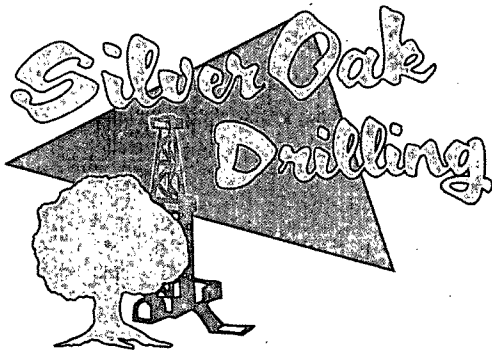




PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288

November 7, 2014

15-42325

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

RE: Hearse 36 St Com #7H
150' FSL & 990' FEL
Sec. 36, T19S, R25E
Eddy County, New Mexico

Dear Sir,

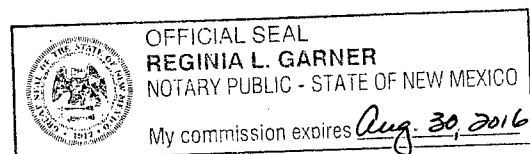
The attached is the Deviation Survey for the above captioned well.

Very truly yours,

Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 7th day of November, 2014.

Notary Public

NM OIL CONSERVATION
ARTESIA DISTRICT
MAR 6 2015
RECEIVED

Hearse 36 State Com 7H

Date	Depth	Deviation	Direction
10/21/2014	169	1.20	0.00
10/21/2014	232	1.30	0.00
10/22/2014	292	1.30	0.00
10/22/2014	405	1.10	0.00
10/22/2014	674	1.20	0.00
10/22/2014	925	0.60	0.00
10/22/2014	1175	0.70	0.00
10/24/2014	1483	0.20	0.00
10/24/2014	1796	0.60	0.00
10/24/2014	2046	0.40	0.00
10/25/2014	2493	0.60	48.66
10/25/2014	2580	0.60	56.40
10/25/2014	2612	0.70	59.00
10/25/2014	2643	1.60	31.50
10/25/2014	2674	3.50	14.50
10/25/2014	2705	5.50	8.60
10/25/2014	2736	7.70	4.50
10/25/2014	2767	10.20	4.80
10/25/2014	2799	13.00	4.10
10/25/2014	2830	15.70	2.80
10/25/2014	2861	18.30	2.60
10/25/2014	2892	21.00	2.10
10/26/2014	2923	23.30	1.20
10/26/2014	2954	26.80	0.70
10/26/2014	2985	31.30	0.30
10/26/2014	3016	35.90	0.30
10/26/2014	3047	39.90	0.10
10/26/2014	3078	43.70	0.10
10/26/2014	3109	47.80	359.70
10/26/2014	3140	50.70	359.30
10/26/2014	3171	53.50	359.90
10/26/2014	3202	57.40	0.60
10/26/2014	3233	61.10	1.20
10/26/2014	3265	64.50	1.30
10/26/2014	3295	68.30	1.30
10/26/2014	3326	72.40	0.70
10/27/2014	3420	81.20	358.60
10/27/2014	3451	85.30	358.50
10/27/2014	3567	89.40	358.90
10/27/2014	3660	90.00	0.40
10/27/2014	3754	90.90	1.00
10/27/2014	3847	90.90	0.90
10/27/2014	3940	90.80	1.00

Date	Depth	Deviation	Direction
10/27/2014	4035	91.20	0.70
10/27/2014	4128	90.60	0.30
10/27/2014	4222	90.20	359.80
10/28/2014	4315	88.90	358.90
10/28/2014	4410	89.20	359.00
10/28/2014	4504	89.40	359.00
10/28/2014	4597	89.60	359.60
10/28/2014	4691	89.60	359.60
10/28/2014	4784	90.00	0.00
10/28/2014	4877	89.80	0.00
10/28/2014	4970	90.80	1.10
10/28/2014	5063	91.50	1.70
10/28/2014	5157	91.40	1.50
10/29/2014	5251	90.70	1.80
10/29/2014	5346	89.60	0.90
10/29/2014	5439	89.50	359.70
10/29/2014	5532	89.50	359.70
10/29/2014	5626	89.40	359.50
10/30/2014	5719	89.10	359.30
10/30/2014	5814	89.20	359.90
10/31/2014	6094	90.90	359.90
10/31/2014	6187	91.30	359.60
10/31/2014	6280	90.90	359.10
11/1/2014	6374	90.40	358.90
11/1/2014	6467	90.50	358.80
11/1/2014	6561	90.60	357.90
11/1/2014	6654	90.80	359.30
11/1/2014	6748	89.90	359.80
11/1/2014	6842	89.60	0.20
11/1/2014	6936	89.40	0.70
11/1/2014	7029	89.80	1.20
11/1/2014	7123	90.40	1.30
11/1/2014	7217	90.60	1.10
11/1/2014	7311	90.60	0.80
11/2/2014	7405	91.00	1.00
11/2/2014	7499	91.30	0.20
11/2/2014	7592	91.10	359.60
# EOF			



COG Operating LLC

Eddy County, NM (NAD27 NME)

Hearse 36 State Com

#7H

WB1 / Job #1411754

Design: Surveys (Silver Oak 3)

Standard Survey Report

03 November, 2014





Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #7H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3417.00usft (Silver Oak 3)
Site:	Hearse 36 State Com	MD Reference:	KB @ 3417.00usft (Silver Oak 3)
Well:	#7H	North Reference:	Grid
Wellbore:	WB1 / Job #1411754	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	Compass 5000 GCR epdm

Project:	Eddy 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:	Hearse 36 State Com		
Site Position:		Northing:	585,673.60 usft
From:	Map	Easting:	466,182.10 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 36' 36.26340 N
		Longitude:	104° 26' 35.37078 W
		Grid Convergence:	-0.06 °

Well:	#7H		
Well Position	+N-S	0.00 usft	Northing:
	+E-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 36' 36.39850 N
		Longitude:	104° 25' 56.75970 W
		Ground Level:	3,399.00 usft

Wellbore:	WB1 / Job #1411754				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	10/24/2014	7.60	60.31	48,418

Design:	Surveys (Silver Oak 3)			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	0.00	0.00	0.00	0.28

Survey Program	Date 11/3/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	2,494.00	VES Gyro Survey (WB1 / Job #1411754)	VES-ISCWSA-GYRO-3	Biaxial Semi-Cont. Gyro
2,580.00	7,701.00	Phoenix MWD Surveys (WB1 / Job #1411	PHX+MWD+IGRF	PHX+MWD+IGRF v3: standard declination

Survey	Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	100.00	0.34	75.41	100.00	0.07	0.29	0.08	0.34	0.34	0.00
	200.00	1.09	47.37	199.99	0.79	1.27	0.80	0.81	0.75	-28.04
	300.00	1.04	39.27	299.97	2.14	2.55	2.15	0.16	-0.05	-8.10
	400.00	0.94	52.35	399.96	3.34	3.77	3.36	0.25	-0.10	13.08
	500.00	1.05	70.57	499.94	4.15	5.29	4.18	0.33	0.11	18.22
	600.00	0.77	71.78	599.93	4.66	6.79	4.70	0.28	-0.28	1.21
	700.00	0.72	75.53	699.92	5.03	8.03	5.07	0.07	-0.05	3.75
	800.00	0.52	74.12	799.92	5.31	9.08	5.36	0.20	-0.20	-1.41
	900.00	0.47	71.25	899.91	5.57	9.90	5.62	0.06	-0.05	-2.87



Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well: #7H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3417.00usft (Silver Oak 3)
Site:	Hearse 36 State Com	MD Reference:	KB @ 3417.00usft (Silver Oak 3)
Well:	#7H	North Reference:	Grid
Wellbore:	WB1 / Job #1411754	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	Compass 5000 GCR epdm

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,000.00	0.32	94.06	999.91	5.68	10.57	5.73	0.21	-0.15	22.81
1,100.00	0.13	93.58	1,099.91	5.65	10.96	5.71	0.19	-0.19	-0.48
1,200.00	0.09	117.94	1,199.91	5.61	11.15	5.66	0.06	-0.04	24.36
1,300.00	0.16	155.51	1,299.91	5.45	11.27	5.50	0.10	0.07	37.57
1,400.00	0.27	152.69	1,399.91	5.11	11.44	5.17	0.11	0.11	-2.82
1,500.00	0.06	119.28	1,499.91	4.88	11.59	4.93	0.22	-0.21	-33.41
1,600.00	0.13	125.82	1,599.91	4.78	11.73	4.84	0.07	0.07	6.54
1,700.00	0.15	116.09	1,699.91	4.66	11.94	4.72	0.03	0.02	-9.73
1,800.00	0.14	145.43	1,799.91	4.50	12.13	4.56	0.07	-0.01	29.34
1,900.00	0.19	93.95	1,899.91	4.39	12.36	4.45	0.15	0.05	-51.48
2,000.00	0.50	69.01	1,999.91	4.53	12.93	4.60	0.34	0.31	-24.94
2,100.00	0.49	62.80	2,099.90	4.89	13.72	4.95	0.05	-0.01	-6.21
2,200.00	0.69	57.73	2,199.90	5.40	14.61	5.47	0.21	0.20	-5.07
2,300.00	0.74	60.16	2,299.89	6.05	15.68	6.12	0.06	0.05	2.43
2,400.00	0.73	50.63	2,399.88	6.77	16.73	6.85	0.12	-0.01	-9.53
2,494.00	0.60	48.66	2,493.87	7.48	17.57	7.56	0.14	-0.14	-2.10
Tie-on to VES Gyro Survey									
2,580.00	0.60	56.40	2,579.87	8.02	18.28	8.11	0.09	0.00	9.00
First Phoenix MWD Survey									
2,612.00	0.70	59.00	2,611.87	8.22	18.59	8.31	0.33	0.31	8.13
2,643.00	1.60	31.50	2,642.86	8.68	18.97	8.77	3.33	2.90	-88.71
2,674.00	3.50	14.50	2,673.83	9.97	19.44	10.06	6.53	6.13	-54.84
2,705.00	5.50	8.60	2,704.73	12.35	19.90	12.45	6.61	6.45	-19.03
2,736.00	7.70	4.50	2,735.53	15.89	20.28	15.99	7.25	7.10	-13.23
2,767.00	10.20	4.80	2,766.15	20.70	20.67	20.80	8.07	8.06	0.97
2,799.00	13.00	4.10	2,797.49	27.11	21.17	27.22	8.76	8.75	-2.19
2,830.00	15.70	2.80	2,827.52	34.78	21.62	34.89	8.77	8.71	-4.19
2,861.00	18.30	2.60	2,857.16	43.83	22.05	43.94	8.39	8.39	-0.65
2,892.00	21.00	2.10	2,886.35	54.25	22.47	54.36	8.73	8.71	-1.61
2,923.00	23.30	1.20	2,915.06	65.93	22.81	66.04	7.50	7.42	-2.90
2,954.00	26.80	0.70	2,943.14	79.05	23.02	79.17	11.31	11.29	-1.61
2,985.00	31.30	0.30	2,970.24	94.10	23.15	94.21	14.53	14.52	-1.29
3,016.00	35.90	0.30	2,996.05	111.25	23.24	111.36	14.84	14.84	0.00
3,047.00	39.90	0.10	3,020.51	130.29	23.30	130.40	12.91	12.90	-0.65
3,078.00	43.70	0.10	3,043.61	150.95	23.34	151.06	12.26	12.26	0.00
3,109.00	47.80	359.70	3,065.24	173.15	23.30	173.26	13.26	13.23	-1.29
3,140.00	50.70	359.30	3,085.47	196.63	23.09	196.74	9.41	9.35	-1.29
3,171.00	53.50	359.90	3,104.51	221.09	22.92	221.20	9.16	9.03	1.94
3,202.00	57.40	0.60	3,122.09	246.62	23.04	246.73	12.72	12.58	2.26
3,233.00	61.10	1.20	3,137.94	273.25	23.46	273.36	12.05	11.94	1.94
3,265.00	64.50	1.30	3,152.56	301.70	24.08	301.81	10.63	10.63	0.31
3,295.00	68.30	1.30	3,164.57	329.18	24.70	329.30	12.67	12.67	0.00
3,326.00	72.40	0.70	3,174.99	358.36	25.21	358.48	13.35	13.23	-1.94



Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #7H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3417.00usft (Silver Oak 3)
Site:	Hearse, 36 State Com	MD Reference:	KB @ 3417.00usft (Silver Oak 3)
Well:	#7H	North Reference:	Grid
Wellbore:	WB1 / Job #1411754	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	Compass 5000, GCR-epdm

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/S (usft)	+E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
3,358.00	75.50	0.00	3,183.84	389.11	25.40	389.23	9.91	9.69	-2.19	
3,389.00	77.80	359.30	3,191.00	419.27	25.21	419.39	7.74	7.42	-2.26	
3,420.00	81.20	358.60	3,196.65	449.74	24.65	449.86	11.19	10.97	-2.26	
3,451.00	85.30	358.50	3,200.29	480.51	23.87	480.62	13.23	13.23	-0.32	
3,483.00	88.00	358.00	3,202.16	512.44	22.90	512.54	8.58	8.44	-1.56	
3,567.00	89.40	358.90	3,204.07	596.38	20.63	596.48	1.98	1.67	1.07	
3,660.00	90.00	0.40	3,204.55	689.38	20.06	689.47	1.74	0.65	1.61	
3,754.00	90.90	1.00	3,203.81	783.37	21.21	783.46	1.15	0.96	0.64	
3,847.00	90.90	0.90	3,202.35	876.34	22.75	876.44	0.11	0.00	-0.11	
3,940.00	90.80	1.00	3,200.97	969.32	24.29	969.43	0.15	-0.11	0.11	
4,035.00	91.20	0.70	3,199.32	1,064.29	25.70	1,064.41	0.53	0.42	-0.32	
4,128.00	90.60	0.30	3,197.86	1,157.28	26.51	1,157.39	0.78	-0.65	-0.43	
4,222.00	90.20	359.80	3,197.20	1,251.27	26.59	1,251.39	0.68	-0.43	-0.53	
4,315.00	88.90	358.90	3,197.93	1,344.26	25.54	1,344.37	1.70	-1.40	-0.97	
4,410.00	89.20	359.00	3,199.50	1,439.23	23.80	1,439.33	0.33	0.32	0.11	
4,504.00	89.40	359.00	3,200.65	1,533.21	22.16	1,533.30	0.21	0.21	0.00	
4,597.00	89.50	358.80	3,201.55	1,626.19	20.37	1,626.27	0.24	0.11	-0.22	
4,691.00	89.60	359.60	3,202.28	1,720.18	19.06	1,720.25	0.86	0.11	0.85	
4,784.00	90.00	0.00	3,202.61	1,813.18	18.73	1,813.25	0.61	0.43	0.43	
4,877.00	89.80	0.00	3,202.77	1,906.18	18.73	1,906.24	0.22	-0.22	0.00	
4,970.00	90.80	1.10	3,202.28	1,999.17	19.63	1,999.24	1.60	1.08	1.18	
5,063.00	91.50	1.70	3,200.42	2,092.12	21.90	2,092.20	0.99	0.75	0.65	
5,157.00	91.40	1.50	3,198.04	2,186.05	24.52	2,186.15	0.24	-0.11	-0.21	
5,251.00	90.70	1.80	3,196.32	2,280.00	27.23	2,280.10	0.81	-0.74	0.32	
5,346.00	89.60	0.90	3,196.07	2,374.97	29.47	2,375.08	1.50	-1.16	-0.95	
5,439.00	89.50	359.70	3,196.80	2,467.96	29.95	2,468.08	1.29	-0.11	-1.29	
5,532.00	89.50	359.70	3,197.61	2,560.96	29.47	2,561.07	0.00	0.00	0.00	
5,626.00	89.40	359.50	3,198.51	2,654.95	28.81	2,655.06	0.24	-0.11	-0.21	
5,719.00	89.10	359.30	3,199.73	2,747.94	27.84	2,748.04	0.39	-0.32	-0.22	
5,814.00	89.20	359.90	3,201.14	2,842.93	27.17	2,843.02	0.64	0.11	0.63	
5,908.00	90.60	0.40	3,201.30	2,936.92	27.42	2,937.02	1.58	1.49	0.53	
6,000.00	90.40	0.50	3,200.50	3,028.92	28.14	3,029.02	0.24	-0.22	0.11	
6,094.00	90.90	359.40	3,199.43	3,122.91	28.06	3,123.01	1.29	0.53	-1.17	
6,187.00	91.30	359.60	3,197.65	3,215.89	27.25	3,215.98	0.48	0.43	0.22	
6,280.00	90.90	359.10	3,195.86	3,308.86	26.19	3,308.95	0.69	-0.43	-0.54	
6,374.00	90.40	358.90	3,194.80	3,402.84	24.55	3,402.92	0.57	-0.53	-0.21	
6,467.00	90.50	358.80	3,194.07	3,495.82	22.69	3,495.89	0.15	0.11	-0.11	
6,561.00	90.60	357.90	3,193.16	3,589.78	19.98	3,589.83	0.96	0.11	-0.96	
6,654.00	90.80	359.30	3,192.03	3,682.74	17.71	3,682.78	1.52	0.22	1.51	
6,748.00	89.90	359.80	3,191.45	3,776.73	16.97	3,776.77	1.10	-0.96	0.53	
6,842.00	89.60	0.20	3,191.86	3,870.73	16.97	3,870.77	0.53	-0.32	0.43	
6,936.00	89.40	0.70	3,192.68	3,964.73	17.71	3,964.76	0.57	-0.21	0.53	
7,029.00	89.80	1.20	3,193.33	4,057.71	19.25	4,057.76	0.69	0.43	0.54	
7,123.00	90.40	1.30	3,193.17	4,151.69	21.30	4,151.74	0.65	0.64	0.11	



Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #7H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3417.00usft (Silver Oak 3)
Site:	Hearse 36 State Com	MD Reference:	KB @ 3417.00usft (Silver Oak 3)
Well:	#7H	North Reference:	Grid
Wellbore:	WB1 / Job #1411754	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	Compass 5000 GCR epdm

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,217.00	90.60	1.10	3,192.35	4,245.66	23.27	4,245.73	0.30	0.21	-0.21
7,311.00	90.60	0.80	3,191.36	4,339.64	24.83	4,339.71	0.32	0.00	-0.32
7,405.00	91.00	1.00	3,190.05	4,433.62	26.30	4,433.70	0.48	0.43	0.21
7,499.00	91.30	0.20	3,188.16	4,527.60	27.29	4,527.68	0.91	0.32	-0.85
7,592.00	91.10	359.60	3,186.22	4,620.58	27.13	4,620.66	0.68	-0.22	-0.65
7,640.00	91.30	359.50	3,185.21	4,668.57	26.75	4,668.64	0.47	0.42	-0.21
Last Phoenix MWD Survey									
7,701.00	91.30	359.50	3,183.83	4,729.55	26.22	4,729.62	0.00	0.00	0.00
Projection to TD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,494.00	2,493.87	7.48	17.57	Tie-on to VES Gyro Survey
2,580.00	2,579.87	8.02	18.28	First Phoenix MWD Survey
7,640.00	3,185.21	4,668.57	26.75	Last Phoenix MWD Survey
7,701.00	3,183.83	4,729.55	26.22	Projection to TD

Checked By: _____ Approved By: _____ Date: _____