

30-015-45832

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COG

EMNRD-COG

SURVEY REPORT

HOWITZER FEDERAL COM #603H

ICD 205

5/20/2019

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

JAKE ELGER

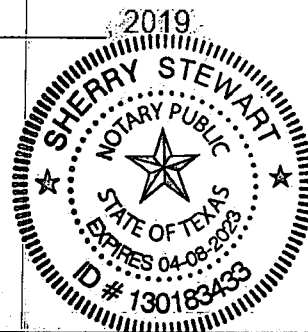
Notarized this date 07 of JUNE

Sherry Stewart

Notary Signature

County of Midland

State of Texas



The Ultimate Partner In Wellbore Placement

SURVEY REPORT

HOWITZER FEDERAL COM #603H

KEEPER GYRO SURVEY

CUSTOMER PROJECT
FIELD

COG
Howitzer Federal Com #603H Keeper Gyro survey
N/A

SDI JOB NO.
SDI DISTRICT
SDI KIT/UNIT

OP:018729
Midland

SITE INFORMATION

Site Name
Lat/Long
Northing
Easting

Eddy County, New Mexico
32.2366694° N, 104.0338131° W
449,948.1 ft
5,962,610.6 ft

Section
Township
Range

MAP INFORMATION

North Reference
Grid Correction
System
Datum
Map Zone

Grid North
-0.16 deg
US State Plane 1927
North American Datum 1927 (Clarke 1866)
New Mexico East: 3001



WELL INFORMATION

Lat/Long
Northing
Easting
UWI

32.2366694° N, 104.0338131° W
449,948.1 ft
5,962,610.6 ft
30-025-45832

DEPTH AND ELEVATION REFERENCE

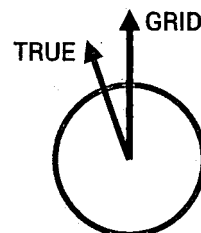
Ground Level
Reference Datum
Reference Height
Reference Elevation

2974.4 ft above Mean Sea Level
RKB
26 ft above G.L.
3000.4 ft

VERTICAL SECTION REFERENCE

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

0 ft
0 ft
269.20°
Minimum Curvature



LOCAL GRAVITY REFERENCE INFORMATION

Local Gravity
True to Grid

998.542 mG [computed]
subtract 0.16°

WELL NOTES

Howitzer Federal Com #603H Keeper Gyro survey

OPERATORS

jeffrey Loyd

SDI Operator Name (Printed)

SIGNATURE

DATE



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5/20/2019 12:46 AM Central Daylight Time

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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
94.78	0.29	82.95	94.77	-0.24	0.03	0.24	0.30	0.24	82.95
100.00	0.30	81.71	100.00	-0.26	0.03	0.26	0.27	0.26	82.88
125.00	0.36	76.99	125.00	-0.40	0.06	0.40	0.27	0.41	81.56
150.00	0.30	68.16	150.00	-0.54	0.10	0.54	0.32	0.55	79.33
175.00	0.20	114.35	175.00	-0.64	0.11	0.64	0.86	0.65	80.46
200.00	0.27	82.34	200.00	-0.74	0.10	0.74	0.59	0.75	82.51
225.00	0.15	119.95	225.00	-0.83	0.09	0.83	0.72	0.83	83.85
250.00	0.22	221.06	250.00	-0.82	0.04	0.82	1.14	0.82	87.41
275.00	0.65	232.29	275.00	-0.68	-0.08	0.68	1.75	0.69	97.09
300.00	0.60	222.53	300.00	-0.48	-0.27	0.48	0.47	0.55	119.01
325.00	0.83	226.28	324.99	-0.26	-0.49	0.26	0.94	0.55	151.65
350.00	0.75	225.46	349.99	-0.01	-0.73	0.02	0.33	0.73	178.70
375.00	0.78	235.37	374.99	0.25	-0.94	-0.24	0.55	0.97	194.36
400.00	0.91	235.44	399.99	0.56	-1.15	-0.54	0.51	1.27	205.37
425.00	0.86	230.98	424.98	0.87	-1.38	0.85	0.34	1.62	211.77
450.00	0.82	229.82	449.98	1.16	-1.61	1.14	0.18	1.97	215.17
475.00	0.88	223.99	474.98	1.43	-1.86	1.40	0.42	2.33	217.00
500.00	0.96	228.42	499.97	1.72	-2.14	1.69	0.42	2.73	218.36
525.00	0.71	236.95	524.97	2.01	-2.36	1.98	1.11	3.08	219.95
550.00	0.75	235.60	549.97	2.28	-2.54	-2.24	0.17	3.39	221.46
575.00	0.83	235.57	574.97	2.56	-2.73	-2.53	0.33	3.72	222.75
600.00	0.87	235.82	599.97	2.87	-2.94	-2.83	0.18	4.08	223.92
625.00	0.95	235.14	624.96	3.20	-3.17	-3.16	0.32	4.48	224.94
650.00	0.87	223.92	649.96	3.51	-3.42	-3.46	0.78	4.87	225.33
675.00	0.84	230.34	674.96	3.79	-3.68	3.74	0.41	5.24	225.45
700.00	0.77	230.57	699.95	4.06	-3.90	4.00	0.29	5.59	225.76
725.00	0.74	232.67	724.95	4.32	-4.10	4.26	0.14	5.92	226.09
750.00	0.83	236.68	749.95	4.60	-4.30	4.54	0.40	6.26	226.56
775.00	0.95	230.38	774.95	4.92	-4.53	4.85	0.63	6.64	226.96
800.00	0.87	236.69	799.94	5.24	-4.77	-5.17	0.50	7.03	227.32
825.00	0.88	233.73	824.94	5.56	-4.99	-5.49	0.18	7.41	227.72

MD	INC	AZIM	TVD	VS	N/S	E/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	/100ft	ft	deg
850.00	0.93	225.87	849.94	5.86	-5.24	-5.79	0.53	7.81	227.82
875.00	0.78	235.96	874.93	6.15	-5.48	-6.07	0.84	8.18	227.94
900.00	0.89	230.25	899.93	6.44	-5.70	-6.37	0.56	8.54	228.16
925.00	0.88	228.94	924.93	6.74	-5.95	-6.66	0.09	8.93	228.22
950.00	0.79	228.65	949.93	7.02	-6.19	-6.93	0.38	9.30	228.24
975.00	0.87	232.01	974.92	7.30	-6.42	-7.21	0.38	9.66	228.32
1000.00	1.36	215.64	999.92	7.63	-6.78	-7.54	2.33	10.14	228.02
1025.00	0.84	221.32	1024.91	7.93	-7.16	-7.83	2.12	10.61	227.56
1050.00	0.88	232.47	1049.91	8.21	-7.41	-8.10	0.68	10.98	227.54
1075.00	0.78	229.19	1074.91	8.49	-7.64	-8.39	0.42	11.35	227.65
1100.00	0.75	242.35	1099.91	8.77	-7.83	-8.66	0.72	11.67	227.88
1125.00	1.07	240.82	1124.90	9.12	-8.02	-9.01	1.27	12.06	228.32
1150.00	1.03	240.34	1149.90	9.52	-8.24	-9.40	0.14	12.51	228.76
1175.00	0.86	239.40	1174.90	9.88	-8.45	-9.76	0.70	12.91	229.12
1200.00	0.86	237.03	1199.89	10.20	-8.65	-10.08	0.15	13.28	229.37
1225.00	0.99	229.20	1224.89	10.52	-8.89	-10.40	0.70	13.68	229.47
1250.00	1.15	222.39	1249.88	10.86	-9.22	-10.73	0.83	14.15	229.34
1275.00	0.91	227.44	1274.88	11.18	-9.54	-11.05	1.02	14.59	229.20
1300.00	0.87	226.78	1299.88	11.47	-9.80	-11.33	0.16	14.98	229.15
1325.00	0.91	228.29	1324.87	11.76	-10.06	-11.62	0.19	15.37	229.11
1350.00	0.96	237.34	1349.87	12.09	-10.31	-11.94	0.61	15.78	229.20
1375.00	1.20	228.68	1374.87	12.46	-10.59	-12.32	1.19	16.25	229.30
1400.00	1.02	229.37	1399.86	12.83	-10.91	-12.68	0.74	16.73	229.29
1425.00	1.06	225.78	1424.86	13.17	-11.22	-13.02	0.30	17.18	229.24
1450.00	0.82	237.32	1449.85	13.49	-11.48	-13.33	1.21	17.59	229.28
1475.00	1.30	221.43	1474.85	13.83	-11.79	-13.67	2.25	18.05	229.24
1500.00	1.01	217.36	1499.85	14.16	-12.17	-13.99	1.22	18.55	228.98
1525.00	0.98	225.60	1524.84	14.45	-12.50	-14.28	0.58	18.98	228.81
1550.00	0.96	229.39	1549.84	14.77	-12.78	-14.59	0.27	19.40	228.78
1575.00	1.14	226.11	1574.83	15.11	-13.09	-14.93	0.76	19.85	228.75
1600.00	1.05	226.18	1599.83	15.46	-13.42	-15.27	0.35	20.33	228.69
1625.00	0.98	218.53	1624.83	15.76	-13.75	-15.57	0.61	20.77	228.56

MD	INC	AZIM	TVD	VS	N/S	E/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
1650.00	1.00	223.76	1649.82	16.05	-14.07	-15.85	0.37	21.20	228.41
1675.00	0.95	230.14	1674.82	16.36	-14.36	-16.16	0.47	21.62	228.38
1700.00	0.83	229.10	1699.82	16.66	-14.61	-16.46	0.50	22.01	228.40
1725.00	1.08	237.45	1724.81	17.00	-14.86	-16.79	1.15	22.42	228.50
1750.00	1.09	232.21	1749.81	17.39	-15.13	-17.18	0.40	22.89	228.63
1775.00	1.13	230.64	1774.80	17.77	-15.43	-17.56	0.18	23.38	228.69
1800.00	1.02	232.02	1799.80	18.14	-15.72	-17.92	0.45	23.84	228.74
1825.00	0.99	211.35	1824.79	18.43	-16.05	-18.21	1.44	24.27	228.62
1850.00	0.87	232.40	1849.79	18.70	-16.35	-18.47	1.44	24.67	228.50
1875.00	0.98	231.42	1874.79	19.02	-16.60	-18.79	0.43	25.07	228.55
1900.00	1.05	231.80	1899.78	19.37	-16.87	-19.14	0.30	25.51	228.61
1925.00	1.10	224.86	1924.78	19.73	-17.18	-19.49	0.55	25.98	228.60
1950.00	1.04	220.59	1949.78	20.05	-17.52	-19.81	0.40	26.44	228.50
1975.00	1.12	208.27	1974.77	20.32	-17.91	-20.07	0.98	26.90	228.25
2000.00	1.15	213.88	1999.77	20.58	-18.33	-20.32	0.46	27.37	227.95
2025.00	1.12	209.87	2024.76	20.84	-18.75	-20.58	0.34	27.85	227.67
2050.00	0.98	200.75	2049.76	21.05	-19.16	-20.78	0.85	28.27	227.32
2075.00	0.85	212.17	2074.75	21.23	-19.52	-20.96	0.89	28.64	227.03
2100.00	1.01	215.77	2099.75	21.46	-19.86	-21.18	0.67	29.04	226.85
2125.00	1.11	207.96	2124.75	21.71	-20.25	-21.43	0.71	29.48	226.62
2150.00	1.19	211.40	2149.74	21.96	-20.69	-21.68	0.42	29.96	226.34
2175.00	1.49	198.10	2174.73	22.21	-21.22	-21.91	1.71	30.50	225.92
2200.00	1.31	188.07	2199.73	22.36	-21.81	-22.05	1.21	31.02	225.32
2225.00	1.19	192.04	2224.72	22.46	-22.35	-22.15	0.59	31.46	224.74
2250.00	1.14	198.47	2249.72	22.60	-22.84	-22.28	0.56	31.90	224.30
2275.00	1.22	197.48	2274.71	22.76	-23.32	-22.44	0.33	32.37	223.89
2300.00	1.53	192.88	2299.70	22.92	-23.90	-22.59	1.32	32.89	223.39
2325.00	1.66	192.10	2324.69	23.08	-24.58	-22.74	0.51	33.49	222.77
2350.00	1.49	189.91	2349.68	23.23	-25.26	-22.87	0.72	34.07	222.17
2375.00	1.44	185.97	2374.68	23.32	-25.89	-22.96	0.44	34.60	221.57
2400.00	1.54	183.55	2399.67	23.39	-26.54	-23.02	0.49	35.13	220.94
2425.00	1.60	169.13	2424.66	23.35	-27.21	-22.97	1.60	35.61	220.17

SURVEY REPORT

HOWITZER FEDERAL COM #603H

KEEPER GYRO SURVEY

MD	INC	AZIM	TVD	VS	N/S	E/W	DLS	CLOSURE	CLOSURE
ft	deg	deg	ft	ft	ft	ft	/100ft	DIST	DIR
2450.00	1.48	167.92	2449.65	23.23	27.87	22.84	0.51	36.04	219.33
2475.00	1.58	174.20	2474.64	23.13	28.53	22.74	0.79	36.48	218.55
2500.00	1.61	175.17	2499.63	23.08	29.23	22.67	0.14	36.99	217.80
2525.00	1.47	167.77	2524.62	22.99	29.89	22.57	0.95	37.46	217.06
2550.00	1.39	172.69	2549.61	22.89	-30.50	-22.47	0.59	37.88	216.37
2575.00	1.61	176.26	2574.61	22.84	-31.15	-22.41	0.96	38.37	215.72
2600.00	1.61	177.60	2599.60	22.81	-31.86	-22.37	0.15	38.92	215.08
2625.00	1.68	172.65	2624.59	22.76	-32.57	-22.31	0.64	39.48	214.41
2650.00	1.63	155.41	2649.57	22.57	-33.26	-22.11	2.00	39.94	213.62
2675.00	1.51	165.85	2674.57	22.35	-33.90	-21.88	1.24	40.35	212.84
2700.00	1.51	171.53	2699.56	22.23	-34.55	-21.75	0.60	40.82	212.20
2725.00	1.56	174.65	2724.55	22.16	-35.21	-21.67	0.38	41.35	211.61
2750.00	1.59	173.94	2749.54	22.10	-35.90	-21.61	0.13	41.90	211.04
2775.00	1.87	171.83	2774.53	22.02	-36.64	-21.51	1.17	42.49	210.41
2800.00	1.59	167.85	2799.52	21.90	-37.39	-21.38	1.24	43.07	209.76
2825.00	1.65	167.91	2824.51	21.76	-38.08	-21.23	0.24	43.60	209.14
2850.00	1.81	168.16	2849.49	21.61	-38.82	-21.08	0.64	44.17	208.50
2875.00	1.78	165.25	2874.48	21.45	-39.58	-20.90	0.38	44.75	207.83
2900.00	1.90	162.24	2899.47	21.23	-40.35	-20.67	0.64	45.33	207.13
2925.00	2.18	157.46	2924.45	20.93	-41.18	-20.36	1.28	45.94	206.31
2950.00	2.77	143.63	2949.43	20.41	-42.11	-19.82	3.33	46.54	205.21
2975.00	3.19	137.94	2974.40	19.60	-43.11	-19.00	2.05	47.11	203.78
3000.00	3.47	136.50	2999.35	18.63	-44.17	-18.01	1.20	47.70	202.18
3025.00	4.10	135.77	3024.30	17.50	-45.36	-16.87	2.52	48.40	200.40
3050.00	4.39	129.60	3049.23	16.16	-46.61	-15.51	2.15	49.12	198.40
3075.00	4.45	127.79	3074.16	14.67	-47.82	-14.00	0.61	49.82	196.32
3100.00	4.68	126.12	3099.08	13.10	-49.01	-12.41	1.05	50.56	194.21
3125.00	4.78	123.66	3123.99	11.42	-50.19	-10.72	0.91	51.32	192.06
3150.00	4.64	122.73	3148.91	9.72	-51.31	-9.00	0.63	52.10	189.95
3175.00	4.63	124.24	3173.83	8.05	-52.43	-7.32	0.49	52.94	187.95
3200.00	4.69	124.83	3198.74	6.39	-53.58	-5.65	0.29	53.88	186.01
3225.00	4.67	124.17	3223.66	4.73	-54.74	-3.96	0.23	54.88	184.14

MD	INC	AZIM	TVD	VS	IN/S	E/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
3250.00	4.98	122.13	3248.57	2.98	-55.89	-2.20	1.42	55.93	182.26
3275.00	4.84	124.80	3273.48	1.22	-57.06	-0.42	1.08	57.07	180.42
3300.00	4.66	125.07	3298.39	-0.46	-58.25	1.28	0.73	58.26	178.74
3325.00	4.54	123.04	3323.31	-2.11	-59.37	2.94	0.81	59.44	177.17
3350.00	4.59	122.04	3348.23	-3.77	-60.44	4.61	0.38	60.62	175.64
3375.00	4.54	125.82	3373.15	-5.40	-61.55	6.26	1.22	61.87	174.19
3400.00	4.43	123.17	3398.08	-7.00	-62.66	7.88	0.94	63.15	172.84
3425.00	4.45	122.13	3423.00	-8.62	-63.70	-9.51	0.33	64.41	171.51
3450.00	4.49	122.28	3447.93	-10.25	-64.74	-11.16	0.19	65.70	170.22
3475.00	4.58	120.14	3472.85	-11.93	-65.77	-12.85	0.75	67.01	168.95
3500.00	4.60	118.95	3497.77	-13.65	-66.75	-14.59	0.40	68.33	167.67
3525.00	4.26	121.07	3522.69	-15.31	-67.72	-16.26	1.53	69.64	166.50
3550.00	4.10	122.18	3547.63	-16.85	-68.67	17.81	0.71	70.94	165.46
3575.00	4.06	122.57	3572.56	-18.34	-69.62	19.31	0.18	72.25	164.50
3600.00	4.09	121.95	3597.50	-19.83	-70.57	20.81	0.20	73.58	163.57
3625.00	4.14	121.36	3622.44	-21.34	-71.51	22.34	0.26	74.92	162.65
3650.00	3.88	119.92	3647.38	-22.83	-72.40	23.84	1.12	76.23	161.77
3675.00	3.74	119.71	3672.32	-24.26	-73.23	25.28	0.55	77.47	160.95
3700.00	3.67	119.69	3697.27	-25.65	-74.03	26.68	0.26	78.69	160.18
3725.00	3.70	120.63	3722.22	-27.03	-74.84	28.07	0.27	79.93	159.44
3750.00	3.79	117.16	3747.16	-28.45	-75.62	29.50	0.97	81.18	158.69
3775.00	3.67	118.46	3772.11	-29.87	-76.38	30.94	0.58	82.41	157.95
3800.00	3.70	118.35	3797.06	-31.28	-77.15	32.36	0.13	83.66	157.25
3825.00	3.84	114.17	3822.00	-32.74	-77.87	33.83	1.24	84.91	156.52
3850.00	3.78	110.97	3846.95	-34.27	-78.51	35.37	0.89	86.11	155.75
3875.00	3.82	110.96	3871.89	-35.80	-79.10	36.91	0.17	87.29	154.98
3900.00	3.86	110.95	3896.84	-37.36	-79.70	38.48	0.15	88.50	154.23
3925.00	4.04	108.64	3921.78	-38.97	-80.29	40.09	0.96	89.74	153.46
3950.00	4.25	106.00	3946.71	-40.69	-80.82	41.82	1.14	91.00	152.64
3975.00	4.48	104.79	3971.64	-42.51	-81.33	43.65	0.99	92.30	151.78
4000.00	4.29	108.13	3996.57	-44.34	-81.87	45.49	1.26	93.65	150.94
4025.00	4.54	105.44	4021.49	-46.17	-82.42	47.33	1.27	95.04	150.13

MD	INC	AZIM	TVD	VS	N/S	E/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
4050.00	4.37	103.50	4046.42	-48.04	-82.91	49.21	0.90	96.41	149.31
4075.00	4.35	105.29	4071.35	-49.88	-83.38	51.05	0.55	97.76	148.52
4100.00	4.58	104.08	4096.27	-51.75	-83.87	52.93	1.01	99.18	147.74
4125.00	4.68	106.17	4121.19	-53.70	-84.40	54.88	0.77	100.67	146.97
4150.00	4.78	109.48	4146.10	-55.65	-85.03	56.84	1.17	102.28	146.24
4175.00	4.83	109.53	4171.01	-57.61	-85.73	58.82	0.20	103.97	145.55
4200.00	5.04	108.60	4195.92	-59.64	-86.43	60.85	0.90	105.70	144.85
4225.00	5.10	112.47	4220.82	-61.69	-87.21	62.92	1.39	107.54	144.19
4250.00	5.14	112.63	4245.72	-63.74	-88.06	64.98	0.17	109.44	143.58
4275.00	5.22	113.25	4270.62	-65.81	-88.94	67.06	0.41	111.39	142.99
4300.00	5.59	113.56	4295.51	-67.96	-89.88	69.22	1.46	113.44	142.40
4325.00	5.88	113.18	4320.39	-70.24	-90.87	71.51	1.19	115.63	141.80
4350.00	6.06	113.92	4345.25	-72.60	-91.91	73.90	0.78	117.93	141.20
4375.00	6.03	114.75	4370.11	-74.99	-92.99	76.29	0.37	120.29	140.63
4400.00	5.92	114.39	4394.98	-77.34	-94.08	78.66	0.44	122.63	140.10
4425.00	6.10	115.36	4419.84	-79.70	-95.18	81.04	0.81	125.00	139.59
4450.00	6.22	113.51	4444.69	-82.13	-96.29	83.48	0.93	127.43	139.08
4475.00	6.30	113.45	4469.54	-84.61	-97.37	85.98	0.33	129.90	138.56
4500.00	6.30	114.42	4494.39	-87.10	-98.49	88.49	0.43	132.40	138.06
4525.00	6.46	114.12	4519.24	-89.62	-99.63	91.02	0.67	134.95	137.59
4550.00	6.84	114.08	4544.07	-92.25	-100.81	93.66	1.51	137.61	137.10
4575.00	7.21	113.12	4568.88	-95.03	-102.03	96.46	1.55	140.41	136.61
4600.00	7.08	114.44	4593.69	-97.86	-103.29	99.31	0.83	143.29	136.12
4625.00	7.15	115.08	4618.50	-100.65	-104.58	102.12	0.42	146.17	135.68
4650.00	7.05	116.29	4643.30	-103.42	-105.92	104.91	0.72	149.08	135.28
4675.00	7.32	113.25	4668.11	-106.24	-107.23	107.75	1.86	152.01	134.86
4700.00	7.28	113.57	4692.91	-109.14	-108.49	110.66	0.22	154.98	134.43
4725.00	7.13	114.68	4717.71	-111.98	-109.78	113.53	0.83	157.92	134.04
4750.00	7.32	115.64	4742.51	-114.81	-111.11	116.37	0.91	160.90	133.68
4775.00	7.10	115.11	4767.31	-117.63	-112.46	119.21	0.92	163.88	133.33
4800.00	7.01	115.88	4792.12	-120.38	-113.78	121.98	0.52	166.81	133.01
4825.00	6.89	115.23	4816.94	-123.09	-115.09	124.71	0.60	169.70	132.70

MD	INC	AZIM	TVD	VS	IN/S	EA/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
4850.00	6.65	115.84	4841.76	-125.73	-116.36	127.37	0.98	172.52	132.41
4875.00	6.40	116.07	4866.60	-128.27	-117.60	129.92	1.00	175.24	132.15
4900.00	6.47	115.25	4891.44	-130.78	-118.81	132.45	0.47	177.93	131.89
4925.00	6.42	115.42	4916.29	-133.30	-120.01	134.99	0.23	180.62	131.64
4950.00	6.10	120.66	4941.14	-135.68	-121.29	137.39	2.62	183.27	131.44
4975.00	6.01	119.18	4966.00	-137.95	-122.61	139.68	0.72	185.85	131.28
5000.00	5.97	117.90	4990.86	-140.22	-123.85	141.97	0.56	188.40	131.10
5025.00	5.87	118.50	5015.73	-142.48	-125.07	144.24	0.45	190.91	130.93
5050.00	5.63	119.97	5040.60	-144.65	-126.29	146.43	1.11	193.37	130.78
5075.00	5.41	120.03	5065.49	-146.71	-127.50	148.51	0.90	195.73	130.65
5100.00	5.36	119.82	5090.38	-148.73	-128.67	150.54	0.21	198.03	130.52
5125.00	5.33	118.83	5115.27	-150.75	-129.81	152.57	0.38	200.32	130.39
5150.00	5.25	116.08	5140.16	-152.77	-130.87	154.62	1.07	202.57	130.24
5175.00	4.85	117.26	5165.06	-154.73	-131.86	156.58	1.62	204.71	130.10
5200.00	4.95	119.11	5189.97	-156.60	-132.87	158.47	0.74	206.80	129.98
5225.00	4.78	118.01	5214.88	-158.45	-133.88	160.33	0.78	208.88	129.86
5250.00	4.51	117.20	5239.80	-160.23	-134.82	162.12	1.11	210.86	129.75
5275.00	4.88	118.37	5264.72	-162.02	-135.77	163.93	1.52	212.86	129.63
5300.00	4.63	118.45	5289.63	-163.83	-136.76	165.76	0.99	214.89	129.52
5325.00	4.53	117.72	5314.55	-165.58	-137.70	167.52	0.46	216.85	129.42
5350.00	4.62	117.12	5339.47	-167.34	-138.62	169.29	0.40	218.80	129.31
5375.00	4.71	113.85	5364.39	-169.16	-139.49	171.12	1.12	220.78	129.19
5400.00	5.29	110.68	5389.29	-171.17	-140.31	173.14	2.58	222.86	129.02
5425.00	5.35	111.41	5414.18	-173.32	-141.15	175.30	0.35	225.06	128.84
5450.00	5.56	110.12	5439.07	-175.53	-141.99	177.53	0.99	227.32	128.65
5475.00	5.58	109.21	5463.95	-177.80	-142.80	179.81	0.36	229.62	128.46
5500.00	5.47	108.86	5488.84	-180.06	-143.59	182.08	0.47	231.89	128.26
5525.00	5.66	109.60	5513.72	-182.34	-144.39	184.37	0.83	234.18	128.07
5550.00	5.62	108.73	5538.60	-184.65	-145.19	186.69	0.38	236.51	127.87
5575.00	5.72	109.13	5563.48	-186.97	-146.00	189.03	0.44	238.85	127.68
5600.00	5.79	107.44	5588.35	-189.34	-146.78	191.41	0.73	241.21	127.48
5625.00	5.83	105.32	5613.22	-191.76	-147.50	193.84	0.87	243.58	127.27

MD	INC	AZIM	TVD	VS	N/S	E/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	/100ft	ft	deg
5650.00	6.01	105.90	5638.09	-194.24	-148.19	196.32	0.77	245.97	127.05
5675.00	6.19	102.56	5662.95	-196.80	-148.84	198.90	1.59	248.42	126.81
5700.00	6.20	101.33	5687.80	-199.43	-149.40	201.54	0.53	250.88	126.55
5725.00	6.54	99.46	5712.65	-202.15	-149.90	204.27	1.59	253.37	126.27
5750.00	6.95	98.12	5737.47	-205.05	-150.35	207.17	1.76	255.98	125.97
5775.00	7.01	98.15	5762.29	-208.05	-150.78	210.18	0.24	258.67	125.65
5800.00	6.95	98.22	5787.10	-211.05	-151.21	213.18	0.26	261.37	125.35
5825.00	7.08	97.76	5811.92	-214.07	-151.63	216.21	0.55	264.08	125.04
5850.00	7.12	97.16	5836.72	-217.13	-152.04	219.27	0.35	266.82	124.74
5875.00	7.26	96.85	5861.53	-220.23	-152.42	222.37	0.56	269.59	124.43
5900.00	6.91	95.97	5886.34	-223.28	-152.76	225.44	1.44	272.32	124.12
5925.00	6.89	96.02	5911.16	-226.27	-153.08	228.43	0.09	274.97	123.83
5950.00	6.98	96.05	5935.97	-229.26	-153.39	231.43	0.36	277.65	123.54
5975.00	7.06	94.19	5960.79	-232.30	-153.66	234.47	0.97	280.34	123.24
6000.00	7.04	95.12	5985.60	-235.36	-153.91	237.53	0.47	283.04	122.94
6025.00	6.66	95.30	6010.42	-238.32	-154.18	240.50	1.53	285.68	122.66
6050.00	6.66	96.14	6035.25	-241.20	-154.47	243.38	0.39	288.27	122.40
6075.00	6.61	95.13	6060.08	-244.07	-154.76	246.26	0.51	290.85	122.15
6100.00	6.63	96.09	6084.91	-246.94	-155.04	249.13	0.45	293.43	121.90
6125.00	6.55	95.21	6109.75	-249.79	-155.32	251.98	0.52	296.01	121.65
6150.00	6.51	96.22	6134.59	-252.61	-155.60	254.81	0.49	298.57	121.41
6175.00	6.50	96.39	6159.43	-255.43	-155.92	257.63	0.08	301.13	121.18
6200.00	6.40	97.60	6184.27	-258.21	-156.26	260.42	0.69	303.70	120.97
6225.00	6.51	95.19	6209.11	-261.00	-156.57	263.21	1.17	306.26	120.75
6250.00	6.22	96.73	6233.96	-263.75	-156.86	265.96	1.35	308.77	120.53
6275.00	6.32	96.84	6258.81	-266.45	-157.18	268.67	0.43	311.27	120.33
6300.00	6.34	96.92	6283.65	-269.19	-157.51	271.41	0.09	313.81	120.13
6325.00	6.35	97.16	6308.50	-271.92	-157.85	274.15	0.10	316.35	119.93
6350.00	6.27	96.59	6333.35	-274.65	-158.18	276.88	0.41	318.88	119.74
6375.00	6.23	98.27	6358.20	-277.34	-158.53	279.58	0.75	321.40	119.55
6400.00	6.25	97.67	6383.05	-280.02	-158.91	282.27	0.27	323.93	119.38
6425.00	6.17	96.34	6407.91	-282.70	-159.24	284.95	0.65	326.43	119.20

MD	INC	AZIM	TVD	VS	IN/S	FE/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
6450.00	6.00	99.87	6432.77	-285.32	-159.61	287.58	1.64	328.90	119.03
6475.00	6.05	98.26	6457.63	-287.90	-160.02	290.17	0.70	331.37	118.88
6500.00	5.94	97.83	6482.49	-290.48	-160.39	292.75	0.45	333.81	118.72
6525.00	6.11	98.78	6507.35	-293.07	-160.77	295.35	0.77	336.27	118.56
6550.00	6.23	98.25	6532.21	-295.73	-161.16	298.00	0.54	338.79	118.41
6575.00	6.24	97.17	6557.06	-298.41	-161.53	300.70	0.47	341.33	118.24
6600.00	6.22	98.82	6581.91	-301.09	-161.91	303.38	0.72	343.88	118.09
6625.00	6.07	97.42	6606.77	-303.74	-162.28	306.03	0.86	346.40	117.94
6650.00	6.19	96.95	6631.63	-306.38	-162.62	308.68	0.52	348.90	117.78
6675.00	6.40	96.13	6656.47	-309.10	-162.93	311.41	0.90	351.45	117.62
6700.00	6.21	95.94	6681.32	-311.83	-163.22	314.14	0.78	354.01	117.46
6725.00	6.52	90.37	6706.17	-314.59	-163.37	316.90	2.78	356.53	117.27
6750.00	6.49	86.78	6731.01	-317.42	-163.30	319.73	1.63	359.02	117.05
6775.00	6.66	84.97	6755.84	-320.28	-163.09	322.59	1.06	361.47	116.82
6800.00	6.59	84.21	6780.68	-323.15	-162.82	325.46	0.43	363.91	116.58
6825.00	6.54	83.99	6805.51	-326.00	-162.53	328.30	0.22	366.33	116.34
6850.00	6.18	83.59	6830.36	-328.76	-162.23	331.06	1.48	368.67	116.11
6875.00	6.03	84.00	6855.22	-331.41	-161.94	333.70	0.60	370.92	115.89
6900.00	6.07	82.96	6880.08	-334.03	-161.64	336.32	0.47	373.15	115.67
6925.00	5.99	82.42	6904.94	-336.64	-161.30	338.92	0.41	375.35	115.45
6950.00	6.04	81.87	6929.80	-339.24	-160.95	341.52	0.32	377.54	115.23
6975.00	6.19	82.80	6954.66	-341.88	-160.59	344.16	0.70	379.78	115.01
7000.00	6.51	83.46	6979.51	-344.63	-160.26	346.90	1.31	382.13	114.80
7025.00	6.45	82.79	7004.35	-347.44	-159.92	349.70	0.37	384.54	114.58
7050.00	6.69	82.34	7029.18	-350.28	-159.55	352.54	0.97	386.97	114.35
7075.00	6.40	82.29	7054.02	-353.11	-159.17	355.37	1.15	389.39	114.13
7100.00	6.24	82.20	7078.87	-355.84	-158.80	358.10	0.65	391.73	113.92
7125.00	6.03	81.90	7103.72	-358.50	-158.43	360.74	0.87	394.00	113.71
7150.00	6.15	82.68	7128.58	-361.13	-158.08	363.37	0.59	396.26	113.51
7175.00	6.00	92.88	7153.44	-363.76	-157.97	366.00	4.35	398.64	113.35
7200.00	5.88	99.02	7178.31	-366.33	-158.24	368.57	2.59	401.10	113.24
7225.00	5.92	100.02	7203.18	-368.85	-158.66	371.11	0.44	403.60	113.15

MD	INC	AZIM	TVD	VS	H/S	FE/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	/100ft	ft	deg
7250.00	6.20	99.68	7228.04	-371.45	-159.11	373.71	1.14	406.17	113.06
7275.00	6.00	99.76	7252.90	-374.06	-159.56	376.32	0.83	408.75	112.98
7300.00	5.99	100.72	7277.76	-376.62	-160.03	378.89	0.40	411.30	112.90
7325.00	6.01	99.64	7302.62	-379.19	-160.49	381.46	0.45	413.85	112.82
7350.00	6.10	98.09	7327.48	-381.79	-160.89	384.07	0.76	416.41	112.73
7375.00	6.25	97.97	7352.34	-384.44	-161.27	386.73	0.61	419.01	112.64
7400.00	6.35	97.64	7377.19	-387.16	-161.64	389.45	0.42	421.67	112.54
7425.00	6.46	97.70	7402.03	-389.92	-162.01	392.22	0.44	424.36	112.44
7450.00	6.36	96.01	7426.87	-392.68	-162.35	394.99	0.86	427.05	112.34
7475.00	6.46	96.19	7451.72	-395.45	-162.65	397.76	0.42	429.73	112.24
7500.00	6.75	95.68	7476.55	-398.31	-162.94	400.63	1.18	432.49	112.13
7525.00	6.76	96.57	7501.38	-401.23	-163.26	403.55	0.42	435.32	112.03
7550.00	6.87	96.37	7526.20	-404.17	-163.59	406.50	0.44	438.18	111.92
7575.00	6.93	98.13	7551.02	-407.15	-163.97	409.48	0.89	441.09	111.82
7600.00	6.91	96.72	7575.84	-410.13	-164.36	412.46	0.69	444.01	111.73
7625.00	7.03	97.34	7600.65	-413.13	-164.73	415.47	0.58	446.94	111.63
7650.00	7.15	98.28	7625.46	-416.19	-165.15	418.53	0.67	449.94	111.53
7675.00	6.99	99.33	7650.27	-419.22	-165.62	421.57	0.83	452.94	111.45
7700.00	6.70	99.91	7675.09	-422.15	-166.12	424.51	1.21	455.86	111.37
7725.00	6.67	100.91	7699.92	-425.00	-166.64	427.37	0.48	458.71	111.30
7750.00	6.57	100.76	7724.76	-427.83	-167.19	430.20	0.38	461.55	111.24
7775.00	6.43	100.59	7749.60	-430.60	-167.71	432.98	0.59	464.33	111.17
7800.00	6.26	100.80	7774.44	-433.31	-168.22	435.70	0.68	467.04	111.11
7825.00	5.79	99.62	7799.31	-435.88	-168.69	438.28	1.94	469.62	111.05
7850.00	5.38	98.52	7824.19	-438.28	-169.07	440.68	1.71	472.00	110.99
7875.00	5.34	96.25	7849.08	-440.59	-169.37	442.99	0.86	474.27	110.92
7900.00	5.20	94.93	7873.97	-442.87	-169.60	445.28	0.75	476.48	110.85
7925.00	5.42	94.57	7898.86	-445.17	-169.79	447.58	0.88	478.71	110.77
7950.00	6.13	92.27	7923.74	-447.68	-169.94	450.09	2.98	481.11	110.68
7975.00	6.82	89.68	7948.58	-450.49	-169.98	452.91	3.01	483.76	110.57
8000.00	6.94	90.67	7973.40	-453.49	-169.99	455.91	0.69	486.57	110.45
8025.00	7.11	89.94	7998.21	-456.55	-170.01	458.96	0.76	489.44	110.33

MD	INC	AZIM	TVD	VS	IN/S	FE/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
8050.00	7.26	89.83	8023.01	-459.67	-170.00	462.09	0.59	492.37	110.20
8075.00	6.85	88.63	8047.82	-462.74	-169.96	465.16	1.74	495.24	110.07
8100.00	6.35	88.21	8072.66	-465.62	-169.88	468.03	2.00	497.91	109.95
8125.00	6.14	84.94	8097.51	-468.33	-169.72	470.75	1.65	500.41	109.83
8150.00	5.84	83.28	8122.37	-470.93	-169.45	473.34	1.39	502.76	109.70
8175.00	5.44	82.37	8147.25	-473.37	-169.15	475.78	1.62	504.95	109.57
8200.00	5.06	81.81	8172.15	-475.64	-168.83	478.04	1.53	506.98	109.45
8225.00	4.70	80.64	8197.06	-477.75	-168.51	480.15	1.52	508.86	109.34
8250.00	4.51	80.60	8221.98	-479.73	-168.18	482.13	0.73	510.62	109.23
8275.00	4.32	80.96	8246.90	-481.63	-167.87	484.03	0.79	512.31	109.13
8300.00	4.21	79.98	8271.83	-483.47	-167.56	485.86	0.52	513.94	109.03
8325.00	4.08	83.42	8296.77	-485.26	-167.30	487.65	1.13	515.55	108.94
8350.00	4.38	84.96	8321.70	-487.10	-167.12	489.48	1.30	517.22	108.85
8375.00	4.39	82.12	8346.63	-489.00	-166.90	491.38	0.87	518.95	108.76
8400.00	4.26	80.25	8371.56	-490.87	-166.61	493.24	0.77	520.62	108.66
8425.00	4.02	81.00	8396.49	-492.65	-166.32	495.02	0.97	522.21	108.57
8450.00	4.25	83.62	8421.43	-494.44	-166.08	496.81	1.17	523.83	108.48
8475.00	4.37	81.62	8446.35	-496.30	-165.84	498.67	0.79	525.52	108.40
8500.00	3.89	78.40	8471.29	-498.08	-165.53	500.44	2.15	527.11	108.30
8525.00	3.73	82.10	8496.23	-499.72	-165.25	502.08	1.18	528.57	108.22
8550.00	3.93	82.41	8521.18	-501.38	-165.02	503.73	0.81	530.07	108.14
8575.00	3.92	80.61	8546.12	-503.07	-164.77	505.42	0.49	531.60	108.06
8600.00	3.77	77.93	8571.06	-504.72	-164.46	507.07	0.93	533.07	107.97
8625.00	3.56	80.52	8596.01	-506.29	-164.16	508.63	1.08	534.47	107.89
8650.00	3.35	77.47	8620.97	-507.77	-163.87	510.11	1.11	535.79	107.81
8675.00	2.91	76.83	8645.93	-509.11	-163.57	511.44	1.75	536.96	107.74
8700.00	2.61	82.49	8670.90	-510.30	-163.35	512.63	1.62	538.02	107.67
8725.00	2.66	88.61	8695.88	-511.44	-163.26	513.77	1.14	539.09	107.63
8750.00	2.74	88.08	8720.85	-512.62	-163.23	514.95	0.33	540.20	107.59
8775.00	2.40	88.55	8745.82	-513.74	-163.19	516.07	1.36	541.26	107.55
8800.00	2.16	98.53	8770.80	-514.73	-163.25	517.06	1.87	542.22	107.52
8825.00	2.33	115.52	8795.78	-515.65	-163.54	517.98	2.74	543.19	107.52

MD	INC	AZIM	TVD	VS	N/S	E/W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	/100ft	ft	deg
8850.00	2.30	114.88	8820.76	-516.56	-163.97	518.90	0.17	544.19	107.54
8875.00	2.18	119.88	8845.74	-517.42	-164.42	519.76	0.91	545.15	107.55
8900.00	1.96	123.11	8870.73	-518.18	-164.89	520.53	0.98	546.02	107.58
8925.00	1.94	130.35	8895.71	-518.85	-165.40	521.21	0.99	546.83	107.61
8950.00	2.15	135.65	8920.70	-519.50	-166.01	521.87	1.13	547.63	107.65
8950.12	2.15	135.67	8920.81	-519.50	-166.01	521.87	1.16	547.64	107.65