



COG Operating LLC

Eddy County, NM (NAD-27 2015)

Copperhead 31 Fed Com 3H

Copperhead 31 Fed Com 3H

30-015-42379

Lateral 1

NM OIL CONSERVATION
ARTESIA DISTRICT
MAR 23 2017

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Design: Lateral 1

Survey Report - Geographic

29 November, 2016





TDS
Survey Report - Geographic



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Copperhead 31 Fed Com 3H
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 2966.60usft (Latshaw 44)
Site:	Copperhead 31 Fed Com 3H	MD Reference:	KB @ 2966.60usft (Latshaw 44)
Well:	Copperhead 31 Fed Com 3H	North Reference:	Grid
Wellbore:	Lateral 1	Survey Calculation Method:	Minimum Curvature
Design:	Lateral 1	Database:	EDM 5000.1 Single User Db

Project	Eddy County, NM (NAD-27 2015)		
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	Copperhead 31 Fed Com 3H, Sec 31, T-26S, R-29E, Unit A				
Site Position:		Northing:	371,068.50 usft	Latitude:	32° 1' 11.235 N
From:	Map	Easting:	597,975.70 usft	Longitude:	104° 1' 1.956 W
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	0.17 °

Well	Copperhead 31 Fed Com 3H					
Well Position	+N/-S	0.00 usft	Northing:	371,068.50 usft	Latitude:	32° 1' 11.235 N
	+E/-W	0.00 usft	Easting:	597,975.70 usft	Longitude:	104° 1' 1.956 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	2,966.60 usft	Ground Level:	2,941.60 usft

Wellbore	Lateral 1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	8/11/2016	7.24	59.81	47,859

Design	Lateral 1				
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	179.21	

Survey Program	Date	11/29/2016			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	9,900.00	VES Gyro #1 (Lateral 1)	VES-ISCWSA-GYRO-3	Biaxial Semi-Cont. Gyro	
10,027.00	17,495.00	TDS MWD #2 (Lateral 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
0.00	0.00	0.00	0.00	0.00	0.00	371,068.50	597,975.70	32° 1' 11.235 N	104° 1' 1.956 W
100.00	0.77	82.42	100.00	0.09	0.67	371,068.59	597,976.37	32° 1' 11.236 N	104° 1' 1.948 W
200.00	1.48	60.21	199.98	0.82	2.45	371,069.32	597,978.16	32° 1' 11.243 N	104° 1' 1.928 W
300.00	1.97	57.35	299.93	2.39	5.02	371,070.89	597,980.72	32° 1' 11.258 N	104° 1' 1.898 W
400.00	2.04	51.34	399.87	4.43	7.86	371,072.93	597,983.56	32° 1' 11.278 N	104° 1' 1.865 W
500.00	2.20	52.07	499.80	6.72	10.76	371,075.22	597,986.47	32° 1' 11.301 N	104° 1' 1.831 W
600.00	1.94	70.59	599.74	8.46	13.87	371,076.96	597,989.58	32° 1' 11.318 N	104° 1' 1.795 W
700.00	1.08	99.53	699.70	8.87	16.40	371,077.37	597,992.10	32° 1' 11.322 N	104° 1' 1.765 W
800.00	1.45	123.70	799.68	8.01	18.38	371,076.51	597,994.08	32° 1' 11.314 N	104° 1' 1.742 W
900.00	0.81	155.38	899.66	6.66	19.73	371,075.16	597,995.43	32° 1' 11.300 N	104° 1' 1.727 W
1,000.00	0.96	170.14	999.65	5.20	20.17	371,073.70	597,995.87	32° 1' 11.286 N	104° 1' 1.722 W



TDS
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Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Site: Copperhead 31 Fed Com 3H
Well: Copperhead 31 Fed Com 3H
Wellbore: Lateral 1
Design: Lateral 1

Local Co-ordinate Reference: Well Copperhead 31 Fed Com 3H
TVD Reference: KB @ 2966.60usft (Latshaw 44)
MD Reference: KB @ 2966.60usft (Latshaw 44)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single 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
1,100.00	1.49	175.07	1,099.63	3.08	20.42	371,071.57	597,996.12	32° 1' 11.265 N	104° 1' 1.719 W
1,200.00	1.16	180.63	1,199.60	0.77	20.52	371,069.27	597,996.22	32° 1' 11.242 N	104° 1' 1.718 W
1,300.00	1.14	180.47	1,299.58	-1.24	20.50	371,067.26	597,996.20	32° 1' 11.222 N	104° 1' 1.718 W
1,400.00	0.91	245.43	1,399.57	-2.56	19.77	371,065.94	597,995.47	32° 1' 11.209 N	104° 1' 1.727 W
1,500.00	0.49	262.01	1,499.56	-2.95	18.63	371,065.55	597,994.33	32° 1' 11.205 N	104° 1' 1.740 W
1,600.00	0.67	355.18	1,599.55	-2.43	18.15	371,066.07	597,993.86	32° 1' 11.210 N	104° 1' 1.745 W
1,700.00	0.56	328.32	1,699.55	-1.43	17.85	371,067.07	597,993.55	32° 1' 11.220 N	104° 1' 1.749 W
1,800.00	0.48	333.11	1,799.55	-0.64	17.40	371,067.86	597,993.10	32° 1' 11.228 N	104° 1' 1.754 W
1,900.00	0.78	308.62	1,899.54	0.16	16.68	371,068.66	597,992.38	32° 1' 11.236 N	104° 1' 1.762 W
2,000.00	0.72	280.59	1,999.53	0.70	15.53	371,069.20	597,991.23	32° 1' 11.241 N	104° 1' 1.776 W
2,100.00	0.31	102.02	2,099.53	0.76	15.18	371,069.25	597,990.88	32° 1' 11.242 N	104° 1' 1.780 W
2,200.00	1.01	86.15	2,199.52	0.76	16.32	371,069.26	597,992.02	32° 1' 11.242 N	104° 1' 1.767 W
2,300.00	0.85	186.38	2,299.51	0.08	17.12	371,068.58	597,992.82	32° 1' 11.235 N	104° 1' 1.757 W
2,400.00	0.98	141.63	2,399.50	-1.33	17.57	371,067.17	597,993.27	32° 1' 11.221 N	104° 1' 1.752 W
2,500.00	2.10	108.33	2,499.47	-2.57	19.84	371,065.93	597,995.54	32° 1' 11.209 N	104° 1' 1.726 W
2,600.00	1.88	109.15	2,599.41	-3.69	23.13	371,064.81	597,998.83	32° 1' 11.198 N	104° 1' 1.688 W
2,700.00	1.06	111.76	2,699.37	-4.57	25.53	371,063.93	598,001.24	32° 1' 11.189 N	104° 1' 1.660 W
2,800.00	0.80	124.58	2,799.36	-5.31	26.97	371,063.19	598,002.67	32° 1' 11.181 N	104° 1' 1.643 W
2,900.00	0.79	124.29	2,899.35	-6.09	28.11	371,062.41	598,003.82	32° 1' 11.174 N	104° 1' 1.630 W
3,000.00	1.41	58.03	2,999.33	-5.83	29.73	371,062.67	598,005.43	32° 1' 11.176 N	104° 1' 1.611 W
3,100.00	1.39	47.26	3,099.30	-4.35	31.66	371,064.14	598,007.36	32° 1' 11.191 N	104° 1' 1.589 W
3,200.00	1.31	36.06	3,199.28	-2.61	33.22	371,065.89	598,008.93	32° 1' 11.208 N	104° 1' 1.570 W
3,300.00	1.22	29.43	3,299.25	-0.76	34.42	371,067.74	598,010.12	32° 1' 11.226 N	104° 1' 1.556 W
3,400.00	1.15	16.59	3,399.23	1.13	35.23	371,069.63	598,010.93	32° 1' 11.245 N	104° 1' 1.547 W
3,500.00	1.20	13.82	3,499.21	3.11	35.77	371,071.61	598,011.47	32° 1' 11.265 N	104° 1' 1.541 W
3,600.00	1.08	355.43	3,599.19	5.07	35.94	371,073.57	598,011.64	32° 1' 11.284 N	104° 1' 1.539 W
3,700.00	1.11	348.08	3,699.17	6.95	35.67	371,075.45	598,011.37	32° 1' 11.303 N	104° 1' 1.542 W
3,800.00	1.23	347.46	3,799.15	8.95	35.23	371,077.45	598,010.94	32° 1' 11.322 N	104° 1' 1.547 W
3,900.00	1.21	346.33	3,899.13	11.02	34.75	371,079.52	598,010.45	32° 1' 11.343 N	104° 1' 1.552 W
4,000.00	1.08	340.74	3,999.11	12.94	34.19	371,081.44	598,009.89	32° 1' 11.362 N	104° 1' 1.559 W
4,100.00	0.98	354.89	4,099.09	14.68	33.80	371,083.18	598,009.51	32° 1' 11.379 N	104° 1' 1.563 W
4,200.00	0.93	345.89	4,199.08	16.32	33.53	371,084.82	598,009.23	32° 1' 11.395 N	104° 1' 1.566 W
4,300.00	0.77	339.54	4,299.07	17.74	33.10	371,086.23	598,008.80	32° 1' 11.409 N	104° 1' 1.571 W
4,400.00	0.89	329.23	4,399.06	19.03	32.46	371,087.53	598,008.17	32° 1' 11.422 N	104° 1' 1.578 W
4,500.00	0.79	315.24	4,499.05	20.19	31.58	371,088.69	598,007.28	32° 1' 11.434 N	104° 1' 1.589 W
4,600.00	0.59	309.04	4,599.04	21.00	30.70	371,089.50	598,006.40	32° 1' 11.442 N	104° 1' 1.599 W
4,700.00	0.66	296.50	4,699.03	21.59	29.78	371,090.08	598,005.48	32° 1' 11.448 N	104° 1' 1.610 W
4,800.00	0.61	280.45	4,799.03	21.94	28.74	371,090.44	598,004.45	32° 1' 11.451 N	104° 1' 1.622 W
4,900.00	0.72	296.33	4,899.02	22.31	27.66	371,090.81	598,003.36	32° 1' 11.455 N	104° 1' 1.634 W
5,000.00	0.28	246.23	4,999.02	22.49	26.87	371,090.99	598,002.57	32° 1' 11.457 N	104° 1' 1.643 W
5,100.00	0.29	231.07	5,099.02	22.24	26.45	371,090.73	598,002.15	32° 1' 11.454 N	104° 1' 1.648 W
5,200.00	0.69	234.95	5,199.01	21.73	25.76	371,090.23	598,001.46	32° 1' 11.449 N	104° 1' 1.656 W
5,300.00	0.75	237.89	5,299.00	21.04	24.71	371,089.54	598,000.41	32° 1' 11.442 N	104° 1' 1.668 W
5,400.00	0.91	211.46	5,398.99	20.01	23.74	371,088.51	597,999.45	32° 1' 11.432 N	104° 1' 1.680 W
5,500.00	0.98	214.10	5,498.98	18.63	22.85	371,087.13	597,998.55	32° 1' 11.418 N	104° 1' 1.690 W
5,600.00	1.05	212.83	5,598.96	17.15	21.87	371,085.65	597,997.58	32° 1' 11.404 N	104° 1' 1.702 W
5,700.00	0.92	198.91	5,698.95	15.62	21.12	371,084.12	597,996.82	32° 1' 11.389 N	104° 1' 1.710 W
5,800.00	1.02	216.13	5,798.94	14.14	20.33	371,082.64	597,996.03	32° 1' 11.374 N	104° 1' 1.720 W
5,900.00	1.03	214.79	5,898.92	12.68	19.29	371,081.18	597,995.00	32° 1' 11.360 N	104° 1' 1.732 W
6,000.00	1.10	208.67	5,998.90	11.10	18.32	371,079.60	597,994.02	32° 1' 11.344 N	104° 1' 1.743 W
6,100.00	1.07	209.19	6,098.88	9.45	17.40	371,077.95	597,993.11	32° 1' 11.328 N	104° 1' 1.754 W
6,200.00	0.89	202.15	6,198.87	7.91	16.66	371,076.41	597,992.36	32° 1' 11.313 N	104° 1' 1.763 W
6,300.00	0.60	195.94	6,298.86	6.69	16.22	371,075.19	597,991.92	32° 1' 11.301 N	104° 1' 1.768 W
6,400.00	0.64	219.50	6,398.86	5.76	15.72	371,074.25	597,991.42	32° 1' 11.291 N	104° 1' 1.773 W
6,500.00	0.80	208.28	6,498.85	4.71	15.03	371,073.21	597,990.74	32° 1' 11.281 N	104° 1' 1.781 W



TDS
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Site: Copperhead 31 Fed Com 3H
Well: Copperhead 31 Fed Com 3H
Wellbore: Lateral 1
Design: Lateral 1

Local Co-ordinate Reference: Well Copperhead 31 Fed Com 3H
TVD Reference: KB @ 2966.60usft (Latshaw 44)
MD Reference: KB @ 2966.60usft (Latshaw 44)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single 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
6,600.00	0.90	128.83	6,598.84	3.60	15.31	371,072.10	597,991.02	32° 1' 11.270 N	104° 1' 1.778 W
6,700.00	1.22	106.72	6,698.82	2.80	16.95	371,071.30	597,992.65	32° 1' 11.262 N	104° 1' 1.759 W
6,800.00	1.94	97.89	6,798.78	2.26	19.64	371,070.76	597,995.35	32° 1' 11.257 N	104° 1' 1.728 W
6,900.00	1.79	99.61	6,898.73	1.77	22.86	371,070.27	597,998.56	32° 1' 11.252 N	104° 1' 1.691 W
7,000.00	1.51	98.96	6,998.69	1.31	25.70	371,069.80	598,001.40	32° 1' 11.247 N	104° 1' 1.658 W
7,100.00	0.93	100.56	7,098.67	0.95	27.80	371,069.45	598,003.50	32° 1' 11.243 N	104° 1' 1.633 W
7,200.00	0.04	90.47	7,198.66	0.80	28.63	371,069.30	598,004.34	32° 1' 11.242 N	104° 1' 1.624 W
7,300.00	0.16	51.44	7,298.66	0.89	28.78	371,069.39	598,004.48	32° 1' 11.243 N	104° 1' 1.622 W
7,400.00	1.29	331.85	7,398.65	1.97	28.35	371,070.47	598,004.06	32° 1' 11.253 N	104° 1' 1.627 W
7,500.00	1.27	331.72	7,498.63	3.94	27.30	371,072.44	598,003.00	32° 1' 11.273 N	104° 1' 1.639 W
7,600.00	1.45	319.77	7,598.60	5.88	25.96	371,074.38	598,001.66	32° 1' 11.292 N	104° 1' 1.655 W
7,700.00	1.71	294.28	7,698.56	7.46	23.78	371,075.96	597,999.48	32° 1' 11.308 N	104° 1' 1.680 W
7,800.00	1.64	291.18	7,798.52	8.59	21.08	371,077.09	597,996.79	32° 1' 11.319 N	104° 1' 1.711 W
7,900.00	1.41	253.18	7,898.49	8.75	18.57	371,077.25	597,994.26	32° 1' 11.321 N	104° 1' 1.740 W
8,000.00	1.63	257.06	7,998.45	8.08	16.01	371,076.57	597,991.71	32° 1' 11.314 N	104° 1' 1.770 W
8,100.00	1.74	256.20	8,098.41	7.40	13.15	371,075.89	597,988.85	32° 1' 11.308 N	104° 1' 1.803 W
8,200.00	0.33	43.65	8,198.40	7.24	11.87	371,075.74	597,987.58	32° 1' 11.306 N	104° 1' 1.818 W
8,300.00	0.47	90.16	8,298.39	7.45	12.48	371,075.95	597,988.18	32° 1' 11.308 N	104° 1' 1.811 W
8,400.00	0.37	74.99	8,398.39	7.53	13.20	371,076.03	597,988.91	32° 1' 11.309 N	104° 1' 1.803 W
8,500.00	0.16	71.68	8,498.39	7.66	13.65	371,076.16	597,989.35	32° 1' 11.310 N	104° 1' 1.797 W
8,600.00	0.76	33.25	8,598.39	8.26	14.14	371,076.76	597,989.85	32° 1' 11.316 N	104° 1' 1.792 W
8,700.00	1.47	14.48	8,698.37	10.05	14.83	371,078.55	597,990.53	32° 1' 11.334 N	104° 1' 1.784 W
8,800.00	0.82	10.68	8,798.35	12.00	15.28	371,080.50	597,990.98	32° 1' 11.353 N	104° 1' 1.778 W
8,900.00	0.19	357.14	8,898.34	12.87	15.41	371,081.37	597,991.11	32° 1' 11.362 N	104° 1' 1.777 W
9,000.00	0.49	229.12	8,998.34	12.75	15.07	371,081.25	597,990.78	32° 1' 11.361 N	104° 1' 1.781 W
9,100.00	0.78	216.93	9,098.34	11.93	14.34	371,080.43	597,990.05	32° 1' 11.352 N	104° 1' 1.789 W
9,200.00	0.86	217.37	9,198.32	10.79	13.48	371,079.29	597,989.18	32° 1' 11.341 N	104° 1' 1.799 W
9,300.00	0.90	218.74	9,298.31	9.58	12.53	371,078.08	597,988.23	32° 1' 11.329 N	104° 1' 1.810 W
9,400.00	1.03	211.64	9,398.30	8.20	11.57	371,076.70	597,987.27	32° 1' 11.316 N	104° 1' 1.822 W
9,500.00	1.00	202.77	9,498.28	6.63	10.76	371,075.13	597,986.46	32° 1' 11.300 N	104° 1' 1.831 W
9,600.00	1.21	192.10	9,598.26	4.80	10.20	371,073.29	597,985.90	32° 1' 11.282 N	104° 1' 1.838 W
9,700.00	1.37	197.43	9,698.24	2.62	9.62	371,071.12	597,985.32	32° 1' 11.260 N	104° 1' 1.844 W
9,800.00	1.31	192.22	9,798.21	0.36	9.02	371,068.86	597,984.72	32° 1' 11.238 N	104° 1' 1.851 W
9,900.00	1.16	200.10	9,898.19	-1.70	8.43	371,066.80	597,984.13	32° 1' 11.218 N	104° 1' 1.858 W
Tie-In to VES Gyro									
10,027.00	1.00	212.60	10,025.17	-3.84	7.39	371,064.65	597,983.09	32° 1' 11.197 N	104° 1' 1.871 W
First TDS MWD Survey									
10,091.00	0.80	219.30	10,089.16	-4.66	6.81	371,063.84	597,982.51	32° 1' 11.188 N	104° 1' 1.877 W
10,185.00	0.70	247.90	10,183.15	-5.38	5.86	371,063.11	597,981.56	32° 1' 11.181 N	104° 1' 1.888 W
10,217.00	0.70	265.40	10,215.15	-5.47	5.48	371,063.03	597,981.19	32° 1' 11.180 N	104° 1' 1.893 W
10,249.00	2.50	195.40	10,247.14	-6.16	5.10	371,062.34	597,980.81	32° 1' 11.174 N	104° 1' 1.897 W
10,280.00	5.70	186.60	10,278.05	-8.34	4.75	371,060.15	597,980.45	32° 1' 11.152 N	104° 1' 1.901 W
10,312.00	9.60	183.70	10,309.76	-12.59	4.39	371,055.91	597,980.10	32° 1' 11.110 N	104° 1' 1.906 W
10,343.00	13.40	183.60	10,340.13	-18.75	4.00	371,049.75	597,979.70	32° 1' 11.049 N	104° 1' 1.910 W
10,375.00	17.20	184.20	10,370.99	-27.18	3.42	371,041.32	597,979.12	32° 1' 10.966 N	104° 1' 1.917 W
10,407.00	21.20	184.40	10,401.21	-37.67	2.63	371,030.83	597,978.33	32° 1' 10.862 N	104° 1' 1.927 W
10,438.00	24.70	183.60	10,429.75	-49.72	1.79	371,018.77	597,977.50	32° 1' 10.743 N	104° 1' 1.937 W
10,470.00	28.30	183.60	10,458.38	-63.97	0.90	371,004.53	597,976.60	32° 1' 10.602 N	104° 1' 1.948 W
10,501.00	31.10	184.30	10,485.31	-79.29	-0.17	370,989.21	597,975.54	32° 1' 10.450 N	104° 1' 1.961 W
10,533.00	34.90	183.40	10,512.14	-96.68	-1.33	370,971.82	597,974.37	32° 1' 10.278 N	104° 1' 1.975 W
10,565.00	37.60	182.10	10,537.95	-115.58	-2.23	370,952.92	597,973.47	32° 1' 10.091 N	104° 1' 1.986 W
10,596.00	41.20	179.50	10,561.90	-135.24	-2.49	370,933.25	597,973.22	32° 1' 9.896 N	104° 1' 1.990 W
10,628.00	44.40	177.10	10,585.38	-156.97	-1.83	370,911.53	597,973.87	32° 1' 9.681 N	104° 1' 1.983 W
10,659.00	48.40	175.60	10,606.75	-179.37	-0.39	370,889.13	597,975.31	32° 1' 9.460 N	104° 1' 1.967 W
10,691.00	53.20	175.50	10,626.97	-204.08	1.53	370,864.41	597,977.24	32° 1' 9.215 N	104° 1' 1.945 W



TDS
Survey Report - Geographic



Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Site: Copperhead 31 Fed Com 3H
Well: Copperhead 31 Fed Com 3H
Wellbore: Lateral 1
Design: Lateral 1

Local Co-ordinate Reference: Well Copperhead 31 Fed Com 3H
TVD Reference: KB @ 2966.60usft (Latshaw 44)
MD Reference: KB @ 2966.60usft (Latshaw 44)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single 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
10,722.00	56.70	175.80	10,644.77	-229.39	3.46	370,839.11	597,979.16	32° 1' 8.965 N	104° 1' 1.924 W
10,754.00	59.80	177.60	10,661.61	-256.55	5.02	370,811.95	597,980.72	32° 1' 8.696 N	104° 1' 1.907 W
10,786.00	62.30	179.20	10,677.10	-284.53	5.79	370,783.96	597,981.50	32° 1' 8.419 N	104° 1' 1.899 W
10,817.00	65.40	178.50	10,690.76	-312.35	6.35	370,756.15	597,982.06	32° 1' 8.143 N	104° 1' 1.893 W
10,849.00	68.80	177.10	10,703.21	-341.80	7.49	370,726.70	597,983.19	32° 1' 7.852 N	104° 1' 1.881 W
10,884.00	73.10	176.50	10,714.63	-374.83	9.34	370,693.67	597,985.04	32° 1' 7.525 N	104° 1' 1.861 W
10,916.00	76.10	176.20	10,723.13	-405.61	11.30	370,662.89	597,987.01	32° 1' 7.220 N	104° 1' 1.839 W
10,948.00	80.20	176.70	10,729.70	-436.86	13.24	370,631.64	597,988.94	32° 1' 6.911 N	104° 1' 1.817 W
10,980.00	83.90	177.80	10,734.12	-468.51	14.76	370,599.99	597,990.46	32° 1' 6.598 N	104° 1' 1.801 W
11,011.00	86.70	179.20	10,736.66	-499.39	15.57	370,569.11	597,991.27	32° 1' 6.292 N	104° 1' 1.792 W
11,043.00	87.80	179.30	10,738.20	-531.35	15.99	370,537.15	597,991.69	32° 1' 5.976 N	104° 1' 1.789 W
11,074.00	88.10	179.30	10,739.31	-562.33	16.36	370,506.17	597,992.07	32° 1' 5.669 N	104° 1' 1.785 W
11,106.00	89.20	179.40	10,740.06	-594.32	16.73	370,474.18	597,992.43	32° 1' 5.353 N	104° 1' 1.782 W
11,137.00	89.30	179.50	10,740.47	-625.32	17.02	370,443.18	597,992.73	32° 1' 5.046 N	104° 1' 1.780 W
11,232.00	89.60	178.90	10,741.38	-720.30	18.35	370,348.20	597,994.05	32° 1' 4.106 N	104° 1' 1.768 W
11,327.00	92.20	180.40	10,739.88	-815.28	18.93	370,253.22	597,994.63	32° 1' 3.166 N	104° 1' 1.764 W
11,421.00	90.50	180.30	10,737.67	-909.25	18.36	370,159.25	597,994.06	32° 1' 2.236 N	104° 1' 1.774 W
11,516.00	91.10	179.10	10,736.34	-1,004.23	18.85	370,064.27	597,994.56	32° 1' 1.296 N	104° 1' 1.771 W
11,611.00	88.70	177.00	10,736.51	-1,099.17	22.09	369,969.33	597,997.79	32° 1' 0.356 N	104° 1' 1.737 W
11,706.00	88.10	176.30	10,739.16	-1,193.96	27.64	369,874.53	598,003.34	32° 0' 59.418 N	104° 1' 1.676 W
11,800.00	89.50	177.10	10,741.13	-1,287.79	33.05	369,780.71	598,008.75	32° 0' 58.489 N	104° 1' 1.616 W
11,895.00	92.20	179.40	10,739.72	-1,382.72	35.95	369,685.78	598,011.65	32° 0' 57.550 N	104° 1' 1.586 W
11,990.00	93.10	182.10	10,735.33	-1,477.60	34.70	369,590.90	598,010.41	32° 0' 56.611 N	104° 1' 1.603 W
12,084.00	92.80	183.60	10,730.49	-1,571.35	30.04	369,497.15	598,005.74	32° 0' 55.683 N	104° 1' 1.661 W
12,214.00	91.50	185.70	10,725.61	-1,700.82	19.51	369,367.68	597,995.21	32° 0' 54.402 N	104° 1' 1.787 W
12,309.00	90.30	183.60	10,724.12	-1,795.49	11.81	369,273.01	597,987.51	32° 0' 53.465 N	104° 1' 1.880 W
12,403.00	89.20	182.00	10,724.53	-1,889.37	7.21	369,179.12	597,982.92	32° 0' 52.536 N	104° 1' 1.937 W
12,498.00	89.40	179.50	10,725.69	-1,984.35	5.97	369,084.15	597,981.67	32° 0' 51.596 N	104° 1' 1.954 W
12,593.00	89.50	178.80	10,726.60	-2,079.34	7.38	368,989.16	597,983.08	32° 0' 50.656 N	104° 1' 1.941 W
12,688.00	88.00	179.20	10,728.68	-2,174.30	9.04	368,894.20	597,984.74	32° 0' 49.716 N	104° 1' 1.925 W
12,783.00	87.60	178.50	10,732.32	-2,269.21	10.94	368,799.29	597,986.65	32° 0' 48.777 N	104° 1' 1.906 W
12,878.00	87.70	178.60	10,736.22	-2,364.10	13.34	368,704.40	597,989.05	32° 0' 47.838 N	104° 1' 1.882 W
12,960.00	88.50	179.00	10,738.94	-2,446.03	15.06	368,622.47	597,990.76	32° 0' 47.027 N	104° 1' 1.864 W
13,055.00	88.30	178.70	10,741.59	-2,540.98	16.97	368,527.52	597,992.67	32° 0' 46.087 N	104° 1' 1.845 W
13,149.00	87.40	179.20	10,745.12	-2,634.89	18.69	368,433.61	597,994.39	32° 0' 45.158 N	104° 1' 1.829 W
13,244.00	87.80	179.20	10,749.09	-2,729.80	20.01	368,338.70	597,995.72	32° 0' 44.219 N	104° 1' 1.817 W
13,339.00	87.40	178.10	10,753.07	-2,824.69	22.25	368,243.81	597,997.95	32° 0' 43.279 N	104° 1' 1.794 W
13,434.00	89.70	179.60	10,755.48	-2,919.63	24.15	368,148.87	597,999.86	32° 0' 42.340 N	104° 1' 1.775 W
13,528.00	89.10	180.10	10,756.46	-3,013.62	24.40	368,054.87	598,000.10	32° 0' 41.410 N	104° 1' 1.775 W
13,623.00	89.40	178.60	10,757.70	-3,108.61	25.48	367,959.89	598,001.18	32° 0' 40.470 N	104° 1' 1.766 W
13,718.00	92.80	181.10	10,755.88	-3,203.57	25.73	367,864.93	598,001.43	32° 0' 39.530 N	104° 1' 1.766 W
13,813.00	91.10	176.10	10,752.65	-3,298.45	28.05	367,770.05	598,003.75	32° 0' 38.591 N	104° 1' 1.743 W
13,908.00	91.30	177.50	10,750.66	-3,393.28	33.35	367,675.22	598,009.05	32° 0' 37.652 N	104° 1' 1.684 W
14,003.00	88.30	178.50	10,750.99	-3,488.21	36.67	367,580.29	598,012.37	32° 0' 36.712 N	104° 1' 1.649 W
14,097.00	89.80	177.90	10,752.55	-3,582.15	39.62	367,486.35	598,015.32	32° 0' 35.783 N	104° 1' 1.618 W
14,192.00	90.40	173.50	10,752.38	-3,676.85	46.74	367,391.64	598,022.44	32° 0' 34.845 N	104° 1' 1.538 W
14,287.00	90.20	173.40	10,751.88	-3,771.23	57.58	367,297.27	598,033.28	32° 0' 33.911 N	104° 1' 1.416 W
14,395.00	89.40	176.20	10,752.26	-3,878.78	67.36	367,189.72	598,043.07	32° 0' 32.846 N	104° 1' 1.306 W
14,490.00	89.00	178.20	10,753.59	-3,973.65	72.00	367,094.85	598,047.71	32° 0' 31.907 N	104° 1' 1.255 W
14,584.00	88.40	176.90	10,755.72	-4,067.54	76.02	367,000.96	598,051.72	32° 0' 30.978 N	104° 1' 1.212 W
14,679.00	89.50	178.50	10,757.46	-4,162.44	79.83	366,906.06	598,055.54	32° 0' 30.039 N	104° 1' 1.170 W
14,775.00	91.40	179.20	10,756.71	-4,258.41	81.76	366,810.09	598,057.46	32° 0' 29.089 N	104° 1' 1.151 W
14,870.00	93.30	179.20	10,752.81	-4,353.32	83.08	366,715.18	598,058.79	32° 0' 28.149 N	104° 1' 1.139 W
14,964.00	92.80	181.60	10,747.81	-4,447.18	82.43	366,621.32	598,058.13	32° 0' 27.221 N	104° 1' 1.150 W
15,059.00	90.50	178.80	10,745.07	-4,542.12	82.10	366,526.38	598,057.80	32° 0' 26.281 N	104° 1' 1.157 W



TDS
Survey Report - Geographic



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Site: Copperhead 31 Fed Com 3H
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Design: Lateral 1

Local Co-ordinate Reference: Well Copperhead 31 Fed Com 3H
TVD Reference: KB @ 2966.60usft (Latshaw 44)
MD Reference: KB @ 2966.60usft (Latshaw 44)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single 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
15,153.00	91.10	182.20	10,743.76	-4,636.09	81.28	366,432.41	598,056.98	32° 0' 25.351 N	104° 1' 1.170 W
15,248.00	90.20	181.00	10,742.68	-4,731.05	78.63	366,337.45	598,054.33	32° 0' 24.411 N	104° 1' 1.204 W
15,343.00	89.90	181.10	10,742.60	-4,826.03	76.89	366,242.47	598,052.59	32° 0' 23.471 N	104° 1' 1.227 W
15,437.00	89.80	178.20	10,742.85	-4,920.02	77.46	366,148.48	598,053.16	32° 0' 22.541 N	104° 1' 1.224 W
15,532.00	92.00	180.30	10,741.35	-5,014.99	78.70	366,053.51	598,054.41	32° 0' 21.601 N	104° 1' 1.213 W
15,627.00	93.30	182.10	10,736.96	-5,109.86	76.72	365,958.64	598,052.42	32° 0' 20.663 N	104° 1' 1.239 W
15,721.00	88.70	180.80	10,735.32	-5,203.79	74.34	365,864.71	598,050.04	32° 0' 19.733 N	104° 1' 1.270 W
15,816.00	89.30	179.80	10,736.98	-5,298.77	73.84	365,769.73	598,049.55	32° 0' 18.793 N	104° 1' 1.279 W
15,911.00	89.50	180.30	10,737.97	-5,393.76	73.76	365,674.73	598,049.46	32° 0' 17.853 N	104° 1' 1.283 W
16,006.00	90.20	182.10	10,738.22	-5,488.74	71.77	365,579.76	598,047.47	32° 0' 16.913 N	104° 1' 1.309 W
16,100.00	90.00	182.10	10,738.06	-5,582.68	68.33	365,485.82	598,044.03	32° 0' 15.983 N	104° 1' 1.352 W
16,195.00	89.10	180.60	10,738.80	-5,677.64	66.09	365,390.86	598,041.79	32° 0' 15.044 N	104° 1' 1.382 W
16,290.00	90.50	179.60	10,739.14	-5,772.64	65.92	365,295.86	598,041.63	32° 0' 14.104 N	104° 1' 1.387 W
16,384.00	90.60	178.50	10,738.23	-5,866.62	67.48	365,201.88	598,043.18	32° 0' 13.173 N	104° 1' 1.372 W
16,479.00	90.50	176.40	10,737.32	-5,961.52	71.71	365,106.98	598,047.41	32° 0' 12.234 N	104° 1' 1.326 W
16,574.00	89.50	174.70	10,737.32	-6,056.23	79.08	365,012.27	598,054.78	32° 0' 11.297 N	104° 1' 1.244 W
16,668.00	90.30	177.80	10,737.49	-6,150.01	85.22	364,918.49	598,060.93	32° 0' 10.368 N	104° 1' 1.175 W
16,763.00	91.00	176.40	10,736.41	-6,244.88	90.03	364,823.62	598,065.73	32° 0' 9.429 N	104° 1' 1.123 W
16,858.00	92.10	177.70	10,733.84	-6,339.72	94.92	364,728.78	598,070.62	32° 0' 8.491 N	104° 1' 1.069 W
16,953.00	87.20	175.30	10,734.42	-6,434.50	100.71	364,634.00	598,076.42	32° 0' 7.552 N	104° 1' 1.005 W
17,047.00	89.40	177.20	10,737.21	-6,528.25	106.86	364,540.25	598,082.56	32° 0' 6.624 N	104° 1' 0.937 W
17,142.00	91.80	179.90	10,736.21	-6,623.20	109.26	364,445.30	598,084.96	32° 0' 5.685 N	104° 1' 0.912 W
17,237.00	88.70	179.30	10,735.80	-6,718.18	109.92	364,350.32	598,085.63	32° 0' 4.745 N	104° 1' 0.908 W
17,332.00	91.30	181.50	10,735.80	-6,813.17	109.26	364,255.33	598,084.97	32° 0' 3.805 N	104° 1' 0.919 W
17,427.00	88.90	182.20	10,735.63	-6,908.11	106.20	364,160.39	598,081.90	32° 0' 2.865 N	104° 1' 0.958 W
17,451.00	89.70	183.90	10,735.93	-6,932.07	104.92	364,136.43	598,080.62	32° 0' 2.628 N	104° 1' 0.973 W
Last TDS MWD Survey									
17,495.00	89.70	183.90	10,736.16	-6,975.97	101.93	364,092.53	598,077.63	32° 0' 2.194 N	104° 1' 1.009 W
Projection to Bit/TD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,900.00	9,898.19	-1.70	8.43	Tie-In to VES Gyro
10,027.00	10,025.17	-3.84	7.39	First TDS MWD Survey
17,451.00	10,735.93	-6,932.07	104.92	Last TDS MWD Survey
17,495.00	10,736.16	-6,975.97	101.93	Projection to Bit/TD

Checked By: _____ Approved By: _____ Date: _____