



Oxy USA Inc.

Lea County, NM

North Hobbs G/SA Unit Section 33

NHU 33-697

Wellbore #1

Design: Surveys

Standard Survey Report

21 January, 2019





Project: Lea County, NM
Site: North Hobbs G/SA Unit Section 33
Well: NHU 33-697
Depth Reference: GL 3633.9' + 17.5' KB @ 3651.40usft (Trinidad 417)
SHL Northing: 620355.07
SHL Easting: 862179.12
Rig: Trinidad 417
Plan: plan2



SECTION DETAILS

MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	VSecl	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
2610.26	40.21	96.12	2449.30	-72.12	672.99	2.00	96.12	676.84	Start 653.69 hold at 2610.26 MD
3263.95	40.21	96.12	2948.55	-117.09	1092.56	0.00	0.00	1098.82	Start Drop -1.50
4277.64	25.00	96.12	3800.00	-175.12	1634.04	1.50	180.00	1643.40	Start 420.83 hold at 4277.64 MD
4698.47	25.00	96.12	4181.40	-194.07	1810.88	0.00	0.00	1821.25	Start 331.01 hold at 4698.47 MD
5029.48	25.00	96.12	4481.40	-208.88	1949.88	0.00	0.00	1961.14	TD @ 5029.48 MD

FORMATION TOP DETAILS

TVDPATH	MDPATH	Formation
1551.49	1569.91	Rustler
1638.62	1662.83	Salt
2660.95	2887.39	Yates
2870.55	3161.83	Seven Rivers
3378.93	3795.37	Queen
3708.11	4175.60	Grayburg
3961.74	4456.10	San Andres 1
4306.94	4836.98	SA3 K

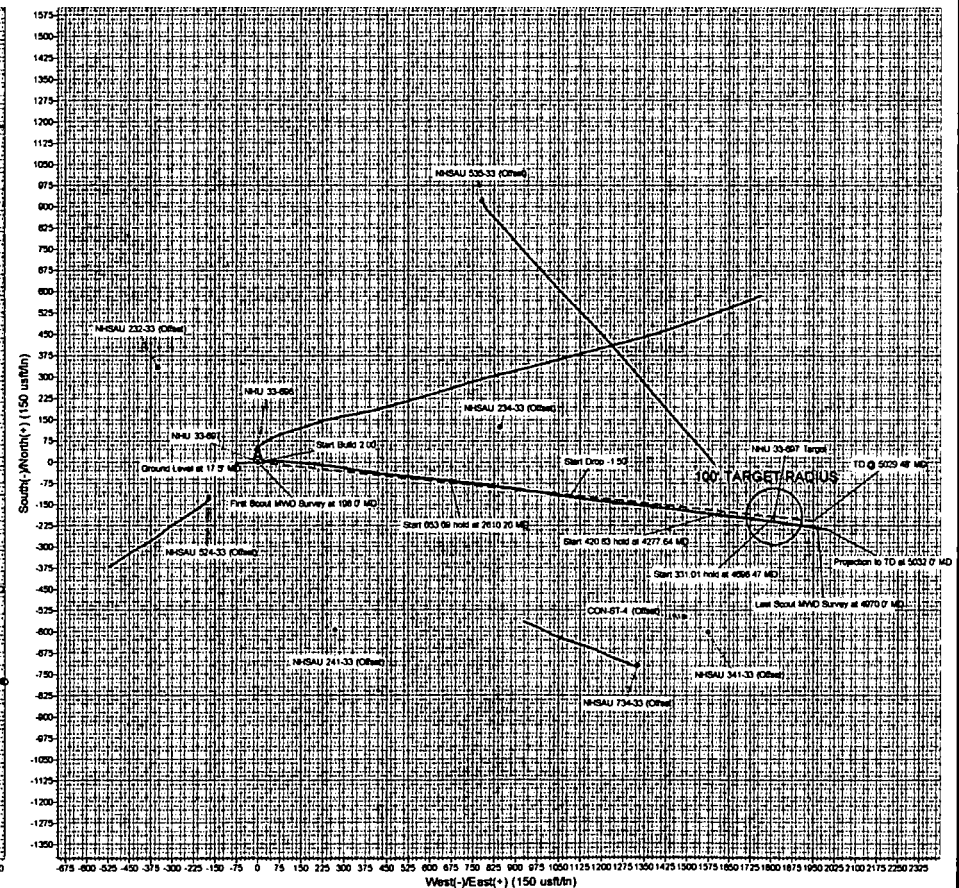
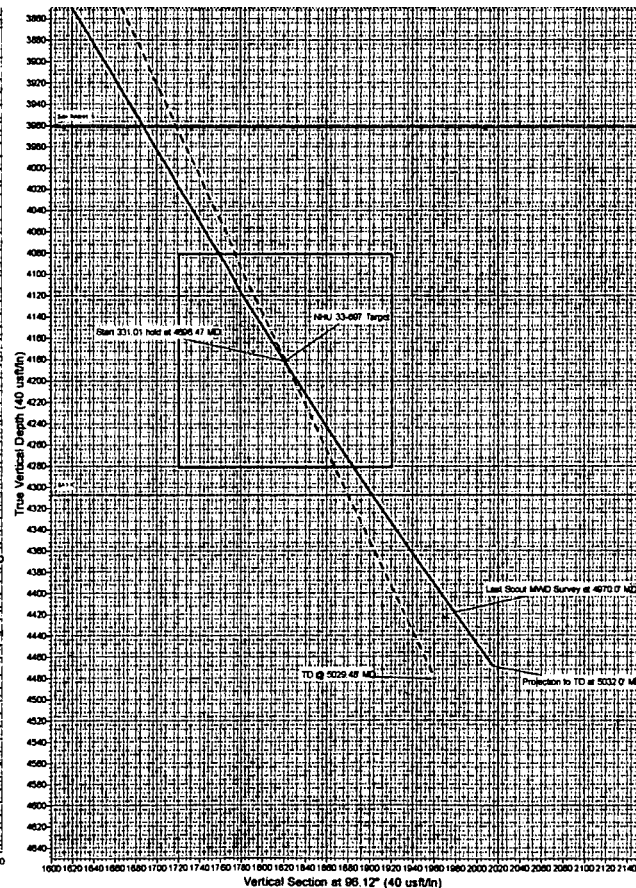
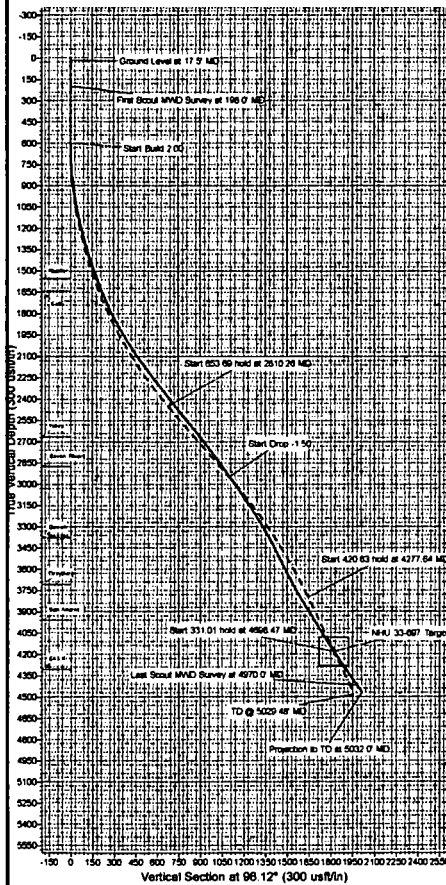
DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Shape
NHU 33-697 Target	4181.40	-194.07	1810.88	820161.00	863990.00	Circle (Radius: 100.00)



Azimuths to Grid North
True North: -0.64°
Magnetic North: 6.13°

Magnetic Field
Strength: 46096.8nT
Dip Angle: 60.72°
Date: 1/14/2018
Model: HDGM





Survey Report



Company:	Oxy USA Inc.	Local Co-ordinate Reference:	Well NHU 33-697
Project:	Lea County, NM	TVD Reference:	GL 3633.9' + 17.5' KB @ 3651.40usft (Trinidad 417)
Site:	North Hobbs G/SA Unit Section 33	MD Reference:	GL 3633.9' + 17.5' KB @ 3651.40usft (Trinidad 417)
Well:	NHU 33-697	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.14 Single User Db

Project	Lea County, NM		
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	North Hobbs G/SA Unit Section 33				
Site Position:		Northing:	623,400.01 usft	Latitude:	32° 42' 29.815 N
From:	Map	Easting:	862,622.48 usft	Longitude:	103° 9' 16.006 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.64 °

Well	NHU 33-697					
Well Position	+N/-S	0.00 usft	Northing:	620,355.07 usft	Latitude:	32° 41' 59.739 N
	+E/-W	0.00 usft	Easting:	862,179.12 usft	Longitude:	103° 9' 21.589 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,633.90 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	1/14/2019	6.77	60.72	48,096.90000000

Design	Surveys				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	96.12	

Survey Program	Date 1/21/2019				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
17.50	5,032.00	Scout MWD Survey (Wellbore #1)	B001Mb_MWD+HRGM	OWSG MWD + HRGM	

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)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
17.50	0.00	0.00	17.50	0.00	0.00	0.00	0.00	0.00	0.00	
Ground Level at 17.5' MD										
198.00	0.31	341.87	198.00	0.46	-0.15	-0.20	0.17	0.17	0.00	
First Scout MWD Survey at 198.0' MD										
349.00	0.53	336.02	348.99	1.49	-0.56	-0.72	0.15	0.15	-3.87	
506.00	0.48	346.97	505.99	2.79	-1.01	-1.30	0.07	-0.03	6.97	
627.00	0.62	140.78	626.99	2.78	-0.71	-1.00	0.89	0.12	127.12	
748.00	3.42	102.90	747.90	1.47	3.23	3.05	2.44	2.31	-31.31	



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Site:	North Hobbs G/SA Unit Section 33	MD Reference:	GL 3633.9' + 17.5' KB @ 3651.40usft (Trinidad 417)
Well:	NHU 33-697	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.14 Single User Db

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)
870.00	6.99	83.39	869.39	1.51	14.15	13.91	3.23	2.93	-15.99
991.00	9.32	82.68	989.16	3.61	31.19	30.62	1.93	1.93	-0.59
1,112.00	11.82	90.24	1,108.10	4.80	53.30	52.49	2.36	2.07	6.25
1,269.00	14.81	96.31	1,260.87	2.53	89.33	88.56	2.10	1.90	3.87
1,395.00	17.19	95.60	1,381.98	-1.06	123.88	123.28	1.90	1.89	-0.56
1,526.00	20.04	94.11	1,506.11	-4.56	165.54	165.08	2.21	2.18	-1.14
1,644.00	20.88	95.25	1,616.67	-7.93	206.64	206.31	0.79	0.71	0.97
1,770.00	23.74	98.06	1,733.23	-13.54	254.13	254.12	2.42	2.27	2.23
1,896.00	27.56	100.17	1,846.79	-22.25	307.95	308.57	3.12	3.03	1.67
2,022.00	30.59	98.77	1,956.90	-32.29	368.34	369.69	2.46	2.40	-1.11
2,148.00	33.80	96.66	2,063.52	-41.24	434.86	436.78	2.70	2.55	-1.67
2,275.00	36.09	96.13	2,167.62	-49.33	507.15	509.51	1.82	1.80	-0.42
2,401.00	37.63	95.95	2,268.43	-57.28	582.31	585.09	1.23	1.22	-0.14
2,528.00	38.29	95.87	2,368.56	-65.33	660.01	663.21	0.52	0.52	-0.06
2,654.00	38.64	96.57	2,467.21	-73.82	737.92	741.59	0.44	0.28	0.56
2,717.00	38.77	96.75	2,516.38	-78.39	777.05	780.98	0.27	0.21	0.29
2,843.00	37.93	97.80	2,615.19	-88.28	854.60	859.14	0.84	-0.67	0.83
2,969.00	37.14	98.33	2,715.11	-99.05	930.60	935.86	0.68	-0.63	0.42
3,095.00	36.04	98.77	2,816.27	-110.21	1,004.88	1,010.90	0.90	-0.87	0.35
3,221.00	34.77	99.47	2,918.97	-121.77	1,076.95	1,083.79	1.06	-1.01	0.56
3,347.00	33.98	97.36	3,022.97	-132.20	1,147.31	1,154.87	1.13	-0.63	-1.67
3,473.00	33.23	96.13	3,127.91	-140.39	1,216.56	1,224.60	0.80	-0.60	-0.98
3,599.00	31.47	96.75	3,234.35	-147.95	1,283.55	1,292.01	1.42	-1.40	0.49
3,725.00	29.45	95.60	3,342.96	-154.84	1,347.05	1,355.88	1.67	-1.60	-0.91
3,851.00	25.63	96.75	3,454.66	-161.06	1,404.96	1,414.13	3.06	-3.03	0.91
3,914.00	25.41	97.54	3,511.51	-164.44	1,431.89	1,441.26	0.64	-0.35	1.25
3,977.00	26.59	96.66	3,568.14	-167.85	1,459.30	1,468.87	1.97	1.87	-1.40
4,039.00	26.07	97.01	3,623.70	-171.12	1,486.60	1,496.37	0.88	-0.84	0.56
4,102.00	26.46	98.24	3,680.20	-174.82	1,514.23	1,524.24	1.06	0.62	1.95
4,166.00	28.35	98.24	3,737.02	-179.04	1,543.38	1,553.68	2.95	2.95	0.00
4,229.00	30.37	97.98	3,791.92	-183.40	1,573.96	1,584.54	3.21	3.21	-0.41
4,291.00	31.87	96.75	3,845.00	-187.50	1,605.74	1,616.58	2.63	2.42	-1.98
4,354.00	31.25	96.75	3,898.68	-191.37	1,638.49	1,649.55	0.98	-0.98	0.00
4,418.00	30.81	96.39	3,953.52	-195.15	1,671.26	1,682.54	0.75	-0.69	-0.56
4,481.00	30.64	96.83	4,007.68	-198.85	1,703.23	1,714.73	0.45	-0.27	0.70
4,543.00	31.03	97.18	4,060.91	-202.73	1,734.77	1,746.50	0.69	0.63	0.56
4,606.00	31.43	97.36	4,114.78	-206.86	1,767.18	1,779.16	0.65	0.63	0.29
4,669.00	32.18	97.71	4,168.32	-211.22	1,800.09	1,812.35	1.23	1.19	0.56
4,732.00	32.79	97.71	4,221.47	-215.76	1,833.62	1,846.17	0.97	0.97	0.00
4,795.00	33.32	97.98	4,274.27	-220.45	1,867.66	1,880.52	0.87	0.84	0.43
4,921.00	34.86	98.33	4,378.61	-230.47	1,937.57	1,951.10	1.23	1.22	0.28
4,970.00	35.43	99.12	4,418.68	-234.75	1,965.45	1,979.27	1.49	1.16	1.61



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Last Scout MWD Survey at 4970.0' MD									
5,032.00	35.43	99.12	4,469.20	-240.45	2,000.93	2,015.17	0.00	0.00	0.00
Projection to TD at 5032.0' MD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
17.50	17.50	0.00	0.00	Ground Level at 17.5' MD
198.00	198.00	0.46	-0.15	First Scout MWD Survey at 198.0' MD
4,970.00	4,418.68	-234.75	1,965.45	Last Scout MWD Survey at 4970.0' MD
5,032.00	4,469.20	-240.45	2,000.93	Projection to TD at 5032.0' MD

Checked By: _____ Approved By: _____ Date: _____