



COG Operating LLC

Lea County, NM (NAD-83 2015)

Ragnar Fed Com #25H

API #: 30-025-43131

SHL: 185' FNL, 2358' FEL, Sec 22, T17S, R32E, Unit B

PP: 330' FSL, 2287' FEL, Sec 15, T17S, R32E, Unit O

BHL: 352' FNL, 2281' FEL, Sec 15, T17S, R32E, Unit B

Design: BHL: 350' FNL, 2284' FEL, Sec 15, T17S, R32E, Unit B

Standard Survey Report

30 June, 2016

HOBBS OCD

OCT 31 P.M.

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TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 185' FNL, 2358' FEL, Sec 22, T17S, R32E, Unit B
Project:	Lea County, NM (NAD-83 2015)	TVD Reference:	KB @ 4032.00usft (Patriot 6)
Site:	Ragnar Fed Com #25H	MD Reference:	KB @ 4032.00usft (Patriot 6)
Well:	SHL: 185' FNL, 2358' FEL, Sec 22, T17S, R32E, Unit B	North Reference:	Grid
Wellbore:	BHL: 350' FNL, 2284' FEL, Sec 15, T17S, R32E, Unit B	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FNL, 2284' FEL, Sec 15, T17S, R32E, Unit B	Database:	EDM 5000.1 Single User Db

Project	Lea County, NM (NAD-83 2015)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Ragnar Fed Com #25H		
Site Position:		Northing:	665,026.10 usft
From:	Map	Easting:	719,492.80 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in
		Latitude:	32° 49' 36.624 N
		Longitude:	103° 45' 12.081 W
		Grid Convergence:	0.31 °

Well	SHL: 185' FNL, 2358' FEL, Sec 22, T17S, R32E, Unit B		
Well Position	+N/-S	0.00 usft	Northing: 665,026.10 usft
	+E/-W	0.00 usft	Easting: 719,492.80 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft
		Latitude:	32° 49' 36.624 N
		Longitude:	103° 45' 12.081 W
		Ground Level:	4,014.00 usft

Wellbore	BHL: 350' FNL, 2284' FEL, Sec 15, T17S, R32E, Unit B		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	6/2/2016	7.20
			Dip Angle (°)
			60.60
			Field Strength (nT)
			48,380

Design	BHL: 350' FNL, 2284' FEL, Sec 15, T17S, R32E, Unit B		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.00	0.00	0.00
			Direction (°)
			0.47

Survey Program	Date 6/30/2016		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
100.00	2,145.00	VES Gyro #1 (BHL: 350' FNL, 2284' FEL,	VES-ISCWSA-GYRO-3
2,278.00	11,143.00	TDS MWD #2 (BHL: 350' FNL, 2284' FEL,	MWD
			Description
			Biaxial Semi-Cont. Gyro
			MWD - Standard

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	0.36	161.99	100.00	-0.30	0.10	-0.30	0.36	0.36	0.00	
200.00	0.44	155.20	200.00	-0.95	0.36	-0.94	0.09	0.08	-6.79	
300.00	0.54	147.20	299.99	-1.69	0.77	-1.68	0.12	0.10	-8.00	
400.00	0.39	144.81	399.99	-2.36	1.22	-2.35	0.15	-0.15	-2.39	
500.00	0.18	202.61	499.99	-2.79	1.36	-2.78	0.33	-0.21	57.80	
600.00	0.23	208.77	599.99	-3.11	1.20	-3.10	0.05	0.05	6.16	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 185' FNL, 2358' FEL, Sec 22, T17S, R32E, Unit B
Project:	Lea County, NM (NAD-83 2015)	TVD Reference:	KB @ 4032.00usft (Patriot 6)
Site:	Ragnar Fed Com #25H	MD Reference:	KB @ 4032.00usft (Patriot 6)
Well:	SHL: 185' FNL, 2358' FEL, Sec 22, T17S, R32E, Unit B	North Reference:	Grid
Wellbore:	BHL: 350' FNL, 2284' FEL, Sec 15, T17S, R32E, Unit B	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FNL, 2284' FEL, Sec 15, T17S, R32E, Unit B	Database:	EDM 5000.1 Single User Db

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)	
700.00	0.41	208.18	699.99	-3.60	0.94	-3.59	0.18	0.18	-0.59	
800.00	0.20	233.79	799.99	-4.02	0.63	-4.01	0.25	-0.21	25.61	
900.00	0.23	186.31	899.98	-4.32	0.46	-4.32	0.18	0.03	-47.48	
1,000.00	0.19	155.98	999.98	-4.67	0.51	-4.67	0.12	-0.04	-30.33	
1,100.00	0.13	151.77	1,099.98	-4.92	0.63	-4.92	0.06	-0.06	-4.21	
1,200.00	0.43	114.15	1,199.98	-5.18	1.03	-5.17	0.34	0.30	-37.62	
1,300.00	0.50	105.34	1,299.98	-5.45	1.79	-5.43	0.10	0.07	-8.81	
1,400.00	0.58	107.14	1,399.97	-5.71	2.69	-5.69	0.08	0.08	1.80	
1,500.00	0.59	66.28	1,499.97	-5.65	3.65	-5.62	0.41	0.01	-40.86	
1,600.00	0.86	53.00	1,599.96	-4.99	4.72	-4.96	0.32	0.27	-13.28	
1,700.00	1.11	54.97	1,699.95	-3.99	6.11	-3.94	0.25	0.25	1.97	
1,800.00	1.38	60.36	1,799.92	-2.84	7.95	-2.77	0.29	0.27	5.39	
1,900.00	1.59	58.65	1,899.89	-1.52	10.18	-1.43	0.21	0.21	-1.71	
2,000.00	1.94	66.23	1,999.84	-0.11	12.92	-0.01	0.42	0.35	7.58	
2,100.00	1.62	61.10	2,099.79	1.25	15.70	1.38	0.36	-0.32	-5.13	
2,145.00	1.50	62.26	2,144.78	1.83	16.78	1.97	0.28	-0.27	2.58	
Tie-In to VES Gyro										
2,278.00	1.40	61.90	2,277.73	3.41	19.76	3.57	0.08	-0.08	-0.27	
First TDS MWD Survey										
2,373.00	1.00	97.00	2,372.71	3.85	21.60	4.03	0.86	-0.42	36.95	
2,468.00	1.00	112.00	2,467.70	3.44	23.19	3.63	0.27	0.00	15.79	
2,563.00	0.90	128.80	2,562.69	2.66	24.54	2.87	0.31	-0.11	17.68	
2,659.00	1.10	100.00	2,658.67	2.03	26.04	2.25	0.56	0.21	-30.00	
2,754.00	1.70	95.80	2,753.64	1.73	28.34	1.96	0.64	0.63	-4.42	
2,849.00	1.70	103.50	2,848.60	1.26	31.11	1.52	0.24	0.00	8.11	
2,944.00	1.40	106.90	2,943.57	0.59	33.59	0.87	0.33	-0.32	3.58	
3,039.00	1.50	97.40	3,038.54	0.10	35.94	0.39	0.27	0.11	-10.00	
3,135.00	2.30	88.10	3,134.48	0.00	39.11	0.32	0.89	0.83	-9.69	
3,230.00	2.20	90.60	3,229.41	0.04	42.84	0.39	0.15	-0.11	2.63	
3,325.00	1.90	92.70	3,324.35	-0.05	46.23	0.33	0.33	-0.32	2.21	
3,417.00	1.70	102.40	3,416.31	-0.42	49.09	-0.01	0.40	-0.22	10.54	
3,512.00	1.70	101.20	3,511.26	-0.99	51.85	-0.57	0.04	0.00	-1.26	
3,608.00	2.10	68.10	3,607.21	-0.61	54.88	-0.16	1.20	0.42	-34.48	
3,703.00	2.40	58.90	3,702.14	1.06	58.19	1.54	0.49	0.32	-9.68	
3,798.00	2.10	76.30	3,797.07	2.50	61.59	3.01	0.78	-0.32	18.32	
3,893.00	1.10	49.80	3,892.03	3.50	63.98	4.03	1.28	-1.05	-27.89	
3,989.00	0.70	357.00	3,988.02	4.69	64.65	5.22	0.91	-0.42	-55.00	
4,084.00	0.60	8.90	4,083.01	5.76	64.70	6.29	0.18	-0.11	12.53	
4,179.00	0.50	15.70	4,178.01	6.65	64.88	7.18	0.13	-0.11	7.16	
4,274.00	0.40	205.60	4,273.01	6.75	64.85	7.28	0.94	-0.11	-179.05	
4,369.00	0.40	223.90	4,368.01	6.21	64.48	6.74	0.13	0.00	19.26	

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Survey										
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4,464.00	0.40	173.50	4,463.00	5.64	64.29	6.17	0.36	0.00	-53.05	
4,559.00	0.40	162.80	4,558.00	4.99	64.42	5.52	0.08	0.00	-11.26	
4,655.00	0.40	161.80	4,654.00	4.36	64.63	4.89	0.01	0.00	-1.04	
4,750.00	0.40	135.40	4,749.00	3.80	64.96	4.34	0.19	0.00	-27.79	
4,845.00	0.40	122.10	4,844.00	3.39	65.48	3.93	0.10	0.00	-14.00	
4,940.00	0.40	131.30	4,938.99	3.00	66.01	3.54	0.07	0.00	9.68	
5,035.00	0.50	127.80	5,033.99	2.52	66.58	3.07	0.11	0.11	-3.68	
5,130.00	0.70	117.00	5,128.98	2.01	67.43	2.56	0.24	0.21	-11.37	
5,225.00	0.10	306.00	5,223.98	1.79	67.88	2.35	0.84	-0.63	-180.00	
5,320.00	0.00	207.10	5,318.98	1.84	67.81	2.40	0.11	-0.11	0.00	
5,416.00	0.10	315.10	5,414.98	1.90	67.75	2.46	0.10	0.10	0.00	
5,511.00	0.10	242.20	5,509.98	1.92	67.62	2.47	0.13	0.00	-76.74	
5,606.00	0.10	248.90	5,604.98	1.85	67.47	2.40	0.01	0.00	7.05	
5,637.00	1.30	339.60	5,635.98	2.17	67.32	2.72	4.21	3.87	292.58	
5,669.00	3.70	341.60	5,667.95	3.49	66.87	4.04	7.50	7.50	6.25	
5,701.00	6.20	345.70	5,699.83	6.15	66.12	6.69	7.89	7.81	12.81	
5,732.00	9.60	351.10	5,730.53	10.32	65.30	10.86	11.21	10.97	17.42	
5,764.00	13.30	357.50	5,761.89	16.64	64.73	17.17	12.21	11.56	20.00	
5,796.00	15.70	0.70	5,792.86	24.65	64.62	25.18	7.90	7.50	10.00	
5,828.00	18.90	0.50	5,823.41	34.16	64.72	34.69	10.00	10.00	-0.63	
5,860.00	22.20	359.20	5,853.37	45.39	64.68	45.92	10.41	10.31	-4.06	
5,891.00	25.30	357.90	5,881.74	57.87	64.36	58.40	10.14	10.00	-4.19	
5,923.00	27.90	357.60	5,910.35	72.19	63.79	72.71	8.14	8.13	-0.94	
5,955.00	30.70	356.60	5,938.26	87.82	62.99	88.34	8.88	8.75	-3.13	
5,986.00	33.50	358.90	5,964.52	104.28	62.36	104.79	9.85	9.03	7.42	
6,018.00	37.10	1.10	5,990.63	122.77	62.38	123.27	11.93	11.25	6.88	
6,050.00	40.20	0.90	6,015.62	142.75	62.72	143.26	9.70	9.69	-0.63	
6,081.00	41.80	0.70	6,039.01	163.08	63.01	163.59	5.18	5.16	-0.65	
6,113.00	42.10	1.70	6,062.81	184.47	63.46	184.98	2.29	0.94	3.13	
6,145.00	42.50	1.50	6,086.48	206.00	64.06	206.51	1.32	1.25	-0.63	
6,177.00	42.80	1.30	6,110.02	227.67	64.59	228.19	1.03	0.94	-0.63	
6,208.00	42.90	1.20	6,132.75	248.75	65.05	249.27	0.39	0.32	-0.32	
6,240.00	43.00	1.90	6,156.17	270.54	65.64	271.07	1.52	0.31	2.19	
6,272.00	45.20	2.20	6,179.15	292.80	66.43	293.33	6.91	6.88	0.94	
6,304.00	48.60	2.00	6,201.01	316.14	67.29	316.68	10.63	10.63	-0.63	
6,335.00	52.00	1.90	6,220.81	339.98	68.10	340.52	10.97	10.97	-0.32	
6,367.00	54.90	1.00	6,239.86	365.67	68.75	366.22	9.34	9.06	-2.81	
6,399.00	57.50	0.20	6,257.66	392.26	69.02	392.81	8.39	8.13	-2.50	
6,431.00	60.50	359.40	6,274.14	419.69	68.92	420.24	9.62	9.38	-2.50	
6,462.00	63.60	358.60	6,288.67	447.06	68.44	447.61	10.26	10.00	-2.58	
6,494.00	66.50	359.60	6,302.17	476.07	67.99	476.61	9.49	9.06	3.13	

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Survey									
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6,526.00	69.00	359.80	6,314.28	505.68	67.83	506.22	7.83	7.81	0.63
6,536.28	69.93	359.90	6,317.89	515.31	67.81	515.85	9.11	9.06	0.95
As-Drilled PP									
6,558.00	71.90	0.10	6,324.99	535.83	67.81	536.37	9.11	9.06	0.93
6,589.00	75.80	359.60	6,333.61	565.61	67.73	566.14	12.68	12.58	-1.61
6,621.00	79.50	359.20	6,340.45	596.86	67.40	597.39	11.63	11.56	-1.25
6,653.00	83.30	359.10	6,345.24	628.49	66.93	629.02	11.88	11.88	-0.31
6,685.00	86.70	359.30	6,348.03	660.36	66.49	660.88	10.64	10.63	0.63
6,716.00	89.10	359.00	6,349.16	691.33	66.03	691.85	7.80	7.74	-0.97
6,748.00	89.50	359.20	6,349.55	723.33	65.53	723.84	1.40	1.25	0.63
6,780.00	90.00	0.00	6,349.69	755.32	65.30	755.83	2.95	1.56	2.50
6,875.00	92.00	1.20	6,348.04	850.30	66.30	850.81	2.46	2.11	1.26
6,984.00	91.40	358.60	6,344.80	959.24	66.11	959.75	2.45	-0.55	-2.39
7,079.00	91.40	359.10	6,342.48	1,054.19	64.20	1,054.68	0.53	0.00	0.53
7,174.00	91.10	359.10	6,340.41	1,149.16	62.71	1,149.63	0.32	-0.32	0.00
7,270.00	90.80	359.40	6,338.82	1,245.14	61.45	1,245.60	0.44	-0.31	0.31
7,365.00	91.40	359.80	6,336.99	1,340.12	60.79	1,340.57	0.76	0.63	0.42
7,460.00	90.50	0.00	6,335.42	1,435.10	60.62	1,435.55	0.97	-0.95	0.21
7,555.00	90.80	359.90	6,334.34	1,530.10	60.54	1,530.54	0.33	0.32	-0.11
7,650.00	90.50	0.30	6,333.26	1,625.09	60.71	1,625.53	0.53	-0.32	0.42
7,745.00	90.30	359.80	6,332.60	1,720.09	60.79	1,720.53	0.57	-0.21	-0.53
7,840.00	90.30	359.40	6,332.10	1,815.08	60.13	1,815.51	0.42	0.00	-0.42
7,935.00	90.70	359.80	6,331.27	1,910.08	59.46	1,910.50	0.60	0.42	0.42
8,030.00	90.50	0.00	6,330.28	2,005.07	59.30	2,005.49	0.30	-0.21	0.21
8,126.00	90.20	0.00	6,329.69	2,101.07	59.30	2,101.48	0.31	-0.31	0.00
8,221.00	90.70	359.70	6,328.94	2,196.07	59.05	2,196.48	0.61	0.53	-0.32
8,316.00	92.10	359.10	6,326.62	2,291.03	58.05	2,291.43	1.60	1.47	-0.63
8,411.00	91.70	359.20	6,323.47	2,385.97	56.64	2,386.35	0.43	-0.42	0.11
8,506.00	91.90	0.40	6,320.49	2,480.92	56.31	2,481.30	1.28	0.21	1.26
8,601.00	90.70	0.00	6,318.33	2,575.89	56.64	2,576.27	1.33	-1.26	-0.42
8,696.00	91.10	0.80	6,316.84	2,670.87	57.31	2,671.25	0.94	0.42	0.84
8,791.00	89.50	358.60	6,316.34	2,765.86	56.81	2,766.24	2.86	-1.68	-2.32
8,886.00	89.10	358.90	6,317.51	2,860.83	54.74	2,861.19	0.53	-0.42	0.32
8,981.00	90.90	358.50	6,317.51	2,955.80	52.58	2,956.14	1.94	1.89	-0.42
9,076.00	91.60	358.50	6,315.43	3,050.75	50.10	3,051.06	0.74	0.74	0.00
9,171.00	91.40	359.10	6,312.95	3,145.70	48.11	3,145.98	0.67	-0.21	0.63
9,266.00	91.80	359.80	6,310.29	3,240.65	47.20	3,240.93	0.85	0.42	0.74
9,362.00	91.40	0.50	6,307.61	3,336.61	47.45	3,336.89	0.84	-0.42	0.73
9,457.00	91.60	1.20	6,305.13	3,431.57	48.86	3,431.86	0.77	0.21	0.74
9,552.00	91.60	0.90	6,302.47	3,526.52	50.60	3,526.81	0.32	0.00	-0.32
9,647.00	91.10	0.40	6,300.24	3,621.48	51.67	3,621.79	0.74	-0.53	-0.53

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 185' FNL, 2358' FEL, Sec 22, T17S, R32E, Unit B
Project:	Lea County, NM (NAD-83 2015)	TVD Reference:	KB @ 4032.00usft (Patriot 6)
Site:	Ragnar Fed Com #25H	MD Reference:	KB @ 4032.00usft (Patriot 6)
Well:	SHL: 185' FNL, 2358' FEL, Sec 22, T17S, R32E, Unit B	North Reference:	Grid
Wellbore:	BHL: 350' FNL, 2284' FEL, Sec 15, T17S, R32E, Unit B	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FNL, 2284' FEL, Sec 15, T17S, R32E, Unit B	Database:	EDM 5000.1 Single User Db

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)
9,742.00	91.30	359.00	6,298.25	3,716.46	51.18	3,716.75	1.49	0.21	-1.47
9,837.00	91.60	359.00	6,295.84	3,811.41	49.52	3,811.69	0.32	0.32	0.00
9,933.00	91.60	359.70	6,293.16	3,907.37	48.43	3,907.64	0.73	0.00	0.73
10,028.00	91.70	359.40	6,290.43	4,002.33	47.68	4,002.58	0.33	0.11	-0.32
10,123.00	91.40	0.10	6,287.86	4,097.29	47.27	4,097.54	0.80	-0.32	0.74
10,218.00	91.30	359.90	6,285.62	4,192.27	47.27	4,192.51	0.24	-0.11	-0.21
10,313.00	91.60	0.20	6,283.21	4,287.23	47.35	4,287.48	0.45	0.32	0.32
10,408.00	91.40	0.50	6,280.73	4,382.20	47.93	4,382.45	0.38	-0.21	0.32
10,503.00	90.40	359.10	6,279.24	4,477.18	47.60	4,477.42	1.81	-1.05	-1.47
10,598.00	90.30	359.40	6,278.65	4,572.17	46.36	4,572.40	0.33	-0.11	0.32
10,693.00	89.90	359.70	6,278.49	4,667.17	45.61	4,667.39	0.53	-0.42	0.32
10,788.00	90.10	359.50	6,278.49	4,762.17	44.95	4,762.38	0.30	0.21	-0.21
10,884.00	90.10	359.20	6,278.32	4,858.16	43.86	4,858.36	0.31	0.00	-0.31
10,979.00	90.30	0.20	6,277.99	4,953.16	43.36	4,953.35	1.07	0.21	1.05
11,074.00	90.30	1.00	6,277.49	5,048.15	44.36	5,048.35	0.84	0.00	0.84
Final MWD Survey									
11,143.00	90.30	1.00	6,277.13	5,117.14	45.56	5,117.34	0.00	0.00	0.00
Projection to Bit/TD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,145.00	2,144.78	1.83	16.78	Tie-In to VES Gyro
2,278.00	2,277.73	3.41	19.76	First TDS MWD Survey
6,536.28	6,317.89	515.31	67.81	As-Drilled PP
11,074.00	6,277.49	5,048.15	44.36	Final MWD Survey
11,143.00	6,277.13	5,117.14	45.56	Projection to Bit/TD

Checked By: _____ Approved By: _____ Date: _____



PATRIOT DRILLING, LLC

OPERATOR: COG Operating, LLC
WELL/LEASE: Ragnar Fed Com 25H
COUNTY: Lea Co., New Mexico
Sec. 22, T 17S, R 32E

**STATE OF NEW MEXICO
DEVIATION REPORT**

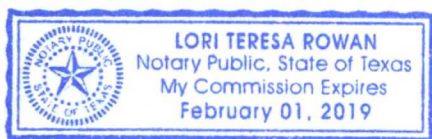
<u>Depth</u>	<u>Deviation</u>	<u>Depth</u>	<u>Deviation</u>
381	1/2	2,373	1
908	1/4	2,944	1 1/2
1,410	1/2		
1,667	3/4		

Patriot Drilling, LLC

M. Leroy Peterson, Executive Vice-President

The foregoing instrument was acknowledged before me on this 5th day of July 2016 by M. Leroy Peterson, Executive Vice-President of Patriot Drilling, LLC.

My Commission Expires: 02/01/2019



Lori T. Rowan
Notary Public for Ector Co., Texas

HOBBS OCD

OCT 31 P.M.

RECEIVED



PATRIOT DRILLING, LLC

OPERATOR: COG Operating, LLC
WELL/LEASE: Ragnar Fed Com 25H
COUNTY: Lea Co., New Mexico
Sec. 22, T 17S, R 32E

**STATE OF NEW MEXICO
DEVIATION REPORT**

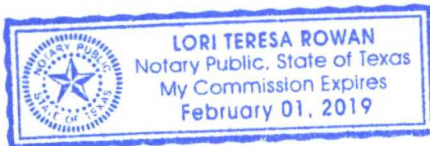
<u>Depth</u>	<u>Deviation</u>	<u>Depth</u>	<u>Deviation</u>
381	1/2	2,373	1
908	1/4	2,944	1 1/2
1,410	1/2		
1,667	3/4		

Patriot Drilling, LLC

M. Leroy Peterson, Executive Vice-President

The foregoing instrument was acknowledged before me on this 5th day of July 2016 by M. Leroy Peterson, Executive Vice-President of Patriot Drilling, LLC.

My Commission Expires: 02/01/2019



Lori T. Rowan
Notary Public for Ector Co., Texas

June 24, 2016

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

Attn: Kanicia Castillo

RE: **Ragnar Federal Com No. 025H**

Please find enclosed a copy of the survey from 0' to 2145' ran on the above referenced well.

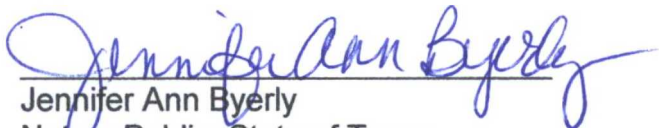
Sincerely,

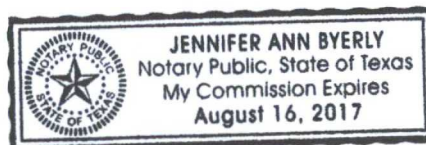

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

HOBBS OGD
OCT 31 P.M.
RECEIVED

This instrument was acknowledged before me on the 24th day of June,
A.D., 2016, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: Concho
Lease/Well: Ragnar Federal Com No./025H

Rig Name: Patriot 6
State/County: New Mexico/Lea
VS-Azi: 0.00 Degrees

Latitude: 32.82684, Longitude: -103.75336
Grid North = True North -0.31 degs (NAD 27)
Grid Correction Applied = -0.31 degs



Depth Reference : RKB = 18 Foot

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyro survey-de_01.ut

Minimum Curvature Method

Report Date/Time: 6/24/2016 / 12:59

VES Survey International

Midland Tx

(432) 563-5444

Surveyor: Gene Heiss

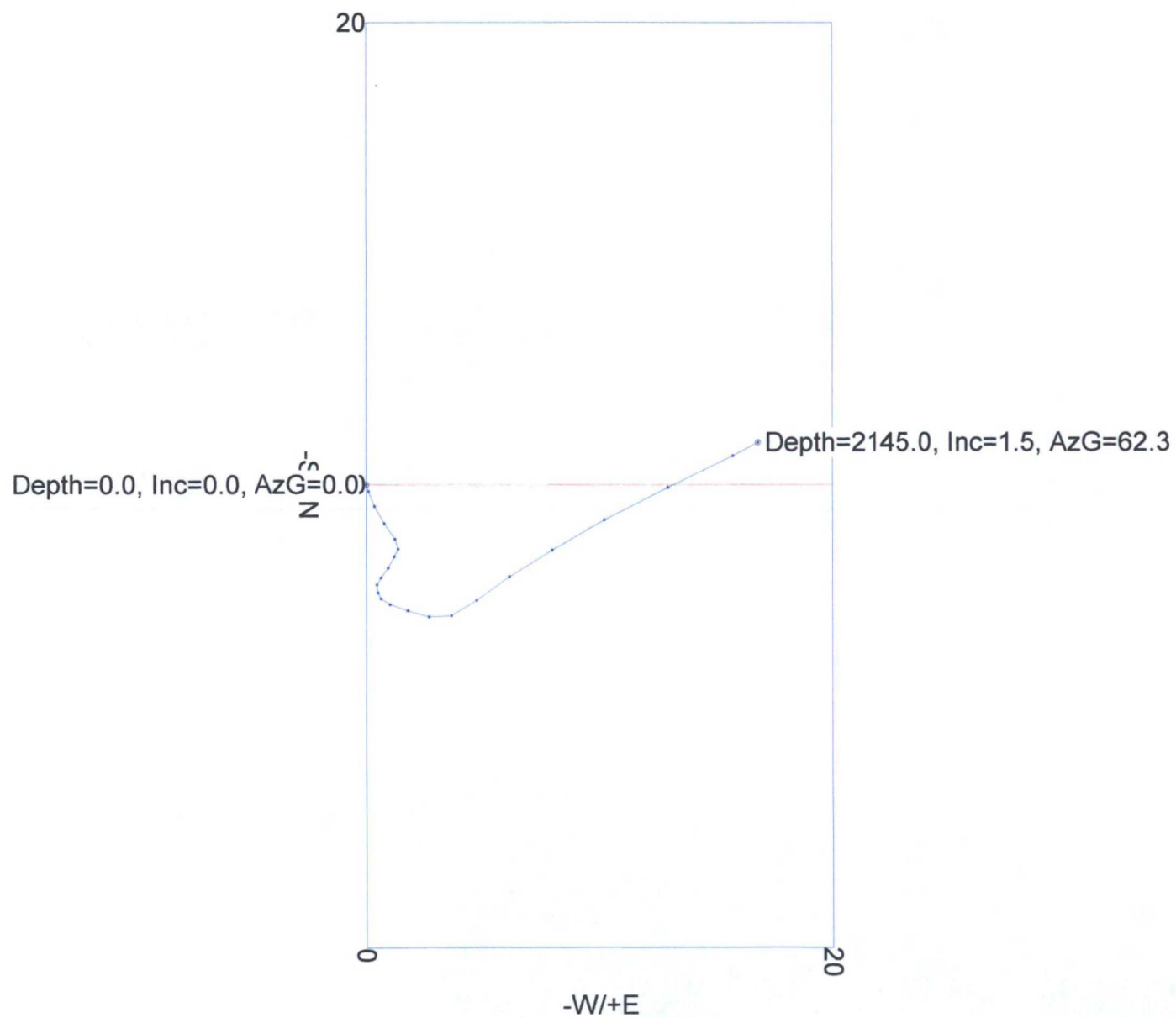
Ragnar Federal Com No. 25H / API 30-025-43131

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	0.36	161.99	100.00	-0.30	0.10	-0.30	0.31	161.99	0.36
200.00	0.44	155.20	200.00	-0.94	0.35	-0.94	1.01	159.39	0.10
300.00	0.54	147.20	299.99	-1.69	0.77	-1.69	1.86	155.45	0.12
400.00	0.39	144.81	399.99	-2.36	1.22	-2.36	2.66	152.63	0.15
500.00	0.18	202.61	499.99	-2.79	1.36	-2.79	3.11	154.02	0.33
600.00	0.23	208.77	599.99	-3.12	1.20	-3.12	3.34	158.89	0.05
700.00	0.41	208.18	699.99	-3.61	0.94	-3.61	3.73	165.46	0.18
800.00	0.20	233.79	799.99	-4.03	0.62	-4.03	4.08	171.23	0.25
900.00	0.23	186.31	899.98	-4.33	0.46	-4.33	4.36	173.99	0.17
1000.00	0.19	155.98	999.98	-4.68	0.50	-4.68	4.71	173.88	0.11
1100.00	0.13	151.77	1099.98	-4.93	0.62	-4.93	4.97	172.80	0.06
1200.00	0.43	114.15	1199.98	-5.18	1.02	-5.18	5.28	168.90	0.33
1300.00	0.50	105.34	1299.98	-5.45	1.78	-5.45	5.74	161.91	0.10
1400.00	0.58	107.14	1399.97	-5.72	2.69	-5.72	6.32	154.80	0.08
1500.00	0.59	66.28	1499.97	-5.66	3.65	-5.66	6.74	147.18	0.41
1600.00	0.86	53.00	1599.96	-5.00	4.73	-5.00	6.88	136.61	0.32

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
1700.00	1.11	54.97	1699.95	-3.99	6.12	-3.99	7.31	123.07	0.25
1800.00	1.38	60.36	1799.92	-2.84	7.96	-2.84	8.45	109.60	0.29
1900.00	1.59	58.65	1899.89	-1.52	10.19	-1.52	10.30	98.49	0.22
2000.00	1.94	66.23	1999.84	-0.12	12.92	-0.12	12.92	90.53	0.42
2100.00	1.62	61.10	2099.79	1.25	15.71	1.25	15.76	85.46	0.35
2145.00	1.50	62.26	2144.78	1.83	16.79	1.83	16.89	83.78	0.28



VES Survey International
Midland Tx
(432) 563-5444
Surveyor: Gene Heiss
Ragnar Federal Com No. 25H / API 30-025-43131



VES Survey Date: 6/16/2016



I Gene Heiss certify that I am employed by VES Survey International. That I did on the day(s) of 06/16/16 through 06/16/16 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 2,145.00 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Vaughn Energy Services, that I am authorized and qualified to make this report; that this survey was conducted at the request of Concho for the Ragnar Federal Com Well # 25H API # 30-025-43131 in Lea County / Parish New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by VES Survey International.

A handwritten signature in blue ink, appearing to read "Gene Heiss", is written over a horizontal line.

Gene Heiss
Service Technician
VES Survey International



I Gene Heiss certify that I am employed by VES Survey International. That I did on the day(s) of 06/16/16 through 06/16/16 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 2,145.00 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Vaughn Energy Services, that I am authorized and qualified to make this report; that this survey was conducted at the request of Concho for the Ragnar Federal Com Well # 25H API # 30-025-43131 in Lea County / Parish New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by VES Survey International.

A handwritten signature in blue ink, appearing to read "Gene Heiss", is written over a horizontal line.

Gene Heiss
Service Technician
VES Survey International