

3001542807

EMKEY COMPANIES

North Seven Rivers (NAD27)
Eddy County, NM (Grid North)
Stiletto 16 State #9H
VH - Job #321214-K-1449

Survey: drop Gyro

Regulatory Report (Grid North)

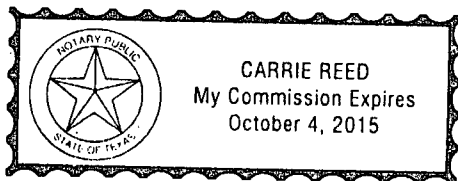
This survey is correct to the best of my knowledge and is supported by actual field data.

Jami Thosener

Notarized this date 31st of December, 2014.

Carrie Reed

Notary Signature
County of Midland
State of Texas



Regulatory Report (Grid North)

Company:	EMKEY COMPANIES	Local Co-ordinate Reference:	Well Stiletto 16 State #9H
Project:	North Seven Rivers (NAD27)	TVD Reference:	Mean Sea Level (System)
Site:	Eddy County, NM (Grid North)	MD Reference:	Mean Sea Level (System)
Well:	Stiletto 16 State #9H	North Reference:	Grid
Wellbore:	VH - Job #321214-K-1449	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #321214-K-1449	Database:	MID - Regulatory

Project:	North Seven Rivers (NAD27)		
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:	Eddy County, NM (Grid North)		
Site Position:		Northing:	574,701.86 usft
From:	Lat/Long	Easting:	449,683.60 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 34' 47.480 N
		Longitude:	104° 29' 48.060 W
		Grid Convergence:	-0.09 °

Well:	Stiletto 16 State #9H Horizontal					
Well Position	+N-S	0.0 usft	Northing:	574,679.25 usft	Latitude:	32° 34' 47.270 N
	+E-W	0.0 usft	Easting:	450,592.25 usft	Longitude:	104° 29' 37.440 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	0.0 usft	

Wellbore:	VH - Job #321214-K-1449				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2014	12/18/2014	7.78	60.26	48,346

Design:	VH - Job #321214-K-1449				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)	
	0.0	0.0	0.0	314.56	

Survey Program:	Date 12/25/2014				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
60.0	893.0	drop Gyro (VH - Job #321214-K-1449)	Keeper	Keeper Gyro	

MD (usft)	Inc (°)	Azi (grid north azim)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0
60.0	0.44	143.07	60.0	-0.2	0.1	143.07	0.2
130.0	0.29	269.53	130.0	-0.4	0.1	162.96	0.4
191.0	0.39	300.10	191.0	-0.3	-0.2	215.36	0.4
251.0	0.95	280.26	251.0	-0.1	-0.9	263.07	0.9
311.0	1.19	329.73	311.0	0.5	-1.7	287.19	1.8
372.0	1.29	303.53	372.0	1.4	-2.6	299.35	3.0
431.0	1.04	320.93	431.0	2.2	-3.5	302.76	4.1
493.0	1.00	330.30	492.9	3.1	-4.1	307.50	5.2
553.0	0.82	320.21	552.9	3.9	-4.6	310.31	6.1
612.0	0.69	304.65	611.9	4.4	-5.2	310.63	6.8
671.0	0.64	327.02	670.9	4.9	-5.7	311.06	7.5

Regulatory Report (Grid North)

Company:	EMKEY COMPANIES	Local Co-ordinate Reference:	Well: Stiletto, 16 State #9H
Project:	North Seven Rivers (NAD27)	TVD Reference:	Mean Sea Level (System)
Site:	Eddy County, NM (Grid North)	MD Reference:	Mean Sea Level (System)
Well:	Stiletto, 16 State #9H	North Reference:	Grid
Wellbore:	VH - Job #321214-K-1449	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #321214-K-1449	Database:	MID: Regulatory

Survey									
MD (usft)	Inc (°)	Azi (grid north azim)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)		
734.0	0.70	330.45	733.9	5.6	-6.0	312.63	8.2		
798.0	0.59	315.99	797.9	6.1	-6.5	313.52	8.9		
861.0	0.99	325.46	860.9	6.8	-7.0	314.26	9.8		
893.0	1.03	315.28	892.9	7.2	-7.4	314.59	10.3		

Checked By: _____ Approved By: _____ Date: _____



Scientific Drilling

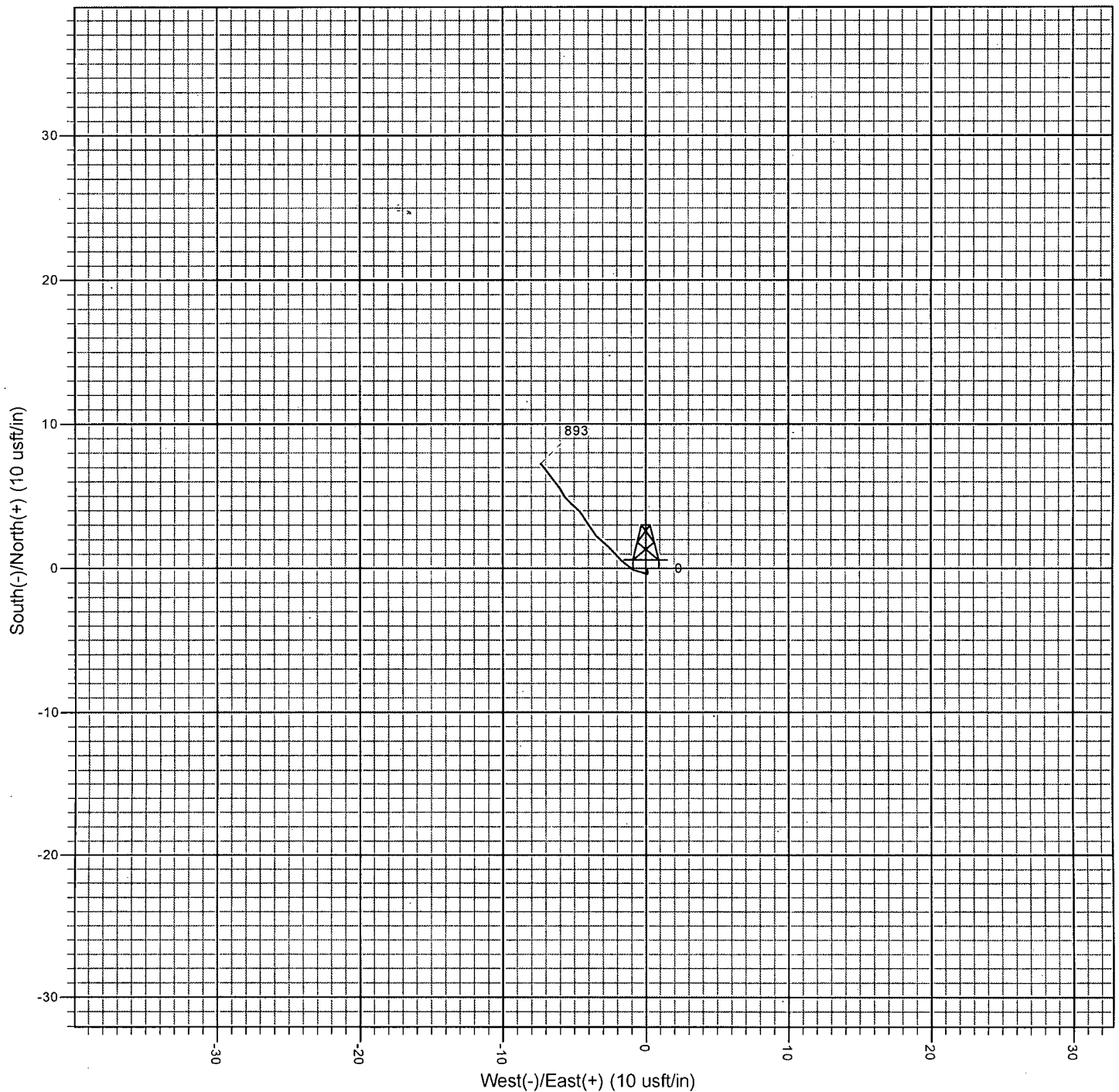
Project: North Seven Rivers (NAD27)
Eddy County, NM (Grid North)
Well: Stiletto 16 State #9H
Wellbore: VH - Job #321214-K-1449
Design: VH - Job #321214-K-1449

WELL DETAILS: Stiletto 16 State #9H

Mean Sea Level (System)

Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	574679.25	450592.25	32° 34' 47.270 N	104° 29' 37.440 W	

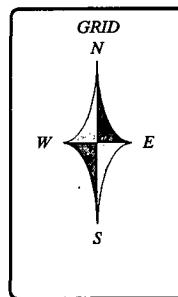


PROJECT DETAILS: North Seven Rivers (NAD27)	SITE DETAILS: Eddy County, NM (Grid North)
Geodetic System: US State Plane 1927 (Exact solution)	Site Centre Latitude: 32° 34' 47.480 N
Datum: NAD 1927 (NADCON CONUS)	Longitude: 104° 29' 48.060 W
Ellipsoid: Clarke 1866	Positional Uncertainty: 0.0
Zone: New Mexico East 3001	Convergence: -0.09
System Datum: Mean Sea Level	Local North: Grid

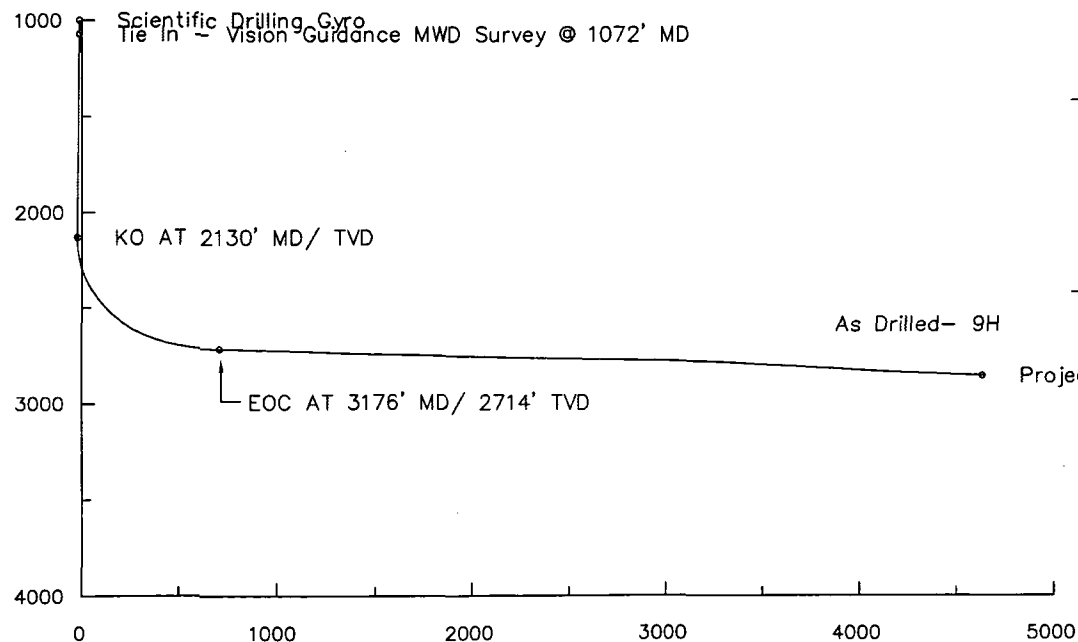
Job Number :	
Company :	Emkey Companies
Lease/Well :	Stiletto 16- 9H
Location :	Eddy County, NM

GL= 3467', KB= 13'
PLAN C

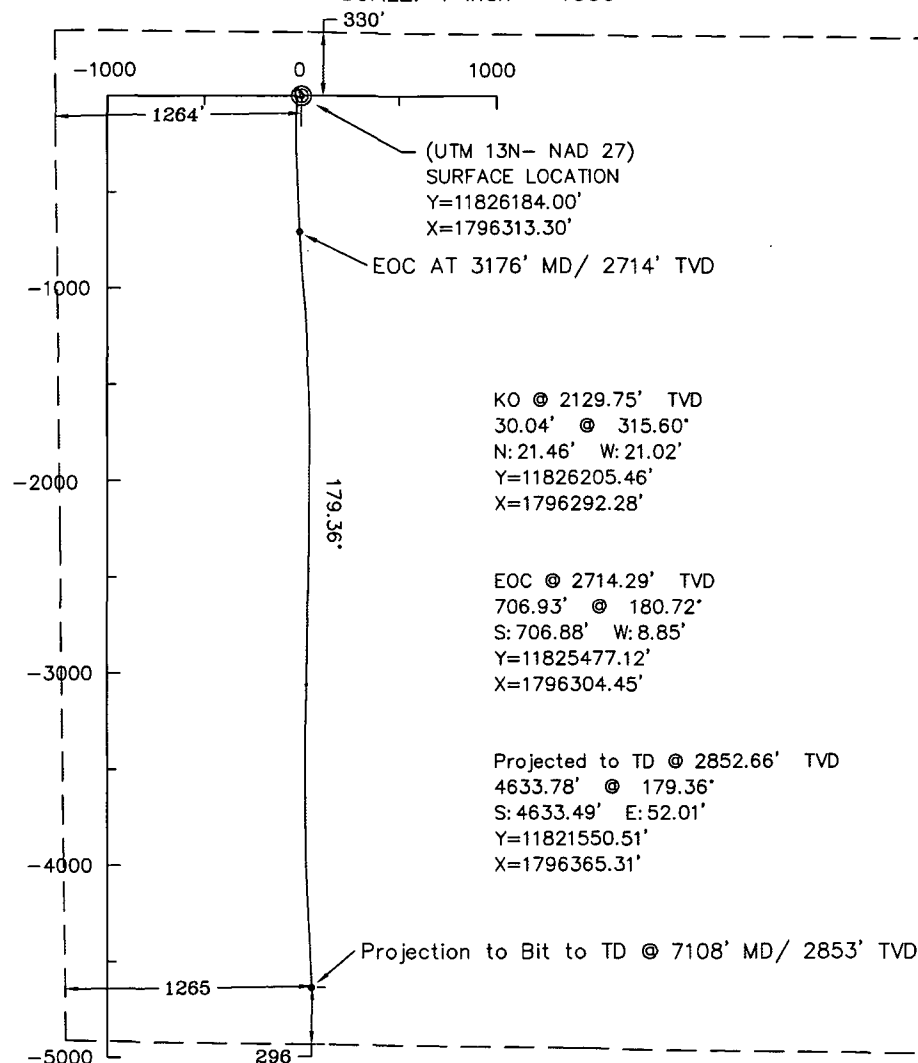
SEC. 16- T 20 S- R 25 E



VERTICAL SECTION
SCALE: 1 inch = 1000'
VERTICAL SECTION PLANE= 179.36



PLAN VIEW
SCALE: 1 inch = 1000'





Job Number: NML 1114-H1297
 Company: Emkey Companies
 Lease/Well: Stiletto 16- 9H
 Location: Eddy County, NM
 Rig Name: UDI 29
 RKB: 13'
 G.L. or M.S.L.: 3467'

State/Country: New Mexico/USA
 Declination: 7.37
 Grid: 7.37
 File name: G:\SVYS\JOBS\STI169HC.SVY
 Date/Time: 16-Jan-15 / 15:28
 Curve Name: As Drilled- 9H

Maverick Directional Services
 Spring, Texas
 Main # 281-364-1212
 Fax # 281-364-1213

Calculated by: Jose Garza
 email: jose@maverickdirectional.com

WINSERVE SURVEY CALCULATIONS
 Minimum Curvature Method
 Vertical Section Plane 179.48
 Vertical Section Referenced to Wellhead
 Rectangular Coordinates Referenced to Wellhead

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Scientific Drilling Gyro's									
60.00	.44	143.07	60.00	.19	-.18	.14	.23	143.07	.73
130.00	.29	269.53	130.00	.40	-.40	.12	.42	162.95	.94
191.00	.39	300.10	191.00	.30	-.30	-.21	.36	215.36	.33
251.00	.95	280.26	250.99	.10	-.11	-.88	.88	263.07	1.00
311.00	1.19	329.73	310.98	-.54	.52	-1.68	1.76	287.19	1.54
372.00	1.29	303.53	371.97	-1.47	1.45	-2.57	2.95	299.35	.94
431.00	1.04	320.93	430.96	-2.26	2.23	-3.46	4.12	302.76	.73
493.00	1.00	330.30	492.95	-3.17	3.14	-4.09	5.15	307.50	.28
553.00	.82	320.21	552.94	-3.96	3.92	-4.62	6.06	310.31	.40
612.00	.69	304.65	611.94	-4.49	4.45	-5.18	6.83	310.63	.41
671.00	.64	327.02	670.93	-4.98	4.93	-5.65	7.50	311.06	.45
734.00	.70	330.45	733.93	-5.61	5.56	-6.04	8.20	312.63	.11
798.00	.59	315.99	797.92	-6.19	6.13	-6.46	8.91	313.52	.31
861.00	.99	325.46	860.92	-6.88	6.81	-6.99	9.76	314.26	.67
Scientific Drilling Gyro									
893.00	1.03	315.28	892.91	-7.31	7.25	-7.35	10.32	314.59	.57
Tie In - Vision Guidance MWD Survey @ 1072' MD									
1072.00	.90	311.50	1071.89	-9.41	9.32	-9.54	13.33	314.35	.08

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
1264.00	1.10	311.50	1263.86	-11.65	11.54	-12.05	16.68	313.78	.10
1454.00	.90	316.10	1453.83	-13.96	13.82	-14.45	20.00	313.74	.11
1642.00	1.00	317.40	1641.80	-16.25	16.10	-16.58	23.11	314.15	.05
1833.00	.90	323.70	1832.78	-18.70	18.53	-18.60	26.25	314.90	.08
2023.00	.70	326.20	2022.76	-20.88	20.70	-20.13	28.87	315.81	.11
2099.00	.70	312.50	2098.75	-21.59	21.40	-20.73	29.79	315.91	.22
KO AT 2130' MD/ TVD									
2130.00	.60	247.30	2129.75	-21.65	21.46	-21.02	30.04	315.60	2.28
2162.00	2.90	194.50	2161.73	-20.81	20.62	-21.37	29.69	313.97	8.07
2194.00	6.10	186.60	2193.63	-18.34	18.14	-21.77	28.34	309.80	10.16
2226.00	9.20	180.50	2225.34	-14.09	13.89	-21.99	26.01	302.29	10.00
2257.00	12.30	175.60	2255.80	-8.32	8.12	-21.76	23.22	290.47	10.42
2289.00	15.80	176.60	2286.84	-.57	.37	-21.24	21.24	271.00	10.96
2320.00	20.00	180.30	2316.33	8.96	-9.15	-21.01	22.92	246.48	14.03
2352.00	24.50	182.80	2345.94	21.06	-21.25	-21.37	30.14	225.15	14.37
2384.00	28.80	183.20	2374.53	35.38	-35.58	-22.12	41.90	211.87	13.45
2415.00	31.80	182.40	2401.30	50.99	-51.20	-22.88	56.08	204.08	9.76
2447.00	34.50	182.00	2428.08	68.47	-68.69	-23.55	72.61	198.93	8.47
2479.00	37.50	181.80	2453.97	87.26	-87.48	-24.17	90.76	195.45	9.38
2511.00	40.10	180.70	2478.91	107.30	-107.53	-24.60	110.31	192.89	8.41
2542.00	43.00	179.70	2502.10	127.86	-128.09	-24.67	130.44	190.90	9.60
2574.00	46.00	179.20	2524.93	150.28	-150.51	-24.45	152.48	189.23	9.44
2606.00	49.70	179.50	2546.40	174.00	-174.23	-24.19	175.90	187.90	11.58
2638.00	52.90	179.90	2566.40	198.97	-199.20	-24.06	200.65	186.89	10.05
2669.00	56.00	180.20	2584.42	224.19	-224.42	-24.08	225.71	186.12	10.03
2701.00	59.10	179.50	2601.59	251.19	-251.42	-24.01	252.56	185.45	9.86
2732.00	61.70	179.00	2616.90	278.14	-278.37	-23.65	279.37	184.86	8.50
2764.00	64.20	178.70	2631.45	306.64	-306.86	-23.08	307.73	184.30	7.86
2796.00	66.90	177.90	2644.70	335.76	-335.97	-22.21	336.71	183.78	8.74
2828.00	69.40	177.50	2656.61	365.44	-365.65	-21.02	366.25	183.29	7.90
2859.00	72.00	177.60	2666.85	394.68	-394.88	-19.77	395.37	182.87	8.39
2891.00	74.00	177.70	2676.21	425.27	-425.45	-18.52	425.85	182.49	6.26
2922.00	75.90	178.40	2684.26	455.19	-455.37	-17.50	455.71	182.20	6.51
2954.00	77.90	178.70	2691.51	486.35	-486.53	-16.71	486.81	181.97	6.32
2986.00	79.90	178.50	2697.67	517.75	-517.92	-15.94	518.16	181.76	6.28
3018.00	82.20	178.00	2702.65	549.35	-549.51	-14.98	549.71	181.56	7.35
3049.00	84.00	177.70	2706.37	580.11	-580.26	-13.82	580.43	181.36	5.89
3081.00	85.20	177.60	2709.38	611.95	-612.09	-12.52	612.22	181.17	3.76
3113.00	86.30	177.90	2711.75	643.85	-643.98	-11.26	644.08	181.00	3.56
3145.00	88.00	177.70	2713.35	675.80	-675.91	-10.04	675.99	180.85	5.35
EOC AT 3176' MD/ 2714' TVD									
3176.00	88.50	177.90	2714.29	706.77	-706.88	-8.85	706.93	180.72	1.74
3239.00	89.00	176.60	2715.67	769.70	-769.79	-5.82	769.81	180.43	2.21
3303.00	88.30	176.10	2717.17	833.59	-833.64	-1.75	833.64	180.12	1.34
3398.00	88.40	175.80	2719.91	928.37	-928.36	4.96	928.38	179.69	.33
3493.00	88.30	174.60	2722.65	1023.06	-1022.99	12.90	1023.07	179.28	1.27

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
3581.00	88.50	175.70	2725.10	1110.78	-1110.64	20.34	1110.82	178.95	1.27
3676.00	86.70	178.40	2729.08	1205.60	-1205.42	25.22	1205.68	178.80	3.41
3771.00	87.40	178.40	2733.97	1300.45	-1300.25	27.87	1300.55	178.77	.74
3866.00	88.10	176.50	2737.70	1395.31	-1395.08	32.10	1395.45	178.68	2.13
3961.00	89.00	177.20	2740.10	1490.18	-1489.91	37.31	1490.37	178.57	1.20
4056.00	88.70	177.70	2742.01	1585.10	-1584.79	41.54	1585.34	178.50	.61
4151.00	89.40	179.20	2743.59	1680.07	-1679.74	44.11	1680.32	178.50	1.74
4247.00	88.50	180.80	2745.35	1776.05	-1775.72	44.11	1776.27	178.58	1.91
4341.00	88.00	181.00	2748.22	1869.97	-1869.66	42.63	1870.15	178.69	.57
4436.00	89.10	180.60	2750.62	1964.92	-1964.62	41.31	1965.06	178.80	1.23
4531.00	88.80	180.30	2752.36	2059.89	-2059.60	40.56	2060.00	178.87	.45
4626.00	88.10	180.30	2754.93	2154.84	-2154.57	40.06	2154.94	178.93	.74
4722.00	88.80	180.70	2757.53	2250.79	-2250.53	39.23	2250.87	179.00	.84
4817.00	88.50	180.50	2759.77	2345.75	-2345.50	38.23	2345.81	179.07	.38
4912.00	89.30	180.90	2761.59	2440.71	-2440.47	37.07	2440.75	179.13	.94
4996.00	89.30	181.20	2762.62	2524.67	-2524.45	35.53	2524.70	179.19	.36
5091.00	88.80	180.90	2764.19	2619.62	-2619.42	33.79	2619.64	179.26	.61
5186.00	88.50	180.40	2766.43	2714.57	-2714.39	32.72	2714.59	179.31	.61
5282.00	88.10	180.80	2769.28	2810.51	-2810.34	31.71	2810.52	179.35	.59
5377.00	89.20	181.30	2771.51	2905.45	-2905.30	29.97	2905.45	179.41	1.27
5472.00	89.00	180.80	2773.01	3000.40	-3000.27	28.23	3000.40	179.46	.57
5567.00	88.70	181.20	2774.91	3095.35	-3095.23	26.57	3095.35	179.51	.53
5662.00	88.20	181.10	2777.48	3190.27	-3190.18	24.67	3190.28	179.56	.54
5758.00	88.10	181.30	2780.58	3286.18	-3286.11	22.66	3286.19	179.60	.23
5852.00	86.50	180.30	2785.01	3380.05	-3379.99	21.34	3380.06	179.64	2.01
5947.00	86.20	180.50	2791.06	3474.84	-3474.80	20.68	3474.86	179.66	.38
6042.00	87.00	179.40	2796.69	3569.67	-3569.63	20.77	3569.69	179.67	1.43
6137.00	86.80	179.90	2801.83	3664.53	-3664.49	21.35	3664.55	179.67	.57
6232.00	86.80	179.50	2807.13	3759.38	-3759.34	21.84	3759.40	179.67	.42
6328.00	86.70	179.30	2812.58	3855.22	-3855.18	22.85	3855.24	179.66	.23
6423.00	86.00	179.40	2818.62	3950.03	-3949.98	23.92	3950.05	179.65	.74
6518.00	86.20	178.10	2825.08	4044.80	-4044.73	25.99	4044.82	179.63	1.38
6613.00	87.50	177.20	2830.31	4139.61	-4139.51	29.88	4139.61	179.59	1.66
6708.00	87.50	177.00	2834.45	4234.43	-4234.29	34.68	4234.44	179.53	.21
6803.00	87.30	176.70	2838.76	4329.24	-4329.05	39.90	4329.24	179.47	.38
6898.00	87.50	177.90	2843.07	4424.07	-4423.85	44.37	4424.07	179.43	1.28
6993.00	87.40	177.70	2847.29	4518.93	-4518.68	48.01	4518.94	179.39	.24
Last Survey Taken by MWD @ 7048' MD/ 2850' TVD									
7048.00	87.30	178.10	2849.84	4573.85	-4573.59	50.02	4573.86	179.37	.75
Projection to Bit to TD @ 7108' MD/ 2853' TVD									
7108.00	87.30	178.10	2852.66	4633.77	-4633.49	52.01	4633.78	179.36	.00