



Oxy USA Inc.

Lea County, NM

North Hobbs G/SA Unit Section 33

NHU 33-696

Wellbore #1

Design: Surveys

Standard Survey Report

14 January, 2019

HOBBS OCD
MAY 28 2019
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Project: Lea County, NM
Site: North Hobbs G/SA Unit Section 33
Well: NHU 33-696
Depth Reference: GL 3634.4' + 17.5' KB @ 3651.90usft (Trinidad 417)
SHL Northing: 620405.06
SHL Easting: 862178.34
Rig: Trinidad 417
Plan: plan3



SECTION DETAILS

MD	Inc	Azi	TVD	+N-S	+E-W	Dieg	TFace	VSecl	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	Start 1858.74 hold at 2159.50 MD
2159.50	31.19	72.99	2083.61	121.12	395.68	2.00	72.99	414.09	Start Drop -1.50
4018.25	31.19	72.99	3673.68	402.69	1318.49	0.00	0.00	1378.70	Start 438.08 hold at 4184.25 MD
4184.25	29.00	72.99	3800.00	424.10	1388.49	1.50	180.00	1449.90	Start 343.58 hold at 4600.33 MD
4600.33	29.00	72.99	4181.40	485.94	1588.66	0.00	0.00	1861.32	TD @ 4943.91' MD
4943.91	29.00	72.99	4481.90	534.66	1747.94	0.00	0.00	1827.89	

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
1552.94	1571.45	Rustler
1640.27	1664.60	Salt
2658.44	2831.48	Yates
2865.88	3073.95	Seven Rivers
3394.82	3692.26	Queen
3717.81	4069.62	Grayburg
3984.04	4374.68	San Andres 1
4329.61	4769.79	SA3 K

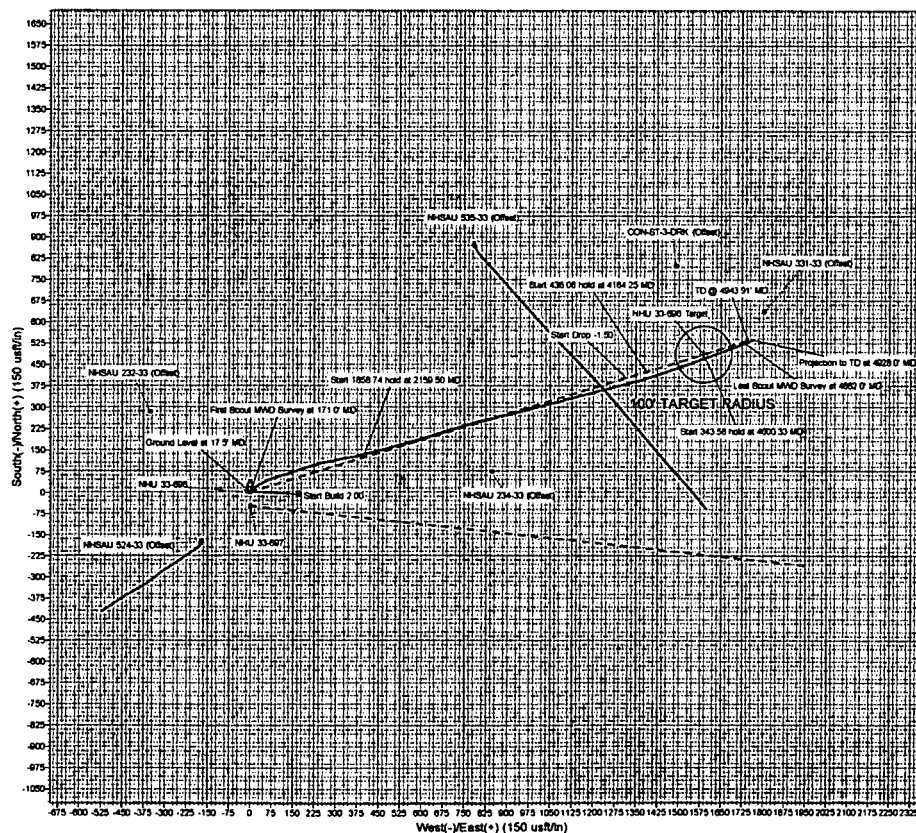
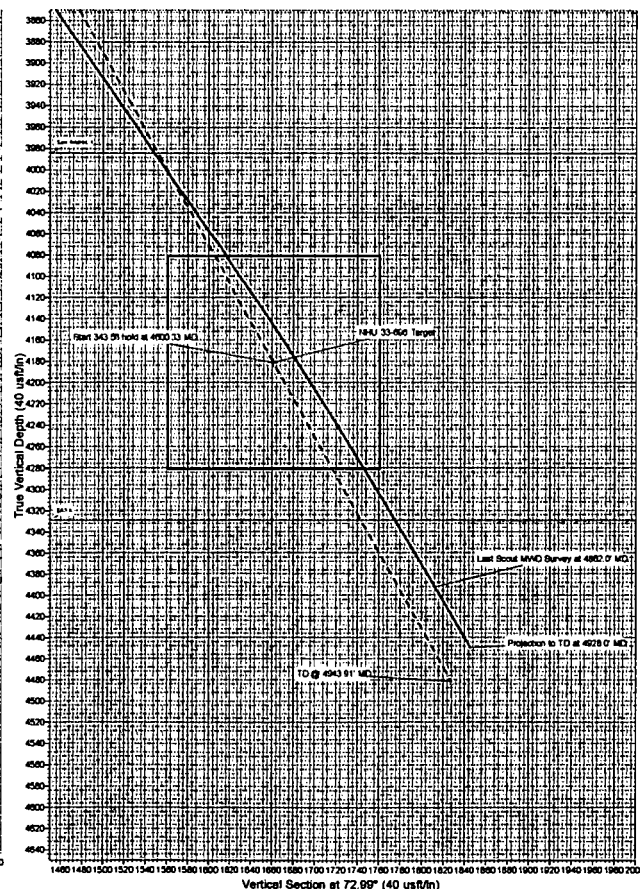
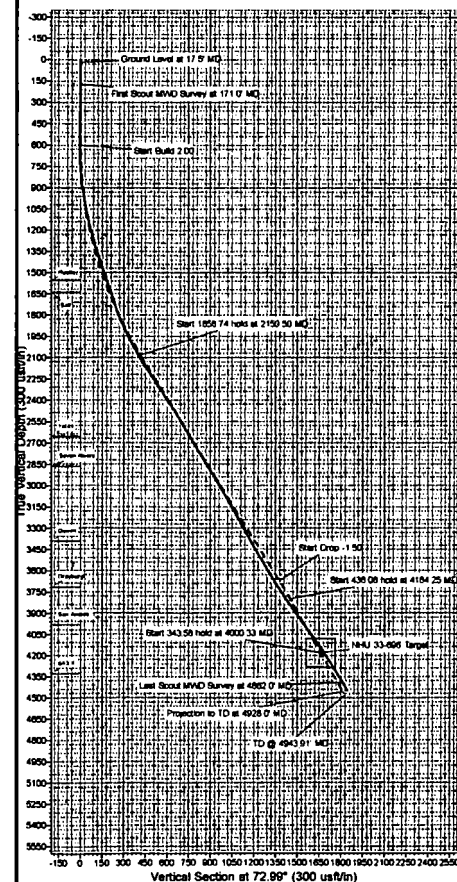
DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Shape
NHU 33-696 Target	4181.40	485.94	1588.66	620881.00	863787.00	Circle (Radius: 100.00)



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

Magnetic Field
Strength: 48099.5nT
Dip Angle: 60.72°
Date: 1/6/2019
Model: HDGM





Survey Report



Company:	Oxy USA Inc.	Local Co-ordinate Reference:	Well NHU 33-696
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Site:	North Hobbs G/SA Unit Section 33	MD Reference:	GL 3634.4' + 17.5' KB @ 3651.90usft (Trinidad 417)
Well:	NHU 33-696	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 33-696					
Well Position	+N/-S	0.00 usft	Northing:	620,405.06 usft	Latitude:	32° 42' 0.233 N
	+E/-W	0.00 usft	Easting:	862,178.34 usft	Longitude:	103° 9' 21.592 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,634.40 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	1/6/2019	6.77	60.72	48,099.50000000

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	72.99	

Survey Program	Date 1/14/2019				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
17.50	4,928.00	Scout MWD Surveys (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										
171.00	0.62	245.63	171.00	-0.34	-0.76	-0.82	0.40	0.40	0.00	
First Scout MWD Survey at 171.0' MD										
323.00	1.27	233.24	322.98	-1.69	-2.86	-3.22	0.45	0.43	-8.15	
505.00	1.67	229.55	504.92	-4.62	-6.49	-7.56	0.23	0.22	-2.03	
627.00	1.05	16.15	626.90	-4.70	-7.53	-8.58	2.14	-0.51	120.16	
748.00	4.62	47.88	747.74	-0.36	-3.61	-3.56	3.11	2.95	26.22	



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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
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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)
869.00	8.18	51.57	867.96	8.26	6.75	8.88	2.96	2.94	3.05
993.00	10.29	55.88	990.35	19.96	22.84	27.67	1.79	1.70	3.48
1,115.00	12.22	60.71	1,110.00	32.39	43.12	50.71	1.76	1.58	3.96
1,240.00	14.33	68.09	1,231.66	44.63	69.01	79.05	2.16	1.69	5.90
1,366.00	17.14	74.07	1,352.94	55.55	101.34	113.16	2.57	2.23	4.75
1,492.00	19.12	72.40	1,472.68	66.89	138.87	152.36	1.62	1.57	-1.33
1,678.00	18.29	71.06	1,648.85	85.57	195.51	211.99	0.50	-0.45	-0.72
1,742.00	17.95	70.40	1,709.68	92.14	214.30	231.88	0.62	-0.53	-1.03
1,838.00	20.79	77.94	1,800.25	100.66	244.91	263.65	3.94	2.96	7.85
1,963.00	25.10	77.59	1,915.33	111.00	292.52	312.20	3.45	3.45	-0.28
2,090.00	28.44	80.75	2,028.71	121.65	348.69	369.03	2.86	2.63	2.49
2,216.00	32.44	74.95	2,137.34	135.26	410.98	432.57	3.94	3.17	-4.60
2,343.00	32.97	74.86	2,244.21	153.13	477.23	501.15	0.42	0.42	-0.07
2,469.00	33.19	74.33	2,349.79	171.40	543.53	569.90	0.29	0.17	-0.42
2,596.00	32.00	73.10	2,456.78	190.57	609.20	638.30	1.07	-0.94	-0.97
2,722.00	31.21	72.66	2,564.09	210.01	672.31	704.33	0.65	-0.63	-0.35
2,848.00	30.20	72.40	2,672.43	229.32	733.68	768.67	0.81	-0.80	-0.21
2,974.00	30.02	75.30	2,781.43	246.90	794.38	831.85	1.16	-0.14	2.30
3,100.00	32.22	76.97	2,889.30	262.47	857.60	896.86	1.88	1.75	1.33
3,226.00	29.89	76.35	2,997.23	277.46	920.84	961.72	1.87	-1.85	-0.49
3,352.00	29.10	74.60	3,106.90	293.01	980.89	1,023.69	0.93	-0.63	-1.39
3,478.00	29.63	75.21	3,216.71	309.09	1,040.54	1,085.45	0.48	0.42	0.48
3,604.00	27.78	75.30	3,327.22	324.50	1,099.07	1,145.91	1.47	-1.47	0.07
3,730.00	28.40	75.04	3,438.38	339.68	1,156.42	1,205.20	0.50	0.49	-0.21
3,856.00	29.80	75.56	3,548.47	355.23	1,215.69	1,266.42	1.13	1.11	0.41
3,982.00	31.56	75.65	3,656.83	371.21	1,277.96	1,330.64	1.40	1.40	0.07
4,107.00	32.70	75.30	3,762.69	387.88	1,342.31	1,397.06	0.92	0.91	-0.28
4,233.00	35.08	71.34	3,867.28	408.11	1,409.55	1,467.28	2.58	1.89	-3.14
4,359.00	34.73	70.91	3,970.62	431.43	1,477.78	1,539.34	0.34	-0.28	-0.34
4,485.00	35.38	70.20	4,073.76	455.53	1,546.02	1,611.64	0.61	0.52	-0.56
4,611.00	32.62	70.29	4,178.21	479.34	1,612.32	1,682.01	2.19	-2.19	0.07
4,737.00	31.30	69.76	4,285.11	502.12	1,675.00	1,748.62	1.07	-1.05	-0.42
4,862.00	30.20	69.06	4,392.53	524.59	1,734.83	1,812.40	0.93	-0.88	-0.56
Last Scout MWD Survey at 4862.0' MD									
4,928.00	30.20	69.06	4,449.57	536.46	1,765.84	1,845.52	0.00	0.00	0.00
Projection to TD at 4928.0' MD									



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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
171.00	171.00	-0.34	-0.76	First Scout MWD Survey at 171.0' MD
4,862.00	4,392.53	524.59	1,734.83	Last Scout MWD Survey at 4862.0' MD
4,928.00	4,449.57	536.46	1,765.84	Projection to TD at 4928.0' MD

Checked By: _____	Approved By: _____	Date: _____
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