

- Y:\SURVEY\EOG MIDLAND\CARAVAN\FINAL PRODUCTS\AD CARAVAN 11H.DWG 6/29/2017 1:29:24 PM eechoa



Yates Petroleum
Project: Lea County, NM (NAD-83)
Site: Caravan State Unit
Well: #11H
Wellbore: OH
Plan: Plan #2 (#11H/OH)

WELL DETAILS: #11H

Ground Elevation:: 3481.0
RKB Elevation: RKB @ 3502.5usft (Nomac 22 - KB=21.5)
Rig Name: Nomac 22 - KB=21.5

Surface Hole Location
Northing: 430543.00 Easting: 777503.80 Latitude: 32° 10' 52.813 N Longitude: 103° 34' 11.931 W



Azimuths to Grid North
True North: -0.41°
Magnetic North: 6.76°

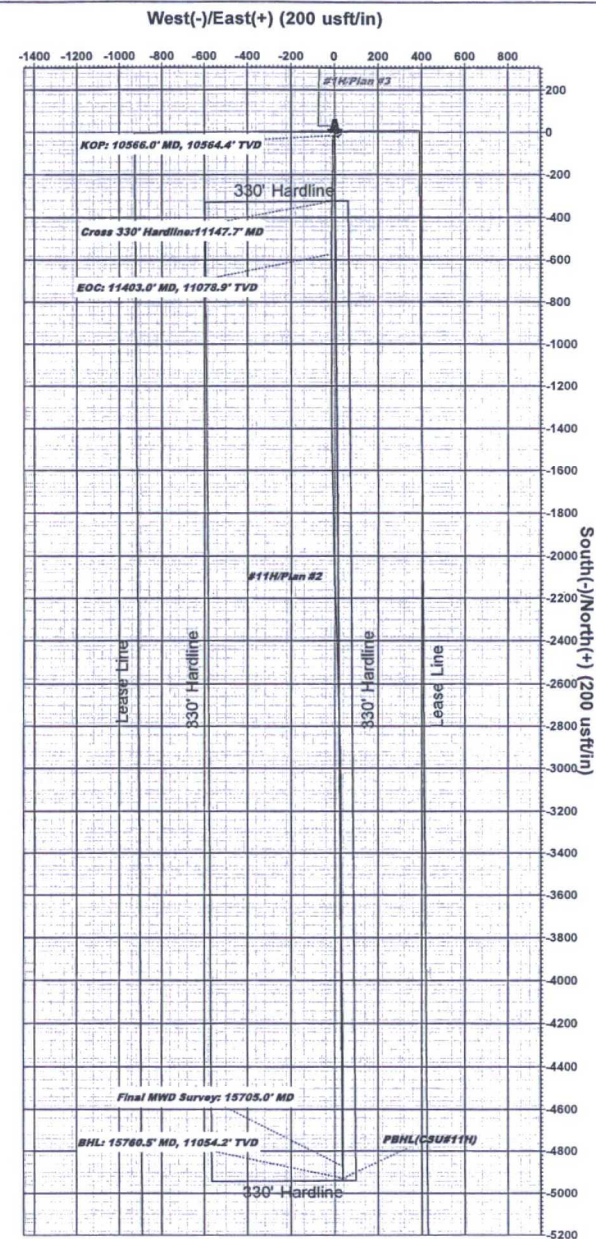
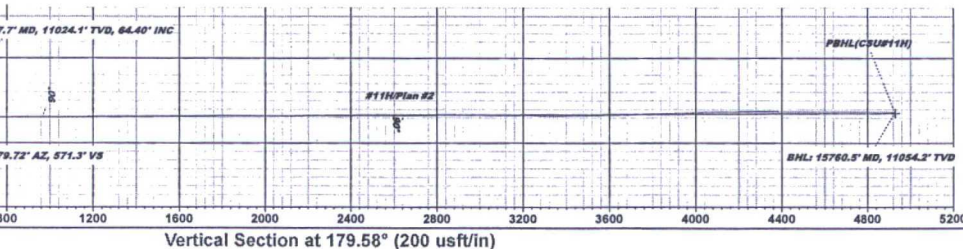
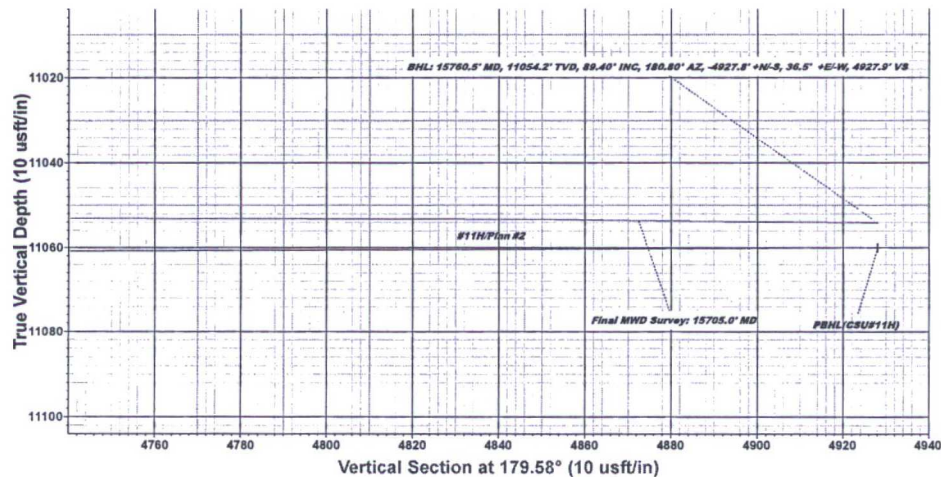
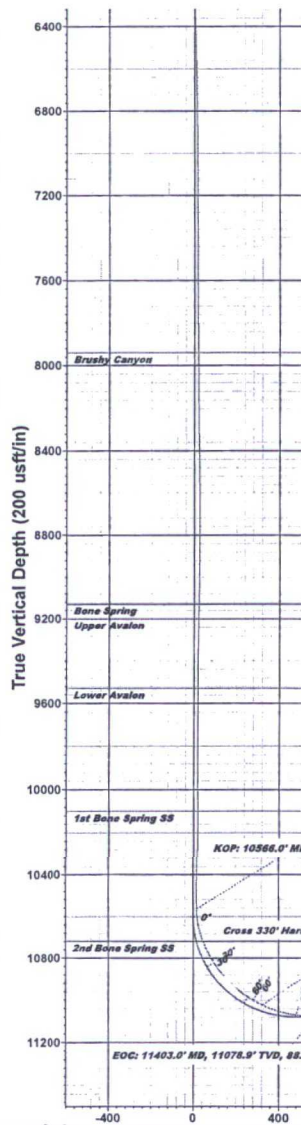
Magnetic Field
Strength: 48250.7nT
Dip Angle: 60.06°
Date: 11/6/2014
Model: IGRF2010

Section Details

	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0
2	10602.5	0.00	0.00	10602.5	0.0	0.0	0.00	0.00	0.0
3	11354.6	90.26	179.58	11080.0	-479.6	3.6	12.00	179.58	479.6
4	15803.1	90.26	179.58	11060.0	-4927.9	36.5	0.00	0.00	4928.0

DESIGN TARGET DETAILS

Name	+N/-S	+E/-W	Northing	Easting
Convoy #1H	30.0	-0.2	430573.00	777503.60
PBHL(CSU#11H)	-4927.9	36.5	425615.10	777540.30



PROJECT DETAILS: Lea County, NM (NAD-83)
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



Crescent Directional Drilling
7715 West Industrial Ave. Midland, Tx 79706
Phone: 432-618-1135

Plan: Plan #2 (#11H/OH)
Created By: Adrian Castro Date: 6:26, January 05 2015



Job Number: SVMO-141699
 Company: Yates Petroleum Corporation
 Lease/Well: Caravan State Unit 11H
 Location: Lea County, NM
 Rig Name: Nomac #22
 RKB: 21.5'
 G.L. or M.S.L.: GL

State/Country: New Mexico/USA
 Declination: 6.76°
 Grid: East To Grid North
 File name: Y:\WINSER~1\2014SU~1\YATES\MO\CARAVA~1\11H.SVY
 Date/Time: 18-Dec-14 / 08:59
 Curve Name: Surface - 1160' M.D. (SRG)

MS Survey

WINSERVE SURVEY CALCULATIONS
 Minimum Curvature Method
 Vertical Section Plane 179.58
 Vertical Section Referenced to Wellhead
 Rectangular Coordinates Referenced to Wellhead

We hereby certify that our survey data from
Surface MD to 1160' MD is, to the best of
 our knowledge a true and accurate account of
 the well bore.
Daniel West 12/18/14
 MS Energy Services Date

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
200.00	.12	87.63	200.00	.01	.21	-.01	.21	87.63	.06
400.00	.18	114.87	400.00	-.11	.70	.12	.71	99.27	.05
600.00	.36	114.14	600.00	-.50	1.56	.52	1.64	107.88	.09
800.00	.37	77.90	799.99	-.63	2.77	.65	2.84	102.74	.11
1000.00	.72	75.73	999.98	-.18	4.62	.21	4.62	92.24	.18
Last Survey Depth Recorded									
1160.00	.72	69.11	1159.97	.43	6.53	-.38	6.54	86.27	.05



Yates Petroleum

Lea County, NM (NAD-83)

Caravan State Unit

#11H

OH

Design: OH

Standard Survey Report

05 January, 2015

HOBBS CO
JUL 03 2017
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Survey Report

Company:	Yates Petroleum	Local Co-ordinate Reference:	Well #11H
Project:	Lea County, NM (NAD-83)	TVD Reference:	RKB @ 3502.5usft (Nomac 22 - KB=21.5)
Site:	Caravan State Unit	MD Reference:	RKB @ 3502.5usft (Nomac 22 - KB=21.5)
Well:	#11H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Houston R5000 Database

Project	Lea County, NM (NAD-83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site		Caravan State Unit			
Site Position:		Northing:	430,472.90 usft	Latitude:	32° 10' 52.428 N
From:	Map	Easting:	773,064.80 usft	Longitude:	103° 35' 3.586 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.40 °

Well	#11H					
Well Position	+N/-S	0.0 usft	Northing:	430,543.00 usft	Latitude:	32° 10' 52.813 N
	+E/-W	0.0 usft	Easting:	777,503.80 usft	Longitude:	103° 34' 11.931 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	3,481.0 usft	

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/6/2014	7.16	60.06	48,251

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	179.58	

Survey Program	Date	1/5/2015		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
200.0	1,160.0	Survey #1 - Gyro (OH)	CB-GYRO-MS	Camera based gyro multishot
1,275.0	15,705.0	Survey #2 - Crescent MWD Survey (OH)	MWD	MWD - Standard
15,760.6	15,760.6	Survey #3 - PTB (OH)	BLIND	Blind drilling, where no tool is applied

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
Convoy #1H									
200.0	0.12	87.63	200.0	0.0	0.2	0.0	0.06	0.06	0.00
400.0	0.18	114.87	400.0	-0.1	0.7	0.1	0.05	0.03	13.62
600.0	0.36	114.14	600.0	-0.5	1.6	0.5	0.09	0.09	-0.37
800.0	0.37	77.90	800.0	-0.6	2.8	0.6	0.11	0.01	-18.12
1,000.0	0.72	75.73	1,000.0	-0.2	4.6	0.2	0.18	0.18	-1.09
1,160.0	0.72	69.11	1,160.0	0.4	6.5	-0.4	0.05	0.00	-4.14
1,275.0	0.70	94.70	1,275.0	0.6	7.9	-0.6	0.27	-0.02	22.25



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Site:	Caravan State Unit	MD Reference:	RKB @ 3502.5usft (Nomac 22 - KB=21.5)
Well:	#11H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Houston R5000 Database

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,431.0	0.70	104.10	1,431.0	0.3	9.8	-0.2	0.07	0.00	6.03
1,618.0	0.90	149.60	1,617.9	-1.2	11.6	1.3	0.35	0.11	24.33
1,805.0	1.30	132.30	1,804.9	-3.9	13.9	4.0	0.28	0.21	-9.25
1,991.0	0.40	123.00	1,990.9	-5.7	16.0	5.8	0.49	-0.48	-5.00
2,178.0	0.30	162.10	2,177.9	-6.5	16.7	6.6	0.14	-0.05	20.91
2,365.0	0.60	249.40	2,364.9	-7.3	16.0	7.4	0.35	0.16	46.68
2,552.0	0.70	271.20	2,551.9	-7.6	13.9	7.8	0.14	0.05	11.66
2,740.0	0.40	290.40	2,739.8	-7.4	12.2	7.5	0.19	-0.16	10.21
2,926.0	0.70	305.80	2,925.8	-6.5	10.6	6.6	0.18	0.16	8.28
3,112.0	0.60	274.20	3,111.8	-5.8	8.7	5.8	0.20	-0.05	-16.99
3,300.0	0.90	340.00	3,299.8	-4.3	7.2	4.4	0.45	0.16	35.00
3,487.0	1.10	4.70	3,486.8	-1.1	6.9	1.2	0.25	0.11	13.21
3,674.0	1.60	350.30	3,673.7	3.2	6.6	-3.2	0.32	0.27	-7.70
3,861.0	1.60	359.20	3,860.7	8.4	6.1	-8.4	0.13	0.00	4.76
4,048.0	1.50	356.70	4,047.6	13.5	5.9	-13.4	0.06	-0.05	-1.34
4,236.0	1.10	350.00	4,235.5	17.7	5.5	-17.7	0.23	-0.21	-3.56
4,423.0	1.20	9.90	4,422.5	21.4	5.5	-21.3	0.22	0.05	10.64
4,609.0	1.60	51.40	4,608.5	24.9	7.9	-24.9	0.57	0.22	22.31
4,795.0	2.50	105.30	4,794.4	25.5	13.8	-25.4	1.09	0.48	28.98
4,983.0	2.20	148.90	4,982.2	21.3	19.6	-21.2	0.94	-0.16	23.19
5,169.0	1.00	143.00	5,168.1	17.0	22.5	-16.8	0.65	-0.65	-3.17
5,178.0	1.00	141.40	5,177.1	16.8	22.6	-16.7	0.31	0.00	-17.78
5,284.0	0.70	168.00	5,283.1	15.5	23.3	-15.3	0.46	-0.28	25.09
5,471.0	0.90	168.80	5,470.1	12.9	23.8	-12.7	0.11	0.11	0.43
5,658.0	0.90	163.90	5,657.1	10.1	24.5	-9.9	0.04	0.00	-2.62
5,844.0	1.10	163.00	5,843.1	7.0	25.4	-6.8	0.11	0.11	-0.48
6,030.0	1.10	166.00	6,029.0	3.5	26.4	-3.3	0.03	0.00	1.61
6,218.0	1.20	168.70	6,217.0	-0.2	27.2	0.4	0.06	0.05	1.44
6,405.0	1.20	169.40	6,403.9	-4.0	27.9	4.2	0.01	0.00	0.37
6,591.0	1.40	169.20	6,589.9	-8.2	28.7	8.4	0.11	0.11	-0.11
6,779.0	0.90	236.90	6,777.9	-11.2	27.9	11.4	0.72	-0.27	36.01
6,966.0	0.90	234.20	6,964.8	-12.9	25.5	13.1	0.02	0.00	-1.44
7,152.0	1.10	225.10	7,150.8	-15.0	23.0	15.2	0.14	0.11	-4.89
7,339.0	1.60	295.20	7,337.8	-15.2	19.4	15.3	0.86	0.27	37.49
7,526.0	0.50	189.40	7,524.7	-14.8	16.9	15.0	0.96	-0.59	-56.58
7,713.0	0.50	156.00	7,711.7	-16.4	17.1	16.5	0.15	0.00	-17.86
7,900.0	0.40	178.70	7,898.7	-17.8	17.5	17.9	0.11	-0.05	12.14
8,088.0	0.40	165.50	8,086.7	-19.1	17.6	19.2	0.05	0.00	-7.02
8,275.0	0.70	167.10	8,273.7	-20.8	18.1	21.0	0.16	0.16	0.86
8,461.0	0.70	176.90	8,459.7	-23.1	18.4	23.2	0.06	0.00	5.27
8,648.0	0.70	172.50	8,646.7	-25.3	18.6	25.5	0.03	0.00	-2.35
8,835.0	1.10	309.60	8,833.7	-25.3	17.3	25.5	0.90	0.21	73.32
9,022.0	1.10	310.20	9,020.6	-23.0	14.6	23.1	0.01	0.00	0.32



Survey Report

Company:	Yates Petroleum	Local Co-ordinate Reference:	Well #11H
Project:	Lea County, NM (NAD-83)	TVD Reference:	RKB @ 3502.5usft (Nomac 22 - KB=21.5)
Site:	Caravan State Unit	MD Reference:	RKB @ 3502.5usft (Nomac 22 - KB=21.5)
Well:	#11H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Houston R5000 Database

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,209.0	1.40	301.00	9,207.6	-20.7	11.3	20.8	0.19	0.16	-4.92
9,396.0	1.60	291.90	9,394.5	-18.5	6.9	18.6	0.17	0.11	-4.87
9,584.0	1.40	280.30	9,582.5	-17.2	2.2	17.2	0.19	-0.11	-6.17
9,770.0	1.20	257.60	9,768.4	-17.2	-2.0	17.2	0.29	-0.11	-12.20
9,957.0	0.90	230.70	9,955.4	-18.5	-5.0	18.5	0.30	-0.16	-14.39
10,144.0	0.50	31.50	10,142.4	-18.8	-5.7	18.7	0.74	-0.21	85.99
10,331.0	0.70	1.70	10,329.4	-16.9	-5.2	16.9	0.19	0.11	-15.94
10,518.0	0.70	279.40	10,516.4	-15.6	-6.3	15.5	0.49	0.00	-44.01
10,566.0	1.32	226.80	10,564.4	-15.9	-7.0	15.9	2.20	1.30	-109.59
KOP: 10566.0' MD, 10564.4' TVD									
10,570.0	1.40	224.90	10,568.4	-16.0	-7.1	15.9	2.20	1.89	-47.43
10,601.0	4.90	190.60	10,599.3	-17.6	-7.6	17.5	12.34	11.29	-110.65
10,632.0	9.70	186.80	10,630.0	-21.5	-8.2	21.4	15.55	15.48	-12.26
10,663.0	14.10	182.90	10,660.4	-27.8	-8.7	27.8	14.42	14.19	-12.58
10,694.0	17.20	180.60	10,690.2	-36.2	-8.9	36.1	10.20	10.00	-7.42
10,725.0	20.90	179.90	10,719.5	-46.3	-8.9	46.2	11.96	11.94	-2.26
10,756.0	23.90	179.90	10,748.2	-58.1	-8.9	58.0	9.68	9.68	0.00
10,787.0	26.20	180.10	10,776.3	-71.2	-8.9	71.2	7.42	7.42	0.65
10,818.0	29.20	179.70	10,803.7	-85.6	-8.9	85.6	9.70	9.68	-1.29
10,849.0	33.10	179.40	10,830.2	-101.7	-8.8	101.6	12.59	12.58	-0.97
10,880.0	37.30	179.00	10,855.6	-119.5	-8.5	119.5	13.57	13.55	-1.29
10,912.0	41.50	179.20	10,880.3	-139.8	-8.2	139.8	13.13	13.13	0.63
10,943.0	44.30	180.30	10,903.0	-160.9	-8.1	160.9	9.35	9.03	3.55
10,974.0	46.10	181.70	10,924.8	-182.9	-8.5	182.9	6.63	5.81	4.52
11,005.0	48.20	181.80	10,945.9	-205.6	-9.2	205.6	6.78	6.77	0.32
11,037.0	51.70	181.70	10,966.5	-230.1	-9.9	230.0	10.94	10.94	-0.31
11,068.0	55.40	181.80	10,984.9	-255.0	-10.7	255.0	11.94	11.94	0.32
11,099.0	60.00	181.30	11,001.5	-281.2	-11.4	281.1	14.90	14.84	-1.61
11,131.0	63.00	181.00	11,016.7	-309.3	-12.0	309.2	9.41	9.38	-0.94
11,147.7	64.40	181.05	11,024.1	-324.3	-12.2	324.2	8.39	8.39	0.33
Cross 330' Hardline: 11147.7' MD, 11024.1' TVD, 64.40° INC									
11,162.0	65.60	181.10	11,030.2	-337.3	-12.5	337.2	8.39	8.39	0.32
11,193.0	68.80	181.00	11,042.2	-365.8	-13.0	365.7	10.33	10.32	-0.32
11,224.0	72.30	180.60	11,052.5	-395.1	-13.4	395.0	11.36	11.29	-1.29
11,255.0	75.50	180.60	11,061.1	-424.8	-13.7	424.7	10.32	10.32	0.00
11,287.0	79.40	180.40	11,068.1	-456.1	-14.0	456.0	12.20	12.19	-0.63
11,318.0	82.70	180.60	11,072.9	-486.7	-14.3	486.6	10.66	10.65	0.65
11,348.0	85.20	180.40	11,076.0	-516.5	-14.5	516.4	8.36	8.33	-0.67
11,379.0	87.40	180.10	11,078.0	-547.5	-14.7	547.3	7.16	7.10	-0.97
11,403.0	88.52	179.72	11,078.9	-571.4	-14.6	571.3	4.94	4.69	-1.56
EOC: 11403.0' MD, 11078.9' TVD, 88.52° INC, 179.72° AZ, 571.3' VS									
11,411.0	88.90	179.60	11,079.1	-579.4	-14.6	579.3	4.94	4.69	-1.56
11,474.0	89.70	179.40	11,079.8	-642.4	-14.0	642.3	1.31	1.27	-0.32
11,567.0	89.70	179.90	11,080.3	-735.4	-13.5	735.3	0.54	0.00	0.54



Survey Report

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Well:	#11H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Houston R5000 Database

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,754.0	89.70	180.30	11,081.3	-922.4	-13.8	922.3	0.21	0.00	0.21
11,941.0	91.00	180.10	11,080.2	-1,109.4	-14.4	1,109.3	0.70	0.70	-0.11
12,128.0	90.60	180.30	11,077.6	-1,296.4	-15.1	1,296.2	0.24	-0.21	0.11
12,316.0	90.80	178.50	11,075.3	-1,484.4	-13.1	1,484.2	0.96	0.11	-0.96
12,503.0	90.60	179.20	11,073.0	-1,671.3	-9.4	1,671.2	0.39	-0.11	0.37
12,691.0	89.90	179.20	11,072.2	-1,859.3	-6.7	1,859.2	0.37	-0.37	0.00
12,878.0	89.90	178.30	11,072.5	-2,046.2	-2.7	2,046.2	0.48	0.00	-0.48
13,064.0	91.00	178.00	11,071.0	-2,232.1	3.3	2,232.1	0.61	0.59	-0.16
13,252.0	90.60	177.80	11,068.4	-2,420.0	10.2	2,420.0	0.24	-0.21	-0.11
13,439.0	90.30	178.30	11,066.9	-2,606.9	16.6	2,606.9	0.31	-0.16	0.27
13,625.0	89.70	178.10	11,066.9	-2,792.8	22.4	2,792.9	0.34	-0.32	-0.11
13,812.0	88.90	179.00	11,069.2	-2,979.7	27.2	2,979.8	0.64	-0.43	0.48
13,999.0	89.60	180.10	11,071.7	-3,166.7	28.6	3,166.8	0.70	0.37	0.59
14,186.0	89.90	179.70	11,072.5	-3,353.7	29.0	3,353.8	0.27	0.16	-0.21
14,374.0	91.30	179.90	11,070.5	-3,541.7	29.6	3,541.8	0.75	0.74	0.11
14,562.0	91.80	179.90	11,065.4	-3,729.6	29.9	3,729.7	0.27	0.27	0.00
14,750.0	92.20	179.20	11,058.9	-3,917.5	31.4	3,917.6	0.43	0.21	-0.37
14,936.0	91.10	178.80	11,053.5	-4,103.4	34.7	4,103.5	0.63	-0.59	-0.22
15,122.0	89.60	179.60	11,052.4	-4,289.3	37.3	4,289.5	0.91	-0.81	0.43
15,309.0	89.90	179.90	11,053.2	-4,476.3	38.1	4,476.5	0.23	0.16	0.16
15,496.0	90.30	179.90	11,052.9	-4,663.3	38.4	4,663.5	0.21	0.21	0.00
15,683.0	89.40	180.60	11,053.4	-4,850.3	37.6	4,850.5	0.61	-0.48	0.37
15,705.0	89.40	180.80	11,053.6	-4,872.3	37.3	4,872.5	0.91	0.00	0.91
Final MWD Survey: 15705.0' MD									
15,760.5	89.40	180.80	11,054.2	-4,927.8	36.5	4,927.9	0.00	0.00	0.00
BHL: 15760.5' MD, 11054.2' TVD, 89.40° INC, 180.80° AZ, -4927.8' +N/-S, 36.5' +E/-W, 4927.9' VS									
15,760.6	89.40	180.80	11,054.2	-4,927.9	36.5	4,928.0	0.00	0.00	0.00
PBHL(CSU#11H)									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,566.0	10,564.4	-15.9	-7.0	KOP: 10566.0' MD, 10564.4' TVD
11,147.7	11,024.1	-324.3	-12.2	Cross 330' Hardline: 11147.7' MD, 11024.1' TVD, 64.40° INC
11,403.0	11,078.9	-571.4	-14.6	EOC: 11403.0' MD, 11078.9' TVD, 88.52° INC, 179.72° AZ, 571.3' VS
15,705.0	11,053.6	-4,872.3	37.3	Final MWD Survey: 15705.0' MD

Checked By: _____ Approved By: _____ Date: _____