

30-025-43898

Company Name: Mewbourne Oil Company
Bird Dog 20/17 B2FC State Com #1H
Lea County, New Mexico (Nad 83)
Rig: Patterson #230
Created By: Shane Robbins
Date: 9/23/2017

Bird Dog 20/17 B2FC State Com #1H
Lea County, New Mexico (Nad 83)
Q171081 & WT-170914
Design #1



PROJECT DETAILS: Lea County, New Mexico (Nad 83)

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone
System Datum: Mean Sea Level

WELL DETAILS: Bird Dog 20/17 B2FC State Com #1H					
			3721.0		
+N-S	+E-W	Northing	Easting	Latitude	Longitude
0.0	0.0	533903.00	800526.20	32° 27' 53.848 N	103° 29' 34.630 W

Azimuths to Grid North

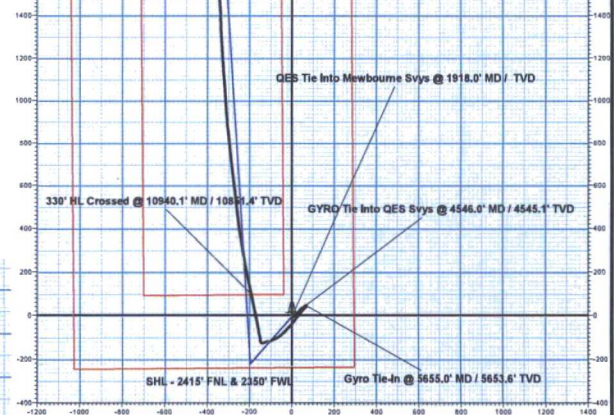
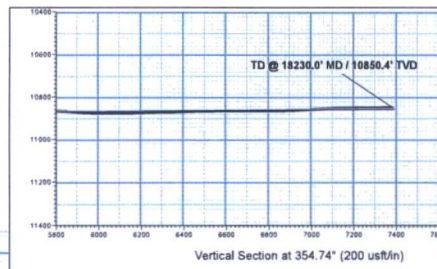
Correction: 6.47°
Magnetic Field

Strength: 48070.1nT
Dip Angle: 60.29°
Date: 8/17/2017
Model: IGRF2015

Provide signature page for
directional survey

ANNOTATIONS

MD	Inc	Azi	TVD	+N-S	+E-W	VSecDeparture	Annotation
1918.0	0.30	232.50	1918.0	-5.3	1.0	-5.4	7.5 QES Tie Into Mewbourne Svys @ 1918.0' MD / TVD
4546.0	2.30	40.90	4545.1	27.6	40.3	23.8	62.8 GYRO Tie Into QES Svys @ 4546.0' MD / 4545.1' TVD
5655.0	1.30	64.77	5653.6	45.3	66.0	39.0	94.6 Gyro Tie-In @ 5655.0' MD / 5653.6' TVD
10940.1	57.20	347.80	10851.4	98.9	-192.5	116.1	613.0 330' HL Crossed @ 10940.1' MD / 10851.4' TVD
18230.0	90.70	355.40	10850.4	7351.1	-678.3	7382.3	7886.7 TD @ 18230.0' MD / 10850.4' TVD



Vertical Section at 354.74° (200 usf/in)



Mewbourne Oil Company

Lea County, New Mexico (Nad 83)

Sec 20, T21S, R34E

Bird Dog 20/17 B2FC State Com #1H

Wellbore #1

Design: Wellbore #1

QES Survey Report

28 September, 2017





Survey Report



Company:	Mewbourne Oil Company	Local Co-ordinate Reference:	Well Bird Dog 20/17 B2FC State Com #1H
Project:	Lea County, New Mexico (Nad 83)	TVD Reference:	WELL @ 3748.0usft (Patterson #230)
Site:	Sec 20, T21S, R34E	MD Reference:	WELL @ 3748.0usft (Patterson #230)
Well:	Bird Dog 20/17 B2FC State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Project	Lea County, New Mexico (Nad 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Sec 20, T21S, R34E		
Site Position:		Northing:	533,903.00 usft
From:	Map	Easting:	800,526.20 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 27' 53.849 N
		Longitude:	103° 29' 34.630 W
		Grid Convergence:	0.45 °

Well	Bird Dog 20/17 B2FC State Com #1H		
Well Position	+N/-S	0.0 usft	Northing: 533,903.00 usft
	+E/-W	0.0 usft	Easting: 800,526.20 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 27' 53.849 N
		Longitude:	103° 29' 34.630 W
		Ground Level:	3,721.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	8/17/2017	6.92
			Dip Angle (°)
			60.29
			Field Strength (nT)
			48,070.11069446

Design	Wellbore #1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.0	0.0	0.0
			Direction (°)
			354.74

Survey Program	Date 9/26/2017		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
199.0	1,918.0	Mewbourne Surveys (Wellbore #1)	MWD default
2,087.0	4,546.0	MWD Surveys (Wellbore #1)	MWD default
4,600.0	5,655.0	GYRO Surveys (Wellbore #1)	GYRO-NS
5,768.0	18,230.0	MWD Surveys (Gyro Tie In) (Wellbore #1)	MWD default
			Description
			MWD - Standard
			MWD - Standard
			OWSG Gyrocompass Gyro
			MWD - Standard

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
199.0	0.30	217.50	199.0	-0.4	-0.3	-0.4	0.15	0.15	0.00
260.0	0.10	257.50	260.0	-0.6	-0.5	-0.5	0.38	-0.33	65.57
351.0	0.10	240.50	351.0	-0.6	-0.6	-0.5	0.03	0.00	-18.68
413.0	0.00	59.50	413.0	-0.6	-0.7	-0.6	0.16	-0.16	0.00
475.0	0.10	148.50	475.0	-0.7	-0.6	-0.6	0.16	0.16	0.00
536.0	0.20	132.50	536.0	-0.8	-0.5	-0.7	0.18	0.16	-26.23
567.0	0.30	121.50	567.0	-0.9	-0.4	-0.8	0.36	0.32	-35.48



Survey Report



Company: Mewbourne Oil Company
Project: Lea County, New Mexico (Nad 83)
Site: Sec 20, T21S, R34E
Well: Bird Dog 20/17 B2FC State Com #1H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Bird Dog 20/17 B2FC State Com #1H
TVD Reference: WELL @ 3748.0usft (Patterson #230)
MD Reference: WELL @ 3748.0usft (Patterson #230)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
629.0	0.30	116.50	629.0	-1.0	-0.1	-1.0	0.04	0.00	-8.06
720.0	0.40	116.50	720.0	-1.3	0.4	-1.3	0.11	0.11	0.00
814.0	0.20	96.50	814.0	-1.4	0.8	-1.5	0.24	-0.21	-21.28
909.0	0.30	119.50	909.0	-1.6	1.2	-1.7	0.15	0.11	24.21
1,004.0	0.40	149.50	1,004.0	-2.0	1.6	-2.1	0.22	0.11	31.58
1,097.0	0.30	160.00	1,097.0	-2.5	1.8	-2.7	0.13	-0.11	11.29
1,192.0	0.20	146.00	1,192.0	-2.9	2.0	-3.0	0.12	-0.11	-14.74
1,287.0	0.10	137.00	1,287.0	-3.1	2.2	-3.3	0.11	-0.11	-9.47
1,382.0	0.10	176.00	1,382.0	-3.2	2.2	-3.4	0.07	0.00	41.05
1,477.0	0.20	203.00	1,477.0	-3.5	2.2	-3.6	0.13	0.11	28.42
1,572.0	0.30	212.00	1,572.0	-3.8	2.0	-4.0	0.11	0.11	9.47
1,667.0	0.30	207.00	1,667.0	-4.2	1.7	-4.4	0.03	0.00	-5.26
1,762.0	0.30	210.00	1,762.0	-4.7	1.5	-4.8	0.02	0.00	3.16
1,857.0	0.30	219.00	1,857.0	-5.1	1.2	-5.2	0.05	0.00	9.47
QES Tie Into Mewbourne Svys @ 1918.0' MD / TVD									
1,918.0	0.30	232.50	1,918.0	-5.3	1.0	-5.4	0.12	0.00	22.13
2,087.0	0.20	147.80	2,087.0	-5.8	0.8	-5.9	0.20	-0.06	-50.12
2,181.0	0.40	129.90	2,181.0	-6.2	1.1	-6.3	0.23	0.21	-19.04
2,276.0	0.40	133.70	2,276.0	-6.6	1.6	-6.7	0.03	0.00	4.00
2,371.0	0.40	117.20	2,371.0	-7.0	2.2	-7.2	0.12	0.00	-17.37
2,465.0	0.20	105.30	2,465.0	-7.2	2.6	-7.4	0.22	-0.21	-12.66
2,560.0	0.40	74.70	2,560.0	-7.2	3.1	-7.4	0.26	0.21	-32.21
2,654.0	0.40	61.30	2,654.0	-6.9	3.7	-7.2	0.10	0.00	-14.26
2,749.0	0.20	66.90	2,749.0	-6.7	4.1	-7.0	0.21	-0.21	5.89
2,844.0	0.20	51.80	2,844.0	-6.5	4.4	-6.9	0.06	0.00	-15.89
2,938.0	0.20	47.30	2,938.0	-6.3	4.7	-6.7	0.02	0.00	-4.79
3,033.0	0.40	36.00	3,033.0	-5.9	5.0	-6.4	0.22	0.21	-11.89
3,127.0	0.70	62.00	3,127.0	-5.4	5.7	-5.9	0.41	0.32	27.66
3,222.0	1.40	67.60	3,221.9	-4.7	7.3	-5.3	0.74	0.74	5.89
3,316.0	2.30	72.20	3,315.9	-3.7	10.1	-4.6	0.97	0.96	4.89
3,411.0	2.10	47.60	3,410.8	-1.9	13.2	-3.1	1.01	-0.21	-25.89
3,506.0	2.50	39.90	3,505.8	0.9	15.8	-0.6	0.53	0.42	-8.11
3,601.0	1.60	37.10	3,600.7	3.5	18.0	1.8	0.95	-0.95	-2.95
3,695.0	1.40	40.20	3,694.7	5.4	19.5	3.6	0.23	-0.21	3.30
3,790.0	1.90	49.40	3,789.6	7.3	21.4	5.3	0.59	0.53	9.68
3,884.0	2.10	49.00	3,883.6	9.5	23.9	7.2	0.21	0.21	-0.43
3,979.0	2.10	45.10	3,978.5	11.9	26.5	9.4	0.15	0.00	-4.11
4,073.0	2.10	45.50	4,072.4	14.3	28.9	11.6	0.02	0.00	0.43
4,168.0	2.10	42.00	4,167.4	16.8	31.3	13.8	0.13	0.00	-3.68
4,262.0	2.10	40.20	4,261.3	19.4	33.6	16.2	0.07	0.00	-1.91
4,357.0	2.10	38.10	4,356.2	22.1	35.8	18.7	0.08	0.00	-2.21
4,451.0	2.10	38.80	4,450.2	24.8	37.9	21.2	0.03	0.00	0.74
GYRO Tie Into QES Svys @ 4546.0' MD / 4545.1' TVD									
4,546.0	2.30	40.90	4,545.1	27.6	40.3	23.8	0.23	0.21	2.21



Survey Report



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Site:	Sec 20, T21S, R34E	MD Reference:	WELL @ 3748.0usft (Patterson #230)
Well:	Bird Dog 20/17 B2FC State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
4,600.0	2.20	44.43	4,599.1	29.1	41.7	25.2	0.32	-0.19	6.54
4,700.0	1.84	63.02	4,699.0	31.2	44.5	27.0	0.74	-0.36	18.59
4,800.0	1.86	67.55	4,799.0	32.6	47.4	28.1	0.15	0.02	4.53
4,900.0	1.92	62.47	4,898.9	34.0	50.4	29.2	0.18	0.06	-5.08
5,000.0	1.82	45.66	4,998.8	35.9	53.0	30.9	0.56	-0.10	-16.81
5,100.0	1.58	52.83	5,098.8	37.8	55.3	32.6	0.32	-0.24	7.17
5,200.0	1.77	45.17	5,198.8	39.7	57.4	34.3	0.29	0.19	-7.66
5,300.0	1.51	64.21	5,298.7	41.4	59.7	35.7	0.60	-0.26	19.04
5,400.0	1.18	40.49	5,398.7	42.7	61.6	36.9	0.64	-0.33	-23.72
5,500.0	1.36	63.10	5,498.7	44.1	63.3	38.1	0.53	0.18	22.61
5,600.0	0.87	58.17	5,598.7	45.0	65.0	38.9	0.50	-0.49	-4.93
Gyro Tie-In @ 5655.0' MD / 5653.6' TVD									
5,655.0	1.30	84.77	5,653.6	45.3	66.0	39.0	1.18	0.78	48.36
5,768.0	1.20	85.90	5,766.6	45.5	68.4	39.0	0.09	-0.09	1.00
5,862.0	0.70	173.80	5,860.6	45.0	69.5	38.4	1.45	-0.53	93.51
5,957.0	2.40	219.50	5,955.6	42.9	68.3	36.4	2.08	1.79	48.11
6,052.0	2.50	220.20	6,050.5	39.8	65.7	33.6	0.11	0.11	0.74
6,146.0	2.60	222.30	6,144.4	36.6	62.9	30.7	0.15	0.11	2.23
6,241.0	2.50	222.90	6,239.3	33.5	60.1	27.9	0.11	-0.11	0.63
6,335.0	3.40	223.60	6,333.2	30.0	56.7	24.6	0.96	0.96	0.74
6,430.0	3.60	221.50	6,428.0	25.7	52.8	20.8	0.25	0.21	-2.21
6,524.0	3.50	220.60	6,521.8	21.3	49.0	16.7	0.12	-0.11	-0.96
6,619.0	3.70	219.90	6,616.6	16.8	45.2	12.6	0.22	0.21	-0.74
6,713.0	4.00	219.90	6,710.4	11.9	41.1	8.1	0.32	0.32	0.00
6,808.0	4.30	220.90	6,805.2	6.7	36.6	3.3	0.32	0.32	1.05
6,902.0	4.30	222.00	6,898.9	1.4	32.0	-1.5	0.09	0.00	1.17
6,997.0	4.30	219.00	6,993.6	-4.0	27.4	-6.5	0.24	0.00	-3.16
7,092.0	4.00	219.70	7,088.4	-9.3	23.0	-11.4	0.32	-0.32	0.74
7,186.0	3.70	221.10	7,182.2	-14.1	18.9	-15.8	0.33	-0.32	1.49
7,281.0	3.70	221.10	7,277.0	-18.8	14.9	-20.0	0.00	0.00	0.00
7,375.0	3.60	220.00	7,370.8	-23.3	11.0	-24.2	0.13	-0.11	-1.17
7,470.0	3.70	216.90	7,465.6	-28.0	7.2	-28.6	0.23	0.11	-3.26
7,564.0	3.80	214.60	7,559.4	-33.0	3.6	-33.2	0.19	0.11	-2.45
7,659.0	3.70	213.40	7,654.2	-38.2	0.2	-38.0	0.13	-0.11	-1.26
7,753.0	3.70	214.10	7,748.0	-43.2	-3.2	-42.7	0.05	0.00	0.74
7,848.0	4.10	228.30	7,842.8	-48.0	-7.5	-47.1	1.10	0.42	14.95
7,942.0	4.00	229.00	7,936.5	-52.4	-12.4	-51.0	0.12	-0.11	0.74
8,036.0	4.10	224.60	8,030.3	-56.9	-17.3	-55.1	0.35	0.11	-4.68
8,131.0	3.90	223.90	8,125.1	-61.7	-21.9	-59.4	0.22	-0.21	-0.74
8,225.0	3.50	223.90	8,218.9	-66.1	-26.1	-63.4	0.43	-0.43	0.00
8,320.0	3.30	223.90	8,313.7	-70.1	-30.0	-67.1	0.21	-0.21	0.00
8,415.0	3.30	224.40	8,408.5	-74.0	-33.8	-70.6	0.03	0.00	0.53
8,509.0	3.10	224.60	8,502.4	-77.8	-37.5	-74.0	0.21	-0.21	0.21



Survey Report



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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
8,604.0	3.20	225.50	8,597.3	-81.5	-41.2	-77.4	0.12	0.11	0.95
8,698.0	3.30	226.70	8,691.1	-85.2	-45.0	-80.7	0.13	0.11	1.28
8,793.0	3.10	229.00	8,786.0	-88.7	-49.0	-83.9	0.25	-0.21	2.42
8,887.0	2.80	228.80	8,879.8	-91.9	-52.6	-86.7	0.32	-0.32	-0.21
8,982.0	3.30	236.40	8,974.7	-95.0	-56.6	-89.4	0.68	0.53	8.00
9,076.0	3.10	237.10	9,068.6	-97.8	-61.0	-91.8	0.22	-0.21	0.74
9,171.0	3.30	242.50	9,163.4	-100.5	-65.6	-94.1	0.38	0.21	5.68
9,265.0	3.20	247.80	9,257.3	-102.7	-70.4	-95.8	0.34	-0.11	5.64
9,360.0	2.90	250.10	9,352.1	-104.6	-75.1	-97.2	0.34	-0.32	2.42
9,455.0	2.70	246.20	9,447.0	-106.3	-79.5	-98.5	0.29	-0.21	-4.11
9,550.0	3.70	241.10	9,541.9	-108.7	-84.2	-100.5	1.09	1.05	-5.37
9,642.0	3.30	248.30	9,633.7	-111.1	-89.2	-102.4	0.65	-0.43	7.83
9,737.0	2.90	247.30	9,728.5	-113.0	-94.0	-103.9	0.42	-0.42	-1.05
9,831.0	4.30	240.80	9,822.4	-115.6	-99.3	-106.1	1.55	1.49	-6.91
9,926.0	3.70	252.60	9,917.1	-118.3	-105.3	-108.1	1.07	-0.63	12.42
10,020.0	3.40	258.50	10,010.9	-119.8	-110.9	-109.1	0.50	-0.32	6.28
10,115.0	5.10	257.10	10,105.7	-121.3	-117.8	-110.0	1.79	1.79	-1.47
10,209.0	5.00	256.40	10,199.3	-123.2	-125.9	-111.1	0.12	-0.11	-0.74
10,304.0	4.20	257.50	10,294.0	-124.9	-133.3	-112.1	0.85	-0.84	1.16
10,398.0	3.90	255.60	10,387.8	-126.4	-139.7	-113.1	0.35	-0.32	-2.02
10,436.0	3.40	254.80	10,425.7	-127.0	-142.1	-113.5	1.32	-1.32	-2.11
10,468.0	3.90	299.30	10,457.6	-126.8	-143.9	-113.0	8.75	1.56	139.06
10,499.0	8.40	337.10	10,488.5	-124.2	-145.7	-110.3	18.80	14.52	121.94
10,531.0	12.20	349.60	10,519.9	-118.7	-147.3	-104.7	13.71	11.88	39.06
10,562.0	14.90	352.80	10,550.1	-111.5	-148.4	-97.4	9.04	8.71	10.32
10,593.0	19.00	348.20	10,579.7	-102.6	-149.9	-88.4	13.91	13.23	-14.84
10,625.0	23.10	347.80	10,609.6	-91.4	-152.3	-77.0	12.82	12.81	-1.25
10,657.0	25.90	349.20	10,638.7	-78.4	-154.9	-63.8	8.94	8.75	4.38
10,688.0	28.90	350.10	10,666.2	-64.3	-157.5	-49.6	9.77	9.68	2.90
10,720.0	31.10	349.10	10,693.9	-48.6	-160.4	-33.7	7.05	6.88	-3.13
10,751.0	34.10	348.00	10,720.0	-32.2	-163.7	-17.1	9.86	9.68	-3.55
10,782.0	38.20	347.30	10,745.1	-14.4	-167.6	1.1	13.29	13.23	-2.26
10,814.0	41.90	347.30	10,769.6	5.7	-172.1	21.5	11.56	11.56	0.00
10,846.0	45.10	347.70	10,792.8	27.2	-176.9	43.3	10.04	10.00	1.25
10,877.0	49.40	347.80	10,813.8	49.5	-181.7	65.9	13.87	13.87	0.32
10,908.0	53.40	347.70	10,833.2	73.1	-186.9	90.0	12.91	12.90	-0.32
10,940.0	57.20	347.80	10,851.4	98.8	-192.4	116.1	11.88	11.88	0.31
330' HL Crossed @ 10940.1' MD / 10851.4' TVD									
10,940.1	57.20	347.80	10,851.4	98.9	-192.5	116.1	0.00	0.00	0.00
10,972.0	60.90	348.50	10,867.8	125.7	-198.1	143.3	11.75	11.60	2.19
11,003.0	65.40	348.40	10,881.8	152.8	-203.6	170.8	14.52	14.52	-0.32
11,034.0	69.90	348.50	10,893.6	180.9	-209.4	199.3	14.52	14.52	0.32
11,066.0	74.20	349.20	10,903.5	210.7	-215.2	229.6	13.60	13.44	2.19
11,097.0	78.40	349.40	10,910.8	240.3	-220.8	259.5	13.56	13.55	0.65

Company:	Mewbourne Oil Company	Local Co-ordinate Reference:	Well Bird Dog 20/17 B2FC State Com #1H
Project:	Lea County, New Mexico (Nad 83)	TVD Reference:	WELL @ 3748.0usft (Patterson #230)
Site:	Sec 20, T21S, R34E	MD Reference:	WELL @ 3748.0usft (Patterson #230)
Well:	Bird Dog 20/17 B2FC State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
11,129.0	82.90	349.80	10,916.0	271.4	-226.5	291.0	14.12	14.06	1.25
11,239.0	88.30	351.20	10,924.4	379.5	-244.6	400.3	5.07	4.91	1.27
11,334.0	91.20	353.30	10,924.9	473.6	-257.4	495.2	3.77	3.05	2.21
11,429.0	91.10	353.30	10,922.9	567.9	-268.5	590.2	0.11	-0.11	0.00
11,524.0	91.10	353.30	10,921.1	662.3	-279.6	685.1	0.00	0.00	0.00
11,618.0	91.10	354.00	10,919.3	755.7	-290.0	779.1	0.74	0.00	0.74
11,713.0	90.30	353.80	10,918.2	850.1	-300.1	874.1	0.87	-0.84	-0.21
11,808.0	91.50	356.10	10,916.7	944.7	-308.4	969.0	2.73	1.26	2.42
11,903.0	91.20	356.10	10,914.4	1,039.5	-314.9	1,064.0	0.32	-0.32	0.00
11,998.0	90.60	356.10	10,912.9	1,134.3	-321.4	1,158.9	0.63	-0.63	0.00
12,093.0	90.30	355.90	10,912.2	1,229.0	-328.0	1,253.9	0.38	-0.32	-0.21
12,188.0	92.90	357.70	10,909.5	1,323.8	-333.3	1,348.8	3.33	2.74	1.89
12,283.0	92.50	357.20	10,905.1	1,418.6	-337.5	1,443.6	0.67	-0.42	-0.53
12,377.0	93.00	356.80	10,900.5	1,512.4	-342.4	1,537.4	0.68	0.53	-0.43
12,472.0	91.40	357.90	10,896.9	1,607.2	-346.8	1,632.2	2.04	-1.68	1.16
12,566.0	90.90	358.70	10,895.0	1,701.2	-349.6	1,726.0	1.00	-0.53	0.85
12,661.0	90.20	359.10	10,894.1	1,796.1	-351.4	1,820.8	0.85	-0.74	0.42
12,756.0	89.60	358.60	10,894.3	1,891.1	-353.3	1,915.5	0.82	-0.63	-0.53
12,850.0	89.20	357.00	10,895.3	1,985.0	-356.9	2,009.4	1.75	-0.43	-1.70
12,945.0	90.80	356.50	10,895.3	2,079.9	-362.3	2,104.3	1.76	1.68	-0.53
13,039.0	91.10	355.60	10,893.7	2,173.6	-368.8	2,198.3	1.01	0.32	-0.96
13,135.0	92.10	355.40	10,891.0	2,269.3	-376.3	2,294.3	1.06	1.04	-0.21
13,229.0	89.40	356.30	10,889.8	2,363.0	-383.1	2,388.2	3.03	-2.87	0.96
13,324.0	89.80	356.50	10,890.4	2,457.9	-389.1	2,483.2	0.47	0.42	0.21
13,418.0	89.90	356.30	10,890.7	2,551.7	-395.0	2,577.1	0.24	0.11	-0.21
13,512.0	89.30	355.70	10,891.3	2,645.4	-401.5	2,671.1	0.90	-0.64	-0.64
13,607.0	88.70	358.60	10,893.0	2,740.3	-406.3	2,766.0	3.12	-0.63	3.05
13,702.0	91.40	359.30	10,892.9	2,835.3	-408.0	2,860.7	2.94	2.84	0.74
13,796.0	90.30	358.90	10,891.5	2,929.2	-409.5	2,954.5	1.25	-1.17	-0.43
13,891.0	89.50	358.60	10,891.7	3,024.2	-411.6	3,049.2	0.90	-0.84	-0.32
13,985.0	90.70	358.90	10,891.5	3,118.2	-413.6	3,143.0	1.32	1.28	0.32
14,080.0	90.20	358.60	10,890.8	3,213.2	-415.7	3,237.7	0.61	-0.53	-0.32
14,174.0	93.50	359.40	10,887.8	3,307.1	-417.3	3,331.4	3.61	3.51	0.85
14,269.0	90.30	358.00	10,884.6	3,402.0	-419.5	3,426.1	3.68	-3.37	-1.47
14,363.0	91.00	355.90	10,883.5	3,495.9	-424.5	3,520.1	2.35	0.74	-2.23
14,458.0	88.60	355.60	10,883.9	3,590.6	-431.5	3,615.0	2.55	-2.53	-0.32
14,552.0	87.70	355.00	10,886.9	3,684.2	-439.2	3,709.0	1.15	-0.96	-0.64
14,646.0	89.20	354.70	10,889.4	3,777.8	-447.6	3,802.9	1.63	1.60	-0.32
14,741.0	90.00	354.50	10,890.1	3,872.4	-456.6	3,897.9	0.87	0.84	-0.21
14,836.0	90.60	354.30	10,889.6	3,966.9	-465.9	3,992.9	0.67	0.63	-0.21
14,931.0	92.60	355.20	10,887.0	4,061.5	-474.5	4,087.9	2.31	2.11	0.95
15,026.0	91.80	354.70	10,883.3	4,156.0	-482.9	4,182.8	0.99	-0.84	-0.53
15,120.0	92.40	355.20	10,879.9	4,249.6	-491.2	4,276.8	0.83	0.64	0.53



Survey Report



Company:	Mewbourne Oil Company	Local Co-ordinate Reference:	Well Bird Dog 20/17 B2FC State Com #1H
Project:	Lea County, New Mexico (Nad 83)	TVD Reference:	WELL @ 3748.0usft (Patterson #230)
Site:	Sec 20, T21S, R34E	MD Reference:	WELL @ 3748.0usft (Patterson #230)
Well:	Bird Dog 20/17 B2FC State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
15,215.0	90.70	356.80	10,877.3	4,344.3	-497.8	4,371.7	2.46	-1.79	1.68
15,310.0	91.00	357.00	10,875.9	4,439.2	-502.9	4,466.6	0.38	0.32	0.21
15,405.0	91.90	357.30	10,873.5	4,534.0	-507.7	4,561.5	1.00	0.95	0.32
15,500.0	90.30	355.40	10,871.7	4,628.8	-513.7	4,656.4	2.61	-1.68	-2.00
15,595.0	87.20	354.30	10,873.7	4,723.4	-522.2	4,751.4	3.46	-3.26	-1.16
15,690.0	87.00	355.00	10,878.5	4,817.9	-531.1	4,846.3	0.77	-0.21	0.74
15,785.0	91.40	358.20	10,879.9	4,912.7	-536.7	4,941.2	5.73	4.63	3.37
15,879.0	92.40	358.70	10,876.7	5,006.6	-539.2	5,034.9	1.19	1.06	0.53
15,974.0	93.50	358.60	10,871.9	5,101.4	-541.5	5,129.6	1.16	1.16	-0.11
16,069.0	93.40	357.90	10,866.1	5,196.2	-544.4	5,224.2	0.74	-0.11	-0.74
16,164.0	90.00	358.70	10,863.3	5,291.1	-547.2	5,319.0	3.68	-3.58	0.84
16,258.0	88.80	358.00	10,864.3	5,385.1	-549.9	5,412.8	1.48	-1.28	-0.74
16,352.0	89.70	357.70	10,865.5	5,479.0	-553.4	5,506.6	1.01	0.96	-0.32
16,447.0	90.50	358.90	10,865.4	5,573.9	-556.2	5,601.5	1.52	0.84	1.26
16,541.0	91.50	359.30	10,863.7	5,667.9	-557.7	5,695.2	1.15	1.06	0.43
16,636.0	86.90	359.60	10,865.1	5,762.9	-558.6	5,789.8	4.85	-4.84	0.32
16,730.0	84.80	358.90	10,871.9	5,856.6	-559.9	5,883.3	2.35	-2.23	-0.74
16,825.0	88.90	355.70	10,877.1	5,951.3	-564.3	5,978.0	5.47	4.32	-3.37
16,919.0	89.90	355.00	10,878.1	6,045.0	-571.9	6,072.0	1.30	1.06	-0.74
17,013.0	92.30	355.00	10,876.3	6,138.6	-580.1	6,166.0	2.55	2.55	0.00
17,107.0	91.00	355.40	10,873.6	6,232.3	-588.0	6,259.9	1.45	-1.38	0.43
17,201.0	91.30	355.90	10,871.7	6,326.0	-595.1	6,353.9	0.62	0.32	0.53
17,295.0	91.60	355.90	10,869.3	6,419.7	-601.8	6,447.8	0.32	0.32	0.00
17,390.0	91.30	355.70	10,866.9	6,514.4	-608.8	6,542.8	0.38	-0.32	-0.21
17,484.0	89.50	355.00	10,866.2	6,608.1	-616.4	6,636.8	2.05	-1.91	-0.74
17,578.0	89.40	357.30	10,867.1	6,701.9	-622.7	6,730.7	2.45	-0.11	2.45
17,673.0	90.30	355.20	10,867.4	6,796.7	-628.9	6,825.7	2.40	0.95	-2.21
17,766.0	93.30	355.00	10,864.5	6,889.3	-636.9	6,918.6	3.23	3.23	-0.22
17,861.0	94.20	354.50	10,858.2	6,983.7	-645.6	7,013.4	1.08	0.95	-0.53
17,955.0	91.00	354.70	10,854.0	7,077.1	-654.4	7,107.3	3.41	-3.40	0.21
18,050.0	90.70	354.90	10,852.6	7,171.7	-663.0	7,202.3	0.38	-0.32	0.21
18,144.0	90.70	355.00	10,851.4	7,265.4	-671.3	7,296.3	0.11	0.00	0.11
18,180.0	90.70	355.40	10,851.0	7,301.2	-674.3	7,332.3	1.11	0.00	1.11
TD @ 18230.0' MD / 10850.4' TVD									
18,230.0	90.70	355.40	10,850.4	7,351.1	-678.3	7,382.3	0.00	0.00	0.00



Survey Report



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Project:	Lea County, New Mexico (Nad 83)	TVD Reference:	WELL @ 3748.0usft (Patterson #230)
Site:	Sec 20, T21S, R34E	MD Reference:	WELL @ 3748.0usft (Patterson #230)
Well:	Bird Dog 20/17 B2FC State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,918.0	1,918.0	-5.3	1.0	QES Tie Into Mewbourne Svys @ 1918.0' MD / TVD
4,546.0	4,545.1	27.6	40.3	GYRO Tie Into QES Svys @ 4546.0' MD / 4545.1' TVD
5,655.0	5,653.6	45.3	66.0	Gyro Tie-In @ 5655.0' MD / 5653.6' TVD
10,940.1	10,851.4	98.9	-192.5	330' HL Crossed @ 10940.1' MD / 10851.4' TVD
18,230.0	10,850.4	7,351.1	-678.3	TD @ 18230.0' MD / 10850.4' TVD

Checked By: _____ Approved By: _____ Date: _____