



Minutes of the 35<sup>th</sup>



ISCWSA meeting

**Industry Steering Committee on  
Wellbore Survey Accuracy**

and

**SPE Wellbore Positioning Technical Section**

Edinburgh, Scotland

May 10th 2012

**Meeting Venue**

Radisson Blu

Edinburgh

Scotland

<b>LastFirstMiddleName</b>	<b>Company</b>	<b>Email_Address</b>
Wylie, Robert	NOV	robert.wylie@nov.com
Verity, Simon	Paradigm	simon.verity@pdgm.com
Ledroz, Adrian G	Gyrodata Inc	adrianl@gyrodata.com
Mann, Carol Eve	Dynamic Graphics, Inc.	carol@dgi.com
Everts, Robert	Shell	r.everts@shell.com
Mullin, Stephen	Gyrodata Inc.	stevem@gyrodata.com
Lowdon, Ross	Schlumberger	rlowdon@slb.com
Poedjono, Benny	Schlumberger	poedjono1@slb.com
Macmillan, Susan	British Geological Survey	smac@bgs.ac.uk
Wilson, Henry	Baker Hughes	harry.wilson@bakerhughes.com
Gjertsen, Morten	Baker Hughes	morten.gjertsen@bakerhughes.com
Allen, Bill	BP	william.allen@bp.com
Mitchell, Ian	Halliburton	ian.mitchell@halliburton.com
Barlow, John S	Scientific Drilling Intl.	jbarlow@alumni.rice.edu
Maus, Stefan	University of Colorado	stefan.maus@noaa.gov
St. Louis, Shaun R	Halliburton Sperry	shaun.stlouis@halliburton.com
Haecker, Bill	Crescent Directional Drilling	bhaecker@crescentdirectional.com
Shoup, Rob	Gyrodata	robs@gyrodata.com
McRobbie, David Philip	Tech21	davemcrobbie286@btinternet.com
McGregor, Andrew	Tech21 Engineering Solutions	andrew.mcgregor@weatherford.com
Harbidge, Philip David	Schlumberger	pharbidge@slb.com
Edwardsen, Inge	Baker Hughes	Inge.Edwardsen@bakerhughes.com
Skinner, Gary	Baker Hughes	gary.skinner@bakerhughes.com
Thomson, Alan W	British Geological Survey	awpt@bgs.ac.uk
Sentance, Andy	Dynamic Graphics	andy@dgl.co.uk
Clarke, Ellen	British Geological Survey	ecla@bgs.ac.uk

Hamilton, Brian	British Geological Survey	bham@bgs.ac.uk
Heath, Alan John	Pathfinder	AHEATH01@Pathfinder.slb.com
Clark, Pete James	Chevron ETC	peterjclark@chevron.com
Waag, Tor Inge	Teknova	tiw@teknova.no
Audard, Florence	Services Techniques Schlumberger	faudard@slb.com
Matzka, Jürgen	DTU Space	jrgm@space.dtu.dk
Grindrod, Steve	Copsegrove Developments Ltd	steve@copsegrove.co.uk
Hansen, Truls Lynne	University of Tromse	truls.hansen@uit.no
Arthur, Andy	Baker Hughes	andy.arthur@bakerhughes.com
Holmes, Anne	Sperry Drilling	anne.holmes@halliburton.com
Ragbirsingh, Yosha M	Baker Hughes	yosha.ragbirsingh@bakerhughes.com
Allen, Timothy	Halliburton	timothy.allen@halliburton.com
Long, Michael	Baker Hughes	michael.long@bakerhughes.com
McCulloch, Simon	Maersk Oil	simon.mcculloch@maerskoil.com
Schiermeier, Pete Louis	Sperry Drilling	pete.schiermeier@halliburton.com
White, Tim	USGS	ttwhite@usgs.gov
Macrae, Laurence Michael	Schlumberger	LMacrae@Slb.com
Bergstrom, Neil S	Devon Energy	neil.bergstrom@dvn.com
Winter, Paul Steven	Baker Hughes	paul.winter@bakerhughes.com
Codling, Jeremy	Halliburton	jerry.codling@halliburton.com
Rohner, Hanspeter	DHS Energy Services	hrohner@dhsenergyservices.com
Wallis, Nick	DHS Energy Services	nwallis@dhsenergyservices.com
Henderson, Colin	Halliburton	colin.henderson@halliburton.com
Price, Tim	IMDEX Technology Germany GmbH	tim.price@imdexlimited.com
Chernyshoff, Andrei	IMDEX Technology Germany GmbH	andrei.chernyshoff@gmail.com
Cooke, Stan C	Weatherford, Tech21	stanley.cooke@weatherford.com
Walker, Patrick D	Halliburton / Sperry Drilling	patrick.walker@halliburton.com

Herbert, Mike	ConocoPhillips	mike.herbert@conocophillips.com
Dawoud, Wafa Mostapha	Baker Hughes	wafa.dawoud@bakerhughes.com
Hong, Dukhwa	Schlumberger	dhong@slb.com
Pham, Son Van	ConocoPhillips	son.v.pham@conocophillips.com
Fraser, Mark	Scientific Drilling	mark.fraser@scientificdrilling.com
Beggan, Ciaran	British Geological Survey	ciar@bgs.ac.uk
Bremner, Ross	Halliburton	Ross.Bremner@Halliburton.com
Pye, Richard Mark	National Oilwell Varco	richard.pye@nov.com
Torkildsen, Torgeir	Wellpos	ttorkil@online.no
McAinsh, Ross	NOV	ross.mcainsh@nov.com
McEldowney, Pete	Halliburton Contractor	pmceldowney@yahoo.com
Bowe, James	Halliburton	jim.bowe@halliburton.com
Brooks, Andrew	Schlumberger	abrooks01@slb.com
Ryan, Barry	Halliburton Sperry	barry.ryan@halliburton.com
Epplin, Dave	Baker Hughes	dave.epplin@inteq.com
Hanak, Chad	Baker Hughes	chad.hanak@bakerhughes.com
Smart, Barry	Gyrodata	Barrys@gyrodata.com
Sawaryn, Steven	BP	sawaryns@bp.com
VanSteenwick, Brett	Scientific Drilling Intl.	bvanstee@ata-sd.com
Hunter, Gail	RICS	GHunter@rics.org
Jamieson, Angus	University of Highlands and Islands	Angus.Jamieson@Tech21.co.uk
Langlands, Iain	Glasgow City Council	Iain.Langlands@glasgow.gov.uk

## Agenda

<b>Activity</b>	<b>Presenter(s)</b>	<b>Title/Notes</b>	<b>From</b>	<b>To</b>
<b>Welcome &amp; Coffee</b>			<b>08:00</b>	<b>08:30</b>
Introductions	Bill Allen, BP	Introductions & Summary of Schedule	08:30	08:45
Presentation	Iain Langlands	Royal Institute of Chartered Surveyors; the survey discipline	08:45	09:15
Presentation	Jerry Codling, Landmark	Survey Comparison Methods	09:15	10:00
<b>Coffee</b>			<b>10:00</b>	<b>10:15</b>
Presentation	Steve Sawaryn, BP	A New Approach to Separation Factor calculation	10:15	10:45
Sub-committee update	Harry Wilson, BHI	Report of Collision Avoidance Sub-committee activity	10:45	11:05
Sub-committee update	Steve Grindrod, Copegrove	Report on Error Model Sub-committee activity	11:05	11:25
Presentation	Conoco Phillips	Requirements for Next Generation Directional MWD Capable of Ranging for Anti-Collision or Intersection	11:25	11:55
Sub-committee update	Ross Lowdon	Report on Well Intercept Sub-committee activity	11:50	12:10
<b>Lunch</b>			<b>12:15</b>	<b>13:00</b>
Facilitated Discussion	Simon McCulloch, Maersk; Pete Clark, Chevron; Neil Bergstrom, Devon facilitated by Bill Allen, BP	Operator's view on the challenges of Wellbore Placement	13:00	14:20
Presentation	Morten Gjertsen	Directional Surveying in the Norwegian Sea	14:20	14:50
Administration	Robert Wylie, NOV	Treasurer's report	14:50	15:00
<b>Coffee</b>			<b>15:00</b>	<b>15:15</b>
Presentation	Harry Wilson, BHI	Sensor data exchange format	15:15	15:45
Presentation	Susan MacMillan	Recent developments in geomagnetic referencing services	15:45	16:15
Presentation	Neil Bergstrom	Magnetic spacing calculation	16:15	16:45
Sub-committee update	Steve Mullin, Gyrodata	Report on Education Sub-committee activity	16:45	17:15
Update on new Website	Phil Harbidge, Schlumberger	Update from the Webmaster	17:15	17:30
AOCB	Bill Allen, BP	AOCB, Wrap-up & goodbye	17:30	18:00

## **Meeting minutes**

### **Bill Allen Chair Opening remarks**

Thanks to Halliburton for sponsorship

Introductions of all present

Description of the day

### **Iain Langlands/Gail Hunter (JM) – RICS presentation**

Angus Jamieson – RICS offers professional recognition for the industry

Ross Lowdon- stated he has gone through the process of being a Fellow in the RICS and has found it a rewarding experience for him and for SLB.

### **Jerry Codling - survey comparison methods**

Bill Allen        Useful tests but need pass fail criteria needed

Adrian Ledroz    Chi square test used, what about doing this – useful but not built in no pass fail

Neil Bergstrom    how to get surveys at different depths- interpolation

Angus Jamieson    High tortuosity caused problems with comparisons, could compensate for depth bias to solve the issue – under estimating random errors, as doesn't

Grant Skinner    will show up poor survey practice – yes

Pete Clark        Combine ladder plots and survey comparisons – could be done

Andy Brooks      T plots need to be corrected for depth error

Benny Poedjono        always need to depth corrections can plot continuous data – yes but errors in continuous data

Harry Wilson     use collision scanning to see how well they work which survey should we use if comparisons done, what to use MASD between MWD and gyro for rigsite surveys

## **Steven Sawaryn New AC calculations**

Torgeir Torkildsen why should we use this instead of current standards, pedal curves are OK? – there is more space to be had with this method.

Jerry Codling pedal curve not iterative, but this is a good step forward

Neil Bergstrom SF =1 and 2 = twice the distance so very good

Andy Brooks Combine this into one ellipsoid using relative uncertainty– the same as single sided

Torgier Torkildsen How do you provide probability of collision – probability on its own doesn't really help, so large uncertainty = lower probability of collision so counter intuitive

Angus Jamieson always resistance to new tech in oilfield - but no difference to the user SF etc still used.

## **Harry Wilson well avoidance group update**

Need feedback on Anti-collision documents

## **Steve Grindrod error model WG**

Torgier Torkildsen Plan to build an error model for MSA? - no work on this

Timothy Allen Bias terms are they OK – yes for drillpipe and will produce a new model

Phil Harbidge how conservative are the old vs new model – not easy to say

Phil Harbidge name of our new error model what is it?

Angus Jamieson WMF where does it come from and errors, - identical to IGRF in principle

Ian Mitchell Standard method for validation error models

## **Son Van Pham Next generation MWD**

Robert Wylie Requirements need to be realistic – agreed

Neil Bergstrom customers need to start asking for what they want – niche technology and make it more routine

Angus Jamieson Need to establish the market size as AC market is large – agreed, good to manage risk

### Panel session

Pete Clark lead presentation on error models survey QA/QC used in industry

Simon McCulloch develop standard set of error models

Grant Skinner get rid of old error models – but need to do this with all models

Torgier Torkildsen Statoil has 15 and might be interested in sharing

Pete Clarke definitely needed

Bill Allen what is a validated error model? Can we do this by service companies, need a process to do this

Angus Jamieson Planning vs execution phase so simplified set for planning and then specific ones for execution

Bill Allen very complex to manage but need to validate error models

Harry Wilson Error model term standardised, operational QC tests to check data meets models

Bill Allen we need to bring all of this together

Neil Bergstrom gross errors low hanging fruit get raw data from service company and check it. Service companies may not QC.

Harry Wilson very difficult to do with gyros

Simon McCulloch all survey data QC'd

Ross Lowdon Need to define what operators want

Bill Allen assumptions made as to what needs to be done for surveys so should be able to define what you want

Angus Jamieson most people we need to be speaking to are not here, service companies happy to improve service quality so we need to educate

Pete Clarke CVX does not look at QC routinely so a lot of work to be done



Bill Allen When you fail QC any one made aware, so proactively interested, so need to chase things up so you get the best quality.

Steven Sawaryn too many standards, so try to get basic standards out to standards body

Harry Wilson What is SM, what do we mean by this, more QC

Pete McEldowney database transfer needs to be improved

Son Van Pham who owns the data? This is a real issue, OK when paying for the data quality, but poor in low cost wells

Ross Bremner too much trust for data from the directional suppliers

Bill Allen office base NPT poor data management cost time = money

Ross Lowdon not paying for data it is worthless and poorly looked after especially databases are an issue

Bill Allen how do you prove survey databases are right

Harry Wilson auditing is done to help

Colin Henderson DE's are not the right guys to look at this

Andy Arthur JORPS not consistently applied internally with the operator, HSE rules especially problematic

Bill Allen service companies need to be diligent and push forward

**Morten Gjertsen Directional Surveying in the Norwegian Sea**

Angus Jamieson 0.45 degrees for DIP, seems big and is a problem for MWD tools

Harry Wilson BHI error model is not ISCWSA

Simon McCulloch cost of station –approx £20k

Ian Mitchell how frequent were the observations taken for Mag sighting in – variometers only

Dave McRobbie Are you going to use this data? – yes to bring the data into FAC, but this is evaluation will build on this going forward

**Robert Wylie    Treasurers report**

Money available now for no sponsorship at meetings or student sponsorship

**Neil Bergstrom        Non mag spacing**

Andy Brooks    10ft spacing needed in all orientations so that all surveys are still in QC. – just correct the issue with MSA/Single station.

Andy Brooks    Does a motor change in magnetism – yes likely as strong internal field.

**Harry Wilson    Sensor data exchange format**

Explains data management is easily lost. Explaining Directional data output file. Shows how BHI takes raw surveys applies corrections and QC's them. Allows auditability of all corrections.

Shows a QC template, a summary of the survey program. Allowed for QC by co-ordinators.

Neil Bergstrom perhaps added in a BGGM model year – yes that is possible

Simon McCulloch                    varying QC is good, based on orientation – High angle E/W is very difficult to correct for.

Pete Clark        question to SLB and HAL, do you have a QC file like this? Yes and Yes (SLB not so formalised but auditable)

Bill Allen        New expected data format to be presented at the next meeting

Phil Harbidge    do the same thing for the gyro providers

Pete Clark        would be very good to have

**Susan MacMillan        Recent developments in geomagnetic referencing service**

Pete Clark        if you had a free observatory where would you put it – put an observatory in Mid Pacific

Neil Bergstrom seabed observatories, are they possible – yes this is difficult but moving forward

Phil Harbidge    what *new* work was being done to verify or improve the magnetic downward continuation calculation process– the process of downward continuation was in continued development at BGS

**Steve Mullin    education sub-committee meeting**

Mission to improve the understanding of wellbore surveying to the general industry

Moving to doing smaller workshops similar to the one done at DEVEX with Ross Lowdon and Harry Wilson

ATW call to get people from operators not from this group which would be counter productive

**Phil Harbidge    Webmaster update**

Demonstration of new website and SG presented what is going to stay on ISCWSA.org

**Bill Allen        AOB**

Help with sponsorship for next meeting