

COG Production L L C

Lea County, NM (NAD27 NME)

Sec. 17, T 26 S. , R 33 E

Vast State 5H

HOBBS OCD

DEC 05 2016

RECEIVED

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

26 April, 2016

Integrity Directional Services, LLC

Survey Report - Geographic

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Vast State 5H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3289.0usft (Scandril Freedom)
Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=26' @ 3289.0usft (Scandril Freedom)
Well:	Vast State 5H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi 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	Sec. 17, T 26 S. , R 33 E		
Site Position:		Northing:	377,872.30 usft
From:	Map	Easting:	730,181.40 usft
Position Uncertainty:	5.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 2' 12.155 N
		Longitude:	103° 35' 25.847 W
		Grid Convergence:	0.39 °

Well	Vast State 5H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	5.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 2' 12.153 N
		Longitude:	103° 35' 26.543 W
		Ground Level:	3,263.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	3/10/2016	7.09	59.90	47,956

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	352.00	

Survey Program	Date 4/26/2016				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	4,810.0	VES GYROS (Wellbore #1)	NS-GYRO-MS	North sensing gyrocompassing m/s	
4,935.0	14,097.0	MWD (Wellbore #1)	MWD	MWD - Standard	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.0	0.00	0.00	0.0	0.0	0.0	377,871.70	730,121.50	32° 2' 12.153 N	103° 35' 26.543 W	
100.0	0.54	101.50	100.0	-0.1	0.5	377,871.60	730,121.96	32° 2' 12.152 N	103° 35' 26.537 W	
200.0	0.58	137.99	200.0	-0.6	1.3	377,871.13	730,122.76	32° 2' 12.147 N	103° 35' 26.528 W	
300.0	0.60	145.52	300.0	-1.4	1.9	377,870.33	730,123.39	32° 2' 12.139 N	103° 35' 26.521 W	
400.0	0.58	144.80	400.0	-2.2	2.5	377,869.48	730,123.98	32° 2' 12.131 N	103° 35' 26.514 W	
500.0	0.64	143.77	500.0	-3.1	3.1	377,868.62	730,124.60	32° 2' 12.122 N	103° 35' 26.507 W	
600.0	0.61	123.41	600.0	-3.8	3.9	377,867.87	730,125.38	32° 2' 12.115 N	103° 35' 26.498 W	
700.0	0.28	173.49	700.0	-4.4	4.4	377,867.34	730,125.85	32° 2' 12.109 N	103° 35' 26.493 W	
800.0	0.44	165.40	800.0	-5.0	4.5	377,866.72	730,125.97	32° 2' 12.103 N	103° 35' 26.491 W	
900.0	0.34	178.30	900.0	-5.6	4.6	377,866.06	730,126.08	32° 2' 12.097 N	103° 35' 26.490 W	
1,000.0	0.47	139.62	1,000.0	-6.3	4.9	377,865.45	730,126.35	32° 2' 12.091 N	103° 35' 26.487 W	

Integrity Directional Services, LLC

Survey Report - Geographic

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Vast State 5H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3289.0usft (Scandril Freedom)
Site:	Sec. 17, T 26 S., R 33 E	MD Reference:	KB=26' @ 3289.0usft (Scandril Freedom)
Well:	Vast State 5H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi 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
1,100.0	0.57	141.09	1,100.0	-7.0	5.4	377,864.75	730,126.93	32° 2' 12.084 N	103° 35' 26.480 W
1,200.0	0.66	175.42	1,200.0	-7.9	5.8	377,863.79	730,127.29	32° 2' 12.074 N	103° 35' 26.476 W
1,300.0	0.39	204.05	1,299.9	-8.8	5.7	377,862.90	730,127.20	32° 2' 12.065 N	103° 35' 26.477 W
1,400.0	0.70	186.58	1,399.9	-9.7	5.5	377,861.98	730,126.99	32° 2' 12.056 N	103° 35' 26.480 W
1,500.0	0.52	205.30	1,499.9	-10.7	5.2	377,860.97	730,126.73	32° 2' 12.046 N	103° 35' 26.483 W
1,600.0	0.43	202.56	1,599.9	-11.5	4.9	377,860.21	730,126.39	32° 2' 12.039 N	103° 35' 26.487 W
1,700.0	0.72	210.37	1,699.9	-12.4	4.4	377,859.32	730,125.93	32° 2' 12.030 N	103° 35' 26.492 W
1,800.0	0.55	222.08	1,799.9	-13.3	3.8	377,858.42	730,125.29	32° 2' 12.021 N	103° 35' 26.500 W
1,900.0	0.71	234.16	1,899.9	-14.0	3.0	377,857.70	730,124.46	32° 2' 12.014 N	103° 35' 26.509 W
2,000.0	0.89	217.84	1,999.9	-15.0	2.0	377,856.73	730,123.48	32° 2' 12.004 N	103° 35' 26.521 W
2,100.0	0.86	225.77	2,099.9	-16.1	1.0	377,855.59	730,122.47	32° 2' 11.993 N	103° 35' 26.533 W
2,200.0	0.71	220.91	2,199.9	-17.1	0.0	377,854.60	730,121.53	32° 2' 11.984 N	103° 35' 26.544 W
2,300.0	0.79	240.17	2,299.9	-17.9	-1.0	377,853.79	730,120.52	32° 2' 11.976 N	103° 35' 26.555 W
2,400.0	0.98	241.76	2,399.9	-18.7	-2.3	377,853.04	730,119.17	32° 2' 11.968 N	103° 35' 26.571 W
2,500.0	0.92	234.75	2,499.9	-19.5	-3.7	377,852.17	730,117.76	32° 2' 11.960 N	103° 35' 26.588 W
2,600.0	1.04	242.64	2,599.8	-20.4	-5.2	377,851.29	730,116.30	32° 2' 11.951 N	103° 35' 26.605 W
2,700.0	1.08	240.30	2,699.8	-21.3	-6.8	377,850.41	730,114.68	32° 2' 11.943 N	103° 35' 26.624 W
2,800.0	1.09	229.29	2,799.8	-22.4	-8.4	377,849.32	730,113.14	32° 2' 11.932 N	103° 35' 26.642 W
2,900.0	1.19	226.91	2,899.8	-23.7	-9.8	377,847.99	730,111.66	32° 2' 11.919 N	103° 35' 26.659 W
3,000.0	1.34	225.82	2,999.8	-25.2	-11.4	377,846.47	730,110.06	32° 2' 11.904 N	103° 35' 26.678 W
3,100.0	1.38	229.69	3,099.7	-26.8	-13.2	377,844.87	730,108.30	32° 2' 11.888 N	103° 35' 26.698 W
3,200.0	1.28	228.08	3,199.7	-28.4	-14.9	377,843.35	730,106.55	32° 2' 11.873 N	103° 35' 26.719 W
3,300.0	1.26	226.92	3,299.7	-29.8	-16.6	377,841.85	730,104.92	32° 2' 11.859 N	103° 35' 26.738 W
3,400.0	1.21	224.94	3,399.7	-31.3	-18.1	377,840.35	730,103.37	32° 2' 11.844 N	103° 35' 26.756 W
3,500.0	1.13	204.64	3,499.6	-33.0	-19.3	377,838.71	730,102.21	32° 2' 11.828 N	103° 35' 26.769 W
3,600.0	0.79	182.13	3,599.6	-34.6	-19.7	377,837.12	730,101.78	32° 2' 11.812 N	103° 35' 26.775 W
3,700.0	0.88	130.11	3,699.6	-35.8	-19.2	377,835.94	730,102.34	32° 2' 11.800 N	103° 35' 26.768 W
3,800.0	1.08	119.69	3,799.6	-36.7	-17.8	377,834.98	730,103.75	32° 2' 11.791 N	103° 35' 26.752 W
3,900.0	0.88	110.35	3,899.6	-37.5	-16.2	377,834.24	730,105.28	32° 2' 11.783 N	103° 35' 26.734 W
4,000.0	0.94	100.49	3,999.6	-37.9	-14.7	377,833.83	730,106.81	32° 2' 11.779 N	103° 35' 26.716 W
4,100.0	0.96	103.12	4,099.6	-38.2	-13.1	377,833.49	730,108.43	32° 2' 11.776 N	103° 35' 26.698 W
4,200.0	1.01	101.29	4,199.5	-38.6	-11.4	377,833.13	730,110.11	32° 2' 11.772 N	103° 35' 26.678 W
4,300.0	1.18	109.53	4,299.5	-39.1	-9.5	377,832.61	730,111.95	32° 2' 11.767 N	103° 35' 26.657 W
4,400.0	1.32	104.39	4,399.5	-39.7	-7.5	377,831.98	730,114.03	32° 2' 11.760 N	103° 35' 26.633 W
4,500.0	0.86	129.80	4,499.5	-40.5	-5.8	377,831.21	730,115.73	32° 2' 11.752 N	103° 35' 26.613 W
4,600.0	1.07	135.51	4,599.5	-41.6	-4.5	377,830.07	730,116.96	32° 2' 11.741 N	103° 35' 26.599 W
4,700.0	1.00	167.35	4,699.5	-43.2	-3.7	377,828.55	730,117.80	32° 2' 11.726 N	103° 35' 26.589 W
4,810.0	0.54	247.15	4,809.4	-44.3	-4.0	377,827.41	730,117.54	32° 2' 11.715 N	103° 35' 26.592 W
4,935.0	0.30	274.10	4,934.4	-44.5	-4.8	377,827.20	730,116.67	32° 2' 11.713 N	103° 35' 26.602 W
First MWD @ 4935' MD / 4934' TVD									
5,027.0	1.90	268.80	5,026.4	-44.5	-6.6	377,827.19	730,114.90	32° 2' 11.713 N	103° 35' 26.623 W
5,121.0	3.90	275.40	5,120.3	-44.2	-11.3	377,827.46	730,110.16	32° 2' 11.716 N	103° 35' 26.678 W
5,214.0	4.00	272.60	5,213.1	-43.8	-17.7	377,827.90	730,103.77	32° 2' 11.721 N	103° 35' 26.752 W
5,307.0	4.10	272.70	5,305.8	-43.5	-24.3	377,828.21	730,097.21	32° 2' 11.724 N	103° 35' 26.828 W
5,400.0	4.90	277.80	5,398.6	-42.8	-31.5	377,828.90	730,089.95	32° 2' 11.731 N	103° 35' 26.913 W
5,494.0	6.60	271.40	5,492.1	-42.1	-40.9	377,829.58	730,080.57	32° 2' 11.739 N	103° 35' 27.021 W
5,588.0	8.50	269.30	5,585.3	-42.1	-53.3	377,829.63	730,068.23	32° 2' 11.740 N	103° 35' 27.165 W
5,681.0	8.80	268.10	5,677.2	-42.4	-67.3	377,829.31	730,054.24	32° 2' 11.738 N	103° 35' 27.327 W
5,775.0	8.40	267.50	5,770.1	-42.9	-81.3	377,828.77	730,040.20	32° 2' 11.733 N	103° 35' 27.491 W
5,868.0	9.50	264.80	5,862.0	-43.9	-95.7	377,827.78	730,025.77	32° 2' 11.725 N	103° 35' 27.658 W
5,961.0	9.20	261.20	5,953.8	-45.8	-110.7	377,825.94	730,010.78	32° 2' 11.707 N	103° 35' 27.833 W
6,054.0	9.10	262.10	6,045.6	-47.9	-125.3	377,823.80	729,996.15	32° 2' 11.687 N	103° 35' 28.003 W
6,149.0	9.20	260.80	6,139.4	-50.1	-140.3	377,821.55	729,981.21	32° 2' 11.666 N	103° 35' 28.176 W
6,243.0	9.10	262.50	6,232.2	-52.3	-155.1	377,819.38	729,966.42	32° 2' 11.646 N	103° 35' 28.348 W
6,336.0	9.20	263.10	6,324.0	-54.2	-169.7	377,817.52	729,951.75	32° 2' 11.628 N	103° 35' 28.519 W

Integrity Directional Services, LLC

Survey Report - Geographic

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Vast State 5H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3289.0usft (Scandril Freedom)
Site:	Sec. 17, T 26 S., R 33 E	MD Reference:	KB=26' @ 3289.0usft (Scandril Freedom)
Well:	Vast State 5H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi 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	
6,429.0	9.10	257.00	6,415.8	-56.7	-184.3	377,814.98	729,937.20	32° 2' 11.604 N	103° 35' 28.688 W	
6,522.0	9.10	256.20	6,507.7	-60.1	-198.6	377,811.57	729,922.89	32° 2' 11.571 N	103° 35' 28.855 W	
6,615.0	9.10	255.50	6,599.5	-63.7	-212.9	377,807.97	729,908.63	32° 2' 11.537 N	103° 35' 29.021 W	
6,709.0	9.00	256.90	6,692.3	-67.3	-227.2	377,804.44	729,894.27	32° 2' 11.503 N	103° 35' 29.188 W	
6,802.0	8.70	256.20	6,784.2	-70.6	-241.1	377,801.12	729,880.36	32° 2' 11.471 N	103° 35' 29.350 W	
6,896.0	9.70	259.40	6,877.0	-73.7	-255.8	377,797.97	729,865.67	32° 2' 11.440 N	103° 35' 29.520 W	
6,989.0	9.80	258.50	6,968.7	-76.8	-271.3	377,794.95	729,850.21	32° 2' 11.412 N	103° 35' 29.700 W	
7,082.0	9.60	260.20	7,060.3	-79.7	-286.7	377,792.05	729,834.82	32° 2' 11.384 N	103° 35' 29.879 W	
7,175.0	9.20	259.90	7,152.1	-82.3	-301.6	377,789.42	729,819.86	32° 2' 11.359 N	103° 35' 30.053 W	
7,269.0	8.80	260.00	7,244.9	-84.8	-316.1	377,786.86	729,805.38	32° 2' 11.335 N	103° 35' 30.222 W	
7,362.0	9.30	255.50	7,336.8	-88.0	-330.4	377,783.74	729,791.09	32° 2' 11.305 N	103° 35' 30.388 W	
7,455.0	9.30	256.20	7,428.5	-91.6	-345.0	377,780.07	729,776.52	32° 2' 11.269 N	103° 35' 30.558 W	
7,548.0	9.10	256.50	7,520.3	-95.1	-359.4	377,776.56	729,762.07	32° 2' 11.236 N	103° 35' 30.726 W	
7,642.0	8.50	256.10	7,613.2	-98.5	-373.4	377,773.15	729,748.10	32° 2' 11.203 N	103° 35' 30.888 W	
7,735.0	9.00	259.60	7,705.2	-101.5	-387.2	377,770.19	729,734.27	32° 2' 11.175 N	103° 35' 31.049 W	
7,828.0	8.20	259.40	7,797.1	-104.0	-400.9	377,767.66	729,720.60	32° 2' 11.150 N	103° 35' 31.208 W	
7,922.0	8.00	261.30	7,890.2	-106.3	-414.0	377,765.43	729,707.55	32° 2' 11.129 N	103° 35' 31.360 W	
8,015.0	9.00	259.80	7,982.1	-108.5	-427.5	377,763.17	729,693.99	32° 2' 11.108 N	103° 35' 31.518 W	
8,108.0	8.90	258.90	8,074.0	-111.2	-441.7	377,760.49	729,679.77	32° 2' 11.082 N	103° 35' 31.683 W	
8,201.0	8.40	259.00	8,166.0	-113.9	-455.5	377,757.81	729,666.04	32° 2' 11.057 N	103° 35' 31.843 W	
8,253.0	8.40	258.10	8,217.4	-115.4	-462.9	377,756.30	729,658.60	32° 2' 11.042 N	103° 35' 31.929 W	
8,295.0	8.30	258.30	8,259.0	-116.6	-468.9	377,755.06	729,652.63	32° 2' 11.030 N	103° 35' 31.999 W	
8,341.0	8.00	259.10	8,304.5	-117.9	-475.3	377,753.78	729,646.23	32° 2' 11.018 N	103° 35' 32.073 W	
8,388.0	7.70	258.90	8,351.0	-119.1	-481.6	377,752.55	729,639.93	32° 2' 11.006 N	103° 35' 32.146 W	
8,434.0	7.80	258.30	8,396.6	-120.4	-487.6	377,751.33	729,633.85	32° 2' 10.995 N	103° 35' 32.217 W	
8,481.0	7.50	257.20	8,443.2	-121.7	-493.8	377,750.00	729,627.74	32° 2' 10.982 N	103° 35' 32.288 W	
8,575.0	8.00	255.20	8,536.4	-124.7	-506.1	377,746.97	729,615.43	32° 2' 10.953 N	103° 35' 32.432 W	
8,668.0	7.70	253.40	8,628.5	-128.2	-518.3	377,743.54	729,603.20	32° 2' 10.920 N	103° 35' 32.574 W	
8,761.0	6.90	253.60	8,720.7	-131.5	-529.6	377,740.18	729,591.87	32° 2' 10.887 N	103° 35' 32.706 W	
8,826.0	6.70	267.50	8,785.3	-132.8	-537.2	377,738.91	729,584.34	32° 2' 10.875 N	103° 35' 32.793 W	
8,858.0	7.80	284.90	8,817.0	-132.3	-541.1	377,739.39	729,580.37	32° 2' 10.880 N	103° 35' 32.839 W	
8,889.0	10.30	296.30	8,847.6	-130.5	-545.6	377,741.16	729,575.86	32° 2' 10.898 N	103° 35' 32.892 W	
8,920.0	13.50	302.30	8,878.0	-127.4	-551.2	377,744.32	729,570.31	32° 2' 10.930 N	103° 35' 32.956 W	
8,951.0	16.60	308.80	8,907.9	-122.7	-557.7	377,749.03	729,563.80	32° 2' 10.977 N	103° 35' 33.031 W	
8,982.0	19.80	316.80	8,937.4	-116.1	-564.7	377,755.64	729,556.75	32° 2' 11.043 N	103° 35' 33.112 W	
9,013.0	22.20	324.50	8,966.3	-107.5	-571.7	377,764.23	729,549.75	32° 2' 11.128 N	103° 35' 33.193 W	
9,044.0	24.70	330.60	8,994.7	-97.1	-578.3	377,774.65	729,543.17	32° 2' 11.232 N	103° 35' 33.269 W	
9,106.0	29.40	343.30	9,050.0	-71.2	-589.1	377,800.55	729,532.42	32° 2' 11.489 N	103° 35' 33.392 W	
9,137.0	31.80	349.00	9,076.7	-55.8	-592.8	377,815.86	729,528.68	32° 2' 11.640 N	103° 35' 33.434 W	
9,200.0	37.30	357.20	9,128.6	-20.4	-596.9	377,851.26	729,524.57	32° 2' 11.991 N	103° 35' 33.479 W	
9,231.0	39.70	359.80	9,152.8	-1.1	-597.4	377,870.55	729,524.08	32° 2' 12.182 N	103° 35' 33.483 W	
9,282.0	44.90	1.40	9,190.5	33.2	-597.0	377,904.86	729,524.46	32° 2' 12.521 N	103° 35' 33.476 W	
9,325.0	49.90	359.40	9,219.6	64.8	-596.8	377,936.50	729,524.66	32° 2' 12.835 N	103° 35' 33.471 W	
9,356.0	54.90	359.10	9,238.5	89.3	-597.2	377,961.05	729,524.34	32° 2' 13.078 N	103° 35' 33.473 W	
9,387.0	59.50	359.70	9,255.3	115.4	-597.4	377,987.10	729,524.07	32° 2' 13.335 N	103° 35' 33.474 W	
9,418.0	64.40	359.60	9,269.9	142.7	-597.6	378,014.45	729,523.90	32° 2' 13.606 N	103° 35' 33.473 W	
9,449.0	70.10	358.60	9,281.9	171.3	-598.0	378,043.02	729,523.45	32° 2' 13.889 N	103° 35' 33.476 W	
9,481.0	75.70	357.10	9,291.3	201.9	-599.2	378,073.57	729,522.29	32° 2' 14.191 N	103° 35' 33.487 W	
9,512.0	81.30	356.50	9,297.5	232.2	-600.9	378,103.89	729,520.60	32° 2' 14.491 N	103° 35' 33.505 W	
9,541.0	86.80	355.80	9,300.5	261.0	-602.8	378,132.65	729,518.66	32° 2' 14.776 N	103° 35' 33.525 W	
9,635.0	89.00	355.70	9,303.9	354.6	-609.8	378,226.33	729,511.70	32° 2' 15.704 N	103° 35' 33.598 W	
9,729.0	91.50	358.00	9,303.5	448.5	-615.0	378,320.17	729,506.53	32° 2' 16.633 N	103° 35' 33.651 W	
9,824.0	92.40	358.30	9,300.3	543.4	-618.0	378,415.06	729,503.47	32° 2' 17.572 N	103° 35' 33.679 W	
9,918.0	93.60	358.70	9,295.4	637.2	-620.5	378,508.90	729,501.01	32° 2' 18.501 N	103° 35' 33.700 W	
10,011.0	91.90	358.70	9,290.9	730.1	-622.6	378,601.77	729,498.90	32° 2' 19.420 N	103° 35' 33.717 W	

Integrity Directional Services, LLC

Survey Report - Geographic

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Vast State 5H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3289.0usft (Scandril Freedom)
Site:	Sec. 17, T 26 S., R 33 E	MD Reference:	KB=26' @ 3289.0usft (Scandril Freedom)
Well:	Vast State 5H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi 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
10,105.0	92.90	358.70	9,287.0	824.0	-624.7	378,695.66	729,496.77	32° 2' 20.349 N	103° 35' 33.734 W
10,198.0	91.50	358.90	9,283.4	916.9	-626.7	378,788.57	729,494.83	32° 2' 21.269 N	103° 35' 33.750 W
10,292.0	91.80	358.60	9,280.7	1,010.8	-628.7	378,882.51	729,492.78	32° 2' 22.198 N	103° 35' 33.766 W
10,386.0	92.50	358.00	9,277.2	1,104.7	-631.5	378,976.40	729,489.99	32° 2' 23.128 N	103° 35' 33.791 W
10,480.0	93.40	359.50	9,272.3	1,198.5	-633.6	379,070.25	729,487.94	32° 2' 24.056 N	103° 35' 33.807 W
10,573.0	90.10	359.00	9,269.5	1,291.5	-634.8	379,163.18	729,486.73	32° 2' 24.976 N	103° 35' 33.814 W
10,667.0	91.20	358.40	9,268.4	1,385.5	-636.9	379,257.15	729,484.59	32° 2' 25.906 N	103° 35' 33.831 W
10,760.0	89.20	358.70	9,268.1	1,478.4	-639.3	379,350.12	729,482.24	32° 2' 26.826 N	103° 35' 33.851 W
10,854.0	90.20	359.00	9,268.6	1,572.4	-641.1	379,444.09	729,480.35	32° 2' 27.757 N	103° 35' 33.865 W
10,948.0	91.10	358.90	9,267.5	1,666.4	-642.9	379,538.07	729,478.63	32° 2' 28.687 N	103° 35' 33.878 W
11,041.0	92.30	359.00	9,264.8	1,759.3	-644.6	379,631.01	729,476.93	32° 2' 29.606 N	103° 35' 33.890 W
11,135.0	90.70	359.40	9,262.3	1,853.3	-645.9	379,724.97	729,475.62	32° 2' 30.536 N	103° 35' 33.898 W
11,228.0	91.30	359.30	9,260.7	1,946.2	-646.9	379,817.95	729,474.56	32° 2' 31.456 N	103° 35' 33.903 W
11,322.0	89.00	359.70	9,260.4	2,040.2	-647.8	379,911.94	729,473.74	32° 2' 32.387 N	103° 35' 33.905 W
11,415.0	89.00	0.20	9,262.1	2,133.2	-647.8	380,004.92	729,473.66	32° 2' 33.307 N	103° 35' 33.899 W
11,508.0	90.60	0.40	9,262.4	2,226.2	-647.3	380,097.92	729,474.15	32° 2' 34.227 N	103° 35' 33.885 W
11,602.0	91.20	0.80	9,260.9	2,320.2	-646.4	380,191.90	729,475.13	32° 2' 35.157 N	103° 35' 33.867 W
11,695.0	89.30	1.10	9,260.5	2,413.2	-644.8	380,284.88	729,476.67	32° 2' 36.077 N	103° 35' 33.841 W
11,788.0	90.40	1.40	9,260.7	2,506.2	-642.8	380,377.86	729,478.70	32° 2' 36.997 N	103° 35' 33.810 W
11,882.0	91.10	2.00	9,259.5	2,600.1	-640.0	380,471.81	729,481.49	32° 2' 37.927 N	103° 35' 33.770 W
11,976.0	90.70	0.60	9,258.0	2,694.1	-637.9	380,565.77	729,483.62	32° 2' 38.856 N	103° 35' 33.738 W
12,070.0	91.10	0.50	9,256.6	2,788.1	-637.0	380,659.75	729,484.52	32° 2' 39.786 N	103° 35' 33.720 W
12,164.0	92.10	0.90	9,253.9	2,882.0	-635.8	380,753.71	729,485.67	32° 2' 40.716 N	103° 35' 33.699 W
12,258.0	92.20	359.30	9,250.4	2,975.9	-635.7	380,847.64	729,485.84	32° 2' 41.645 N	103° 35' 33.690 W
12,352.0	92.80	359.40	9,246.3	3,069.8	-636.7	380,941.54	729,484.77	32° 2' 42.575 N	103° 35' 33.695 W
12,446.0	93.60	359.30	9,241.1	3,163.7	-637.8	381,035.39	729,483.71	32° 2' 43.503 N	103° 35' 33.700 W
12,540.0	92.30	358.30	9,236.2	3,257.5	-639.8	381,129.24	729,481.74	32° 2' 44.432 N	103° 35' 33.715 W
12,634.0	93.30	358.50	9,231.6	3,351.4	-642.4	381,223.09	729,479.12	32° 2' 45.361 N	103° 35' 33.738 W
12,728.0	94.40	358.30	9,225.3	3,445.1	-645.0	381,316.84	729,476.50	32° 2' 46.289 N	103° 35' 33.761 W
12,822.0	93.60	358.20	9,218.8	3,538.9	-647.9	381,410.57	729,473.64	32° 2' 47.217 N	103° 35' 33.787 W
12,916.0	94.40	358.50	9,212.2	3,632.6	-650.6	381,504.30	729,470.94	32° 2' 48.145 N	103° 35' 33.811 W
13,009.0	92.00	359.90	9,207.0	3,725.4	-651.9	381,597.14	729,469.64	32° 2' 49.063 N	103° 35' 33.818 W
13,102.0	93.10	0.01	9,202.9	3,818.3	-651.9	381,690.04	729,469.56	32° 2' 49.983 N	103° 35' 33.812 W
13,196.0	93.50	0.40	9,197.5	3,912.2	-651.6	381,783.89	729,469.90	32° 2' 50.911 N	103° 35' 33.801 W
13,290.0	92.20	359.00	9,192.8	4,006.1	-652.1	381,877.76	729,469.40	32° 2' 51.840 N	103° 35' 33.799 W
13,384.0	92.90	359.80	9,188.6	4,100.0	-653.1	381,971.66	729,468.42	32° 2' 52.770 N	103° 35' 33.803 W
13,477.0	93.60	359.90	9,183.3	4,192.8	-653.3	382,064.51	729,468.18	32° 2' 53.689 N	103° 35' 33.798 W
13,571.0	94.30	359.90	9,176.9	4,286.6	-653.5	382,158.29	729,468.01	32° 2' 54.617 N	103° 35' 33.793 W
13,665.0	93.50	358.50	9,170.5	4,380.4	-654.8	382,252.06	729,466.70	32° 2' 55.545 N	103° 35' 33.800 W
13,758.0	92.20	358.50	9,165.8	4,473.2	-657.2	382,344.91	729,464.27	32° 2' 56.464 N	103° 35' 33.821 W
13,852.0	91.10	358.60	9,163.1	4,567.1	-659.6	382,438.84	729,461.89	32° 2' 57.393 N	103° 35' 33.841 W
13,945.0	91.90	359.00	9,160.7	4,660.1	-661.5	382,531.79	729,459.95	32° 2' 58.313 N	103° 35' 33.857 W
14,038.0	92.30	2.90	9,157.3	4,753.0	-660.0	382,624.69	729,461.49	32° 2' 59.232 N	103° 35' 33.831 W
Last MWD @ 14038' MD / 9157' TVD									
14,097.0	92.30	2.90	9,154.9	4,811.9	-657.0	382,683.57	729,464.47	32° 2' 59.815 N	103° 35' 33.792 W

Integrity Directional Services, LLC

Survey Report - Geographic

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Vast State 5H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3289.0usft (Scandrill Freedom)
Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=26' @ 3289.0usft (Scandrill Freedom)
Well:	Vast State 5H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,935.0	4,934.4	-44.5	-4.8	First MWD @ 4935' MD / 4934' TVD
14,038.0	9,157.3	4,753.0	-660.0	Last MWD @ 14038' MD / 9157' TVD
14,097.0	9,154.9	4,811.9	-657.0	PTD @ 14097' MD / 9155' TVD

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------