

Directional Survey

Company: AIM
 HP 629
Well: ST. ANDREWS

State: TEXAS
County: ANDREWS

Report Date: 11/12/14 12:35:51
Location: ST. ANDREWS
Rig: H&P 629
Operator: ISYS TOOLS
Lat/Long: 32 22' 0.84" N 102 25' 0.89" E
Magnetic Declination: 6.67 East
Vertical Section Azimuth: 0.00
North Reference: True North

Survey MD (ft)	Inclination (degrees)	Azimuth (degrees)	TVD (ft)	NS (ft)	EW (ft)	CA (degrees)	CD (ft)	VS (ft)	DLS (deg/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	← Tie In			
92.00	0.09	319.43	92.00	0.05	-0.05	312.76	0.07	-0.05	0.03
133.80	0.09	179.24	133.80	0.04	-0.07	298.02	0.08	-0.04	0.12
193.81	0.18	187.69	193.81	-0.10	-0.07	213.83	0.12	0.10	0.05
258.34	0.26	165.15	258.34	-0.34	-0.02	182.80	0.34	0.34	0.05
291.42	0.18	167.26	291.42	-0.46	0.03	176.48	0.46	0.46	0.07
350.69	0.35	182.76	350.69	-0.73	0.07	174.38	0.73	0.73	0.09
534.21	0.26	170.78	534.21	-1.69	0.22	172.45	1.70	1.69	0.02
812.10	0.44	147.54	812.09	-3.12	1.07	161.08	3.30	3.12	0.02
939.97	0.35	140.49	939.96	-3.77	1.66	156.23	4.12	3.77	0.02
1120.73	0.35	137.67	1120.71	-4.52	2.48	151.27	5.15	4.52	0.00
1404.00	0.53	123.58	1403.98	-5.68	4.30	142.88	7.12	5.68	0.02
1593.00	0.53	138.38	1592.97	-6.65	5.73	139.27	8.78	6.65	0.02
1713.00	0.70	144.01	1712.96	-7.56	6.64	138.72	10.06	7.56	0.05
1897.40	0.44	159.51	1897.35	-9.02	7.73	139.42	11.88	9.02	0.05
2085.52	0.79	153.17	2085.46	-10.75	8.77	140.77	13.87	10.75	0.06
2275.00	0.44	94.70	2274.93	-11.81	10.22	139.13	15.62	11.81	0.11
2464.64	0.79	83.43	2464.56	-11.49	12.22	133.22	16.77	11.49	0.06
2653.52	0.79	79.20	2653.42	-10.80	14.73	126.24	18.26	10.80	0.01
2748.00	0.88	68.63	2747.89	-10.26	15.99	122.68	19.00	10.26	0.06
2842.99	0.88	65.11	2842.87	-9.53	17.26	118.92	19.72	9.53	0.02
3031.72	0.88	71.45	3031.58	-8.16	19.80	112.39	21.42	8.16	0.02
3220.81	1.23	53.13	3220.64	-6.14	22.59	105.21	23.41	6.14	0.08
3409.85	1.41	48.20	3409.63	-3.00	25.60	96.69	25.78	3.00	0.03
3598.82	1.41	50.32	3598.54	0.42	28.75	89.16	28.75	-0.42	0.01
3693.26	1.67	46.09	3692.95	2.32	30.42	85.63	30.51	-2.32	0.09
3882.00	1.76	43.97	3881.60	6.75	33.93	78.74	34.59	-6.75	0.02
4071.00	1.93	43.27	4070.50	11.62	37.58	72.82	39.34	-11.62	0.03
4255.00	2.02	46.09	4254.39	16.61	41.49	68.18	44.69	-16.61	0.02
4449.00	1.93	48.20	4448.28	21.70	45.83	64.67	50.70	-21.70	0.02
4638.00	2.20	47.50	4637.16	26.82	50.31	61.93	57.01	-26.82	0.04
4827.00	2.11	51.02	4826.02	32.06	55.11	59.82	63.76	-32.06	0.03
5016.68	2.11	51.72	5015.57	37.02	60.03	58.34	70.52	-37.02	0.00
5205.63	2.37	58.77	5204.38	41.88	65.57	57.43	77.80	-41.88	0.06
5394.72	2.37	63.70	5393.31	46.41	71.93	57.17	85.60	-46.41	0.03
5583.00	2.55	58.77	5581.41	51.10	78.51	56.94	93.67	-51.10	0.04
5772.71	2.37	60.88	5770.95	55.98	85.02	56.64	101.80	-55.98	0.03
5961.65	2.37	57.36	5959.73	60.74	91.21	56.34	109.59	-60.74	0.02
6150.00	2.37	57.36	6147.92	65.68	97.24	55.96	117.34	-65.68	0.00
6339.00	2.46	58.77	6336.75	70.65	103.46	55.67	125.28	-70.65	0.02

Survey MD (ft)	Inclination (degrees)	Azimuth (degrees)	TVD (ft)	NS (ft)	EW (ft)	CA (degrees)	CD (ft)	VS (ft)	DLS (deg/100ft)
6528.00	2.55	58.06	6525.57	75.76	109.95	55.43	133.52	-75.76	0.02
6717.00	2.46	58.77	6714.39	80.88	116.43	55.22	141.77	-80.88	0.02
6829.00	2.37	52.43	6826.29	83.97	119.99	55.02	146.45	-83.97	0.08
7096.32	1.93	3.11	7093.44	92.32	123.67	53.26	154.33	-92.32	0.21
7285.45	1.58	51.72	7282.49	97.34	125.32	52.16	158.68	-97.34	0.23
7506.87	1.06	58.06	7503.85	100.77	129.08	52.02	163.76	-100.77	0.07
7696.01	0.62	39.75	7692.97	102.72	131.00	51.90	166.47	-102.72	0.08
7885.00	0.88	347.61	7881.95	104.95	131.09	51.32	167.92	-104.95	0.11
8074.00	0.44	119.36	8070.94	106.04	131.28	51.07	168.76	-106.04	0.19
8263.00	0.26	283.50	8259.94	105.81	131.53	51.18	168.81	-105.81	0.11
8452.00	2.20	312.39	8448.89	107.98	128.16	49.88	167.58	-107.98	0.31
8648.00	2.02	310.98	8644.75	112.13	122.25	47.47	165.88	-112.13	0.03



· Directional Drilling · Horizontal Drilling · MWD/LWD · Mud Motors

December 31, 2014

Railroad Commission of Texas
Oil and Gas Division
P.O. Box 12967
Capitol Station
Austin, Texas 78711

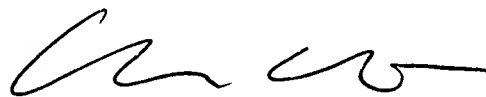
Attention: Pamela Johns

Re: OXY USA Inc.
St. Andrews Unit #320LH
Andrews County, Texas
API No. 42-003-46580

Enclosed, please find the original and one copy of the survey performed on the referenced well by Aim Directional Services, LLC (P-5 No. 009134). Other information required by your office is as follows:

<u>Name & Title of Surveyor</u>	<u>Drainhole Number</u>	<u>Surveyed Depths</u>	<u>Date Performed</u>	<u>Type of Survey</u>
Allison Reinert VP Engineering	Original hole	8754' – 16891'	11/06/14 – 11/16/14	MWD

A certified plat on which the bottom hole location is oriented both to the surface location and the lease line (or unit lines in case of pooling) is attached to the survey report. If any other information is required, please contact the undersigned at the letterhead address and phone number.



Allison Reinert
VP Engineering

Enclosures
cc:



· Directional Drilling · Horizontal Drilling · MWD/LWD · Mud Motors

December 31, 2014

State of Texas
County of Andrews

I, Allison Reinert, certify that; I am employed by Aim Directional Services, LLC; that I did on the day(s) of November 6, 2014 through November 16, 2014 conduct or supervise the taking of a directional MWD survey from a depth of 8754 feet to a depth of 16891 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Aim Directional Services, LLC; that I am authorized and qualified to make this report; that this survey was conducted at the request of OXY USA Inc. for St. Andrews Unit #320LH API No. 42-003-46580 in Andrews County, Texas; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Aim Directional Services, LLC.

A handwritten signature in black ink, appearing to read "Allison Reinert", written over a horizontal line.

Allison Reinert
VP Engineering



Company:	Occidental Permian Ltd.	Local Co-ordinate Reference:	Well #320LH
Project:	Andrews County, Texas	TVD Reference:	WELL @ 3104.10usft (Original Well Elev)
Site:	St. Andrews Unit #320LH	MD Reference:	WELL @ 3104.10usft (Original Well Elev)
Well:	#320LH	North Reference:	Grid
Wellbore:	Aim MWD Surveys	Survey Calculation Method:	Minimum Curvature
Design:	Aim MWD Surveys	Database:	EDM 5000.1 Single User Db

Project	Andrews County, Texas		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Texas North Central 4202		

Site	St. Andrews Unit #320LH				
Site Position:		Northing:	295,460.92 usft	Latitude:	32° 22' 50.244 N
From:	Map	Easting:	478,268.39 usft	Longitude:	102° 25' 51.678 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-2.69 °

Well	#320LH					
Well Position	+N/-S	0.00 usft	Northing:	295,460.92 usft	Latitude:	32° 22' 50.244 N
	+E/-W	0.00 usft	Easting:	478,268.39 usft	Longitude:	102° 25' 51.678 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,079.10 usft

Wellbore	Aim MWD Surveys				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	11/7/2014	6.45	60.23	48,232

Design	Aim MWD Surveys				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	8,655.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	347.52	

Survey Program	Date	11/17/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
245.00	8,655.00	Actual (Surface Surveys)	Gyroscope	Gyroscope	
8,754.00	16,891.00	Survey #1 (Aim MWD Surveys)	MWD	Std MWD	

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	0.00
245.00	0.20	181.00	245.00	-0.43	-0.01	-0.42	0.08	0.08	0.00	0.00
402.00	0.40	176.10	402.00	-1.25	0.03	-1.22	0.13	0.13	-3.12	-3.12
556.00	0.30	164.10	555.99	-2.17	0.17	-2.16	0.08	-0.06	-7.79	-7.79
864.00	0.40	140.90	863.99	-3.78	1.07	-3.92	0.06	0.03	-7.53	-7.53
991.00	0.40	133.80	990.99	-4.43	1.67	-4.69	0.04	0.00	-5.59	-5.59
1,172.00	0.40	131.00	1,171.98	-5.28	2.60	-5.72	0.01	0.00	-1.55	-1.55
1,398.00	0.40	128.90	1,397.98	-6.30	3.81	-6.97	0.01	0.00	-0.93	-0.93
1,701.00	0.50	136.60	1,700.97	-7.92	5.54	-8.93	0.04	0.03	2.54	2.54
1,949.00	0.40	152.80	1,948.96	-9.48	6.68	-10.70	0.06	-0.04	6.53	6.53



Aim Directional Services

Survey Report



Company:	Occidental Permian Ltd.	Local Co-ordinate Reference:	Well #320LH
Project:	Andrews County, Texas	TVD Reference:	WELL @ 3104.10usft (Original Well Elev)
Site:	St. Andrews Unit #320LH	MD Reference:	WELL @ 3104.10usft (Original Well Elev)
Well:	#320LH	North Reference:	Grid
Wellbore:	Aim MWD Surveys	Survey Calculation Method:	Minimum Curvature
Design:	Aim MWD Surveys	Database:	EDM 5000.1 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)	
2,138.00	0.80	146.50	2,137.95	-11.17	7.71	-12.57	0.21	0.21	-3.33	
2,327.00	0.40	88.00	2,326.94	-12.24	9.10	-13.92	0.36	-0.21	-30.95	
2,516.00	0.80	76.80	2,515.93	-11.92	11.04	-14.02	0.22	0.21	-5.93	
2,705.00	0.80	72.50	2,704.91	-11.22	13.59	-13.89	0.03	0.00	-2.28	
2,894.00	0.90	58.40	2,893.89	-10.05	16.11	-13.29	0.12	0.05	-7.46	
3,083.00	0.90	64.80	3,082.87	-8.64	18.72	-12.48	0.05	0.00	3.39	
3,272.00	1.20	46.50	3,271.83	-6.64	21.50	-11.13	0.24	0.16	-9.68	
3,461.00	1.40	41.50	3,460.79	-3.55	24.46	-8.75	0.12	0.11	-2.65	
3,650.00	1.40	43.60	3,649.73	-0.15	27.58	-6.11	0.03	0.00	1.11	
3,934.00	1.80	37.30	3,933.62	5.91	32.68	-1.29	0.15	0.14	-2.22	
4,123.00	1.90	36.60	4,122.52	10.79	36.35	2.68	0.05	0.05	-0.37	
4,312.00	2.00	39.40	4,311.41	15.85	40.31	6.77	0.07	0.05	1.48	
4,501.00	1.90	41.50	4,500.30	20.75	44.48	10.65	0.07	-0.05	1.11	
4,690.00	2.20	40.80	4,689.18	25.84	48.92	14.66	0.16	0.16	-0.37	
4,879.00	2.10	44.40	4,878.05	31.06	53.72	18.72	0.09	-0.05	1.90	
5,068.00	2.10	45.10	5,066.92	35.98	58.59	22.47	0.01	0.00	0.37	
5,257.00	2.40	52.10	5,255.77	40.85	64.17	26.02	0.21	0.16	3.70	
5,446.00	2.20	57.00	5,444.62	45.26	70.33	28.99	0.15	-0.11	2.59	
5,557.00	2.60	52.10	5,555.52	47.97	74.11	30.82	0.40	0.36	-4.41	
5,824.00	2.40	54.20	5,822.27	54.96	83.42	35.63	0.08	-0.07	0.79	
6,013.00	2.40	50.70	6,011.10	59.78	89.69	38.98	0.08	0.00	-1.85	
6,124.00	2.40	50.70	6,122.01	62.72	93.29	41.08	0.00	0.00	0.00	
6,313.00	2.50	52.10	6,310.83	67.76	99.60	44.64	0.06	0.05	0.74	
6,502.00	2.60	51.40	6,499.65	72.97	106.21	48.29	0.06	0.05	-0.37	
6,691.00	2.50	52.10	6,688.46	78.17	112.81	51.95	0.06	-0.05	0.37	
6,881.00	2.40	45.80	6,878.29	83.49	118.93	55.82	0.15	-0.05	-3.32	
6,959.00	2.40	45.80	6,956.22	85.77	121.27	57.54	0.00	0.00	0.00	
7,148.00	1.90	356.40	7,145.10	91.66	123.91	62.71	0.98	-0.26	-26.14	
7,337.00	1.60	45.10	7,334.02	96.65	125.58	67.22	0.78	-0.16	25.77	
7,558.00	1.10	51.40	7,554.96	100.15	129.43	69.81	0.24	-0.23	2.85	
7,748.00	0.06	33.10	7,744.95	101.37	130.91	70.68	0.55	-0.55	-9.63	
7,937.00	0.90	340.90	7,933.94	102.85	130.48	72.23	0.46	0.44	-27.62	
8,126.00	0.40	112.70	8,122.93	104.00	130.60	73.32	0.64	-0.26	69.74	
8,315.00	0.30	276.80	8,311.93	103.81	130.72	73.11	0.37	-0.05	86.83	
8,504.00	2.20	305.70	8,500.88	105.98	127.28	75.97	1.03	1.01	15.29	
8,655.00	2.00	304.30	8,651.78	109.16	122.75	80.05	0.14	-0.13	-0.93	
Tie on to Surface Surveys										
8,754.00	2.50	303.50	8,750.70	111.32	119.52	82.86	0.51	0.51	-0.81	
8,849.00	2.20	304.40	8,845.62	113.50	116.29	85.69	0.32	-0.32	0.95	
8,880.00	4.40	344.70	8,876.57	114.98	115.48	87.31	9.91	7.10	130.00	
8,912.00	8.60	356.00	8,908.36	118.55	114.99	90.90	13.66	13.13	35.31	
8,943.00	12.50	359.20	8,938.83	124.22	114.78	96.48	12.72	12.58	10.32	
8,975.00	15.30	0.90	8,969.89	131.91	114.80	103.98	8.84	8.75	5.31	



Aim Directional Services

Survey Report



Company:	Occidental Permian Ltd.	Local Co-ordinate Reference:	Well #320LH
Project:	Andrews County, Texas	TVD Reference:	WELL @ 3104.10usft (Original Well Elev)
Site:	St. Andrews Unit #320LH	MD Reference:	WELL @ 3104.10usft (Original Well Elev)
Well:	#320LH	North Reference:	Grid
Wellbore:	Aim MWD Surveys	Survey Calculation Method:	Minimum Curvature
Design:	Aim MWD Surveys	Database:	EDM 5000.1 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)	
9,006.00	16.10	358.30	8,999.73	140.29	114.74	112.18	3.44	2.58	-8.39	
9,038.00	18.40	356.90	9,030.29	149.77	114.33	121.53	7.30	7.19	-4.38	
9,085.00	21.30	353.30	9,074.50	165.66	112.94	137.34	6.69	6.17	-7.66	
9,132.00	25.30	349.30	9,117.66	184.02	110.07	155.88	9.15	8.51	-8.51	
9,180.00	30.90	349.20	9,159.98	206.22	105.86	178.47	11.67	11.67	-0.21	
9,227.00	35.70	350.00	9,199.25	231.59	101.21	204.25	10.26	10.21	1.70	
9,274.00	41.10	349.40	9,236.07	260.31	95.99	233.41	11.52	11.49	-1.28	
9,321.00	46.60	348.80	9,269.96	292.26	89.82	265.95	11.74	11.70	-1.28	
9,369.00	52.10	349.10	9,301.21	327.99	82.85	302.34	11.47	11.46	0.63	
9,416.00	55.70	348.10	9,328.90	365.21	75.34	340.30	7.85	7.66	-2.13	
9,464.00	62.10	348.20	9,353.68	405.42	66.90	381.38	13.33	13.33	0.21	
9,511.00	67.90	346.90	9,373.54	446.99	57.71	423.96	12.59	12.34	-2.77	
9,558.00	69.90	346.70	9,390.46	489.68	47.70	467.80	4.27	4.26	-0.43	
9,605.00	70.20	346.50	9,406.49	532.65	37.46	511.97	0.75	0.64	-0.43	
9,653.00	70.20	347.20	9,422.75	576.63	27.19	557.13	1.37	0.00	1.46	
9,700.00	69.90	346.50	9,438.79	619.65	17.14	601.31	1.54	-0.64	-1.49	
9,747.00	69.80	346.20	9,454.98	662.53	6.72	645.42	0.64	-0.21	-0.64	
9,794.00	71.90	346.50	9,470.40	705.67	-3.75	689.81	4.51	4.47	0.64	
9,842.00	76.20	346.00	9,483.58	750.49	-14.72	735.94	9.01	8.96	-1.04	
9,889.00	80.00	345.30	9,493.27	795.04	-26.12	781.90	8.22	8.09	-1.49	
9,936.00	82.50	345.40	9,500.42	839.98	-37.87	828.31	5.32	5.32	0.21	
9,983.00	86.90	348.90	9,504.76	885.59	-48.27	875.09	11.94	9.36	7.45	
10,031.00	88.20	349.20	9,506.82	932.67	-57.38	923.03	2.78	2.71	0.63	
10,078.00	89.30	349.50	9,507.84	978.85	-66.06	969.99	2.43	2.34	0.64	
10,140.00	90.60	349.60	9,507.90	1,039.82	-77.31	1,031.95	2.10	2.10	0.16	
10,268.00	92.00	349.90	9,504.99	1,165.74	-100.08	1,159.82	1.12	1.09	0.23	
10,362.00	91.70	349.50	9,501.96	1,258.17	-116.87	1,253.70	0.53	-0.32	-0.43	
10,457.00	89.50	349.50	9,500.96	1,351.57	-134.18	1,348.63	2.32	-2.32	0.00	
10,551.00	89.70	350.20	9,501.62	1,444.10	-150.75	1,442.55	0.77	0.21	0.74	
10,646.00	89.80	349.80	9,502.03	1,537.65	-167.25	1,537.46	0.43	0.11	-0.42	
10,835.00	90.90	348.30	9,500.88	1,723.20	-203.14	1,726.38	0.98	0.58	-0.79	
10,930.00	90.60	348.10	9,499.63	1,816.19	-222.57	1,821.37	0.38	-0.32	-0.21	
11,024.00	90.30	347.50	9,498.90	1,908.06	-242.43	1,915.36	0.71	-0.32	-0.64	
11,119.00	90.70	346.70	9,498.07	2,000.66	-263.64	2,010.36	0.94	0.42	-0.84	
11,213.00	90.70	347.30	9,496.92	2,092.24	-284.79	2,104.35	0.64	0.00	0.64	
11,308.00	89.10	346.70	9,497.08	2,184.80	-306.15	2,199.34	1.80	-1.68	-0.63	
11,402.00	90.20	347.50	9,497.66	2,276.43	-327.14	2,293.33	1.45	1.17	0.85	
11,497.00	88.40	348.10	9,498.82	2,369.27	-347.21	2,388.32	2.00	-1.89	0.63	
11,591.00	89.30	348.40	9,500.71	2,461.28	-366.35	2,482.29	1.01	0.96	0.32	
11,686.00	88.70	347.40	9,502.36	2,554.15	-386.26	2,577.27	1.23	-0.63	-1.05	
11,785.00	85.10	346.20	9,507.72	2,650.38	-408.83	2,676.10	3.83	-3.64	-1.21	
11,875.00	84.50	346.20	9,515.87	2,737.42	-430.21	2,765.71	0.67	-0.67	0.00	
11,969.00	87.60	344.60	9,522.35	2,828.16	-453.85	2,859.41	3.71	3.30	-1.70	



Aim Directional Services

Survey Report



Company:	Occidental Permian Ltd.	Local Co-ordinate Reference:	Well #320LH
Project:	Andrews County, Texas	TVD Reference:	WELL @ 3104.10usft (Original Well Elev)
Site:	St. Andrews Unit #320LH	MD Reference:	WELL @ 3104.10usft (Original Well Elev)
Well:	#320LH	North Reference:	Grid
Wellbore:	Aim MWD Surveys	Survey Calculation Method:	Minimum Curvature
Design:	Aim MWD Surveys	Database:	EDM 5000.1 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)	
12,063.00	88.70	345.70	9,525.38	2,918.97	-477.92	2,953.27	1.65	1.17	1.17	
12,158.00	89.00	345.60	9,527.29	3,010.98	-501.46	3,048.20	0.33	0.32	-0.11	
12,253.00	89.40	345.40	9,528.62	3,102.95	-525.25	3,143.14	0.47	0.42	-0.21	
12,347.00	89.90	345.00	9,529.19	3,193.83	-549.26	3,237.06	0.68	0.53	-0.43	
12,442.00	90.60	345.70	9,528.78	3,285.74	-573.29	3,331.99	1.04	0.74	0.74	
12,536.00	91.00	346.00	9,527.46	3,376.88	-596.26	3,425.94	0.53	0.43	0.32	
12,631.00	90.60	346.00	9,526.14	3,469.05	-619.24	3,520.89	0.42	-0.42	0.00	
12,725.00	88.80	344.10	9,526.63	3,559.85	-643.49	3,614.80	2.78	-1.91	-2.02	
12,820.00	89.50	344.80	9,528.04	3,651.37	-668.95	3,709.65	1.04	0.74	0.74	
12,914.00	90.00	344.40	9,528.45	3,741.99	-693.92	3,803.53	0.68	0.53	-0.43	
13,011.00	86.40	343.00	9,531.50	3,835.03	-721.12	3,900.24	3.98	-3.71	-1.44	
13,101.00	86.50	344.30	9,537.07	3,921.22	-746.41	3,989.87	1.45	0.11	1.44	
13,196.00	86.90	343.80	9,542.54	4,012.41	-772.47	4,084.53	0.67	0.42	-0.53	
13,290.00	88.00	344.80	9,546.72	4,102.81	-797.88	4,178.29	1.58	1.17	1.06	
13,385.00	87.70	344.50	9,550.28	4,194.36	-823.01	4,273.10	0.45	-0.32	-0.32	
13,479.00	88.50	344.50	9,553.40	4,284.89	-848.12	4,366.92	0.85	0.85	0.00	
13,574.00	89.50	345.50	9,555.06	4,376.64	-872.70	4,461.81	1.49	1.05	1.05	
13,668.00	88.90	345.40	9,556.37	4,467.61	-896.31	4,555.74	0.65	-0.64	-0.11	
13,762.00	89.10	346.10	9,558.01	4,558.70	-919.45	4,649.68	0.77	0.21	0.74	
13,857.00	91.20	348.00	9,557.76	4,651.28	-940.73	4,744.67	2.98	2.21	2.00	
13,952.00	91.40	347.90	9,555.61	4,744.16	-960.56	4,839.64	0.24	0.21	-0.11	
14,046.00	91.20	348.50	9,553.47	4,836.15	-979.78	4,933.61	0.67	-0.21	0.64	
14,141.00	91.10	348.40	9,551.57	4,929.21	-998.80	5,028.58	0.15	-0.11	-0.11	
14,235.00	90.60	348.70	9,550.17	5,021.33	-1,017.45	5,122.55	0.62	-0.53	0.32	
14,330.00	90.60	348.70	9,549.18	5,114.48	-1,036.07	5,217.53	0.00	0.00	0.00	
14,424.00	90.40	349.30	9,548.36	5,206.75	-1,054.00	5,311.49	0.67	-0.21	0.64	
14,519.00	88.20	349.20	9,549.52	5,300.07	-1,071.72	5,406.43	2.32	-2.32	-0.11	
14,613.00	89.30	347.60	9,551.57	5,392.12	-1,090.62	5,500.40	2.07	1.17	-1.70	
14,708.00	91.40	346.00	9,550.99	5,484.60	-1,112.31	5,595.38	2.78	2.21	-1.68	
14,802.00	90.60	345.90	9,549.35	5,575.78	-1,135.13	5,689.33	0.86	-0.85	-0.11	
14,897.00	90.00	345.60	9,548.85	5,667.85	-1,158.51	5,784.28	0.71	-0.63	-0.32	
14,991.00	91.70	345.10	9,547.46	5,758.78	-1,182.28	5,878.20	1.89	1.81	-0.53	
15,086.00	91.50	345.10	9,544.80	5,850.55	-1,206.70	5,973.08	0.21	-0.21	0.00	
15,180.00	91.30	345.10	9,542.51	5,941.36	-1,230.86	6,066.97	0.21	-0.21	0.00	
15,273.00	90.20	344.00	9,541.29	6,030.99	-1,255.63	6,159.83	1.67	-1.18	-1.18	
15,368.00	91.10	344.50	9,540.21	6,122.42	-1,281.42	6,254.67	1.08	0.95	0.53	
15,462.00	92.00	344.50	9,537.67	6,212.97	-1,306.53	6,348.50	0.96	0.96	0.00	
15,557.00	90.00	344.00	9,536.01	6,304.38	-1,332.31	6,443.33	2.17	-2.11	-0.53	
15,651.00	89.50	342.90	9,536.42	6,394.48	-1,359.09	6,537.09	1.29	-0.53	-1.17	
15,746.00	88.90	342.00	9,537.75	6,485.05	-1,387.73	6,631.71	1.14	-0.63	-0.95	
15,840.00	88.60	341.10	9,539.80	6,574.20	-1,417.47	6,725.17	1.01	-0.32	-0.96	
15,935.00	88.20	342.30	9,542.45	6,664.36	-1,447.29	6,819.64	1.33	-0.42	1.26	
16,029.00	89.50	343.10	9,544.34	6,754.08	-1,475.23	6,913.29	1.62	1.38	0.85	
16,124.00	88.90	342.40	9,545.66	6,844.80	-1,503.40	7,007.95	0.97	-0.63	-0.74	



Company:	Occidental Permian Ltd.	Local Co-ordinate Reference:	Well #320LH
Project:	Andrews County, Texas	TVD Reference:	WELL @ 3104.10usft (Original Well Elev)
Site:	St. Andrews Unit #320LH	MD Reference:	WELL @ 3104.10usft (Original Well Elev)
Well:	#320LH	North Reference:	Grid
Wellbore:	Aim MWD Surveys	Survey Calculation Method:	Minimum Curvature
Design:	Aim MWD Surveys	Database:	EDM 5000.1 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)	
16,218.00	90.20	343.80	9,546.40	6,934.73	-1,530.73	7,101.66	2.03	1.38	1.49	
16,313.00	92.40	345.20	9,544.25	7,026.25	-1,556.11	7,196.50	2.74	2.32	1.47	
16,407.00	93.00	345.00	9,539.82	7,116.99	-1,580.25	7,290.31	0.67	0.64	-0.21	
16,502.00	92.90	344.40	9,534.93	7,208.50	-1,605.28	7,385.07	0.64	-0.11	-0.63	
16,596.00	90.50	344.40	9,532.14	7,298.99	-1,630.55	7,478.88	2.55	-2.55	0.00	
16,691.00	90.40	345.70	9,531.40	7,390.77	-1,655.06	7,573.79	1.37	-0.11	1.37	
16,785.00	91.00	345.70	9,530.25	7,481.85	-1,678.27	7,667.73	0.64	0.64	0.00	
16,799.47	91.08	345.81	9,529.98	7,495.87	-1,681.83	7,682.20	0.96	0.58	0.77	
SAU 320LH LTP										
16,837.00	91.30	346.10	9,529.20	7,532.27	-1,690.94	7,719.70	0.96	0.58	0.77	
Last Aim MWD Survey Taken										
16,889.46	91.30	346.10	9,528.01	7,583.18	-1,703.54	7,772.13	0.00	0.00	0.00	
SAU 320LH PBHL										
16,891.00	91.30	346.10	9,527.98	7,584.68	-1,703.91	7,773.67	0.00	0.00	0.00	
Projection to TD										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
SAU 320LH LTP	0.00	0.00	9,545.00	7,501.43	-1,660.94	302,962.35	476,607.45	32° 24' 3.623 N	102° 26' 15.135 W	
- actual wellpath misses target center by 26.32usft at 16799.45usft MD (9529.98 TVD, 7495.85 N, -1681.83 E)										
- Point										
SAU 320LH PBHL	0.00	360.00	9,545.00	7,589.30	-1,680.40	303,050.22	476,587.99	32° 24' 4.483 N	102° 26' 15.410 W	
- actual wellpath misses target center by 29.35usft at 16889.46usft MD (9528.01 TVD, 7583.18 N, -1703.54 E)										
- Point										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
8,655.00	8,651.78	109.16	122.75	Tie on to Surface Surveys	
16,837.00	9,529.20	7,532.27	-1,690.94	Last Aim MWD Survey Taken	
16,891.00	9,527.98	7,584.68	-1,703.91	Projection to TD	

Checked By: _____ Approved By: _____ Date: _____

Devon Energy Production Co., L.P.
ULS 4-33 LEASE

Wind River Energy, Inc.

UNIVERSITY
LAND SURVEY
BLOCK 4

34 35
39 38

St. Andrews Unit #320LH
MD = 16891.00 TVD = 9527.98'
INC = 91.30° AZM = 346.10°
N/-S = 7584.68' E/-W = -1703.91'
Closure = 7773.71' @ 347.34° Azm

COG OPERATING

Tandem Energy Corporation
UNIVERSITY40A LEASE

OXY USA INC.
ST. ANDREWS UNIT

Surface to Penetration Point
Grid Bearing - N12°29'05"E -- 0'
Penetration Point to First Take Point
Grid Bearing - N12°29'05"E -- 0'
First Take Point to Last Take Point
Grid Bearing - N12°29'05"E -- 7683'
Last Take Point to End of Terminus
Grid Bearing - N12°29'05"E -- 90'

REVISED NEW DRILL
SURFACE LOCATION WELL NO. 320LH
2500' FNL x 1290' FWL Section 3, Block 3
University Land Survey,
ANDREWS CO., TX. WELL DATA - NAD 27, TX(INC)
X = 478268.39'; Y = 295460.92'
Lat. = 32°22'50.24"; Long. = 102°25'51.68"
Ground Elevation: 3079.1'
Approx. 7.5 miles Northeast of Andrews City, TX

PENETRATION POINT WELL NO. 320LH
2500' FNL x 1290' FWL Section 3, Block 3
University Land Survey,
ANDREWS CO., TX. WELL DATA - NAD 27, TX(INC)
X = 478268.39'; Y = 295460.92'
Lat. = 32°22'50.24"; Long. = 102°25'51.68"

FIRST TAKE POINT WELL NO. 320LH
2500' FNL x 1290' FWL Section 3, Block 3
University Land Survey,
ANDREWS CO., TX. WELL DATA - NAD 27, TX(INC)
X = 478268.39'; Y = 295460.92'
Lat. = 32°22'50.24"; Long. = 102°25'51.68"

LAST TAKE POINT WELL NO. 320LH
100' FNL x 1290' FWL Section 39, Block 4
University Land Survey,
ANDREWS CO., TX. WELL DATA - NAD 27, TX(INC)
X = 476607.45'; Y = 302962.35'
Lat. = 32°24'03.62"; Long. = 102°26'15.14"

END OF TERMINUS WELL NO. 320LH
10' FNL x 1290' FWL Section 39, Block 4
University Land Survey,
ANDREWS CO., TX. WELL DATA - NAD 27, TX(INC)
X = 476587.99'; Y = 303050.22'
Lat. = 32°24'04.48"; Long. = 102°26'15.41"

COG OPERATING

UNIVERSITY
LAND SURVEY
BLOCK 3

UNIVERSITY / WAFWA ST. ANDREWS UNIT 320LH	
NAD 83 LAT (DD)	NAD 83 LONG (DD)
32.3807262	-102.4314581

UNIT ACREAGE = 6089.93 ± AC.
SAINT WILMA (STRAWN) FIELD
UNIT BOUNDARY - - - - -
PRODUCING WELL - - - - - ●
INJECTION WELL - - - - - ●
WELL LOCATIONS - - - - - ○
PROPOSED CONVERSION - - - - - ○_{PC}

GRID
NAD27 TNCZ
I, DENNIS W. HUGHES hereby certify that this plat,
drawn to the scale indicated, accurately represents
conditions as they actually exist on the property
on which permit to drill is sought and correctly
reflects all pertinent data required to be shown on
such plat by orders of the Railroad Commission of Texas.

Date: 9/3/2014



OXY USA INC.

Partial Unit Plat

ST. ANDREWS UNIT

Well No. 320LH

Andrews County, Texas

Scale: 1" = 1000' 9-3-2014 359_st_andrews-unit.dgn
Plat prepared by MAL
Horizon Survey, Inc.

Wind River Energy, Inc.

UNIVERSITY
LAND SURVEY
BLOCK 4 34 35
39 38

Devon Energy Production Co., L.P.
U.S. 4-33 LEASE

33

LEO111290
(LTP)11290

3805

3908

3904

3911

3915

3940WW

3918WD
S40

3901

3916

3906

St. Andrews Unit 320LH
Oxy USA Inc.
API: 42-003-46580
SD: 8648.00 TVD: 8644.75
N: 112.13' E: 122.25'

3901

3916

3906

203

404

3909

3910

3906

307

301

UNIVERSITY
LAND SURVEY
BLOCK 3

302

302IMH
FTP

308

311

312

322H
FTP

323DH
FTP

304

314

303

305

910

Clayton
Williams
Energy, Inc.

1002

UNIVERSITY /WARWA	
ST. ANDREWS UNIT 320LH	
NAD 83	NAD 83
LAT (00)	LONG (00)
32.3807262	-102.4314581



OXY USA INC.

Partial Unit Plat

ST. ANDREWS UNIT

Well No. 320LH

Andrews County, Texas

Scale: 1" = 1000'
9-3-2014
Plot prepared by MLL
Horizon Survey, Inc.

COG OPERATING

Tandem
Energy
Corporation
UNIVERSITY 40A LEASE

Surface to Penetration Point
Grid Bearing - N12°29'05"E -- 0'
Penetration Point to First Take Point
Grid Bearing - N12°29'05"E -- 0'
First Take Point to Last Take Point
Grid Bearing - N12°29'05"E -- 7683'
Last Take Point to End of Terminus
Grid Bearing - N12°29'05"E -- 90'

REVISED NEW DRILL

SURFACE LOCATION WELL NO. 320LH
2500' FNL x 1290' FNL Section 3, Block 3
University Land Survey,
ANDREWS CO., TX. WELL DATA - NAD 27, TX(INC)
X = 478268.39'; Y = 295460.92'
Lat. = 32°22'50.24"; Long. = 102°25'51.68"
Approx. 7.5 miles Northeast of Andrews City, TX

PENETRATION POINT WELL NO. 320LH
2500' FNL x 1290' FNL Section 3, Block 3
University Land Survey,
ANDREWS CO., TX. WELL DATA - NAD 27, TX(INC)
X = 478268.39'; Y = 295460.92'
Lat. = 32°22'50.24"; Long. = 102°25'51.68"

FIRST TAKE POINT WELL NO. 320LH
2500' FNL x 1290' FNL Section 3, Block 3
University Land Survey,
ANDREWS CO., TX. WELL DATA - NAD 27, TX(INC)
X = 478268.39'; Y = 295460.92'
Lat. = 32°22'50.24"; Long. = 102°25'51.68"

LAST TAKE POINT WELL NO. 320LH
100' FNL x 1290' FNL Section 39, Block 4
University Land Survey,
ANDREWS CO., TX. WELL DATA - NAD 27, TX(INC)
X = 476607.45'; Y = 302962.35'
Lat. = 32°24'03.62"; Long. = 102°26'15.14"

END OF TERMINUS WELL NO. 320LH
10' FNL x 1290' FNL Section 39, Block 4
University Land Survey,
ANDREWS CO., TX. WELL DATA - NAD 27, TX(INC)
X = 476587.99'; Y = 303050.22'
Lat. = 32°24'04.48"; Long. = 102°26'15.41"

UNIT ACREAGE = 6089.93 ± AC.
SAINT WILMA (STRAWN) FIELD

UNIT BOUNDARY - - - - -

PRODUCING WELL - - - - -

INJECTION WELL - - - - -

WELL LOCATIONS - - - - -

PROPOSED CONVERSION - - - - -

GRID
NAD27 TNGZ

I, DENNIS W. HUGHES hereby certify that this plat, drawn to the data indicated, accurately represents conditions as they actually exist on the property on which permit to drill is sought and correctly reflects all pertinent data required to be shown on such plat by orders of the Railroad Commission of Texas.

Dennis W. Hughes

Date: 9/3/2014

pc