



30-025-43580

Oxy USA Inc.

Lea County, NM (NAD83)
North Hobbs G/SA Unit
NHU 24-686

Wellbore #1

Design: Surveys

Standard Survey Report

06 February, 2018





Survey Report



Company:	Oxy USA Inc.	Local Co-ordinate Reference:	Well NHU 24-686
Project:	Lea County, NM (NAD83)	TVD Reference:	GL 3673' + 17.5' KB @ 3690.50usft (Trinidad 435)
Site:	North Hobbs G/SA Unit	MD Reference:	GL 3673' + 17.5' KB @ 3690.50usft (Trinidad 435)
Well:	NHU 24-686	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.14 Single User Db

Project	Lea County, NM (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	North Hobbs G/SA Unit		
Site Position:		Northing:	634,724.44 usft
From:	Map	Easting:	888,704.25 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 44' 23.293 N
		Longitude:	103° 12' 13.024 W
		Grid Convergence:	0.61 °

Well	NHU 24-686		
Well Position	+N/-S	0.00 usft	Northing: 631,699.31 usft
	+E/-W	0.00 usft	Easting: 887,033.83 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 43' 53.540 N
		Longitude:	103° 12' 32.954 W
		Ground Level:	3,673.00 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	HDGM	12/06/17	6.90
			Dip Angle (°) 60.77
			Field Strength (nT) 48,187.30000000

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 (°) 108.70

Survey Program	Date 02/06/18		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
176.00	5,087.00	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
176.00	0.48	165.11	176.00	-0.71	0.19	0.41	0.27	0.27	0.00
361.00	0.48	156.23	360.99	-2.17	0.70	1.36	0.04	0.00	-4.80
546.00	0.62	120.02	545.98	-3.38	1.88	2.86	0.20	0.08	-19.57
728.00	0.84	128.81	727.97	-4.71	3.77	5.08	0.14	0.12	4.83
910.00	1.32	120.90	909.94	-6.62	6.61	8.38	0.28	0.26	-4.35
1,097.00	0.70	348.98	1,096.92	-6.61	8.24	9.92	1.00	-0.33	-70.55
1,285.00	0.75	349.50	1,284.91	-4.27	7.80	8.75	0.03	0.03	0.28
1,473.00	1.01	348.18	1,472.88	-1.44	7.23	7.31	0.14	0.14	-0.70



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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)
1,633.00	1.05	353.37	1,632.86	1.40	6.77	5.97	0.06	0.03	3.24
1,759.00	1.19	357.59	1,758.83	3.85	6.59	5.00	0.13	0.11	3.35
1,884.00	1.63	134.61	1,883.82	3.90	7.80	6.14	2.10	0.35	109.62
2,009.00	4.04	122.48	2,008.66	0.29	12.78	12.01	1.98	1.93	-9.70
2,135.00	8.53	124.59	2,133.87	-7.41	24.22	25.32	3.57	3.56	1.67
2,259.00	13.54	133.29	2,255.54	-22.59	42.37	47.38	4.25	4.04	7.02
2,387.00	18.73	129.34	2,378.46	-45.91	69.19	80.26	4.14	4.05	-3.09
2,512.00	25.23	125.56	2,494.32	-74.16	106.43	124.58	5.32	5.20	-3.02
2,638.00	29.67	118.61	2,606.14	-104.73	155.69	181.04	4.34	3.52	-5.52
2,765.00	33.71	115.54	2,714.18	-134.99	215.11	247.03	3.42	3.18	-2.42
2,890.00	36.35	111.58	2,816.55	-163.58	280.87	318.49	2.79	2.11	-3.17
3,014.00	37.36	104.29	2,915.81	-186.39	351.54	392.74	3.62	0.81	-5.88
3,140.00	35.65	104.38	3,017.09	-204.95	424.16	467.48	1.36	-1.36	0.07
3,265.00	32.97	104.38	3,120.33	-222.45	492.41	537.73	2.14	-2.14	0.00
3,391.00	32.26	105.52	3,226.46	-239.96	558.02	605.49	0.75	-0.56	0.90
3,517.00	31.65	107.01	3,333.37	-258.63	622.03	672.11	0.79	-0.48	1.18
3,643.00	34.81	108.24	3,438.75	-279.56	687.82	741.14	2.56	2.51	0.98
3,769.00	39.21	106.75	3,539.34	-302.31	760.15	816.94	3.56	3.49	-1.18
3,896.00	40.35	108.77	3,636.95	-327.11	837.52	898.18	1.36	0.90	1.59
4,022.00	39.74	106.49	3,733.41	-351.67	914.77	979.22	1.26	-0.48	-1.81
4,146.00	38.90	105.96	3,829.34	-373.62	990.21	1,057.72	0.73	-0.68	-0.43
4,272.00	38.15	105.34	3,927.91	-394.80	1,065.78	1,136.09	0.67	-0.60	-0.49
4,397.00	35.82	106.13	4,027.75	-415.17	1,138.16	1,211.18	1.90	-1.86	0.63
4,522.00	33.23	105.43	4,130.73	-434.45	1,206.32	1,281.93	2.10	-2.07	-0.56
4,648.00	31.69	103.67	4,237.04	-451.46	1,271.77	1,349.37	1.43	-1.22	-1.40
4,774.00	29.10	102.88	4,345.72	-466.11	1,333.80	1,412.83	2.08	-2.06	-0.63
4,899.00	24.66	102.44	4,457.18	-478.51	1,388.93	1,469.02	3.56	-3.55	-0.35
4,990.00	22.02	102.00	4,540.73	-486.15	1,424.16	1,504.84	2.91	-2.90	-0.48
5,020.00	22.24	102.53	4,568.52	-488.55	1,435.20	1,516.07	0.99	0.73	1.77
Last Scout MWD Survey @ 5020' MD									
5,087.00	22.24	102.53	4,630.54	-494.05	1,459.96	1,541.28	0.00	0.00	0.00
Projection to TD @ 5087' MD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,020.00	4,568.52	-488.55	1,435.20	Last Scout MWD Survey @ 5020' MD
5,087.00	4,630.54	-494.05	1,459.96	Projection to TD @ 5087' MD

Checked By: _____ Approved By: _____ Date: _____



Project: Lea County, NM
Site: North Hobbs G/SA Unit
Well: NHU 24-686
Depth Reference: GL 3673' + 17.5' KB @ 3690.50usft (Trinidad 435)
SHL Northing: 631638.38
SHL Easting: 845853.95
Rig: Trinidad 435
Plan: plan2



SECTION DETAILS												FORMATION TOP DETAILS		
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation	TVDP	MDPath	Formation		
3769.00	39.21	106.75	3539.34	-302.31	760.15	0.00	0.00	816.57	Tie-In Start DLS 4.00 TFO -17.00	220.50	220.50	Triassic Red Beds		
4010.08	48.50	103.00	3713.02	-344.68	921.46	4.00	-17.00	983.04	Start DLS 4.00 TFO 180.00	1530.50	1530.83	Rustler		
4972.58	10.00	103.00	4537.09	-448.49	1371.14	4.00	180.00	1442.62	Start 63.88 hold at 4972.58 MD	1640.50	1640.64	SALT		
5036.46	10.00	103.00	4600.00	-450.99	1381.94	0.00	0.00	1453.67	TD @ 5036.46 MD	2780.50	2845.52	Yates		
										3010.50	3131.89	Seven Rivers		
										3530.50	3757.62	Queen		
										3840.50	4190.16	Grayburg		
										4100.50	4507.98	San Andres (Zone 1)		
										4280.50	4706.14	San Andres (Zone 3 upper)		
										4550.50	4986.19	San Andres (Zone 3 lower)		

DESIGN TARGET DETAILS						Azimuths to Grid North	
Name	TVD	+N/-S	+E/-W	Northing	Easting		
NHU 24-686 PBHL	4600.00	-429.38	1304.05	631209.00	847158.00	True North: -0.61°	Magnetic North: 6.29°

T G M

Magnetic Field
Strength: 48200.2snT
Dip Angle: 60.77°
Date: 2017/10/25
Model: HDGM

