



# OPERATIONAL WELLBORE SURVEY GROUP

February 5, 2024

**Jonathan Lightfoot**

Oxy | Sr. Drilling Engineering Consultant / Principal  
Sub-Committee Chair

**Mohamed Elshabrawy, MSc**

Shell | Senior Well Engineer | Borehole Surveying SME  
Sub-Committee Chair in Transition



# Agenda

- Mission & Anti-Trust
- Brand and Scope
- 2024 Meetings and Events
- ISCWSA Officers
- Review of a Generic PUM (A021Gc\_GYRO-NS-CT\_R5) on ISCWSA # 1 Well Profile compared to Vendor Continuous Earth-Rate North-Seeking Gyros
- MWD Surveying in Texas – Trends from Gibson Reports
- API RP78 Status Update
- Open Discussion



## Attendees on December 4<sup>th</sup>

1. Jonathan Lightfoot – Oxy
  2. Mohamed Elshabrawy – Shell
  3. Todd McKenzie - Shell
  4. Ayush Raj Srivastava - ExxonMobil
  5. Pete Clark – Chevron
  6. Kevin Sutherland - Chevron
  7. Dalis Deliu – ConocoPhillips
  8. Bill Allen – bp
  9. Marianne Houbiers – Equinor
  10. Nicholas Robertson – bp
  11. Hans Dreisig – Total
1. Adrian Ledroz - Gyrodata
  2. Michael Calkins – HilCorp
  3. Jerry Codling – Halliburton Landmark Graphics
  4. Marc Willerth – H&P Technologies
  5. Jamie Steward – Baker Hughes
  6. Darren Aklestad – slb
  7. Nasikul Islam – Al Driller
  8. Jon Bang – Gyrodata



## Our Mission

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



# Anti-Trust Statement

*We are meeting to help develop and promote good practices in wellbore surveying necessary to support wellbore construction which enhance safety and competition.*

*The meeting will be conducted in compliance with all laws including the antitrust laws, both state and federal. We will not discuss prices paid to suppliers or charged to customers nor will we endorse or disparage vendors or goods or services, divide markets, or discuss with whom we will or will not do business, nor other specific commercial terms, because these are matters for each company or individual to independently evaluate and determine.*



# OWSG: Operational Wellbore Survey Group

Operators, OEMs, Service Partners & Interested Parties

Scope: Case Studies and Operational Practices - Implementation

Schedule: Meetings every other month

Outgoing OWSG Chair – Jonathan Lightfoot

Incoming OWSG Chair - Mohamed Elshabrawy

# 2024 Meetings

1. ~~February 6th~~
2. March 26th
3. May 28th
4. July 23<sup>rd</sup>
5. September 24<sup>th</sup>
6. November 26<sup>th</sup>





# 2024 ISCWSA Meetings

## Meeting # 59 – Glasgow, Scotland

Glasgow Grosvenor Hotel

April 17th & 18<sup>th</sup>

Meeting # 60 - New Orleans, Louisiana

Ernest N. Morial Convention Center

SPE ATCE | September 23-25, 2024

Mtg will be Sept. 25<sup>th</sup> & 26<sup>th</sup>

APR. 17 - APR. 18, 2024

ISCWSA #59 - Glasgow, Scotland

Glasgow Grosvenor Hotel  
1-9 Grosvenor Terrace  
Glasgow G12 0TA  
United Kingdom

Early Bird  
\$125.00  
(ends 03/17/2024)

[REGISTER](#)







# ISCWSA CURRENT OFFICERS

## WELCOME TO THE NEWLY ELECTED WELLBORE POSITIONING TECHNICAL SECTION BOARD

New [ISCWSA](#) Board positions:

[Hans Dreisig](#) - Chair Person

[Andrew McGregor](#) - Program Chair

[David Gibson](#) - Membership Chair

[Matt Weber](#) - Director at Large

[Mohamed Elshabrawy](#) - Director at Large

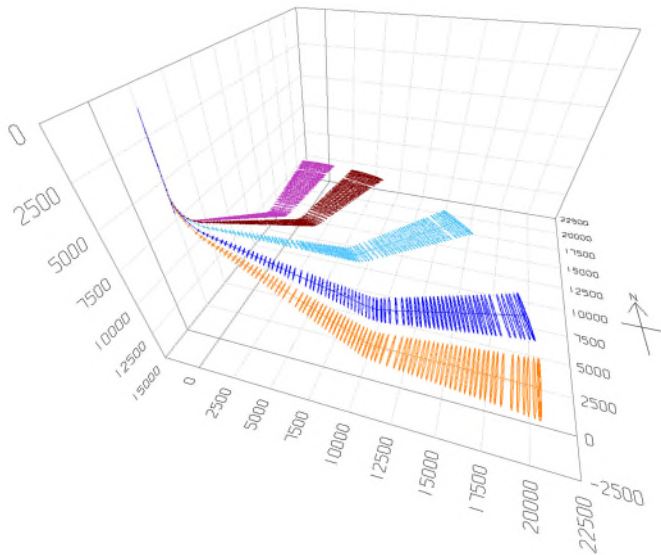
## SPE WPTS Sub-Committees

- **Collision Avoidance**
  - Darren Aklestad (slb)
- **Education**
  - Mahmoud Elgizawy (slb)
- **Error Model**
  - Andy McGregor (H&P Technologies)
  - Marc Willerth (H&P Technologies) Joint Chair in Transition
- **OWSG**
  - Jonathan Lightfoot (Oxy)
  - Mohamed Elshabrawy (Shell) Joint Chair in Transition
- **Survey QA/QC**
  - Philip Harbidge (Expro)
- **Well Intercept**
  - Benny Poedjono (slb)
  - Jamie Dorey (Scientific Drilling)

Thanks for your hard work and great support over the last 2 years:  
Adrián Ledroz – outgoing Chair  
Marc Willerth - outgoing Membership Chair  
David Gibson - outgoing Director at Large

# EOU PUM Comparison: A021Gc\_GYRO-NS-CT\_R5

- Review of a Generic PUM (A021Gc\_GYRO-NS-CT\_R5) on ISCWSA # 1 Well Profile compared to Vendor Continuous Earth-Rate North-Seeking Gyros



PUM	Model	North	15°	45°	75°	East
A021Gc	Gyro-NS-CT REV5	1622 ft	1659 ft	1803 ft	1910 ft	1914 ft
Vender A	CT-WIR NS-ERG				203 ft	
Vendor B	CT-WIR NS-ERG				291 ft	
Vendor C	GTD-Wline C100Gd_MEMS				289 ft	
A010Mc	MWD+IFR1+MS+SAG R5				361 ft	
A024Mb	CB_Film_MMS R5				1615 ft	



# MWD INDUSTRY SURVEY – GIBSON REPORTS

- TRRC P-5 DIRECTIONAL SURVEY LIST
- REGULATORY REPORTING REQUIREMENTS
- MWD ACTIVITY IN TEXAS
- REVIEW OF LEADERS IN FOOTAGE SURVEYED IN TEXAS



# TX RRC SURVEYORS

- TRRC P-5 DIRECTIONAL SURVEY LIST
- 129 Delinquent Surveyors

## Submission Procedures

Requirements of survey companies:

- Must appear on list of approved survey companies\*
- Must have active P-5 (Organization Report)
- Must upload certification letter as a separate file

TX RRC Survey Companies	Count
Active	65
Active-Ext	3
Delinquent	129
Inactive	3
<b>Grand Total</b>	<b>200</b>

TEXAS SURVEYING MARKET REVIEW – ACTIVE (APPROVED)

NRC ONLINE SYSTEM

Oil & Gas Data Query

Query Menu Help

### Organization Operator Query Criteria

Enter your search criteria and click on Submit to view the results.

**Search Criteria**

Operator(s):  Search for Operator

Organization Status:

Organization Type:

Initial P-5 Filed Date: Between  And  (MM/DD/YYYY)

Last P-5 Filed Date: Between  And  (MM/DD/YYYY)

Expiration Date: Between  And  (MM/DD/YYYY)

Location Address:  (zip code)

Mailing Address:  (zip code)

Renewal Month:

Activity/Specialty Code:

Submit Reset Return





- TRRC P-5  
DIRECTIONAL  
SURVEY LIST
- MWD ACTIVITY IN  
TEXAS
- REGULATORY  
REPORTING  
REQUIREMENTS
- REVIEW OF  
LEADERS IN  
FOOTAGE  
SURVEYED IN  
TEXAS



### Texas Administrative Code

[TITLE 16](#)      ECONOMIC REGULATION  
[PART 1](#)        RAILROAD COMMISSION OF TEXAS  
[CHAPTER 3](#)    OIL AND GAS DIVISION

#### Rules

<a href="#">§3.1</a>	Organization Report; Retention of Records; Notice Requirements
<a href="#">§3.2</a>	Commission Access to Properties
<a href="#">§3.3</a>	Identification of Properties, Wells, and Tanks
<a href="#">§3.4</a>	Oil and Geothermal Lease Numbers and Gas Well ID Numbers Required on All Forms
<a href="#">§3.5</a>	Application To Drill, Deepen, Reenter, or Plug Back
<a href="#">§3.6</a>	Application for Multiple Completion
<a href="#">§3.7</a>	Strata To Be Sealed Off
<a href="#">§3.8</a>	Water Protection
<a href="#">§3.9</a>	Disposal Wells
<a href="#">§3.10</a>	Restriction of Production of Oil and Gas from Different Strata
<a href="#">§3.11</a>	Inclination and Directional Surveys Required
<a href="#">§3.12</a>	Directional Survey Company Report
<a href="#">§3.13</a>	Casing, Cementing, Drilling, Well Control, and Completion Requirements



## Texas Administrative Code

<u>TITLE 16</u>	ECONOMIC REGULATION
<u>PART 1</u>	RAILROAD COMMISSION OF TEXAS
<u>CHAPTER 3</u>	OIL AND GAS DIVISION
RULE §3.12	Directional Survey Company Report

(a) For each well drilled for oil, gas, or geothermal resources for which a directional survey report is required by rule, regulation, or order, the surveying company shall prepare and file the following information. The information shall be certified by the person having personal knowledge of the facts, by execution and dating of the data compiled:

- (1) the name of the surveying company;
- (2) the name of the individual performing the survey for the surveying company;
- (3) the title or position the individual holds with the surveying company;
- (4) the date on which the individual performed the survey;
- (5) the type of survey conducted and whether the survey was multishot;
- (6) a complete identification of the well, including the name of the operator of the well; the fee owner; the commission lease number, if assigned; the well number; the API number, and the drilling permit number, the land survey; the field name; and the county and state; and
- (7) a notation that the survey was conducted from a depth of \_\_\_\_ feet to \_\_\_\_ feet.

(b) Each directional survey, with its accompanying certification and a certified plat on which the bottom hole location is oriented both to the surface location and to the lease lines (or unit lines in case of pooling) shall be mailed by registered, certified, or overnight mail direct to the commission in Austin by the surveying company making the survey. The surveying company may file electronically if the Commission has provided for such filing.



### Texas Administrative Code

<a href="#">TITLE 16</a>	ECONOMIC REGULATION
<a href="#">PART 1</a>	RAILROAD COMMISSION OF TEXAS
<a href="#">CHAPTER 3</a>	OIL AND GAS DIVISION
<a href="#">RULE §3.11</a>	Inclination and Directional Surveys Required

(a) General. All wells shall be drilled as nearly vertical as possible by normal, prudent, practical drilling operations. Nothing in this section shall require a wellbore to cross lease and/or property lines (or unit lines in cases of pooling) without special permission.

(b) Inclination surveys.

(1) Requirements.

(A) An inclination survey made by persons or concerns approved by the commission shall be filed on a form prescribed by the commission if the well is drilled, or when, as a result of any operation, the course of the well is changed. The first shot point of such inclination survey shall be made at the surface and succeeding shot points shall be made either at 500-foot intervals or at the nearest drill bit change thereto, but not to exceed 1,000 feet apart.

(B) Inclination surveys conforming to these requirements may be made either during the normal course of drilling or after the well has reached its final depth. Inclination surveys shall be required on wells drilled to a total depth of 2,000 feet or less on a regular location at least 150 feet from the nearest lease line, provided the well is not intentionally deviated from the vertical in any manner whatsoever.

(C) Copies of all directional or inclination surveys, regardless of the reason for which they are run, shall be filed as a part of or in addition to the inclination surveys otherwise required by this section. If computations are made from dipmeter surveys to determine the course of the wellbore in any portion of the surveyed interval, a report of such computations shall be required.

(D) Inclination surveys shall not be required in any well drilled to a total depth of 2,000 feet or less on a regular location at least 150 feet from the nearest lease line, provided the well is not intentionally deviated from the vertical in any manner whatsoever.

(E) Inclination surveys shall not be required on wells deepened with rotary tools if the well is deepened no more than 300 feet or the distance from the surface location to the nearest lease or boundary line, whichever is the lesser, and provided that the well was not intentionally deviated from the vertical at any time before or after the beginning of deepening operations.

(F) Inclination surveys will not be required on wells that are drilled and completed as dry holes and are permanently plugged and abandoned. If such wells are reentered at a later date and completed as producers or injection or disposal wells, inclination reports will be required and must be filed with the appropriate completion form for the well.

(G) Inclination survey filings will not be required on wells that are reentries within casing of previously producing wells if inclination data are already on file with the Railroad Commission of Texas (commission). If such data are not on file with the commission, the results of an inclination survey must be reported on the appropriate form and filed with the completion form, except as provided by subparagraph (D) of this paragraph.

### Survey Types

#### Inclination surveys

Inclination and offset data only (Form W-12)  
No coordinates or directional data

#### Directional surveys

Gyroscopic borehole survey (GYRO)  
Measurement while drilling (MWD)  
Provide coordinate data (X, Y, and Z)

Each survey type has different data and certification requirements. It pays to get it right the first time.





## Wellbore Positioning Technical Section



The Industry Steering Committee on  
Wellbore Survey Accuracy (ISCWSA)

### (2) Reports.

(A) The report form shall be signed and certified by a party having personal knowledge of the facts therein contained. The report shall include a tabulation of the maximum drifts which could occur between the surface and the first shot point, and each two successive shot points, assuming that all of the unsurveyed hole between any two shot points has the same inclination as that measured at the lowest shot point, and the total possible accumulative drift, assuming that all measured angles of inclination are in the same direction.

(B) In addition, the report shall be accompanied by a certified statement of the operator, or of someone acting at his direction on his behalf, either:

- (i) that the well was not intentionally deviated from vertical; or
- (ii) that the well was deviated at random, with an explanation of the circumstances.

(C) The report shall be filed in the district office by attaching one copy to each appropriate completion form for the well.

(D) The commission may require the submittal of the original charts, graphs, or discs resulting from the surveys.

### (c) Directional surveys.

#### (1) When required.

(A) When the maximum displacement indicated by an inclination survey is greater than the actual distance from the surface location to the nearest lease line or pooled unit boundary, it will be considered to be a violating well subject to plugging and to penalty action. However, an operator may submit a directional survey, run at his own expense by a commission approved surveying company, to show the true bottom hole location of the well to be within the prescribed limits. When such directional survey shows the well to be bottomed within the confines of the lease, but nearer to a well or lease line or pooled unit boundary than allowed by applicable rules, or by the permit for the well if the well has been granted an exception to §3.37 of this title (relating to Statewide Spacing Rule), a new permit will be required if it is established that the bottom hole location or completion location is not a reasonable location.

(B) Directional surveys shall be required on each well drilled under the directional deviation provisions of this section.

(C) No oil, gas, or geothermal resource allowable shall be assigned any well on which a directional survey is required under any provision of this section until a directional survey has been filed with and accepted by the commission.

#### (2) Filing and type of survey.

(A) Directional surveys required under this section must be run by competent surveying companies, approved by the commission, signed and certified by a person having actual knowledge of the facts, in the manner prescribed by the commission in accordance with §3.12 of this title (relating to Directional Survey Company Report).

(B) All directional surveys, unless otherwise specified by the commission, shall be either single shot surveys or multi-shot surveys with the shot points not more than 200 feet apart, beginning within 200 feet of the surface, and the bottom hole location must be oriented both to the surface location and to the lease lines (or unit lines in cases of pooling).



SWR 12: Directional Surveys



Directional Surveys must be submitted and certified by the company that performed the survey.

They cannot be accepted directly from the operator.

2023 Average Time to Submit Regulatory Reports – Sample of Public Data  
*Courtesy of Gibson Reports*

Avg Time To Submit

Survey Company	Permitted Wells	Avg. Survey to TRRC Time
PANTHER DRILLING SYSTEMS LLC	8	5.11
DIXON DIRECTIONAL, LLC	232	6.34
KINGSLEY	182	6.37
INFINITY ENERGY SERVICES, LLC	2	6.50
CAPITAL DIRECTIONAL, LLC	23	9.52
THE O&G PROFESSOR, LLC	13	10.08
SCIENTIFIC DRILLING INT'L, INC.	227	10.92
DRILTECH MWD RENTALS, LLC	83	14.38
TALLY	43	14.88
SURVEY RENTALS INC	113	15.43
GEO-MAG MWD LLC	16	16.69
BAKER HUGHES INTEQ	310	17.10
LEGACY DIRECTIONAL DRILLING, LLC	171	19.50
HALLIBURTON ENERGY SERVICES	109	19.70
STINGRAY DIRECTIONAL SERVICES	1	22.00
MS ENERGY SERVICES	295	24.05
PATRIOT DRILLING SERVICES LLC	98	24.31
LIBERTY DRILLING SERVICES, LLC	34	24.41
TRUE SHOT, LLC	216	24.41
TOTAL DIRECTIONAL SERVICES, LLC	239	25.29
KLX DIRECTIONAL DRILLING LLC	407	26.75
INTREPID D.D.S., LTD.	43	27.35
SCHLUMBERGER TECHNOLOGY CO..	158	27.62
FIRST DIRECTIONAL RENTALS L.L.C	3	27.67
METEORITE ENERGY SERVICES INC.	403	30.19
GORDON TECHNOLOGIES LLC	867	30.31
TAKTIKAL DIRECTIONAL LLC	3	30.33
ALTITUDE	285	30.73
PHOENIX TECHNOLOGY SERV USA I..	638	31.31
ENSIGN U S DRILLING INC	3	31.33

Avg Time To Submit

Survey Company	Permitted Wells	Avg. Survey to TRRC Time
TITAN DIRECTIONAL DRILLING, LLC	57	32.39
AIM DIRECTIONAL SERVICES, LLC	34	33.44
STRYKER ENERGY DIRCTNL SRVCS,..	56	34.47
APEX MWD LLC	11	36.73
PRIME SOLUTION SERVICES LLC	42	37.70
NABORS	109	38.46
NZONE GUIDANCE, L.L.C.	27	40.79
WELLBENDERS DIRECTIONAL SERV ..	20	41.45
DEEP ENERGY SPECIALISTS, LLC	15	49.13
PROFESSIONAL DIRECTIONAL ENT I..	586	50.45
GEO GUIDANCE DRILLING SVCS, INC	123	50.97
SB DIRECTIONAL SERVICES, LLC	30	64.74
LEAM	109	65.54
TRUE DIRECTIONAL SERVICES, LLC	8	73.63
FIREROCK ENERGY SERVICES, LLC	14	73.87
INVICTUS TOOLS, LLC	543	78.27
DD INNOVATION LLC	8	85.50
NOVA DIRECTIONAL, INC.	12	86.00
INTEGRITY SERVICES, LLC	33	87.64
M3P DIRECTIONAL SERVICES, LTD.	1	106.00
BLACK DIAMOND OILFIELD RNTLS L..	11	113.92
NATIONAL OILWELL VARCO, L.P.	10	114.10
AETHON ENERGY OPERATING LLC	2	133.00
SCOUT DOWNHOLE, INC.	107	137.99
NEWSCO INTL ENERGY SVC USA INC.	2	139.33



- [Microsoft PowerPoint - Filing Completions for OG UIC - 2021.08 \(texas.gov\)](#)

## Texas Administrative Code Rule 3.16



## Rule 3.16 (cont'd)



Subsequent Completion Reports are due:

- within **30 days** of any *physical changes* made to wellbore structure
  - Adding new and/or squeezing perforations
  - Adding a liner
  - Adding tubing
  - Setting CIBP with/without cement



# RRC Email

From today's meeting

Picture attached.  
Link to time to submit over the last 10 years only MWD surveys  
[https://public.tableau.com/views/Timetosubmit2013/Timetosubmit?:language=en-US&publish=yes&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/Timetosubmit2013/Timetosubmit?:language=en-US&publish=yes&:display_count=n&:origin=viz_share_link)

**From the TRRC Items attached are from the TRRC**


**From:** Roseanna Edson [Roseanna.Edson@rrc.texas.gov](mailto:Roseanna.Edson@rrc.texas.gov)  
**Sent:** Thursday, July 21, 2022 12:38 PM  
**To:** David Gibson [david@gibsonreports.com](mailto:david@gibsonreports.com)  
**Subject:** FW: Example of Approved Directional Services Resume


David,

I just realized that you had originally asked for the steps to set up a directional company. The steps are as follows:

1. Obtain a P-5 account
2. Submit company resume (see email below) to me or [EngUnit@rrc.texas.gov](mailto:EngUnit@rrc.texas.gov)
3. Setup an RRC online account- submit a SAD Form to our IT department at [rrconline-security@rrc.texas.gov](mailto:rrconline-security@rrc.texas.gov) (see SAD form pdf attached)
4. Designate an Account Admin to set up the RRC online accounts for the filers (see Acct Admin screen shots pdf attached)

Regards,

 Roseanna Edson  
Eng. Specialist II | Engineering Unit  
Railroad Commission of Texas  
512-463-5405  
[Take our Customer Service Survey](#)



**ATTENTION:** As part of our response to COVID-19, we ask that all applications submitted to the Engineering Unit be submitted by email to [EngUnit@rrc.texas.gov](mailto:EngUnit@rrc.texas.gov)



# API RP78 WELLBORE POSITIONING & SURVEYING

- Current Status: Ballot Draft is under edit by API
- Draft was ½ Finished in December 2023
- Expectation to be Ready Mid to Late February
- Updates will be shared to the group when we hear back from API's Program Director
- Ballot in 2024-Q1 – Pending API Edit Progress
- Hopefully before the end of March or sooner for Comment and Voting



## Future Case Study and Discussion Topic

- Unconventional Pad Surface and Intermediate Steering for Safe Separation
  - Recommended Slot Spacing
  - Surface Nudges
  - S-Shaped with 2D Curve vs. Slant with 3D Curves
- DLS Limitations for Artificial Lift (Well Life Cycle)
- Tie-In Practices for Whipstock Sidetracks & Openhole Sidetracks
- Revision 5.x Naming Format for PUMs (OWSG Prefix with Short Names)



# Thank you

Next Meeting will be on March 26, 2024.