



Cathedral Energy Services

Survey Report



Company: Cobra Oil & Gas Corp.
Project: Lea Co, NM (NAD 27)
Site: Sec 8-T10S-R33E
Well: Angel Eyes 17 State #1H
Wellbore: HZ [346737]
Design: FINAL

Local Co-ordinate Reference: Well Angel Eyes 17 State #1H
TVD Reference: 17' KB @ 4221.00usft (Double K Drilling Rig #7)
MD Reference: 17' KB @ 4221.00usft (Double K Drilling Rig #7)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: USA EDM 5000 Multi Users DB

Project	Lea Co, NM (NAD 27)		
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 8-T10S-R33E, 0.9985g			
Site Position:		Northing:	893,687.10 usft	Latitude:	33° 27' 16.10 N
From:	Map	Easting:	728,634.50 usft	Longitude:	103° 35' 1.41 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.41 °

Well	Angel Eyes 17 State #1H					
Well Position	+N-S	0.00 usft	Northing:	893,687.10 usft	Latitude:	33° 27' 16.10 N
	+E-W	0.00 usft	Easting:	728,634.50 usft	Longitude:	103° 35' 1.41 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	4,204.00 usft

Wellbore	HZ [346737]				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	HDGM	2/26/2018	6.97	61.27	48,664.70000000

Design	FINAL			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.00	0.00	0.00	193.87

Survey Program		Date	3/25/2018	
From	To			
(usft)	(usft)	Survey (Wellbore)	Tool Name	Description
103.10	1,852.00	Gyro Surveys (HZ [346737])	GyroFlex	
1,932.00	4,391.00	CES MWD (HZ [346737])	MWD+HDGM	OWSG MWD + HDGM
4,391.00	9,500.00	CES MWD (ST01) (HZ [346737])	MWD+HDGM	OWSG MWD + HDGM

Survey									
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Formations /
Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Comments
(usft)			(usft)			(usft)	(°/100usft)	(°/100u	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
103.10	0.40	124.29	103.10	-0.20	0.30	0.13	0.39	0.39	
199.00	0.30	181.29	199.00	-0.64	0.57	0.49	0.36	-0.10	
320.00	0.50	131.29	319.99	-1.31	0.96	1.04	0.32	0.17	
415.00	0.30	348.29	414.99	-1.34	1.22	1.01	0.80	-0.21	
568.00	0.40	86.29	567.99	-0.91	1.67	0.48	0.35	0.07	
691.00	0.30	346.29	690.99	-0.57	2.02	0.07	0.44	-0.08	
816.00	0.70	289.29	815.99	0.00	1.22	-0.29	0.47	0.32	
944.00	1.10	287.29	943.97	0.62	-0.69	-0.44	0.31	0.31	
1,071.00	0.90	242.29	1,070.95	0.52	-2.73	0.15	0.62	-0.16	
1,197.00	0.30	231.29	1,196.95	-0.14	-3.87	1.07	0.48	-0.48	



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Local Co-ordinate Reference:
 TVD Reference:
 MD Reference:
 North Reference:
 Survey Calculation Method:
 Database:

Well Angel Eyes 17 State #1H
 17' KB @ 4221.00usft (Double K Drilling Rig #7)
 17' KB @ 4221.00usft (Double K Drilling Rig #7)
 Grid
 Minimum Curvature
 USA EDM 5000 Multi Users DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
1,323.00	0.20	286.29	1,322.94	-0.29	-4.34	1.32	0.20	-0.08	
1,450.00	0.80	259.29	1,449.94	-0.39	-5.42	1.68	0.49	0.47	
1,577.00	0.80	280.29	1,576.93	-0.40	-7.16	2.10	0.23	0.00	
1,702.00	0.90	259.29	1,701.91	-0.42	-8.99	2.57	0.28	0.08	
1,828.00	1.40	261.29	1,827.89	-0.84	-11.48	3.57	0.40	0.40	
1,852.00	1.00	283.29	1,851.88	-0.84	-11.97	3.68	2.51	-1.67	Last Gyro Survey
1,932.00	1.00	287.50	1,931.87	-0.47	-13.32	3.65	0.09	0.00	
2,027.00	0.80	298.00	2,026.86	0.07	-14.71	3.45	0.25	-0.21	
2,122.00	0.80	297.70	2,121.85	0.67	-15.89	3.16	0.02	0.00	
2,217.00	0.60	299.60	2,216.84	1.23	-16.91	2.86	0.21	-0.21	
2,311.00	0.90	302.90	2,310.83	1.87	-17.96	2.49	0.32	0.32	
2,406.00	1.20	307.50	2,405.82	2.88	-19.37	1.85	0.33	0.32	
2,501.00	2.40	22.10	2,500.78	5.33	-19.41	-0.52	2.51	1.26	
2,596.00	2.30	28.60	2,595.70	8.85	-17.75	-4.33	0.30	-0.11	
2,690.00	1.80	12.20	2,689.65	11.78	-16.57	-7.47	0.95	-0.74	
2,785.00	1.50	9.40	2,784.61	14.31	-16.09	-10.03	0.13	-0.11	
2,880.00	1.50	13.30	2,879.58	16.74	-15.60	-12.52	0.11	0.00	
2,974.00	0.80	99.30	2,973.56	17.84	-14.67	-13.80	1.76	-0.74	
3,068.00	0.70	112.70	3,067.56	17.51	-13.49	-13.76	0.21	-0.11	
3,162.00	1.10	118.10	3,161.54	16.86	-12.17	-13.45	0.43	0.43	
3,257.00	0.80	112.70	3,256.53	16.18	-10.75	-13.13	0.33	-0.32	
3,351.00	0.80	126.10	3,350.52	15.54	-9.61	-12.78	0.20	0.00	
3,446.00	0.70	134.40	3,445.51	14.74	-8.66	-12.23	0.16	-0.11	
3,540.00	0.90	146.30	3,539.50	13.72	-7.84	-11.44	0.28	0.21	
3,635.00	1.10	157.90	3,634.49	12.26	-7.09	-10.20	0.30	0.21	
3,730.00	1.10	159.70	3,729.47	10.56	-6.43	-8.71	0.04	0.00	
3,824.00	1.00	158.50	3,823.46	8.95	-5.81	-7.29	0.11	-0.11	
3,856.00	0.70	160.20	3,855.45	8.50	-5.64	-6.90	0.94	-0.94	
3,888.00	1.70	180.20	3,887.45	7.85	-5.58	-6.28	3.34	3.12	
3,919.00	4.50	183.30	3,918.40	6.17	-5.65	-4.64	9.05	9.03	
3,951.00	8.10	187.60	3,950.20	2.68	-6.02	-1.16	11.34	11.25	
3,983.00	11.50	189.90	3,981.73	-2.70	-6.87	4.28	10.69	10.62	
4,014.00	13.90	188.00	4,011.97	-9.43	-7.92	11.05	7.86	7.74	
4,045.00	17.10	185.70	4,041.84	-17.65	-8.89	19.27	10.51	10.32	
4,077.00	21.10	185.50	4,072.07	-28.07	-9.91	29.63	12.50	12.50	
4,108.00	25.20	185.00	4,100.57	-40.21	-11.02	41.68	13.24	13.23	
4,140.00	28.40	184.80	4,129.13	-54.58	-12.25	55.92	10.00	10.00	
4,171.00	31.30	186.60	4,156.01	-69.93	-13.79	71.20	9.79	9.35	
4,203.00	34.20	186.70	4,182.92	-87.08	-16.11	88.40	9.73	9.06	
4,234.00	36.70	190.80	4,208.17	-104.79	-19.16	106.33	8.97	8.06	
4,266.00	39.20	191.80	4,233.41	-124.09	-23.02	125.99	8.05	7.81	
4,297.00	41.80	192.00	4,256.98	-143.79	-27.18	146.11	8.40	8.39	
4,329.00	44.00	192.70	4,280.42	-165.06	-31.84	167.88	7.03	6.87	
4,360.00	46.20	193.60	4,302.30	-186.44	-36.84	189.84	7.39	7.10	
4,380.00	47.36	195.10	4,315.99	-200.56	-40.45	204.41	7.85	5.78	Section Line Crossing
4,391.00	48.00	195.90	4,323.40	-208.40	-42.62	212.54	7.95	5.85	
4,422.00	48.10	190.90	4,344.13	-230.81	-47.96	235.58	12.00	0.32	
4,454.00	52.10	190.60	4,364.65	-254.93	-52.54	260.09	12.52	12.50	
4,485.00	56.10	191.50	4,382.83	-279.57	-57.36	285.16	13.12	12.90	
4,517.00	60.40	193.30	4,399.66	-306.13	-63.21	312.36	14.26	13.44	
4,548.00	64.80	195.30	4,413.93	-332.79	-70.01	339.87	15.30	14.19	
4,580.00	70.30	196.80	4,426.14	-361.19	-78.22	369.41	17.80	17.19	
4,612.00	75.80	197.70	4,435.47	-390.41	-87.32	399.95	17.35	17.19	



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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 (°/100u)	Formations / Comments
4,643.00	81.90	197.70	4,441.46	-419.37	-96.56	430.29	19.68	19.68	
4,675.00	87.60	197.60	4,444.39	-449.72	-106.22	462.07	17.82	17.81	
4,707.00	91.00	197.90	4,444.78	-480.19	-115.97	493.99	10.67	10.62	
4,738.00	90.50	198.00	4,444.37	-509.68	-125.53	524.91	1.64	-1.61	
4,760.00	89.90	197.67	4,444.30	-530.62	-132.26	546.86	3.12	-2.73	FTP - N. Hard Line Crossing
4,771.00	89.60	197.50	4,444.34	-541.11	-135.59	557.83	3.12	-2.73	
4,802.00	89.40	197.30	4,444.61	-570.69	-144.86	588.77	0.91	-0.65	
4,834.00	90.10	196.90	4,444.75	-601.27	-154.27	620.72	2.52	2.19	
4,865.00	90.20	195.90	4,444.67	-631.01	-163.02	651.69	3.24	0.32	
4,897.00	90.70	196.10	4,444.42	-661.77	-171.84	683.67	1.68	1.56	
4,928.00	91.30	196.00	4,443.88	-691.56	-180.41	714.64	1.96	1.94	
4,960.00	91.50	195.70	4,443.10	-722.33	-189.15	746.81	1.13	0.62	
4,991.00	91.70	195.70	4,442.23	-752.16	-197.53	777.58	0.65	0.65	
5,023.00	90.90	194.30	4,441.51	-783.06	-205.81	809.57	5.04	-2.50	
5,055.00	89.60	192.90	4,441.37	-814.16	-213.33	841.57	5.97	-4.08	
5,096.00	88.70	192.00	4,441.98	-854.19	-222.17	882.55	3.10	-2.20	
5,127.00	89.10	192.20	4,442.57	-884.50	-228.67	913.53	1.44	1.29	
5,159.00	89.50	192.40	4,442.96	-915.76	-235.49	945.51	1.40	1.25	
5,190.00	89.90	192.20	4,443.12	-946.05	-242.09	976.50	1.44	1.29	
5,222.00	90.20	190.60	4,443.10	-977.42	-248.41	1,008.47	5.09	0.94	
5,254.00	90.20	189.50	4,442.98	-1,008.93	-254.00	1,040.40	3.44	0.00	
5,285.00	90.60	189.70	4,442.77	-1,039.49	-259.17	1,071.31	1.44	1.29	
5,317.00	90.30	188.30	4,442.52	-1,071.10	-264.17	1,103.19	4.47	-0.94	
5,348.00	90.90	188.40	4,442.19	-1,101.77	-268.68	1,134.05	1.96	1.94	
5,379.00	91.30	188.20	4,441.60	-1,132.44	-273.15	1,164.90	1.44	1.29	
5,410.00	91.20	187.20	4,440.92	-1,163.15	-277.30	1,195.71	3.24	-0.32	
5,442.00	91.30	186.40	4,440.22	-1,194.92	-281.09	1,227.46	2.52	0.31	
5,473.00	91.80	186.20	4,439.38	-1,225.72	-284.49	1,258.18	1.74	1.61	
5,505.00	91.10	185.00	4,438.57	-1,257.55	-287.61	1,289.83	4.34	-2.19	
5,536.00	90.90	184.80	4,438.03	-1,288.44	-290.26	1,320.45	0.91	-0.65	
5,567.00	91.10	184.30	4,437.49	-1,319.33	-292.72	1,351.03	1.74	0.65	
5,599.00	89.70	183.60	4,437.27	-1,351.26	-294.92	1,382.55	4.89	-4.37	
5,630.00	89.50	183.40	4,437.48	-1,382.20	-296.82	1,413.05	0.91	-0.65	
5,662.00	89.10	184.10	4,437.88	-1,414.13	-298.91	1,444.55	2.52	-1.25	
5,694.00	89.50	183.70	4,438.27	-1,446.05	-301.08	1,476.08	1.77	1.25	
5,725.00	88.70	183.00	4,438.75	-1,476.99	-302.90	1,506.54	3.43	-2.58	
5,756.00	88.90	182.60	4,439.40	-1,507.95	-304.41	1,536.95	1.44	0.65	
5,788.00	88.70	182.40	4,440.07	-1,539.91	-305.81	1,568.32	0.88	-0.62	
5,820.00	88.60	181.50	4,440.83	-1,571.88	-306.89	1,599.62	2.83	-0.31	
5,851.00	89.10	181.10	4,441.45	-1,602.87	-307.60	1,629.87	2.07	1.61	
5,883.00	89.80	181.10	4,441.76	-1,634.86	-308.21	1,661.08	2.19	2.19	
5,915.00	89.70	180.40	4,441.90	-1,666.86	-308.63	1,692.24	2.21	-0.31	
5,947.00	90.00	180.20	4,441.98	-1,698.86	-308.80	1,723.35	1.13	0.94	
5,978.00	90.20	179.70	4,441.93	-1,729.86	-308.77	1,753.44	1.74	0.65	
6,009.00	89.30	179.30	4,442.06	-1,760.85	-308.50	1,783.47	3.18	-2.90	
6,041.00	88.90	179.00	4,442.56	-1,792.85	-308.03	1,814.41	1.56	-1.25	
6,072.00	87.80	179.00	4,443.46	-1,823.83	-307.48	1,844.36	3.55	-3.55	
6,103.00	87.30	178.40	4,444.78	-1,854.79	-306.78	1,874.25	2.52	-1.61	
6,135.00	86.90	178.10	4,446.40	-1,886.74	-305.81	1,905.03	1.56	-1.25	
6,167.00	86.60	177.00	4,448.21	-1,918.66	-304.44	1,935.69	3.56	-0.94	
6,199.00	86.80	176.70	4,450.06	-1,950.55	-302.69	1,966.24	1.13	0.62	
6,230.00	87.30	176.50	4,451.65	-1,981.46	-300.85	1,995.80	1.74	1.61	
6,262.00	87.60	176.10	4,453.08	-2,013.36	-298.79	2,026.28	1.56	0.94	



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6,293.00	88.20	176.10	4,454.21	-2,044.27	-296.68	2,055.78	1.94	1.94	
6,324.00	88.80	176.30	4,455.02	-2,075.19	-294.63	2,085.31	2.04	1.94	
6,356.00	89.30	176.00	4,455.55	-2,107.11	-292.48	2,115.78	1.82	1.56	
6,388.00	89.80	176.20	4,455.80	-2,139.04	-290.30	2,146.26	1.68	1.56	
6,419.00	90.40	176.10	4,455.75	-2,169.97	-288.22	2,175.79	1.96	1.94	
6,451.00	91.10	176.10	4,455.33	-2,201.89	-286.04	2,206.26	2.19	2.19	
6,475.00	91.80	175.30	4,454.72	-2,225.81	-284.24	2,229.05	4.43	2.92	
6,506.00	92.20	175.50	4,453.64	-2,256.69	-281.76	2,258.44	1.44	1.29	
6,538.00	92.60	175.30	4,452.30	-2,288.56	-279.20	2,288.76	1.40	1.25	
6,569.00	92.90	175.60	4,450.82	-2,319.43	-276.74	2,318.14	1.37	0.97	
6,601.00	93.10	175.40	4,449.14	-2,351.29	-274.23	2,348.47	0.88	0.62	
6,632.00	91.70	175.00	4,447.84	-2,382.15	-271.64	2,377.81	4.70	-4.52	
6,664.00	91.00	175.40	4,447.09	-2,414.03	-268.96	2,408.12	2.52	-2.19	
6,696.00	91.10	175.80	4,446.50	-2,445.93	-266.51	2,438.50	1.29	0.31	
6,728.00	91.60	175.80	4,445.75	-2,477.83	-264.11	2,468.89	1.68	1.56	
6,759.00	92.10	175.80	4,444.75	-2,508.73	-261.79	2,498.33	1.74	1.61	
6,790.00	90.90	176.80	4,443.94	-2,539.65	-259.73	2,527.86	4.65	-3.87	
6,822.00	90.60	176.70	4,443.52	-2,571.59	-257.86	2,558.42	0.99	-0.94	
6,853.00	91.00	176.70	4,443.08	-2,602.54	-256.08	2,588.04	1.29	1.29	
6,885.00	90.90	176.70	4,442.55	-2,634.48	-254.24	2,618.61	0.31	-0.31	
6,917.00	89.30	175.90	4,442.50	-2,666.41	-252.17	2,649.11	5.59	-5.00	
6,948.00	89.30	175.90	4,442.88	-2,697.33	-249.96	2,678.60	0.00	0.00	
6,979.00	89.40	175.90	4,443.23	-2,728.25	-247.74	2,708.09	0.32	0.32	
7,011.00	89.60	175.80	4,443.51	-2,760.16	-245.42	2,738.51	0.70	0.62	
7,042.00	90.10	176.00	4,443.59	-2,791.08	-243.21	2,768.00	1.74	1.61	
7,073.00	90.70	176.30	4,443.37	-2,822.01	-241.13	2,797.53	2.16	1.94	
7,105.00	91.20	176.80	4,442.84	-2,853.95	-239.20	2,828.08	2.21	1.56	
7,136.00	91.50	176.30	4,442.11	-2,884.88	-237.34	2,857.66	1.88	0.97	
7,168.00	89.90	176.30	4,441.72	-2,916.81	-235.27	2,888.17	5.00	-5.00	
7,199.00	89.70	176.10	4,441.83	-2,947.75	-233.22	2,917.70	0.91	-0.65	
7,231.00	89.80	176.70	4,441.97	-2,978.68	-231.21	2,948.23	1.90	0.31	
7,263.00	88.70	177.40	4,442.39	-3,011.64	-229.56	2,978.85	4.07	-3.44	
7,294.00	88.70	177.80	4,443.09	-3,042.60	-228.26	3,008.60	1.29	0.00	
7,326.00	89.10	178.10	4,443.70	-3,074.57	-227.12	3,039.37	1.56	1.25	
7,357.00	89.50	178.00	4,444.08	-3,105.55	-226.06	3,069.19	1.33	1.29	
7,389.00	89.90	178.10	4,444.25	-3,137.54	-224.97	3,099.98	1.29	1.25	
7,421.00	90.00	177.60	4,444.28	-3,169.51	-223.77	3,130.74	1.59	0.31	
7,452.00	90.20	177.90	4,444.22	-3,200.49	-222.56	3,160.52	1.16	0.65	
7,484.00	90.30	177.80	4,444.09	-3,232.47	-221.36	3,191.28	0.44	0.31	
7,515.00	90.20	177.40	4,443.95	-3,263.44	-220.06	3,221.04	1.33	-0.32	
7,547.00	90.60	177.80	4,443.73	-3,295.41	-218.72	3,251.75	1.77	1.25	
7,578.00	91.10	177.80	4,443.27	-3,326.38	-217.53	3,281.54	1.61	1.61	
7,609.00	91.40	177.80	4,442.59	-3,357.35	-216.34	3,311.32	0.97	0.97	
7,641.00	90.10	177.70	4,442.17	-3,389.32	-215.08	3,342.06	4.07	-4.06	
7,672.00	90.20	177.80	4,442.09	-3,420.30	-213.87	3,371.84	0.46	0.32	
7,703.00	90.30	177.50	4,441.95	-3,451.27	-212.59	3,401.61	1.02	0.32	
7,735.00	88.90	177.00	4,442.18	-3,483.24	-211.06	3,432.27	4.65	-4.37	
7,766.00	89.10	177.50	4,442.72	-3,514.20	-209.57	3,461.97	1.74	0.65	
7,798.00	89.70	177.50	4,443.05	-3,546.16	-208.18	3,492.67	1.87	1.87	
7,829.00	90.10	177.80	4,443.11	-3,577.14	-206.91	3,522.43	1.61	1.29	
7,861.00	90.60	177.40	4,442.91	-3,609.11	-205.57	3,553.15	2.00	1.56	
7,892.00	89.80	176.30	4,442.80	-3,640.06	-203.86	3,582.79	4.39	-2.58	
7,924.00	89.90	176.40	4,442.89	-3,671.99	-201.82	3,613.31	0.44	0.31	



Cathedral Energy Services

Survey Report



Company: Cobra Oil & Gas Corp.
 Project: Lea Co, NM (NAD 27)
 Site: Sec 8-T10S-R33E
 Well: Angel Eyes 17 State #1H
 Wellbore: HZ [346737]
 Design: FINAL

Local Co-ordinate Reference:
 TVD Reference:
 MD Reference:
 North Reference:
 Survey Calculation Method:
 Database:

Well Angel Eyes 17 State #1H
 17' KB @ 4221.00usft (Double K Drilling Rig #7)
 17' KB @ 4221.00usft (Double K Drilling Rig #7)
 Grid
 Minimum Curvature
 USA EDM 5000 Multi Users DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
7,955.00	90.10	176.50	4,442.89	-3,702.94	-199.91	3,642.89	0.72	0.65	
7,986.00	90.40	176.70	4,442.75	-3,733.88	-198.07	3,672.49	1.16	0.97	
8,018.00	90.60	176.80	4,442.47	-3,765.82	-186.20	3,703.05	0.70	0.62	
8,050.00	88.80	176.70	4,442.42	-3,797.77	-194.33	3,733.62	3.14	-3.12	
8,081.00	88.50	176.40	4,442.66	-3,828.71	-192.46	3,763.21	1.02	-0.32	
8,112.00	88.40	176.50	4,442.96	-3,859.65	-180.54	3,792.79	0.46	-0.32	
8,144.00	88.30	175.50	4,443.80	-3,891.57	-188.31	3,823.24	4.65	-3.44	
8,175.00	88.30	175.70	4,444.52	-3,922.46	-185.93	3,852.68	0.64	0.00	
8,206.00	88.90	175.70	4,445.28	-3,953.36	-183.61	3,882.11	1.94	1.94	
8,238.00	88.90	175.80	4,445.81	-3,985.27	-181.18	3,912.50	3.14	3.12	
8,269.00	90.30	175.00	4,445.58	-4,016.17	-178.64	3,941.89	2.33	1.29	
8,300.00	90.70	175.20	4,445.29	-4,047.05	-175.99	3,971.24	1.44	1.29	
8,331.00	91.00	175.00	4,444.83	-4,077.93	-173.35	4,000.59	1.16	0.97	
8,362.00	91.10	174.70	4,444.26	-4,108.80	-170.58	4,029.89	1.02	0.32	
8,393.00	89.40	174.70	4,444.13	-4,139.67	-167.70	4,059.17	5.48	-5.48	
8,425.00	89.10	175.10	4,444.54	-4,171.54	-164.86	4,089.43	1.56	-0.94	
8,456.00	89.50	174.80	4,444.92	-4,202.42	-162.13	4,118.75	1.61	1.29	
8,488.00	90.00	175.40	4,445.06	-4,234.30	-159.40	4,149.05	2.44	1.56	
8,515.00	90.40	175.40	4,444.97	-4,261.21	-157.23	4,174.66	1.48	1.48	
8,547.00	90.70	175.90	4,444.68	-4,293.12	-154.80	4,205.05	1.82	0.94	
8,578.00	89.40	176.00	4,444.63	-4,324.04	-152.61	4,234.55	4.21	-4.19	
8,610.00	89.30	176.50	4,445.00	-4,355.97	-150.52	4,265.04	1.59	-0.31	
8,641.00	89.50	176.50	4,445.32	-4,386.91	-148.63	4,294.63	0.65	0.65	
8,672.00	90.00	176.90	4,445.46	-4,417.86	-146.84	4,324.25	2.07	1.61	
8,704.00	90.20	176.80	4,445.40	-4,448.81	-145.09	4,354.84	0.70	0.62	
8,735.00	90.80	176.90	4,445.19	-4,480.76	-143.38	4,384.49	1.33	1.29	
8,767.00	89.10	177.10	4,445.27	-4,512.72	-141.71	4,415.11	4.73	-4.69	
8,798.00	89.10	177.30	4,445.76	-4,543.68	-140.19	4,444.80	0.65	0.00	
8,830.00	89.00	177.20	4,448.29	-4,575.64	-138.66	4,475.46	0.44	-0.31	
8,862.00	89.30	177.50	4,446.76	-4,607.60	-137.18	4,506.13	1.33	0.94	
8,893.00	89.70	177.90	4,447.03	-4,638.57	-135.93	4,535.91	1.82	1.29	
8,925.00	90.20	178.20	4,447.06	-4,670.55	-134.85	4,566.70	1.82	1.56	
8,957.00	90.50	178.30	4,446.86	-4,702.54	-133.87	4,597.51	0.99	0.94	
8,988.00	90.50	178.50	4,446.58	-4,733.52	-133.00	4,627.39	0.65	0.00	
9,019.00	88.90	178.40	4,446.76	-4,764.51	-132.16	4,657.27	5.17	-5.16	
9,051.00	88.70	178.70	4,447.43	-4,796.49	-131.35	4,688.13	1.13	-0.62	
9,083.00	88.90	178.70	4,448.10	-4,828.48	-130.63	4,719.01	0.62	0.62	
9,114.00	89.30	179.00	4,448.58	-4,859.47	-130.01	4,748.94	1.61	1.29	
9,146.00	89.50	179.00	4,448.92	-4,891.46	-129.45	4,779.87	0.62	0.62	
9,178.00	88.60	178.40	4,449.45	-4,923.45	-128.72	4,810.75	3.38	-2.81	
9,209.00	88.50	178.50	4,450.23	-4,954.43	-127.88	4,840.62	0.46	-0.32	
9,241.00	88.80	178.60	4,450.99	-4,986.41	-127.07	4,871.48	0.99	0.94	
9,272.00	89.30	178.50	4,451.50	-5,017.39	-126.29	4,901.37	1.64	1.61	
9,303.00	90.20	178.70	4,451.64	-5,048.38	-125.53	4,931.28	2.97	2.90	
9,335.00	90.50	178.90	4,451.44	-5,080.38	-124.86	4,962.18	1.13	0.94	
9,367.00	90.90	179.00	4,451.05	-5,112.37	-124.28	4,993.09	1.29	1.25	
9,399.00	91.20	179.20	4,450.46	-5,144.36	-123.77	5,024.03	1.13	0.94	
9,431.00	91.30	179.40	4,449.77	-5,176.35	-123.38	5,055.00	0.70	0.31	Last CES Survey
9,475.00	91.30	179.40	4,448.77	-5,220.34	-122.92	5,097.59	0.00	0.00	LTP - S. Hard Line Crossing
9,500.00	91.30	179.40	4,448.20	-5,245.33	-122.66	5,121.79	0.00	0.00	Actual BHL


Cathedral Energy Services
 Survey Report


Company: Cobra Oil & Gas Corp.
Project: Lea Co, NM (NAD 27)
Site: Sec 8-T10S-R33E
Well: Angel Eyes 17 State #1H
Wellbore: HZ [346737]
Design: FINAL

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well Angel Eyes 17 State #1H
 17" KB @ 4221.00usft (Double K Drilling Rig #7)
 17" KB @ 4221.00usft (Double K Drilling Rig #7)
 Grid
 Minimum Curvature
 USA EDM 5000 Multi Users DB

Targets**Target Name**

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL 1a - SAE 17 #1H - actual wellpath misses target center by 1170.43usft at 9475.00usft MD (4448.77 TVD, -5220.34 N, -122.92 E) - Point	0.00	0.00	4,447.00	-5,239.10	-1,293.20	888,448.00	727,341.30	33° 26' 24.36 N	103° 35' 17.12 W
T1a - SAE 17 #1H - actual wellpath misses target center by 24.61usft at 5085.86usft MD (4441.97 TVD, -854.08 N, -222.14 E) - Point	0.00	0.00	4,464.00	-856.10	-211.37	892,831.00	728,423.13	33° 27' 7.64 N	103° 35' 3.98 W
LP 1a - SAE 17 #1H - actual wellpath misses target center by 20.74usft at 4759.84usft MD (4444.29 TVD, -530.47 N, -132.21 E) - Point	0.00	0.00	4,465.00	-530.90	-131.10	893,156.20	728,503.40	33° 27' 10.86 N	103° 35' 3.00 W
PBHL 2 - SAE 17 #1H - actual wellpath misses target center by 35.23usft at 9474.54usft MD (4448.78 TVD, -5219.87 N, -122.93 E) - Point	0.00	0.00	4,468.00	-5,220.00	-93.40	888,467.10	728,541.10	33° 26' 24.46 N	103° 35' 2.96 W

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,852.00	1,851.88	-0.84	-11.97	Last Gyro Survey
4,380.00	4,315.99	-200.56	-40.45	Section Line Crossing
4,780.00	4,444.30	-530.62	-132.26	FTP - N. Hard Line Crossing
9,431.00	4,449.77	-5,176.35	-123.38	Last CES Survey
9,475.00	4,448.77	-5,220.34	-122.92	LTP - S. Hard Line Crossing
9,500.00	4,448.20	-5,245.33	-122.66	Actual BHL

Checked By: _____ Approved By: _____ Date: _____