

30-025-43840

Oxy USA Inc.

**Lea County, NM
North Hobbs G/SA Unit
NHU 19-960**

Wellbore #1

HOBBS OCD

FEB 14 2018

RECEIVED

Survey: Scout MWD

Standard Survey Report

18 December, 2017



a business unit of Turbo Drill Industries, Inc.



Project: Lea County, NM
Site: North Hobbs G/SA Unit
Well: NHU 19-960
Depth Reference: GL 3661' + 17.5' KB @ 3678.50usft (Trinidad 435)
SHL Northing: 633698.52
SHL Easting: 853379.70
Rig: Trinidad 435
Plan: plan1



SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1800.00	0.00	0.00	1800.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
2175.00	7.50	127.00	2173.93	-14.75	19.57	2.00	127.00	24.51	Start 1438.66 hold at 2175.00 MD
3613.66	7.50	127.00	3600.29	-127.77	169.54	0.00	0.00	212.29	Start Drop -2.00
3988.66	0.00	0.00	3974.22	-142.52	189.11	2.00	180.00	236.80	Start 625.78 hold at 3988.66 MD
4614.45	0.00	0.00	4600.00	-142.52	189.11	0.00	0.00	236.80	TD @ 4614.45' MD

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
313.26	313.26	Triassic Red Beds
1577.19	1577.19	Rustler
1688.99	1688.99	SALT
2758.94	2765.06	Yates
2978.67	2986.68	Seven Rivers
3528.57	3541.33	Queen
3846.26	3860.67	Grayburg
4133.34	4147.79	San Andres (Zone 1)
4543.58	4558.03	San Andres (Zone 3K)

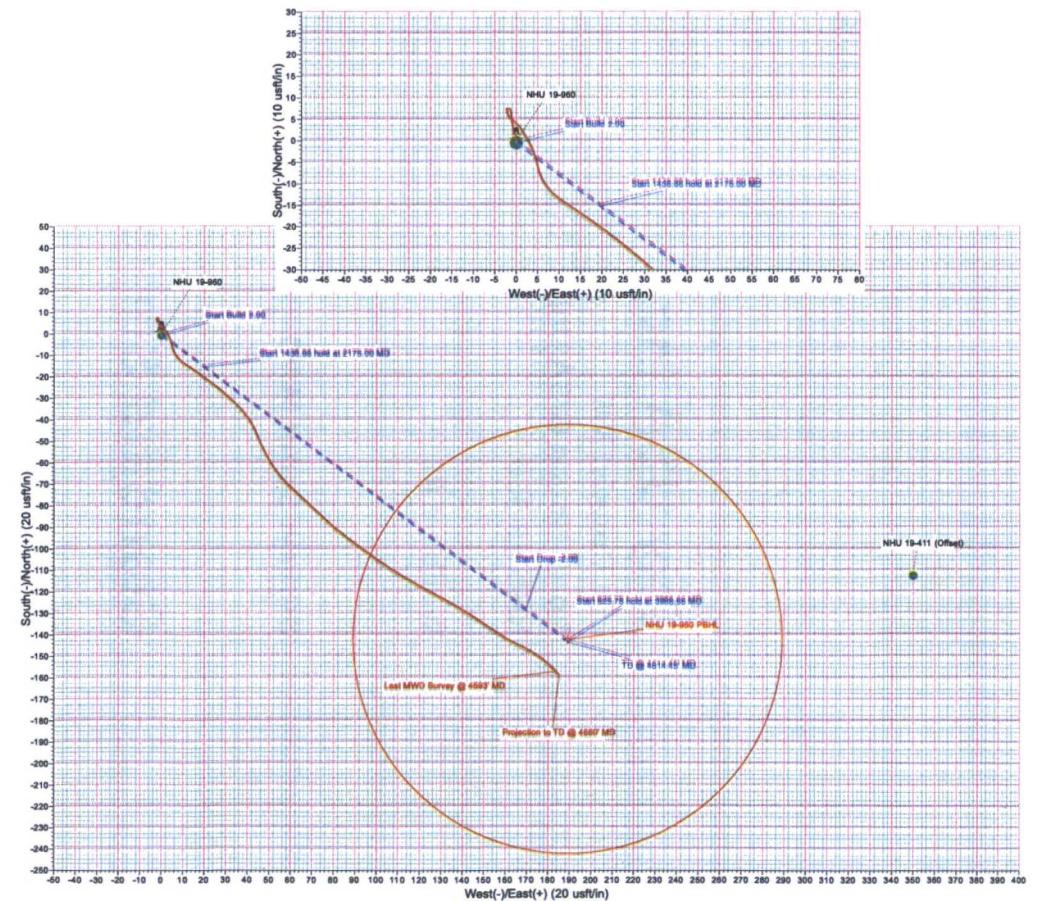
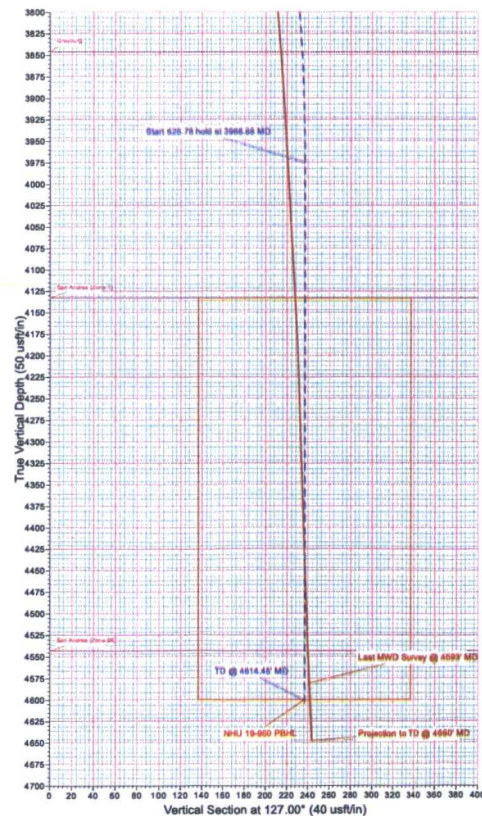
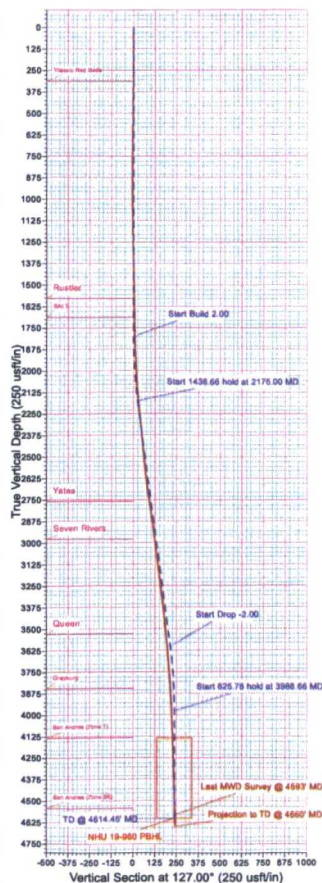
DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
NHU 19-960 PBHL	4600.00	-142.52	189.11	633556.00	853568.81



Azimuths to Grid North
True North: -0.52°
Magnetic North: 6.28°

Magnetic Field
Strength: 48212.8nT
Dip Angle: 60.78°
Date: 2017/11/02
Model: HDGM



Survey Report



Company:	Oxy USA Inc.	Local Co-ordinate Reference:	Well NHU 19-960
Project:	Lea County, NM	TVD Reference:	GL 3661' + 17.5' KB @ 3678.50usft (Trinidad 435)
Site:	North Hobbs G/SA Unit	MD Reference:	GL 3661' + 17.5' KB @ 3678.50usft (Trinidad 435)
Well:	NHU 19-960	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		
Site Position:		Northing:	634,663.65 usft
From:	Map	Easting:	847,524.56 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 44' 22.880 N
		Longitude:	103° 12' 11.270 W
		Grid Convergence:	0.61 °

Well	NHU 19-960		
Well Position	+N/-S	0.00 usft	Northing: 633,698.52 usft
	+E/-W	0.00 usft	Easting: 853,379.70 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 44' 12.708 N
		Longitude:	103° 11' 2.854 W
		Ground Level:	3,661.00 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	HDGM	2017/11/02	6.90
			Dip Angle (°)
			60.78
			Field Strength (nT)
			48,212.60000000

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)
	0.00	0.00	0.00
			Direction (°)
			130.70

Survey Program	Date 2017/12/18		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
177.00	4,660.00	Scout MWD (Wellbore #1)	MWD+HRGM
			Description
			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	
177.00	0.26	11.99	177.00	0.39	0.08	-0.19	0.15	0.15	0.00	
361.00	0.57	328.40	360.99	1.58	-0.31	-1.27	0.23	0.17	-23.69	
545.00	0.75	355.12	544.98	3.56	-0.89	-3.00	0.19	0.10	14.52	
729.00	0.97	352.57	728.96	6.30	-1.20	-5.02	0.12	0.12	-1.39	
913.00	0.66	240.42	912.95	7.33	-2.32	-6.53	0.74	-0.17	-60.95	
1,098.00	1.10	128.54	1,097.94	5.69	-1.86	-5.12	0.80	0.24	-60.48	
1,287.00	1.10	138.20	1,286.90	3.21	0.77	-1.51	0.10	0.00	5.11	
1,476.00	1.36	154.82	1,475.86	-0.17	2.94	2.34	0.23	0.14	8.79	

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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)
1,537.00	1.49	155.52	1,536.84	-1.55	3.57	3.72	0.22	0.21	1.15
1,634.00	1.54	162.55	1,633.81	-3.94	4.49	5.97	0.20	0.05	7.25
1,760.00	1.23	169.67	1,759.77	-6.89	5.24	8.46	0.28	-0.25	5.65
1,886.00	2.29	146.73	1,885.71	-10.32	6.86	11.93	0.99	0.84	-18.21
2,010.00	3.16	124.40	2,009.57	-14.32	11.04	17.71	1.09	0.70	-18.01
2,136.00	4.31	124.05	2,135.30	-18.94	17.83	25.86	0.91	0.91	-0.28
2,261.00	6.68	129.24	2,259.72	-26.17	27.35	37.80	1.94	1.90	4.15
2,386.00	6.42	138.29	2,383.91	-35.98	37.63	51.99	0.85	-0.21	7.24
2,512.00	5.54	160.26	2,509.24	-46.97	44.37	64.27	1.93	-0.70	17.44
2,637.00	7.56	149.54	2,633.42	-59.74	50.58	77.30	1.88	1.62	-8.58
2,763.00	8.79	131.88	2,758.16	-73.31	61.95	94.77	2.21	0.98	-14.02
2,888.00	7.87	133.72	2,881.84	-85.60	75.25	112.87	0.77	-0.74	1.47
3,014.00	6.86	126.25	3,006.80	-96.01	87.55	128.99	1.10	-0.80	-5.93
3,140.00	6.99	125.46	3,131.88	-104.91	99.87	144.12	0.13	0.10	-0.63
3,265.00	6.95	121.07	3,255.96	-113.23	112.54	159.15	0.43	-0.03	-3.51
3,391.00	6.90	118.16	3,381.04	-120.73	125.74	174.06	0.28	-0.04	-2.31
3,517.00	5.71	119.92	3,506.27	-127.43	137.85	187.60	0.96	-0.94	1.40
3,643.00	4.79	124.05	3,631.74	-133.50	147.64	198.99	0.79	-0.73	3.28
3,768.00	4.44	124.32	3,756.34	-139.15	155.96	208.98	0.28	-0.28	0.22
3,894.00	2.95	116.58	3,882.07	-143.35	162.89	216.97	1.24	-1.18	-6.14
4,020.00	2.42	115.88	4,007.94	-145.97	168.18	222.69	0.42	-0.42	-0.56
4,144.00	2.59	122.21	4,131.82	-148.60	172.91	227.99	0.26	0.14	5.10
4,270.00	1.49	126.69	4,257.74	-151.10	176.63	232.44	0.88	-0.87	3.56
4,458.00	1.63	131.00	4,445.67	-154.31	180.61	237.55	0.10	0.07	2.29
4,593.00	2.02	139.96	4,580.60	-157.39	183.59	241.82	0.36	0.29	6.64
Last MWD Survey @ 4593' MD									
4,660.00	2.02	139.96	4,647.56	-159.20	185.11	244.15	0.00	0.00	0.00
Projection to TD @ 4660' MD									

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,593.00	4,580.60	-157.39	183.59	Last MWD Survey @ 4593' MD
4,660.00	4,647.56	-159.20	185.11	Projection to TD @ 4660' MD

Checked By: _____ Approved By: _____ Date: _____