



C O N C H O

COG Operating L L C

Lea County, NM (NAD27 NME)

Sec. 8, T 26 S. , R 33 E

Tigercat Federal Com #1H

Wellbore #1

Design: Wellbore #1

Standard Survey Report

19 February, 2018

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tigercat Federal Com #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3348.00ft (Scandril Freedom)
Site:	Sec. 8, T 26 S. , R 33 E	MD Reference:	KB=26' @ 3348.00ft (Scandril Freedom)
Well:	Tigercat Federal Com #1H	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. 8, T 26 S. , R 33 E		
Site Position:		Northing:	387,851.4000 usft
From:	Map	Easting:	728,086.5000 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "
		Latitude:	32.064180
		Longitude:	-103.597054
		Grid Convergence:	0.39 °

Well	Tigercat Federal Com #1H, ACTIVE		
Well Position	+N/-S	0.00 ft	Northing: 387,868.9000 usft
	+E/-W	0.00 ft	Easting: 730,106.1000 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	0.00 ft
		Latitude:	32.064190
		Longitude:	-103.590534
		Ground Level:	3,322.00 ft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	HDGM	1/2/2018	6.80
			Dip Angle (°)
			59.73
			Field Strength (nT)
			47,873

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)
	0.00	0.00	0.00
			Direction (°)
			176.02

Survey Program	Date 2/19/2018		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name
100.00	9,670.00	Gyro Surveys (Wellbore #1)	Keeper
9,750.00	20,302.00	MWD Surveys (Wellbore #1)	MWD
			Description
			Standard Wireline Keeper ver 1.0.2
			MWD - Standard

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Buid Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.45	114.22	100.00	-0.16	0.36	0.19	0.45	0.45	0.00
125.00	0.67	97.57	125.00	-0.22	0.59	0.26	1.09	0.88	-66.60
150.00	0.72	87.81	150.00	-0.23	0.89	0.30	0.51	0.20	-39.04
175.00	0.74	78.83	174.99	-0.20	1.21	0.28	0.46	0.08	-35.92
200.00	0.74	77.10	199.99	-0.13	1.53	0.23	0.09	0.00	-6.92
225.00	0.74	92.91	224.99	-0.10	1.84	0.23	0.81	0.00	63.24
250.00	0.66	86.48	249.99	-0.10	2.15	0.25	0.45	-0.32	-25.72
275.00	0.69	84.47	274.99	-0.08	2.44	0.25	0.15	0.12	-8.04
300.00	0.68	89.76	299.98	-0.06	2.74	0.25	0.26	-0.04	21.16

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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)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
325.00	0.77	76.47	324.98	-0.02	3.05	0.23	0.76	0.36	-53.16	
350.00	0.73	87.07	349.98	0.03	3.37	0.21	0.58	-0.16	42.40	
375.00	0.64	81.94	374.98	0.05	3.67	0.20	0.44	-0.36	-20.52	
400.00	0.57	89.84	399.98	0.07	3.93	0.20	0.43	-0.28	31.60	
425.00	0.51	93.74	424.98	0.07	4.17	0.22	0.28	-0.24	15.60	
450.00	0.49	90.72	449.98	0.06	4.39	0.25	0.13	-0.08	-12.08	
475.00	0.31	83.44	474.97	0.06	4.56	0.25	0.75	-0.72	-29.12	
500.00	0.26	88.06	499.97	0.07	4.69	0.25	0.22	-0.20	18.48	
525.00	0.23	84.35	524.97	0.08	4.79	0.25	0.14	-0.12	-14.84	
550.00	0.23	102.43	549.97	0.07	4.89	0.27	0.29	0.00	72.32	
575.00	0.12	129.12	574.97	0.05	4.96	0.30	0.54	-0.44	106.76	
600.00	0.22	131.23	599.97	0.00	5.02	0.35	0.40	0.40	8.44	
625.00	0.17	92.99	624.97	-0.03	5.09	0.39	0.54	-0.20	-152.96	
650.00	0.10	155.06	649.97	-0.06	5.14	0.41	0.61	-0.28	248.28	
675.00	0.06	243.72	674.97	-0.08	5.13	0.44	0.46	-0.16	354.64	
700.00	0.20	290.12	699.97	-0.07	5.08	0.43	0.66	0.56	185.60	
725.00	0.32	278.01	724.97	-0.05	4.97	0.39	0.53	0.48	-48.44	
750.00	0.35	270.89	749.97	-0.04	4.83	0.37	0.21	0.12	-28.48	
775.00	0.38	295.37	774.97	0.00	4.67	0.33	0.63	0.12	97.92	
800.00	0.39	294.53	799.97	0.07	4.52	0.24	0.05	0.04	-3.36	
825.00	0.41	288.64	824.97	0.13	4.36	0.17	0.18	0.08	-23.56	
850.00	0.48	273.26	849.97	0.17	4.17	0.12	0.55	0.28	-61.52	
875.00	0.46	278.22	874.97	0.19	3.97	0.09	0.18	-0.08	19.84	
900.00	0.43	253.28	899.97	0.18	3.78	0.09	0.78	-0.12	-99.76	
925.00	0.44	265.35	924.97	0.14	3.59	0.11	0.37	0.04	48.28	
950.00	0.50	265.04	949.97	0.12	3.39	0.11	0.24	0.24	-1.24	
975.00	0.37	263.58	974.97	0.11	3.20	0.12	0.52	-0.52	-5.84	
1,000.00	0.45	138.47	999.97	0.02	3.18	0.20	2.91	0.32	-500.44	
1,025.00	1.25	114.35	1,024.96	-0.16	3.50	0.40	3.44	3.20	-96.48	
1,050.00	1.72	116.35	1,049.95	-0.44	4.08	0.72	1.89	1.88	8.00	
1,075.00	1.92	113.77	1,074.94	-0.78	4.80	1.11	0.86	0.80	-10.32	
1,100.00	1.99	107.51	1,099.93	-1.08	5.60	1.46	0.90	0.28	-25.04	
1,125.00	2.15	111.81	1,124.91	-1.38	6.45	1.83	0.89	0.64	17.20	
1,150.00	2.11	111.09	1,149.89	-1.72	7.31	2.22	0.19	-0.16	-2.88	
1,175.00	2.11	113.16	1,174.88	-2.07	8.17	2.63	0.30	0.00	8.28	
1,200.00	2.24	107.86	1,199.86	-2.40	9.05	3.02	0.96	0.52	-21.20	
1,225.00	2.25	109.23	1,224.84	-2.71	9.98	3.40	0.22	0.04	5.48	
1,250.00	2.25	105.62	1,249.82	-3.00	10.92	3.75	0.57	0.00	-14.44	
1,275.00	2.39	101.71	1,274.80	-3.24	11.90	4.06	0.84	0.56	-15.64	
1,300.00	2.68	95.69	1,299.78	-3.41	12.99	4.30	1.57	1.16	-24.08	
1,325.00	2.80	90.76	1,324.75	-3.47	14.19	4.45	1.06	0.48	-19.72	
1,350.00	2.92	88.18	1,349.72	-3.46	15.43	4.52	0.70	0.48	-10.32	
1,375.00	2.91	88.22	1,374.68	-3.42	16.70	4.57	0.04	-0.04	0.16	

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1,400.00	2.97	89.04	1,399.65	-3.39	17.98	4.63	0.29	0.24	3.28	
1,425.00	3.03	87.27	1,424.62	-3.35	19.29	4.68	0.44	0.24	-7.08	
1,450.00	3.17	88.33	1,449.58	-3.29	20.64	4.72	0.61	0.56	4.24	
1,475.00	3.26	86.57	1,474.54	-3.23	22.04	4.75	0.53	0.36	-7.04	
1,500.00	3.32	84.00	1,499.50	-3.11	23.47	4.74	0.64	0.24	-10.28	
1,525.00	3.39	85.08	1,524.46	-2.97	24.93	4.70	0.38	0.28	4.32	
1,550.00	3.55	82.97	1,549.41	-2.82	26.43	4.64	0.82	0.64	-8.44	
1,575.00	3.71	79.44	1,574.36	-2.57	28.00	4.51	1.10	0.64	-14.12	
1,600.00	3.69	77.60	1,599.31	-2.25	29.58	4.30	0.48	-0.08	-7.36	
1,625.00	3.76	76.32	1,624.26	-1.89	31.16	4.04	0.43	0.28	-5.12	
1,650.00	3.96	74.68	1,649.20	-1.46	32.79	3.74	0.91	0.80	-6.56	
1,675.00	4.00	75.83	1,674.14	-1.02	34.47	3.41	0.36	0.16	4.60	
1,700.00	4.04	75.67	1,699.08	-0.59	36.17	3.10	0.17	0.16	-0.64	
1,725.00	4.10	74.90	1,724.01	-0.14	37.88	2.77	0.32	0.24	-3.08	
1,750.00	4.07	75.62	1,748.95	0.31	39.60	2.44	0.24	-0.12	2.88	
1,775.00	4.13	74.62	1,773.89	0.77	41.33	2.10	0.37	0.24	-4.00	
1,800.00	4.05	74.17	1,798.82	1.25	43.05	1.74	0.34	-0.32	-1.80	
1,825.00	3.91	72.00	1,823.76	1.76	44.71	1.35	0.82	-0.56	-8.68	
1,850.00	3.43	70.37	1,848.71	2.27	46.22	0.94	1.96	-1.92	-6.52	
1,875.00	3.34	69.23	1,873.67	2.78	47.61	0.53	0.45	-0.36	-4.56	
1,900.00	3.37	67.98	1,898.62	3.31	48.97	0.09	0.32	0.12	-5.00	
1,925.00	3.36	67.14	1,923.58	3.87	50.33	-0.37	0.20	-0.04	-3.36	
1,950.00	3.33	66.73	1,948.54	4.45	51.67	-0.85	0.15	-0.12	-1.64	
1,975.00	3.28	67.47	1,973.50	5.01	53.00	-1.32	0.26	-0.20	2.96	
2,000.00	3.41	66.97	1,998.45	5.57	54.34	-1.79	0.53	0.52	-2.00	
2,025.00	3.56	65.77	2,023.41	6.18	55.73	-2.30	0.67	0.60	-4.80	
2,050.00	3.67	65.25	2,048.36	6.83	57.17	-2.85	0.46	0.44	-2.08	
2,075.00	3.61	64.92	2,073.31	7.50	58.61	-3.42	0.25	-0.24	-1.32	
2,100.00	3.78	66.18	2,098.26	8.17	60.08	-3.98	0.75	0.68	5.04	
2,125.00	3.89	64.70	2,123.20	8.86	61.60	-4.57	0.59	0.44	-5.92	
2,150.00	3.92	65.74	2,148.14	9.58	63.14	-5.17	0.31	0.12	4.16	
2,175.00	3.85	64.88	2,173.09	10.28	64.68	-5.77	0.36	-0.28	-3.44	
2,200.00	3.77	64.68	2,198.03	10.99	66.18	-6.37	0.32	-0.32	-0.80	
2,225.00	3.39	66.16	2,222.98	11.64	67.60	-6.92	1.56	-1.52	5.92	
2,250.00	3.38	66.44	2,247.94	12.24	68.95	-7.42	0.08	-0.04	1.12	
2,275.00	3.44	66.29	2,272.89	12.83	70.32	-7.92	0.24	0.24	-0.60	
2,300.00	3.42	65.29	2,297.85	13.45	71.68	-8.44	0.25	-0.08	-4.00	
2,325.00	3.48	65.92	2,322.80	14.07	73.05	-8.96	0.28	0.24	2.52	
2,350.00	3.43	65.96	2,347.76	14.68	74.43	-9.48	0.20	-0.20	0.16	
2,375.00	3.54	64.38	2,372.71	15.32	75.81	-10.02	0.58	0.44	-6.32	
2,400.00	3.66	62.53	2,397.66	16.02	77.21	-10.62	0.67	0.48	-7.40	
2,425.00	3.62	62.39	2,422.61	16.76	78.62	-11.26	0.16	-0.16	-0.56	
2,450.00	3.59	64.01	2,447.56	17.46	80.02	-11.87	0.42	-0.12	6.48	

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2,475.00	3.70	63.36	2,472.51	18.17	81.44	-12.47	0.47	0.44	-2.60
2,500.00	3.33	61.61	2,497.46	18.88	82.80	-13.08	1.54	-1.48	-7.00
2,525.00	3.10	61.20	2,522.43	19.55	84.04	-13.67	0.92	-0.92	-1.64
2,550.00	2.89	60.86	2,547.39	20.18	85.18	-14.22	0.84	-0.84	-1.36
2,575.00	2.73	57.62	2,572.36	20.81	86.23	-14.77	0.90	-0.64	-12.96
2,600.00	2.70	56.45	2,597.33	21.45	87.22	-15.34	0.25	-0.12	-4.68
2,625.00	2.73	58.10	2,622.30	22.09	88.22	-15.91	0.33	0.12	6.60
2,650.00	2.78	57.49	2,647.28	22.73	89.24	-16.48	0.23	0.20	-2.44
2,675.00	2.81	56.65	2,672.25	23.39	90.26	-17.07	0.20	0.12	-3.36
2,700.00	2.87	56.93	2,697.22	24.07	91.30	-17.68	0.25	0.24	1.12
2,725.00	3.03	55.13	2,722.18	24.79	92.36	-18.32	0.74	0.64	-7.20
2,750.00	3.17	54.91	2,747.15	25.57	93.47	-19.02	0.56	0.56	-0.88
2,775.00	3.39	57.21	2,772.10	26.36	94.66	-19.73	1.03	0.88	9.20
2,800.00	3.51	55.61	2,797.06	27.20	95.91	-20.47	0.62	0.48	-6.40
2,825.00	3.43	57.18	2,822.01	28.03	97.17	-21.22	0.50	-0.32	6.28
2,850.00	3.38	59.20	2,846.97	28.82	98.43	-21.91	0.52	-0.20	8.08
2,875.00	3.15	66.21	2,871.93	29.47	99.69	-22.48	1.84	-0.92	28.04
2,900.00	3.03	72.08	2,896.89	29.95	100.95	-22.87	1.35	-0.48	23.48
2,925.00	3.08	72.94	2,921.86	30.35	102.22	-23.18	0.27	0.20	3.44
2,950.00	3.05	74.54	2,946.82	30.73	103.51	-23.47	0.36	-0.12	6.40
2,975.00	3.19	72.47	2,971.78	31.11	104.81	-23.76	0.72	0.56	-8.28
3,000.00	3.24	67.58	2,996.75	31.59	106.13	-24.15	1.11	0.20	-19.56
3,025.00	3.22	67.82	3,021.71	32.13	107.43	-24.59	0.10	-0.08	0.96
3,050.00	3.34	64.93	3,046.66	32.70	108.74	-25.07	0.82	0.48	-11.56
3,075.00	3.38	61.95	3,071.62	33.35	110.05	-25.64	0.72	0.16	-11.92
3,100.00	3.34	64.79	3,096.58	34.01	111.36	-26.20	0.68	-0.16	11.36
3,125.00	3.46	64.32	3,121.53	34.65	112.70	-26.74	0.49	0.48	-1.88
3,150.00	3.66	63.72	3,146.49	35.33	114.09	-27.32	0.81	0.80	-2.40
3,175.00	3.75	63.50	3,171.43	36.05	115.54	-27.94	0.36	0.36	-0.88
3,200.00	3.71	63.60	3,196.38	36.77	117.00	-28.56	0.16	-0.16	0.40
3,225.00	3.60	65.78	3,221.33	37.45	118.44	-29.14	0.71	-0.44	8.72
3,250.00	3.47	70.54	3,246.28	38.03	119.87	-29.62	1.28	-0.52	19.04
3,275.00	3.34	76.62	3,271.24	38.45	121.29	-29.94	1.53	-0.52	24.32
3,300.00	3.34	80.27	3,296.20	38.74	122.71	-30.13	0.85	0.00	14.60
3,325.00	3.41	80.05	3,321.15	38.99	124.16	-30.28	0.28	0.28	-0.88
3,350.00	3.44	78.69	3,346.11	39.27	125.63	-30.45	0.35	0.12	-5.44
3,375.00	3.42	79.69	3,371.06	39.55	127.10	-30.63	0.25	-0.08	4.00
3,400.00	3.33	79.06	3,396.02	39.82	128.55	-30.80	0.39	-0.36	-2.52
3,425.00	3.13	76.76	3,420.98	40.11	129.92	-31.00	0.95	-0.80	-9.20
3,450.00	2.93	72.96	3,445.95	40.46	131.20	-31.25	1.13	-0.80	-15.20
3,475.00	3.02	74.30	3,470.91	40.82	132.44	-31.53	0.45	0.36	5.36
3,500.00	2.99	73.13	3,495.88	41.19	133.70	-31.81	0.27	-0.12	-4.68
3,525.00	3.08	72.21	3,520.84	41.58	134.97	-32.11	0.41	0.36	-3.68
3,550.00	2.99	72.90	3,545.81	41.98	136.23	-32.42	0.39	-0.36	2.76

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tigercat Federal Com #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3348.00ft (Scandril Freedom)
Site:	Sec. 8, T 26 S., R 33 E	MD Reference:	KB=26' @ 3348.00ft (Scandril Freedom)
Well:	Tigercat Federal Com #1H	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)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
3,575.00	3.04	72.27	3,570.77	42.37	137.48	-32.73	0.24	0.20	-2.52
3,600.00	3.14	74.17	3,595.74	42.76	138.77	-33.03	0.57	0.40	7.60
3,625.00	3.40	73.48	3,620.70	43.16	140.14	-33.33	1.05	1.04	-2.76
3,650.00	3.66	75.00	3,645.65	43.58	141.62	-33.64	1.11	1.04	6.08
3,675.00	3.69	76.21	3,670.60	43.98	143.18	-33.93	0.33	0.12	4.84
3,700.00	3.71	75.03	3,695.54	44.38	144.74	-34.22	0.31	0.08	-4.72
3,725.00	3.88	74.48	3,720.49	44.81	146.34	-34.55	0.70	0.68	-2.20
3,750.00	3.93	74.96	3,745.43	45.26	147.98	-34.88	0.24	0.20	1.92
3,775.00	3.71	75.39	3,770.38	45.69	149.59	-35.19	0.89	-0.88	1.72
3,800.00	3.20	75.15	3,795.33	46.07	151.05	-35.47	2.04	-2.04	-0.96
3,825.00	1.98	67.33	3,820.30	46.41	152.12	-35.74	5.07	-4.88	-31.28
3,850.00	1.48	69.68	3,845.29	46.69	152.82	-35.97	2.02	-2.00	9.40
3,875.00	1.18	74.19	3,870.29	46.87	153.37	-36.12	1.27	-1.20	18.04
3,900.00	1.14	82.69	3,895.28	46.98	153.86	-36.18	0.71	-0.16	34.00
3,925.00	1.15	85.26	3,920.28	47.03	154.36	-36.20	0.21	0.04	10.28
3,950.00	1.16	95.67	3,945.27	47.02	154.86	-36.16	0.84	0.04	41.64
3,975.00	1.26	100.24	3,970.27	46.95	155.38	-36.05	0.56	0.40	18.28
4,000.00	1.40	108.14	3,995.26	46.81	155.95	-35.87	0.92	0.56	31.60
4,025.00	1.42	114.66	4,020.25	46.58	156.52	-35.61	0.65	0.08	26.08
4,050.00	1.60	115.80	4,045.24	46.30	157.11	-35.28	0.73	0.72	4.56
4,075.00	1.80	113.41	4,070.23	45.99	157.79	-34.93	0.85	0.80	-9.56
4,100.00	2.16	101.85	4,095.22	45.74	158.61	-34.62	2.14	1.44	-46.24
4,125.00	2.63	96.88	4,120.19	45.58	159.64	-34.39	2.05	1.88	-19.88
4,150.00	3.04	92.90	4,145.16	45.47	160.87	-34.20	1.82	1.64	-15.92
4,175.00	3.61	88.95	4,170.12	45.45	162.32	-34.08	2.46	2.28	-15.80
4,200.00	3.95	84.91	4,195.07	45.54	163.96	-34.05	1.73	1.36	-16.16
4,225.00	4.13	83.62	4,220.01	45.72	165.72	-34.11	0.81	0.72	-5.16
4,250.00	4.19	81.27	4,244.94	45.96	167.51	-34.22	0.72	0.24	-9.40
4,275.00	4.20	78.32	4,269.87	46.28	169.31	-34.42	0.86	0.04	-11.80
4,300.00	4.17	70.95	4,294.81	46.77	171.07	-34.78	2.15	-0.12	-29.48
4,325.00	4.14	66.35	4,319.74	47.42	172.76	-35.32	1.34	-0.12	-18.40
4,350.00	3.95	62.52	4,344.68	48.18	174.35	-35.97	1.32	-0.76	-15.32
4,375.00	3.76	57.59	4,369.62	49.02	175.80	-36.70	1.53	-0.76	-19.72
4,400.00	3.82	52.81	4,394.57	49.96	177.16	-37.55	1.29	0.24	-19.12
4,425.00	3.52	51.16	4,419.52	50.95	178.42	-38.44	1.27	-1.20	-6.60
4,450.00	3.38	51.05	4,444.47	51.89	179.59	-39.30	0.56	-0.56	-0.44
4,475.00	3.10	50.80	4,469.43	52.78	180.69	-40.11	1.12	-1.12	-1.00
4,500.00	2.94	53.23	4,494.40	53.59	181.72	-40.85	0.82	-0.64	9.72
4,525.00	2.88	53.85	4,519.36	54.35	182.74	-41.53	0.27	-0.24	2.48
4,550.00	2.75	55.44	4,544.33	55.06	183.75	-42.17	0.61	-0.52	6.36
4,575.00	2.64	57.90	4,569.31	55.71	184.73	-42.75	0.64	-0.44	9.84
4,600.00	2.54	65.62	4,594.28	56.24	185.72	-43.21	1.45	-0.40	30.88
4,625.00	2.51	69.73	4,619.26	56.66	186.74	-43.56	0.73	-0.12	16.44

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tigercat Federal Com #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3348.00ft (Scandril Freedom)
Site:	Sec. 8, T 26 S., R 33 E	MD Reference:	KB=26' @ 3348.00ft (Scandril Freedom)
Well:	Tigercat Federal Com #1H	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)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
4,650.00	2.56	71.12	4,644.23	57.03	187.78	-43.86	0.32	0.20	5.56	
4,675.00	2.60	72.22	4,669.21	57.38	188.85	-44.14	0.25	0.16	4.40	
4,700.00	2.61	72.05	4,694.18	57.73	189.93	-44.41	0.05	0.04	-0.68	
4,725.00	2.62	75.83	4,719.15	58.05	191.02	-44.65	0.69	0.04	15.12	
4,750.00	2.67	76.46	4,744.13	58.32	192.14	-44.85	0.23	0.20	2.52	
4,775.00	2.71	75.89	4,769.10	58.60	193.28	-45.05	0.19	0.16	-2.28	
4,800.00	2.73	74.97	4,794.07	58.90	194.43	-45.26	0.19	0.08	-3.68	
4,825.00	2.94	74.92	4,819.04	59.22	195.63	-45.50	0.84	0.84	-0.20	
4,850.00	2.93	76.52	4,844.01	59.54	196.87	-45.73	0.33	-0.04	6.40	
4,875.00	2.95	76.45	4,868.98	59.84	198.11	-45.94	0.08	0.08	-0.28	
4,900.00	2.99	75.51	4,893.94	60.15	199.37	-46.17	0.25	0.16	-3.76	
4,925.00	3.00	73.93	4,918.91	60.50	200.63	-46.42	0.33	0.04	-6.32	
4,950.00	3.06	72.85	4,943.87	60.87	201.90	-46.71	0.33	0.24	-4.32	
4,975.00	3.11	76.25	4,968.84	61.23	203.19	-46.98	0.76	0.20	13.60	
5,000.00	3.07	76.90	4,993.80	61.54	204.50	-47.20	0.21	-0.16	2.60	
5,025.00	3.18	75.40	5,018.76	61.87	205.83	-47.44	0.55	0.44	-6.00	
5,050.00	3.35	74.85	5,043.72	62.24	207.20	-47.71	0.69	0.68	-2.20	
5,075.00	3.32	75.39	5,068.68	62.61	208.61	-47.98	0.17	-0.12	2.16	
5,100.00	3.37	76.81	5,093.64	62.96	210.02	-48.23	0.39	0.20	5.68	
5,125.00	3.41	76.56	5,118.59	63.30	211.46	-48.47	0.17	0.16	-1.00	
5,150.00	3.56	76.04	5,143.55	63.66	212.94	-48.73	0.61	0.60	-2.08	
5,175.00	3.54	74.67	5,168.50	64.05	214.44	-49.01	0.35	-0.08	-5.48	
5,200.00	3.50	74.68	5,193.45	64.46	215.92	-49.32	0.16	-0.16	0.04	
5,225.00	3.46	75.06	5,218.41	64.85	217.38	-49.61	0.18	-0.16	1.52	
5,250.00	3.57	75.69	5,243.36	65.24	218.86	-49.89	0.47	0.44	2.52	
5,275.00	3.57	74.04	5,268.31	65.65	220.37	-50.19	0.41	0.00	-6.60	
5,300.00	3.56	75.21	5,293.26	66.06	221.87	-50.50	0.29	-0.04	4.68	
5,325.00	3.54	73.46	5,318.22	66.48	223.36	-50.81	0.44	-0.08	-7.00	
5,350.00	3.56	74.99	5,343.17	66.90	224.85	-51.13	0.39	0.08	6.12	
5,375.00	3.59	73.35	5,368.12	67.32	226.35	-51.45	0.43	0.12	-6.56	
5,400.00	3.46	74.51	5,393.07	67.75	227.82	-51.77	0.59	-0.52	4.64	
5,425.00	3.49	74.64	5,418.03	68.15	229.28	-52.07	0.12	0.12	0.52	
5,450.00	3.49	74.98	5,442.98	68.55	230.75	-52.37	0.08	0.00	1.36	
5,475.00	3.47	73.73	5,467.93	68.96	232.21	-52.68	0.31	-0.08	-5.00	
5,500.00	3.49	74.74	5,492.89	69.37	233.67	-52.99	0.26	0.08	4.04	
5,525.00	3.49	72.07	5,517.84	69.81	235.13	-53.32	0.65	0.00	-10.68	
5,550.00	3.53	71.74	5,542.79	70.28	236.59	-53.69	0.18	0.16	-1.32	
5,575.00	3.59	71.69	5,567.75	70.77	238.06	-54.08	0.24	0.24	-0.20	
5,600.00	3.60	70.55	5,592.70	71.28	239.54	-54.48	0.29	0.04	-4.56	
5,625.00	3.72	70.10	5,617.64	71.81	241.05	-54.91	0.49	0.48	-1.80	
5,650.00	3.81	66.82	5,642.59	72.42	242.57	-55.41	0.93	0.36	-13.12	
5,675.00	3.80	65.47	5,667.54	73.09	244.09	-55.97	0.36	-0.04	-5.40	
5,700.00	3.84	65.39	5,692.48	73.78	245.60	-56.56	0.16	0.16	-0.32	



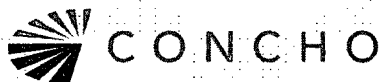
Survey Report

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tigercat Federal Com #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3348.00ft (Scandrift Freedom)
Site:	Sec. 8, T 26 S., R 33 E	MD Reference:	KB=26' @ 3348.00ft (Scandrift Freedom)
Well:	Tigercat Federal Com #1H	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)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,725.00	3.79	66.88	5,717.42	74.45	247.13	-57.12	0.44	-0.20	5.96
5,750.00	3.87	66.20	5,742.37	75.12	248.66	-57.68	0.37	0.32	-2.72
5,775.00	3.86	66.85	5,767.31	75.79	250.20	-58.24	0.18	-0.04	2.60
5,800.00	3.84	66.10	5,792.26	76.46	251.74	-58.80	0.22	-0.08	-3.00
5,825.00	3.84	64.59	5,817.20	77.16	253.26	-59.39	0.40	0.00	-6.04
5,850.00	3.74	64.43	5,842.15	77.87	254.75	-60.00	0.40	-0.40	-0.64
5,875.00	3.72	65.07	5,867.09	78.56	256.23	-60.59	0.18	-0.08	2.56
5,900.00	3.69	64.89	5,892.04	79.25	257.69	-61.17	0.13	-0.12	-0.72
5,925.00	3.55	63.42	5,916.99	79.93	259.11	-61.76	0.67	-0.56	-5.88
5,950.00	3.40	64.06	5,941.94	80.60	260.47	-62.33	0.62	-0.60	2.56
5,975.00	3.47	64.73	5,966.90	81.25	261.82	-62.88	0.32	0.28	2.68
6,000.00	3.53	66.66	5,991.85	81.88	263.21	-63.41	0.53	0.24	7.72
6,025.00	3.55	66.42	6,016.80	82.49	264.63	-63.93	0.10	0.08	-0.96
6,050.00	3.59	65.47	6,041.76	83.13	266.05	-64.46	0.29	0.16	-3.80
6,075.00	3.56	64.64	6,066.71	83.79	267.46	-65.02	0.24	-0.12	-3.32
6,100.00	3.53	66.84	6,091.66	84.42	268.87	-65.56	0.56	-0.12	8.80
6,125.00	3.57	65.30	6,116.61	85.05	270.29	-66.08	0.41	0.16	-6.16
6,150.00	3.53	66.20	6,141.56	85.69	271.70	-66.62	0.27	-0.16	3.60
6,175.00	3.45	67.43	6,166.52	86.28	273.10	-67.12	0.44	-0.32	4.92
6,200.00	3.53	65.25	6,191.47	86.90	274.49	-67.63	0.62	0.32	-8.72
6,225.00	3.54	65.50	6,216.42	87.54	275.89	-68.18	0.07	0.04	1.00
6,250.00	3.55	64.63	6,241.38	88.19	277.29	-68.73	0.22	0.04	-3.48
6,275.00	3.57	65.42	6,266.33	88.84	278.70	-69.29	0.21	0.08	3.16
6,300.00	3.54	65.86	6,291.28	89.48	280.11	-69.83	0.16	-0.12	1.76
6,325.00	3.54	64.74	6,316.23	90.13	281.51	-70.37	0.28	0.00	-4.48
6,350.00	3.57	64.49	6,341.18	90.79	282.91	-70.94	0.14	0.12	-1.00
6,375.00	3.64	64.83	6,366.13	91.47	284.33	-71.51	0.29	0.28	1.36
6,400.00	3.68	65.20	6,391.08	92.14	285.78	-72.08	0.19	0.16	1.48
6,425.00	3.67	64.22	6,416.03	92.83	287.23	-72.67	0.25	-0.04	-3.92
6,450.00	3.63	65.37	6,440.98	93.50	288.67	-73.24	0.33	-0.16	4.60
6,475.00	3.56	66.20	6,465.93	94.15	290.10	-73.78	0.35	-0.28	3.32
6,500.00	3.74	64.37	6,490.88	94.81	291.55	-74.35	0.86	0.72	-7.32
6,525.00	3.70	64.04	6,515.83	95.52	293.01	-74.95	0.18	-0.16	-1.32
6,550.00	3.69	63.32	6,540.78	96.23	294.45	-75.56	0.19	-0.04	-2.88
6,575.00	3.70	65.55	6,565.72	96.93	295.90	-76.16	0.58	0.04	8.92
6,600.00	3.72	64.37	6,590.67	97.61	297.37	-76.74	0.32	0.08	-4.72
6,625.00	3.75	66.41	6,615.62	98.29	298.85	-77.31	0.54	0.12	8.16
6,650.00	3.75	63.25	6,640.57	98.98	300.33	-77.90	0.83	0.00	-12.64
6,675.00	3.67	63.25	6,665.51	99.71	301.77	-78.53	0.32	-0.32	0.00
6,700.00	3.76	62.17	6,690.46	100.46	303.21	-79.17	0.46	0.36	-4.32
6,725.00	3.77	54.36	6,715.41	101.32	304.60	-79.93	2.05	0.04	-31.24
6,750.00	3.77	48.87	6,740.35	102.34	305.89	-80.86	1.44	0.00	-21.96
6,775.00	3.94	47.66	6,765.30	103.46	307.15	-81.89	0.75	0.68	-4.84
6,800.00	3.91	46.44	6,790.24	104.62	308.40	-82.96	0.35	-0.12	-4.88

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tigercat Federal Com #1H
Project:	Lea County, NM (NAD27 NME)	TYD Reference:	KB=26' @ 3348.00ft (Scandril Freedom)
Site:	Sec. 8, T 26 S., R 33 E	MD Reference:	KB=26' @ 3348.00ft (Scandril Freedom)
Well:	Tigercat Federal Com #1H	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)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
6,825.00	3.85	45.02	6,815.18	105.80	309.61	-84.06	0.45	-0.24	-5.68
6,850.00	3.94	45.18	6,840.12	107.00	310.81	-85.17	0.36	0.36	0.64
6,875.00	3.83	46.62	6,865.07	108.18	312.03	-86.26	0.59	-0.44	5.76
6,900.00	3.84	46.55	6,890.01	109.33	313.24	-87.32	0.04	0.04	-0.28
6,925.00	3.85	46.09	6,914.95	110.49	314.46	-88.40	0.13	0.04	-1.84
6,950.00	3.98	46.06	6,939.89	111.67	315.68	-89.49	0.52	0.52	-0.12
6,975.00	3.91	45.24	6,964.84	112.87	316.91	-90.61	0.36	-0.28	-3.28
7,000.00	3.88	46.14	6,989.78	114.06	318.13	-91.70	0.27	-0.12	3.60
7,025.00	3.91	44.30	7,014.72	115.26	319.34	-92.81	0.51	0.12	-7.36
7,050.00	3.86	45.19	7,039.66	116.46	320.53	-93.93	0.31	-0.20	3.56
7,075.00	3.99	44.16	7,064.60	117.68	321.73	-95.06	0.59	0.52	-4.12
7,100.00	4.48	44.44	7,089.54	119.00	323.02	-96.29	1.96	1.96	1.12
7,125.00	5.15	46.36	7,114.45	120.47	324.52	-97.65	2.76	2.68	7.68
7,150.00	5.47	48.07	7,139.34	122.04	326.21	-99.10	1.43	1.28	6.84
7,175.00	5.48	48.31	7,164.23	123.63	327.99	-100.57	0.10	0.04	0.96
7,200.00	5.51	48.18	7,189.11	125.22	329.78	-102.03	0.13	0.12	-0.52
7,225.00	5.69	47.75	7,213.99	126.86	331.59	-103.54	0.74	0.72	-1.72
7,250.00	5.69	47.69	7,238.87	128.52	333.42	-105.07	0.02	0.00	-0.24
7,275.00	5.61	47.49	7,263.75	130.18	335.24	-106.60	0.33	-0.32	-0.80
7,300.00	5.60	48.65	7,288.63	131.82	337.06	-108.10	0.45	-0.04	4.64
7,325.00	5.56	47.87	7,313.51	133.43	338.87	-109.59	0.34	-0.16	-3.12
7,350.00	5.66	48.26	7,338.39	135.07	340.69	-111.10	0.43	0.40	1.56
7,375.00	5.56	48.03	7,363.27	136.70	342.51	-112.60	0.41	-0.40	-0.92
7,400.00	5.62	48.68	7,388.15	138.32	344.33	-114.08	0.35	0.24	2.60
7,425.00	5.34	48.02	7,413.04	139.90	346.11	-115.54	1.15	-1.12	-2.64
7,450.00	5.34	46.22	7,437.93	141.49	347.82	-117.00	0.67	0.00	-7.20
7,475.00	5.23	46.70	7,462.82	143.07	349.49	-118.47	0.47	-0.44	1.92
7,500.00	5.10	46.60	7,487.72	144.62	351.12	-119.90	0.52	-0.52	-0.40
7,525.00	5.10	47.04	7,512.62	146.14	352.74	-121.30	0.16	0.00	1.76
7,550.00	5.11	47.10	7,537.52	147.65	354.37	-122.70	0.05	0.04	0.24
7,575.00	4.98	46.65	7,562.42	149.16	355.98	-124.09	0.54	-0.52	-1.80
7,600.00	4.92	47.33	7,587.33	150.63	357.56	-125.45	0.34	-0.24	2.72
7,625.00	5.03	47.08	7,612.24	152.10	359.15	-126.81	0.45	0.44	-1.00
7,650.00	5.14	47.21	7,637.14	153.61	360.77	-128.20	0.44	0.44	0.52
7,675.00	5.98	47.16	7,662.02	155.25	362.55	-129.72	3.36	3.36	-0.20
7,700.00	6.24	46.87	7,686.88	157.07	364.49	-131.39	1.05	1.04	-1.16
7,725.00	6.28	48.53	7,711.73	158.90	366.51	-133.08	0.74	0.16	6.64
7,750.00	6.26	48.61	7,736.58	160.71	368.56	-134.74	0.09	-0.08	0.32
7,775.00	6.32	49.13	7,761.43	162.51	370.62	-136.39	0.33	0.24	2.08
7,800.00	6.21	50.28	7,786.28	164.27	372.70	-138.01	0.67	-0.44	4.60
7,825.00	6.22	50.92	7,811.13	165.99	374.79	-139.58	0.28	0.04	2.56
7,850.00	6.17	51.10	7,835.99	167.69	376.89	-141.13	0.21	-0.20	0.72
7,875.00	6.13	51.71	7,860.84	169.36	378.98	-142.65	0.31	-0.16	2.44



Survey Report

Company:	COG Operating L.L.C.	Local Co-ordinate Reference:	Well Tigercat Federal Com #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3348.00ft (Scandril Freedom)
Site:	Sec. 8, T 26 S, R 33 E	MD Reference:	KB=26' @ 3348.00ft (Scandril Freedom)
Well:	Tigercat Federal Com #1H	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)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,900.00	6.10	51.17	7,885.70	171.02	381.06	-144.16	0.26	-0.12	-2.16
7,925.00	6.05	51.97	7,910.56	172.67	383.14	-145.66	0.39	-0.20	3.20
7,950.00	6.07	51.45	7,935.42	174.30	385.21	-147.14	0.23	0.08	-2.08
7,975.00	5.82	50.70	7,960.29	175.93	387.22	-148.63	1.05	-1.00	-3.00
8,000.00	5.78	49.91	7,985.16	177.54	389.17	-150.10	0.36	-0.16	-3.16
8,025.00	5.68	48.18	8,010.03	179.18	391.05	-151.60	0.80	-0.40	-6.92
8,050.00	5.79	49.44	8,034.91	180.82	392.93	-153.11	0.67	0.44	5.04
8,075.00	5.79	50.09	8,059.78	182.45	394.86	-154.60	0.26	0.00	2.60
8,100.00	5.84	49.52	8,084.65	184.09	396.79	-156.10	0.31	0.20	-2.28
8,125.00	5.79	49.64	8,109.52	185.73	398.72	-157.61	0.21	-0.20	0.48
8,150.00	5.58	52.17	8,134.40	187.29	400.64	-159.03	1.31	-0.84	10.12
8,175.00	5.71	51.90	8,159.28	188.80	402.58	-160.41	0.53	0.52	-1.08
8,200.00	5.75	51.84	8,184.16	190.34	404.54	-161.81	0.16	0.16	-0.24
8,225.00	5.73	53.39	8,209.03	191.86	406.53	-163.18	0.63	-0.08	6.20
8,250.00	5.79	59.49	8,233.90	193.25	408.62	-164.42	2.46	0.24	24.40
8,275.00	5.97	62.01	8,258.77	194.50	410.85	-165.51	1.26	0.72	10.08
8,300.00	5.92	62.15	8,283.64	195.71	413.14	-166.56	0.21	-0.20	0.56
8,325.00	5.97	62.52	8,308.50	196.91	415.43	-167.60	0.25	0.20	1.48
8,350.00	5.98	62.31	8,333.37	198.12	417.74	-168.64	0.10	0.04	-0.84
8,375.00	5.68	62.92	8,358.24	199.28	420.00	-169.65	1.23	-1.20	2.44
8,400.00	5.76	64.12	8,383.11	200.40	422.23	-170.61	0.58	0.32	4.80
8,425.00	5.64	63.24	8,407.99	201.50	424.45	-171.55	0.59	-0.48	-3.52
8,450.00	5.48	63.18	8,432.87	202.59	426.61	-172.49	0.64	-0.64	-0.24
8,475.00	5.64	63.13	8,457.76	203.68	428.77	-173.43	0.64	0.64	-0.20
8,500.00	5.76	61.59	8,482.63	204.83	430.97	-174.43	0.78	0.48	-6.16
8,525.00	6.19	57.74	8,507.50	206.15	433.22	-175.58	2.35	1.72	-15.40
8,550.00	6.50	55.23	8,532.34	207.68	435.52	-176.95	1.66	1.24	-10.04
8,575.00	6.54	55.57	8,557.18	209.29	437.86	-178.39	0.22	0.16	1.36
8,600.00	6.52	54.32	8,582.02	210.92	440.18	-179.86	0.57	-0.08	-5.00
8,625.00	6.35	54.56	8,606.86	212.55	442.46	-181.33	0.69	-0.68	0.96
8,650.00	6.13	53.74	8,631.71	214.14	444.67	-182.76	0.95	-0.88	-3.28
8,675.00	5.82	55.67	8,656.58	215.65	446.79	-184.12	1.48	-1.24	7.72
8,700.00	5.80	54.34	8,681.45	217.10	448.86	-185.42	0.54	-0.08	-5.32
8,725.00	5.63	54.89	8,706.32	218.54	450.89	-186.72	0.71	-0.68	2.20
8,750.00	5.46	54.82	8,731.21	219.93	452.87	-187.97	0.68	-0.68	-0.28
8,775.00	5.72	54.64	8,756.09	221.34	454.85	-189.23	1.04	1.04	-0.72
8,800.00	6.28	53.28	8,780.95	222.87	456.97	-190.62	2.31	2.24	-5.44
8,825.00	7.03	51.22	8,805.78	224.65	459.25	-192.23	3.15	3.00	-8.24
8,850.00	7.09	51.90	8,830.59	226.56	461.66	-193.97	0.41	0.24	2.72
8,875.00	7.12	51.79	8,855.40	228.47	464.09	-195.71	0.13	0.12	-0.44
8,900.00	6.87	51.89	8,880.22	230.35	466.49	-197.42	1.00	-1.00	0.40
8,925.00	6.59	51.96	8,905.04	232.16	468.79	-199.06	1.12	-1.12	0.28
8,950.00	6.36	51.31	8,929.88	233.91	471.00	-200.65	0.97	-0.92	-2.60

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tigercat Federal Com #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3348.00ft (Scandriil Freedom)
Site:	Sec. 8, T 26 S. , R 33 E	MD Reference:	KB=26' @ 3348.00ft (Scandriil Freedom)
Well:	Tigercat Federal Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

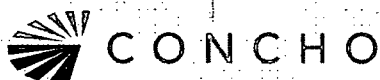
Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,975.00	6.14	52.51	8,954.74	235.59	473.15	-202.18	1.02	-0.88	4.80
9,000.00	5.84	52.64	8,979.60	237.17	475.22	-203.62	1.20	-1.20	0.52
9,025.00	5.46	53.11	9,004.48	238.66	477.18	-204.96	1.53	-1.52	1.88
9,050.00	5.24	54.19	9,029.37	240.04	479.06	-206.21	0.97	-0.88	4.32
9,075.00	5.16	54.84	9,054.27	241.36	480.90	-207.40	0.40	-0.32	2.60
9,100.00	5.12	53.37	9,079.16	242.67	482.72	-208.58	0.55	-0.16	-5.88
9,125.00	5.22	51.48	9,104.06	244.04	484.50	-209.83	0.79	0.40	-7.56
9,150.00	5.15	51.30	9,128.96	245.45	486.27	-211.11	0.29	-0.28	-0.72
9,175.00	5.51	50.60	9,153.85	246.92	488.07	-212.45	1.46	1.44	-2.80
9,200.00	6.17	50.32	9,178.72	248.54	490.03	-213.92	2.64	2.64	-1.12
9,225.00	6.50	49.40	9,203.57	250.31	492.14	-215.55	1.38	1.32	-3.68
9,250.00	6.46	47.38	9,228.41	252.19	494.25	-217.27	0.93	-0.16	-8.08
9,275.00	6.14	47.49	9,253.26	254.04	496.27	-218.99	1.28	-1.28	0.44
9,300.00	5.79	46.75	9,278.12	255.81	498.17	-220.62	1.43	-1.40	-2.96
9,325.00	5.82	46.85	9,303.00	257.54	500.02	-222.22	0.13	0.12	0.40
9,350.00	6.10	48.40	9,327.86	259.29	501.93	-223.83	1.29	1.12	6.20
9,375.00	6.56	53.58	9,352.71	261.02	504.08	-225.40	2.93	1.84	20.72
9,400.00	7.07	57.80	9,377.53	262.69	506.53	-226.90	2.86	2.04	16.88
9,425.00	7.29	59.31	9,402.34	264.32	509.19	-228.34	1.16	0.88	6.04
9,450.00	7.11	59.87	9,427.14	265.90	511.90	-229.73	0.77	-0.72	2.24
9,475.00	6.76	61.60	9,451.96	267.38	514.53	-231.02	1.63	-1.40	6.92
9,500.00	6.55	62.10	9,476.79	268.75	517.08	-232.21	0.87	-0.84	2.00
9,525.00	6.22	63.18	9,501.63	270.03	519.55	-233.31	1.40	-1.32	4.32
9,550.00	6.04	64.17	9,526.49	271.21	521.94	-234.33	0.83	-0.72	3.96
9,575.00	5.97	66.59	9,551.35	272.30	524.32	-235.25	1.05	-0.28	9.68
9,600.00	5.73	68.59	9,576.22	273.27	526.68	-236.06	1.26	-0.96	8.00
9,625.00	5.72	70.89	9,601.10	274.13	529.02	-236.76	0.92	-0.04	9.20
9,650.00	6.29	75.96	9,625.96	274.87	531.52	-237.32	3.11	2.28	20.28
9,670.00	6.68	81.15	9,645.83	275.32	533.73	-237.61	3.52	1.95	25.95
9,750.00	6.28	79.49	9,725.32	276.83	542.63	-238.50	0.55	-0.50	-2.08
First MWD Survey @ 9750' MD									
9,775.00	5.88	79.14	9,750.18	277.32	545.24	-238.81	1.61	-1.60	-1.40
9,838.00	4.30	106.87	9,812.94	277.25	550.67	-238.36	4.57	-2.51	44.02
9,870.00	6.46	153.34	9,844.81	275.29	552.62	-236.27	14.63	6.75	145.22
9,901.00	10.33	165.73	9,875.47	271.03	554.09	-231.92	13.71	12.48	39.97
9,932.00	14.03	168.92	9,905.77	264.65	555.50	-225.46	12.13	11.94	10.29
9,979.00	20.01	170.12	9,950.69	251.13	557.98	-211.79	12.74	12.72	2.55
10,026.00	26.04	173.52	9,993.93	232.94	560.52	-193.47	13.13	12.83	7.23
10,073.00	31.37	176.48	10,035.14	210.46	562.44	-170.91	11.73	11.34	6.30
10,119.00	36.01	176.27	10,073.41	185.00	564.05	-145.40	10.09	10.09	-0.46
10,166.00	39.68	175.07	10,110.51	156.25	566.24	-116.57	7.96	7.81	-2.55
10,213.00	45.71	174.75	10,145.04	124.52	569.07	-84.73	12.84	12.83	-0.68
10,260.00	51.06	175.23	10,176.25	89.53	572.14	-49.61	11.41	11.38	1.02
10,307.00	54.50	172.66	10,204.67	52.33	576.10	-12.21	8.52	7.32	-5.47

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tigercat Federal Com #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3348.00ft (Scandril Freedom)
Site:	Sec. 8, T 26 S., R 33 E	MD Reference:	KB=26' @ 3348.00ft (Scandril Freedom)
Well:	Tigercat Federal Com #1H	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)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,335.87	58.12	171.60	10,220.68	28.54	579.39	11.75	12.91	12.54	-3.66
FTP (330 FNL) @ 10335.87 MD									
10,349.75	59.87	171.12	10,227.84	16.77	581.18	23.61	12.91	12.57	-3.45
Tigercat Fed Com 1H FTP									
10,354.00	60.40	170.98	10,229.95	13.13	581.76	27.28	12.91	12.57	-3.37
10,401.00	66.41	172.85	10,250.98	-28.46	587.64	69.17	13.27	12.79	3.98
10,495.00	78.05	180.19	10,279.66	-117.59	592.88	158.46	14.44	12.38	7.81
10,522.00	82.34	181.55	10,284.26	-144.19	592.47	184.96	16.65	15.89	5.04
10,584.00	83.81	180.25	10,291.73	-205.72	591.51	246.28	3.15	2.37	-2.10
10,615.00	85.42	179.41	10,294.64	-236.59	591.60	277.08	5.85	5.19	-2.71
10,708.00	89.12	179.01	10,299.07	-329.45	592.88	369.81	4.00	3.98	-0.43
10,801.00	89.87	179.22	10,299.89	-422.44	594.32	462.67	0.84	0.81	0.23
10,894.00	87.91	178.16	10,301.69	-515.39	596.44	555.55	2.40	-2.11	-1.14
10,988.00	89.51	179.16	10,303.81	-609.34	598.64	649.42	2.01	1.70	1.06
11,081.00	89.01	179.08	10,305.01	-702.32	600.07	742.27	0.54	-0.54	-0.09
11,175.00	89.23	179.19	10,306.45	-796.30	601.49	836.12	0.26	0.23	0.12
11,269.00	89.76	177.96	10,307.28	-890.26	603.82	930.03	1.42	0.56	-1.31
11,338.14	89.70	177.96	10,307.61	-959.36	606.28	999.13	0.09	-0.09	0.00
Tigercat Fed Com 1H T @ 1000 VS									
11,362.00	89.68	177.96	10,307.73	-983.20	607.13	1,022.97	0.09	-0.09	0.00
11,455.00	89.37	178.16	10,308.51	-1,076.15	610.28	1,115.91	0.40	-0.33	0.22
11,549.00	89.99	178.88	10,309.03	-1,170.11	612.71	1,209.82	1.01	0.66	0.77
11,643.00	90.01	179.07	10,309.03	-1,264.10	614.39	1,303.69	0.20	0.02	0.20
11,737.00	88.56	178.49	10,310.20	-1,358.07	616.39	1,397.57	1.66	-1.54	-0.62
11,831.00	90.07	178.93	10,311.33	-1,452.03	618.51	1,491.46	1.67	1.61	0.47
11,924.00	92.51	180.19	10,309.23	-1,545.00	619.22	1,584.25	2.95	2.62	1.35
12,018.00	90.27	178.88	10,306.95	-1,638.96	619.99	1,678.04	2.76	-2.38	-1.39
12,112.00	89.79	179.07	10,306.90	-1,732.94	621.67	1,771.91	0.55	-0.51	0.20
12,205.00	89.57	179.16	10,307.42	-1,825.93	623.10	1,864.77	0.26	-0.24	0.10
12,299.00	90.01	179.26	10,307.77	-1,919.92	624.40	1,958.63	0.48	0.47	0.11
12,339.63	89.99	179.34	10,307.77	-1,960.55	624.90	1,999.19	0.20	-0.05	0.19
Tigercat Fed Com 1H T @ 2000 VS									
12,392.00	89.96	179.44	10,307.79	-2,012.91	625.45	2,051.47	0.20	-0.05	0.19
12,486.00	90.32	179.99	10,307.56	-2,106.91	625.92	2,145.27	0.70	0.38	0.59
12,579.00	88.22	179.02	10,308.75	-2,199.89	626.73	2,238.09	2.49	-2.26	-1.04
12,674.00	88.53	179.77	10,311.44	-2,294.85	627.73	2,332.88	0.85	0.33	0.79
12,767.00	88.89	180.28	10,313.54	-2,387.83	627.69	2,425.63	0.67	0.39	0.55
12,861.00	90.18	178.95	10,314.30	-2,481.82	628.32	2,519.44	1.97	1.37	-1.41
12,955.00	89.82	178.44	10,314.30	-2,575.79	630.46	2,613.34	0.66	-0.38	-0.54
13,049.00	87.01	177.70	10,316.90	-2,669.69	633.62	2,707.23	3.09	-2.99	-0.79
13,143.00	88.16	178.01	10,320.86	-2,763.54	637.14	2,801.10	1.27	1.22	0.33
13,236.00	88.36	178.72	10,323.68	-2,856.46	639.79	2,893.98	0.79	0.22	0.76
13,330.00	88.98	178.94	10,325.86	-2,950.41	641.71	2,987.84	0.70	0.66	0.23
13,424.00	87.04	179.00	10,329.13	-3,044.34	643.40	3,081.65	2.06	-2.06	0.06



Survey Report

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tigercat Federal Com #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3348.00ft (Scandrill Freedom)
Site:	Sec. 8, T 26 S. , R 33 E	MD Reference:	KB=26' @ 3348.00ft (Scandrill Freedom)
Well:	Tigercat Federal Com #1H	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)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,518.00	87.88	179.44	10,333.29	-3,138.24	644.68	3,175.41	1.01	0.89	0.47
13,611.00	90.10	180.35	10,334.93	-3,231.22	644.85	3,268.18	2.58	2.39	0.98
13,705.00	90.32	180.61	10,334.59	-3,325.21	644.06	3,361.89	0.36	0.23	0.28
13,798.00	90.43	180.62	10,333.98	-3,418.20	643.06	3,454.59	0.12	0.12	0.01
13,892.00	91.39	180.97	10,332.49	-3,512.18	641.76	3,548.25	1.09	1.02	0.37
13,986.00	91.61	181.27	10,330.03	-3,606.13	639.92	3,641.85	0.40	0.23	0.32
14,079.00	91.11	179.96	10,327.82	-3,699.10	638.92	3,734.52	1.51	-0.54	-1.41
14,172.00	91.75	179.92	10,325.50	-3,792.07	639.02	3,827.28	0.69	0.69	-0.04
14,267.00	89.87	179.32	10,324.16	-3,887.05	639.65	3,922.07	2.08	-1.98	-0.63
14,344.34	89.75	179.34	10,324.41	-3,964.39	640.55	3,999.28	0.15	-0.15	0.03
Tigercat Fed Com 1H T @ 4000'VS									
14,360.00	89.73	179.35	10,324.48	-3,980.04	640.73	4,014.92	0.15	-0.15	0.03
14,454.00	89.79	178.70	10,324.87	-4,074.03	642.33	4,108.79	0.69	0.06	-0.69
14,547.00	89.57	179.65	10,325.39	-4,167.02	643.67	4,201.64	1.05	-0.24	1.02
14,640.00	89.65	178.94	10,326.03	-4,260.01	644.81	4,294.49	0.77	0.09	-0.76
14,735.00	89.45	178.68	10,326.77	-4,354.98	646.79	4,389.37	0.35	-0.21	-0.27
14,828.00	89.26	178.74	10,327.82	-4,447.95	648.88	4,482.26	0.21	-0.20	0.06
14,921.00	89.34	179.27	10,328.96	-4,540.93	650.49	4,575.13	0.58	0.09	0.57
15,015.00	89.54	179.80	10,329.87	-4,634.93	651.26	4,668.95	0.60	0.21	0.56
15,109.00	88.61	180.69	10,331.39	-4,728.91	650.85	4,762.68	1.37	-0.99	0.95
15,202.00	88.11	180.47	10,334.05	-4,821.87	649.91	4,855.35	0.59	-0.54	-0.24
15,296.00	90.43	180.00	10,335.25	-4,915.85	649.53	4,949.08	2.52	2.47	-0.50
15,390.00	89.34	179.12	10,335.44	-5,009.85	650.25	5,042.90	1.49	-1.16	-0.94
15,484.00	89.23	178.86	10,336.61	-5,103.82	651.91	5,136.76	0.30	-0.12	-0.28
15,577.00	90.24	178.94	10,337.04	-5,196.81	653.69	5,229.64	1.09	1.09	0.09
15,670.00	90.27	178.31	10,336.63	-5,289.78	655.92	5,322.55	0.68	0.03	-0.68
15,764.00	90.97	178.86	10,335.61	-5,383.74	658.24	5,416.45	0.95	0.74	0.59
15,858.00	88.61	178.79	10,335.96	-5,477.72	660.17	5,510.33	2.51	-2.51	-0.07
15,951.00	88.95	179.01	10,337.94	-5,570.68	661.96	5,603.19	0.44	0.37	0.24
16,044.00	89.82	179.81	10,338.93	-5,663.66	662.91	5,696.02	1.27	0.94	0.86
16,138.00	89.57	180.27	10,339.43	-5,757.66	662.85	5,789.78	0.56	-0.27	0.49
16,232.00	89.82	180.33	10,339.94	-5,851.66	662.36	5,883.52	0.27	0.27	0.06
16,326.00	89.90	180.75	10,340.16	-5,945.66	661.47	5,977.23	0.45	0.09	0.45
16,420.00	89.40	181.24	10,340.74	-6,039.64	659.84	6,070.87	0.74	-0.53	0.52
16,513.00	88.70	180.60	10,342.28	-6,132.61	658.35	6,163.52	1.02	-0.75	-0.69
16,607.00	90.63	181.82	10,342.83	-6,226.58	656.36	6,257.12	2.43	2.05	1.30
16,700.00	90.21	181.53	10,342.15	-6,319.54	653.64	6,349.67	0.55	-0.45	-0.31
16,794.00	92.65	181.26	10,339.80	-6,413.48	651.35	6,443.22	2.61	2.60	-0.29
16,887.00	92.48	180.33	10,335.64	-6,506.37	650.07	6,535.80	1.02	-0.18	-1.00
16,980.00	89.03	179.50	10,334.42	-6,599.35	650.20	6,628.57	3.82	-3.71	-0.89
17,073.00	89.68	179.72	10,335.46	-6,692.34	650.84	6,721.38	0.74	0.70	0.24
17,167.00	88.25	178.21	10,337.16	-6,786.31	652.53	6,815.23	2.21	-1.52	-1.61
17,261.00	88.39	178.59	10,339.92	-6,880.23	655.16	6,909.11	0.43	0.15	0.40

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tigercat Federal Com #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3348.00ft (Scandril Freedom)
Site:	Sec. 8, T 26 S, R 33 E	MD Reference:	KB=26' @ 3348.00ft (Scandril Freedom)
Well:	Tigercat Federal Com #1H	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)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
17,351.34	88.50	179.46	10,342.37	-6,970.52	656.69	6,999.29	0.97	0.12	0.97
Tigercat Fed Com 1H T @ 7000'VS									
17,354.00	88.50	179.49	10,342.44	-6,973.18	656.72	7,001.95	0.97	0.12	0.97
17,448.00	88.36	179.59	10,345.02	-7,067.14	657.47	7,095.73	0.18	-0.15	0.11
17,541.00	87.18	179.99	10,348.63	-7,160.07	657.81	7,188.46	1.34	-1.27	0.43
17,635.00	89.20	178.94	10,351.60	-7,254.01	658.69	7,282.24	2.42	2.15	-1.12
17,729.00	89.48	178.78	10,352.69	-7,347.99	660.56	7,376.12	0.34	0.30	-0.17
17,823.00	89.37	178.49	10,353.63	-7,441.96	662.80	7,470.01	0.33	-0.12	-0.31
17,853.04	89.13	178.19	10,354.02	-7,471.98	663.67	7,500.02	1.26	-0.79	-0.99
Tigercat Fed Com 1H T @ 7500'VS									
17,916.00	88.64	177.57	10,355.24	-7,534.89	665.99	7,562.94	1.26	-0.78	-0.99
18,011.00	89.40	178.44	10,356.87	-7,629.81	669.30	7,657.87	1.22	0.80	0.92
18,104.00	91.36	180.90	10,356.25	-7,722.80	669.84	7,750.66	3.38	2.11	2.65
18,198.00	90.04	180.79	10,355.10	-7,816.78	668.45	7,844.32	1.41	-1.40	-0.12
18,291.00	87.35	178.88	10,357.22	-7,909.74	668.72	7,937.08	3.55	-2.89	-2.05
18,353.72	87.11	179.00	10,360.25	-7,972.38	669.88	7,999.65	0.43	-0.38	0.19
Tigercat Fed Com 1H T @ 8000'VS									
18,385.00	86.99	179.06	10,361.86	-8,003.61	670.40	8,030.84	0.43	-0.38	0.19
18,478.00	87.66	179.88	10,366.20	-8,096.50	671.26	8,123.57	1.14	0.72	0.88
18,554.42	87.61	179.80	10,369.36	-8,172.86	671.48	8,199.76	0.13	-0.06	-0.11
Tigercat Fed Com 1H T @ 8200'VS									
18,571.00	87.60	179.78	10,370.05	-8,189.42	671.54	8,216.28	0.13	-0.06	-0.11
18,665.00	87.77	180.02	10,373.85	-8,283.35	671.70	8,309.99	0.31	0.18	0.26
18,758.00	87.91	180.40	10,377.35	-8,376.28	671.36	8,402.68	0.44	0.15	0.41
18,852.00	88.33	178.48	10,380.44	-8,470.22	672.28	8,496.46	2.09	0.45	-2.04
18,945.00	87.38	177.68	10,383.92	-8,563.10	675.39	8,589.33	1.34	-1.02	-0.86
19,038.00	86.96	177.18	10,388.51	-8,655.89	679.56	8,682.19	0.70	-0.45	-0.54
19,132.00	90.35	177.32	10,390.71	-8,749.75	684.07	8,776.12	3.61	3.61	0.15
19,225.00	91.02	177.87	10,389.60	-8,842.66	687.97	8,869.08	0.93	0.72	0.59
19,319.00	91.95	178.25	10,387.17	-8,936.57	691.15	8,962.99	1.07	0.99	0.40
19,356.41	91.26	178.53	10,386.12	-8,973.95	692.20	9,000.36	1.99	-1.84	0.75
Tigercat Fed Com 1H T @ 9000'VS									
19,412.00	90.24	178.95	10,385.39	-9,029.52	693.42	9,055.87	1.99	-1.84	0.75
19,505.00	91.05	179.24	10,384.34	-9,122.50	694.89	9,148.73	0.93	0.87	0.31
19,599.00	86.51	177.73	10,386.34	-9,216.42	697.37	9,242.60	5.09	-4.83	-1.61
19,692.00	86.43	178.87	10,392.07	-9,309.20	700.13	9,335.35	1.23	-0.09	1.23
19,785.00	88.05	178.45	10,396.55	-9,402.07	702.30	9,428.14	1.80	1.74	-0.45
19,878.00	89.17	177.09	10,398.80	-9,494.96	705.92	9,521.06	1.89	1.20	-1.46
19,972.00	90.46	179.02	10,399.11	-9,588.90	709.11	9,615.00	2.47	1.37	2.05
20,065.00	90.21	178.09	10,398.56	-9,681.87	711.45	9,707.90	1.04	-0.27	-1.00
20,159.00	90.80	178.70	10,397.74	-9,775.83	714.09	9,801.82	0.90	0.63	0.65
Final MWD Survey @ 20159'MD									
20,250.63	90.80	178.70	10,396.46	-9,867.43	716.16	9,893.34	0.00	0.00	0.00
Tigercat Fed Com 1H LTP									
20,250.86	90.80	178.70	10,396.45	-9,867.66	716.17	9,893.57	0.00	0.00	0.00

Company:	COG Operating L.L.C.	Local Co-ordinate Reference:	Well Tigercat Federal Com #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3348.00ft (Scandriil Freedom)
Site:	Sec. 8, T.26 S., R.33 E	MD Reference:	KB=26' @ 3348.00ft (Scandriil Freedom)
Well:	Tigercat Federal Com #1H	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)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
LTP (330 FNL) @ 20250.86'MD - Tigercat Fed Com 1H T @ 9900'VS									
20,302.00	90.80	178.70	10,395.74	-9,918.78	717.33	9,944.65	0.00	0.00	0.00
PTD @ 20302'MD - Tigercat Fed Com 1H BHL									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
9,750.00	9,725.32	276.83	542.63	First MWD Survey @ 9750'MD
10,335.87	10,220.68	28.54	579.39	FTP (330 FNL) @ 10335.87'MD
20,159.00	10,397.74	-9,775.83	714.09	Final MWD Survey @ 20159'MD
20,250.86	10,396.45	-9,867.66	716.17	LTP (330 FNL) @ 20250.86'MD
20,302.00	10,395.74	-9,918.78	717.33	PTD @ 20302'MD

Checked By: _____	Approved By: _____	Date: _____
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COG

SURVEY REPORT

TIGERCAT FEDERAL COM #1H

SCAN FREEDOM

2/4/2018

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

Kolton Cotton

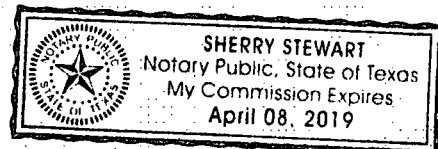
Notarized this date 7 of March, 2018.

Sherry Stewart

Notary Signature

County of Midland

State of Texas



The Ultimate Partner In Wellbore Placement

CUSTOMER
PROJECT
FIELD

COG
TigerCat Federal Com #1H
TigerCat Federal Com #1H

SDI JOB NO.
SDI DISTRICT
SDI KIT/UNIT

OP.007857
Midland

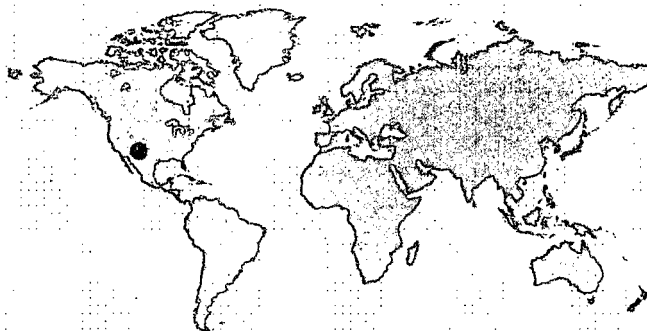
SITE INFORMATION

Site Name TigerCat Federal Com #1H
Lat/Long 32.06419° N, 103.5905336° W
Northing 387,868.9 ft
Easting 730,106.2 ft

Section
Township
Range

MAP INFORMATION

North Reference Grid North
Grid Correction -0.39 deg
System US State Plane 1927
Datum North American Datum 1927 (Clarke 1866)
Map Zone New Mexico East: 3001

**WELL INFORMATION**

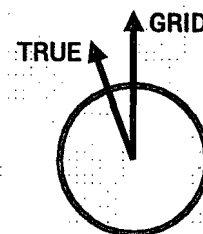
Lat/Long 32.06419° N, 103.5905336° W
Northing 387,868.9 ft
Easting 730,106.2 ft
UWI 30-025-44302

DEPTH AND ELEVATION REFERENCE

Ground Level 3322 ft above Mean Sea Level
Reference Datum KB
Reference Height 29 ft above G.L.
Reference Elevation 3351 ft

VERTICAL SECTION REFERENCE

+N/-S 0 ft
+E/-W 0 ft
Proposal Direction 176.02°
Calculation Method Minimum Curvature

**LOCAL GRAVITY REFERENCE INFORMATION**

Local Gravity 998.495 mG [computed]
True to Grid subtract 0.39°

WELL NOTES

Keeper Gyro Survey ran in 4 1/2" Drill Pipe to 9,670'

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	0.45	114.22	100.00	0.18	-0.16	0.36	0.45	0.39	114.22
125.00	0.67	97.57	125.00	0.26	-0.22	0.59	1.09	0.63	110.40
150.00	0.72	87.81	150.00	0.29	-0.23	0.89	0.51	0.92	104.62
175.00	0.74	78.83	174.99	0.28	-0.20	1.21	0.47	1.22	99.18
200.00	0.74	77.10	199.99	0.23	-0.13	1.52	0.09	1.53	94.80
225.00	0.74	92.91	224.99	0.23	-0.10	1.84	0.81	1.84	93.12
250.00	0.66	86.48	249.99	0.25	-0.10	2.14	0.44	2.14	92.66
275.00	0.69	84.47	274.99	0.25	-0.08	2.44	0.16	2.44	91.79
300.00	0.68	89.76	299.98	0.25	-0.06	2.73	0.26	2.73	91.28
325.00	0.77	76.47	324.98	0.23	-0.02	3.04	0.75	3.04	90.40
350.00	0.73	87.07	349.98	0.21	0.03	3.37	0.57	3.37	89.56
375.00	0.64	81.94	374.98	0.20	0.05	3.66	0.42	3.66	89.16
400.00	0.57	89.84	399.98	0.20	0.07	3.93	0.45	3.93	88.92
425.00	0.51	93.74	424.98	0.22	0.07	4.16	0.29	4.16	89.08
450.00	0.49	90.72	449.98	0.25	0.06	4.38	0.14	4.38	89.24
475.00	0.31	83.44	474.97	0.25	0.06	4.55	0.72	4.55	89.18
500.00	0.26	88.06	499.97	0.25	0.07	4.68	0.23	4.68	89.09
525.00	0.23	84.35	524.97	0.25	0.08	4.78	0.15	4.78	89.02
550.00	0.23	102.43	549.97	0.26	0.08	4.88	0.29	4.88	89.11
575.00	0.12	129.12	574.97	0.29	0.05	4.95	0.53	4.95	89.43
600.00	0.22	131.23	599.97	0.35	0.00	5.00	0.42	5.00	89.98
625.00	0.17	92.99	624.97	0.38	-0.03	5.08	0.55	5.08	90.36
650.00	0.10	155.06	649.97	0.41	-0.05	5.13	0.61	5.13	90.60
675.00	0.06	243.72	674.97	0.43	-0.08	5.12	0.45	5.12	90.88
700.00	0.20	290.12	699.97	0.42	-0.07	5.07	0.67	5.07	90.78
725.00	0.32	278.01	724.97	0.39	-0.04	4.96	0.51	4.96	90.51
750.00	0.35	270.89	749.97	0.37	-0.03	4.82	0.21	4.82	90.39
775.00	0.38	295.37	774.97	0.32	0.00	4.67	0.63	4.67	89.96
800.00	0.39	294.53	799.97	0.24	0.07	4.51	0.05	4.51	89.06
825.00	0.41	288.64	824.97	0.16	0.14	4.35	0.18	4.35	88.19
850.00	0.48	273.26	849.97	0.12	0.17	4.16	0.56	4.17	87.63

MD	INC	AZIM	IVD	VS	N/S	E/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
875.00	0.46	278.22	874.97	0.08	0.19	3.96	0.18	3.96	87.22
900.00	0.43	253.28	899.97	0.08	0.18	3.77	0.78	3.77	87.27
925.00	0.44	265.35	924.97	0.10	0.14	3.58	0.37	3.59	87.69
950.00	0.50	265.04	949.97	0.11	0.13	3.38	0.26	3.38	87.84
975.00	0.37	263.58	974.97	0.11	0.11	3.19	0.54	3.19	88.04
1000.00	0.45	138.47	999.97	0.19	0.03	3.17	2.91	3.17	89.52
1025.00	1.25	114.35	1024.96	0.40	-0.16	3.49	3.43	3.49	92.62
1050.00	1.72	116.35	1049.95	0.72	-0.44	4.07	1.88	4.09	96.14
1075.00	1.92	113.77	1074.94	1.10	-0.77	4.79	0.88	4.85	99.17
1100.00	1.99	107.51	1099.93	1.46	-1.07	5.59	0.90	5.69	100.87
1125.00	2.15	111.81	1124.91	1.82	-1.38	6.44	0.88	6.58	102.08
1150.00	2.11	111.09	1149.89	2.22	-1.72	7.30	0.18	7.50	103.24
1175.00	2.11	113.16	1174.88	2.63	-2.06	8.16	0.31	8.41	104.21
1200.00	2.24	107.86	1199.86	3.02	-2.40	9.05	0.96	9.36	104.84
1225.00	2.25	109.23	1224.84	3.39	-2.71	9.98	0.22	10.34	105.19
1250.00	2.25	105.62	1249.82	3.75	-3.00	10.91	0.57	11.32	105.38
1275.00	2.39	101.71	1274.80	4.06	-3.24	11.89	0.85	12.33	105.24
1300.00	2.68	95.69	1299.78	4.30	-3.40	12.98	1.58	13.42	104.69
1325.00	2.80	90.76	1324.75	4.44	-3.47	14.18	1.05	14.59	103.75
1350.00	2.92	88.18	1349.72	4.52	-3.46	15.42	0.73	15.81	102.64
1375.00	2.91	88.22	1374.68	4.57	-3.42	16.69	0.04	17.04	101.57
1400.00	2.97	89.04	1399.65	4.63	-3.39	17.98	0.27	18.29	100.67
1425.00	3.03	87.27	1424.62	4.67	-3.34	19.28	0.44	19.57	99.84
1450.00	3.17	88.33	1449.58	4.72	-3.29	20.63	0.62	20.89	99.07
1475.00	3.26	86.57	1474.54	4.75	-3.23	22.03	0.53	22.27	98.34
1500.00	3.32	84.00	1499.50	4.73	-3.11	23.46	0.63	23.67	97.56
1525.00	3.39	85.08	1524.46	4.70	-2.97	24.92	0.41	25.09	96.80
1550.00	3.55	82.97	1549.41	4.64	-2.81	26.42	0.81	26.57	96.08
1575.00	3.71	79.44	1574.36	4.51	-2.57	27.99	1.10	28.10	95.25
1600.00	3.69	77.60	1599.31	4.30	-2.25	29.57	0.48	29.65	94.35
1625.00	3.76	76.32	1624.26	4.04	-1.88	31.15	0.44	31.21	93.46
1650.00	3.96	74.68	1649.20	3.73	-1.46	32.78	0.90	32.81	92.56

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	4.00	75.83	1674.14	3.41	-1.02	34.45	0.36	34.47	91.70
1700.00	4.04	75.67	1699.08	3.10	-0.59	36.15	0.17	36.15	90.94
1725.00	4.10	74.90	1724.01	2.77	-0.14	37.87	0.33	37.87	90.21
1750.00	4.07	75.62	1748.95	2.43	0.31	39.59	0.23	39.59	89.55
1775.00	4.13	74.62	1773.89	2.10	0.77	41.32	0.37	41.32	88.93
1800.00	4.05	74.17	1798.82	1.74	1.25	43.04	0.35	43.05	88.33
1825.00	3.91	72.00	1823.76	1.35	1.76	44.70	0.84	44.73	87.75
1850.00	3.43	70.37	1848.71	0.94	2.27	46.21	1.96	46.27	87.19
1875.00	3.34	69.23	1873.67	0.53	2.78	47.60	0.45	47.68	86.66
1900.00	3.37	67.98	1898.62	0.09	3.32	48.96	0.32	49.07	86.13
1925.00	3.36	67.14	1923.58	-0.37	3.88	50.32	0.20	50.46	85.59
1950.00	3.33	66.73	1948.54	-0.85	4.45	51.66	0.17	51.85	85.08
1975.00	3.28	67.47	1973.50	-1.32	5.01	52.99	0.24	53.22	84.60
2000.00	3.41	66.97	1998.45	-1.79	5.57	54.33	0.52	54.62	84.14
2025.00	3.56	65.77	2023.41	-2.30	6.18	55.72	0.68	56.07	83.67
2050.00	3.67	65.25	2048.36	-2.85	6.84	57.16	0.44	57.57	83.18
2075.00	3.61	64.92	2073.31	-3.42	7.51	58.60	0.27	59.08	82.70
2100.00	3.78	66.18	2098.26	-3.98	8.17	60.07	0.77	60.62	82.25
2125.00	3.89	64.70	2123.20	-4.57	8.87	61.59	0.58	62.22	81.81
2150.00	3.92	65.74	2148.14	-5.18	9.58	63.13	0.32	63.86	81.37
2175.00	3.85	64.88	2173.08	-5.78	10.29	64.67	0.37	65.49	80.96
2200.00	3.77	64.68	2198.03	-6.38	11.00	66.18	0.33	67.08	80.56
2225.00	3.39	66.16	2222.98	-6.93	11.65	67.60	1.58	68.59	80.22
2250.00	3.38	66.44	2247.94	-7.43	12.24	68.95	0.08	70.02	79.93
2275.00	3.44	66.29	2272.89	-7.93	12.84	70.31	0.25	71.47	79.65
2300.00	3.42	65.29	2297.85	-8.44	13.45	71.67	0.26	72.92	79.37
2325.00	3.48	65.92	2322.80	-8.97	14.07	73.04	0.29	74.38	79.09
2350.00	3.43	65.96	2347.76	-9.49	14.69	74.42	0.22	75.85	78.84
2375.00	3.54	64.38	2372.71	-10.03	15.32	75.79	0.60	77.33	78.57
2400.00	3.66	62.53	2397.66	-10.63	16.03	77.20	0.66	78.84	78.27
2425.00	3.62	62.39	2422.61	-11.26	16.76	78.60	0.17	80.37	77.96
2450.00	3.59	64.01	2447.56	-11.87	17.47	80.01	0.42	81.89	77.68

MD	INC	AZIM	TVD	VS	IN/AS	E/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
2475.00	3.70	63.36	2472.51	-12.48	18.17	81.43	0.47	83.43	77.42
2500.00	3.33	61.61	2497.46	-13.09	18.88	82.79	1.54	84.92	77.15
2525.00	3.10	61.20	2522.43	-13.67	19.55	84.02	0.94	86.27	76.90
2550.00	2.89	60.86	2547.39	-14.22	20.18	85.16	0.82	87.52	76.67
2575.00	2.73	57.62	2572.36	-14.77	20.81	86.22	0.92	88.69	76.43
2600.00	2.70	56.45	2597.33	-15.35	21.45	87.21	0.24	89.81	76.18
2625.00	2.73	58.10	2622.30	-15.92	22.09	88.21	0.32	90.93	75.94
2650.00	2.78	57.49	2647.28	-16.49	22.73	89.22	0.24	92.07	75.71
2675.00	2.81	56.65	2672.25	-17.07	23.40	90.25	0.19	93.23	75.47
2700.00	2.87	56.93	2697.22	-17.68	24.07	91.28	0.26	94.40	75.23
2725.00	3.03	55.13	2722.18	-18.32	24.79	92.35	0.74	95.62	74.97
2750.00	3.17	54.91	2747.15	-19.02	25.57	93.45	0.57	96.89	74.70
2775.00	3.39	57.21	2772.11	-19.73	26.36	94.64	1.03	98.24	74.43
2800.00	3.51	55.61	2797.06	-20.47	27.20	95.89	0.61	99.68	74.17
2825.00	3.43	57.18	2822.01	-21.22	28.03	97.15	0.49	101.12	73.90
2850.00	3.38	59.20	2846.97	-21.92	28.82	98.42	0.52	102.55	73.68
2875.00	3.15	66.21	2871.93	-22.48	29.47	99.68	1.86	103.94	73.53
2900.00	3.03	72.08	2896.89	-22.87	29.95	100.94	1.35	105.29	73.47
2925.00	3.08	72.94	2921.86	-23.19	30.35	102.21	0.27	106.62	73.46
2950.00	3.05	74.54	2946.82	-23.47	30.73	103.49	0.37	107.96	73.46
2975.00	3.19	72.47	2971.78	-23.77	31.11	104.80	0.75	109.32	73.46
3000.00	3.24	67.58	2996.75	-24.15	31.59	106.11	1.11	110.72	73.42
3025.00	3.22	67.82	3021.71	-24.59	32.13	107.41	0.08	112.12	73.35
3050.00	3.34	64.93	3046.66	-25.08	32.70	108.72	0.81	113.53	73.26
3075.00	3.38	61.95	3071.62	-25.64	33.36	110.03	0.72	114.98	73.14
3100.00	3.34	64.79	3096.58	-26.20	34.01	111.34	0.69	116.42	73.01
3125.00	3.46	64.32	3121.53	-26.75	34.65	112.68	0.47	117.89	72.91
3150.00	3.66	63.72	3146.49	-27.33	35.33	114.08	0.83	119.43	72.79
3175.00	3.75	63.50	3171.43	-27.94	36.05	115.53	0.35	121.02	72.67
3200.00	3.71	63.60	3196.38	-28.57	36.77	116.98	0.15	122.63	72.55
3225.00	3.60	65.78	3221.33	-29.15	37.46	118.42	0.70	124.21	72.45
3250.00	3.47	70.54	3246.28	-29.62	38.03	119.85	1.28	125.74	72.40

MD	INC	AZIM	MD	VS	INVS	IE/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
3275.00	3.34	76.62	3271.24	-29.94	38.45	121.28	1.54	127.23	72.41
3300.00	3.34	80.27	3296.20	-30.13	38.74	122.70	0.85	128.67	72.48
3325.00	3.41	80.05	3321.15	-30.28	38.99	124.15	0.26	130.13	72.56
3350.00	3.44	78.69	3346.11	-30.46	39.27	125.62	0.35	131.61	72.64
3375.00	3.42	79.69	3371.06	-30.63	39.55	127.09	0.25	133.10	72.71
3400.00	3.33	79.06	3396.02	-30.80	39.82	128.54	0.42	134.56	72.79
3425.00	3.13	76.76	3420.98	-31.00	40.11	129.91	0.94	135.96	72.84
3450.00	2.93	72.96	3445.95	-31.26	40.46	131.19	1.12	137.28	72.86
3475.00	3.02	74.30	3470.91	-31.53	40.82	132.43	0.45	138.58	72.87
3500.00	2.99	73.13	3495.88	-31.81	41.19	133.69	0.27	139.89	72.88
3525.00	3.08	72.21	3520.84	-32.12	41.59	134.96	0.40	141.22	72.87
3550.00	2.99	72.90	3545.81	-32.43	41.98	136.22	0.39	142.54	72.87
3575.00	3.04	72.27	3570.77	-32.73	42.38	137.47	0.23	143.86	72.87
3600.00	3.14	74.17	3595.74	-33.03	42.77	138.76	0.58	145.20	72.87
3625.00	3.40	73.48	3620.70	-33.33	43.16	140.13	1.06	146.63	72.88
3650.00	3.66	75.00	3645.65	-33.65	43.58	141.61	1.11	148.17	72.89
3675.00	3.69	76.21	3670.60	-33.94	43.98	143.17	0.32	149.77	72.92
3700.00	3.71	75.03	3695.54	-34.23	44.38	144.73	0.32	151.38	72.95
3725.00	3.88	74.48	3720.49	-34.55	44.81	146.32	0.69	153.03	72.97
3750.00	3.93	74.96	3745.43	-34.88	45.26	147.96	0.27	154.73	72.99
3775.00	3.71	75.39	3770.38	-35.20	45.69	149.58	0.91	156.40	73.01
3800.00	3.20	75.15	3795.33	-35.48	46.07	151.03	2.04	157.90	73.04
3825.00	1.98	67.33	3820.30	-35.75	46.42	152.11	5.07	159.03	73.03
3850.00	1.48	69.68	3845.29	-35.98	46.70	152.81	1.99	159.78	73.01
3875.00	1.18	74.19	3870.29	-36.12	46.88	153.36	1.30	160.36	73.00
3900.00	1.14	82.69	3895.28	-36.19	46.98	153.85	0.70	160.86	73.02
3925.00	1.15	85.26	3920.28	-36.21	47.03	154.35	0.21	161.35	73.05
3950.00	1.16	95.67	3945.27	-36.17	47.03	154.85	0.84	161.83	73.11
3975.00	1.26	100.24	3970.27	-36.06	46.95	155.37	0.57	162.31	73.18
4000.00	1.40	108.14	3995.26	-35.87	46.81	155.93	0.93	162.80	73.29
4025.00	1.42	114.66	4020.25	-35.61	46.59	156.50	0.65	163.29	73.42
4050.00	1.60	115.80	4045.24	-35.29	46.30	157.10	0.72	163.78	73.58

MD	INC	AZIM	TV	VS	INVS	HE/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	ft/100ft	ft	deg
4075.00	1.80	113.41	4070.23	-34.94	46.00	157.77	0.86	164.34	73.75
4100.00	2.16	101.85	4095.22	-34.63	45.74	158.59	2.15	165.06	73.91
4125.00	2.63	96.88	4120.20	-34.39	45.58	159.62	2.03	166.00	74.06
4150.00	3.04	92.90	4145.16	-34.20	45.48	160.85	1.84	167.16	74.21
4175.00	3.61	88.95	4170.12	-34.08	45.46	162.30	2.43	168.55	74.35
4200.00	3.95	84.91	4195.07	-34.06	45.55	163.95	1.75	170.16	74.47
4225.00	4.13	83.62	4220.01	-34.11	45.72	165.70	0.80	171.89	74.57
4250.00	4.19	81.27	4244.94	-34.23	45.96	167.50	0.72	173.69	74.66
4275.00	4.20	78.32	4269.87	-34.42	46.29	169.30	0.86	175.51	74.71
4300.00	4.17	70.95	4294.81	-34.78	46.77	171.06	2.16	177.33	74.71
4325.00	4.14	66.35	4319.74	-35.32	47.43	172.74	1.34	179.14	74.65
4350.00	3.95	62.52	4344.68	-35.97	48.19	174.33	1.33	180.87	74.55
4375.00	3.76	57.59	4369.62	-36.71	49.03	175.79	1.53	182.50	74.42
4400.00	3.82	52.81	4394.57	-37.55	49.97	177.15	1.29	184.06	74.25
4425.00	3.52	51.16	4419.52	-38.45	50.95	178.41	1.26	185.54	74.06
4450.00	3.38	51.05	4444.47	-39.31	51.90	179.58	0.57	186.93	73.88
4475.00	3.10	50.80	4469.43	-40.12	52.79	180.68	1.15	188.23	73.71
4500.00	2.94	53.23	4494.40	-40.86	53.60	181.71	0.79	189.45	73.57
4525.00	2.88	53.85	4519.36	-41.54	54.35	182.74	0.28	190.65	73.43
4550.00	2.75	55.44	4544.33	-42.18	55.07	183.74	0.60	191.81	73.32
4575.00	2.64	57.90	4569.31	-42.76	55.71	184.72	0.66	192.94	73.22
4600.00	2.54	65.62	4594.28	-43.22	56.25	185.71	1.45	194.04	73.15
4625.00	2.51	69.73	4619.26	-43.57	56.66	186.73	0.73	195.14	73.12
4650.00	2.56	71.12	4644.23	-43.86	57.03	187.77	0.32	196.24	73.10
4675.00	2.60	72.22	4669.21	-44.14	57.39	188.84	0.25	197.37	73.10
4700.00	2.61	72.05	4694.18	-44.42	57.74	189.92	0.05	198.51	73.09
4725.00	2.62	75.83	4719.15	-44.66	58.05	191.02	0.69	199.65	73.10
4750.00	2.67	76.46	4744.13	-44.85	58.33	192.14	0.24	200.80	73.11
4775.00	2.71	75.89	4769.10	-45.05	58.61	193.28	0.21	201.97	73.13
4800.00	2.73	74.97	4794.07	-45.27	58.91	194.43	0.19	203.16	73.14
4825.00	2.94	74.92	4819.04	-45.51	59.23	195.62	0.83	204.39	73.15
4850.00	2.93	76.52	4844.01	-45.74	59.55	196.86	0.33	205.67	73.17

MD	INC	AZIM	TV	VS	IN/S	HE/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	/100ft	ft	deg
4875.00	2.95	76.45	4868.98	-45.95	59.85	198.11	0.06	206.95	73.19
4900.00	2.99	75.51	4893.94	-46.18	60.16	199.37	0.24	208.24	73.21
4925.00	3.00	73.93	4918.91	-46.43	60.50	200.63	0.34	209.55	73.22
4950.00	3.06	72.85	4943.87	-46.72	60.88	201.89	0.32	210.87	73.22
4975.00	3.11	76.25	4968.84	-46.99	61.24	203.19	0.76	212.22	73.23
5000.00	3.07	76.90	4993.80	-47.21	61.55	204.50	0.24	213.56	73.25
5025.00	3.18	75.40	5018.76	-47.44	61.88	205.82	0.57	214.93	73.27
5050.00	3.35	74.85	5043.72	-47.71	62.25	207.20	0.69	216.35	73.28
5075.00	3.32	75.39	5068.68	-47.99	62.62	208.61	0.17	217.80	73.29
5100.00	3.37	76.81	5093.64	-48.24	62.97	210.02	0.38	219.26	73.31
5125.00	3.41	76.56	5118.59	-48.48	63.31	211.46	0.16	220.74	73.33
5150.00	3.56	76.04	5143.55	-48.74	63.67	212.94	0.64	222.25	73.35
5175.00	3.54	74.67	5168.50	-49.02	64.06	214.44	0.36	223.80	73.37
5200.00	3.50	74.68	5193.45	-49.32	64.47	215.92	0.16	225.33	73.38
5225.00	3.46	75.06	5218.41	-49.62	64.86	217.38	0.19	226.85	73.39
5250.00	3.57	75.69	5243.36	-49.90	65.25	218.86	0.48	228.38	73.40
5275.00	3.57	74.04	5268.31	-50.20	65.66	220.36	0.41	229.94	73.41
5300.00	3.56	75.21	5293.26	-50.51	66.07	221.86	0.29	231.49	73.42
5325.00	3.54	73.46	5318.21	-50.82	66.49	223.35	0.45	233.04	73.42
5350.00	3.56	74.99	5343.17	-51.14	66.91	224.84	0.39	234.59	73.43
5375.00	3.59	73.35	5368.12	-51.46	67.33	226.34	0.43	236.14	73.43
5400.00	3.46	74.51	5393.07	-51.78	67.76	227.82	0.57	237.68	73.44
5425.00	3.49	74.64	5418.02	-52.08	68.16	229.28	0.13	239.19	73.44
5450.00	3.49	74.98	5442.98	-52.38	68.56	230.75	0.08	240.72	73.45
5475.00	3.47	73.73	5467.93	-52.68	68.97	232.21	0.32	242.24	73.46
5500.00	3.49	74.74	5492.89	-52.99	69.38	233.67	0.27	243.75	73.46
5525.00	3.49	72.07	5517.84	-53.33	69.82	235.13	0.65	245.28	73.46
5550.00	3.53	71.74	5542.79	-53.70	70.29	236.59	0.18	246.81	73.45
5575.00	3.59	71.69	5567.74	-54.08	70.78	238.06	0.23	248.36	73.44
5600.00	3.60	70.55	5592.69	-54.49	71.29	239.54	0.29	249.93	73.43
5625.00	3.72	70.10	5617.64	-54.92	71.82	241.05	0.49	251.52	73.41
5650.00	3.81	66.82	5642.59	-55.42	72.43	242.57	0.93	253.16	73.38

MD ft	INC deg	AZIM deg	TVD ft	VS ft	INVS ft	TE/W ft	DLS ft/100ft	CLOSURE DIST ft	CLOSURE DIR deg
5675.00	3.80	65.47	5667.53	-55.98	73.10	244.09	0.36	254.80	73.33
5700.00	3.84	65.39	5692.48	-56.57	73.79	245.61	0.17	256.45	73.28
5725.00	3.79	66.88	5717.42	-57.13	74.46	247.13	0.43	258.10	73.23
5750.00	3.87	66.20	5742.37	-57.69	75.13	248.66	0.37	259.76	73.19
5775.00	3.86	66.85	5767.31	-58.25	75.80	250.21	0.19	261.44	73.15
5800.00	3.84	66.10	5792.25	-58.81	76.47	251.74	0.22	263.10	73.10
5825.00	3.84	64.59	5817.20	-59.40	77.17	253.26	0.41	264.76	73.05
5850.00	3.74	64.43	5842.14	-60.01	77.88	254.76	0.42	266.39	73.00
5875.00	3.72	65.07	5867.09	-60.60	78.57	256.23	0.18	268.00	72.95
5900.00	3.69	64.89	5892.04	-61.18	79.25	257.69	0.14	269.60	72.90
5925.00	3.55	63.42	5916.99	-61.76	79.94	259.11	0.66	271.16	72.85
5950.00	3.40	64.06	5941.94	-62.34	80.61	260.47	0.61	272.66	72.80
5975.00	3.47	64.73	5966.90	-62.89	81.26	261.82	0.32	274.14	72.76
6000.00	3.53	66.66	5991.85	-63.42	81.89	263.21	0.53	275.65	72.72
6025.00	3.55	66.42	6016.80	-63.94	82.50	264.62	0.10	277.19	72.68
6050.00	3.59	65.47	6041.76	-64.47	83.14	266.04	0.28	278.73	72.65
6075.00	3.56	64.64	6066.71	-65.03	83.79	267.46	0.24	280.28	72.60
6100.00	3.53	66.84	6091.66	-65.56	84.43	268.86	0.55	281.81	72.57
6125.00	3.57	65.30	6116.61	-66.09	85.06	270.28	0.42	283.35	72.53
6150.00	3.53	66.20	6141.56	-66.63	85.69	271.69	0.27	284.89	72.49
6175.00	3.45	67.43	6166.52	-67.13	86.29	273.09	0.44	286.40	72.46
6200.00	3.53	65.25	6191.47	-67.64	86.90	274.49	0.61	287.91	72.43
6225.00	3.54	65.50	6216.42	-68.19	87.55	275.89	0.08	289.44	72.39
6250.00	3.55	64.63	6241.37	-68.74	88.20	277.29	0.22	290.98	72.36
6275.00	3.57	65.42	6266.33	-69.29	88.85	278.70	0.21	292.52	72.32
6300.00	3.54	65.86	6291.28	-69.83	89.49	280.11	0.17	294.06	72.28
6325.00	3.54	64.74	6316.23	-70.38	90.14	281.51	0.27	295.59	72.25
6350.00	3.57	64.49	6341.18	-70.95	90.80	282.91	0.14	297.12	72.21
6375.00	3.64	64.83	6366.13	-71.52	91.47	284.33	0.30	298.68	72.17
6400.00	3.68	65.20	6391.08	-72.09	92.15	285.78	0.17	300.27	72.13
6425.00	3.67	64.22	6416.03	-72.67	92.83	287.22	0.25	301.85	72.09
6450.00	3.63	65.37	6440.98	-73.25	93.51	288.66	0.33	303.43	72.05

MD	INC	AZIM	TVD	VS	INVS	HE/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	/100ft	ft	deg
6475.00	3.56	66.20	6465.93	-73.79	94.15	290.09	0.33	304.99	72.02
6500.00	3.74	64.37	6490.88	-74.35	94.82	291.54	0.85	306.57	71.98
6525.00	3.70	64.04	6515.83	-74.96	95.53	293.00	0.17	308.18	71.94
6550.00	3.69	63.32	6540.78	-75.57	96.24	294.45	0.20	309.78	71.90
6575.00	3.70	65.55	6565.72	-76.16	96.93	295.90	0.57	311.37	71.86
6600.00	3.72	64.37	6590.67	-76.74	97.62	297.36	0.32	312.98	71.83
6625.00	3.75	66.41	6615.62	-77.32	98.30	298.85	0.55	314.60	71.79
6650.00	3.75	63.25	6640.56	-77.91	98.99	300.33	0.83	316.22	71.76
6675.00	3.67	63.25	6665.51	-78.54	99.72	301.77	0.29	317.82	71.71
6700.00	3.76	62.17	6690.46	-79.18	100.46	303.21	0.43	319.42	71.67
6725.00	3.77	54.36	6715.41	-79.94	101.33	304.60	2.05	321.01	71.60
6750.00	3.77	48.87	6740.35	-80.87	102.35	305.89	1.44	322.56	71.50
6775.00	3.94	47.66	6765.30	-81.90	103.47	307.15	0.76	324.11	71.38
6800.00	3.91	46.44	6790.24	-82.98	104.63	308.40	0.36	325.67	71.26
6825.00	3.85	45.02	6815.18	-84.07	105.81	309.61	0.45	327.20	71.13
6850.00	3.94	45.18	6840.12	-85.18	107.01	310.82	0.36	328.72	71.00
6875.00	3.83	46.62	6865.06	-86.28	108.19	312.03	0.58	330.26	70.88
6900.00	3.84	46.55	6890.01	-87.34	109.34	313.25	0.05	331.78	70.76
6925.00	3.85	46.09	6914.95	-88.41	110.50	314.46	0.13	333.31	70.64
6950.00	3.98	46.06	6939.89	-89.51	111.69	315.69	0.49	334.87	70.52
6975.00	3.91	45.24	6964.83	-90.62	112.89	316.92	0.36	336.43	70.39
7000.00	3.88	46.14	6989.78	-91.72	114.07	318.14	0.27	337.97	70.27
7025.00	3.91	44.30	7014.72	-92.83	115.27	319.34	0.51	339.51	70.15
7050.00	3.86	45.19	7039.66	-93.94	116.47	320.53	0.32	341.04	70.03
7075.00	3.99	44.16	7064.60	-95.07	117.69	321.73	0.59	342.58	69.91
7100.00	4.48	44.44	7089.53	-96.30	119.01	323.02	2.00	344.25	69.78
7125.00	5.15	46.36	7114.45	-97.67	120.48	324.52	2.72	346.16	69.63
7150.00	5.47	48.07	7139.34	-99.11	122.05	326.22	1.45	348.30	69.49
7175.00	5.48	48.31	7164.22	-100.58	123.64	327.99	0.10	350.52	69.35
7200.00	5.51	48.18	7189.11	-102.04	125.24	329.78	0.14	352.76	69.21
7225.00	5.69	47.75	7213.99	-103.55	126.87	331.59	0.72	355.04	69.06
7250.00	5.69	47.69	7238.87	-105.08	128.54	333.43	0.02	357.34	68.92

MD	INC	AZIM	TVR	VS	NVS	E/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	/100ft	ft	deg
7275.00	5.61	47.49	7263.75	-106.61	130.20	335.24	0.30	359.64	68.78
7300.00	5.60	48.65	7288.63	-108.12	131.83	337.06	0.46	361.92	68.64
7325.00	5.56	47.87	7313.51	-109.60	133.45	338.87	0.35	364.20	68.51
7350.00	5.66	48.26	7338.39	-111.11	135.08	340.69	0.44	366.49	68.37
7375.00	5.56	48.03	7363.27	-112.61	136.71	342.51	0.40	368.79	68.24
7400.00	5.62	48.68	7388.15	-114.09	138.33	344.33	0.34	371.08	68.11
7425.00	5.34	48.02	7413.03	-115.55	139.91	346.12	1.13	373.33	67.99
7450.00	5.34	46.22	7437.93	-117.01	141.50	347.82	0.67	375.50	67.86
7475.00	5.23	46.70	7462.82	-118.48	143.08	349.49	0.47	377.65	67.74
7500.00	5.10	46.60	7487.72	-119.91	144.63	351.13	0.53	379.75	67.61
7525.00	5.10	47.04	7512.62	-121.31	146.15	352.75	0.16	381.82	67.50
7550.00	5.11	47.10	7537.52	-122.71	147.66	354.38	0.03	383.91	67.38
7575.00	4.98	46.65	7562.42	-124.10	149.17	355.98	0.54	385.97	67.26
7600.00	4.92	47.33	7587.33	-125.46	150.64	357.56	0.34	387.99	67.15
7625.00	5.03	47.08	7612.24	-126.82	152.11	359.15	0.46	390.03	67.05
7650.00	5.14	47.21	7637.14	-128.21	153.62	360.77	0.43	392.12	66.94
7675.00	5.98	47.16	7662.02	-129.73	155.26	362.55	3.36	394.40	66.82
7700.00	6.24	46.87	7686.88	-131.40	157.08	364.50	1.04	396.90	66.69
7725.00	6.28	48.53	7711.73	-133.09	158.91	366.51	0.74	399.48	66.56
7750.00	6.26	48.61	7736.58	-134.75	160.72	368.56	0.09	402.08	66.44
7775.00	6.32	49.13	7761.43	-136.40	162.52	370.62	0.35	404.69	66.32
7800.00	6.21	50.28	7786.28	-138.02	164.29	372.70	0.67	407.31	66.21
7825.00	6.22	50.92	7811.13	-139.59	166.00	374.80	0.28	409.91	66.11
7850.00	6.17	51.10	7835.99	-141.14	167.70	376.89	0.23	412.52	66.01
7875.00	6.13	51.71	7860.84	-142.66	169.37	378.98	0.30	415.11	65.92
7900.00	6.10	51.17	7885.70	-144.17	171.03	381.07	0.26	417.69	65.83
7925.00	6.05	51.97	7910.56	-145.66	172.67	383.14	0.38	420.25	65.74
7950.00	6.07	51.45	7935.42	-147.15	174.31	385.21	0.23	422.81	65.65
7975.00	5.82	50.70	7960.29	-148.64	175.94	387.22	1.06	425.32	65.57
8000.00	5.78	49.91	7985.16	-150.11	177.55	389.17	0.37	427.76	65.48
8025.00	5.68	48.18	8010.03	-151.61	179.19	391.05	0.78	430.15	65.38
8050.00	5.79	49.44	8034.91	-153.12	180.83	392.93	0.67	432.55	65.29

MD	INC	AZIM	TVL	VS	IN/SH	FE/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	/100ft	ft	deg
8075.00	5.79	50.09	8059.78	-154.62	182.46	394.86	0.26	434.98	65.20
8100.00	5.84	49.52	8084.65	-156.11	184.10	396.79	0.31	437.42	65.11
8125.00	5.79	49.64	8109.52	-157.61	185.74	398.72	0.22	439.86	65.02
8150.00	5.58	52.17	8134.40	-159.04	187.30	400.64	1.30	442.26	64.94
8175.00	5.71	51.90	8159.28	-160.41	188.81	402.58	0.54	444.66	64.87
8200.00	5.75	51.84	8184.15	-161.81	190.35	404.54	0.17	447.09	64.80
8225.00	5.73	53.39	8209.03	-163.19	191.87	406.53	0.62	449.53	64.73
8250.00	5.79	59.49	8233.90	-164.43	193.26	408.62	2.46	452.02	64.69
8275.00	5.97	62.01	8258.77	-165.52	194.51	410.85	1.24	454.57	64.67
8300.00	5.92	62.15	8283.64	-166.57	195.72	413.14	0.20	457.16	64.65
8325.00	5.97	62.52	8308.50	-167.61	196.92	415.43	0.27	459.74	64.64
8350.00	5.98	62.31	8333.37	-168.65	198.13	417.74	0.10	462.34	64.63
8375.00	5.68	62.92	8358.24	-169.66	199.30	420.00	1.24	464.88	64.61
8400.00	5.76	64.12	8383.11	-170.62	200.41	422.23	0.57	467.37	64.61
8425.00	5.64	63.24	8407.99	-171.56	201.51	424.45	0.57	469.86	64.60
8450.00	5.48	63.18	8432.87	-172.50	202.60	426.62	0.64	472.28	64.60
8475.00	5.64	63.13	8457.75	-173.44	203.69	428.78	0.63	474.70	64.59
8500.00	5.76	61.59	8482.63	-174.44	204.85	430.98	0.77	477.18	64.58
8525.00	6.19	57.74	8507.49	-175.60	206.16	433.22	2.36	479.77	64.55
8550.00	6.50	55.23	8532.34	-176.96	207.69	435.52	1.67	482.51	64.50
8575.00	6.54	55.57	8557.18	-178.41	209.30	437.86	0.21	485.32	64.45
8600.00	6.52	54.32	8582.02	-179.87	210.93	440.19	0.58	488.12	64.40
8625.00	6.35	54.56	8606.86	-181.34	212.56	442.47	0.67	490.88	64.34
8650.00	6.13	53.74	8631.71	-182.77	214.15	444.67	0.96	493.55	64.28
8675.00	5.82	55.67	8656.58	-184.13	215.66	446.79	1.45	496.12	64.23
8700.00	5.80	54.34	8681.45	-185.43	217.11	448.87	0.55	498.62	64.19
8725.00	5.63	54.89	8706.32	-186.73	218.55	450.90	0.70	501.07	64.14
8750.00	5.46	54.82	8731.21	-187.98	219.94	452.87	0.66	503.45	64.10
8775.00	5.72	54.64	8756.09	-189.24	221.35	454.86	1.02	505.86	64.05
8800.00	6.28	53.28	8780.95	-190.63	222.89	456.97	2.32	508.43	64.00
8825.00	7.03	51.22	8805.78	-192.24	224.66	459.26	3.16	511.27	63.93
8850.00	7.09	51.90	8830.59	-193.98	226.57	461.67	0.41	514.27	63.86

MD	INC	AZIM	TVD	VS	IN/S	TE/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	/100ft	ft	deg
8875.00	7.12	51.79	8855.40	-195.72	228.49	464.10	0.13	517.30	63.79
8900.00	6.87	51.89	8880.21	-197.43	230.37	466.50	1.02	520.28	63.72
8925.00	6.59	51.96	8905.04	-199.07	232.17	468.80	1.12	523.14	63.65
8950.00	6.36	51.31	8929.88	-200.67	233.92	471.01	0.95	525.90	63.59
8975.00	6.14	52.51	8954.73	-202.19	235.60	473.16	1.02	528.57	63.53
9000.00	5.84	52.64	8979.60	-203.63	237.19	475.23	1.23	531.13	63.48
9025.00	5.46	53.11	9004.47	-204.98	238.67	477.19	1.52	533.55	63.43
9050.00	5.24	54.19	9029.37	-206.23	240.06	479.07	0.99	535.85	63.38
9075.00	5.16	54.84	9054.26	-207.41	241.37	480.91	0.38	538.08	63.35
9100.00	5.12	53.37	9079.16	-208.59	242.68	482.72	0.56	540.29	63.31
9125.00	5.22	51.48	9104.06	-209.84	244.06	484.51	0.79	542.50	63.26
9150.00	5.15	51.30	9128.96	-211.12	245.46	486.27	0.28	544.71	63.22
9175.00	5.51	50.60	9153.85	-212.46	246.93	488.08	1.49	546.98	63.16
9200.00	6.17	50.32	9178.72	-213.94	248.55	490.04	2.61	549.46	63.11
9225.00	6.50	49.40	9203.57	-215.56	250.32	492.14	1.39	552.15	63.04
9250.00	6.46	47.38	9228.41	-217.28	252.20	494.25	0.92	554.88	62.97
9275.00	6.14	47.49	9253.26	-218.99	254.05	496.27	1.26	557.52	62.89
9300.00	5.79	46.75	9278.12	-220.63	255.82	498.18	1.44	560.02	62.82
9325.00	5.82	46.85	9302.99	-222.22	257.55	500.02	0.13	562.45	62.75
9350.00	6.10	48.40	9327.86	-223.84	259.30	501.94	1.28	564.96	62.68
9375.00	6.56	53.58	9352.71	-225.41	261.03	504.08	2.94	567.66	62.62
9400.00	7.07	57.80	9377.53	-226.91	262.70	506.53	2.87	570.60	62.59
9425.00	7.29	59.31	9402.33	-228.35	264.33	509.20	1.14	573.72	62.57
9450.00	7.11	59.87	9427.14	-229.74	265.91	511.90	0.76	576.85	62.55
9475.00	6.76	61.60	9451.95	-231.03	267.39	514.54	1.64	579.87	62.54
9500.00	6.55	62.10	9476.79	-232.22	268.76	517.09	0.86	582.76	62.54
9525.00	6.22	63.18	9501.63	-233.32	270.04	519.56	1.42	585.54	62.54
9550.00	6.04	64.17	9526.49	-234.34	271.22	521.95	0.82	588.21	62.54
9575.00	5.97	66.59	9551.35	-235.26	272.31	524.33	1.05	590.83	62.55
9600.00	5.73	68.59	9576.22	-236.07	273.28	526.68	1.27	593.36	62.58
9625.00	5.72	70.89	9601.10	-236.77	274.15	529.02	0.92	595.84	62.61
9650.00	6.29	75.96	9625.96	-237.33	274.89	531.53	3.12	598.40	62.65

MD	INC	AZIM	TVD	VS	N/S	E/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	/100ft	ft	deg
9670.00	6.68	81.15	9645.83	-237.62	275.33	533.74	3.51	600.57	62.71