



Oxy USA

**Lea County, NM
South Hobbs G/SA Unit
SHU 277**

Wellbore #1

Design: Surveys

Standard Survey Report

08 October, 2018

**HOBBS OCD
DEC 12 2018
RECEIVED**





Project: Lea County, NM
Site: South Hobbs G/SA Unit
Well: SHU 277
Depth Reference: GL 3598' + 13.5' KB @ 3611.50usft (Savanna 417)
SHL Northing: 610134.20
SHL Easting: 864167.74
Rig: Savanna 417
Plan: plan1



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	
1700.00	0.00	0.00	1700.00	0.00	0.00	0.00	0.00	0.00	Start Build 1.00
2300.00	8.00	207.19	2298.90	-27.92	-14.34	1.00	207.19	31.39	Start 1090.11 hold at 2300.00 MD
3390.11	6.00	207.19	3383.05	-129.28	-66.40	0.00	0.00	145.34	Start Drop -1.00
3990.11	0.00	0.00	3981.95	-157.20	-80.74	1.00	180.00	176.72	Start 1179.55 hold at 3990.11 MD
5169.66	0.00	0.00	5161.50	-157.20	-80.74	0.00	0.00	176.72	TD @ 5169.66 MD

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
1941.86	1641.86	RUSTLER
1763.63	1763.63	SALT
2792.94	2796.76	YATES
2988.13	2993.02	SEVEN RIVERS
3528.43	3536.12	QUEEN
3841.86	3850.01	GRAYBURG
4127.26	4135.42	SAN ANDRES 1
4169.86	4178.02	SA2 C UPPER
4461.77	4469.93	SA3 K
4733.58	4741.74	ROZ A

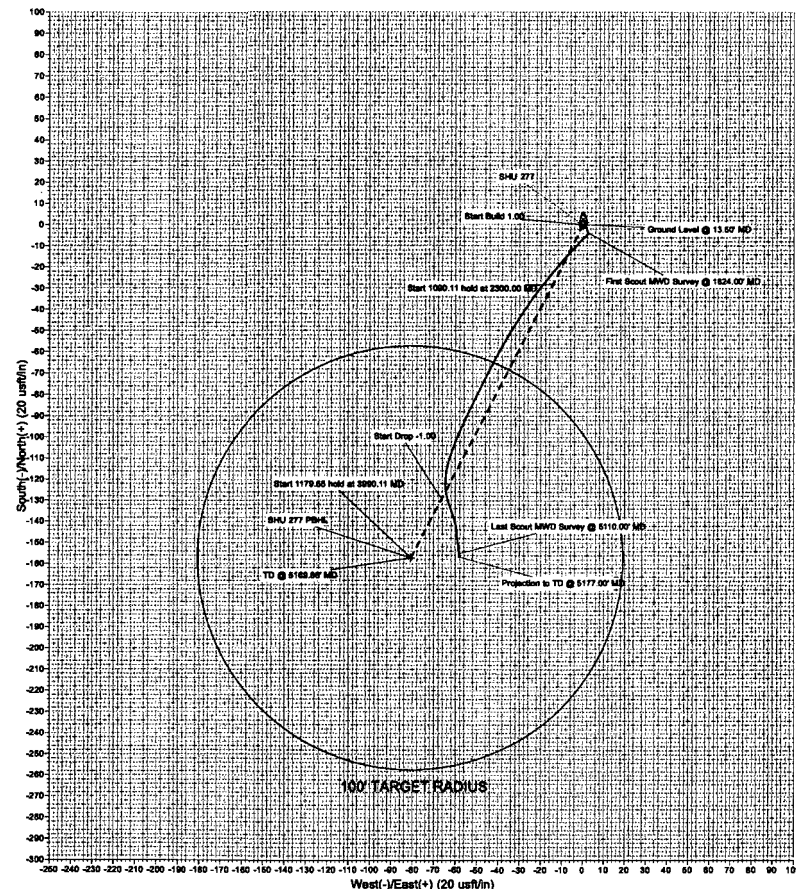
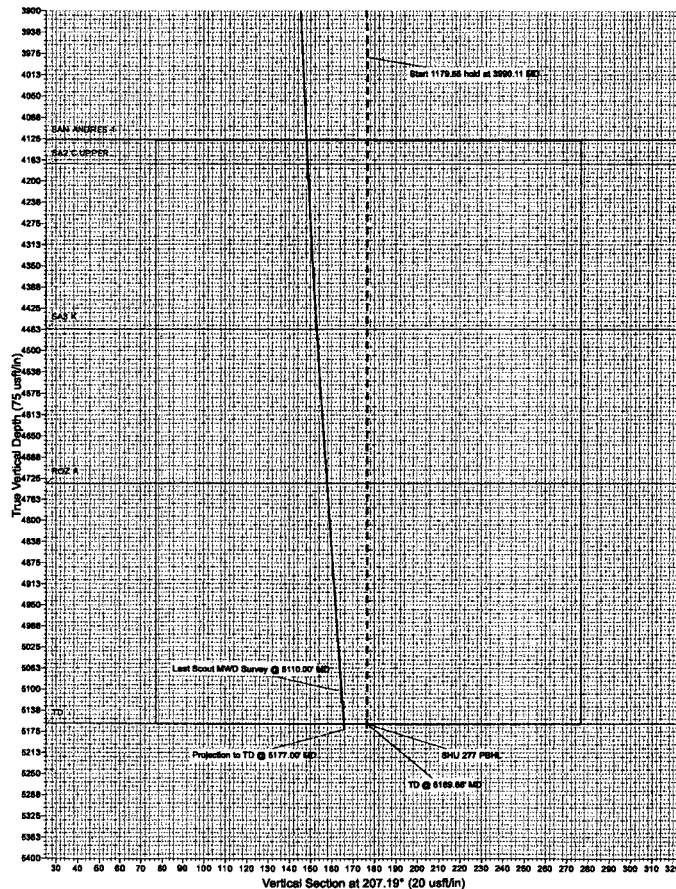
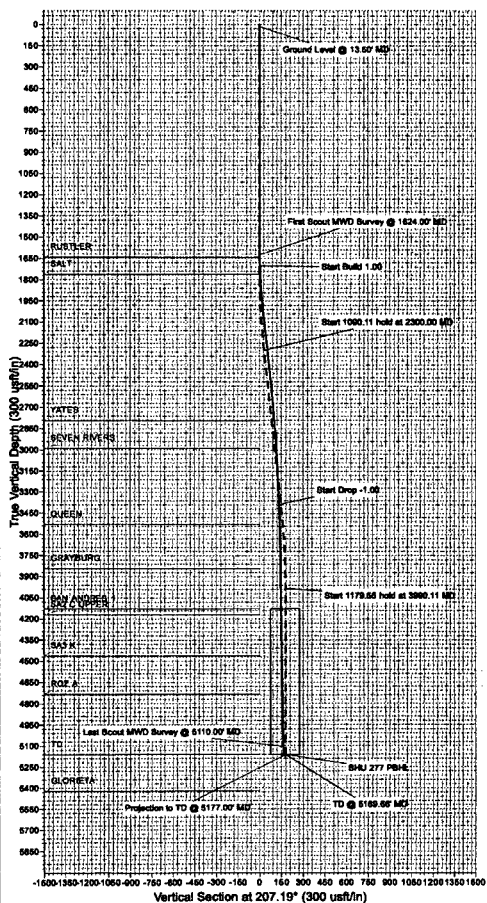
DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Shape
SHU 277 PBHL	5161.50	-157.20	-80.74	609977.00	864087.00	Circle (Radius: 100.00)



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

Magnetic Field
Strength: 48142.4anT
Dip Angle: 60.73°
Date: 10/03/2018
Model: HDGM





Survey Report



Company:	Oxy USA	Local Co-ordinate Reference:	Well SHU 277
Project:	Lea County, NM	TVD Reference:	GL 3598' + 13.5' KB @ 3611.50usft (Savanna 417)
Site:	South Hobbs G/SA Unit	MD Reference:	GL 3598' + 13.5' KB @ 3611.50usft (Savanna 417)
Well:	SHU 277	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	South Hobbs G/SA Unit		
Site Position:		Northing:	616,257.52 usft
From:	Map	Easting:	857,718.46 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 41' 19.686 N
		Longitude:	103° 10' 14.307 W
		Grid Convergence:	0.63 °

Well	SHU 277		
Well Position	+N/-S	0.00 usft	Northing: 610,134.20 usft
	+E/-W	0.00 usft	Easting: 864,167.74 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 40' 18.399 N
		Longitude:	103° 8' 59.656 W
		Ground Level:	3,598.00 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
	HDGM	10/03/18	(°)
			6.77
			Dip Angle (°)
			60.73
			Field Strength (nT)
			48,142.40000000

Design	Surveys		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction (°)
			207.19

Survey Program	Date 10/08/18		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
13.50	1,493.18	Gyrodata Gyro (Wellbore #1)	GYD_G003_GC+DROP+H
1,624.00	5,177.00	Scout MWD (Wellbore #1)	B001Mb_MWD+HRGM
			OWSG MWD + HRGM

Survey										
Measured Depth	Inclination	Azimuth	Vertical Depth	+N/-S	+E/-W	Vertical Section	Dogleg Rate	Build Rate	Turn Rate	
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(°/100usft)	(°/100usft)	(°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
13.50	0.00	0.00	13.50	0.00	0.00	0.00	0.00	0.00	0.00	
Ground Level @ 13.50' MD										
76.34	0.57	106.17	76.34	-0.09	0.30	-0.06	0.91	0.91	0.00	
262.81	0.70	154.78	262.80	-1.38	1.68	0.46	0.29	0.07	26.07	
444.64	0.32	175.99	444.62	-2.89	2.19	1.57	0.23	-0.21	11.66	
624.31	0.10	220.57	624.29	-3.51	2.12	2.15	0.14	-0.12	24.81	
806.96	0.16	32.04	806.94	-3.41	2.15	2.05	0.14	0.03	93.88	



Survey Report



Company:	Oxy USA	Local Co-ordinate Reference:	Well SHU 277
Project:	Lea County, NM	TVD Reference:	GL 3598' + 13.5' KB @ 3611.50usft (Savanna 417)
Site:	South Hobbs G/SA Unit	MD Reference:	GL 3598' + 13.5' KB @ 3611.50usft (Savanna 417)
Well:	SHU 277	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)
986.15	0.16	209.40	986.13	-3.42	2.16	2.05	0.18	0.00	98.98
1,145.07	0.03	43.33	1,145.05	-3.58	2.08	2.24	0.12	-0.08	-104.50
1,317.75	0.22	118.22	1,317.73	-3.70	2.40	2.20	0.12	0.11	43.37
1,493.18	0.23	155.03	1,493.16	-4.18	2.85	2.42	0.08	0.01	20.98
1,624.00	0.31	354.88	1,623.98	-4.07	2.93	2.28	0.41	0.06	-122.42
First Scout MWD Survey @ 1624.00' MD									
1,796.00	3.30	223.13	1,795.89	-7.22	-0.50	6.65	2.04	1.74	-76.60
1,969.00	5.36	222.78	1,968.38	-16.78	-9.39	19.22	1.19	1.19	-0.20
2,142.00	6.73	216.89	2,140.42	-30.82	-20.97	37.00	0.87	0.79	-3.40
2,314.00	6.29	211.18	2,311.31	-46.95	-31.89	56.33	0.45	-0.26	-3.32
2,487.00	5.76	208.54	2,483.36	-62.68	-40.95	74.46	0.35	-0.31	-1.53
2,659.00	5.14	205.73	2,654.58	-77.20	-48.42	90.80	0.39	-0.36	-1.63
2,831.00	4.26	205.82	2,826.00	-89.89	-54.55	104.88	0.51	-0.51	0.05
3,004.00	3.43	201.77	2,998.61	-100.49	-59.26	116.46	0.50	-0.48	-2.34
3,176.00	2.86	197.82	3,170.35	-109.35	-62.48	125.82	0.35	-0.33	-2.30
3,349.00	2.20	187.89	3,343.18	-116.75	-64.26	133.21	0.46	-0.38	-5.74
3,521.00	1.67	179.45	3,515.08	-122.52	-64.69	138.54	0.35	-0.31	-4.91
3,694.00	1.19	166.27	3,688.03	-126.79	-64.24	142.13	0.33	-0.28	-7.62
3,867.00	1.10	166.27	3,860.99	-130.15	-63.42	144.74	0.05	-0.05	0.00
4,039.00	1.05	157.04	4,032.96	-133.20	-62.41	147.00	0.10	-0.03	-5.37
4,212.00	1.01	163.89	4,205.93	-136.13	-61.37	149.13	0.07	-0.02	3.96
4,384.00	1.23	162.84	4,377.90	-139.35	-60.41	151.55	0.13	0.13	-0.61
4,556.00	1.23	170.13	4,549.86	-142.93	-59.54	154.34	0.09	0.00	4.24
4,729.00	1.32	178.92	4,722.82	-146.75	-59.19	157.58	0.12	0.05	5.08
4,901.00	1.23	168.20	4,894.78	-150.54	-58.77	160.76	0.15	-0.05	-6.23
5,074.00	1.32	177.34	5,067.73	-154.35	-58.30	163.93	0.13	0.05	5.28
5,110.00	1.27	179.10	5,103.73	-155.16	-58.28	164.64	0.18	-0.14	4.89
Last Scout MWD Survey @ 5110.00' MD									
5,177.00	1.27	179.10	5,170.71	-156.64	-58.25	165.95	0.00	0.00	0.00
Projection to TD @ 5177.00' MD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
13.50	13.50	0.00	0.00	Ground Level @ 13.50' MD
1,624.00	1,623.98	-4.07	2.93	First Scout MWD Survey @ 1624.00' MD
5,110.00	5,103.73	-155.16	-58.28	Last Scout MWD Survey @ 5110.00' MD
5,177.00	5,170.71	-156.64	-58.25	Projection to TD @ 5177.00' MD

Checked By: _____ Approved By: _____ Date: _____