

HOBES OGD

DEC 05 2014



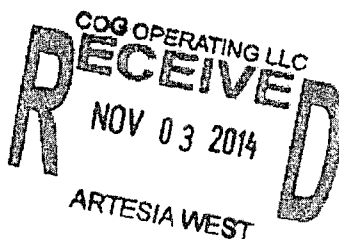
RECEIVED

PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288

30-025-41621

October 20, 2014

COG, LLC
One Concho Center
600 W. Illinois Ave.
Midland, TX 79701



RE: 9418 JV-P Vaca Draw 2H
190' FNL & 330' FEL
Sec. 10, T25S, R3eE
Lea County, New Mexico

Dear Sir,

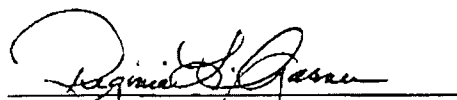
The attached is the Deviation Survey for the above captioned well.

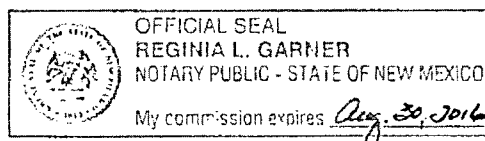
Very truly yours,


Eddie LaRue
Operations Manager

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 20th day of October, 2014.


Regina L. Garner
Notary Public



DEC 05 2014

9418 JV-P Vaca Draw #2H

Date	Depth	Deviation	Direction	TVD	Horiz Disp
9/28/2014	351	0.25	0.00	0.00	0.00
9/28/2014	651	0.60	0.00	0.00	0.00
9/29/2014	943	0.40	0.00	0.00	0.00
10/1/2014	1291	0.40	0.00	0.00	0.00
10/1/2014	1544	0.30	0.00	0.00	0.00
10/1/2014	1829	0.20	0.00	0.00	0.00
10/1/2014	2113	0.40	0.00	0.00	0.00
10/2/2014	2398	0.60	0.00	0.00	0.00
10/2/2014	2683	1.00	0.00	0.00	0.00
10/2/2014	2967	1.00	0.00	0.00	0.00
10/2/2014	3252	1.90	0.00	0.00	0.00
10/2/2014	3537	1.50	0.00	0.00	0.00
10/3/2014	3822	1.40	0.00	0.00	0.00
10/3/2014	4106	1.40	0.00	0.00	0.00
10/3/2014	4391	2.10	0.00	0.00	0.00
10/4/2014	4675	2.50	0.00	0.00	0.00
10/4/2014	5088	1.80	0.00	0.00	0.00
10/6/2014	5388	1.30	0.00	0.00	0.00
10/6/2014	5641	0.60	0.00	0.00	0.00
10/6/2014	5893	0.60	0.00	0.00	0.00
10/6/2014	6146	0.70	0.00	0.00	0.00
10/6/2014	6402	0.60	0.00	0.00	0.00
10/7/2014	6621	0.00	0.00	0.00	0.00
10/7/2014	6874	0.30	0.00	0.00	0.00
10/7/2014	7128	0.60	0.00	0.00	0.00
10/7/2014	7412	0.60	0.00	0.00	0.00
10/7/2014	7666	0.50	0.00	0.00	0.00
10/8/2014	7919	1.10	0.00	0.00	0.00
10/8/2014	8172	1.30	0.00	0.00	0.00
10/8/2014	8425	1.10	0.00	0.00	0.00
10/8/2014	8679	1.20	0.00	0.00	0.00
10/9/2014	8876	0.90	0.00	0.00	0.00
10/9/2014	8934	2.50	194.00	8932.56	0.00
10/9/2014	9030	9.50	192.90	9028.00	0.00
10/9/2014	9124	16.20	186.90	0.00	0.00
10/10/2014	9158	18.10	188.10	0.00	0.00
10/10/2014	9190	20.80	190.00	0.00	0.00
10/10/2014	9222	24.50	190.30	0.00	0.00
10/10/2014	9253	28.20	189.70	9239.51	0.00
10/10/2014	9348	39.70	189.50	9318.52	0.00
10/10/2014	9411	46.90	188.90	9364.56	0.00
10/11/2014	9433	50.70	188.70	9385.00	178.30
10/11/2014	9474	54.80	189.00	9404.40	202.59
10/11/2014	9506	68.30	189.50	9422.00	228.94

Date	Depth	Deviation	Direction	TVD	Horiz Disp
10/11/2014	9537	62.60	190.00	9437.22	255.51
10/11/2014	9569	66.80	190.00	9450.99	284.01
10/11/2014	9600	70.90	190.00	9462.18	312.48
10/11/2014	9632	75.20	190.40	9471.50	342.61
10/11/2014	9664	79.70	190.60	9478.46	373.33
10/11/2014	9695	84.40	190.90	482.74	403.50
10/11/2014	9726	88.80	191.30	9485.58	0.00
10/12/2014	9757	90.50	191.50	9485.00	512.34
10/12/2014	9852	91.40	185.10	9483.14	557.78
10/12/2014	9947	91.50	189.10	9480.79	653.30
10/12/2014	10042	100.42	91.00	0.00	0.00
10/12/2014	10137	90.70	186.50	9477.31	0.00
10/12/2014	10326	89.40	181.70	9477.40	0.00
10/12/2014	10611	91.20	178.90	9477.23	0.00
10/12/2014	10801	90.20	178.80	9474.91	0.00
10/13/2014	11085	89.40	178.00	9480.86	1786.74
10/13/2014	11180	90.20	178.10	9481.20	1881.84
10/13/2014	11275	92.30	178.96	9479.00	1978.00
10/13/2014	11369	90.00	177.70	0.00	0.00
10/13/2014	11464	90.00	177.40	9477.24	2163.65
10/13/2014	11559	90.20	177.20	9477.07	2260.53
10/13/2014	11654	90.20	178.00	9476.74	2355.43
10/13/2014	11749	90.10	177.60	9476.49	2450.35
10/13/2014	11844	90.50	177.50	9475.99	2545.25
10/13/2014	11939	91.00	177.20	8474.75	2640.13
10/13/2014	12034	91.60	177.30	9472.59	0.00
10/13/2014	12223	90.20	178.60	9468.90	0.00
10/13/2014	12319	90.40	178.90	9462.37	0.00
10/14/2014	12414	90.20	178.90	9467.96	3114.65
10/14/2014	12508	89.70	178.80	9468.04	3208.63
10/14/2014	12603	90.10	174.00	9468.00	3303.68
10/14/2014	12698	90.60	179.10	9467.00	3398.00
10/14/2014	12793	91.00	179.10	9466.30	3493.60
10/14/2014	12887	89.50	180.20	9465.89	3587.63
10/14/2014	12982	89.20	180.80	9466.97	3682.62
10/14/2014	13077	89.90	179.80	9467.72	3777.61
10/14/2014	13173	89.80	180.70	969467.97	3873.61
10/14/2014	13268	90.90	180.70	9467.39	0.00
10/14/2014	13458	88.80	181.10	9467.16	0.00
10/14/2014	13553	89.80	180.60	9468.00	0.00
10/15/2014	13647	91.10	181.10	9467.00	4347.00
10/15/2014	13742	90.50	180.30	9466.29	4442.00
10/15/2014	13887	90.90	179.90	46509.00	4537.00
10/15/2014	13932	91.20	179.70	9463.00	4632.00
10/15/2014	13969	91.40	179.30	9462.51	4669.50



October 28, 2014

Concho Resources, Inc.
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701

Attn: Kanicia Castillo

RE: 9418 JV-P Vaca Draw 2H

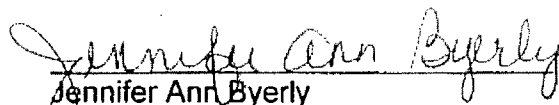
Please find enclosed a copy of the survey from 0.00' to 8850.00' ran on the above referenced well.

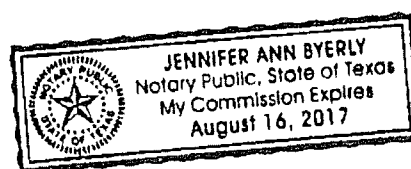
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 28 day of October, A.D., 2014, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas



Company: COG Operating LLC

Lease/Well: 9418 JV-P Vaca Draw /2H



Rig Name: Silver Oak 12

State/County: New Mexico / Lea

Latitude: 32.15, Longitude: -103.55

GRID North is 0.42 Degrees East of True North

VS-Azi: 0.00 Degrees



Depth Reference : R.K.B= 18 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: 9418 JV-P Vaca Draw 2H-de_01.ut

Minimum Curvature Method

Report Date/Time: 10/28/2014 / 10:41

VES Survey International

(432) 563-5444

West Texas

Surveyor: Javier Estrada

9418 JV-P Vaca Draw 2H / API 30-025-41621

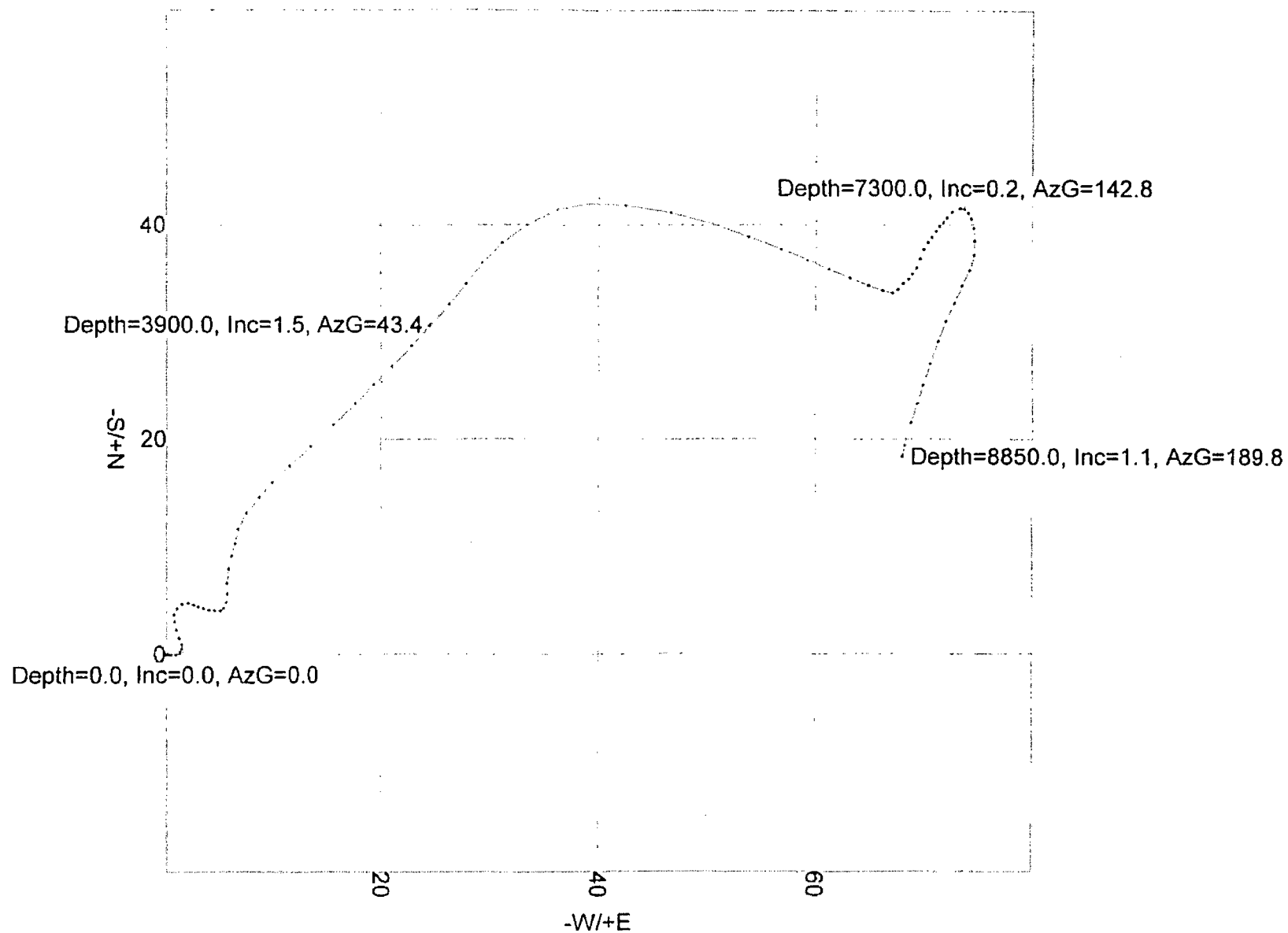
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	----
100.00	0.15	103.72	100.00	-0.03	0.13	-0.03	0.13	103.72	0.15
200.00	0.22	96.29	200.00	-0.08	0.45	-0.08	0.45	100.60	0.07
300.00	0.31	81.93	300.00	-0.07	0.91	-0.07	0.91	94.16	0.12
400.00	0.09	37.68	400.00	0.04	1.23	0.04	1.23	88.32	0.26
500.00	0.15	25.89	500.00	0.21	1.33	0.21	1.35	80.83	0.06
600.00	0.21	25.55	600.00	0.49	1.47	0.49	1.55	71.38	0.06
700.00	0.30	338.22	700.00	0.90	1.45	0.90	1.70	58.14	0.22
800.00	0.45	333.80	799.99	1.49	1.18	1.49	1.90	38.34	0.15
900.00	0.47	348.55	899.99	2.24	0.93	2.24	2.42	22.43	0.12
1000.00	0.45	347.34	999.99	3.02	0.76	3.02	3.12	14.07	0.03
1100.00	0.30	7.87	1099.99	3.66	0.71	3.66	3.73	10.94	0.20
1200.00	0.44	38.00	1199.98	4.23	0.98	4.23	4.34	13.07	0.24
1300.00	0.27	56.62	1299.98	4.66	1.41	4.66	4.87	16.87	0.21
1400.00	0.42	93.58	1399.98	4.76	1.97	4.76	5.15	22.48	0.26
1500.00	0.28	128.72	1499.98	4.59	2.53	4.59	5.24	28.86	0.25
1600.00	0.24	94.43	1599.98	4.42	2.93	4.42	5.30	33.59	0.16
1700.00	0.36	117.78	1699.98	4.25	3.42	4.25	5.46	38.82	0.17
1800.00	0.25	97.26	1799.97	4.08	3.91	4.08	5.65	43.79	0.16

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	0.35	92.33	1899.97	4.04	4.43	4.04	5.99	47.63	0.11
2000.00	0.26	92.39	1999.97	4.02	4.96	4.02	6.38	50.99	0.09
2100.00	0.28	12.50	2099.97	4.25	5.24	4.25	6.74	50.97	0.35
2200.00	0.48	29.30	2199.97	4.85	5.50	4.85	7.33	48.58	0.23
2300.00	0.49	344.45	2299.97	5.63	5.59	5.63	7.93	44.80	0.37
2400.00	0.71	8.17	2399.96	6.65	5.56	6.65	8.67	39.92	0.33
2500.00	0.78	5.89	2499.95	7.93	5.72	7.93	9.78	35.78	0.08
2600.00	0.69	18.21	2599.94	9.18	5.98	9.18	10.96	33.06	0.18
2700.00	0.87	14.57	2699.94	10.32	6.31	10.32	12.10	31.45	0.05
2800.00	0.89	10.85	2799.93	11.65	6.61	11.65	13.39	29.55	0.22
2900.00	1.11	38.94	2899.91	13.17	7.36	13.17	15.09	29.21	0.53
3000.00	1.00	40.34	2999.90	14.59	8.54	14.59	16.91	30.34	0.11
3100.00	1.12	43.17	3099.88	15.97	9.78	15.97	18.73	31.47	0.13
3200.00	1.48	50.02	3199.85	17.51	11.44	17.51	20.92	33.14	0.39
3300.00	1.64	47.12	3299.82	19.31	13.47	19.31	23.55	34.89	0.18
3400.00	1.71	46.29	3399.77	21.32	15.59	21.32	26.41	36.19	0.08
3500.00	1.53	44.54	3499.73	23.30	17.61	23.30	29.20	37.08	0.19
3600.00	1.35	43.50	3599.70	25.10	19.35	25.10	31.70	37.63	0.18
3700.00	1.40	47.06	3699.67	26.79	21.06	26.79	34.08	38.17	0.10
3800.00	1.56	39.57	3799.64	28.67	22.82	28.67	36.65	38.52	0.25
3900.00	1.47	43.42	3899.60	30.65	24.57	30.65	39.28	38.71	0.14
4000.00	1.53	41.68	3999.57	32.57	26.33	32.57	41.88	38.95	0.08
4100.00	1.28	34.06	4099.54	34.49	27.84	34.49	44.33	38.91	0.31
4200.00	1.64	39.14	4199.51	36.46	29.32	36.46	46.78	38.80	0.28
4300.00	1.44	48.82	4299.48	38.33	31.11	38.33	49.36	39.06	0.27
4400.00	1.85	57.24	4399.43	40.03	33.41	40.03	52.14	39.86	0.48
4500.00	1.73	70.37	4499.39	41.41	36.20	41.41	55.00	41.16	0.43
4600.00	1.66	88.79	4599.34	41.95	39.07	41.95	57.33	42.97	0.55
4700.00	2.38	95.87	4699.28	41.77	42.59	41.77	59.65	45.56	0.76
4800.00	2.47	101.59	4799.19	41.12	46.77	41.12	62.28	48.67	0.26
4900.00	2.09	109.39	4899.11	40.09	50.59	40.09	64.55	51.61	0.49
5000.00	1.93	111.48	4999.05	38.86	53.88	38.86	66.44	54.20	0.17
5100.00	1.74	110.45	5099.00	37.72	56.88	37.72	68.25	56.45	0.20
5200.00	1.24	115.61	5198.96	36.72	59.27	36.72	69.73	58.22	0.52
5300.00	1.22	113.67	5298.94	35.82	61.23	35.82	70.94	59.67	0.04
5400.00	1.17	112.88	5398.92	35.00	63.14	35.00	72.19	61.00	0.06
5500.00	0.94	111.82	5498.90	34.30	64.84	34.30	73.35	62.12	0.23
5600.00	0.67	106.92	5598.89	33.82	66.16	33.82	74.30	62.92	0.28
5700.00	0.41	96.28	5698.89	33.61	67.08	33.61	75.03	63.38	0.28

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5800.00	0.46	21.10	5798.89	33.95	67.58	33.95	75.62	63.33	0.53
5900.00	0.45	65.98	5898.88	34.48	68.08	34.48	76.31	63.14	0.36
6000.00	0.35	29.11	5998.88	34.91	68.59	34.91	76.98	63.03	0.27
6100.00	0.30	40.33	6098.88	35.37	68.90	35.37	77.45	62.83	0.08
6200.00	0.55	27.12	6198.88	35.99	69.28	35.99	78.07	62.55	0.27
6300.00	0.49	18.26	6298.87	36.82	69.63	36.82	78.77	62.13	0.10
6400.00	0.61	22.61	6398.87	37.71	69.97	37.71	79.49	61.68	0.13
6500.00	0.28	49.18	6498.87	38.36	70.36	38.36	80.14	61.40	0.38
6600.00	0.41	29.26	6598.86	38.83	70.71	38.83	80.67	61.23	0.18
6700.00	0.38	40.87	6698.86	39.39	71.11	39.39	81.29	61.02	0.08
6800.00	0.30	25.10	6798.86	39.87	71.43	39.87	81.81	60.83	0.12
6900.00	0.30	63.08	6898.86	40.23	71.78	40.23	82.28	60.73	0.20
7000.00	0.36	17.61	6998.86	40.65	72.11	40.65	82.78	60.59	0.26
7100.00	0.54	59.48	7098.85	41.18	72.61	41.18	83.48	60.44	0.37
7200.00	0.36	70.05	7198.85	41.53	73.31	41.53	84.26	60.47	0.20
7300.00	0.24	142.76	7298.85	41.47	73.73	41.47	84.60	60.65	0.37
7400.00	0.35	129.43	7398.85	41.11	74.10	41.11	84.74	60.98	0.13
7500.00	0.39	169.27	7498.85	40.57	74.40	40.57	84.74	61.39	0.26
7600.00	0.67	167.93	7598.84	39.67	74.68	39.67	84.48	61.99	0.28
7700.00	0.88	183.16	7698.83	38.50	74.67	38.50	84.01	62.73	0.18
7800.00	0.85	180.35	7798.83	37.16	74.64	37.16	83.37	63.53	0.18
7900.00	0.91	211.19	7898.81	35.73	74.22	35.73	82.37	64.29	0.47
8000.00	0.95	199.34	7998.80	34.27	73.63	34.27	81.12	65.01	0.20
8100.00	1.08	208.14	8098.79	32.65	72.81	32.65	79.80	65.85	0.20
8200.00	1.08	202.39	8198.77	30.96	72.01	30.96	78.38	66.74	0.11
8300.00	1.17	199.26	8298.76	29.12	71.31	29.12	77.03	67.79	0.11
8400.00	1.37	199.25	8398.72	27.03	70.58	27.03	75.58	69.05	0.20
8500.00	1.06	197.65	8498.70	25.02	69.91	25.02	74.25	70.31	0.31
8600.00	0.98	196.89	8598.69	23.32	69.38	23.32	73.19	71.42	0.07
8700.00	1.18	197.69	8698.67	21.51	68.82	21.51	72.10	72.64	0.20
8800.00	1.31	193.91	8798.64	19.42	68.23	19.42	70.94	74.11	0.15
8850.00	1.15	189.76	8848.63	18.37	68.00	18.37	70.44	74.88	0.37



VES Survey International
(432) 563-5444
West Texas
Surveyor: Javier Estrada
9418 JV-P Vaca Draw 2H / API 30-025-41621



VES Survey Date: 10/08/2014



COG Operating LLC

Lea County, NM (NAD27 NME)

9418 JV-P Vaca Draw

2H

OH

Survey: MWD #1

Survey Report - Geographic

15 October, 2014



Wellplanning
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	WELL @ 3432.5usft (Original Well Elev)
Site:	9418 JV-P Vaca Draw	MD Reference:	WELL @ 3432.5usft (Original Well Elev)
Well:	2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Project	Lea County, NM (NAD27 NME)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	9418 JV-P Vaca Draw		
Site Position:		Northing:	419,780.50 usft
From:	Map	Easting:	741,734.30 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 9' 6.058 N
		Longitude:	103° 33' 8.114 W
		Grid Convergence:	0.42 °

Well	2H		
Well Position	+N/-S	0.0 usft	Northing: 419,780.50 usft
	+E/-W	0.0 usft	Easting: 741,734.30 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 9' 6.058 N
		Longitude:	103° 33' 8.114 W
		Ground Level:	3,414.5 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010	9/24/2013	7.29
			Dip Angle
			60.07
			Field Strength
			48,347

Design	OH		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			180.16

Survey Program	Date: 10/15/2014		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.0	8,850.0	GYRO (OH)	MWD
8,935.0	14,018.0	MWD #1 (OH)	MWD
			Description
			MWD - Standard
			MWD - Standard

Survey										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Map	Map	Latitude	Longitude	
Depth	(°)	(°)	Depth	(usft)	(usft)	Northing	Easting			
(usft)			(usft)			(usft)	(usft)			
8,850.0	1.15	189.76	8,848.6	18.5	68.0	419,798.98	741,802.32	32° 9' 6.236 N	103° 33' 7.321 W	
8,935.0	2.50	184.00	8,933.6	15.8	67.4	419,798.34	741,801.72	32° 9' 6.210 N	103° 33' 7.328 W	
8,997.0	4.50	201.20	8,995.5	14.0	66.8	419,794.49	741,801.10	32° 9' 6.192 N	103° 33' 7.336 W	
8,998.0	7.00	197.20	8,996.4	11.1	65.8	419,791.55	741,800.10	32° 9' 6.163 N	103° 33' 7.348 W	
9,030.0	9.50	192.90	9,028.0	6.6	64.6	419,787.11	741,798.93	32° 9' 6.119 N	103° 33' 7.362 W	
9,061.0	12.00	190.30	9,058.5	0.9	63.5	419,781.45	741,797.79	32° 9' 6.083 N	103° 33' 7.375 W	
9,093.0	14.10	187.20	9,089.7	-6.2	62.4	419,774.31	741,798.70	32° 9' 5.992 N	103° 33' 7.389 W	
9,124.0	16.20	186.80	9,119.8	-14.2	61.4	419,768.27	741,795.71	32° 9' 5.913 N	103° 33' 7.401 W	
9,158.0	18.10	188.10	9,152.1	-24.2	60.1	419,758.33	741,794.40	32° 9' 5.815 N	103° 33' 7.417 W	
9,190.0	20.80	190.00	9,182.2	-34.7	58.4	419,745.81	741,792.71	32° 9' 5.711 N	103° 33' 7.438 W	
9,222.0	24.50	190.30	9,211.8	-46.8	56.2	419,733.68	741,790.54	32° 9' 5.581 N	103° 33' 7.464 W	



Wellplanning
Survey Report - Geographic

Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: 9418 JV-P Vaca Draw
Well: 2H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well 2H
TVD Reference: WELL @ 3432.5usft (Original Well Elev)
MD Reference: WELL @ 3432.5usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,253.0	28.20	189.70	9,239.5	-60.4	53.9	419,720.13	741,788.15	32° 8' 5.457 N	103° 33' 7.483 W
9,285.0	31.80	189.20	9,267.2	-76.1	51.2	419,704.35	741,785.53	32° 8' 5.301 N	103° 33' 7.525 W
9,317.0	35.40	189.50	9,293.9	-93.6	48.4	419,686.88	741,782.65	32° 8' 5.126 N	103° 33' 7.560 W
9,348.0	38.20	189.50	9,318.6	-112.1	45.3	419,668.36	741,779.55	32° 8' 4.945 N	103° 33' 7.597 W
9,380.0	43.00	189.00	9,342.7	-132.9	41.9	419,647.60	741,776.17	32° 8' 4.740 N	103° 33' 7.638 W
9,411.0	48.90	188.90	9,384.6	-154.5	38.5	419,625.97	741,772.77	32° 8' 4.528 N	103° 33' 7.680 W
9,443.0	50.70	188.70	9,385.7	-178.3	34.8	419,602.18	741,769.08	32° 8' 4.291 N	103° 33' 7.724 W
9,474.0	54.80	189.00	9,404.4	-202.7	31.0	419,577.80	741,765.29	32° 8' 4.050 N	103° 33' 7.771 W
9,506.0	58.30	189.80	9,422.1	-229.0	26.6	419,551.47	741,760.92	32° 8' 3.790 N	103° 33' 7.824 W
9,537.0	62.60	190.00	9,437.4	-255.6	22.0	419,524.91	741,756.29	32° 8' 3.527 N	103° 33' 7.880 W
9,569.0	66.80	190.00	9,451.0	-284.1	17.0	419,498.42	741,751.26	32° 8' 3.246 N	103° 33' 7.941 W
9,600.0	70.90	190.10	9,462.2	-312.5	11.9	419,467.96	741,748.22	32° 8' 2.865 N	103° 33' 8.002 W
9,632.0	75.20	190.40	9,471.5	-342.7	6.5	419,437.84	741,740.77	32° 8' 2.667 N	103° 33' 8.068 W
9,664.0	79.70	190.60	9,478.5	-373.4	0.8	419,407.14	741,735.08	32° 8' 2.364 N	103° 33' 8.136 W
9,695.0	84.40	190.90	9,482.8	-403.5	-4.9	419,376.99	741,729.36	32° 8' 2.066 N	103° 33' 8.206 W
9,726.0	88.80	191.30	9,484.6	-433.9	-10.9	419,346.83	741,723.40	32° 8' 1.766 N	103° 33' 8.277 W
9,757.0	90.50	191.50	9,484.8	-464.3	-17.0	419,316.24	741,717.27	32° 8' 1.465 N	103° 33' 8.351 W
9,852.0	91.40	189.10	9,483.2	-557.7	-34.0	419,222.79	741,700.29	32° 8' 0.542 N	103° 33' 8.557 W
9,947.0	91.50	189.10	9,480.8	-651.5	-49.0	419,129.02	741,685.27	32° 8' 59.615 N	103° 33' 8.739 W
10,042.0	91.00	188.40	9,478.7	-745.4	-63.5	419,035.15	741,670.82	32° 8' 58.687 N	103° 33' 8.915 W
10,137.0	90.70	188.50	9,477.3	-839.5	-75.8	418,940.96	741,658.51	32° 8' 57.756 N	103° 33' 9.086 W
10,231.0	89.80	184.00	9,476.8	-933.1	-84.4	418,847.37	741,649.91	32° 8' 56.830 N	103° 33' 9.174 W
10,326.0	89.40	181.70	9,477.4	-1,028.0	-89.1	418,752.49	741,645.18	32° 8' 55.892 N	103° 33' 9.237 W
10,421.0	89.80	180.70	9,478.1	-1,123.0	-91.1	418,657.52	741,643.19	32° 8' 54.952 N	103° 33' 9.288 W
10,516.0	90.00	179.80	9,478.3	-1,218.0	-91.5	418,562.52	741,642.78	32° 8' 54.012 N	103° 33' 9.281 W
10,611.0	91.20	178.90	9,477.3	-1,313.0	-90.4	418,467.53	741,643.86	32° 8' 53.072 N	103° 33' 9.277 W
10,706.0	90.70	178.80	9,475.7	-1,407.9	-88.4	418,372.57	741,645.93	32° 8' 52.132 N	103° 33' 9.261 W
10,801.0	90.20	178.80	9,474.9	-1,502.9	-86.2	418,277.60	741,648.06	32° 8' 51.192 N	103° 33' 9.244 W
10,895.0	88.30	179.50	9,476.2	-1,596.9	-84.8	418,183.62	741,649.48	32° 8' 50.262 N	103° 33' 9.235 W
10,990.0	88.30	178.60	9,479.0	-1,681.8	-83.2	418,088.68	741,651.05	32° 8' 49.323 N	103° 33' 9.225 W
11,085.0	89.40	178.00	9,480.9	-1,766.8	-80.4	417,993.74	741,653.87	32° 8' 48.383 N	103° 33' 9.200 W
11,180.0	90.20	178.10	9,481.2	-1,881.7	-77.2	417,898.80	741,657.10	32° 8' 47.443 N	103° 33' 9.171 W
11,275.0	92.30	178.90	9,479.2	-1,976.8	-74.7	417,803.66	741,659.59	32° 8' 46.504 N	103° 33' 9.150 W
11,369.0	90.00	177.70	9,477.3	-2,070.6	-71.9	417,709.93	741,662.38	32° 8' 45.574 N	103° 33' 9.125 W
11,464.0	90.00	177.40	9,477.3	-2,165.5	-67.9	417,615.01	741,666.44	32° 8' 44.634 N	103° 33' 9.088 W
11,559.0	90.20	177.20	9,477.1	-2,260.4	-63.4	417,520.12	741,670.91	32° 8' 43.695 N	103° 33' 9.042 W
11,654.0	90.20	178.00	9,476.8	-2,355.3	-59.4	417,425.20	741,674.89	32° 8' 42.755 N	103° 33' 9.004 W
11,749.0	90.10	177.60	9,476.5	-2,450.2	-55.8	417,330.27	741,678.54	32° 8' 41.816 N	103° 33' 8.969 W
11,844.0	90.50	177.50	9,476.0	-2,545.1	-51.7	417,235.36	741,682.60	32° 8' 40.876 N	103° 33' 8.930 W
11,939.0	91.00	177.20	9,474.8	-2,640.0	-47.3	417,140.47	741,686.99	32° 8' 39.937 N	103° 33' 8.887 W
12,034.0	91.80	177.30	9,472.6	-2,734.9	-42.7	417,045.61	741,691.55	32° 8' 38.998 N	103° 33' 8.842 W
12,129.0	91.30	177.80	9,470.2	-2,829.8	-38.7	416,950.72	741,695.61	32° 8' 38.059 N	103° 33' 8.803 W
12,223.0	90.20	178.60	9,469.0	-2,923.7	-35.7	416,856.78	741,698.56	32° 8' 37.129 N	103° 33' 8.776 W
12,319.0	90.40	178.90	9,468.5	-3,019.7	-33.6	416,760.80	741,700.65	32° 8' 36.179 N	103° 33' 8.760 W
12,414.0	90.20	178.90	9,468.0	-3,114.7	-31.8	416,665.82	741,702.48	32° 8' 35.239 N	103° 33' 8.747 W
12,508.0	89.70	178.80	9,468.1	-3,208.7	-29.9	416,571.84	741,704.36	32° 8' 34.309 N	103° 33' 8.733 W
12,603.0	90.10	179.00	9,468.2	-3,303.6	-28.1	416,476.86	741,706.19	32° 8' 33.368 N	103° 33' 8.720 W
12,698.0	90.80	179.10	9,467.7	-3,398.6	-26.5	416,381.88	741,707.76	32° 8' 32.429 N	103° 33' 8.709 W
12,793.0	91.00	179.10	9,466.3	-3,493.6	-25.0	416,286.90	741,709.26	32° 8' 31.489 N	103° 33' 8.700 W
12,888.0	89.50	180.20	9,465.9	-3,588.6	-24.5	416,191.90	741,709.84	32° 8' 30.549 N	103° 33' 8.701 W
12,983.0	89.20	180.80	9,467.0	-3,683.6	-25.3	416,096.91	741,709.01	32° 8' 29.609 N	103° 33' 8.719 W
13,078.0	89.90	179.80	9,467.7	-3,778.6	-25.8	416,001.92	741,708.51	32° 8' 28.669 N	103° 33' 8.733 W
13,173.0	89.80	180.70	9,468.0	-3,873.6	-26.2	415,906.92	741,708.10	32° 8' 27.729 N	103° 33' 8.746 W
13,268.0	90.90	180.20	9,467.4	-3,968.6	-26.9	415,811.93	741,707.35	32° 8' 26.789 N	103° 33' 8.762 W
13,362.0	90.30	180.50	9,466.4	-4,062.6	-27.5	415,717.94	741,706.77	32° 8' 25.859 N	103° 33' 8.777 W



Wellplanning
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	WELL @ 3432.5usft (Original Well Elev)
Site:	9418 JV-P Vaca Draw	MD Reference:	WELL @ 3432.5usft (Original Well Elev)
Well:	2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
13,458.0	88.80	181.10	9,467.2	-4,158.5	-28.9	415,621.95	741,705.43	32° 8' 24.909 N	103° 33' 8.801 W
13,553.0	89.80	180.80	9,468.3	-4,253.5	-30.3	415,526.97	741,704.03	32° 8' 23.969 N	103° 33' 8.825 W
13,647.0	91.10	181.10	9,467.6	-4,347.5	-31.7	415,432.99	741,702.63	32° 8' 23.039 N	103° 33' 8.849 W
13,742.0	90.50	180.30	9,468.3	-4,442.5	-32.8	415,338.00	741,701.47	32° 8' 22.099 N	103° 33' 8.871 W
13,837.0	90.90	179.90	9,465.1	-4,537.5	-33.0	415,243.01	741,701.30	32° 8' 21.159 N	103° 33' 8.880 W
13,932.0	91.20	179.70	9,463.4	-4,632.5	-32.7	415,148.03	741,701.84	32° 8' 20.220 N	103° 33' 8.885 W
13,969.0	91.40	179.30	9,462.5	-4,669.5	-32.3	415,111.04	741,701.98	32° 8' 19.853 N	103° 33' 8.884 W
14,018.0	91.40	179.30	9,461.3	-4,718.4	-31.7	415,062.06	741,702.56	32° 8' 19.369 N	103° 33' 8.881 W

PBHL(9418 JVP Vaca Draw #2H)

Checked By: _____	Approved By: _____	Date: _____
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