

# OWSG & RP 78 Update

Sub-Committee Report for Mtg. 57



## Agenda

- Introduction
- Meetings
- How to Join
- Attendees
- Topics
- RP 78 Update
- AADE NTCE RP 78 Intro Paper

## Our Mission

To promote practices that provide confidence that reported wellbore positions are within their stated uncertainty.

Agenda



## OWSG Meetings in 2022-23

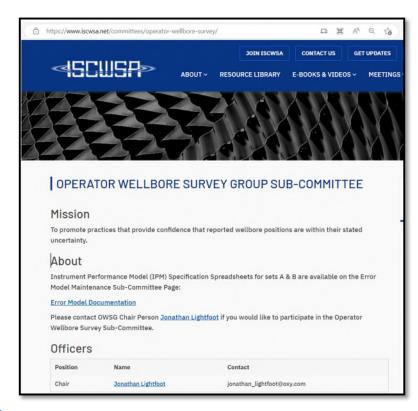
- May 23, 2023 (Mtg 24)
- April 11, 2023 (Mtg 23) Ideas & Case Studies
- February 7, 2023 (Mtg 22)
- December 1, 2022 (Mtg 21)
- September 28, 2022 (Mtg 20)
- August 9, 2022 (Mtg 19)
- June 14, 2022 (Mtg 18)
- January 25, 2022 (Mtg 17)





## Join the OWSG

- Go to www.ISCWSA.net
- Select: SUBCOMMITTEES from the upper dropdown menu
- Select: OPERATOR'S WELLBORE SURVEY GROUP
- Click on the Chair's Name: Jonathan Lightfoot
- Send an email and ask to be added to the Teams Meeting Distribution List
- Meetings are Open for Anyone
- Please email me in advance of the meeting if you have Ideas, Suggested Topics, Issues or Case Studies
- If you would like to be Chair just ask! Happy to continue but happy to allow someone else to do the job.



57<sup>th</sup> General Meeting Main meeting 10<sup>th</sup> of March 2023 Stavanger



#### Wellbore Positioning Technical Section



The Industry Steering Committee on Wellbore Survey Accuracy (ISCWSA)

### **Attendees**

## Meeting Lookback

• Total: 89

Average: 18 per Mtg.

• Avg. Operator: 13

• Avg. Non-Op: 6

Name	Affiliation	25-Jan-2022	9-Aug-2022	28-Sep-2022	1-Dec-2022	7-Feb-2023	Total
Jonathan Lightfoot	Oxy	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	5
Will Tank	Оху	$\checkmark$	×	$\checkmark$	×	$\checkmark$	3
Pete Clark	Chevron	$\checkmark$	$\checkmark$	<b>√</b>	×	$\checkmark$	4
Kevin Sutherland	Chevron	<b>√</b>	×	X	X	×	1
Dalis Deliu	ConocoPhillips	$\checkmark$	$\checkmark$	<b>√</b>	$\checkmark$	$\checkmark$	5
Nestor Sanchez	ConocoPhillips	×	×	$\checkmark$	X	$\checkmark$	2
Heather Vannoy	EOG	$\checkmark$	$\checkmark$	<b>√</b>	×	$\checkmark$	4
Price Maxwell	Оху	×	×	$\checkmark$	$\checkmark$	$\checkmark$	3
Hans Dreisig	Total	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	5
Marianne Houbiers	Equinor	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	5
Matt Weber	Shell		×	$\checkmark$	$\checkmark$	×	2
Bill Allen	BP	✓	✓	✓	<b>√</b>	×	4
Nicholas Robertson	BP	<b>√</b>	<b>√</b>	<b>√</b>	<b>√</b>	×	4
Juan Jose Exposito	Cepsa EP SA	×	×	✓	✓	×	2
Petter Kvandal	Aker bp	×	×	<b>√</b>	<b>√</b>	×	2
Frank Gao	Оху	×	×	✓	×	×	1
Tatiana Gobert	Oxy	×	×	<b>√</b>	×	×	1
Ryan Carlson	ExxonMobil	✓	×	✓	×	×	2
Juan Sierra	Oxy	×	×	<b>√</b>	×	×	1
David Baker	ConocoPhillips	×	<b>√</b>	<b>√</b>	X	×	2
Fauzia Waluyo	Aramco	×	<b>√</b>	X	×	×	1
Knut Ness	ADNOC	<b>√</b>	<b>√</b>	X	X	×	2
Ali Karimi	Оху	×	<b>√</b>	X	×	×	1
Jacob Gauthier	BPX Energy	<b>√</b>	×	X	×	×	1
Chad Dubois	ExxonMobil	<b>√</b>	×	X	X	×	1
Name	Affiliation	25-Jan-2022	9-Aug-2022	28-Sep-2022	1-Dec-2022	7-Feb-2023	Tota
David Gutierrez	Superior QC	×	×	$\checkmark$	$\checkmark$	×	2
Mike Calkins	Three Sigma Well Design, LLC	×	×	$\checkmark$	$\checkmark$	$\checkmark$	3
Tim Paton	Superior QC	$\checkmark$	×	$\checkmark$	×	$\checkmark$	3
Marc Willerth	HP Tech	<b>√</b>	$\checkmark$	<b>√</b>	$\checkmark$	$\checkmark$	5
Jerry Codling	Halliburton	×	×	$\checkmark$	$\checkmark$	$\checkmark$	3
Adrian Ledroz	Gyrodata slb	<b>√</b>	×	$\checkmark$	$\checkmark$	<b>√</b>	4
Ross Lowdon	slb	×	×	×	<b>√</b>	×	1
Phillip Gurden	Gurden Tech Consultancy	×	×	$\checkmark$	×	×	1
Chad Hanak	Superior QC	×	×	<b>√</b>	×	×	1
Philip Harbidge	Path Control	×	×	$\checkmark$	×	×	1
Gary Skinner	Baker Hughes	<b>√</b>	×	×	×	×	1

Recent Attendees 5

## Mtg. Topics

- API RP 78 (Every Meeting)
- Maximum Survey Interval Implementation Challenges
- 5-1 Error Models, Data Movement & Dispensation Practices
- IADC Technical Publications Committee (Volunteer Opportunity)
- Advanced Trajectory Designs (3D Curves, Catenary, Bezier, Spline-in-Tension)
- Wellbore Quality Metrics, IOGP P7, MWD Sensor Calibration & Lab Stds.
- Wits-Level 7 Survey Object Table, Cone of Uncertainty Models, Sustained Inc. Calc
- Measure of Lateral Straightness Calculations
- Upcoming Industry Events (IADD, Geothermal, OWSG, SPE, IADC, etc.)

# API RP 78 Update

Progress Update

Title of slide 7



#### Wellbore Positioning Technical Section



The Industry Steering Committee on Wellbore Survey Accuracy (ISCWSA)

#### **FINAL EDITS - MARCH**

## API RP-78 WORKGROUP LEADER REVIEW

#### FINAL VERSION PREP API BALLOTING – MAY

#### **183 TOTAL PAGES**

MAIN RP BODY: 88 PAGES

ANNEX: 44 PAGES

BIBLIOGRAPHY: 6 PAGES

#### ANNEX A, B, & C

A: SURVEY MATHEMATICS
B: DEPTH PROCESS AUDIT
C: MAGNETIC, DEPTH AND GYRO
SURVEY QA/QC

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The Industry Steering Committee on Wellbore Survey Accuracy (ISCWSA)

## RP 78 Task Group Leaders

Original Section Leaders
 & Technical Leaders for
 Each Category

 Pre-Ballot Draft to be Posted on API RP 78 Task Group SharePoint Site -End of March

Section	Leader	Technical	
Anti-Collision	Steven Sawaryn	Pete Clark	
Database	Jordon Meyer / Mary Malihpour	Maria French	
Directional Survey Records	Jonathan Lightfoot	Michael Long	
Glossary	Son Pham	Maria French	
Maps, Plots and Visualization	William Allen	Kevin McClard	
Operation / Execution	Ed Dew	Benny Poedjono	
Planning / Engineering	Pete Clark	Julie Cruse	
Purpose and Scope	Ben Coco	Jonathan Lightfoot	
QA/QC Depth	Roger Goobie	Harold Bolt	
QA/QC Gyro	Roger Goobie	Adrian Ledroz	
QA/QC Magnetic	Roger Goobie	Andy Brooks	
Software	Bill Allen	Stuart Sargent	
Survey Mathematics	Pete Clark	Chad Hanak	
Survey Program	Lisa Grant	Ross Lowdon	
Transition / Handover	Will Tank	Benny Poedjono	
Well Origin / Surface Location	Bert Kampes	John Connor	

**Presentation** g





# AADE NTCE Intro to RP78 Paper

April 4-5, 2023

AADE NTCE 10



#### Wellbore Positioning Technical Section



The Industry Steering Committee on Wellbore Survey Accuracy (ISCWSA)

The American Petroleum Institute (API) recently undertook development of a document called Recommended Practice 78. Wellbore Surveying and Positioning, (RP 78), a modern technical industry standard for wellbore placement that can be applied to all wellbore construction applications. The standard is intended to serve as the primary technical reference for proven engineering practices in the application of oil and gas, geothermal, carbon sequestration, coalbed methane (CBM), horizontal directional drilling (HDD) trenchless boring, mineral ventilation and extraction, scientific coring, and all other subsurface borehole construction applications.

API RP 78's development was led by a group of independent consultants, industry experts, academia, and representatives from public and private energy operators. The Operator's Wellbore Survey Group (OWSG), that later became an official sub-committee of the Industry Steering Committee on Wellbore Survey Accuracy (ISCWSA), initiated the project after a poll of operator members showed the need for a set of minimum industry requirements for wellbore construction, safeseparation, and positioning. The ISCWSA is equivalent to the Society of Petroleum Engineers (SPE) Wellbore Positioning Technical Section (WPTS). The establishment of this standard, made available through API's standards development process. will provide modern practices for all subsurface boring industries, beyond just oil and gas applications.

attenders understand the roles and regulatives governing the

AMERICAN ADDROXULE

end matter is willow unable service a support well-long construction which produce

sales and connection. The meeting still be

the antique leve, both east and indout. We will

amount our sill or orders or dispusathere goeds or services, deale markets,

Andrea with release to will or will out the

factors Acres by marrier for each compute or

cell and gas explanation and production ignorators. Pro-

the distribution for through the refinite.

**OWSG Focus Areas and Initiatives** 

way of the trial order in opposed to previously being exclusive to

and past meeting minutes are posted on the ISCWSA website

and those interested in participating can request to be added to

The most fire a standard set of position amortainty models, also known as error models, busines a priority of early regetings.

first models, also called instrument performance make

(IPM) plus a crucial role in the management of directions

name for an error model is a positional uncertainty model

include conventional legacy filtrobused instruments, modern

Indication Only Planning - A method for new vertical

Some of these models serve only a utility purpose and are

electronic magnetic tests, and gyroscopic servey system

not based on survey instruments. These include:

· Unknown Madel - A competitive impressed formance model road when data is available but key.

Introduction to API RP 78, Wellbore Surveying and Positioning Assethen D. Lightfoot and Will Tank, Day, Ben Coop, API

Abstract
The American Principum Institute (API) secontly undersical Planting Theorem 78 development of a discusses colled Recommended Procises 78.
Billbur Serveying and Poursoning, (BP 78), a modern referred industry numbers for wellfore placement that can be applied to all wellfore construction applications. The standard is intended to serve as the primary exhaucal reference for purson engineering practices in the application of cell and gas, probernal, varior sequestration, coalled methane (CBM), nonnenal directional drilling (RDD) trenchless being, mineral ventilation and revenues as scientific using, and all other advanture barehole construction applications.

API RP 78's Acceleptacet was led by a group of independent consultants, indicary expens, academia, and representatives from public and private energy operators. The Operator's Welliure Survey Cross (OWSG), that later became an official sub-contention of the Industry Streng Communication on Wellfore Survey Assensey (ISCWSA), interpret the provided after a pull of agenties manufacts showed the proof of the color minutes inhalty reported for welling amounted of the Society of Petrolesen Engineers (SPE) Welling Providing Technical Section (WPTS). The establishment of the process reads available through API's standards development groups, will provide traders practices for all minuralise sering industries, beyond just rel and gas applications.

#### Introduction In 2012, the OWSG was formed to binus oil and no

operators together for more frequent collaboration. The group armed to primiting operator made and initially met exceptly in Houston, Texas, with operators taking turns as hom. The OWSG emblished a mission measure and an anti-tran The mission of the OWNO is to enhance confidence in

wellberr permissal scorney by promoting but practices i discreased surveying. This involves calculating well-on portional tecoritority, also known to once models, using directional survey sufficient paragrams.

To comply with anti-trust laws, the following anti-trust entiment is read at the start of every OWSG marring to ensure

wellbern paries bound on departure trend analysis from Blind Model - A conservative model applied to long inevals without directional servery data

· Zero-crite Model - A utility commonly used for welfrore noths which need to round adjustface hasteds or follow perific beauthous such as hardines

Sensories Factor (GF) is a spin of concession distance to combined according of subserface proximity analysis for delling and planning. Error models generate offspoolsh and are meladed on the decomments of the SF colcutation. The choices distance between wellbores is used as the SF manurates and termed the center to center least distance or closest assembly The WPTS Error Model Maintenance Sub-Committee previously maintained a set of error models based on the herry standard Accorncy Production for Districtural MWD (Williampor et al. 1949)

In addition, another challenge presental itself because of exercestance or invalid and inconvened models from various sources. Before the MWD model, succeptainty alculations water based on the new settinal Wolff and do Ward (WdW) systematic model (WallE pt al., 1991). Developed to the 1987's the Will potentic pethod are still ned in the application of modern gyre instruments. Herevye, those advanced gives were different from the concurrenced files hand gyres covered in the systematic materal. WAW systematic to be used for modern gore instruments like advanced mertial and two morb-scaking cards-rate gores until a new key industry paper teas authored establishing a framework for all gyons Trefchines et al., 2004). The elementary half-propert calculation method is worth-

separation pair used in the industry. This method principles to separation distance board on one-half persons of the traveless depth (MD) resulting in a force slope of the part of separation per thousand first of depth along the benturic and does to consider well-have position inscretainty and in the object practical experience rather than engineering theory or membershaped and example, at 10,000 ft MD, the separation distance thereign may to be at least 50 ft, while at 17,000 ft MID, it would need to be at least 75 ft. While will in one wakey, depth-based rules are: secreshary to SF rules and are mainly used to complement them Acceptor important issue raised by important forward on the menuncy metication of the stocked MWD model. It become

apparent that because the industry had been using this model with less-marketing softenesses, consuleting position confidence was receiving, and a need pointed to take advantage of the improved magnetic models. The MWD error model was modelized to accommodate both the loss resultation (LRGM) and high resolution (HBGM) promagnetic models. The original MWD resolut assumes the use of a sendard resolution generagence model (SRGM). The arreston SRGM is the POGM crustal field rankel developed by BGS, and it determines local magnetic reference values. Operagnetic models are used to calculate the enagentic declination correction crucial for directional and horizontal well surveys and to the primary source of learns uncertainty. The date-sensitive reference values, including magnetic dip angle and total magnetic fluid strength, are enough for quality prepril an

A Lockshop III Tark and B. Com-

The indicates found a new challenge with the used to subset improved regiment models state of NOAA's HERM (Manageri al. 501 ft. This way resided contains detailed information on the Earth's main magnetic and created fields derived from satellite and not comed an experiment, and is enclosed assembly to come for charges over time. Hereever, at the time the MWD made tion was discovered to accommodate a LRGM and HRGM such as WMM or HGRE and HDGM, respectively

A cital sand many to when the interregal research models Most operators relied on magnetic models supplied by vendors or software providers loading to incomitating between planning and drilling operations

The OWSG are of every models (Hav2) was developed to establish consistency among operators and service providers (Gendred et al. 2016). The paper defines five primary was:

Set A Standard
Set B Extended
A D-Quadre-supplied
Set B Gens will save exhibition
Made Declaration

The CASC models were upstanted in hane 2015 with a model the time place and standardized naming structure. Meanwhile, the ISCN SA MWD mouths were applied to Barris from the original Kero in 1999 and were included in OWSG Rav2. ON SIG models were banded ever at the 50th DICWSA. persons and are now operated by Form Model Maintenant

Self-Committee (EMM\_SC). The latest revision implies Somether 2022) is referred to at PSCWSA Revision 3.1, and the OWSG is no longer used in the model naming. The lates ISCUSA remote that makes are qualible on the ISCUSA vehile in Excel workhooks for easy deventual. The opelets ischides reporte reference names for law, stoubed, and birthresolution reference madels, and details for five prononmorphic entirement cutteraging can be found on the PACWAA EMM\_SC solven including priver spectrum degree and update

The HWSG mortings continued discussions related to the read the acadishing standard projecting practices in survey and shifting near affice unifs. Concentrations regressed around the need for just narray operating and reporting procedure (SORP) to confirm exhaulted and have making and external mirry. The requirement for raw tensor transcrimen (BSM) to independently encross surveys was discussed become ervise provides were not commenty reporting RSM. This led to interest the continue transference with more reference the victorian bearing activated to traversion and quality assembly plots. A final survey program with a specified error model was required for leading into a survey management



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Missing ???

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## Questions

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