

30-025-43891

COG

SURVEY REPORT

TENDERLOIN FEDERAL COM #4H

MCVAY #8

10/12/2017

This survey is correct to the best of my knowledge and is supported by actual field data.

Kolton Cotton

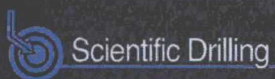
Notarized this date 9 of February, 2018.

Sherry Stewart

Notary Signature

County of Midland

State of Texas



The **Ultimate Partner** In Wellbore Placement

SURVEY REPORT

TENDERLOIN FEDERAL COM #4H

DEFINITIVE KEEPER GYRO SURVEY

CUSTOMER
PROJECT
FIELD

COG
Tenderloin Federal Com #4H
Tenderloin Federal Com #4H

SDI JOB NO.
SDI DISTRICT
SDI KIT/UNIT

OP.004975
Midland

SITE INFORMATION

Site Name
Lat/Long
Northing
Easting

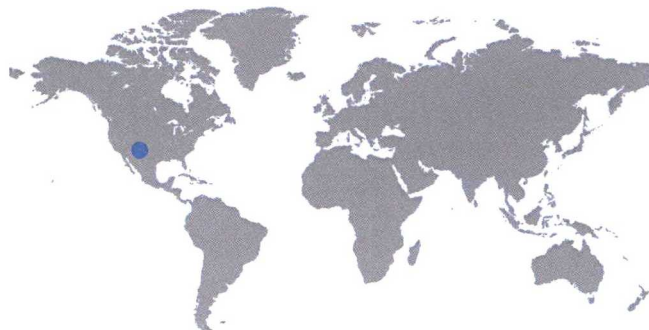
Tenderloin Federal Com #4H
32.399383° N, 103.532013° W
509,936.9 ft
747,325.9 ft

Section
Township
Range

MAP INFORMATION

North Reference
Grid Correction
System
Datum
Map Zone

Grid North
-0.43 deg
US State Plane 1927
North American Datum 1927 (Clarke 1866)
New Mexico East: 3001



WELL INFORMATION

Lat/Long
Northing
Easting
UWI

32.4006608° N, 103.532014° W
510,401.8 ft
747,322.2 ft
30-025-43891

DEPTH AND ELEVATION REFERENCE

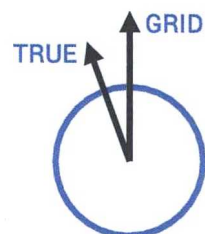
Ground Level
Reference Datum
Reference Height
Reference Elevation

3524.3 ft above Mean Sea
Level
KB
26 ft above G.L.
3550.3 ft

VERTICAL SECTION REFERENCE

+N/-S
+E/-W
Proposal Direction
Calculation Method

0 ft
0 ft
359.55°
Minimum Curvature



LOCAL GRAVITY REFERENCE INFORMATION

Local Gravity
True to Grid

998.504 mG [computed]
subtract 0.43°

WELL NOTES

Keeper Gyro Survey ran in 4 1/2" Drill Pipe to 10,197'

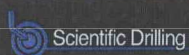
OPERATORS

C. Booher

SDI Operator Name (Printed)

SIGNATURE

DATE



MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg
0.00	0.00	0.00	0.00	0.00	0.00	0.00	Invalid	0.00	0.00
100.00	0.22	214.48	100.00	-0.16	-0.16	-0.11	0.22	0.19	214.48
125.00	0.38	223.52	125.00	-0.26	-0.26	-0.19	0.67	0.32	216.80
150.00	0.62	221.84	150.00	-0.42	-0.42	-0.34	0.98	0.54	219.10
175.00	0.73	221.33	175.00	-0.64	-0.64	-0.54	0.42	0.84	219.97
200.00	0.93	225.61	199.99	-0.90	-0.90	-0.79	0.83	1.20	221.11
225.00	0.96	219.40	224.99	-1.20	-1.20	-1.06	0.42	1.61	221.45
250.00	0.86	218.83	249.99	-1.50	-1.51	-1.31	0.39	2.00	220.99
275.00	0.91	218.41	274.98	-1.80	-1.81	-1.55	0.20	2.39	220.61
300.00	0.95	221.88	299.98	-2.11	-2.12	-1.82	0.27	2.79	220.55
325.00	0.96	222.20	324.98	-2.41	-2.43	-2.09	0.05	3.21	220.74
350.00	0.99	220.50	349.97	-2.73	-2.75	-2.37	0.16	3.63	220.81
375.00	1.05	220.68	374.97	-3.07	-3.09	-2.66	0.26	4.08	220.79
400.00	1.03	216.78	399.97	-3.42	-3.44	-2.95	0.30	4.53	220.58
425.00	0.99	215.43	424.96	-3.77	-3.80	-3.21	0.18	4.97	220.19
450.00	1.13	212.64	449.96	-4.15	-4.18	-3.47	0.61	5.43	219.66
475.00	1.13	207.87	474.95	-4.58	-4.61	-3.71	0.38	5.92	218.88
500.00	1.13	207.89	499.95	-5.01	-5.04	-3.94	0.01	6.40	218.04
525.00	1.12	210.20	524.94	-5.44	-5.47	-4.18	0.19	6.89	217.40
550.00	1.16	209.06	549.94	-5.87	-5.90	-4.43	0.18	7.38	216.88
575.00	1.44	209.82	574.93	-6.36	-6.40	-4.71	1.15	7.94	216.35
600.00	1.70	205.96	599.92	-6.96	-7.00	-5.03	1.12	8.62	215.67
625.00	1.74	205.22	624.91	-7.64	-7.68	-5.35	0.16	9.36	214.86
650.00	1.79	203.52	649.90	-8.34	-8.38	-5.67	0.31	10.12	214.07
675.00	1.80	203.19	674.89	-9.05	-9.10	-5.98	0.04	10.89	213.30
700.00	1.99	203.39	699.87	-9.81	-9.86	-6.30	0.79	11.70	212.60
725.00	2.11	201.61	724.86	-10.63	-10.68	-6.65	0.52	12.58	211.88
750.00	2.20	203.40	749.84	-11.50	-11.55	-7.01	0.44	13.51	211.23
775.00	2.24	203.41	774.82	-12.38	-12.44	-7.39	0.17	14.47	210.71
800.00	2.30	201.82	799.80	-13.29	-13.35	-7.77	0.36	15.45	210.20
825.00	2.30	203.55	824.78	-14.21	-14.28	-8.16	0.28	16.45	209.74
850.00	2.54	204.95	849.76	-15.17	-15.24	-8.59	0.97	17.50	209.41

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg
875.00	2.69	204.00	874.73	-16.21	-16.28	-9.06	0.62	18.63	209.11
900.00	2.69	202.76	899.71	-17.28	-17.36	-9.53	0.23	19.80	208.77
925.00	2.92	203.09	924.68	-18.40	-18.48	-10.01	0.93	21.02	208.43
950.00	2.99	202.51	949.64	-19.59	-19.67	-10.50	0.33	22.30	208.10
975.00	3.17	203.90	974.61	-20.82	-20.90	-11.03	0.75	23.64	207.83
1000.00	3.23	204.69	999.57	-22.08	-22.18	-11.61	0.31	25.03	207.63
1025.00	3.26	205.37	1024.53	-23.36	-23.46	-12.21	0.20	26.44	207.49
1050.00	3.30	206.99	1049.49	-24.64	-24.74	-12.84	0.41	27.87	207.42
1075.00	2.95	208.23	1074.45	-25.84	-25.95	-13.47	1.44	29.24	207.43
1100.00	2.16	218.63	1099.42	-26.77	-26.88	-14.07	3.63	30.34	207.62
1125.00	0.85	252.31	1124.42	-27.20	-27.31	-14.54	6.12	30.94	208.03
1150.00	0.89	340.94	1149.41	-27.07	-27.18	-14.78	4.88	30.94	208.54
1175.00	2.06	9.14	1174.40	-26.44	-26.55	-14.77	5.35	30.39	209.09
1200.00	2.38	9.18	1199.39	-25.48	-25.60	-14.62	1.27	29.48	209.73
1225.00	2.43	10.15	1224.36	-24.45	-24.57	-14.44	0.26	28.50	210.45
1250.00	2.11	7.37	1249.34	-23.48	-23.59	-14.29	1.35	27.58	211.21
1275.00	1.81	1.24	1274.33	-22.63	-22.74	-14.22	1.45	26.82	212.03
1300.00	1.66	356.15	1299.32	-21.87	-21.98	-14.24	0.85	26.19	212.93
1325.00	1.38	346.21	1324.31	-21.22	-21.33	-14.34	1.55	25.70	213.90
1350.00	1.18	336.84	1349.30	-20.69	-20.80	-14.51	1.14	25.36	214.89
1375.00	1.07	320.37	1374.30	-20.27	-20.39	-14.76	1.37	25.17	215.90
1400.00	0.96	310.39	1399.30	-19.95	-20.07	-15.07	0.83	25.10	216.89
1425.00	0.95	296.03	1424.29	-19.73	-19.85	-15.41	0.95	25.13	217.83
1450.00	1.17	289.29	1449.29	-19.55	-19.67	-15.84	1.01	25.25	218.84
1475.00	0.96	290.92	1474.28	-19.38	-19.51	-16.27	0.86	25.41	219.83
1500.00	0.84	284.31	1499.28	-19.26	-19.39	-16.65	0.63	25.56	220.64
1525.00	0.77	275.29	1524.28	-19.20	-19.33	-16.99	0.58	25.74	221.31
1550.00	0.80	276.73	1549.28	-19.16	-19.30	-17.33	0.14	25.94	221.93
1575.00	0.75	271.30	1574.27	-19.13	-19.27	-17.67	0.35	26.14	222.51
1600.00	0.79	266.89	1599.27	-19.14	-19.28	-18.00	0.30	26.38	223.04
1625.00	0.80	261.90	1624.27	-19.17	-19.31	-18.35	0.28	26.64	223.54
1650.00	1.09	247.18	1649.26	-19.28	-19.43	-18.74	1.48	26.99	223.97

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg
1675.00	1.35	238.87	1674.26	-19.52	-19.67	-19.21	1.28	27.50	224.32
1700.00	1.51	234.29	1699.25	-19.86	-20.02	-19.73	0.77	28.11	224.59
1725.00	1.70	226.70	1724.24	-20.30	-20.46	-20.27	1.13	28.80	224.73
1750.00	1.85	225.76	1749.23	-20.83	-21.00	-20.83	0.61	29.58	224.77
1775.00	1.98	227.09	1774.22	-21.41	-21.57	-21.43	0.58	30.41	224.81
1800.00	2.11	225.64	1799.20	-22.02	-22.19	-22.08	0.53	31.30	224.86
1825.00	2.26	224.39	1824.18	-22.68	-22.86	-22.75	0.63	32.26	224.86
1850.00	2.32	223.91	1849.16	-23.40	-23.58	-23.45	0.27	33.25	224.84
1875.00	2.36	222.29	1874.14	-24.14	-24.33	-24.15	0.30	34.27	224.79
1900.00	2.35	222.70	1899.12	-24.89	-25.08	-24.84	0.07	35.30	224.72
1925.00	2.41	222.74	1924.10	-25.64	-25.85	-25.54	0.25	36.34	224.66
1950.00	2.58	222.18	1949.07	-26.44	-26.65	-26.28	0.68	37.43	224.60
1975.00	2.63	221.33	1974.05	-27.28	-27.50	-27.04	0.27	38.56	224.52
2000.00	2.66	220.12	1999.02	-28.15	-28.37	-27.79	0.24	39.71	224.40
2025.00	2.71	220.16	2023.99	-29.04	-29.27	-28.54	0.21	40.88	224.28
2050.00	2.74	219.98	2048.97	-29.95	-30.18	-29.31	0.11	42.07	224.16
2075.00	2.75	219.62	2073.94	-30.86	-31.10	-30.07	0.08	43.26	224.04
2100.00	2.70	220.37	2098.91	-31.76	-32.01	-30.84	0.26	44.45	223.94
2125.00	2.38	219.18	2123.88	-32.61	-32.86	-31.55	1.30	45.55	223.83
2150.00	2.26	218.04	2148.86	-33.39	-33.65	-32.18	0.51	46.56	223.72
2175.00	2.24	217.97	2173.84	-34.16	-34.42	-32.78	0.08	47.53	223.60
2200.00	2.32	219.72	2198.83	-34.93	-35.19	-33.40	0.42	48.52	223.51
2225.00	2.34	218.17	2223.80	-35.71	-35.98	-34.04	0.27	49.53	223.41
2250.00	2.22	217.79	2248.78	-36.49	-36.76	-34.65	0.48	50.52	223.31
2275.00	2.28	216.61	2273.77	-37.27	-37.55	-35.25	0.29	51.50	223.19
2300.00	2.27	217.19	2298.75	-38.06	-38.34	-35.84	0.09	52.48	223.07
2325.00	2.34	217.34	2323.73	-38.85	-39.14	-36.45	0.27	53.49	222.96
2350.00	2.29	218.74	2348.71	-39.64	-39.93	-37.07	0.31	54.49	222.87
2375.00	2.39	217.89	2373.68	-40.44	-40.73	-37.70	0.42	55.51	222.79
2400.00	2.39	217.02	2398.66	-41.26	-41.56	-38.34	0.14	56.54	222.69
2425.00	2.44	217.92	2423.64	-42.09	-42.40	-38.98	0.26	57.59	222.59
2450.00	2.47	218.22	2448.62	-42.93	-43.24	-39.64	0.15	58.66	222.51

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
2475.00	2.50	215.69	2473.59	-43.79	-44.10	-40.29	0.45	59.74	222.41
2500.00	2.65	216.73	2498.57	-44.69	-45.01	-40.95	0.63	60.85	222.30
2525.00	2.75	217.71	2523.54	-45.62	-45.95	-41.66	0.47	62.02	222.20
2550.00	2.80	217.39	2548.51	-46.57	-46.91	-42.40	0.21	63.23	222.11
2575.00	2.86	218.41	2573.48	-47.54	-47.88	-43.16	0.30	64.47	222.03
2600.00	2.85	218.04	2598.45	-48.51	-48.86	-43.93	0.08	65.71	221.96
2625.00	2.79	216.82	2623.42	-49.49	-49.84	-44.68	0.34	66.93	221.88
2650.00	2.80	217.71	2648.39	-50.45	-50.81	-45.42	0.18	68.15	221.79
2675.00	2.90	217.43	2673.36	-51.43	-51.79	-46.18	0.41	69.39	221.72
2700.00	2.84	218.07	2698.33	-52.42	-52.79	-46.94	0.26	70.64	221.65
2725.00	2.82	220.84	2723.30	-53.36	-53.74	-47.73	0.56	71.87	221.61
2750.00	2.50	217.80	2748.27	-54.25	-54.64	-48.47	1.40	73.03	221.58
2775.00	2.33	216.00	2773.25	-55.09	-55.48	-49.10	0.76	74.08	221.51
2800.00	2.17	215.35	2798.23	-55.88	-56.27	-49.67	0.66	75.06	221.43
2825.00	1.89	215.58	2823.21	-56.60	-56.99	-50.18	1.09	75.94	221.36
2850.00	1.75	211.61	2848.20	-57.26	-57.66	-50.62	0.75	76.73	221.29
2875.00	1.76	210.62	2873.19	-57.91	-58.31	-51.02	0.12	77.48	221.19
2900.00	1.70	208.40	2898.18	-58.56	-58.97	-51.39	0.36	78.22	221.07
2925.00	1.85	207.24	2923.17	-59.24	-59.65	-51.75	0.60	78.97	220.94
2950.00	1.75	205.49	2948.15	-59.94	-60.35	-52.10	0.45	79.73	220.80
2975.00	1.61	203.54	2973.14	-60.60	-61.02	-52.40	0.60	80.43	220.66
3000.00	1.56	204.30	2998.13	-61.23	-61.65	-52.69	0.19	81.10	220.52
3025.00	1.45	198.95	3023.12	-61.84	-62.26	-52.93	0.72	81.72	220.37
3050.00	1.44	197.26	3048.12	-62.44	-62.86	-53.12	0.18	82.30	220.20
3075.00	1.37	193.15	3073.11	-63.03	-63.45	-53.29	0.47	82.86	220.02
3100.00	1.33	191.02	3098.10	-63.61	-64.03	-53.41	0.27	83.38	219.83
3125.00	1.25	183.49	3123.10	-64.16	-64.58	-53.48	0.74	83.85	219.63
3150.00	1.13	175.09	3148.09	-64.68	-65.10	-53.48	0.85	84.25	219.40
3175.00	1.11	172.06	3173.09	-65.17	-65.59	-53.42	0.25	84.59	219.16
3200.00	1.04	162.36	3198.08	-65.62	-66.04	-53.32	0.77	84.88	218.92
3225.00	1.05	151.80	3223.08	-66.04	-66.46	-53.14	0.77	85.10	218.64
3250.00	1.12	140.95	3248.07	-66.44	-66.86	-52.88	0.87	85.24	218.34

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg
3275.00	1.26	133.87	3273.07	-66.82	-67.24	-52.53	0.81	85.32	218.00
3300.00	1.27	128.59	3298.06	-67.19	-67.60	-52.11	0.47	85.36	217.63
3325.00	1.55	118.07	3323.05	-67.53	-67.93	-51.60	1.54	85.31	217.22
3350.00	2.09	112.77	3348.04	-67.87	-68.27	-50.88	2.24	85.14	216.70
3375.00	2.34	111.91	3373.02	-68.24	-68.64	-49.98	1.01	84.91	216.06
3400.00	1.96	119.46	3398.00	-68.65	-69.04	-49.14	1.89	84.74	215.44
3425.00	2.53	106.67	3422.99	-69.02	-69.40	-48.24	3.04	84.52	214.80
3450.00	2.69	104.09	3447.96	-69.33	-69.71	-47.14	0.79	84.15	214.07
3475.00	2.85	104.86	3472.93	-69.65	-70.01	-45.97	0.65	83.75	213.29
3500.00	2.68	103.46	3497.90	-69.95	-70.30	-44.80	0.75	83.36	212.51
3525.00	2.65	103.15	3522.87	-70.23	-70.57	-43.67	0.13	82.99	211.75
3550.00	2.57	101.43	3547.85	-70.48	-70.81	-42.56	0.44	82.62	211.00
3575.00	2.36	103.54	3572.82	-70.72	-71.05	-41.51	0.93	82.28	210.30
3600.00	1.99	112.42	3597.81	-71.01	-71.33	-40.61	1.99	82.08	209.65
3625.00	2.00	109.09	3622.79	-71.32	-71.64	-39.79	0.47	81.95	209.05
3650.00	1.93	110.80	3647.78	-71.62	-71.93	-38.99	0.39	81.82	208.46
3675.00	1.82	112.24	3672.76	-71.93	-72.23	-38.23	0.47	81.72	207.89
3700.00	1.81	113.37	3697.75	-72.24	-72.54	-37.50	0.16	81.66	207.34
3725.00	1.83	113.75	3722.74	-72.56	-72.85	-36.77	0.12	81.61	206.78
3750.00	1.99	115.55	3747.72	-72.92	-73.20	-36.01	0.67	81.58	206.20
3775.00	1.95	116.26	3772.71	-73.30	-73.58	-35.24	0.18	81.58	205.59
3800.00	2.23	118.92	3797.69	-73.73	-74.00	-34.43	1.18	81.62	204.95
3825.00	2.31	116.76	3822.67	-74.20	-74.46	-33.56	0.46	81.68	204.26
3850.00	2.36	116.76	3847.65	-74.66	-74.92	-32.65	0.23	81.73	203.54
3875.00	2.35	115.86	3872.63	-75.13	-75.38	-31.73	0.16	81.78	202.83
3900.00	2.44	117.52	3897.61	-75.60	-75.85	-30.79	0.46	81.86	202.10
3925.00	2.32	115.62	3922.59	-76.08	-76.31	-29.86	0.56	81.95	201.37
3950.00	2.39	117.20	3947.57	-76.54	-76.77	-28.94	0.37	82.04	200.66
3975.00	2.45	121.09	3972.54	-77.06	-77.28	-28.02	0.69	82.21	199.93
4000.00	2.47	120.40	3997.52	-77.62	-77.83	-27.10	0.15	82.42	199.20
4025.00	2.29	116.79	4022.50	-78.12	-78.33	-26.19	0.95	82.59	198.49
4050.00	2.19	119.16	4047.48	-78.59	-78.79	-25.33	0.53	82.76	197.82

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
4075.00	2.22	130.13	4072.46	-79.14	-79.33	-24.54	1.69	83.04	197.19
4100.00	1.51	118.91	4097.45	-79.61	-79.80	-23.88	3.19	83.30	196.66
4125.00	1.27	118.15	4122.44	-79.91	-80.09	-23.35	0.95	83.43	196.25
4150.00	1.16	115.85	4147.44	-80.15	-80.33	-22.88	0.47	83.53	195.90
4175.00	0.98	110.82	4172.43	-80.34	-80.52	-22.45	0.82	83.59	195.58
4200.00	0.90	115.57	4197.43	-80.51	-80.68	-22.07	0.45	83.65	195.30
4225.00	0.94	112.86	4222.43	-80.67	-80.85	-21.70	0.24	83.71	195.03
4250.00	1.00	102.44	4247.42	-80.80	-80.97	-21.30	0.75	83.73	194.74
4275.00	0.95	97.17	4272.42	-80.88	-81.05	-20.88	0.42	83.69	194.45
4300.00	1.09	68.17	4297.41	-80.82	-80.98	-20.46	2.12	83.53	194.18
4325.00	1.44	78.01	4322.41	-80.67	-80.83	-19.93	1.63	83.25	193.85
4350.00	1.48	88.77	4347.40	-80.60	-80.76	-19.30	1.11	83.03	193.44
4375.00	1.23	85.23	4372.39	-80.58	-80.73	-18.71	1.04	82.87	193.05
4400.00	1.23	81.94	4397.39	-80.52	-80.67	-18.17	0.28	82.69	192.70
4425.00	1.34	81.94	4422.38	-80.45	-80.59	-17.62	0.44	82.49	192.33
4450.00	1.14	94.26	4447.38	-80.43	-80.57	-17.08	1.31	82.36	191.97
4475.00	1.30	84.05	4472.37	-80.42	-80.56	-16.55	1.07	82.24	191.61
4500.00	1.22	80.17	4497.36	-80.35	-80.48	-16.01	0.47	82.06	191.25
4525.00	1.14	74.41	4522.36	-80.25	-80.37	-15.51	0.56	81.85	190.92
4550.00	1.75	77.43	4547.35	-80.10	-80.22	-14.89	2.43	81.59	190.52
4575.00	1.82	85.54	4572.34	-79.99	-80.11	-14.12	1.05	81.34	190.00
4600.00	1.04	82.38	4597.33	-79.94	-80.04	-13.50	3.16	81.18	189.58
4625.00	0.95	85.90	4622.33	-79.89	-80.00	-13.07	0.41	81.06	189.28
4650.00	0.97	83.16	4647.32	-79.86	-79.96	-12.65	0.20	80.95	188.99
4675.00	1.11	115.22	4672.32	-79.94	-80.04	-12.22	2.36	80.97	188.68
4700.00	0.90	94.51	4697.32	-80.06	-80.16	-11.81	1.67	81.02	188.38
4725.00	0.87	76.83	4722.31	-80.04	-80.13	-11.43	1.09	80.94	188.12
4750.00	0.67	80.53	4747.31	-79.97	-80.06	-11.10	0.81	80.83	187.90
4775.00	0.68	85.73	4772.31	-79.94	-80.03	-10.81	0.25	80.75	187.69
4800.00	0.63	81.25	4797.31	-79.91	-79.99	-10.53	0.28	80.68	187.50
4825.00	0.62	82.68	4822.31	-79.87	-79.96	-10.26	0.08	80.61	187.31
4850.00	0.71	87.07	4847.30	-79.85	-79.93	-9.97	0.44	80.55	187.11

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
4875.00	0.54	89.42	4872.30	-79.84	-79.92	-9.70	0.73	80.51	186.92
4900.00	0.43	84.24	4897.30	-79.83	-79.91	-9.49	0.45	80.47	186.77
4925.00	0.71	66.75	4922.30	-79.77	-79.84	-9.25	1.29	80.38	186.61
4950.00	0.64	84.47	4947.30	-79.69	-79.77	-8.97	0.87	80.27	186.42
4975.00	0.56	82.77	4972.30	-79.67	-79.74	-8.71	0.31	80.21	186.24
5000.00	0.22	79.85	4997.30	-79.64	-79.71	-8.54	1.35	80.17	186.12
5025.00	0.38	79.90	5022.30	-79.62	-79.69	-8.41	0.64	80.13	186.03
5050.00	0.45	86.01	5047.30	-79.60	-79.67	-8.23	0.31	80.09	185.90
5075.00	0.33	56.05	5072.29	-79.56	-79.62	-8.08	0.92	80.03	185.79
5100.00	0.35	59.67	5097.29	-79.48	-79.54	-7.95	0.13	79.94	185.71
5125.00	0.48	59.61	5122.29	-79.39	-79.45	-7.79	0.51	79.83	185.60
5150.00	0.92	74.06	5147.29	-79.28	-79.34	-7.51	1.87	79.70	185.41
5175.00	0.36	55.17	5172.29	-79.18	-79.24	-7.25	2.36	79.57	185.23
5200.00	0.40	50.16	5197.29	-79.08	-79.14	-7.12	0.20	79.46	185.14
5225.00	0.30	45.62	5222.29	-78.98	-79.04	-7.01	0.43	79.35	185.07
5250.00	0.15	123.89	5247.29	-78.96	-79.01	-6.93	1.21	79.32	185.02
5275.00	0.21	75.02	5272.29	-78.96	-79.02	-6.86	0.63	79.32	184.97
5300.00	0.15	114.12	5297.29	-78.97	-79.02	-6.79	0.52	79.31	184.91
5325.00	0.30	145.41	5322.29	-79.03	-79.09	-6.72	0.76	79.38	184.86
5350.00	1.05	172.24	5347.29	-79.32	-79.37	-6.65	3.16	79.65	184.79
5375.00	2.12	176.96	5372.28	-80.01	-80.06	-6.60	4.31	80.33	184.71
5400.00	2.82	176.01	5397.25	-81.08	-81.14	-6.53	2.80	81.40	184.60
5425.00	3.41	178.39	5422.22	-82.44	-82.49	-6.47	2.42	82.75	184.48
5450.00	3.80	179.09	5447.17	-84.01	-84.07	-6.43	1.58	84.31	184.38
5475.00	4.55	181.93	5472.10	-85.83	-85.89	-6.45	3.11	86.13	184.30
5500.00	4.08	181.20	5497.03	-87.72	-87.77	-6.50	1.90	88.01	184.24
5525.00	3.83	179.85	5521.97	-89.44	-89.49	-6.52	1.09	89.73	184.17
5550.00	3.88	178.91	5546.91	-91.12	-91.17	-6.50	0.33	91.40	184.08
5575.00	3.89	180.02	5571.86	-92.81	-92.87	-6.49	0.31	93.09	184.00
5600.00	4.18	182.64	5596.79	-94.57	-94.63	-6.53	1.36	94.85	183.95
5625.00	4.42	182.75	5621.72	-96.44	-96.50	-6.62	0.94	96.73	183.92
5650.00	3.97	181.26	5646.66	-98.27	-98.33	-6.68	1.84	98.55	183.89

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg
5675.00	3.88	179.92	5671.60	-99.98	-100.04	-6.70	0.53	100.26	183.83
5700.00	4.00	181.27	5696.54	-101.70	-101.75	-6.72	0.61	101.98	183.78
5725.00	4.13	181.66	5721.48	-103.47	-103.52	-6.76	0.55	103.75	183.74
5750.00	4.37	181.86	5746.41	-105.32	-105.38	-6.82	0.95	105.60	183.70
5775.00	4.06	180.37	5771.34	-107.16	-107.21	-6.86	1.31	107.43	183.66
5800.00	3.96	180.98	5796.28	-108.90	-108.96	-6.88	0.42	109.18	183.61
5825.00	4.03	179.55	5821.22	-110.65	-110.70	-6.89	0.48	110.92	183.56
5850.00	4.21	181.93	5846.15	-112.44	-112.50	-6.91	0.98	112.71	183.51
5875.00	4.28	183.75	5871.08	-114.29	-114.35	-7.00	0.62	114.56	183.50
5900.00	4.00	182.96	5896.02	-116.09	-116.15	-7.11	1.16	116.37	183.50
5925.00	3.94	182.62	5920.96	-117.82	-117.88	-7.19	0.24	118.10	183.49
5950.00	3.89	185.89	5945.90	-119.52	-119.58	-7.32	0.92	119.80	183.50
5975.00	4.08	186.98	5970.84	-121.24	-121.30	-7.51	0.83	121.53	183.54
6000.00	3.92	185.83	5995.78	-122.97	-123.03	-7.71	0.72	123.27	183.58
6025.00	4.00	185.49	6020.72	-124.68	-124.75	-7.88	0.33	125.00	183.61
6050.00	3.99	188.48	6045.66	-126.41	-126.48	-8.09	0.83	126.74	183.66
6075.00	3.94	186.97	6070.60	-128.12	-128.19	-8.32	0.46	128.46	183.71
6100.00	3.93	184.81	6095.54	-129.83	-129.90	-8.50	0.59	130.17	183.74
6125.00	4.01	185.13	6120.48	-131.55	-131.62	-8.65	0.35	131.90	183.76
6150.00	4.03	185.29	6145.42	-133.29	-133.37	-8.81	0.08	133.66	183.78
6175.00	4.42	185.03	6170.35	-135.13	-135.20	-8.97	1.56	135.50	183.80
6200.00	4.95	186.28	6195.27	-137.15	-137.23	-9.18	2.16	137.54	183.83
6225.00	4.56	186.16	6220.18	-139.21	-139.29	-9.40	1.54	139.61	183.86
6250.00	4.21	184.47	6245.11	-141.11	-141.19	-9.58	1.51	141.52	183.88
6275.00	4.10	185.68	6270.04	-142.92	-143.00	-9.74	0.54	143.33	183.90
6300.00	4.83	187.86	6294.97	-144.85	-144.93	-9.97	2.98	145.27	183.94
6325.00	4.88	185.16	6319.88	-146.95	-147.03	-10.21	0.94	147.39	183.97
6350.00	4.83	185.68	6344.79	-149.05	-149.14	-10.41	0.28	149.50	183.99
6375.00	4.35	184.55	6369.71	-151.05	-151.13	-10.59	1.94	151.50	184.01
6400.00	4.23	184.90	6394.64	-152.91	-153.00	-10.74	0.49	153.38	184.02
6425.00	4.68	184.35	6419.56	-154.84	-154.93	-10.90	1.78	155.32	184.02
6450.00	4.66	185.63	6444.48	-156.87	-156.96	-11.08	0.42	157.35	184.04

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg
6475.00	4.49	186.23	6469.40	-158.85	-158.94	-11.28	0.70	159.34	184.06
6500.00	4.41	186.19	6494.32	-160.77	-160.87	-11.49	0.33	161.28	184.09
6525.00	4.53	190.37	6519.25	-162.70	-162.80	-11.77	1.40	163.22	184.14
6550.00	4.58	191.17	6544.17	-164.64	-164.75	-12.14	0.31	165.19	184.22
6575.00	4.55	189.19	6569.09	-166.60	-166.70	-12.50	0.64	167.17	184.29
6600.00	4.34	186.30	6594.01	-168.52	-168.62	-12.76	1.22	169.11	184.33
6625.00	4.28	187.02	6618.94	-170.38	-170.49	-12.98	0.33	170.98	184.35
6650.00	4.87	188.10	6643.86	-172.36	-172.47	-13.24	2.38	172.97	184.39
6675.00	4.94	187.87	6668.77	-174.47	-174.58	-13.54	0.27	175.11	184.43
6700.00	4.41	186.94	6693.69	-176.49	-176.60	-13.80	2.12	177.14	184.47
6725.00	4.35	186.66	6718.62	-178.38	-178.50	-14.03	0.26	179.05	184.49
6750.00	4.41	188.09	6743.54	-180.28	-180.39	-14.27	0.51	180.96	184.52
6775.00	4.75	189.53	6768.46	-182.25	-182.37	-14.58	1.41	182.95	184.57
6800.00	5.06	192.69	6793.37	-184.34	-184.46	-14.99	1.66	185.07	184.65
6825.00	4.47	189.40	6818.28	-186.37	-186.50	-15.39	2.63	187.13	184.72
6850.00	4.36	190.07	6843.21	-188.27	-188.39	-15.72	0.46	189.05	184.77
6875.00	4.31	190.39	6868.14	-190.12	-190.26	-16.05	0.22	190.93	184.82
6900.00	4.43	192.88	6893.07	-191.99	-192.12	-16.44	0.90	192.82	184.89
6925.00	4.50	191.76	6917.99	-193.88	-194.02	-16.85	0.43	194.75	184.96
6950.00	4.32	190.91	6942.92	-195.77	-195.91	-17.23	0.74	196.66	185.03
6975.00	4.23	190.46	6967.85	-197.60	-197.74	-17.58	0.38	198.52	185.08
7000.00	4.47	191.33	6992.77	-199.46	-199.60	-17.94	0.99	200.41	185.14
7025.00	5.71	194.90	7017.68	-201.61	-201.76	-18.45	5.09	202.60	185.22
7050.00	4.54	191.17	7042.58	-203.78	-203.93	-18.96	4.84	204.81	185.31
7075.00	4.30	191.97	7067.50	-205.66	-205.82	-19.35	0.98	206.73	185.37
7100.00	4.26	191.30	7092.43	-207.49	-207.65	-19.72	0.28	208.58	185.43
7125.00	4.63	194.70	7117.36	-209.37	-209.53	-20.16	1.84	210.50	185.50
7150.00	4.22	193.38	7142.28	-211.24	-211.41	-20.63	1.69	212.41	185.57
7175.00	4.15	196.41	7167.21	-213.00	-213.17	-21.10	0.92	214.21	185.65
7200.00	4.00	199.06	7192.15	-214.69	-214.86	-21.64	0.98	215.95	185.75
7225.00	4.22	200.38	7217.09	-216.37	-216.55	-22.24	0.97	217.69	185.86
7250.00	4.01	200.16	7242.02	-218.04	-218.23	-22.86	0.84	219.43	185.98

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
7275.00	4.15	200.19	7266.96	-219.71	-219.90	-23.48	0.55	221.15	186.09
7300.00	3.63	193.82	7291.90	-221.32	-221.52	-23.98	2.69	222.81	186.18
7325.00	3.32	187.92	7316.86	-222.81	-223.00	-24.27	1.90	224.32	186.21
7350.00	3.35	183.59	7341.81	-224.25	-224.45	-24.41	1.02	225.77	186.21
7375.00	3.80	185.87	7366.76	-225.80	-226.00	-24.54	1.87	227.33	186.20
7400.00	3.50	185.09	7391.71	-227.38	-227.58	-24.70	1.20	228.92	186.19
7425.00	3.33	185.40	7416.67	-228.87	-229.07	-24.83	0.69	230.41	186.19
7450.00	3.35	184.96	7441.63	-230.31	-230.52	-24.96	0.12	231.87	186.18
7475.00	3.37	180.87	7466.58	-231.78	-231.98	-25.04	0.96	233.33	186.16
7500.00	3.74	169.48	7491.54	-233.31	-233.52	-24.90	3.19	234.84	186.09
7525.00	3.77	165.98	7516.48	-234.92	-235.12	-24.55	0.92	236.39	185.96
7550.00	3.79	164.56	7541.43	-236.51	-236.71	-24.13	0.38	237.94	185.82
7575.00	3.82	164.25	7566.37	-238.12	-238.31	-23.69	0.15	239.48	185.68
7600.00	3.86	165.89	7591.32	-239.74	-239.93	-23.25	0.46	241.05	185.54
7625.00	4.01	168.28	7616.26	-241.41	-241.60	-22.87	0.90	242.68	185.41
7650.00	3.68	167.64	7641.20	-243.06	-243.24	-22.52	1.36	244.28	185.29
7675.00	3.67	168.71	7666.15	-244.63	-244.81	-22.19	0.28	245.81	185.18
7700.00	3.77	168.95	7691.10	-246.22	-246.40	-21.88	0.40	247.37	185.07
7725.00	3.71	169.94	7716.04	-247.83	-248.00	-21.58	0.36	248.94	184.97
7750.00	4.22	176.07	7740.98	-249.54	-249.72	-21.38	2.66	250.63	184.89
7775.00	3.67	169.18	7765.93	-251.25	-251.42	-21.16	2.90	252.31	184.81
7800.00	3.88	173.39	7790.87	-252.88	-253.05	-20.92	1.38	253.91	184.73
7825.00	3.59	170.87	7815.82	-254.49	-254.66	-20.70	1.34	255.50	184.65
7850.00	3.88	174.18	7840.76	-256.11	-256.28	-20.48	1.46	257.09	184.57
7875.00	3.48	171.77	7865.71	-257.70	-257.87	-20.29	1.74	258.67	184.50
7900.00	3.54	172.12	7890.67	-259.22	-259.38	-20.08	0.27	260.16	184.43
7925.00	3.53	172.09	7915.62	-260.74	-260.91	-19.86	0.06	261.66	184.35
7950.00	3.45	175.10	7940.57	-262.26	-262.42	-19.69	0.79	263.16	184.29
7975.00	3.43	175.26	7965.53	-263.75	-263.91	-19.57	0.11	264.64	184.24
8000.00	3.42	176.08	7990.48	-265.24	-265.40	-19.46	0.20	266.11	184.19
8025.00	3.36	178.33	8015.44	-266.72	-266.88	-19.38	0.57	267.58	184.15
8050.00	3.28	178.63	8040.40	-268.17	-268.33	-19.35	0.35	269.02	184.12

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
8075.00	3.25	181.53	8065.36	-269.59	-269.75	-19.35	0.67	270.44	184.10
8100.00	3.26	183.01	8090.32	-271.01	-271.17	-19.40	0.34	271.86	184.09
8125.00	3.29	184.93	8115.28	-272.43	-272.59	-19.50	0.46	273.29	184.09
8150.00	3.13	187.38	8140.24	-273.82	-273.98	-19.65	0.83	274.69	184.10
8175.00	3.16	188.70	8165.20	-275.18	-275.34	-19.84	0.31	276.06	184.12
8200.00	2.98	192.76	8190.16	-276.49	-276.66	-20.09	1.15	277.39	184.15
8225.00	3.06	192.00	8215.13	-277.78	-277.95	-20.37	0.39	278.69	184.19
8250.00	3.13	193.27	8240.09	-279.09	-279.26	-20.67	0.38	280.03	184.23
8275.00	3.07	195.65	8265.05	-280.40	-280.57	-21.01	0.57	281.36	184.28
8300.00	3.13	193.83	8290.02	-281.70	-281.88	-21.35	0.45	282.69	184.33
8325.00	3.12	196.20	8314.98	-283.01	-283.19	-21.70	0.52	284.02	184.38
8350.00	3.23	194.59	8339.94	-284.35	-284.53	-22.07	0.55	285.38	184.44
8375.00	3.43	196.43	8364.90	-285.74	-285.93	-22.46	0.92	286.81	184.49
8400.00	3.09	193.41	8389.86	-287.11	-287.30	-22.83	1.53	288.21	184.54
8425.00	3.21	194.28	8414.82	-288.45	-288.64	-23.16	0.52	289.57	184.59
8450.00	3.20	193.33	8439.78	-289.80	-289.99	-23.49	0.22	290.94	184.63
8475.00	3.17	193.91	8464.74	-291.15	-291.34	-23.82	0.17	292.31	184.67
8500.00	3.07	193.51	8489.71	-292.47	-292.66	-24.14	0.40	293.66	184.72
8525.00	3.01	192.05	8514.67	-293.76	-293.96	-24.43	0.38	294.97	184.75
8550.00	3.10	192.08	8539.64	-295.06	-295.26	-24.71	0.35	296.29	184.78
8575.00	3.12	192.40	8564.60	-296.38	-296.59	-25.00	0.10	297.64	184.82
8600.00	3.19	192.92	8589.56	-297.72	-297.93	-25.30	0.29	299.00	184.85
8625.00	3.22	191.91	8614.52	-299.08	-299.29	-25.60	0.28	300.39	184.89
8650.00	3.40	191.97	8639.48	-300.49	-300.71	-25.90	0.70	301.82	184.92
8675.00	3.10	192.81	8664.44	-301.88	-302.09	-26.20	1.20	303.23	184.96
8700.00	3.37	183.62	8689.40	-303.27	-303.49	-26.40	2.32	304.63	184.97
8725.00	3.52	177.70	8714.36	-304.77	-304.99	-26.42	1.55	306.13	184.95
8750.00	3.66	179.76	8739.31	-306.33	-306.55	-26.38	0.77	307.68	184.92
8775.00	4.09	179.01	8764.25	-308.03	-308.24	-26.36	1.73	309.37	184.89
8800.00	3.68	176.72	8789.19	-309.72	-309.94	-26.30	1.75	311.05	184.85
8825.00	3.69	175.86	8814.14	-311.32	-311.54	-26.20	0.22	312.64	184.81
8850.00	3.77	175.41	8839.09	-312.95	-313.16	-26.07	0.38	314.24	184.76

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg
8875.00	3.84	175.92	8864.03	-314.60	-314.82	-25.95	0.30	315.88	184.71
8900.00	4.42	173.27	8888.97	-316.40	-316.61	-25.78	2.42	317.66	184.65
8925.00	4.20	169.29	8913.90	-318.25	-318.46	-25.49	1.48	319.48	184.58
8950.00	4.22	168.89	8938.83	-320.06	-320.27	-25.15	0.14	321.25	184.49
8975.00	4.33	168.74	8963.76	-321.89	-322.09	-24.78	0.45	323.05	184.40
9000.00	4.08	167.17	8988.69	-323.68	-323.89	-24.40	1.12	324.80	184.31
9025.00	3.76	166.52	9013.63	-325.35	-325.55	-24.01	1.26	326.43	184.22
9050.00	3.72	166.98	9038.58	-326.94	-327.14	-23.64	0.21	327.99	184.13
9075.00	4.49	169.07	9063.52	-328.69	-328.89	-23.27	3.12	329.71	184.05
9100.00	4.07	169.67	9088.45	-330.53	-330.72	-22.93	1.68	331.51	183.97
9125.00	4.25	169.03	9113.38	-332.31	-332.50	-22.59	0.74	333.27	183.89
9150.00	4.39	169.76	9138.31	-334.17	-334.35	-22.25	0.61	335.09	183.81
9175.00	4.58	173.40	9163.23	-336.10	-336.28	-21.96	1.37	337.00	183.74
9200.00	4.74	175.80	9188.15	-338.12	-338.31	-21.77	1.00	339.01	183.68
9225.00	4.77	176.37	9213.06	-340.19	-340.37	-21.63	0.24	341.06	183.64
9250.00	5.00	175.26	9237.97	-342.32	-342.50	-21.47	0.97	343.17	183.59
9275.00	5.16	175.52	9262.88	-344.52	-344.70	-21.30	0.66	345.36	183.54
9300.00	5.07	174.94	9287.78	-346.75	-346.92	-21.11	0.43	347.56	183.48
9325.00	4.93	175.00	9312.68	-348.92	-349.09	-20.92	0.56	349.72	183.43
9350.00	4.65	175.58	9337.59	-351.00	-351.17	-20.75	1.11	351.78	183.38
9375.00	4.29	176.45	9362.52	-352.94	-353.11	-20.61	1.48	353.72	183.34
9400.00	3.91	176.24	9387.45	-354.73	-354.90	-20.50	1.51	355.49	183.31
9425.00	3.94	176.75	9412.40	-356.44	-356.61	-20.39	0.18	357.19	183.27
9450.00	4.37	175.30	9437.33	-358.24	-358.41	-20.27	1.77	358.99	183.24
9475.00	4.62	171.97	9462.25	-360.19	-360.36	-20.05	1.45	360.92	183.18
9500.00	4.91	172.00	9487.17	-362.25	-362.41	-19.76	1.15	362.95	183.12
9525.00	5.13	173.69	9512.07	-364.42	-364.58	-19.49	1.07	365.10	183.06
9550.00	5.45	172.59	9536.96	-366.71	-366.87	-19.21	1.35	367.38	183.00
9575.00	5.87	172.33	9561.84	-369.16	-369.32	-18.89	1.67	369.80	182.93
9600.00	6.00	172.02	9586.71	-371.72	-371.88	-18.54	0.52	372.34	182.85
9625.00	5.90	172.35	9611.57	-374.29	-374.44	-18.18	0.42	374.88	182.78
9650.00	5.65	171.50	9636.45	-376.78	-376.93	-17.83	1.06	377.35	182.71

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg
9675.00	5.41	171.26	9661.33	-379.17	-379.31	-17.47	0.97	379.72	182.64
9700.00	5.28	170.22	9686.22	-381.47	-381.61	-17.10	0.64	381.99	182.57
9725.00	5.02	169.68	9711.12	-383.68	-383.82	-16.70	1.07	384.18	182.49
9750.00	4.69	168.40	9736.03	-385.76	-385.90	-16.30	1.36	386.24	182.42
9775.00	4.52	167.96	9760.95	-387.72	-387.86	-15.89	0.72	388.19	182.35
9800.00	4.27	167.87	9785.88	-389.60	-389.73	-15.49	0.97	390.04	182.28
9825.00	4.06	169.27	9810.81	-391.38	-391.51	-15.13	0.96	391.81	182.21
9850.00	3.98	169.32	9835.75	-393.11	-393.23	-14.81	0.32	393.51	182.16
9875.00	3.94	171.65	9860.69	-394.81	-394.94	-14.52	0.66	395.20	182.11
9900.00	3.92	173.63	9885.63	-396.51	-396.64	-14.30	0.55	396.89	182.06
9925.00	3.84	174.76	9910.57	-398.20	-398.32	-14.13	0.43	398.57	182.03
9950.00	3.89	176.15	9935.52	-399.88	-400.00	-14.00	0.42	400.25	182.00
9975.00	3.75	176.77	9960.46	-401.54	-401.66	-13.89	0.58	401.90	181.98
10000.00	3.50	176.09	9985.41	-403.12	-403.24	-13.79	1.04	403.48	181.96
10025.00	4.01	174.69	10010.36	-404.75	-404.87	-13.66	2.09	405.10	181.93
10050.00	3.45	175.77	10035.30	-406.38	-406.49	-13.52	2.24	406.72	181.91
10075.00	3.27	174.44	10060.26	-407.84	-407.95	-13.40	0.81	408.17	181.88
10100.00	3.21	172.21	10085.22	-409.24	-409.36	-13.24	0.55	409.57	181.85
10125.00	3.26	173.20	10110.18	-410.64	-410.76	-13.06	0.29	410.97	181.82
10150.00	3.15	172.82	10135.14	-412.03	-412.14	-12.89	0.46	412.35	181.79
10175.00	3.07	170.58	10160.11	-413.37	-413.49	-12.69	0.58	413.68	181.76
10197.00	2.94	170.73	10182.08	-414.51	-414.62	-12.50	0.57	414.81	181.73

COG Operating L L C

Lea County, NM (NAD27 NME)

Sec. 12, T 22 S. , R 33 E

Tenderloin Federal 4H

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

31 October, 2017

Survey Report - Geographic

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tenderloin Federal 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3550.30ft (McVay 8)
Site:	Sec. 12, T 22 S. , R 33 E	MD Reference:	KB=26' @ 3550.30ft (McVay 8)
Well:	Tenderloin Federal 4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

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. 12, T 22 S. , R 33 E		
Site Position:		Northing:	509,936.9000 usft
From:	Map	Easting:	747,325.9000 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "
		Latitude:	32.399383
		Longitude:	-103.532013
		Grid Convergence:	0.43 °

Well	Tenderloin Federal 4H, ACTIVE		
Well Position	+N/-S	0.00 ft	Northing: 510,401.8000 usft
	+E/-W	0.00 ft	Easting: 747,322.2000 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	0.00 ft
		Latitude:	32.400661
		Longitude:	-103.532014
		Ground Level:	3,524.30 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/5/2017	7.00	60.24	48,093

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	359.55	

Survey Program	Date	10/31/2017			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
100.00	10,197.00	Gyro Surveys (Wellbore #1)	Keeper	Standard Wireline Keeper ver 1.0.2	
10,294.00	20,785.00	MWD Surveys (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	510,401.8000	747,322.2000	32.400661	-103.532014	
100.00	0.22	214.48	100.00	-0.16	-0.11	510,401.6417	747,322.0913	32.400661	-103.532014	
125.00	0.38	223.52	125.00	-0.26	-0.19	510,401.5421	747,322.0070	32.400661	-103.532014	
150.00	0.62	221.84	150.00	-0.42	-0.34	510,401.3812	747,321.8597	32.400660	-103.532015	
175.00	0.73	221.33	175.00	-0.64	-0.54	510,401.1608	747,321.6643	32.400660	-103.532015	
200.00	0.93	225.61	199.99	-0.90	-0.79	510,400.8993	747,321.4142	32.400659	-103.532016	
225.00	0.96	219.40	224.99	-1.20	-1.06	510,400.5955	747,321.1363	32.400658	-103.532017	
250.00	0.86	218.83	249.99	-1.51	-1.31	510,400.2875	747,320.8857	32.400657	-103.532018	
275.00	0.91	218.41	274.98	-1.81	-1.56	510,399.9858	747,320.6447	32.400656	-103.532019	
300.00	0.95	221.88	299.98	-2.12	-1.82	510,399.6760	747,320.3830	32.400655	-103.532019	
325.00	0.96	222.20	324.98	-2.43	-2.10	510,399.3665	747,320.1040	32.400655	-103.532020	

Survey Report - Geographic

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tenderloin Federal 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3550.30ft (McVay 8)
Site:	Sec. 12, T 22 S. , R 33 E	MD Reference:	KB=26' @ 3550.30ft (McVay 8)
Well:	Tenderloin Federal 4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
350.00	0.99	220.50	349.97	-2.75	-2.38	510,399.0471	747,319.8230	32.400654	-103.532021
375.00	1.05	220.68	374.97	-3.09	-2.67	510,398.7092	747,319.5335	32.400653	-103.532022
400.00	1.03	216.78	399.97	-3.44	-2.95	510,398.3555	747,319.2496	32.400652	-103.532023
425.00	0.99	215.43	424.96	-3.80	-3.21	510,397.9996	747,318.9899	32.400651	-103.532024
450.00	1.13	212.64	449.96	-4.18	-3.47	510,397.6160	747,318.7317	32.400650	-103.532025
475.00	1.13	207.87	474.95	-4.61	-3.72	510,397.1905	747,318.4835	32.400649	-103.532026
500.00	1.13	207.89	499.95	-5.05	-3.95	510,396.7547	747,318.2530	32.400647	-103.532026
525.00	1.12	210.20	524.94	-5.47	-4.19	510,396.3257	747,318.0148	32.400646	-103.532027
550.00	1.16	209.06	549.94	-5.91	-4.43	510,395.8933	747,317.7690	32.400645	-103.532028
575.00	1.44	209.82	574.93	-6.40	-4.71	510,395.3996	747,317.4898	32.400644	-103.532029
600.00	1.70	205.96	599.92	-7.01	-5.03	510,394.7936	747,317.1713	32.400642	-103.532030
625.00	1.74	205.22	624.91	-7.68	-5.35	510,394.1168	747,316.8472	32.400640	-103.532031
650.00	1.79	203.52	649.90	-8.38	-5.67	510,393.4155	747,316.5297	32.400638	-103.532032
675.00	1.80	203.19	674.89	-9.10	-5.98	510,392.6965	747,316.2193	32.400636	-103.532033
700.00	1.99	203.39	699.87	-9.86	-6.31	510,391.9372	747,315.8923	32.400634	-103.532034
725.00	2.11	201.61	724.86	-10.69	-6.65	510,391.1110	747,315.5505	32.400632	-103.532035
750.00	2.20	203.40	749.84	-11.56	-7.01	510,390.2427	747,315.1905	32.400630	-103.532037
775.00	2.24	203.41	774.82	-12.45	-7.39	510,389.3540	747,314.8058	32.400627	-103.532038
800.00	2.30	201.82	799.80	-13.36	-7.77	510,388.4399	747,314.4252	32.400625	-103.532039
825.00	2.30	203.55	824.78	-14.29	-8.16	510,387.5143	747,314.0383	32.400622	-103.532040
850.00	2.54	204.95	849.76	-15.25	-8.60	510,386.5522	747,313.6042	32.400620	-103.532042
875.00	2.69	204.00	874.73	-16.29	-9.07	510,385.5140	747,313.1319	32.400617	-103.532043
900.00	2.69	202.76	899.71	-17.36	-9.53	510,384.4371	747,312.6664	32.400614	-103.532045
925.00	2.92	203.09	924.68	-18.49	-10.01	510,383.3104	747,312.1897	32.400611	-103.532046
950.00	2.99	202.51	949.64	-19.68	-10.51	510,382.1223	747,311.6903	32.400607	-103.532048
975.00	3.17	203.90	974.61	-20.91	-11.04	510,380.8880	747,311.1607	32.400604	-103.532050
1,000.00	3.23	204.69	999.57	-22.18	-11.61	510,379.6161	747,310.5864	32.400601	-103.532052
1,025.00	3.26	205.37	1,024.53	-23.47	-12.21	510,378.3339	747,309.9877	32.400597	-103.532054
1,050.00	3.30	206.99	1,049.49	-24.75	-12.84	510,377.0504	747,309.3565	32.400594	-103.532056
1,075.00	2.95	208.23	1,074.45	-25.96	-13.47	510,375.8425	747,308.7257	32.400590	-103.532058
1,100.00	2.16	218.63	1,099.42	-26.89	-14.07	510,374.9076	747,308.1273	32.400588	-103.532060
1,125.00	0.85	252.31	1,124.42	-27.32	-14.54	510,374.4832	747,307.6564	32.400586	-103.532061
1,150.00	0.89	340.94	1,149.41	-27.19	-14.78	510,374.6104	747,307.4164	32.400587	-103.532062
1,175.00	2.06	9.14	1,174.40	-26.56	-14.78	510,375.2375	747,307.4243	32.400589	-103.532062
1,200.00	2.38	9.18	1,199.39	-25.61	-14.62	510,376.1936	747,307.5785	32.400591	-103.532062
1,225.00	2.43	10.15	1,224.36	-24.57	-14.45	510,377.2277	747,307.7547	32.400594	-103.532061
1,250.00	2.11	7.37	1,249.34	-23.59	-14.29	510,378.2058	747,307.9072	32.400597	-103.532060
1,275.00	1.81	1.24	1,274.33	-22.74	-14.23	510,379.0570	747,307.9748	32.400599	-103.532060
1,300.00	1.66	356.15	1,299.32	-21.99	-14.24	510,379.8130	747,307.9590	32.400601	-103.532060
1,325.00	1.38	346.21	1,324.31	-21.33	-14.34	510,380.4667	747,307.8629	32.400603	-103.532061
1,350.00	1.18	336.84	1,349.30	-20.80	-14.51	510,380.9957	747,307.6899	32.400604	-103.532061
1,375.00	1.07	320.37	1,374.30	-20.39	-14.76	510,381.4121	747,307.4398	32.400606	-103.532062
1,400.00	0.96	310.39	1,399.29	-20.07	-15.07	510,381.7276	747,307.1314	32.400606	-103.532063
1,425.00	0.95	296.03	1,424.29	-19.85	-15.41	510,381.9543	747,306.7856	32.400607	-103.532064
1,450.00	1.17	289.29	1,449.29	-19.67	-15.84	510,382.1296	747,306.3585	32.400608	-103.532065
1,475.00	0.96	290.92	1,474.28	-19.51	-16.28	510,382.2886	747,305.9220	32.400608	-103.532067
1,500.00	0.84	284.31	1,499.28	-19.39	-16.65	510,382.4087	747,305.5488	32.400608	-103.532068
1,525.00	0.77	275.29	1,524.28	-19.33	-17.00	510,382.4695	747,305.2040	32.400608	-103.532069
1,550.00	0.80	276.73	1,549.27	-19.29	-17.34	510,382.5054	747,304.8634	32.400609	-103.532070
1,575.00	0.75	271.30	1,574.27	-19.27	-17.67	510,382.5296	747,304.5265	32.400609	-103.532071
1,600.00	0.79	266.89	1,599.27	-19.28	-18.01	510,382.5240	747,304.1908	32.400609	-103.532072
1,625.00	0.80	261.90	1,624.27	-19.31	-18.35	510,382.4900	747,303.8459	32.400609	-103.532073
1,650.00	1.09	247.18	1,649.26	-19.43	-18.75	510,382.3732	747,303.4540	32.400608	-103.532075
1,675.00	1.35	238.87	1,674.26	-19.67	-19.22	510,382.1287	747,302.9827	32.400608	-103.532076
1,700.00	1.51	234.29	1,699.25	-20.02	-19.74	510,381.7842	747,302.4631	32.400607	-103.532078

Survey Report - Geographic

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tenderloin Federal 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3550.30ft (McVay 8)
Site:	Sec. 12, T 22 S. , R 33 E	MD Reference:	KB=26' @ 3550.30ft (McVay 8)
Well:	Tenderloin Federal 4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
1,725.00	1.70	226.70	1,724.24	-20.46	-20.27	510,381.3377	747,301.9258	32.400605	-103.532080	
1,750.00	1.85	225.76	1,749.23	-21.00	-20.83	510,380.8018	747,301.3668	32.400604	-103.532082	
1,775.00	1.98	227.09	1,774.22	-21.57	-21.44	510,380.2262	747,300.7614	32.400602	-103.532084	
1,800.00	2.11	225.64	1,799.20	-22.19	-22.08	510,379.6104	747,300.1160	32.400601	-103.532086	
1,825.00	2.26	224.39	1,824.18	-22.86	-22.76	510,378.9364	747,299.4422	32.400599	-103.532088	
1,850.00	2.32	223.91	1,849.16	-23.58	-23.45	510,378.2196	747,298.7464	32.400597	-103.532090	
1,875.00	2.36	222.29	1,874.14	-24.33	-24.15	510,377.4743	747,298.0491	32.400595	-103.532092	
1,900.00	2.35	222.70	1,899.12	-25.08	-24.84	510,376.7168	747,297.3552	32.400593	-103.532095	
1,925.00	2.41	222.74	1,924.10	-25.85	-25.55	510,375.9541	747,296.6509	32.400591	-103.532097	
1,950.00	2.58	222.18	1,949.07	-26.65	-26.28	510,375.1511	747,295.9163	32.400589	-103.532099	
1,975.00	2.63	221.33	1,974.05	-27.50	-27.04	510,374.3034	747,295.1597	32.400586	-103.532102	
2,000.00	2.66	220.12	1,999.02	-28.37	-27.79	510,373.4291	747,294.4071	32.400584	-103.532104	
2,025.00	2.71	220.16	2,023.99	-29.27	-28.55	510,372.5338	747,293.6522	32.400581	-103.532107	
2,050.00	2.74	219.98	2,048.97	-30.18	-29.31	510,371.6243	747,292.8871	32.400579	-103.532109	
2,075.00	2.75	219.62	2,073.94	-31.10	-30.08	510,370.7044	747,292.1207	32.400576	-103.532112	
2,100.00	2.70	220.37	2,098.91	-32.01	-30.84	510,369.7939	747,291.3569	32.400574	-103.532114	
2,125.00	2.38	219.18	2,123.88	-32.86	-31.55	510,368.9429	747,290.6475	32.400572	-103.532117	
2,150.00	2.26	218.04	2,148.86	-33.65	-32.18	510,368.1523	747,290.0158	32.400569	-103.532119	
2,175.00	2.24	217.97	2,173.84	-34.42	-32.79	510,367.3789	747,289.4115	32.400567	-103.532121	
2,200.00	2.32	219.72	2,198.82	-35.20	-33.41	510,366.6045	747,288.7876	32.400565	-103.532123	
2,225.00	2.34	218.17	2,223.80	-35.99	-34.05	510,365.8141	747,288.1488	32.400563	-103.532125	
2,250.00	2.22	217.79	2,248.78	-36.77	-34.66	510,365.0302	747,287.5367	32.400561	-103.532127	
2,275.00	2.28	216.61	2,273.76	-37.55	-35.26	510,364.2484	747,286.9434	32.400559	-103.532129	
2,300.00	2.27	217.19	2,298.75	-38.35	-35.85	510,363.4548	747,286.3476	32.400557	-103.532131	
2,325.00	2.34	217.34	2,323.72	-39.15	-36.46	510,362.6546	747,285.7387	32.400554	-103.532133	
2,350.00	2.29	218.74	2,348.70	-39.94	-37.08	510,361.8592	747,285.1166	32.400552	-103.532135	
2,375.00	2.39	217.89	2,373.68	-40.74	-37.72	510,361.0583	747,284.4839	32.400550	-103.532137	
2,400.00	2.39	217.02	2,398.66	-41.57	-38.35	510,360.2307	747,283.8499	32.400548	-103.532139	
2,425.00	2.44	217.92	2,423.64	-42.41	-38.99	510,359.3947	747,283.2090	32.400546	-103.532141	
2,450.00	2.47	218.22	2,448.62	-43.25	-39.65	510,358.5517	747,282.5487	32.400543	-103.532143	
2,475.00	2.50	215.69	2,473.59	-44.11	-40.30	510,357.6856	747,281.8973	32.400541	-103.532145	
2,500.00	2.65	216.73	2,498.57	-45.02	-40.97	510,356.7796	747,281.2336	32.400538	-103.532147	
2,525.00	2.75	217.71	2,523.54	-45.96	-41.68	510,355.8419	747,280.5212	32.400536	-103.532150	
2,550.00	2.80	217.39	2,548.51	-46.92	-42.42	510,354.8823	747,279.7835	32.400533	-103.532152	
2,575.00	2.86	218.41	2,573.48	-47.89	-43.17	510,353.9085	747,279.0252	32.400531	-103.532155	
2,600.00	2.85	218.04	2,598.45	-48.87	-43.95	510,352.9303	747,278.2548	32.400528	-103.532157	
2,625.00	2.79	216.82	2,623.42	-49.85	-44.69	510,351.9537	747,277.5071	32.400525	-103.532160	
2,650.00	2.80	217.71	2,648.39	-50.82	-45.43	510,350.9835	747,276.7690	32.400523	-103.532162	
2,675.00	2.90	217.43	2,673.36	-51.80	-46.19	510,349.9983	747,276.0111	32.400520	-103.532164	
2,700.00	2.84	218.07	2,698.33	-52.79	-46.96	510,349.0085	747,275.2449	32.400517	-103.532167	
2,725.00	2.82	220.84	2,723.30	-53.74	-47.74	510,348.0557	747,274.4608	32.400515	-103.532170	
2,750.00	2.50	217.80	2,748.27	-54.64	-48.48	510,347.1596	747,273.7244	32.400512	-103.532172	
2,775.00	2.33	216.00	2,773.25	-55.48	-49.11	510,346.3176	747,273.0916	32.400510	-103.532174	
2,800.00	2.17	215.35	2,798.23	-56.28	-49.68	510,345.5205	747,272.5190	32.400508	-103.532176	
2,825.00	1.89	215.58	2,823.21	-57.00	-50.19	510,344.7991	747,272.0053	32.400506	-103.532178	
2,850.00	1.75	211.61	2,848.20	-57.66	-50.63	510,344.1387	747,271.5654	32.400504	-103.532179	
2,875.00	1.76	210.62	2,873.19	-58.32	-51.03	510,343.4833	747,271.1697	32.400502	-103.532180	
2,900.00	1.70	208.40	2,898.18	-58.97	-51.40	510,342.8267	747,270.7978	32.400500	-103.532182	
2,925.00	1.85	207.24	2,923.16	-59.66	-51.76	510,342.1417	747,270.4367	32.400498	-103.532183	
2,950.00	1.75	205.49	2,948.15	-60.36	-52.11	510,341.4383	747,270.0878	32.400496	-103.532184	
2,975.00	1.61	203.54	2,973.14	-61.03	-52.42	510,340.7718	747,269.7832	32.400495	-103.532185	
3,000.00	1.56	204.30	2,998.13	-61.66	-52.70	510,340.1397	747,269.5029	32.400493	-103.532186	
3,025.00	1.45	198.95	3,023.12	-62.27	-52.94	510,339.5304	747,269.2602	32.400491	-103.532187	
3,050.00	1.44	197.26	3,048.12	-62.87	-53.14	510,338.9312	747,269.0642	32.400490	-103.532187	
3,075.00	1.37	193.15	3,073.11	-63.46	-53.30	510,338.3402	747,268.9030	32.400488	-103.532188	

Survey Report - Geographic

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tenderloin Federal 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3550.30ft (McVay 8)
Site:	Sec. 12, T 22 S. , R 33 E	MD Reference:	KB=26' @ 3550.30ft (McVay 8)
Well:	Tenderloin Federal 4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
3,100.00	1.33	191.02	3,098.10	-64.04	-53.42	510,337.7644	747,268.7796	32.400486	-103.532188	
3,125.00	1.25	183.49	3,123.09	-64.59	-53.49	510,337.2074	747,268.7075	32.400485	-103.532188	
3,150.00	1.13	175.09	3,148.09	-65.11	-53.49	510,336.6897	747,268.7120	32.400483	-103.532188	
3,175.00	1.11	172.06	3,173.08	-65.60	-53.43	510,336.2042	747,268.7666	32.400482	-103.532188	
3,200.00	1.04	162.36	3,198.08	-66.05	-53.33	510,335.7482	747,268.8688	32.400481	-103.532188	
3,225.00	1.05	151.80	3,223.08	-66.47	-53.15	510,335.3301	747,269.0458	32.400480	-103.532187	
3,250.00	1.12	140.95	3,248.07	-66.86	-52.89	510,334.9385	747,269.3079	32.400479	-103.532187	
3,275.00	1.26	133.87	3,273.07	-67.24	-52.54	510,334.5582	747,269.6600	32.400478	-103.532185	
3,300.00	1.27	128.59	3,298.06	-67.61	-52.13	510,334.1949	747,270.0747	32.400477	-103.532184	
3,325.00	1.55	118.07	3,323.05	-67.94	-51.61	510,333.8630	747,270.5896	32.400476	-103.532182	
3,350.00	2.09	112.77	3,348.04	-68.27	-50.89	510,333.5275	747,271.3083	32.400475	-103.532180	
3,375.00	2.34	111.91	3,373.02	-68.64	-50.00	510,333.1606	747,272.2022	32.400474	-103.532177	
3,400.00	1.96	119.46	3,398.00	-69.04	-49.15	510,332.7599	747,273.0479	32.400473	-103.532174	
3,425.00	2.53	106.67	3,422.98	-69.41	-48.25	510,332.3914	747,273.9488	32.400471	-103.532172	
3,450.00	2.69	104.09	3,447.96	-69.71	-47.15	510,332.0903	747,275.0463	32.400471	-103.532168	
3,475.00	2.85	104.86	3,472.93	-70.01	-45.98	510,331.7880	747,276.2161	32.400470	-103.532164	
3,500.00	2.68	103.46	3,497.90	-70.31	-44.81	510,331.4926	747,277.3852	32.400469	-103.532160	
3,525.00	2.65	103.15	3,522.87	-70.58	-43.68	510,331.2251	747,278.5164	32.400468	-103.532157	
3,550.00	2.57	101.43	3,547.85	-70.82	-42.57	510,330.9825	747,279.6286	32.400467	-103.532153	
3,575.00	2.36	103.54	3,572.82	-71.05	-41.52	510,330.7509	747,280.6784	32.400467	-103.532150	
3,600.00	1.99	112.42	3,597.81	-71.34	-40.62	510,330.4649	747,281.5801	32.400466	-103.532147	
3,625.00	2.00	109.09	3,622.79	-71.64	-39.81	510,330.1567	747,282.3936	32.400465	-103.532144	
3,650.00	1.93	110.80	3,647.78	-71.94	-39.00	510,329.8645	747,283.1994	32.400464	-103.532142	
3,675.00	1.82	112.24	3,672.76	-72.24	-38.24	510,329.5647	747,283.9604	32.400464	-103.532139	
3,700.00	1.81	113.37	3,697.75	-72.54	-37.51	510,329.2579	747,284.6903	32.400463	-103.532137	
3,725.00	1.83	113.75	3,722.74	-72.86	-36.78	510,328.9405	747,285.4180	32.400462	-103.532134	
3,750.00	1.99	115.55	3,747.72	-73.21	-36.03	510,328.5925	747,286.1750	32.400461	-103.532132	
3,775.00	1.95	116.26	3,772.71	-73.58	-35.25	510,328.2171	747,286.9481	32.400460	-103.532130	
3,800.00	2.23	118.92	3,797.69	-74.01	-34.44	510,327.7937	747,287.7553	32.400459	-103.532127	
3,825.00	2.31	116.76	3,822.67	-74.47	-33.57	510,327.3317	747,288.6309	32.400457	-103.532124	
3,850.00	2.36	116.76	3,847.65	-74.93	-32.66	510,326.8731	747,289.5403	32.400456	-103.532121	
3,875.00	2.35	115.86	3,872.63	-75.38	-31.74	510,326.4177	747,290.4612	32.400455	-103.532118	
3,900.00	2.44	117.52	3,897.61	-75.85	-30.81	510,325.9483	747,291.3943	32.400453	-103.532115	
3,925.00	2.32	115.62	3,922.59	-76.32	-29.88	510,325.4836	747,292.3225	32.400452	-103.532112	
3,950.00	2.39	117.20	3,947.57	-76.77	-28.96	510,325.0265	747,293.2424	32.400451	-103.532109	
3,975.00	2.45	121.09	3,972.54	-77.29	-28.04	510,324.5123	747,294.1636	32.400449	-103.532106	
4,000.00	2.47	120.40	3,997.52	-77.84	-27.11	510,323.9638	747,295.0858	32.400448	-103.532103	
4,025.00	2.29	116.79	4,022.50	-78.33	-26.20	510,323.4661	747,295.9963	32.400446	-103.532100	
4,050.00	2.19	119.16	4,047.48	-78.79	-25.34	510,323.0082	747,296.8593	32.400445	-103.532098	
4,075.00	2.22	130.13	4,072.46	-79.34	-24.55	510,322.4634	747,297.6467	32.400444	-103.532095	
4,100.00	1.51	118.91	4,097.45	-79.81	-23.89	510,321.9921	747,298.3052	32.400442	-103.532093	
4,125.00	1.27	118.15	4,122.44	-80.10	-23.36	510,321.7021	747,298.8379	32.400442	-103.532091	
4,150.00	1.16	115.85	4,147.44	-80.34	-22.89	510,321.4611	747,299.3099	32.400441	-103.532090	
4,175.00	0.98	110.82	4,172.43	-80.53	-22.46	510,321.2747	747,299.7374	32.400440	-103.532088	
4,200.00	0.90	115.57	4,197.43	-80.69	-22.09	510,321.1140	747,300.1144	32.400440	-103.532087	
4,225.00	0.94	112.86	4,222.42	-80.85	-21.72	510,320.9496	747,300.4805	32.400439	-103.532086	
4,250.00	1.00	102.44	4,247.42	-80.98	-21.32	510,320.8230	747,300.8825	32.400439	-103.532085	
4,275.00	0.95	97.17	4,272.42	-81.05	-20.90	510,320.7501	747,301.3011	32.400439	-103.532083	
4,300.00	1.09	68.17	4,297.41	-80.99	-20.47	510,320.8126	747,301.7275	32.400439	-103.532082	
4,325.00	1.44	78.01	4,322.41	-80.83	-19.94	510,320.9663	747,302.2555	32.400439	-103.532080	
4,350.00	1.48	88.77	4,347.40	-80.76	-19.31	510,321.0385	747,302.8855	32.400440	-103.532078	
4,375.00	1.23	85.23	4,372.39	-80.73	-18.72	510,321.0678	747,303.4757	32.400440	-103.532076	
4,400.00	1.23	81.94	4,397.39	-80.67	-18.19	510,321.1277	747,304.0088	32.400440	-103.532074	
4,425.00	1.34	81.94	4,422.38	-80.59	-17.64	510,321.2063	747,304.5639	32.400440	-103.532073	
4,450.00	1.14	94.26	4,447.37	-80.57	-17.10	510,321.2288	747,305.1013	32.400440	-103.532071	

Survey Report - Geographic

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tenderloin Federal 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3550.30ft (McVay 8)
Site:	Sec. 12, T 22 S. , R 33 E	MD Reference:	KB=26' @ 3550.30ft (McVay 8)
Well:	Tenderloin Federal 4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
4,475.00	1.30	84.05	4,472.37	-80.56	-16.57	510,321.2397	747,305.6314	32.400440	-103.532069	
4,500.00	1.22	80.17	4,497.36	-80.49	-16.02	510,321.3146	747,306.1757	32.400440	-103.532067	
4,525.00	1.14	74.41	4,522.36	-80.37	-15.52	510,321.4268	747,306.6775	32.400441	-103.532066	
4,550.00	1.75	77.43	4,547.35	-80.22	-14.91	510,321.5768	747,307.2896	32.400441	-103.532064	
4,575.00	1.82	85.54	4,572.34	-80.11	-14.14	510,321.6907	747,308.0580	32.400441	-103.532061	
4,600.00	1.04	82.38	4,597.33	-80.05	-13.52	510,321.7517	747,308.6786	32.400442	-103.532059	
4,625.00	0.95	85.90	4,622.33	-80.00	-13.09	510,321.7966	747,309.1102	32.400442	-103.532058	
4,650.00	0.97	83.16	4,647.32	-79.96	-12.67	510,321.8366	747,309.5271	32.400442	-103.532057	
4,675.00	1.11	115.22	4,672.32	-80.04	-12.24	510,321.7586	747,309.9562	32.400442	-103.532055	
4,700.00	0.90	94.51	4,697.31	-80.16	-11.83	510,321.6400	747,310.3710	32.400441	-103.532054	
4,725.00	0.87	76.83	4,722.31	-80.13	-11.45	510,321.6678	747,310.7516	32.400441	-103.532053	
4,750.00	0.67	80.53	4,747.31	-80.07	-11.12	510,321.7351	747,311.0805	32.400441	-103.532052	
4,775.00	0.68	85.73	4,772.31	-80.03	-10.83	510,321.7702	747,311.3727	32.400442	-103.532051	
4,800.00	0.63	81.25	4,797.31	-80.00	-10.54	510,321.8021	747,311.6564	32.400442	-103.532050	
4,825.00	0.62	82.68	4,822.30	-79.96	-10.27	510,321.8403	747,311.9264	32.400442	-103.532049	
4,850.00	0.71	87.07	4,847.30	-79.93	-9.98	510,321.8654	747,312.2153	32.400442	-103.532048	
4,875.00	0.54	89.42	4,872.30	-79.93	-9.71	510,321.8745	747,312.4878	32.400442	-103.532047	
4,900.00	0.43	84.24	4,897.30	-79.92	-9.50	510,321.8851	747,312.6989	32.400442	-103.532046	
4,925.00	0.71	66.75	4,922.30	-79.84	-9.27	510,321.9557	747,312.9346	32.400442	-103.532045	
4,950.00	0.64	84.47	4,947.30	-79.77	-8.98	510,322.0303	747,313.2159	32.400442	-103.532045	
4,975.00	0.56	82.77	4,972.30	-79.74	-8.72	510,322.0591	747,313.4760	32.400442	-103.532044	
5,000.00	0.22	79.85	4,997.30	-79.72	-8.56	510,322.0830	747,313.6445	32.400442	-103.532043	
5,025.00	0.38	79.90	5,022.30	-79.69	-8.43	510,322.1060	747,313.7733	32.400442	-103.532043	
5,050.00	0.45	86.01	5,047.29	-79.67	-8.25	510,322.1273	747,313.9529	32.400442	-103.532042	
5,075.00	0.33	56.05	5,072.29	-79.63	-8.09	510,322.1744	747,314.1106	32.400443	-103.532042	
5,100.00	0.35	59.67	5,097.29	-79.55	-7.96	510,322.2531	747,314.2362	32.400443	-103.532041	
5,125.00	0.48	59.61	5,122.29	-79.46	-7.81	510,322.3447	747,314.3924	32.400443	-103.532041	
5,150.00	0.92	74.06	5,147.29	-79.35	-7.52	510,322.4528	747,314.6757	32.400443	-103.532040	
5,175.00	0.36	55.17	5,172.29	-79.25	-7.27	510,322.5527	747,314.9332	32.400444	-103.532039	
5,200.00	0.40	50.16	5,197.29	-79.15	-7.14	510,322.6535	747,315.0647	32.400444	-103.532039	
5,225.00	0.30	45.62	5,222.29	-79.04	-7.02	510,322.7552	747,315.1785	32.400444	-103.532038	
5,250.00	0.15	123.89	5,247.29	-79.02	-6.95	510,322.7827	747,315.2524	32.400444	-103.532038	
5,275.00	0.21	75.02	5,272.29	-79.02	-6.88	510,322.7763	747,315.3238	32.400444	-103.532038	
5,300.00	0.15	114.12	5,297.29	-79.03	-6.80	510,322.7748	747,315.3979	32.400444	-103.532037	
5,325.00	0.30	145.41	5,322.29	-79.09	-6.74	510,322.7075	747,315.4650	32.400444	-103.532037	
5,350.00	1.05	172.24	5,347.29	-79.37	-6.67	510,322.4267	747,315.5331	32.400443	-103.532037	
5,375.00	2.12	176.96	5,372.28	-80.06	-6.61	510,321.7379	747,315.5885	32.400441	-103.532037	
5,400.00	2.82	176.01	5,397.25	-81.14	-6.54	510,320.6627	747,315.6558	32.400438	-103.532037	
5,425.00	3.41	178.39	5,422.22	-82.49	-6.48	510,319.3060	747,315.7195	32.400435	-103.532037	
5,450.00	3.80	179.09	5,447.17	-84.07	-6.45	510,317.7344	747,315.7536	32.400430	-103.532036	
5,475.00	4.55	181.93	5,472.10	-85.89	-6.47	510,315.9150	747,315.7333	32.400425	-103.532037	
5,500.00	4.08	181.20	5,497.03	-87.77	-6.52	510,314.0348	747,315.6813	32.400420	-103.532037	
5,525.00	3.83	179.85	5,521.97	-89.49	-6.54	510,312.3107	747,315.6649	32.400415	-103.532037	
5,550.00	3.88	178.91	5,546.91	-91.17	-6.52	510,310.6301	747,315.6831	32.400411	-103.532037	
5,575.00	3.89	180.02	5,571.86	-92.86	-6.50	510,308.9364	747,315.6989	32.400406	-103.532037	
5,600.00	4.18	182.64	5,596.79	-94.62	-6.54	510,307.1782	747,315.6567	32.400401	-103.532037	
5,625.00	4.42	182.75	5,621.72	-96.49	-6.63	510,305.3058	747,315.5685	32.400396	-103.532037	
5,650.00	3.97	181.26	5,646.66	-98.32	-6.70	510,303.4783	747,315.5032	32.400391	-103.532038	
5,675.00	3.88	179.92	5,671.60	-100.03	-6.71	510,301.7673	747,315.4854	32.400386	-103.532038	
5,700.00	4.00	181.27	5,696.54	-101.75	-6.73	510,300.0497	747,315.4672	32.400382	-103.532038	
5,725.00	4.13	181.66	5,721.48	-103.52	-6.78	510,298.2781	747,315.4218	32.400377	-103.532038	
5,750.00	4.37	181.86	5,746.41	-105.37	-6.84	510,296.4263	747,315.3648	32.400372	-103.532038	
5,775.00	4.06	180.37	5,771.34	-107.21	-6.87	510,294.5893	747,315.3282	32.400367	-103.532038	
5,800.00	3.96	180.98	5,796.28	-108.96	-6.89	510,292.8412	747,315.3077	32.400362	-103.532039	
5,825.00	4.03	179.55	5,821.22	-110.70	-6.90	510,291.0996	747,315.2999	32.400357	-103.532039	

Survey Report - Geographic

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tenderloin Federal 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3550.30ft (McVay 8)
Site:	Sec. 12, T 22 S., R 33 E	MD Reference:	KB=26' @ 3550.30ft (McVay 8)
Well:	Tenderloin Federal 4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
5,850.00	4.21	181.93	5,846.15	-112.50	-6.92	510,289.3040	747,315.2759	32.400352	-103.532039	
5,875.00	4.28	183.75	5,871.08	-114.34	-7.02	510,287.4560	747,315.1839	32.400347	-103.532039	
5,900.00	4.00	182.96	5,896.02	-116.15	-7.12	510,285.6543	747,315.0779	32.400342	-103.532039	
5,925.00	3.94	182.62	5,920.96	-117.87	-7.21	510,283.9256	747,314.9936	32.400337	-103.532040	
5,950.00	3.89	185.89	5,945.90	-119.58	-7.33	510,282.2240	747,314.8673	32.400333	-103.532040	
5,975.00	4.08	186.98	5,970.84	-121.30	-7.53	510,280.4977	747,314.6722	32.400328	-103.532041	
6,000.00	3.92	185.83	5,995.78	-123.04	-7.72	510,278.7648	747,314.4773	32.400323	-103.532042	
6,025.00	4.00	185.49	6,020.72	-124.75	-7.89	510,277.0467	747,314.3071	32.400319	-103.532042	
6,050.00	3.99	188.48	6,045.66	-126.48	-8.10	510,275.3185	747,314.0954	32.400314	-103.532043	
6,075.00	3.94	186.97	6,070.60	-128.19	-8.34	510,273.6057	747,313.8629	32.400309	-103.532044	
6,100.00	3.93	184.81	6,095.54	-129.90	-8.51	510,271.8994	747,313.6869	32.400304	-103.532044	
6,125.00	4.01	185.13	6,120.48	-131.63	-8.66	510,270.1751	747,313.5369	32.400300	-103.532045	
6,150.00	4.03	185.29	6,145.42	-133.37	-8.82	510,268.4297	747,313.3777	32.400295	-103.532045	
6,175.00	4.42	185.03	6,170.35	-135.20	-8.99	510,266.5954	747,313.2123	32.400290	-103.532046	
6,200.00	4.95	186.28	6,195.27	-137.24	-9.19	510,264.5636	747,313.0098	32.400284	-103.532047	
6,225.00	4.56	186.16	6,220.18	-139.30	-9.41	510,262.5035	747,312.7852	32.400279	-103.532047	
6,250.00	4.21	184.47	6,245.11	-141.20	-9.59	510,260.6005	747,312.6070	32.400273	-103.532048	
6,275.00	4.10	185.68	6,270.04	-143.00	-9.75	510,258.7964	747,312.4471	32.400268	-103.532049	
6,300.00	4.83	187.86	6,294.97	-144.94	-9.99	510,256.8644	747,312.2147	32.400263	-103.532049	
6,325.00	4.88	185.16	6,319.88	-147.04	-10.22	510,254.7627	747,311.9751	32.400257	-103.532050	
6,350.00	4.83	185.68	6,344.79	-149.14	-10.42	510,252.6564	747,311.7753	32.400252	-103.532051	
6,375.00	4.35	184.55	6,369.71	-151.14	-10.60	510,250.6639	747,311.5959	32.400246	-103.532052	
6,400.00	4.23	184.90	6,394.64	-153.00	-10.76	510,248.8001	747,311.4420	32.400241	-103.532052	
6,425.00	4.68	184.35	6,419.56	-154.94	-10.91	510,246.8646	747,311.2859	32.400236	-103.532053	
6,450.00	4.66	185.63	6,444.48	-156.96	-11.09	510,244.8370	747,311.1089	32.400230	-103.532053	
6,475.00	4.49	186.23	6,469.40	-158.95	-11.30	510,242.8536	747,310.9030	32.400225	-103.532054	
6,500.00	4.41	186.19	6,494.32	-160.88	-11.51	510,240.9252	747,310.6932	32.400219	-103.532055	
6,525.00	4.53	190.37	6,519.25	-162.80	-11.79	510,238.9985	747,310.4119	32.400214	-103.532056	
6,550.00	4.58	191.17	6,544.17	-164.75	-12.16	510,237.0482	747,310.0408	32.400209	-103.532057	
6,575.00	4.55	189.19	6,569.09	-166.71	-12.51	510,235.0900	747,309.6891	32.400203	-103.532058	
6,600.00	4.34	186.30	6,594.01	-168.63	-12.77	510,233.1709	747,309.4269	32.400198	-103.532059	
6,625.00	4.28	187.02	6,618.94	-170.50	-12.99	510,231.3048	747,309.2091	32.400193	-103.532060	
6,650.00	4.87	188.10	6,643.86	-172.47	-13.25	510,229.3283	747,308.9455	32.400187	-103.532061	
6,675.00	4.94	187.87	6,668.77	-174.59	-13.55	510,227.2115	747,308.6486	32.400182	-103.532062	
6,700.00	4.41	186.94	6,693.69	-176.61	-13.81	510,225.1911	747,308.3851	32.400176	-103.532063	
6,725.00	4.35	186.66	6,718.61	-178.51	-14.04	510,223.2952	747,308.1590	32.400171	-103.532063	
6,750.00	4.41	188.09	6,743.54	-180.40	-14.29	510,221.4019	747,307.9138	32.400166	-103.532064	
6,775.00	4.75	189.53	6,768.46	-182.37	-14.59	510,219.4295	747,307.6071	32.400160	-103.532065	
6,800.00	5.06	192.69	6,793.37	-184.47	-15.01	510,217.3331	747,307.1936	32.400155	-103.532067	
6,825.00	4.47	189.40	6,818.28	-186.50	-15.41	510,215.2964	747,306.7923	32.400149	-103.532068	
6,850.00	4.36	190.07	6,843.21	-188.40	-15.73	510,213.3996	747,306.4670	32.400144	-103.532069	
6,875.00	4.31	190.39	6,868.14	-190.26	-16.07	510,211.5400	747,306.1314	32.400139	-103.532070	
6,900.00	4.43	192.88	6,893.07	-192.13	-16.45	510,209.6748	747,305.7468	32.400134	-103.532072	
6,925.00	4.50	191.76	6,917.99	-194.03	-16.87	510,207.7734	747,305.3317	32.400128	-103.532073	
6,950.00	4.32	190.91	6,942.92	-195.91	-17.25	510,205.8887	747,304.9536	32.400123	-103.532074	
6,975.00	4.23	190.46	6,967.85	-197.74	-17.59	510,204.0574	747,304.6080	32.400118	-103.532075	
7,000.00	4.47	191.33	6,992.77	-199.60	-17.95	510,202.1955	747,304.2492	32.400113	-103.532077	
7,025.00	5.71	194.90	7,017.67	-201.76	-18.46	510,200.0384	747,303.7380	32.400107	-103.532078	
7,050.00	4.54	191.17	7,042.57	-203.93	-18.97	510,197.8657	747,303.2265	32.400101	-103.532080	
7,075.00	4.30	191.97	7,067.50	-205.82	-19.36	510,195.9782	747,302.8405	32.400096	-103.532081	
7,100.00	4.26	191.30	7,092.43	-207.65	-19.74	510,194.1508	747,302.4641	32.400091	-103.532083	
7,125.00	4.63	194.70	7,117.36	-209.54	-20.17	510,192.2643	747,302.0261	32.400086	-103.532084	
7,150.00	4.22	193.38	7,142.28	-211.41	-20.64	510,190.3934	747,301.5572	32.400081	-103.532086	
7,175.00	4.15	196.41	7,167.21	-213.17	-21.11	510,188.6308	747,301.0888	32.400076	-103.532087	
7,200.00	4.00	199.06	7,192.15	-214.86	-21.65	510,186.9389	747,300.5485	32.400071	-103.532089	

Survey Report - Geographic

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tenderloin Federal 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3550.30ft (McVay 8)
Site:	Sec. 12, T 22 S., R 33 E	MD Reference:	KB=26' @ 3550.30ft (McVay 8)
Well:	Tenderloin Federal 4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
7,225.00	4.22	200.38	7,217.09	-216.55	-22.26	510,185.2525	747,299.9435	32.400067	-103.532091	
7,250.00	4.01	200.16	7,242.02	-218.23	-22.88	510,183.5697	747,299.3219	32.400062	-103.532093	
7,275.00	4.15	200.19	7,266.96	-219.90	-23.49	510,181.9001	747,298.7084	32.400057	-103.532095	
7,300.00	3.63	193.82	7,291.90	-221.52	-23.99	510,180.2826	747,298.2071	32.400053	-103.532097	
7,325.00	3.32	187.92	7,316.86	-223.00	-24.28	510,178.7971	747,297.9183	32.400049	-103.532098	
7,350.00	3.35	183.59	7,341.81	-224.45	-24.43	510,177.3510	747,297.7729	32.400045	-103.532098	
7,375.00	3.80	185.87	7,366.76	-226.00	-24.56	510,175.7980	747,297.6424	32.400041	-103.532099	
7,400.00	3.50	185.09	7,391.71	-227.59	-24.71	510,174.2138	747,297.4900	32.400036	-103.532099	
7,425.00	3.33	185.40	7,416.67	-229.07	-24.85	510,172.7308	747,297.3539	32.400032	-103.532100	
7,450.00	3.35	184.96	7,441.63	-230.52	-24.98	510,171.2803	747,297.2224	32.400028	-103.532100	
7,475.00	3.37	180.87	7,466.58	-231.98	-25.05	510,169.8178	747,297.1481	32.400024	-103.532100	
7,500.00	3.74	169.48	7,491.54	-233.52	-24.91	510,168.2815	747,297.2859	32.400020	-103.532100	
7,525.00	3.77	165.98	7,516.48	-235.12	-24.57	510,166.6824	747,297.6338	32.400016	-103.532099	
7,550.00	3.79	164.56	7,541.43	-236.71	-24.15	510,165.0886	747,298.0529	32.400011	-103.532098	
7,575.00	3.82	164.25	7,566.37	-238.31	-23.70	510,163.4906	747,298.4989	32.400007	-103.532096	
7,600.00	3.86	165.89	7,591.32	-239.93	-23.27	510,161.8730	747,298.9301	32.400002	-103.532095	
7,625.00	4.01	168.28	7,616.26	-241.60	-22.89	510,160.2010	747,299.3128	32.399998	-103.532094	
7,650.00	3.68	167.64	7,641.20	-243.24	-22.54	510,158.5614	747,299.6621	32.399993	-103.532092	
7,675.00	3.67	168.71	7,666.15	-244.81	-22.21	510,156.9931	747,299.9905	32.399989	-103.532091	
7,700.00	3.77	168.95	7,691.10	-246.40	-21.90	510,155.4018	747,300.3047	32.399984	-103.532090	
7,725.00	3.71	169.94	7,716.04	-248.00	-21.60	510,153.7987	747,300.6035	32.399980	-103.532090	
7,750.00	4.22	176.07	7,740.98	-249.72	-21.39	510,152.0846	747,300.8078	32.399975	-103.532089	
7,775.00	3.67	169.18	7,765.92	-251.42	-21.18	510,150.3811	747,301.0211	32.399971	-103.532088	
7,800.00	3.88	173.39	7,790.87	-253.05	-20.93	510,148.7549	747,301.2686	32.399966	-103.532087	
7,825.00	3.59	170.87	7,815.82	-254.66	-20.71	510,147.1419	747,301.4902	32.399962	-103.532087	
7,850.00	3.88	174.18	7,840.76	-256.27	-20.50	510,145.5277	747,301.7002	32.399957	-103.532086	
7,875.00	3.48	171.77	7,865.71	-257.87	-20.31	510,143.9352	747,301.8945	32.399953	-103.532086	
7,900.00	3.54	172.12	7,890.67	-259.38	-20.09	510,142.4198	747,302.1090	32.399949	-103.532085	
7,925.00	3.53	172.09	7,915.62	-260.91	-19.88	510,140.8929	747,302.3207	32.399945	-103.532084	
7,950.00	3.45	175.10	7,940.57	-262.42	-19.71	510,139.3812	747,302.4909	32.399940	-103.532084	
7,975.00	3.43	175.26	7,965.53	-263.91	-19.58	510,137.8864	747,302.6169	32.399936	-103.532083	
8,000.00	3.42	176.08	7,990.48	-265.40	-19.47	510,136.3971	747,302.7297	32.399932	-103.532083	
8,025.00	3.36	178.33	8,015.44	-266.88	-19.40	510,134.9209	747,302.8020	32.399928	-103.532083	
8,050.00	3.28	178.63	8,040.40	-268.33	-19.36	510,133.4736	747,302.8405	32.399924	-103.532083	
8,075.00	3.25	181.53	8,065.36	-269.75	-19.36	510,132.0502	747,302.8387	32.399920	-103.532083	
8,100.00	3.26	183.01	8,090.32	-271.17	-19.42	510,130.6319	747,302.7824	32.399916	-103.532083	
8,125.00	3.29	184.93	8,115.28	-272.59	-19.52	510,129.2074	747,302.6834	32.399912	-103.532083	
8,150.00	3.13	187.38	8,140.24	-273.98	-19.67	510,127.8158	747,302.5341	32.399909	-103.532084	
8,175.00	3.16	188.70	8,165.20	-275.34	-19.86	510,126.4578	747,302.3422	32.399905	-103.532085	
8,200.00	2.98	192.76	8,190.16	-276.66	-20.11	510,125.1429	747,302.0945	32.399901	-103.532085	
8,225.00	3.06	192.00	8,215.13	-277.94	-20.39	510,123.8564	747,301.8122	32.399898	-103.532086	
8,250.00	3.13	193.27	8,240.09	-279.26	-20.68	510,122.5394	747,301.5168	32.399894	-103.532087	
8,275.00	3.07	195.65	8,265.05	-280.57	-21.02	510,121.2305	747,301.1795	32.399891	-103.532088	
8,300.00	3.13	193.83	8,290.02	-281.88	-21.36	510,119.9231	747,300.8358	32.399887	-103.532090	
8,325.00	3.12	196.20	8,314.98	-283.19	-21.72	510,118.6071	747,300.4828	32.399883	-103.532091	
8,350.00	3.23	194.59	8,339.94	-284.53	-22.08	510,117.2721	747,300.1156	32.399880	-103.532092	
8,375.00	3.43	196.43	8,364.90	-285.93	-22.47	510,115.8732	747,299.7267	32.399876	-103.532093	
8,400.00	3.09	193.41	8,389.86	-287.30	-22.84	510,114.5005	747,299.3589	32.399872	-103.532095	
8,425.00	3.21	194.28	8,414.82	-288.63	-23.17	510,113.1667	747,299.0300	32.399868	-103.532096	
8,450.00	3.20	193.33	8,439.78	-289.99	-23.50	510,111.8094	747,298.6964	32.399865	-103.532097	
8,475.00	3.17	193.91	8,464.74	-291.34	-23.83	510,110.4595	747,298.3694	32.399861	-103.532098	
8,500.00	3.07	193.51	8,489.71	-292.66	-24.15	510,109.1376	747,298.0468	32.399857	-103.532099	
8,525.00	3.01	192.05	8,514.67	-293.96	-24.45	510,107.8448	747,297.7534	32.399854	-103.532100	
8,550.00	3.10	192.08	8,539.64	-295.26	-24.73	510,106.5418	747,297.4749	32.399850	-103.532101	
8,575.00	3.12	192.40	8,564.60	-296.58	-25.01	510,105.2164	747,297.1873	32.399847	-103.532102	

Survey Report - Geographic

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tenderloin Federal 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3550.30ft (McVay 8)
Site:	Sec. 12, T 22 S. , R 33 E	MD Reference:	KB=26' @ 3550.30ft (McVay 8)
Well:	Tenderloin Federal 4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
8,600.00	3.19	192.92	8,589.56	-297.93	-25.31	510,103.8739	747,296.8857	32.399843	-103.532103	
8,625.00	3.22	191.91	8,614.52	-299.29	-25.61	510,102.5089	747,296.5853	32.399839	-103.532104	
8,650.00	3.40	191.97	8,639.48	-300.70	-25.91	510,101.0967	747,296.2866	32.399835	-103.532105	
8,675.00	3.10	192.81	8,664.44	-302.09	-26.22	510,099.7123	747,295.9830	32.399831	-103.532106	
8,700.00	3.37	183.62	8,689.40	-303.48	-26.41	510,098.3198	747,295.7867	32.399828	-103.532106	
8,725.00	3.52	177.70	8,714.36	-304.98	-26.43	510,096.8197	747,295.7711	32.399824	-103.532107	
8,750.00	3.66	179.76	8,739.31	-306.55	-26.39	510,095.2549	747,295.8053	32.399819	-103.532106	
8,775.00	4.09	179.01	8,764.25	-308.24	-26.38	510,093.5655	747,295.8240	32.399815	-103.532106	
8,800.00	3.68	176.72	8,789.19	-309.93	-26.31	510,091.8731	747,295.8853	32.399810	-103.532106	
8,825.00	3.69	175.86	8,814.14	-311.53	-26.21	510,090.2698	747,295.9893	32.399806	-103.532106	
8,850.00	3.77	175.41	8,839.09	-313.15	-26.09	510,088.6481	747,296.1132	32.399801	-103.532106	
8,875.00	3.84	175.92	8,864.03	-314.81	-25.96	510,086.9939	747,296.2385	32.399797	-103.532105	
8,900.00	4.42	173.27	8,888.97	-316.60	-25.79	510,085.2021	747,296.4110	32.399792	-103.532105	
8,925.00	4.20	169.29	8,913.90	-318.45	-25.51	510,083.3459	747,296.6940	32.399786	-103.532104	
8,950.00	4.22	168.89	8,938.83	-320.26	-25.16	510,081.5438	747,297.0414	32.399782	-103.532103	
8,975.00	4.33	168.74	8,963.76	-322.09	-24.80	510,079.7156	747,297.4029	32.399776	-103.532102	
9,000.00	4.08	167.17	8,988.69	-323.88	-24.42	510,077.9229	747,297.7847	32.399772	-103.532101	
9,025.00	3.76	166.52	9,013.63	-325.54	-24.03	510,076.2586	747,298.1732	32.399767	-103.532099	
9,050.00	3.72	166.98	9,038.58	-327.13	-23.65	510,074.6713	747,298.5470	32.399763	-103.532098	
9,075.00	4.49	169.07	9,063.52	-328.88	-23.28	510,072.9203	747,298.9153	32.399758	-103.532097	
9,100.00	4.07	169.67	9,088.45	-330.71	-22.94	510,071.0866	747,299.2599	32.399753	-103.532096	
9,125.00	4.25	169.03	9,113.38	-332.50	-22.60	510,069.3044	747,299.5953	32.399748	-103.532095	
9,150.00	4.39	169.76	9,138.31	-334.35	-22.26	510,067.4534	747,299.9417	32.399743	-103.532094	
9,175.00	4.58	173.40	9,163.23	-336.28	-21.97	510,065.5203	747,300.2265	32.399737	-103.532093	
9,200.00	4.74	175.80	9,188.15	-338.30	-21.78	510,063.4986	747,300.4169	32.399732	-103.532092	
9,225.00	4.77	176.37	9,213.06	-340.37	-21.64	510,061.4311	747,300.5583	32.399726	-103.532092	
9,250.00	5.00	175.26	9,237.97	-342.49	-21.49	510,059.3080	747,300.7142	32.399720	-103.532091	
9,275.00	5.16	175.52	9,262.88	-344.70	-21.31	510,057.1015	747,300.8920	32.399714	-103.532091	
9,300.00	5.07	174.94	9,287.78	-346.92	-21.12	510,054.8804	747,301.0772	32.399708	-103.532090	
9,325.00	4.93	175.00	9,312.68	-349.09	-20.93	510,052.7099	747,301.2683	32.399702	-103.532090	
9,350.00	4.65	175.58	9,337.59	-351.17	-20.76	510,050.6294	747,301.4400	32.399696	-103.532089	
9,375.00	4.29	176.45	9,362.52	-353.11	-20.62	510,048.6858	747,301.5760	32.399691	-103.532089	
9,400.00	3.91	176.24	9,387.45	-354.90	-20.51	510,046.9020	747,301.6898	32.399686	-103.532089	
9,425.00	3.94	176.75	9,412.39	-356.61	-20.41	510,045.1940	747,301.7944	32.399681	-103.532088	
9,450.00	4.37	175.30	9,437.33	-358.41	-20.28	510,043.3872	747,301.9211	32.399677	-103.532088	
9,475.00	4.62	171.97	9,462.25	-360.36	-20.06	510,041.4410	747,302.1398	32.399671	-103.532087	
9,500.00	4.91	172.00	9,487.17	-362.42	-19.77	510,039.3845	747,302.4294	32.399666	-103.532086	
9,525.00	5.13	173.69	9,512.07	-364.59	-19.50	510,037.2141	747,302.7011	32.399660	-103.532086	
9,550.00	5.45	172.59	9,536.96	-366.87	-19.22	510,034.9259	747,302.9771	32.399653	-103.532085	
9,575.00	5.87	172.33	9,561.84	-369.32	-18.90	510,032.4816	747,303.3008	32.399647	-103.532084	
9,600.00	6.00	172.02	9,586.71	-371.88	-18.55	510,029.9207	747,303.6528	32.399639	-103.532083	
9,625.00	5.90	172.35	9,611.57	-374.45	-18.19	510,027.3533	747,304.0053	32.399632	-103.532082	
9,650.00	5.65	171.50	9,636.45	-376.94	-17.84	510,024.8627	747,304.3582	32.399626	-103.532080	
9,675.00	5.41	171.26	9,661.33	-379.32	-17.48	510,022.4807	747,304.7192	32.399619	-103.532079	
9,700.00	5.28	170.22	9,686.22	-381.62	-17.11	510,020.1823	747,305.0937	32.399613	-103.532078	
9,725.00	5.02	169.68	9,711.12	-383.83	-16.72	510,017.9727	747,305.4850	32.399607	-103.532077	
9,750.00	4.69	168.40	9,736.03	-385.91	-16.31	510,015.8954	747,305.8865	32.399601	-103.532076	
9,775.00	4.52	167.96	9,760.95	-387.87	-15.90	510,013.9308	747,306.2975	32.399595	-103.532074	
9,800.00	4.27	167.87	9,785.88	-389.74	-15.50	510,012.0574	747,306.6985	32.399590	-103.532073	
9,825.00	4.06	169.27	9,810.81	-391.52	-15.14	510,010.2780	747,307.0589	32.399585	-103.532072	
9,850.00	3.98	169.32	9,835.75	-393.24	-14.82	510,008.5559	747,307.3844	32.399581	-103.532071	
9,875.00	3.94	171.65	9,860.69	-394.95	-14.53	510,006.8535	747,307.6699	32.399576	-103.532070	
9,900.00	3.92	173.63	9,885.63	-396.65	-14.31	510,005.1544	747,307.8895	32.399571	-103.532070	
9,925.00	3.84	174.76	9,910.57	-398.33	-14.14	510,003.4715	747,308.0607	32.399567	-103.532069	
9,950.00	3.89	176.15	9,935.52	-400.01	-14.01	510,001.7918	747,308.1941	32.399562	-103.532069	

Survey Report - Geographic

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tenderloin Federal 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3550.30ft (McVay 8)
Site:	Sec. 12, T 22 S., R 33 E	MD Reference:	KB=26' @ 3550.30ft (McVay 8)
Well:	Tenderloin Federal 4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,975.00	3.75	176.77	9,960.46	-401.67	-13.90	510,000.1295	747,308.2971	32.399557	-103.532068	
10,000.00	3.50	176.09	9,985.41	-403.25	-13.80	509,998.5519	747,308.3952	32.399553	-103.532068	
10,025.00	4.01	174.69	10,010.36	-404.88	-13.67	509,996.9202	747,308.5282	32.399549	-103.532068	
10,050.00	3.45	175.77	10,035.30	-406.50	-13.54	509,995.2996	747,308.6645	32.399544	-103.532067	
10,075.00	3.27	174.44	10,060.26	-407.96	-13.41	509,993.8398	747,308.7891	32.399540	-103.532067	
10,100.00	3.21	172.21	10,085.22	-409.36	-13.25	509,992.4366	747,308.9531	32.399536	-103.532066	
10,125.00	3.26	173.20	10,110.18	-410.76	-13.07	509,991.0373	747,309.1321	32.399532	-103.532066	
10,150.00	3.15	172.82	10,135.14	-412.15	-12.90	509,989.6500	747,309.3021	32.399529	-103.532065	
10,175.00	3.07	170.58	10,160.10	-413.49	-12.70	509,988.3081	747,309.4975	32.399525	-103.532065	
10,197.00	2.94	170.73	10,182.07	-414.63	-12.52	509,987.1701	747,309.6848	32.399522	-103.532064	
10,294.00	2.64	165.90	10,278.96	-419.25	-11.57	509,982.5484	747,310.6298	32.399509	-103.532061	
First MWD Survey @ 10294.00MD										
10,339.00	1.41	151.13	10,323.93	-420.74	-11.05	509,981.0583	747,311.1496	32.399505	-103.532060	
10,386.00	4.31	14.37	10,370.89	-419.54	-10.33	509,982.2637	747,311.8676	32.399508	-103.532057	
10,433.00	8.72	16.61	10,417.58	-414.41	-8.87	509,987.3911	747,313.3251	32.399522	-103.532052	
10,481.00	12.87	7.33	10,464.72	-405.62	-7.15	509,996.1844	747,315.0481	32.399547	-103.532047	
10,528.00	19.09	6.52	10,509.88	-392.78	-5.61	510,009.0246	747,316.5902	32.399582	-103.532041	
10,574.00	22.59	5.48	10,552.87	-376.50	-3.91	510,025.2980	747,318.2886	32.399626	-103.532035	
10,620.00	27.25	6.75	10,594.57	-357.24	-1.83	510,044.5615	747,320.3713	32.399679	-103.532028	
10,667.00	31.87	6.33	10,635.44	-334.21	0.81	510,067.5916	747,323.0054	32.399743	-103.532019	
10,684.30	33.61	6.14	10,650.00	-324.91	1.82	510,076.8924	747,324.0208	32.399768	-103.532016	
South 330' Hardline Crossing @ 10684.30MD										
10,714.00	36.60	5.84	10,674.29	-307.92	3.60	510,093.8773	747,325.8007	32.399815	-103.532009	
10,761.00	40.76	3.22	10,710.97	-278.65	5.89	510,123.1494	747,328.0893	32.399895	-103.532001	
10,808.00	45.97	2.35	10,745.13	-246.43	7.45	510,155.3723	747,329.6450	32.399984	-103.531995	
10,854.00	51.31	359.78	10,775.52	-211.93	8.05	510,189.8753	747,330.2546	32.400079	-103.531993	
10,901.00	57.48	357.69	10,802.87	-173.74	7.18	510,228.0566	747,329.3846	32.400184	-103.531994	
10,947.00	64.40	357.07	10,825.20	-133.60	5.34	510,268.1986	747,327.5404	32.400294	-103.531999	
10,994.00	70.29	357.94	10,843.30	-90.29	3.46	510,311.5116	747,325.6602	32.400413	-103.532005	
11,041.00	73.91	358.71	10,857.74	-45.59	2.16	510,356.2096	747,324.3562	32.400536	-103.532008	
11,088.00	78.20	358.33	10,869.07	0.00	0.98	510,401.7983	747,323.1769	32.400661	-103.532010	
11,142.00	81.21	357.63	10,878.71	53.09	-0.90	510,454.8893	747,321.3028	32.400807	-103.532015	
11,239.00	87.80	357.65	10,888.00	149.51	-4.87	510,551.3083	747,317.3292	32.401072	-103.532026	
11,334.00	89.68	357.57	10,890.09	244.40	-8.83	510,646.1983	747,313.3687	32.401333	-103.532036	
11,429.00	88.84	359.13	10,891.31	339.35	-11.57	510,741.1470	747,310.6335	32.401594	-103.532043	
11,524.00	89.65	359.02	10,892.57	434.33	-13.10	510,836.1254	747,309.1000	32.401855	-103.532045	
11,619.00	88.59	359.94	10,894.03	529.31	-13.96	510,931.1077	747,308.2378	32.402116	-103.532046	
11,715.00	88.92	359.65	10,896.11	625.29	-14.31	511,027.0840	747,307.8944	32.402380	-103.532045	
11,810.00	89.87	359.90	10,897.11	720.28	-14.68	511,122.0766	747,307.5214	32.402641	-103.532044	
11,905.00	90.55	359.89	10,896.77	815.28	-14.85	511,217.0751	747,307.3473	32.402902	-103.532042	
12,000.00	91.39	0.04	10,895.16	910.26	-14.91	511,312.0604	747,307.2893	32.403164	-103.532040	
12,094.00	89.85	0.04	10,894.14	1,004.25	-14.85	511,406.0518	747,307.3549	32.403422	-103.532037	
12,189.00	89.68	359.25	10,894.53	1,099.25	-15.43	511,501.0482	747,306.7663	32.403683	-103.532037	
12,285.00	90.74	358.67	10,894.18	1,195.23	-17.18	511,597.0298	747,305.0239	32.403947	-103.532040	
12,380.00	90.01	357.87	10,893.56	1,290.19	-20.04	511,691.9829	747,302.1560	32.404208	-103.532047	
12,475.00	90.29	357.40	10,893.31	1,385.10	-23.96	511,786.9011	747,298.2358	32.404469	-103.532058	
12,570.00	90.77	357.10	10,892.43	1,479.99	-28.52	511,881.7871	747,293.6781	32.404730	-103.532070	
12,666.00	89.59	357.60	10,892.13	1,575.88	-32.96	511,977.6817	747,289.2397	32.404993	-103.532082	
12,762.00	89.73	357.72	10,892.70	1,671.80	-36.88	512,073.5998	747,285.3202	32.405257	-103.532092	
12,858.00	90.63	359.56	10,892.40	1,767.77	-39.16	512,169.5669	747,283.0418	32.405521	-103.532097	
12,953.00	89.26	0.06	10,892.49	1,862.77	-39.47	512,264.5636	747,282.7268	32.405782	-103.532096	
13,049.00	89.45	359.99	10,893.57	1,958.76	-39.43	512,360.5573	747,282.7687	32.406046	-103.532094	
13,145.00	90.18	359.30	10,893.88	2,054.76	-40.03	512,456.5535	747,282.1739	32.406310	-103.532093	
13,241.00	89.03	0.25	10,894.54	2,150.75	-40.40	512,552.5476	747,281.7968	32.406574	-103.532092	
13,336.00	89.20	359.98	10,896.01	2,245.74	-40.21	512,647.5357	747,281.9875	32.406835	-103.532089	

Survey Report - Geographic

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tenderloin Federal 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3550.30ft (McVay 8)
Site:	Sec. 12, T 22 S., R 33 E	MD Reference:	KB=26' @ 3550.30ft (McVay 8)
Well:	Tenderloin Federal 4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
13,431.00	90.01	359.71	10,896.66	2,340.74	-40.47	512,742.5320	747,281.7305	32.407096	-103.532088	
13,528.00	90.88	359.16	10,895.91	2,437.73	-41.43	512,839.5229	747,280.7740	32.407363	-103.532089	
13,624.00	89.31	359.46	10,895.75	2,533.72	-42.58	512,935.5125	747,279.6180	32.407626	-103.532090	
13,719.00	90.07	359.08	10,896.26	2,628.71	-43.79	513,030.5023	747,278.4077	32.407888	-103.532092	
13,815.00	88.64	359.01	10,897.34	2,724.69	-45.39	513,126.4802	747,276.8078	32.408151	-103.532094	
13,911.00	88.75	358.68	10,899.53	2,820.64	-47.33	513,222.4355	747,274.8732	32.408415	-103.532098	
14,006.00	88.98	0.40	10,901.41	2,915.62	-48.09	513,317.4100	747,274.1107	32.408676	-103.532099	
14,102.00	89.73	0.68	10,902.49	3,011.60	-47.18	513,413.3986	747,275.0155	32.408940	-103.532093	
14,198.00	90.69	0.08	10,902.14	3,107.60	-46.55	513,509.3941	747,275.6521	32.409204	-103.532089	
14,293.00	90.57	0.13	10,901.10	3,202.59	-46.37	513,604.3880	747,275.8262	32.409465	-103.532086	
14,388.00	88.98	0.62	10,901.47	3,297.59	-45.75	513,699.3817	747,276.4480	32.409726	-103.532082	
14,483.00	89.40	0.49	10,902.81	3,392.57	-44.83	513,794.3674	747,277.3681	32.409987	-103.532076	
14,579.00	90.32	359.87	10,903.05	3,488.57	-44.53	513,890.3649	747,277.6696	32.410251	-103.532073	
14,674.00	88.67	1.03	10,903.88	3,583.56	-43.78	513,985.3532	747,278.4156	32.410512	-103.532068	
14,769.00	89.29	0.99	10,905.58	3,678.53	-42.11	514,080.3227	747,280.0898	32.410773	-103.532061	
14,865.00	89.73	0.52	10,906.40	3,774.52	-40.85	514,176.3102	747,281.3548	32.411037	-103.532054	
14,960.00	90.60	0.19	10,906.12	3,869.51	-40.26	514,271.3067	747,281.9434	32.411298	-103.532050	
15,074.00	89.20	1.13	10,906.32	3,983.50	-38.94	514,385.2947	747,283.2564	32.411611	-103.532043	
15,170.00	89.40	0.77	10,907.49	4,079.48	-37.35	514,481.2739	747,284.8480	32.411875	-103.532035	
15,265.00	89.29	359.87	10,908.58	4,174.47	-36.82	514,576.2650	747,285.3785	32.412136	-103.532031	
15,361.00	91.02	359.83	10,908.32	4,270.47	-37.07	514,672.2605	747,285.1272	32.412400	-103.532030	
15,457.00	91.61	359.17	10,906.12	4,366.44	-37.91	514,768.2304	747,284.2898	32.412664	-103.532030	
15,553.00	92.25	359.28	10,902.88	4,462.38	-39.21	514,864.1665	747,282.9920	32.412928	-103.532032	
15,648.00	91.08	357.98	10,900.12	4,557.30	-41.48	514,959.0954	747,280.7214	32.413189	-103.532037	
15,750.00	88.56	357.01	10,900.44	4,659.20	-45.94	515,060.9878	747,276.2638	32.413469	-103.532049	
15,845.00	88.36	356.91	10,903.00	4,754.03	-50.97	515,155.8196	747,271.2275	32.413729	-103.532063	
15,940.00	89.37	358.94	10,904.88	4,848.94	-54.41	515,250.7323	747,267.7890	32.413990	-103.532072	
16,036.00	91.08	0.84	10,904.50	4,944.93	-54.60	515,346.7232	747,267.6046	32.414254	-103.532070	
16,131.00	91.36	0.98	10,902.48	5,039.90	-53.09	515,441.6894	747,269.1130	32.414515	-103.532063	
16,226.00	91.22	1.03	10,900.34	5,134.86	-51.42	515,536.6505	747,270.7789	32.414776	-103.532055	
16,322.00	91.05	0.62	10,898.44	5,230.83	-50.04	515,632.6213	747,272.1608	32.415040	-103.532049	
16,417.00	90.71	0.11	10,896.98	5,325.82	-49.43	515,727.6075	747,272.7659	32.415301	-103.532044	
16,513.00	90.32	359.87	10,896.12	5,421.81	-49.45	515,823.6032	747,272.7492	32.415565	-103.532042	
16,608.00	90.13	359.75	10,895.74	5,516.81	-49.77	515,918.6017	747,272.4341	32.415826	-103.532041	
16,704.00	91.22	359.91	10,894.61	5,612.80	-50.05	516,014.5929	747,272.1493	32.416090	-103.532039	
16,799.00	91.95	359.75	10,891.99	5,707.77	-50.33	516,109.5553	747,271.8676	32.416351	-103.532038	
16,895.00	91.92	359.42	10,888.74	5,803.71	-51.03	516,205.4977	747,271.1726	32.416615	-103.532038	
16,990.00	91.75	359.34	10,885.70	5,898.66	-52.05	516,300.4432	747,270.1452	32.416876	-103.532039	
17,085.00	91.75	359.22	10,882.80	5,993.60	-53.25	516,395.3912	747,268.9520	32.417137	-103.532040	
17,181.00	91.78	358.86	10,879.84	6,089.54	-54.86	516,491.3318	747,267.3443	32.417400	-103.532043	
17,277.00	89.48	359.48	10,878.79	6,185.52	-56.25	516,587.3087	747,265.9540	32.417664	-103.532046	
17,372.00	89.12	359.51	10,879.95	6,280.51	-57.08	516,682.2976	747,265.1168	32.417925	-103.532046	
17,467.00	89.20	359.38	10,881.34	6,375.50	-58.00	516,777.2827	747,264.1966	32.418186	-103.532047	
17,563.00	89.20	359.13	10,882.68	6,471.48	-59.25	516,873.2650	747,262.9485	32.418450	-103.532048	
17,658.00	89.29	358.92	10,883.93	6,566.46	-60.87	516,968.2427	747,261.3322	32.418711	-103.532051	
17,753.00	90.55	359.65	10,884.07	6,661.45	-62.05	517,063.2325	747,260.1467	32.418972	-103.532053	
17,848.00	90.27	359.88	10,883.39	6,756.44	-62.44	517,158.2289	747,259.7571	32.419234	-103.532052	
17,943.00	90.29	359.24	10,882.92	6,851.44	-63.17	517,253.2243	747,259.0276	32.419495	-103.532052	
18,039.00	90.41	358.98	10,882.34	6,947.42	-64.66	517,349.2107	747,257.5364	32.419759	-103.532054	
18,134.00	90.49	358.68	10,881.59	7,042.40	-66.60	517,444.1876	747,255.5967	32.420020	-103.532058	
18,230.00	90.38	359.81	10,880.86	7,138.39	-67.87	517,540.1748	747,254.3318	32.420284	-103.532060	
18,325.00	90.38	359.99	10,880.23	7,233.39	-68.03	517,635.1723	747,254.1660	32.420545	-103.532058	
18,420.00	90.35	359.53	10,879.63	7,328.38	-68.43	517,730.1691	747,253.7681	32.420806	-103.532057	
18,516.00	90.91	359.32	10,878.57	7,424.37	-69.40	517,826.1578	747,252.8047	32.421070	-103.532058	
18,611.00	91.10	358.61	10,876.90	7,519.34	-71.11	517,921.1269	747,251.0890	32.421331	-103.532061	

Survey Report - Geographic

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tenderloin Federal 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3550.30ft (McVay 8)
Site:	Sec. 12, T 22 S. , R 33 E	MD Reference:	KB=26' @ 3550.30ft (McVay 8)
Well:	Tenderloin Federal 4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
18,706.00	91.58	358.68	10,874.68	7,614.29	-73.36	518,016.0739	747,248.8432	32.421592	-103.532066
18,801.00	90.32	359.04	10,873.11	7,709.26	-75.25	518,111.0398	747,246.9535	32.421853	-103.532070
18,897.00	90.21	358.86	10,872.66	7,805.24	-77.01	518,207.0224	747,245.1943	32.422117	-103.532073
18,998.00	90.52	0.84	10,872.02	7,906.23	-77.27	518,308.0146	747,244.9299	32.422394	-103.532072
19,080.00	90.46	0.96	10,871.32	7,988.22	-75.98	518,390.0013	747,246.2178	32.422620	-103.532066
19,175.00	89.79	1.01	10,871.11	8,083.20	-74.35	518,484.9863	747,247.8509	32.422881	-103.532058
19,271.00	89.29	0.68	10,871.88	8,179.19	-72.93	518,580.9722	747,249.2667	32.423144	-103.532051
19,367.00	88.47	0.44	10,873.76	8,275.16	-72.00	518,676.9482	747,250.2048	32.423408	-103.532046
19,462.00	89.71	0.60	10,875.27	8,370.15	-71.13	518,771.9302	747,251.0668	32.423669	-103.532041
19,557.00	89.34	0.41	10,876.06	8,465.14	-70.30	518,866.9228	747,251.9041	32.423930	-103.532036
19,653.00	90.35	0.76	10,876.32	8,561.13	-69.32	518,962.9159	747,252.8843	32.424194	-103.532030
19,748.00	90.63	0.49	10,875.50	8,656.12	-68.28	519,057.9064	747,253.9205	32.424455	-103.532025
19,843.00	90.52	0.49	10,874.55	8,751.12	-67.47	519,152.8980	747,254.7329	32.424716	-103.532020
19,939.00	90.18	0.00	10,873.96	8,847.11	-67.06	519,248.8947	747,255.1434	32.424980	-103.532016
20,034.00	90.27	0.28	10,873.59	8,942.11	-66.82	519,343.8934	747,255.3755	32.425241	-103.532013
20,129.00	90.15	0.21	10,873.24	9,037.11	-66.42	519,438.8916	747,255.7817	32.425502	-103.532009
20,224.00	90.07	0.32	10,873.06	9,132.11	-65.98	519,533.8902	747,256.2211	32.425763	-103.532005
20,319.00	89.71	0.33	10,873.24	9,227.11	-65.44	519,628.8882	747,256.7600	32.426025	-103.532001
20,414.00	89.37	0.02	10,874.00	9,322.10	-65.15	519,723.8842	747,257.0501	32.426286	-103.531998
20,509.00	89.06	359.74	10,875.31	9,417.09	-65.35	519,818.8747	747,256.8512	32.426547	-103.531997
20,604.00	89.60	357.60	10,876.42	9,512.06	-67.55	519,913.8366	747,254.6464	32.426808	-103.532001
20,668.53	89.61	359.10	10,876.86	9,576.56	-69.41	519,978.3363	747,252.7890	32.426985	-103.532006
North 330' Hardline Crossing @ 20668.53'MD									
20,699.00	89.62	359.81	10,877.06	9,607.02	-69.70	520,008.8040	747,252.4995	32.427069	-103.532006
20,728.00	89.68	359.92	10,877.24	9,636.02	-69.77	520,037.8033	747,252.4312	32.427149	-103.532006
Final MWD Survey @ 20728'MD									
20,785.00	89.68	359.92	10,877.56	9,693.02	-69.85	520,094.8023	747,252.3516	32.427305	-103.532004
Projection to TD @ 20785'MD									

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
10,294.00	10,278.96	-419.25	-11.57	First MWD Survey @ 10294'MD
10,684.30	10,650.00	-324.91	1.82	South 330' Hardline Crossing @ 10684.30'MD
20,668.53	10,876.86	9,576.56	-69.41	North 330' Hardline Crossing @ 20668.53'MD
20,728.00	10,877.24	9,636.02	-69.77	Final MWD Survey @ 20728'MD
20,785.00	10,877.56	9,693.02	-69.85	Projection to TD @ 20785'MD

Checked By: _____ Approved By: _____ Date: _____