

COG Production L L C

Lea County, NM (NAD27 NME)

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

Vast State 2H

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

14 June, 2016

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Integrity Directional Services, LLC

Survey Report - Geographic

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Vast State 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Well:	Vast State 2H	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	Latitude:	32° 2' 12.155 N
From:	Map	Easting:	730,181.40 usft	Longitude:	103° 35' 25.847 W
Position Uncertainty:	5.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.39 °

Well	Vast State 2H					
Well Position	+N/-S	0.00 ft	Northing:	377,878.70 usft	Latitude:	32° 2' 12.131 N
	+E/-W	0.00 ft	Easting:	731,451.10 usft	Longitude:	103° 35' 11.097 W
Position Uncertainty		5.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	3,259.00 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	5/20/2016	7.06	59.90	47,937

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	359.78	

Survey Program	Date 6/14/2016				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
100.00	8,570.00	Phoenix Surveys (Wellbore #1)	MWD	MWD - Standard	
8,670.00	14,279.00	IDS MWD (Wellbore #1)	MWD	MWD - Standard	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	377,878.70	731,451.10	32° 2' 12.131 N	103° 35' 11.097 W	
100.00	0.45	267.89	100.00	-0.01	-0.39	377,878.68	731,450.70	32° 2' 12.131 N	103° 35' 11.101 W	
200.00	0.46	155.02	200.00	-0.39	-0.62	377,878.31	731,450.48	32° 2' 12.127 N	103° 35' 11.104 W	
300.00	0.14	233.85	300.00	-0.83	-0.54	377,877.87	731,450.55	32° 2' 12.123 N	103° 35' 11.103 W	
400.00	0.19	204.99	400.00	-1.05	-0.71	377,877.65	731,450.38	32° 2' 12.121 N	103° 35' 11.105 W	
500.00	0.19	236.06	500.00	-1.29	-0.92	377,877.40	731,450.18	32° 2' 12.119 N	103° 35' 11.107 W	
600.00	0.06	243.34	599.99	-1.41	-1.11	377,877.29	731,449.99	32° 2' 12.117 N	103° 35' 11.110 W	
700.00	0.14	166.17	699.99	-1.55	-1.12	377,877.15	731,449.97	32° 2' 12.116 N	103° 35' 11.110 W	
800.00	0.17	245.84	799.99	-1.73	-1.23	377,876.97	731,449.87	32° 2' 12.114 N	103° 35' 11.111 W	
900.00	0.08	7.50	899.99	-1.72	-1.36	377,876.98	731,449.74	32° 2' 12.114 N	103° 35' 11.112 W	
1,000.00	0.26	311.01	999.99	-1.50	-1.52	377,877.19	731,449.58	32° 2' 12.117 N	103° 35' 11.114 W	

Integrity Directional Services, LLC

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Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Well:	Vast State 2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,100.00	0.90	204.82	1,099.99	-2.07	-2.02	377,876.63	731,449.08	32° 2' 12.111 N	103° 35' 11.120 W
1,200.00	0.95	230.74	1,199.98	-3.31	-2.99	377,875.39	731,448.11	32° 2' 12.099 N	103° 35' 11.132 W
1,300.00	1.35	194.50	1,299.96	-4.97	-3.93	377,873.73	731,447.17	32° 2' 12.082 N	103° 35' 11.143 W
1,400.00	1.02	198.74	1,399.94	-6.95	-4.51	377,871.74	731,446.59	32° 2' 12.063 N	103° 35' 11.149 W
1,500.00	1.20	217.15	1,499.92	-8.63	-5.43	377,870.07	731,445.67	32° 2' 12.046 N	103° 35' 11.160 W
1,600.00	1.01	238.94	1,599.90	-9.92	-6.81	377,868.78	731,444.28	32° 2' 12.034 N	103° 35' 11.176 W
1,700.00	1.33	201.54	1,699.88	-11.46	-7.99	377,867.24	731,443.10	32° 2' 12.018 N	103° 35' 11.190 W
1,800.00	0.77	268.39	1,799.87	-12.55	-9.09	377,866.14	731,442.00	32° 2' 12.008 N	103° 35' 11.203 W
1,900.00	0.89	199.15	1,899.86	-13.31	-10.02	377,865.39	731,441.08	32° 2' 12.000 N	103° 35' 11.214 W
2,000.00	1.46	200.11	1,999.84	-15.24	-10.71	377,863.46	731,440.39	32° 2' 11.981 N	103° 35' 11.222 W
2,100.00	1.37	189.42	2,099.81	-17.61	-11.34	377,861.09	731,439.75	32° 2' 11.958 N	103° 35' 11.230 W
2,200.00	1.53	211.99	2,199.78	-19.92	-12.25	377,858.77	731,438.85	32° 2' 11.935 N	103° 35' 11.240 W
2,300.00	1.54	216.39	2,299.74	-22.14	-13.75	377,856.56	731,437.34	32° 2' 11.913 N	103° 35' 11.258 W
2,400.00	1.18	229.85	2,399.71	-23.88	-15.34	377,854.81	731,435.76	32° 2' 11.896 N	103° 35' 11.277 W
2,500.00	1.60	201.69	2,499.68	-25.84	-16.64	377,852.85	731,434.46	32° 2' 11.877 N	103° 35' 11.292 W
2,600.00	2.01	206.64	2,599.63	-28.71	-17.94	377,849.99	731,433.15	32° 2' 11.848 N	103° 35' 11.307 W
2,700.00	1.38	157.81	2,699.59	-31.39	-18.27	377,847.31	731,432.82	32° 2' 11.822 N	103° 35' 11.311 W
2,800.00	1.34	150.46	2,799.57	-33.52	-17.24	377,845.17	731,433.85	32° 2' 11.801 N	103° 35' 11.300 W
2,900.00	1.30	156.62	2,899.54	-35.58	-16.22	377,843.12	731,434.88	32° 2' 11.780 N	103° 35' 11.288 W
3,000.00	0.92	158.64	2,999.52	-37.37	-15.47	377,841.33	731,435.62	32° 2' 11.763 N	103° 35' 11.279 W
3,100.00	1.54	168.62	3,099.50	-39.44	-14.92	377,839.26	731,436.18	32° 2' 11.742 N	103° 35' 11.273 W
3,200.00	1.07	230.49	3,199.47	-41.35	-15.37	377,837.35	731,435.73	32° 2' 11.723 N	103° 35' 11.278 W
3,300.00	1.35	165.08	3,299.46	-43.08	-15.79	377,835.62	731,435.31	32° 2' 11.706 N	103° 35' 11.283 W
3,400.00	1.52	164.61	3,399.43	-45.50	-15.13	377,833.20	731,435.96	32° 2' 11.682 N	103° 35' 11.276 W
3,500.00	0.85	129.08	3,499.40	-47.24	-14.20	377,831.45	731,436.89	32° 2' 11.665 N	103° 35' 11.265 W
3,600.00	1.10	119.66	3,599.39	-48.19	-12.79	377,830.51	731,438.30	32° 2' 11.655 N	103° 35' 11.249 W
3,700.00	1.32	112.73	3,699.37	-49.11	-10.90	377,829.59	731,440.20	32° 2' 11.646 N	103° 35' 11.227 W
3,800.00	0.68	148.45	3,799.35	-50.06	-9.53	377,828.64	731,441.57	32° 2' 11.637 N	103° 35' 11.211 W
3,900.00	1.13	108.64	3,899.34	-50.88	-8.28	377,827.82	731,442.82	32° 2' 11.628 N	103° 35' 11.197 W
4,000.00	0.91	104.87	3,999.33	-51.40	-6.58	377,827.30	731,444.52	32° 2' 11.623 N	103° 35' 11.177 W
4,100.00	1.27	145.89	4,099.31	-52.52	-5.19	377,826.18	731,445.91	32° 2' 11.612 N	103° 35' 11.161 W
4,200.00	0.85	134.70	4,199.29	-53.96	-4.04	377,824.74	731,447.06	32° 2' 11.598 N	103° 35' 11.148 W
4,300.00	1.31	173.02	4,299.27	-55.61	-3.37	377,823.08	731,447.72	32° 2' 11.581 N	103° 35' 11.140 W
4,400.00	1.82	171.33	4,399.24	-58.32	-3.00	377,820.38	731,448.10	32° 2' 11.554 N	103° 35' 11.136 W
4,500.00	1.85	169.58	4,499.19	-61.48	-2.47	377,817.22	731,448.63	32° 2' 11.523 N	103° 35' 11.130 W
4,600.00	2.39	153.09	4,599.12	-64.92	-1.23	377,813.78	731,449.87	32° 2' 11.489 N	103° 35' 11.116 W
4,700.00	1.41	177.12	4,699.06	-68.01	-0.22	377,810.69	731,450.87	32° 2' 11.458 N	103° 35' 11.105 W
4,800.00	1.37	181.51	4,799.03	-70.44	-0.19	377,808.26	731,450.90	32° 2' 11.434 N	103° 35' 11.104 W
4,900.00	0.95	169.12	4,899.01	-72.44	-0.07	377,806.25	731,451.03	32° 2' 11.414 N	103° 35' 11.103 W
5,000.00	1.34	195.75	4,998.99	-74.38	-0.23	377,804.31	731,450.87	32° 2' 11.395 N	103° 35' 11.105 W
5,100.00	1.13	176.15	5,098.97	-76.49	-0.48	377,802.21	731,450.62	32° 2' 11.374 N	103° 35' 11.108 W
5,200.00	1.14	205.00	5,198.95	-78.38	-0.84	377,800.32	731,450.26	32° 2' 11.356 N	103° 35' 11.113 W
5,300.00	0.98	205.44	5,298.93	-80.05	-1.62	377,798.65	731,449.47	32° 2' 11.339 N	103° 35' 11.122 W
5,400.00	0.80	241.16	5,398.92	-81.16	-2.60	377,797.54	731,448.49	32° 2' 11.328 N	103° 35' 11.133 W
5,500.00	1.03	202.84	5,498.91	-82.33	-3.56	377,796.37	731,447.53	32° 2' 11.317 N	103° 35' 11.145 W
5,600.00	1.22	198.00	5,598.89	-84.17	-4.24	377,794.53	731,446.86	32° 2' 11.299 N	103° 35' 11.153 W
5,700.00	1.40	197.03	5,698.87	-86.35	-4.93	377,792.35	731,446.17	32° 2' 11.277 N	103° 35' 11.161 W
5,800.00	1.16	186.46	5,798.84	-88.52	-5.40	377,790.18	731,445.70	32° 2' 11.256 N	103° 35' 11.166 W
5,900.00	1.29	195.18	5,898.82	-90.61	-5.81	377,788.09	731,445.29	32° 2' 11.235 N	103° 35' 11.171 W
6,000.00	1.70	176.32	5,998.78	-93.18	-6.01	377,785.52	731,445.09	32° 2' 11.210 N	103° 35' 11.174 W
6,100.00	1.04	169.78	6,098.76	-95.55	-5.75	377,783.15	731,445.35	32° 2' 11.186 N	103° 35' 11.171 W
6,200.00	1.11	169.64	6,198.74	-97.40	-5.42	377,781.30	731,445.68	32° 2' 11.168 N	103° 35' 11.167 W
6,300.00	1.29	172.41	6,298.72	-99.47	-5.09	377,779.23	731,446.00	32° 2' 11.147 N	103° 35' 11.164 W
6,400.00	1.59	183.39	6,398.68	-101.97	-5.03	377,776.73	731,446.07	32° 2' 11.123 N	103° 35' 11.163 W
6,500.00	1.37	190.82	6,498.65	-104.53	-5.33	377,774.17	731,445.76	32° 2' 11.097 N	103° 35' 11.167 W

Integrity Directional Services, LLC

Survey Report - Geographic

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Vast State 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Well:	Vast State 2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,600.00	1.51	187.34	6,598.62	-107.01	-5.72	377,771.69	731,445.37	32° 2' 11.073 N	103° 35' 11.172 W
6,700.00	1.47	194.72	6,698.59	-109.56	-6.22	377,769.14	731,444.88	32° 2' 11.048 N	103° 35' 11.178 W
6,800.00	1.43	184.67	6,798.55	-112.04	-6.65	377,766.66	731,444.45	32° 2' 11.023 N	103° 35' 11.183 W
6,900.00	1.43	198.01	6,898.52	-114.47	-7.13	377,764.23	731,443.96	32° 2' 10.999 N	103° 35' 11.189 W
7,000.00	1.55	198.93	6,998.49	-116.94	-7.96	377,761.76	731,443.14	32° 2' 10.975 N	103° 35' 11.198 W
7,100.00	1.67	195.72	7,098.45	-119.62	-8.79	377,759.08	731,442.30	32° 2' 10.948 N	103° 35' 11.208 W
7,200.00	1.51	193.86	7,198.41	-122.30	-9.50	377,756.40	731,441.59	32° 2' 10.922 N	103° 35' 11.217 W
7,300.00	1.08	231.16	7,298.39	-124.17	-10.55	377,754.53	731,440.54	32° 2' 10.903 N	103° 35' 11.229 W
7,400.00	1.45	200.89	7,398.36	-125.94	-11.74	377,752.75	731,439.36	32° 2' 10.886 N	103° 35' 11.243 W
7,500.00	1.68	199.59	7,498.33	-128.51	-12.68	377,750.19	731,438.42	32° 2' 10.860 N	103° 35' 11.254 W
7,600.00	1.31	192.81	7,598.29	-131.00	-13.43	377,747.70	731,437.67	32° 2' 10.836 N	103° 35' 11.263 W
7,700.00	1.47	167.64	7,698.26	-133.37	-13.40	377,745.33	731,437.69	32° 2' 10.812 N	103° 35' 11.263 W
7,800.00	1.29	162.83	7,798.23	-135.70	-12.80	377,743.00	731,438.30	32° 2' 10.789 N	103° 35' 11.256 W
7,900.00	0.75	166.00	7,898.22	-137.41	-12.31	377,741.29	731,438.79	32° 2' 10.772 N	103° 35' 11.251 W
8,000.00	0.46	103.09	7,998.21	-138.14	-11.76	377,740.56	731,439.34	32° 2' 10.765 N	103° 35' 11.244 W
8,100.00	0.10	320.22	8,098.21	-138.16	-11.42	377,740.54	731,439.67	32° 2' 10.765 N	103° 35' 11.240 W
8,200.00	0.42	178.84	8,198.21	-138.46	-11.47	377,740.24	731,439.63	32° 2' 10.762 N	103° 35' 11.241 W
8,300.00	0.30	207.28	8,298.21	-139.06	-11.58	377,739.64	731,439.51	32° 2' 10.756 N	103° 35' 11.242 W
8,400.00	0.08	106.13	8,398.21	-139.31	-11.64	377,739.39	731,439.46	32° 2' 10.754 N	103° 35' 11.243 W
8,500.00	0.26	113.13	8,498.21	-139.42	-11.36	377,739.28	731,439.74	32° 2' 10.752 N	103° 35' 11.240 W
8,570.00	0.47	148.86	8,568.21	-139.73	-11.07	377,738.97	731,440.03	32° 2' 10.749 N	103° 35' 11.236 W
8,670.00	0.40	146.30	8,668.20	-140.37	-10.66	377,738.33	731,440.44	32° 2' 10.743 N	103° 35' 11.232 W
First IDS Survey									
8,764.00	0.40	138.80	8,762.20	-140.89	-10.26	377,737.81	731,440.83	32° 2' 10.738 N	103° 35' 11.227 W
8,827.00	0.40	138.90	8,825.20	-141.22	-9.97	377,737.48	731,441.12	32° 2' 10.734 N	103° 35' 11.224 W
8,859.00	0.70	18.70	8,857.20	-141.12	-9.84	377,737.58	731,441.26	32° 2' 10.735 N	103° 35' 11.222 W
8,890.00	4.80	2.30	8,888.16	-139.64	-9.72	377,739.06	731,441.37	32° 2' 10.750 N	103° 35' 11.221 W
8,922.00	9.40	3.90	8,919.90	-135.69	-9.49	377,743.00	731,441.60	32° 2' 10.789 N	103° 35' 11.218 W
8,953.00	13.50	4.40	8,950.28	-129.56	-9.04	377,749.14	731,442.05	32° 2' 10.850 N	103° 35' 11.212 W
8,985.00	17.10	5.40	8,981.14	-121.15	-8.31	377,757.55	731,442.78	32° 2' 10.933 N	103° 35' 11.203 W
9,016.00	20.70	1.70	9,010.47	-111.13	-7.72	377,767.57	731,443.38	32° 2' 11.032 N	103° 35' 11.195 W
9,048.00	24.10	359.70	9,040.05	-98.94	-7.59	377,779.76	731,443.51	32° 2' 11.153 N	103° 35' 11.193 W
9,079.00	27.00	358.70	9,068.01	-85.57	-7.78	377,793.13	731,443.32	32° 2' 11.285 N	103° 35' 11.194 W
9,111.00	30.20	357.70	9,096.11	-70.27	-8.27	377,808.43	731,442.83	32° 2' 11.437 N	103° 35' 11.198 W
9,142.00	32.70	358.50	9,122.55	-54.10	-8.80	377,824.60	731,442.30	32° 2' 11.597 N	103° 35' 11.203 W
9,174.00	34.50	358.40	9,149.20	-36.40	-9.28	377,842.30	731,441.82	32° 2' 11.772 N	103° 35' 11.207 W
9,205.00	37.10	0.80	9,174.34	-18.27	-9.39	377,860.43	731,441.70	32° 2' 11.951 N	103° 35' 11.207 W
9,237.00	41.10	0.00	9,199.17	1.91	-9.26	377,880.60	731,441.84	32° 2' 12.151 N	103° 35' 11.204 W
9,268.00	45.80	1.10	9,221.67	23.22	-9.05	377,901.92	731,442.05	32° 2' 12.362 N	103° 35' 11.200 W
9,300.00	51.00	2.50	9,242.91	47.12	-8.28	377,925.82	731,442.81	32° 2' 12.598 N	103° 35' 11.189 W
9,331.00	55.60	2.50	9,261.43	71.95	-7.20	377,950.65	731,443.90	32° 2' 12.844 N	103° 35' 11.174 W
9,363.00	58.80	1.90	9,278.76	98.82	-6.17	377,977.52	731,444.93	32° 2' 13.110 N	103° 35' 11.160 W
9,387.48	61.25	1.74	9,290.99	120.02	-5.50	377,998.72	731,445.60	32° 2' 13.319 N	103° 35' 11.151 W
South 330' Crossing									
9,394.00	61.90	1.70	9,294.10	125.75	-5.32	378,004.45	731,445.77	32° 2' 13.376 N	103° 35' 11.148 W
9,426.00	64.80	2.00	9,308.45	154.33	-4.40	378,033.03	731,446.70	32° 2' 13.659 N	103° 35' 11.135 W
9,457.00	68.10	1.40	9,320.83	182.73	-3.56	378,061.43	731,447.54	32° 2' 13.940 N	103° 35' 11.123 W
9,489.00	71.90	0.70	9,331.78	212.79	-3.01	378,091.49	731,448.09	32° 2' 14.237 N	103° 35' 11.114 W
9,520.00	74.70	0.00	9,340.68	242.48	-2.83	378,121.18	731,448.27	32° 2' 14.531 N	103° 35' 11.110 W
9,552.00	77.10	358.80	9,348.48	273.51	-3.16	378,152.21	731,447.94	32° 2' 14.838 N	103° 35' 11.111 W
9,583.00	80.40	358.10	9,354.53	303.90	-3.98	378,182.60	731,447.12	32° 2' 15.139 N	103° 35' 11.118 W
9,615.00	84.30	358.00	9,358.79	335.59	-5.06	378,214.29	731,446.04	32° 2' 15.453 N	103° 35' 11.128 W
9,643.00	87.10	359.30	9,360.89	363.50	-5.72	378,242.20	731,445.38	32° 2' 15.729 N	103° 35' 11.134 W
9,674.00	90.70	0.00	9,361.48	394.49	-5.90	378,273.19	731,445.19	32° 2' 16.035 N	103° 35' 11.133 W
9,706.00	96.00	0.40	9,359.61	426.42	-5.79	378,305.12	731,445.30	32° 2' 16.351 N	103° 35' 11.130 W

Integrity Directional Services, LLC

Survey Report - Geographic

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Vast State 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Well:	Vast State 2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,731.00	98.20	1.00	9,356.52	451.23	-5.49	378,329.93	731,445.61	32° 2' 16.597 N	103° 35' 11.124 W
9,832.00	98.10	0.90	9,342.20	551.19	-3.83	378,429.89	731,447.26	32° 2' 17.586 N	103° 35' 11.097 W
9,927.00	94.90	358.00	9,331.45	645.56	-4.75	378,524.25	731,446.35	32° 2' 18.520 N	103° 35' 11.100 W
10,021.00	90.50	356.10	9,327.02	739.30	-9.58	378,618.00	731,441.52	32° 2' 19.448 N	103° 35' 11.148 W
10,115.00	90.40	356.30	9,326.28	833.09	-15.81	378,711.79	731,435.29	32° 2' 20.376 N	103° 35' 11.213 W
10,210.00	90.90	357.10	9,325.20	927.93	-21.28	378,806.62	731,429.82	32° 2' 21.315 N	103° 35' 11.269 W
10,304.00	91.40	357.40	9,323.32	1,021.80	-25.79	378,900.50	731,425.31	32° 2' 22.245 N	103° 35' 11.314 W
10,399.00	90.20	356.80	9,321.99	1,116.67	-30.59	378,995.36	731,420.50	32° 2' 23.184 N	103° 35' 11.362 W
10,493.00	91.40	357.50	9,320.68	1,210.54	-35.27	379,089.23	731,415.83	32° 2' 24.113 N	103° 35' 11.409 W
10,588.00	91.50	358.10	9,318.28	1,305.44	-38.91	379,184.13	731,412.18	32° 2' 25.052 N	103° 35' 11.444 W
10,682.00	92.00	358.20	9,315.40	1,399.34	-41.95	379,278.04	731,409.15	32° 2' 25.982 N	103° 35' 11.471 W
10,777.00	90.90	359.20	9,313.00	1,494.29	-44.10	379,372.98	731,407.00	32° 2' 26.921 N	103° 35' 11.489 W
10,871.00	91.90	0.00	9,310.70	1,588.25	-44.76	379,466.95	731,406.34	32° 2' 27.851 N	103° 35' 11.489 W
10,966.00	92.60	0.70	9,306.97	1,683.18	-44.18	379,561.87	731,406.92	32° 2' 28.791 N	103° 35' 11.475 W
11,061.00	93.10	0.70	9,302.25	1,778.05	-43.02	379,656.75	731,408.08	32° 2' 29.730 N	103° 35' 11.453 W
11,155.00	93.80	1.20	9,296.59	1,871.87	-41.46	379,750.56	731,409.64	32° 2' 30.658 N	103° 35' 11.428 W
11,250.00	93.20	0.00	9,290.79	1,966.68	-40.47	379,845.38	731,410.63	32° 2' 31.596 N	103° 35' 11.409 W
11,344.00	90.10	358.10	9,288.09	2,060.62	-42.03	379,939.31	731,409.07	32° 2' 32.526 N	103° 35' 11.419 W
11,439.00	90.10	358.20	9,287.92	2,155.57	-45.09	380,034.26	731,406.00	32° 2' 33.465 N	103° 35' 11.447 W
11,533.00	91.00	359.70	9,287.02	2,249.54	-46.82	380,128.24	731,404.28	32° 2' 34.396 N	103° 35' 11.460 W
11,628.00	91.90	0.10	9,284.62	2,344.51	-46.98	380,223.21	731,404.11	32° 2' 35.335 N	103° 35' 11.454 W
11,722.00	92.90	0.40	9,280.68	2,438.43	-46.57	380,317.12	731,404.52	32° 2' 36.265 N	103° 35' 11.442 W
11,819.00	94.00	0.30	9,274.84	2,535.25	-45.98	380,413.94	731,405.11	32° 2' 37.223 N	103° 35' 11.427 W
11,913.00	92.70	1.40	9,269.35	2,629.07	-44.59	380,507.77	731,406.51	32° 2' 38.151 N	103° 35' 11.403 W
12,008.00	92.00	1.40	9,265.45	2,723.96	-42.27	380,602.66	731,408.83	32° 2' 39.090 N	103° 35' 11.369 W
12,102.00	93.10	2.10	9,261.27	2,817.83	-39.40	380,696.52	731,411.69	32° 2' 40.019 N	103° 35' 11.328 W
12,197.00	93.70	2.70	9,255.64	2,912.57	-35.43	380,791.27	731,415.67	32° 2' 40.956 N	103° 35' 11.274 W
12,291.00	92.40	2.30	9,250.64	3,006.35	-31.34	380,885.04	731,419.76	32° 2' 41.884 N	103° 35' 11.219 W
12,386.00	92.10	1.20	9,246.91	3,101.23	-28.44	380,979.92	731,422.66	32° 2' 42.822 N	103° 35' 11.178 W
12,480.00	92.60	1.10	9,243.05	3,195.13	-26.55	381,073.82	731,424.54	32° 2' 43.752 N	103° 35' 11.148 W
12,575.00	92.00	0.50	9,239.24	3,290.05	-25.23	381,168.74	731,425.87	32° 2' 44.691 N	103° 35' 11.125 W
12,670.00	92.20	0.70	9,235.76	3,384.98	-24.23	381,263.67	731,426.86	32° 2' 45.630 N	103° 35' 11.106 W
12,764.00	92.80	0.80	9,231.66	3,478.88	-23.00	381,357.57	731,428.09	32° 2' 46.559 N	103° 35' 11.084 W
12,859.00	93.90	0.90	9,226.11	3,573.70	-21.60	381,452.40	731,429.50	32° 2' 47.497 N	103° 35' 11.060 W
12,953.00	92.10	0.20	9,221.19	3,667.57	-20.70	381,546.26	731,430.40	32° 2' 48.426 N	103° 35' 11.042 W
13,048.00	92.90	0.50	9,217.04	3,762.47	-20.12	381,641.16	731,430.98	32° 2' 49.365 N	103° 35' 11.028 W
13,142.00	93.40	0.70	9,211.88	3,856.33	-19.13	381,735.02	731,431.96	32° 2' 50.294 N	103° 35' 11.009 W
13,237.00	92.50	359.30	9,206.99	3,951.20	-19.14	381,829.89	731,431.96	32° 2' 51.233 N	103° 35' 11.001 W
13,332.00	91.60	359.60	9,203.59	4,046.13	-20.05	381,924.82	731,431.05	32° 2' 52.172 N	103° 35' 11.004 W
13,426.00	92.90	0.70	9,199.90	4,140.05	-19.80	382,018.74	731,431.30	32° 2' 53.102 N	103° 35' 10.994 W
13,521.00	93.50	0.90	9,194.60	4,234.90	-18.48	382,113.59	731,432.62	32° 2' 54.040 N	103° 35' 10.971 W
13,615.00	93.80	1.70	9,188.61	4,328.68	-16.35	382,207.37	731,434.75	32° 2' 54.968 N	103° 35' 10.939 W
13,701.31	93.80	1.25	9,182.89	4,414.77	-14.14	382,293.46	731,436.96	32° 2' 55.820 N	103° 35' 10.906 W
North 330' Crossing									
13,710.00	93.80	1.20	9,182.32	4,423.44	-13.95	382,302.13	731,437.15	32° 2' 55.906 N	103° 35' 10.903 W
13,804.00	93.30	0.10	9,176.50	4,517.25	-12.89	382,395.94	731,438.21	32° 2' 56.834 N	103° 35' 10.883 W
13,899.00	92.30	358.80	9,171.86	4,612.13	-13.80	382,490.82	731,437.30	32° 2' 57.773 N	103° 35' 10.886 W
13,993.00	89.50	359.00	9,170.38	4,706.09	-15.60	382,584.78	731,435.50	32° 2' 58.703 N	103° 35' 10.900 W
14,088.00	89.50	0.00	9,171.21	4,801.09	-16.43	382,679.77	731,434.67	32° 2' 59.643 N	103° 35' 10.902 W
14,183.00	88.80	0.20	9,172.62	4,896.07	-16.26	382,774.76	731,434.83	32° 3' 0.583 N	103° 35' 10.892 W
Final IDS Survey									
14,279.00	89.00	359.20	9,174.46	4,992.05	-16.77	382,870.74	731,434.33	32° 3' 1.533 N	103° 35' 10.890 W
Projection to TD									

Integrity Directional Services, LLC

Survey Report - Geographic

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Vast State 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Well:	Vast State 2H	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 (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
8,670.00	8,668.20	-140.37	-10.66	First IDS Survey
9,387.48	9,290.99	120.02	-5.50	South 330' Crossing
13,701.31	9,182.89	4,414.77	-14.14	North 330' Crossing
14,183.00	9,172.62	4,896.07	-16.26	Final IDS Survey
14,279.00	9,174.46	4,992.05	-16.77	Projection to TD

Checked By: _____ Approved By: _____ Date: _____



PATRIOT DRILLING, LLC

HOBBS OCD

OCT 06 2016

RECEIVED

OPERATOR: COG Operating, LLC
WELL/LEASE: Vast State #2H
COUNTY: Lea Co., New Mexico
Sec. 17, T 26S, R 33E

**STATE OF NEW MEXICO
DEVIATION REPORT**

<u>Depth</u>	<u>Deviation</u>	<u>Depth</u>	<u>Deviation</u>
463	1/4	3,930	1
825	1/2	4,494	2
1,013	1/4	5,087	1 1/4
1,484	1 1/4	5,559	1 1/4
1,672	1 1/4	6,313	1 1/4
2,238	1 1/2	6,785	1 1/2
2,612	2	7,446	1 1/2
3,083	1 3/4	7,824	1 1/2
3,459	1 1/4	8,297	1/4

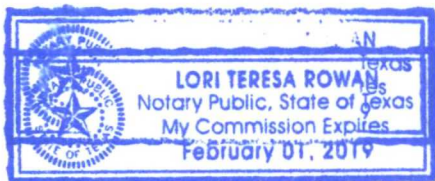
Patriot Drilling, LLC

M. Leroy Peterson, Executive Vice-President

The foregoing instrument was acknowledged before me on this 20th day of June 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



SURVEY CERTIFICATION FORM



3610 Elkins Road Midland, TX 79705 t:432-684-0057 f: 432-686-7954

HOBBS OCD

OCT 06 2016

RECEIVED

Company: COG
Well Name: Vast State # 2
Survey Instrument Type: North Seek Rate Gyro

Job #: 1610290
County/State: Lea Co., New Mexico
API #: 30-025-42942

TIE-IN DATA

Measure Depth (ft)	Vertical Depth (ft)	Inclination (°)	Azimuth (°)	N-S Coordinates	E-W Coordinates	Data Source
0	0	0	0	0	0	Surface

First Survey

Date	Depth (ft)	Inclination (°)	Azimuth (°)
2016-06-08	0	0	0

Last Survey

Date	Depth (ft)	Inclination (°)	Azimuth (°)
2016-06-08	8570	0.47	148.86

Projected TD Survey

Date	Depth (ft)	Inclination (°)	Azimuth (°)
0	0	0	0

Grid Correction
-0.4

Gyro Operator: Phoenix Technology Services USA Ltd.

Gyro Supervisor: Jaime Stephenson

To the best of my knowledge I certify this survey data to be correct and true

Date:

06-08-16

Print Name: Noe Garza

Signature:



Company: COG
 Well: Vast State # 2
 Location: Lea Co., New Mexico
 Rig: Patriot 2

HOBBS OCD

OCT 06 2016
 RECEIVED

Job Number: 1610290
 Grid Corr.: -0.40
 Lat: 32.04
 Long: -103.59

Date: 06-08-16
 Calculation Method: Minimum Curvature
 Proposed Azimuth:
 RKB - MSL in feet: 20 Feet
 Tie Into: Surface

Survey Tool Type	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates		Closure		Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
							N/S (ft)	E/W (ft)	Distance (ft)	Angle (deg)			
Enter Tie-In Survey on Line 10													
FIELD COPY, NON-DEFINITIVE													
TIE IN	0			0	0	0	0	0					
Gyro	100.00	0.45	267.89	100	100.00	-0.01	0.01 S	0.39 W	0.39	267.89	0.45	0.45	267.89
	200.00	0.46	155.02	100	200.00	-0.39	0.39 S	0.62 W	0.73	237.45	0.76	0.01	-112.87
	300.00	0.14	233.85	100	300.00	-0.83	0.83 S	0.54 W	0.99	213.30	0.45	-0.32	78.83
	400.00	0.19	204.99	100	400.00	-1.05	1.05 S	0.71 W	1.27	214.16	0.10	0.05	-28.86
	500.00	0.19	236.06	100	500.00	-1.29	1.29 S	0.92 W	1.59	215.44	0.10	0.00	31.07
	600.00	0.06	243.34	100	599.99	-1.41	1.41 S	1.11 W	1.79	218.09	0.13	-0.13	7.28
	700.00	0.14	166.17	100	699.99	-1.55	1.55 S	1.12 W	1.92	215.88	0.14	0.08	-77.17
	800.00	0.17	245.84	100	799.99	-1.73	1.73 S	1.23 W	2.12	215.36	0.20	0.03	79.67
	900.00	0.08	7.50	100	899.99	-1.72	1.72 S	1.36 W	2.19	218.18	0.22	-0.09	-238.34
	1000.00	0.26	311.01	100	999.99	-1.50	1.50 S	1.52 W	2.14	225.23	0.23	0.18	303.51
	1100.00	0.90	204.82	100	1099.99	-2.07	2.07 S	2.02 W	2.89	224.29	1.00	0.64	-106.19
	1200.00	0.95	230.74	100	1199.98	-3.31	3.31 S	2.99 W	4.46	222.12	0.42	0.05	25.92
	1300.00	1.35	194.50	100	1299.96	-4.97	4.97 S	3.93 W	6.33	218.30	0.81	0.40	-36.24
	1400.00	1.02	198.74	100	1399.94	-6.95	6.95 S	4.51 W	8.29	212.95	0.34	-0.33	4.24
	1500.00	1.20	217.15	100	1499.92	-8.63	8.63 S	5.43 W	10.20	212.15	0.40	0.18	18.41
	1600.00	1.01	238.94	100	1599.90	-9.92	9.92 S	6.81 W	12.04	214.48	0.46	-0.19	21.79
	1700.00	1.33	201.54	100	1699.88	-11.46	11.46 S	7.99 W	13.97	214.91	0.81	0.32	-37.40
	1800.00	0.77	268.39	100	1799.87	-12.55	12.55 S	9.09 W	15.50	215.91	1.25	-0.56	66.85
	1900.00	0.89	199.15	100	1899.86	-13.31	13.31 S	10.02 W	16.66	216.98	0.95	0.12	-69.24
	2000.00	1.46	200.11	100	1999.84	-15.24	15.24 S	10.71 W	18.62	215.11	0.57	0.57	0.96
	2100.00	1.37	189.42	100	2099.81	-17.61	17.61 S	11.34 W	20.95	212.79	0.28	-0.09	-10.69
	2200.00	1.53	211.99	100	2199.77	-19.92	19.92 S	12.25 W	23.39	211.58	0.59	0.16	22.57
	2300.00	1.54	216.39	100	2299.74	-22.14	22.14 S	13.75 W	26.06	211.85	0.12	0.01	4.40
	2400.00	1.18	229.85	100	2399.71	-23.88	23.88 S	15.34 W	28.38	212.71	0.48	-0.36	13.46
	2500.00	1.60	201.69	100	2499.68	-25.84	25.84 S	16.64 W	30.74	212.77	0.79	0.42	-28.16
	2600.00	2.01	206.64	100	2599.63	-28.71	28.71 S	17.94 W	33.85	212.00	0.44	0.41	4.95
	2700.00	1.38	157.81	100	2699.59	-31.39	31.39 S	18.27 W	36.32	210.20	1.51	-0.63	-48.83



Company: COG
 Well: Vast State # 2
 Location: Lea Co., New Mexico
 Rig: Patriot 2

Job Number: 1610290
 Grid Corr.: -0.40
 Lat: 32.04
 Long: -103.59

Calculation Method: Minimum Curvature
 Proposed Azimuth:
 RKB - MSL in feet: 20 Feet
 Tie Into: Surface

Survey Tool Type	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates		Closure		Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
							N/S (ft)	E/W (ft)	Distance (ft)	Angle (deg)			
	2800.00	1.34	150.46	100	2799.56	-33.52	33.52 S	17.24 W	37.70	207.22	0.18	-0.04	-7.35
	2900.00	1.30	156.62	100	2899.54	-35.58	35.58 S	16.22 W	39.10	204.50	0.15	-0.04	6.16
	3000.00	0.92	158.64	100	2999.52	-37.37	37.37 S	15.47 W	40.45	202.49	0.38	-0.38	2.02
	3100.00	1.54	168.62	100	3099.50	-39.44	39.44 S	14.92 W	42.16	200.72	0.65	0.62	9.98
	3200.00	1.07	230.49	100	3199.47	-41.35	41.35 S	15.37 W	44.11	200.39	1.40	-0.47	61.87
	3300.00	1.35	165.08	100	3299.46	-43.08	43.08 S	15.79 W	45.88	200.13	1.33	0.28	-65.41
	3400.00	1.52	164.61	100	3399.42	-45.50	45.50 S	15.13 W	47.95	198.40	0.17	0.17	-0.47
	3500.00	0.85	129.08	100	3499.40	-47.24	47.24 S	14.20 W	49.33	196.73	0.96	-0.67	-35.53
	3600.00	1.10	119.66	100	3599.39	-48.19	48.19 S	12.79 W	49.86	194.87	0.30	0.25	-9.42
	3700.00	1.32	112.73	100	3699.37	-49.11	49.11 S	10.90 W	50.30	192.51	0.26	0.22	-6.93
	3800.00	0.68	148.45	100	3799.35	-50.06	50.06 S	9.53 W	50.96	190.77	0.86	-0.64	35.72
	3900.00	1.13	108.64	100	3899.34	-50.88	50.88 S	8.28 W	51.55	189.24	0.75	0.45	-39.81
	4000.00	0.91	104.87	100	3999.32	-51.40	51.40 S	6.58 W	51.82	187.29	0.23	-0.22	-3.77
	4100.00	1.27	145.89	100	4099.31	-52.52	52.52 S	5.19 W	52.77	185.64	0.83	0.36	41.02
	4200.00	0.85	134.70	100	4199.29	-53.96	53.96 S	4.04 W	54.11	184.28	0.47	-0.42	-11.19
	4300.00	1.31	173.02	100	4299.27	-55.61	55.61 S	3.37 W	55.72	183.47	0.83	0.46	38.32
	4400.00	1.82	171.33	100	4399.24	-58.32	58.32 S	3.00 W	58.40	182.94	0.51	0.51	-1.69
	4500.00	1.85	169.58	100	4499.18	-61.48	61.48 S	2.47 W	61.53	182.30	0.06	0.03	-1.75
	4600.00	2.39	153.09	100	4599.12	-64.92	64.92 S	1.23 W	64.93	181.09	0.81	0.54	-16.49
	4700.00	1.41	177.12	100	4699.06	-68.01	68.01 S	0.22 W	68.01	180.19	1.24	-0.98	24.03
	4800.00	1.37	181.51	100	4799.03	-70.44	70.44 S	0.19 W	70.44	180.16	0.11	-0.04	4.39
	4900.00	0.95	169.12	100	4899.01	-72.44	72.44 S	0.07 W	72.44	180.05	0.49	-0.42	-12.39
	5000.00	1.34	195.75	100	4998.99	-74.38	74.38 S	0.23 W	74.38	180.18	0.65	0.39	26.63
	5100.00	1.13	176.15	100	5098.97	-76.49	76.49 S	0.48 W	76.49	180.36	0.47	-0.21	-19.60
	5200.00	1.14	205.00	100	5198.95	-78.38	78.38 S	0.84 W	78.38	180.61	0.57	0.01	28.85
	5300.00	0.98	205.44	100	5298.93	-80.05	80.05 S	1.62 W	80.07	181.16	0.16	-0.16	0.44
	5400.00	0.80	241.16	100	5398.92	-81.16	81.16 S	2.60 W	81.20	181.84	0.57	-0.18	35.72
	5500.00	1.03	202.84	100	5498.91	-82.33	82.33 S	3.56 W	82.40	182.48	0.64	0.23	-38.32
	5600.00	1.22	198.00	100	5598.89	-84.17	84.17 S	4.24 W	84.27	182.88	0.21	0.19	-4.84
	5700.00	1.40	197.03	100	5698.86	-86.35	86.35 S	4.93 W	86.49	183.27	0.18	0.18	-0.97



Company: COG
 Well: Vast State # 2
 Location: Lea Co., New Mexico
 Rig: Patriot 2

Job Number: 1610290
 Grid Corr.: -0.40
 Lat: 32.04
 Long: -103.59

Calculation Method: Minimum Curvature
 Proposed Azimuth: _____
 RKB - MSL in feet: 20 Feet
 Tie Into: Surface

Survey Tool Type	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates		Closure		Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
							N/S (ft)	E/W (ft)	Distance (ft)	Angle (deg)			
	5800.00	1.16	186.46	100	5798.84	-88.52	88.52 S	5.40 W	88.69	183.49	0.34	-0.24	-10.57
	5900.00	1.29	195.18	100	5898.82	-90.61	90.61 S	5.81 W	90.80	183.67	0.23	0.13	8.72
	6000.00	1.70	176.32	100	5998.78	-93.18	93.18 S	6.01 W	93.37	183.69	0.64	0.41	-18.86
	6100.00	1.04	169.78	100	6098.75	-95.55	95.55 S	5.75 W	95.73	183.44	0.68	-0.66	-6.54
	6200.00	1.11	169.64	100	6198.74	-97.40	97.40 S	5.42 W	97.55	183.18	0.07	0.07	-0.14
	6300.00	1.29	172.41	100	6298.71	-99.47	99.47 S	5.09 W	99.60	182.93	0.19	0.18	2.77
	6400.00	1.59	183.39	100	6398.68	-101.97	101.97 S	5.03 W	102.09	182.82	0.41	0.30	10.98
	6500.00	1.37	190.82	100	6498.65	-104.53	104.53 S	5.33 W	104.66	182.92	0.29	-0.22	7.43
	6600.00	1.51	187.34	100	6598.62	-107.01	107.01 S	5.72 W	107.16	183.06	0.17	0.14	-3.48
	6700.00	1.47	194.72	100	6698.58	-109.56	109.56 S	6.22 W	109.73	183.25	0.20	-0.04	7.38
	6800.00	1.43	184.67	100	6798.55	-112.04	112.04 S	6.65 W	112.24	183.40	0.26	-0.04	-10.05
	6900.00	1.43	198.01	100	6898.52	-114.47	114.47 S	7.13 W	114.69	183.57	0.33	0.00	13.34
	7000.00	1.55	198.93	100	6998.49	-116.94	116.94 S	7.96 W	117.21	183.89	0.12	0.12	0.92
	7100.00	1.67	195.72	100	7098.45	-119.62	119.62 S	8.79 W	119.94	184.20	0.15	0.12	-3.21
	7200.00	1.51	193.86	100	7198.41	-122.30	122.30 S	9.50 W	122.67	184.44	0.17	-0.16	-1.86
	7300.00	1.08	231.16	100	7298.39	-124.17	124.17 S	10.55 W	124.62	184.86	0.92	-0.43	37.30
	7400.00	1.45	200.89	100	7398.36	-125.94	125.94 S	11.74 W	126.49	185.32	0.75	0.37	-30.27
	7500.00	1.68	199.59	100	7498.32	-128.51	128.51 S	12.68 W	129.13	185.64	0.23	0.23	-1.30
	7600.00	1.31	192.81	100	7598.29	-131.00	131.00 S	13.43 W	131.69	185.85	0.41	-0.37	-6.78
	7700.00	1.47	167.64	100	7698.26	-133.37	133.37 S	13.40 W	134.04	185.74	0.63	0.16	-25.17
	7800.00	1.29	162.83	100	7798.23	-135.70	135.70 S	12.80 W	136.30	185.39	0.21	-0.18	-4.81
	7900.00	0.75	166.00	100	7898.22	-137.41	137.41 S	12.31 W	137.96	185.12	0.54	-0.54	3.17
	8000.00	0.46	103.09	100	7998.21	-138.14	138.14 S	11.76 W	138.63	184.86	0.68	-0.29	-62.91
	8100.00	0.10	320.22	100	8098.21	-138.16	138.16 S	11.42 W	138.63	184.73	0.54	-0.36	217.13
	8200.00	0.42	178.84	100	8198.21	-138.46	138.46 S	11.47 W	138.93	184.74	0.50	0.32	-141.38
	8300.00	0.30	207.28	100	8298.21	-139.06	139.06 S	11.58 W	139.54	184.76	0.21	-0.12	28.44
	8400.00	0.08	106.13	100	8398.21	-139.31	139.31 S	11.64 W	139.79	184.77	0.33	-0.22	-101.15
	8500.00	0.26	113.13	100	8498.21	-139.42	139.42 S	11.36 W	139.88	184.66	0.18	0.18	7.00
	8570.00	0.47	148.86	70	8568.21	-139.73	139.73 S	11.07 W	140.16	184.53	0.43	0.30	51.04