy and procedure to be too complicated. Lisa proposed that the operator sub group could produce a lay terms document to simply list what needs to be done, to enable the operator engineers to better monitor and follow the processes at a higher or laymen terms level.

Wayne Phillips, Schlumberger agreed that education is best way the group can offer value to the industry.

Shola Okewunmi, Chevron suggested that perhaps the SPE ISCWSA should offer lunch and learns delivered to the industry and that the SPE should organise these meetings.

Simon McCulloch, Maersk, closed the meeting.