



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

30-015-42501

August 18, 2014

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

RE: Noose Federal Com #11H
150' FSL & 1130' FEL
Sec. 35, T19S, R25E
Eddy County, New Mexico

Dear Sir,

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

Very truly yours,

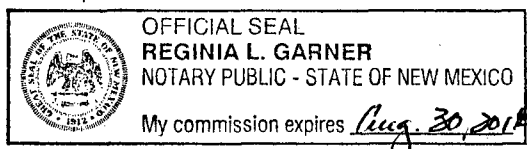
Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 18th day of August, 2014.

Notary Public

NM OIL CONSERVATION
ARTESIA DISTRICT
NOV 10
RECEIVED



NOOSE FEDERAL COM #11 H

Date	Depth	Deviation	Direction
8/4/2014	239	0.10	0.00
8/4/2014	721	0.20	0.00
8/5/2014	1191	0.50	0.00
8/6/2014	1420	0.40	0.00
8/7/2014	1888	0.30	0.00
8/7/2014	2363	0.10	0.00
8/7/2014	2391	0.60	2.50
8/7/2014	2422	0.60	11.90
8/7/2014	2453	1.60	9.60
8/8/2014	2578	16.20	9.50
8/8/2014	2609	19.00	10.00
8/8/2014	2641	22.10	9.00
8/8/2014	2672	24.40	7.70
8/8/2014	2704	26.30	5.80
8/8/2014	2735	29.10	4.10
8/8/2014	2890	42.60	359.60
8/8/2014	2921	45.00	359.50
8/8/2014	2953	48.10	358.90
8/8/2014	3015	53.70	359.60
8/8/2014	3036	50.80	359.20
8/8/2014	3046	57.50	0.20
8/8/2014	3077	62.00	0.60
8/8/2014	3108	65.80	1.10
8/8/2014	3171	71.10	1.50
8/8/2014	3202	74.40	0.90
8/8/2014	3233	78.20	0.30
8/8/2014	3264	81.50	359.30
8/8/2014	3295	84.80	358.60
8/9/2014	3346	89.10	358.60
8/9/2014	3377	90.70	358.80
8/9/2014	3471	91.10	358.80
8/9/2014	3565	91.10	359.30
8/9/2014	3659	90.60	0.30
8/9/2014	3752	90.60	0.50
8/9/2014	3845	90.90	0.40
8/9/2014	3938	90.00	0.30
8/9/2014	4032	91.70	0.10
8/9/2014	4125	93.00	0.50
8/9/2014	4219	93.20	0.80
8/10/2014	4312	92.80	359.80
8/10/2014	4406	92.60	359.20
8/10/2014	4500	93.00	359.50
8/10/2014	4593	91.40	359.30

Date	Depth	Deviation	Direction
8/10/2014	4688	91.90	0.20
8/10/2014	4782	92.10	0.40
8/11/2014	4875	91.50	1.40
8/11/2014	4969	91.70	0.90
8/11/2014	5155	90.80	1.10
8/11/2014	5249	91.50	0.90
8/11/2014	5343	90.60	1.00
8/11/2014	5436	90.30	0.50
8/11/2014	5530	89.90	359.90
8/11/2014	5624	90.00	359.20
8/12/2014	5718	89.70	359.30
8/12/2014	5812	90.20	358.60
8/12/2014	5905	90.50	358.80
8/12/2014	5998	90.40	359.30
8/12/2014	6093	90.20	0.20
8/12/2014	6187	90.90	360.00
8/12/2014	6281	91.70	0.30
8/13/2014	6374	91.30	1.00
8/13/2014	6468	91.60	0.90
8/13/2014	6561	91.20	1.10
8/13/2014	6655	91.80	0.40
8/13/2014	6749	90.80	0.50
8/13/2014	6842	89.80	360.00
8/13/2014	6935	90.20	359.90
8/14/2014	7028	88.70	0.30
8/14/2014	7123	89.90	0.80
8/14/2014	7216	89.70	0.30
8/14/2014	7311	88.90	359.00
8/14/2014	7404	90.50	359.30
# EOF			



COG Operating LLC

Eddy County, NM (NAD27 NME)

Noose Federal Com

#11H

WB1/Job #1411423

Design: Surveys (Silver Oak 3)

Standard Survey Report

15 August, 2014





Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #11H
Project:	Eddy County, NM (NAD27/NME)	TVD Reference:	KB @ 3470.00usft (Silver Oak 3)
Site:	Noose Federal Com	MD Reference:	KB @ 3470.00usft (Silver Oak 3)
Well:	#11H	North Reference:	Grid
Wellbore:	WB1/Job #1411423	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	GCR:DB

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:		Noose Federal Com			
Site Position:		Northing:	585,657.00 usft	Latitude:	32° 36' 36.04153 N
From:	Map	Easting:	460,945.50 usft	Longitude:	104° 27' 36.59241 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.07 °

Well	#11H					
Well Position	+N/-S	0.00 usft	Northing:	585,666.90 usft	Latitude:	32° 36' 36.17482 N
	+E/-W	0.00 usft	Easting:	464,061.70 usft	Longitude:	104° 27' 0.16061.W
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,452.00 usft	

Wellbore		WB1/Job #1411423			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	08/01/14	7.63	60.32	48,439

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	0.17

Survey Program		Date	08/15/14		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	2,348.00	VES Gyro Surveys (WB1/Job #1411423)	VES-ISCWSA-GYRO-3	Biaxial Semi-Cont. Gyro	
2,391.00	7,568.00	Phoenix MWD Surveys (WB1/Job #1411423)	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	0.22	348.70	100.00	0.19	-0.04	0.19	0.22	0.22	0.00
200.00	0.15	5.42	200.00	0.51	-0.06	0.51	0.09	-0.07	16.72
300.00	0.21	337.01	300.00	0.81	-0.12	0.81	0.11	0.06	-28.41
400.00	0.57	296.50	400.00	1.20	-0.64	1.19	0.43	0.36	-40.51
500.00	0.37	284.10	499.99	1.50	-1.40	1.49	0.22	-0.20	-12.40
600.00	0.05	317.72	599.99	1.61	-1.74	1.60	0.33	-0.32	33.62
700.00	0.27	335.78	699.99	1.86	-1.87	1.85	0.22		18.06
800.00	0.34	306.37	799.99	2.25	-2.20	2.24	0.17	0.07	-29.41
900.00	0.72	320.32	899.99	2.91	-2.84	2.90	0.40	0.38	13.95



Phoenix Technology Services
Survey Report



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Well:	#11H	North Reference:	Grid
Wellbore:	WB1/Job #1411423	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	GCR DB

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	0.39	316.18	999.98	3.63	-3.48	3.62	0.33	-0.33	-4.14
1,100.00	0.40	312.64	1,099.98	4.12	-3.97	4.10	0.03	0.01	-3.54
1,200.00	0.41	332.01	1,199.98	4.67	-4.40	4.66	0.14	0.01	19.37
1,300.00	0.46	331.29	1,299.97	5.34	-4.76	5.32	0.05	0.05	-0.72
1,400.00	0.55	327.69	1,399.97	6.09	-5.21	6.08	0.10	0.09	-3.60
1,500.00	0.22	314.23	1,499.97	6.63	-5.60	6.62	0.34	-0.33	-13.46
1,600.00	0.42	322.03	1,599.97	7.06	-5.96	7.04	0.20	0.20	7.80
1,700.00	0.31	318.38	1,699.96	7.55	-6.37	7.53	0.11	-0.11	-3.65
1,800.00	0.19	324.41	1,799.96	7.89	-6.64	7.87	0.12	-0.12	6.03
1,900.00	0.25	330.49	1,899.96	8.21	-6.85	8.19	0.06	0.06	6.08
2,000.00	0.34	344.73	1,999.96	8.69	-7.03	8.67	0.12	0.09	14.24
2,100.00	0.18	341.89	2,099.96	9.12	-7.16	9.10	0.16	-0.16	-2.84
2,200.00	0.30	30.37	2,199.96	9.50	-7.08	9.48	0.23	0.12	48.48
2,300.00	0.41	45.26	2,299.96	9.97	-6.69	9.95	0.14	0.11	14.89
2,348.00	0.46	32.25	2,347.96	10.26	-6.47	10.24	0.23	0.10	-27.10
VES Gyro Tie-in									
2,391.00	0.60	2.50	2,390.95	10.63	-6.36	10.61	0.71	0.33	-69.19
First Phoenix MWD Survey									
2,422.00	0.60	11.90	2,421.95	10.95	-6.32	10.93	0.32	0.00	30.32
2,453.00	1.60	9.60	2,452.95	11.54	-6.22	11.52	3.23	3.23	-7.42
2,484.00	5.80	5.80	2,483.87	13.52	-5.99	13.50	13.56	13.55	-12.26
2,516.00	10.20	6.70	2,515.56	17.95	-5.49	17.93	13.76	13.75	2.81
2,547.00	13.80	7.00	2,545.87	24.34	-4.72	24.33	11.61	11.61	0.97
2,578.00	16.20	9.50	2,575.81	32.28	-3.56	32.27	8.02	7.74	8.06
2,609.00	19.00	10.00	2,605.36	41.52	-1.97	41.51	9.05	9.03	1.61
2,641.00	22.10	9.00	2,635.32	52.60	-0.12	52.59	9.75	9.69	-3.13
2,672.00	24.40	7.70	2,663.80	64.70	1.65	64.71	7.60	7.42	-4.19
2,704.00	26.30	5.80	2,692.72	78.31	3.25	78.32	6.46	5.94	-5.94
2,735.00	29.10	4.10	2,720.16	92.66	4.49	92.67	9.38	9.03	-5.48
2,766.00	31.70	1.60	2,746.90	108.32	5.25	108.34	9.33	8.39	-8.06
2,797.00	34.90	0.60	2,772.81	125.34	5.57	125.35	10.47	10.32	-3.23
2,828.00	37.80	359.90	2,797.77	143.71	5.65	143.73	9.45	9.35	-2.26
2,859.00	40.40	359.50	2,821.83	163.26	5.54	163.28	8.43	8.39	-1.29
2,890.00	42.60	359.60	2,845.04	183.80	5.38	183.81	7.10	7.10	0.32
2,921.00	45.00	359.50	2,867.42	205.25	5.21	205.27	7.75	7.74	-0.32
2,953.00	48.10	358.90	2,889.42	228.48	4.89	228.49	9.78	9.69	-1.88
2,984.00	50.80	359.20	2,909.57	252.03	4.50	252.04	8.74	8.71	0.97
3,015.00	53.70	359.60	2,928.55	276.54	4.24	276.55	9.41	9.35	1.29
3,046.00	57.50	0.20	2,946.06	302.11	4.20	302.12	12.36	12.26	1.94
3,077.00	62.00	0.60	2,961.67	328.88	4.39	328.89	14.56	14.52	1.29
3,108.00	65.80	1.10	2,975.31	356.71	4.81	356.72	12.34	12.26	1.61
3,139.00	68.30	1.40	2,987.40	385.25	5.43	385.26	8.11	8.06	0.97
3,171.00	71.10	1.50	2,998.50	415.25	6.19	415.26	8.75	8.75	0.31



Phoenix Technology Services
Survey Report



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Wellbore:	WB1/Job #1411423	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	GCR DB

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)
3,202.00	74.40	0.90	3,007.69	444.84	6.81	444.86	10.80	10.65	-1.94
3,233.00	78.20	0.30	3,015.03	474.95	7.12	474.97	12.40	12.26	-1.94
3,264.00	81.50	359.30	3,020.49	505.46	7.01	505.48	11.11	10.65	-3.23
3,295.00	84.80	358.60	3,024.19	536.23	6.45	536.25	10.88	10.65	-2.26
3,327.00	87.70	358.30	3,026.28	568.15	5.58	568.16	9.11	9.06	-0.94
3,346.00	89.10	358.60	3,026.81	587.13	5.07	587.15	7.54	7.37	1.58
3,377.00	90.70	358.80	3,026.87	618.13	4.37	618.14	5.20	5.16	0.65
3,471.00	91.10	358.80	3,025.39	712.09	2.40	712.10	0.43	0.43	0.00
3,564.00	91.10	359.30	3,023.60	805.06	0.86	805.06	0.54	0.00	0.54
3,658.00	90.60	0.30	3,022.21	899.05	0.53	899.05	1.19	-0.53	1.06
3,752.00	90.60	0.50	3,021.23	993.04	1.19	993.04	0.21	0.00	0.21
3,845.00	90.90	0.40	3,020.01	1,086.03	1.92	1,086.03	0.34	0.32	-0.11
3,938.00	91.00	0.30	3,018.47	1,179.02	2.48	1,179.02	0.15	0.11	-0.11
4,032.00	91.70	0.10	3,016.25	1,272.99	2.81	1,272.99	0.77	0.74	-0.21
4,125.00	93.00	0.50	3,012.44	1,365.91	3.30	1,365.91	1.46	1.40	0.43
4,219.00	93.20	0.80	3,007.36	1,459.76	4.36	1,459.77	0.38	0.21	0.32
4,312.00	92.80	359.80	3,002.49	1,552.63	4.85	1,552.64	1.16	-0.43	-1.08
4,406.00	92.60	359.20	2,998.06	1,646.53	4.03	1,646.53	0.67	-0.21	-0.64
4,500.00	93.00	359.50	2,993.47	1,740.41	2.97	1,740.41	0.53	0.43	0.32
4,593.00	91.40	359.30	2,989.90	1,833.33	1.99	1,833.33	1.73	-1.72	-0.22
4,688.00	91.90	0.20	2,987.16	1,928.29	1.58	1,928.29	1.08	0.53	0.95
4,782.00	92.10	0.40	2,983.88	2,022.23	2.07	2,022.23	0.30	0.21	0.21
4,875.00	91.50	1.40	2,980.96	2,115.17	3.53	2,115.17	1.25	-0.65	1.08
4,969.00	91.70	0.90	2,978.34	2,209.12	5.42	2,209.12	0.57	0.21	-0.53
5,062.00	90.20	1.30	2,976.79	2,302.08	7.20	2,302.09	1.67	-1.61	0.43
5,155.00	90.80	1.10	2,975.98	2,395.06	9.15	2,395.08	0.68	0.65	-0.22
5,249.00	91.50	0.90	2,974.10	2,489.02	10.79	2,489.05	0.77	0.74	-0.21
5,343.00	90.60	1.00	2,972.37	2,583.00	12.35	2,583.02	0.96	-0.96	0.11
5,436.00	90.30	0.50	2,971.64	2,675.98	13.56	2,676.01	0.63	-0.32	-0.54
5,530.00	89.90	359.90	2,971.48	2,769.98	13.89	2,770.01	0.77	-0.43	-0.64
5,624.00	90.00	359.20	2,971.56	2,863.98	13.15	2,864.01	0.75	0.11	-0.74
5,718.00	89.70	359.30	2,971.81	2,957.97	11.92	2,957.99	0.34	-0.32	0.11
5,811.00	90.20	358.60	2,971.89	3,050.95	10.22	3,050.97	0.92	0.54	-0.75
5,905.00	90.50	358.80	2,971.31	3,144.93	8.09	3,144.94	0.38	0.32	0.21
5,998.00	90.40	359.30	2,970.58	3,237.91	6.54	3,237.92	0.55	-0.11	0.54
6,093.00	90.20	0.20	2,970.09	3,332.91	6.13	3,332.91	0.97	-0.21	0.95
6,187.00	90.90	0.00	2,969.18	3,426.90	6.29	3,426.91	0.77	0.74	-0.21
6,281.00	91.70	0.30	2,967.05	3,520.88	6.54	3,520.88	0.91	0.85	0.32
6,374.00	91.30	1.00	2,964.62	3,613.84	7.59	3,613.85	0.87	-0.43	0.75
6,468.00	91.60	0.90	2,962.24	3,707.80	9.15	3,707.81	0.34	0.32	-0.11
6,561.00	91.20	1.10	2,959.97	3,800.75	10.78	3,800.77	0.48	-0.43	0.22
6,655.00	91.80	0.40	2,957.51	3,894.71	12.01	3,894.73	0.98	0.64	-0.74
6,749.00	90.80	0.50	2,955.37	3,988.68	12.74	3,988.70	1.07	-1.06	0.11
6,842.00	89.80	0.00	2,954.89	4,081.68	13.15	4,081.70	1.20	-1.08	-0.54



Phoenix Technology Services
Survey Report



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Wellbore:	WB1/Job #1411423	Survey Calculation Method:	Minimum Curvature
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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)
6,935.00	90.20	359.90	2,954.89	4,174.68	13.07	4,174.70	0.44	0.43	-0.11
7,028.00	88.70	0.30	2,955.78	4,267.67	13.23	4,267.69	1.67	-1.61	0.43
7,123.00	89.90	0.80	2,956.94	4,362.66	14.14	4,362.68	1.37	1.26	0.53
7,216.00	89.70	0.30	2,957.26	4,455.65	15.04	4,455.68	0.58	-0.22	-0.54
7,310.00	88.90	359.00	2,958.41	4,549.64	14.46	4,549.67	1.62	-0.85	-1.38
7,404.00	90.50	359.30	2,958.90	4,643.63	13.07	4,643.65	1.73	1.70	0.32
7,498.00	89.70	359.50	2,958.74	4,737.62	12.08	4,737.64	0.88	-0.85	0.21
7,508.00	89.90	0.10	2,958.78	4,747.62	12.05	4,747.64	6.32	2.00	6.00
Last Phoenix MWD Survey									
7,568.00	89.90	0.10	2,958.88	4,807.62	12.15	4,807.64	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)	
2,348.00	2,347.96	10.26	-6.47	VES Gyro Tie-in
2,391.00	2,390.95	10.63	-6.36	First Phoenix MWD Survey
7,508.00	2,958.78	4,747.62	12.05	Last Phoenix MWD Survey
7,568.00	2,958.88	4,807.62	12.15	Projection to TD

Checked By: _____ Approved By: _____ Date: _____