



PHOENIX
TECHNOLOGY SERVICES

COG Operating LLC

Lea County, NM (NAD83 NME)
Dominator 25 Federal
713H

OH / 63135 / 63140

HOBBS CCD
APR 09 2019
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Survey: Phoenix MWD Surveys

Standard Survey Report

18 October, 2018





Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD83 NME)
Site: Dominator 25 Federal
Well: 713H
Wellbore: OH / 63135 / 63140
Design: Surveys (McVay 8)

Local Co-ordinate Reference: Well 713H
TVD Reference: RKB @ 3367.20usft (McVay 8)
MD Reference: RKB @ 3367.20usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: USA Compass

Project	Lea County, NM (NAD83 NME)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Dominator 25 Federal			
Site Position:		Northing:	399,248.70 usft	Latitude: 32° 5' 42.09877 N
From:	Map	Easting:	792,020.40 usft	Longitude: 103° 31' 25.76450 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.43 °

Well	713H			
Well Position	+N/-S	0.00 usft	Northing:	399,228.50 usft
	+E/-W	0.00 usft	Easting:	789,576.40 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft	Ground Level: 3,341.20 usft

Wellbore	OH / 63135 / 63140				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	MVHD	8/31/2018	6.69	59.78	47,822.56400921

Design	Surveys (McVay 8)				
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	0.85	

Survey Program	Date 10/18/2018				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	11,742.00	Scientific Gyros (OH / 63135 / 63140)	NS-GYRO-MS	North sensing gyrocompassing m/s	
11,930.00	17,340.00	Phoenix MWD Surveys (OH / 63135 / 63140)	MWD+HDGM	OWSG Rev.2 MWD + HDGM	

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)
11,742.00	2.52	266.25	11,735.36	-149.67	26.33	-149.27	0.00	0.00	0.00
Tie In									
11,930.00	3.76	275.80	11,923.07	-149.32	16.08	-149.07	0.71	0.66	5.08
First Phoenix MWD Survey									
12,024.00	3.35	245.86	12,016.90	-150.13	10.50	-149.96	2.00	-0.44	-31.85
12,119.00	3.52	250.73	12,111.73	-152.23	5.22	-152.14	0.36	0.18	5.13
12,150.00	3.70	300.17	12,142.67	-152.04	3.45	-151.97	9.75	0.58	159.48
12,182.00	7.43	336.20	12,174.53	-149.63	1.73	-149.59	15.44	11.66	112.59
12,213.00	11.99	348.27	12,205.08	-144.64	0.26	-144.62	16.03	14.71	38.94



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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)
12,245.00	17.16	358.52	12,236.04	-136.66	-0.54	-136.65	18.00	16.16	32.03
12,274.00	21.70	1.15	12,263.38	-127.02	-0.54	-127.01	15.94	15.66	9.07
12,306.00	26.14	4.37	12,292.63	-114.07	0.12	-114.05	14.46	13.88	10.06
12,337.00	30.43	3.31	12,319.92	-99.41	1.09	-99.38	13.93	13.84	-3.42
12,369.00	33.44	2.78	12,347.08	-82.51	1.99	-82.47	9.45	9.41	-1.66
12,401.00	36.72	5.32	12,373.26	-64.17	3.30	-64.12	11.22	10.25	7.94
12,432.00	39.31	9.46	12,397.69	-45.25	5.77	-45.16	11.72	8.35	13.35
12,463.00	41.61	12.14	12,421.27	-25.50	9.55	-25.36	9.30	7.42	8.65
12,494.00	43.46	13.21	12,444.11	-5.06	14.16	-4.85	6.41	5.97	3.45
12,526.00	45.46	15.00	12,466.95	16.68	19.62	16.97	7.38	6.25	5.59
12,558.00	47.50	13.19	12,488.99	39.18	25.27	39.55	7.58	6.38	-5.66
12,573.20	49.28	12.62	12,499.08	50.26	27.80	50.67	12.03	11.70	-3.75
FTP									
12,589.00	51.13	12.06	12,509.20	62.12	30.40	62.56	12.03	11.72	-3.55
12,621.00	53.63	11.50	12,528.73	86.93	35.57	87.45	7.93	7.81	-1.75
12,653.00	55.84	11.38	12,547.20	112.53	40.75	113.13	6.91	6.91	-0.38
12,684.00	56.81	10.62	12,564.39	137.86	45.67	138.52	3.74	3.13	-2.45
12,716.00	59.52	8.23	12,581.27	164.67	50.12	165.40	10.58	8.47	-7.47
12,747.00	64.39	8.86	12,595.84	191.72	54.18	192.50	15.81	15.71	2.03
12,779.00	67.50	7.39	12,608.88	220.64	58.31	221.49	10.59	9.72	-4.59
12,810.00	70.27	6.15	12,620.05	249.36	61.71	250.25	9.68	8.94	-4.00
12,842.00	72.40	5.25	12,630.29	279.52	64.72	280.45	7.17	6.66	-2.81
12,874.00	75.81	5.34	12,639.05	310.16	67.56	311.13	10.66	10.66	0.28
12,905.00	78.22	5.44	12,646.02	340.24	70.40	341.24	7.78	7.77	0.32
12,937.00	81.35	4.95	12,651.69	371.60	73.25	372.64	9.90	9.78	-1.53
12,969.00	82.90	3.68	12,656.08	403.20	75.64	404.28	6.24	4.84	-3.97
13,007.00	85.40	3.31	12,659.95	440.93	77.94	442.04	6.65	6.58	-0.97
13,101.00	86.33	2.98	12,666.73	534.54	83.08	535.72	1.05	0.99	-0.35
13,196.00	89.13	2.09	12,670.49	629.37	87.28	630.59	3.09	2.95	-0.94
13,291.00	89.16	1.86	12,671.91	724.30	90.55	725.56	0.24	0.03	-0.24
13,386.00	91.48	2.65	12,671.38	819.22	94.29	820.53	2.58	2.44	0.83
13,480.00	88.43	1.63	12,671.45	913.14	97.80	914.49	3.42	-3.24	-1.09
13,574.00	87.37	3.17	12,674.90	1,006.99	101.73	1,008.39	1.99	-1.13	1.64
13,668.00	87.11	1.32	12,679.42	1,100.80	105.41	1,102.25	1.99	-0.28	-1.97
13,763.00	89.80	0.57	12,681.98	1,195.75	106.98	1,197.20	2.94	2.83	-0.79
13,857.00	90.20	358.59	12,681.98	1,289.74	106.29	1,291.17	2.15	0.43	-2.11
13,951.00	89.22	359.62	12,682.46	1,383.72	104.82	1,385.13	1.51	-1.04	1.10
14,046.00	91.12	1.35	12,682.18	1,478.71	105.62	1,480.12	2.70	2.00	1.82
14,140.00	89.64	3.48	12,681.55	1,572.62	109.59	1,574.07	2.76	-1.57	2.27
14,235.00	89.13	1.60	12,682.57	1,667.52	113.79	1,669.02	2.05	-0.54	-1.98
14,330.00	88.21	356.97	12,684.78	1,762.46	112.61	1,763.93	4.97	-0.97	-4.87
14,426.00	88.80	355.06	12,687.29	1,858.19	105.94	1,859.55	2.08	0.61	-1.99
14,520.00	88.49	353.61	12,689.51	1,951.70	96.67	1,952.92	1.58	-0.33	-1.54
14,600.00	89.78	352.72	12,690.72	2,031.12	87.15	2,032.19	1.96	1.61	-1.11



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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)
14,695.00	91.26	358.07	12,689.85	2,125.77	79.52	2,126.72	5.84	1.56	5.63
14,790.00	89.13	355.38	12,689.53	2,220.60	74.10	2,221.46	3.61	-2.24	-2.83
14,885.00	90.20	359.93	12,690.09	2,315.49	70.21	2,316.28	4.92	1.13	4.79
14,980.00	90.11	3.85	12,689.83	2,410.42	73.34	2,411.25	4.13	-0.09	4.13
15,074.00	88.94	4.24	12,690.61	2,504.18	79.97	2,505.09	1.31	-1.24	0.41
15,169.00	89.16	5.79	12,692.18	2,598.80	88.28	2,599.83	1.65	0.23	1.63
15,263.00	92.47	5.31	12,690.85	2,692.34	97.36	2,693.49	3.56	3.52	-0.51
15,358.00	90.62	0.51	12,688.28	2,787.15	102.18	2,788.36	5.41	-1.95	-5.05
15,453.00	90.92	0.65	12,687.01	2,882.14	103.14	2,883.35	0.35	0.32	0.15
15,548.00	90.53	359.79	12,685.80	2,977.13	103.51	2,978.34	0.99	-0.41	-0.91
15,643.00	88.40	357.70	12,686.69	3,072.09	101.43	3,073.26	3.14	-2.24	-2.20
15,738.00	90.34	0.10	12,687.74	3,167.06	99.61	3,168.19	3.25	2.04	2.53
15,833.00	89.66	356.40	12,687.74	3,262.00	96.70	3,263.07	3.96	-0.72	-3.89
15,928.00	90.95	355.07	12,687.23	3,356.73	89.64	3,357.69	1.95	1.36	-1.40
16,022.00	91.15	355.56	12,685.51	3,450.40	81.96	3,451.23	0.56	0.21	0.52
16,117.00	88.99	357.41	12,685.39	3,545.21	76.14	3,545.95	2.99	-2.27	1.95
16,212.00	88.12	355.19	12,687.79	3,639.97	70.01	3,640.61	2.51	-0.92	-2.34
16,306.00	89.08	353.16	12,690.08	3,733.45	60.48	3,733.94	2.39	1.02	-2.16
16,401.00	88.63	354.07	12,691.98	3,827.84	49.91	3,828.16	1.07	-0.47	0.96
16,497.00	88.60	358.25	12,694.30	3,923.58	43.49	3,923.79	4.35	-0.03	4.35
16,592.00	88.85	0.60	12,696.42	4,018.54	42.53	4,018.73	2.49	0.26	2.47
16,687.00	89.10	1.82	12,698.12	4,113.51	44.54	4,113.71	1.31	0.26	1.28
16,782.00	90.90	3.84	12,698.12	4,208.38	49.23	4,208.65	2.85	1.89	2.13
16,876.00	92.52	4.45	12,695.31	4,302.09	56.02	4,302.45	1.84	1.72	0.65
16,970.00	91.51	4.52	12,692.01	4,395.74	63.37	4,396.20	1.08	-1.07	0.07
17,065.00	90.31	3.18	12,690.50	4,490.51	69.74	4,491.05	1.89	-1.26	-1.41
17,160.00	90.45	4.34	12,689.87	4,585.30	75.97	4,585.93	1.23	0.15	1.22
17,245.50	90.52	5.27	12,689.14	4,670.50	83.13	4,671.22	1.09	0.09	1.09
LTP									
17,253.00	90.53	5.35	12,689.07	4,677.97	83.83	4,678.70	1.09	0.09	1.09
17,281.00	89.86	6.30	12,688.98	4,705.82	86.67	4,706.59	4.15	-2.39	3.39
Final Phoenix MWD Survey									
17,340.00	89.86	6.30	12,689.12	4,764.47	93.14	4,765.32	0.00	0.00	0.00
Projection to TD									



Survey Report



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Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,742.00	11,735.36	-149.67	26.33	Tie In
11,930.00	11,923.07	-149.32	16.08	First Phoenix MWD Survey
12,573.20	12,499.08	50.26	27.80	FTP
17,245.50	12,689.14	4,670.50	83.13	LTP
17,281.00	12,688.98	4,705.82	86.67	Final Phoenix MWD Survey
17,340.00	12,689.12	4,764.47	93.14	Projection to TD