

Job Number: SVCO-110920 State/Country: New Mexico/USA
 Company: Yates Petroleum Corporation Declination: 7.66°
 Lease/Well: GRATEFUL BOD FED COM 1H Grid: East To Grid
 Location: Eddy County, NM File name: F:\SURVEY\2011SU~1\YATES\GRATEF1H.SVY
 Rig Name: Patterson #511 Date/Time: 03-Aug-11 / 10:21
 RKB: 19' Curve Name: Surface - 7376' M.D. (Gyroscopic)
 G.L. or M.S.L.: GL

30-015-38990

WINSERVE SURVEY CALCULATIONS

Minimum Curvature Method

Vertical Section Plane 271.32

Vertical Section Referenced to offset from Wellhead: EW =.00 Ft , NS=.00 Ft

Rectangular Coordinates Referenced to Wellhead

Measured	Incl	Drift	TRUE	N-S	E-W	Vertical	CLOSURE	CLOSURE	Dogleg
Depth	Angle	Direction	Vertical	FT	FT	Section	Distance	Direction	Severity
FT	Deg	Deg	Depth			FT	FT	Deg	Deg/100
0	0	0	0	0	0	0	0	0	0
200	0.25	169.22	200	-0.43	0.08	-0.09	0.44	169.22	0.12
400	0.5	203.17	400	-1.66	-0.18	0.14	1.67	186.19	0.16
600	0.25	176.13	599.99	-2.9	-0.49	0.43	2.94	189.68	0.15
800	0.25	187.08	799.99	-3.77	-0.52	0.43	3.8	187.84	0.02
1000	0.75	72.03	999.98	-3.79	0.67	-0.76	3.85	169.94	0.44
1200	1	69.98	1199.96	-2.79	3.56	-3.62	4.52	128.14	0.13
1400	0.75	55.93	1399.94	-1.46	6.28	-6.31	6.45	103.11	0.16
1600	0.5	93.89	1599.93	-0.79	8.24	-8.25	8.27	95.47	0.24
1800	0	0	1799.92	-0.85	9.11	-9.12	9.15	95.32	0.25
2000	0.25	62.79	1999.92	-0.65	9.5	-9.51	9.52	93.9	0.12
2200	0.25	1.75	2199.92	-0.01	9.9	-9.89	9.9	90.07	0.13
2400	0.25	63.7	2399.92	0.62	10.3	-10.28	10.32	86.57	0.13
2600	0.25	46.65	2599.92	1.11	11.01	-10.98	11.07	84.24	0.04
2800	0.25	93.37	2799.92	1.38	11.76	-11.73	11.84	83.29	0.1
3000	0.25	76.32	2999.91	1.46	12.62	-12.59	12.71	83.4	0.04
3200	0.25	58.27	3199.91	1.79	13.42	-13.37	13.54	82.38	0.04
3400	0.5	28.22	3399.91	2.79	14.2	-14.13	14.47	78.88	0.16
3600	0.75	48.18	3599.9	4.43	15.59	-15.48	16.21	74.12	0.16
3800	0.75	28.13	3799.88	6.46	17.18	-17.03	18.36	69.39	0.13
4000	0.75	35.08	3999.86	8.69	18.55	-18.35	20.48	64.91	0.05
4200	0.75	61.03	4199.85	10.39	20.45	-20.2	22.94	63.06	0.17
4400	0.75	57.99	4399.83	11.72	22.7	-22.43	25.55	62.7	0.02
4600	0.75	47.94	4599.81	13.29	24.79	-24.47	28.12	61.8	0.07
4800	0.75	35.04	4799.79	15.24	26.51	-26.15	30.58	60.11	0.08
5000	0.5	36.15	4999.78	17.02	27.78	-27.38	32.57	58.51	0.13
5200	0.25	15.25	5199.78	18.14	28.4	-27.98	33.7	57.44	0.14
5400	0.5	303.35	5399.77	19.04	27.79	-27.34	33.69	55.58	0.24

5600	0.75	286.46	5599.76	19.89	25.81	-25.34	32.58	52.37	0.15
5800	0.75	270.56	5799.75	20.28	23.24	-22.77	30.84	48.9	0.1
6000	0.75	268.66	5999.73	20.26	20.62	-20.15	28.91	45.51	0.01
6200	1	263.76	6199.7	20.04	17.58	-17.11	26.66	41.26	0.13
6400	1.25	272.87	6399.67	19.96	13.67	-13.2	24.19	34.4	0.15
6600	2	290.98	6599.59	21.32	8.23	-7.74	22.85	21.11	0.45
6800	2	279.59	6799.46	23.15	1.53	-1	23.2	3.78	0.2
7000	1.75	280.69	6999.36	24.3	-4.91	5.47	24.79	348.57	0.13
7200	1.5	284.8	7199.28	25.53	-10.44	11.03	27.58	337.75	0.14
7376	2	284.01	7375.19	26.86	-15.65	16.27	31.09	329.77	0.28



30-015-3899D

Yates Petroleum Corporation

Eddy County - NAD83

Grateful "BOD" Federal Com

#1H

OH

Survey: MWD #1

Leam X&Y Report

17 August, 2011





Leam Drilling Systems

Leam X&Y Report



Company:	Yates Petroleum Corporation	Local Co-ordinate Reference:	Well #1H
Project:	Eddy County - NAD83	TVD Reference:	WELL @ 3517.8usft (18.8'KB Patt#511)
Site:	Grateful "BOD" Federal Com	MD Reference:	WELL @ 3517.8usft (18.8'KB Patt#511)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Midland(Permian Basin) Database

Project	Eddy County - NAD83		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Grateful "BOD" Federal Com					
Site Position:			Northing:	637,678.17 usft	Latitude:	32° 45' 9.452 N
From:	Map		Easting:	637,217.91 usft	Longitude:	104° 1' 17.241 W
Position Uncertainty:	0.0 usft		Slot Radius:	13-3/16 "	Grid Convergence:	0 17 °

Well	#1H					
Well Position	+N/-S	0.0 usft	Northing:	637,678.17 usft	Latitude:	32° 45' 9.452 N
	+E/-W	0.0 usft	Easting:	637,217.91 usft	Longitude:	104° 1' 17.241 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,499.0 usft

Wellbore		OH			
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	07/07/11	7 83	60 60	48.878

Design:	OH			
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	271.32



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Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Midland(Permian Basin) Database

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
200.0	7,376.0	GYRO (OH)		
7,431.0	12,065.0	MWD #1 (OH)		

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	DLeg (°/100usft)	N/S (usft)	E/W (usft)	Northing (usft)	Easting (usft)
7,376.0	2.00	284.01	7,375.2	16.3	0.00	26.9	-15.7	637,705.03	637,202.26
7,431.0	2.02	292.07	7,430.2	18.1	0.51	27.5	-17.5	637,705.63	637,200.43
KOP - 7431.0'MD, 2.02°INC, 292.07°AZI, 7430.2'TVD									
7,463.0	3.25	292.07	7,462.1	19.5	3.84	28.0	-18.8	637,706.18	637,199.07
7,495.0	7.03	277.83	7,494.0	22.3	12.38	28.6	-21.6	637,706.79	637,196.29
7,526.0	11.16	273.61	7,524.6	27.2	13.49	29.1	-26.5	637,707.24	637,191.41
7,558.0	15.56	272.56	7,555.7	34.6	13.77	29.5	-33.9	637,707.62	637,184.03
7,590.0	19.69	270.80	7,586.2	44.2	13.01	29.7	-43.6	637,707.89	637,174.35
7,622.0	23.74	269.39	7,615.9	56.1	12.76	29.7	-55.4	637,707.90	637,162.51
7,654.0	26.90	268.87	7,644.9	69.7	9.90	29.5	-69.1	637,707.69	637,148.83
7,685.0	29.98	268.51	7,672.1	84.5	9.95	29.2	-83.8	637,707.35	637,134.07
7,717.0	31.39	268.87	7,699.6	100.8	4.44	28.8	-100.2	637,706.97	637,117.75
7,749.0	33.59	269.04	7,726.6	118.0	6.88	28.5	-117.4	637,706.66	637,100.56
7,781.0	34.99	269.39	7,753.1	136.0	4.42	28.2	-135.4	637,706.42	637,082.54
7,813.0	38.25	269.75	7,778.7	155.1	10.21	28.1	-154.5	637,706.27	637,063.45
7,845.0	41.06	269.92	7,803.4	175.5	8.79	28.0	-174.9	637,706.22	637,043.03
7,876.0	44.67	270.98	7,826.1	196.6	11.87	28.2	-196.0	637,706.39	637,021.95
7,908.0	47.92	271.15	7,848.2	219.7	10.16	28.6	-219.1	637,706.82	636,998.82
7,940.0	52.49	271.68	7,868.7	244.3	14.34	29.3	-243.7	637,707.43	636,974.25
7,971.0	56.98	271.33	7,886.6	269.6	14.51	29.9	-269.0	637,708.09	636,948.95
8,003.0	61.46	271.33	7,902.9	297.1	14.00	30.6	-296.4	637,708.73	636,921.48



Leam Drilling Systems

Leam X&Y Report



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Site:	Grateful "BOD" Federal Com	MD Reference:	WELL @ 3517.8usft (18'8"KB Patt#511)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Midland(Permian Basin) Database

Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	DLeg (°/100usft)	N/S (usft)	E/W (usft)	Northing (usft)	Easting (usft)	
8,035.0	65.07	271.15	7,917.3	325.6	11.29	31.2	-325.0	637,709.35	636,892.91	
8,067.0	67.44	271.33	7,930.2	354.9	7.42	31.8	-354.3	637,709.98	636,863.63	
8,098.0	69.81	271.15	7,941.5	383.8	7.66	32.4	-383.1	637,710.61	636,834.77	
8,130.0	73.07	270.98	7,951.7	414.1	10.20	33.0	-413.5	637,711.17	636,804.44	
8,162.0	77.46	271.15	7,959.8	445.1	13.73	33.6	-444.4	637,711.75	636,773.51	
8,194.0	80.10	269.93	7,966.1	476.4	9.06	33.9	-475.8	637,712.04	636,742.12	
8,225.0	82.39	269.39	7,970.8	507.1	7.59	33.7	-506.4	637,711.86	636,711.49	
8,258.0	86.70	268.69	7,973.9	539.9	13.23	33.1	-539.3	637,711.31	636,678.65	
8,289.0	90.74	269.75	7,974.6	570.8	13.47	32.7	-570.2	637,710.89	636,647.67	
EOC - 8289.0°MD, 90.74°INC, 269.75°AZI, 7974.6°TVD, 32.7°N, -570.2°E										
8,321.0	92.97	269.92	7,973.6	602.8	6.99	32.6	-602.2	637,710.79	636,615.68	
8,353.0	91.89	269.75	7,972.2	634.8	3.42	32.5	-634.2	637,710.70	636,583.71	
8,385.0	91.89	269.57	7,971.2	666.7	0.56	32.3	-666.2	637,710.51	636,551.73	
8,417.0	92.24	269.57	7,970.0	698.7	1.09	32.1	-698.2	637,710.27	636,519.75	
8,480.0	92.15	269.39	7,967.6	761.6	0.32	31.5	-761.1	637,709.70	636,456.80	
8,544.0	92.41	269.39	7,965.1	825.5	0.41	30.8	-825.1	637,709.02	636,392.86	
8,576.0	92.50	269.75	7,963.7	857.5	1.16	30.6	-857.0	637,708.78	636,360.89	
8,608.0	92.24	269.57	7,962.4	889.5	0.99	30.4	-889.0	637,708.59	636,328.92	
8,671.0	92.33	269.75	7,959.8	952.4	0.32	30.0	-951.9	637,708.22	636,265.97	
8,735.0	91.89	269.22	7,957.5	1,016.3	1.08	29.5	-1,015.9	637,707.64	636,202.01	
8,799.0	92.06	269.57	7,955.3	1,080.2	0.61	28.8	-1,079.9	637,706.97	636,138.05	
8,862.0	92.94	270.69	7,952.5	1,143.2	2.26	28.9	-1,142.8	637,707.11	636,075.12	
8,926.0	93.29	270.62	7,949.1	1,207.1	0.56	29.7	-1,206.7	637,707.84	636,011.22	
8,989.0	93.38	270.10	7,945.4	1,269.9	0.84	30.1	-1,269.6	637,708.23	635,948.32	
9,053.0	93.38	269.57	7,941.6	1,333.8	0.83	29.9	-1,333.5	637,708.05	635,884.44	
9,116.0	93.38	269.22	7,937.9	1,396.7	0.55	29.2	-1,396.4	637,707.39	635,821.55	
9,180.0	93.29	268.69	7,934.2	1,460.5	0.84	28.1	-1,460.2	637,706.22	635,757.67	



Leam Drilling Systems

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Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Midland(Permian Basin) Database

Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	DLeg ("/100usft)	N/S (usft)	E/W (usft)	Northing (usft)	Easting (usft)	
9,243.0	93.03	268.34	7,930.7	1,523.3	0.69	26.4	-1,523.1	637,704.59	635,694.78	
9,307.0	93.12	268.51	7,927.3	1,587.2	0.30	24.7	-1,587.0	637,702.83	635,630.90	
9,370.0	92.41	267.99	7,924.2	1,650.0	1.40	22.7	-1,649.9	637,700.91	635,568.00	
9,434.0	91.89	267.99	7,921.8	1,713.8	0.81	20.5	-1,713.8	637,698.67	635,504.09	
9,497.0	91.97	268.16	7,919.7	1,776.7	0.30	18.4	-1,776.8	637,696.55	635,441.16	
9,561.0	91.62	268.34	7,917.7	1,840.6	0.61	16.4	-1,840.7	637,694.60	635,377.22	
9,625.0	91.45	268.69	7,916.0	1,904.5	0.61	14.8	-1,904.6	637,692.94	635,313.27	
9,689.0	91.62	269.39	7,914.3	1,968.4	1.13	13.7	-1,968.6	637,691.87	635,249.30	
9,752.0	92.77	269.92	7,911.9	2,031.3	2.01	13.3	-2,031.6	637,691.49	635,186.35	
9,816.0	93.47	270.80	7,908.4	2,095.2	1.76	13.7	-2,095.5	637,691.89	635,122.44	
9,879.0	94.00	272.73	7,904.3	2,158.1	3.17	15.7	-2,158.3	637,693.83	635,059.61	
9,942.0	93.47	272.21	7,900.2	2,220.9	1.18	18.4	-2,221.1	637,696.54	634,996.80	
10,005.0	93.56	271.50	7,896.3	2,283.8	1.13	20.4	-2,284.0	637,698.57	634,933.96	
10,070.0	93.64	270.98	7,892.2	2,348.7	0.81	21.8	-2,348.8	637,699.98	634,869.10	
10,133.0	93.47	270.80	7,888.3	2,411.6	0.39	22.8	-2,411.7	637,700.95	634,806.23	
10,197.0	92.85	269.92	7,884.8	2,475.5	1.68	23.2	-2,475.6	637,701.36	634,742.33	
10,260.0	92.77	269.75	7,881.7	2,538.4	0.30	23.0	-2,538.5	637,701.17	634,679.40	
10,324.0	92.77	270.45	7,878.6	2,602.3	1.09	23.1	-2,602.4	637,701.29	634,615.48	
10,387.0	93.21	270.45	7,875.3	2,665.2	0.70	23.6	-2,665.3	637,701.78	634,552.57	
10,451.0	92.94	269.75	7,871.9	2,729.1	1.17	23.7	-2,729.3	637,701.89	634,488.66	
10,514.0	92.77	269.92	7,868.8	2,792.0	0.38	23.5	-2,792.2	637,701.71	634,425.74	
10,578.0	94.00	269.92	7,865.0	2,855.8	1.92	23.5	-2,856.1	637,701.62	634,361.85	
10,641.0	93.56	269.04	7,860.8	2,918.7	1.56	22.9	-2,918.9	637,701.05	634,298.99	
10,705.0	92.77	268.16	7,857.3	2,982.5	1.85	21.3	-2,982.8	637,699.49	634,235.11	
10,768.0	93.21	268.87	7,854.0	3,045.3	1.32	19.7	-3,045.7	637,697.86	634,172.22	
10,831.0	93.47	268.16	7,850.3	3,108.2	1.20	18.1	-3,108.6	637,696.23	634,109.35	
10,895.0	93.38	269.39	7,846.5	3,172.0	1.92	16.7	-3,172.4	637,694.86	634,045.48	



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11,086.0	92.77	270.27	7,836.3	3,362.6	0.56	16.1	-3,363.2	637,694.30	633,854.75	
11,150.0	93.29	270.45	7,832.9	3,426.5	0.86	16.5	-3,427.1	637,694.70	633,790.85	
11,213.0	93.47	270.62	7,829.2	3,489.4	0.39	17.1	-3,490.0	637,695.29	633,727.96	
11,277.0	93.82	270.98	7,825.1	3,553.3	0.78	18.0	-3,553.8	637,696.18	633,664.09	
11,341.0	94.08	271.50	7,820.7	3,617.1	0.91	19.4	-3,617.7	637,697.56	633,600.26	
11,404.0	94.88	270.98	7,815.8	3,679.9	1.51	20.7	-3,680.4	637,698.92	633,537.47	
11,468.0	94.35	271.15	7,810.6	3,743.7	0.87	21.9	-3,744.2	637,700.10	633,473.69	
11,532.0	94.52	271.15	7,805.7	3,807.5	0.27	23.2	-3,808.0	637,701.39	633,409.89	
11,596.0	95.05	270.80	7,800.3	3,871.3	0.99	24.3	-3,871.8	637,702.47	633,346.12	
11,659.0	94.00	270.62	7,795.4	3,934.1	1.69	25.1	-3,934.6	637,703.25	633,283.33	
11,722.0	93.64	270.10	7,791.2	3,997.0	1.00	25.5	-3,997.4	637,703.64	633,220.47	
11,754.0	92.50	270.10	7,789.5	4,028.9	3.56	25.5	-4,029.4	637,703.70	633,188.51	
11,786.0	91.36	270.27	7,788.4	4,060.9	3.60	25.6	-4,061.4	637,703.80	633,156.53	
11,850.0	90.74	270.62	7,787.2	4,124.9	1.11	26.1	-4,125.4	637,704.30	633,092.55	
11,913.0	91.45	270.62	7,786.0	4,187.9	1.13	26.8	-4,188.4	637,704.98	633,029.56	
11,977.0	91.36	270.45	7,784.4	4,251.8	0.30	27.4	-4,252.3	637,705.58	632,965.58	
12,004.0	91.45	270.27	7,783.8	4,278.8	0.75	27.6	-4,279.3	637,705.75	632,938.59	
12,065.0	91.45	270.27	7,782.2	4,339.8	0.00	27.9	-4,340.3	637,706.04	632,877.61	
BHL - 12065.0'MD, 91.45°INC, 270.27°AZI, 7782.2'TVD, 27.9°N, -4340.3'E										

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
7,431.0	7,430.2	27.5	-17.5	KOP - 7431.0'MD, 2.02°INC, 292.07°AZI, 7430.2'TVD
8,289.0	7,974.6	32.7	-570.2	EOC - 8289.0'MD, 90.74°INC, 269.75°AZI, 7974.6'TVD, 32.7°N, -570.2'E
12,065.0	7,782.2	27.9	-4,340.3	BHL - 12065.0'MD, 91.45°INC, 270.27°AZI, 7782.2'TVD, 27.9°N, -4340.3'E



Leam Drilling Systems

Leam X&Y Report



Company: Yates Petroleum Corporation
Project: Eddy County - NAD83
Site: Grateful "BOD" Federal Com
Well: #1H
Wellbore: OH
Design: OH

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well #1H
WELL @ 3517.8usft (18.8'KB Patt#511)
WELL @ 3517.8usft (18.8'KB Patt#511)
Grid
Minimum Curvature
Midland(Permian Basin) Database

Checked By: _____ Approved By: _____ Date: _____

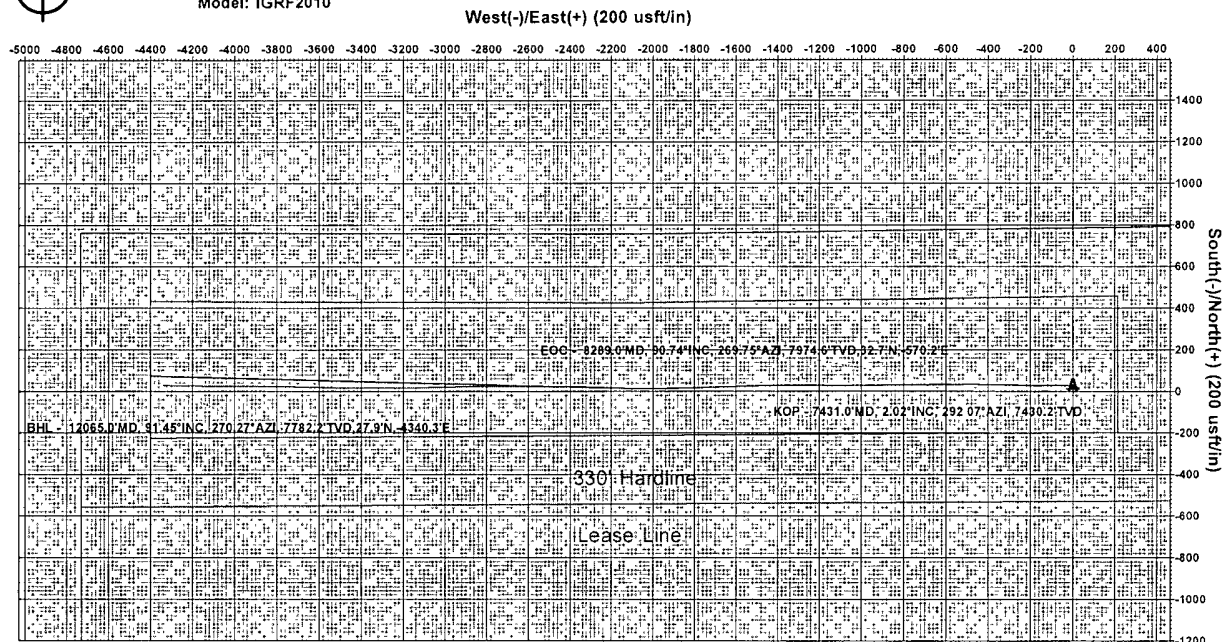
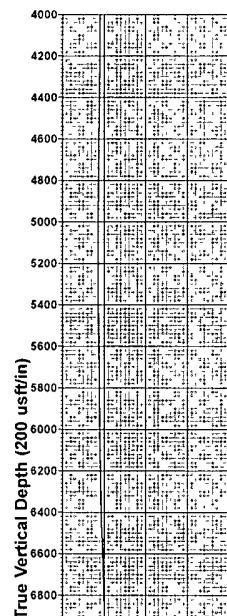
Yates Petroleum Corporation

Project: Eddy County - NAD83
Site: Grateful "BOD" Federal Com
Well: #1H
Wellbore: OH
Plan: Plan #3 (#1H/OH)



Azimuths to Grid North
True North: -0.17°
Magnetic North: 7.66°

Magnetic Field
Strength: 48878.2snT
Dip Angle: 60.60°
Date: 07/07/2011
Model: IGRF2010



WELL DETAILS: #1H

Ground Elevation:: 3499.0
RKB Elevation: WELL @ 3517.8usft (18.8'KB Patt#511)
Rig Name: 18.8'KB Patt#511

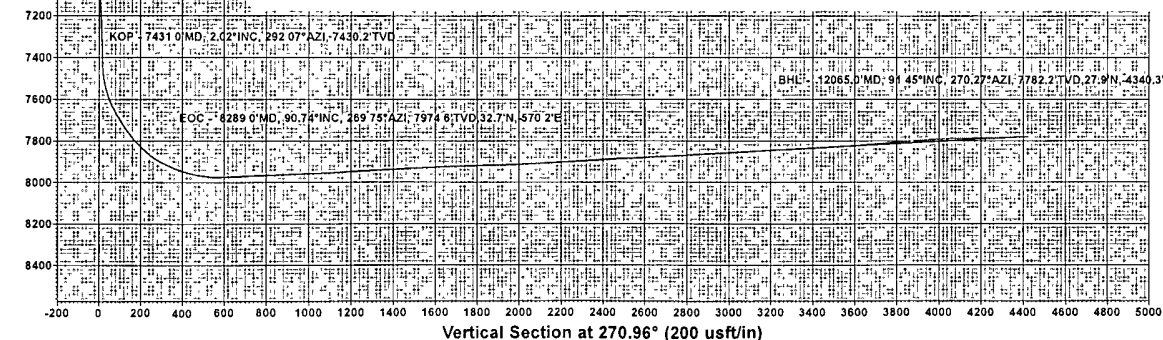
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	637678.17	637217.91	32° 45' 9.452 N	104° 1' 17.241 W

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
9816.0	93.47	270.80	7908.4	13.7	-2095.5	0.00	0.00	2095.4	
9853.5	93.20	271.50	7906.2	14.5	-2132.9	2.00	111.10	2132.8	
9959.5	93.20	271.50	7900.3	17.2	-2238.7	0.00	0.00	2238.6	
12125.8	93.20	271.50	7779.4	73.9	-4400.9	0.00	0.00	4401.5	PBHL(Grateful#1H)

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
PBHL(Grateful#1H)	7780.0	101.3	-4400.4	637779.42	632817.51	Point



PROJECT DETAILS: Eddy County - NAD83
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone
System Datum: Mean Sea Level
Local North: Grid



LEAM DRILLING SYSTEMS, INC.
4906 West Highway 80 Midland, Texas 79707
Phone: 432-697-1490

Plan: Plan #3 (#1H/OH)
Created By: Nate Bingham Date: 8/5/2011