



Caza
Oil & Gas, Inc.

Caza Operating, LLC

Eddy County, NM (NAD 27 NME)

Forehand Ranch 22 State

#8H

30-015-43555

ST 1

**NM OIL CONSERVATION
ARTESIA DISTRICT**

FEB 26 2018

RECEIVED

Design: ST 1

Standard Survey Report

22 May, 2017



Scientific Drilling

www.scientificdrilling.com

Company:	Caza Operating, LLC	Well #8H
Project:	Eddy County, NM (NAD 27 NME)	KB=27' @ 3176.00usft
Site:	Forehand Ranch 22 State	KB=27' @ 3176.00usft
Well:	#8H	Grid
Wellbore:	ST 1	Minimum Curvature
Design:	ST 1	Midland District

Project:	Eddy County, NM (NAD 27 NME)		
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:		Forehand Ranch 22 State			
Site Position:		Northing:	468,975.80 usft	Latitude:	32° 17' 21.211 N
From:	Map	Easting:	550,495.80 usft	Longitude:	104° 10' 11.733 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.09 °

Well:		#8H				
Well Position	+N/-S	0.00 usft	Northing:	469,054.70 usft	Latitude:	32° 17' 22.034 N
	+E/-W	0.00 usft	Easting:	547,610.60 usft	Longitude:	104° 10' 45.344 W
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,149.00 usft	

Wellbore:	ST 1				
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Magnetic	Model Name	Sample Date	Declination (D)	Dip Angle (D)	Field Strength (G)
	HDGM	5/12/2017	7.42	60.10	48,111

Design:	ST 1				
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Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	8,362.00

Vertical Section	Depth From (ft)	N/A	TA	Direction
	(ft)	(usft)	(ft)	(ft)
	0.00	0.00	0.00	180.27

Survey Program	Date	From	To	Survey (Wellbore)	Method	Reference
	5/22/2017	(ft)	(ft)			
		299.00	8,362.00	SDI MWD (OH)	MWD+HDGM	OWSG MWD + HDGM
		8,394.00	16,456.00	SDI MWD #2 (ST 1)	MWD+HDGM	OWSG MWD + HDGM

Survey	Measured Depth (ft)	Inclination (°)	Azimuth (°)	W/Depth (ft)	N/A	TA	Direction	Depth (ft)	Build Rate (ft/1000ft)	Turn Rate (ft/1000ft)
	(ft)	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	299.00	0.65	70.81	298.99	0.56	1.60	-0.56	0.22	0.22	0.00
	452.00	1.18	63.35	451.97	1.55	3.83	-1.57	0.35	0.35	-4.88
	573.00	1.92	64.17	572.93	2.99	6.77	-3.02	0.61	0.61	0.68
	707.00	1.99	60.27	706.85	5.12	10.81	-5.17	0.11	0.05	-2.91
	805.00	1.44	65.52	804.81	6.48	13.41	-6.54	0.58	-0.56	5.36
	988.00	2.40	17.83	987.71	11.08	16.67	-11.16	0.97	0.52	-26.06
	1,177.00	3.30	0.12	1,176.48	20.29	17.90	-20.37	0.66	0.48	-9.37
	1,366.00	3.44	15.68	1,365.16	31.18	19.44	-31.27	0.49	0.07	8.23
	1,556.00	3.12	24.26	1,554.85	41.39	23.10	-41.49	0.31	-0.17	4.52

Company	Caza Operating, LLC	Well #8H
Project	Eddy County, NM (NAD 27 NME)	KB=27' @ 3176.00usft
Site	Forehand Ranch 22 State	KB=27' @ 3176.00usft
Well	#8H	Grid
Well Log	ST 1	Minimum Curvature
Depth	ST 1	Midland District

Depth (ft)	inclination (°)	Azimuth (°)	True Depth (ft)	True Azimuth (°)	True Azimuth (°)	True Azimuth (°)	True Azimuth (°)	True Azimuth (°)	True Azimuth (°)
1,746.00	4.08	34.69	1,744.47	51.66	29.08	-51.79	0.61	0.51	5.49
1,935.00	4.22	29.85	1,932.98	63.22	36.36	-63.39	0.20	0.07	-2.56
2,126.00	4.34	342.79	2,123.50	76.22	37.72	-76.40	1.79	0.06	-24.64
2,315.00	3.53	336.62	2,312.05	88.39	33.30	-88.55	0.48	-0.43	-3.26
2,504.00	3.18	335.97	2,500.73	98.52	28.86	-98.66	0.19	-0.19	-0.34
2,694.00	2.95	337.94	2,690.46	107.87	24.87	-107.98	0.13	-0.12	1.04
2,884.00	2.86	331.81	2,880.21	116.58	20.80	-116.67	0.17	-0.05	-3.23
3,073.00	2.27	333.76	3,069.02	124.09	16.92	-124.17	0.32	-0.31	1.03
3,262.00	3.20	339.39	3,257.81	132.38	13.40	-132.44	0.51	0.49	2.98
3,452.00	3.48	340.11	3,447.48	142.77	9.58	-142.81	0.15	0.15	0.38
3,641.00	3.40	346.19	3,636.14	153.61	6.29	-153.63	0.20	-0.04	3.22
3,830.00	3.37	343.81	3,824.81	164.38	3.40	-164.40	0.08	-0.02	-1.26
4,020.00	2.86	344.85	4,014.53	174.32	0.60	-174.32	0.27	-0.27	0.55
4,210.00	2.42	340.57	4,204.33	182.68	-1.97	-182.67	0.25	-0.23	-2.25
4,399.00	2.78	348.68	4,393.14	190.94	-4.20	-190.92	0.27	0.19	4.29
4,588.00	2.55	345.23	4,581.93	199.50	-6.17	-199.47	0.15	-0.12	-1.83
4,778.00	3.13	0.50	4,771.70	208.77	-7.20	-208.74	0.50	0.31	8.04
4,967.00	3.34	4.74	4,960.40	219.42	-6.70	-219.38	0.17	0.11	2.24
5,157.00	2.98	4.03	5,150.11	229.86	-5.90	-229.83	0.19	-0.19	-0.37
5,347.00	2.46	7.32	5,339.90	238.83	-5.03	-238.81	0.29	-0.27	1.73
5,537.00	3.04	348.42	5,529.68	247.81	-5.52	-247.78	0.56	0.31	-9.95
5,727.00	2.73	343.86	5,719.44	257.09	-7.79	-257.05	0.20	-0.16	-2.40
5,917.00	2.62	335.58	5,909.23	265.39	-10.84	-265.34	0.21	-0.06	-4.36
6,106.00	1.68	327.24	6,098.10	271.66	-14.13	-271.59	0.52	-0.50	-4.41
6,295.00	1.48	333.72	6,287.03	276.18	-16.71	-276.10	0.14	-0.11	3.43
6,483.00	1.43	336.35	6,474.97	280.50	-18.72	-280.41	0.04	-0.03	1.40
6,673.00	1.13	337.30	6,664.92	284.40	-20.40	-284.30	0.16	-0.16	0.50
6,853.00	1.12	338.12	6,844.88	287.67	-21.74	-287.57	0.01	-0.01	0.46
7,043.00	1.03	16.13	7,034.85	291.04	-21.96	-290.93	0.37	-0.05	20.01
7,234.00	0.70	308.01	7,225.84	293.40	-22.40	-293.30	0.53	-0.17	-35.66
7,423.00	0.78	304.09	7,414.82	294.83	-24.37	-294.72	0.05	0.04	-2.07
7,605.00	1.14	284.69	7,596.79	295.99	-27.15	-295.86	0.26	0.20	-10.66
7,794.00	2.15	265.93	7,785.72	296.21	-32.51	-296.06	0.60	0.53	-9.93
7,983.00	1.60	149.74	7,974.66	293.68	-34.71	-293.52	1.69	-0.29	-61.48
8,173.00	0.66	132.86	8,164.62	290.65	-32.58	-290.49	0.52	-0.49	-8.88
8,362.00	0.48	126.00	8,353.61	289.44	-31.14	-289.29	0.10	-0.10	-3.63
8,394.00	0.15	210.29	8,385.61	289.33	-31.05	-289.18	1.53	-1.03	263.41
8,504.00	6.82	187.56	8,495.35	282.72	-31.98	-282.57	6.07	6.06	-20.66
8,552.00	8.71	188.13	8,542.91	276.30	-32.87	-276.14	3.94	3.94	1.19
8,599.00	14.31	186.15	8,588.94	266.99	-34.00	-266.83	11.94	11.91	-4.21
8,647.00	18.77	185.97	8,634.94	253.40	-35.44	-253.24	9.29	9.29	-0.38
8,694.00	22.97	181.55	8,678.85	236.71	-36.47	-236.54	9.54	8.94	-9.40
8,742.00	25.45	180.39	8,722.63	217.03	-36.80	-216.86	5.26	5.17	-2.42

Company	Caza Operating, LLC	Well #8H
Location	Eddy County, NM (NAD 27 NME)	KB=27' @ 3176.00usft
Site	Forehand Ranch 22 State	KB=27' @ 3176.00usft
Well	#8H	Grid
Well #1	ST 1	Minimum Curvature
Well #2	ST 1	Midland District

Station	Offset	Angle	Station	Offset	Angle	Station	Offset	Angle	Station	Offset
8,789.00	30.25	179.48	8,764.17	195.08	-36.76	-194.91	10.25	10.21	-1.94	
8,837.00	33.16	176.90	8,805.01	169.88	-35.94	-169.71	6.69	6.06	-5.38	
8,884.00	36.73	175.71	8,843.53	143.02	-34.19	-142.86	7.73	7.60	-2.53	
8,932.00	40.28	177.99	8,881.09	113.19	-32.57	-113.03	7.96	7.40	4.75	
8,979.00	43.74	178.62	8,916.00	81.75	-31.65	-81.60	7.42	7.36	1.34	
9,026.00	45.91	178.30	8,949.34	48.63	-30.76	-48.49	4.64	4.62	-0.68	
9,071.00	48.86	176.94	8,979.80	15.55	-29.37	-15.41	6.92	6.56	-3.02	
9,121.00	52.77	176.24	9,011.39	-23.13	-27.06	23.26	7.89	7.82	-1.40	
9,168.00	56.36	176.29	9,038.63	-61.34	-24.57	61.45	7.64	7.64	0.11	
9,216.00	59.63	176.25	9,064.07	-101.95	-21.92	102.05	6.81	6.81	-0.08	
9,263.00	62.93	177.12	9,086.65	-143.09	-19.54	143.18	7.21	7.02	1.85	
9,311.00	66.42	175.10	9,107.18	-186.37	-16.59	186.44	8.21	7.27	-4.21	
9,358.00	69.13	175.88	9,124.96	-229.74	-13.17	229.80	5.97	5.77	1.66	
9,407.00	69.73	175.29	9,142.17	-275.48	-9.64	275.52	1.66	1.22	-1.20	
9,454.00	73.33	176.92	9,157.06	-319.94	-6.62	319.97	8.34	7.66	3.47	
9,501.00	74.07	178.17	9,170.25	-365.01	-4.68	365.03	3.00	1.57	2.66	
9,548.00	78.00	179.56	9,181.59	-410.60	-3.79	410.62	8.84	8.36	2.96	
9,596.00	82.90	180.13	9,189.56	-457.92	-3.66	457.94	10.28	10.21	1.19	
9,666.00	89.63	184.05	9,194.11	-527.68	-6.21	527.70	11.12	9.61	5.60	
9,787.00	90.44	184.54	9,194.04	-648.33	-15.28	648.40	0.78	0.67	0.40	
9,882.00	91.18	184.59	9,192.70	-743.02	-22.84	743.12	0.78	0.78	0.05	
9,977.00	90.50	184.00	9,191.31	-837.74	-29.95	837.88	0.95	-0.72	-0.62	
10,072.00	89.97	182.35	9,190.92	-932.59	-35.21	932.75	1.82	-0.56	-1.74	
10,167.00	90.34	181.78	9,190.66	-1,027.53	-38.63	1,027.70	0.72	0.39	-0.60	
10,261.00	89.90	180.68	9,190.46	-1,121.51	-40.65	1,121.69	1.26	-0.47	-1.17	
10,356.00	89.33	179.16	9,191.10	-1,216.50	-40.52	1,216.68	1.71	-0.60	-1.60	
10,451.00	88.42	177.71	9,192.97	-1,311.45	-37.93	1,311.61	1.80	-0.96	-1.53	
10,545.00	89.76	178.20	9,194.46	-1,405.37	-34.57	1,405.52	1.52	1.43	0.52	
10,639.00	90.81	178.09	9,193.99	-1,499.32	-31.53	1,499.45	1.12	1.12	-0.12	
10,734.00	90.81	178.41	9,192.65	-1,594.27	-28.63	1,594.38	0.34	0.00	0.34	
10,829.00	90.84	178.85	9,191.28	-1,689.23	-26.36	1,689.33	0.46	0.03	0.46	
10,924.00	91.21	178.30	9,189.58	-1,784.18	-23.99	1,784.28	0.70	0.39	-0.58	
11,019.00	91.38	178.34	9,187.43	-1,879.12	-21.21	1,879.20	0.18	0.18	0.04	
11,113.00	91.04	177.53	9,185.45	-1,973.04	-17.82	1,973.10	0.93	-0.36	-0.86	
11,219.00	90.24	179.19	9,184.26	-2,078.98	-14.79	2,079.03	1.74	-0.75	1.57	
11,313.00	90.54	180.26	9,183.62	-2,172.98	-14.34	2,173.02	1.18	0.32	1.14	
11,408.00	90.64	180.68	9,182.65	-2,267.97	-15.12	2,268.01	0.45	0.11	0.44	
11,504.00	90.20	181.05	9,181.94	-2,363.95	-16.57	2,364.01	0.60	-0.46	0.39	
11,599.00	90.24	180.90	9,181.58	-2,458.94	-18.18	2,459.00	0.16	0.04	-0.16	
11,694.00	90.50	180.69	9,180.96	-2,553.93	-19.50	2,553.99	0.35	0.27	-0.22	
11,789.00	90.87	181.18	9,179.83	-2,648.91	-21.05	2,648.98	0.65	0.39	0.52	
11,883.00	89.63	181.06	9,179.42	-2,742.89	-22.89	2,742.96	1.33	-1.32	-0.13	
11,978.00	89.29	181.08	9,180.31	-2,837.87	-24.66	2,837.95	0.36	-0.36	0.02	

Company	Caza Operating, LLC	Well #8H
County	Eddy County, NM (NAD 27 NME)	KB=27' @ 3176.00usft
State	Forehand Ranch 22 State	KB=27' @ 3176.00usft
Well	#8H	Grid
Wellbore	ST 1	Minimum Curvature
Direction	ST 1	Midland District

Station	True Azimuth (deg)	True Dip (deg)	True Depth (ft)	True Elevation (ft)	True Magnetic Declination (deg)	True Magnetic Dip (deg)	True Magnetic Depth (ft)	True Magnetic Elevation (ft)	True Magnetic Dip Angle (deg)
12,073.00	89.16	179.98	9,181.60	-2,932.85	-25.54	2,932.94	1.17	-0.14	-1.16
12,167.00	88.96	179.18	9,183.14	-3,026.84	-24.85	3,026.92	0.88	-0.21	-0.85
12,262.00	89.03	179.37	9,184.81	-3,121.81	-23.65	3,121.89	0.21	0.07	0.20
12,357.00	89.13	178.79	9,186.33	-3,216.79	-22.13	3,216.86	0.62	0.11	-0.61
12,453.00	89.66	179.17	9,187.35	-3,312.77	-20.42	3,312.83	0.68	0.55	0.40
12,547.00	89.16	178.49	9,188.31	-3,406.74	-18.50	3,406.79	0.90	-0.53	-0.72
12,641.00	89.87	179.98	9,189.11	-3,500.73	-17.24	3,500.77	1.76	0.76	1.59
12,736.00	88.76	178.84	9,190.25	-3,595.71	-16.27	3,595.75	1.67	-1.17	-1.20
12,831.00	88.72	179.25	9,192.33	-3,690.68	-14.68	3,690.71	0.43	-0.04	0.43
12,926.00	91.38	179.21	9,192.25	-3,785.66	-13.41	3,785.68	2.80	2.80	-0.04
13,020.00	92.49	179.95	9,189.08	-3,879.60	-12.72	3,879.62	1.42	1.18	0.79
13,114.00	91.21	179.15	9,186.04	-3,973.55	-11.98	3,973.56	1.61	-1.36	-0.85
13,210.00	91.04	178.92	9,184.16	-4,069.51	-10.36	4,069.52	0.30	-0.18	-0.24
13,305.00	91.01	179.54	9,182.46	-4,164.49	-9.09	4,164.49	0.65	-0.03	0.65
13,400.00	88.76	180.72	9,182.65	-4,259.48	-9.30	4,259.48	2.67	-2.37	1.24
13,495.00	88.08	179.74	9,185.27	-4,354.44	-9.68	4,354.44	1.26	-0.72	-1.03
13,590.00	89.16	179.85	9,187.56	-4,449.41	-9.34	4,449.41	1.14	1.14	0.12
13,685.00	89.13	180.07	9,188.97	-4,544.40	-9.28	4,544.40	0.23	-0.03	0.23
13,780.00	90.77	181.21	9,189.06	-4,639.39	-10.34	4,639.39	2.10	1.73	1.20
13,875.00	91.08	181.09	9,187.52	-4,734.36	-12.24	4,734.37	0.35	0.33	-0.13
13,970.00	90.94	180.95	9,185.85	-4,829.33	-13.94	4,829.34	0.21	-0.15	-0.15
14,064.00	91.44	180.52	9,183.90	-4,923.30	-15.14	4,923.32	0.70	0.53	-0.46
14,159.00	89.90	181.29	9,182.79	-5,018.28	-16.64	5,018.30	1.81	-1.62	0.81
14,254.00	90.94	181.01	9,182.09	-5,113.26	-18.55	5,113.29	1.13	1.09	-0.29
14,348.00	90.10	181.93	9,181.24	-5,207.22	-20.96	5,207.26	1.33	-0.89	0.98
14,443.00	89.19	182.15	9,181.83	-5,302.16	-24.34	5,302.21	0.99	-0.96	0.23
14,538.00	89.90	182.20	9,182.58	-5,397.09	-27.95	5,397.16	0.75	0.75	0.05
14,633.00	89.83	181.67	9,182.80	-5,492.03	-31.15	5,492.12	0.56	-0.07	-0.56
14,728.00	90.00	181.69	9,182.94	-5,586.99	-33.94	5,587.09	0.18	0.18	0.02
14,823.00	90.24	181.48	9,182.75	-5,681.95	-36.57	5,682.06	0.34	0.25	-0.22
14,918.00	90.34	181.41	9,182.26	-5,776.92	-38.96	5,777.04	0.13	0.11	-0.07
15,013.00	88.66	180.99	9,183.09	-5,871.89	-40.95	5,872.02	1.82	-1.77	-0.44
15,108.00	88.49	180.75	9,185.46	-5,966.85	-42.39	5,966.99	0.31	-0.18	-0.25
15,203.00	87.75	180.23	9,188.57	-6,061.80	-43.21	6,061.93	0.95	-0.78	-0.55
15,298.00	89.23	179.03	9,191.08	-6,156.76	-42.59	6,156.89	2.01	1.56	-1.26
15,394.00	89.09	179.17	9,192.48	-6,252.74	-41.08	6,252.86	0.21	-0.15	0.15
15,488.00	89.16	179.33	9,193.92	-6,346.72	-39.85	6,346.83	0.19	0.07	0.17
15,583.00	89.03	179.44	9,195.42	-6,441.70	-38.83	6,441.81	0.18	-0.14	0.12
15,678.00	89.13	179.55	9,196.94	-6,536.68	-38.00	6,536.79	0.16	0.11	0.12
15,772.00	88.96	178.31	9,198.51	-6,630.65	-36.24	6,630.75	1.33	-0.18	-1.32
15,867.00	90.40	177.92	9,199.04	-6,725.60	-33.12	6,725.68	1.57	1.52	-0.41
15,962.00	90.34	177.03	9,198.43	-6,820.50	-28.93	6,820.56	0.94	-0.06	-0.94
16,057.00	90.40	177.28	9,197.82	-6,915.38	-24.22	6,915.42	0.27	0.06	0.26
16,152.00	91.38	178.57	9,196.34	-7,010.31	-20.78	7,010.33	1.71	1.03	1.36

Company:	Caza Operating, LLC	Local Coordinate Reference:	Well #8H
Project:	Eddy County, NM (NAD 27 NME)	WDR#10000000	KB=27' @ 3176.00usft
Site:	Forehand Ranch 22 State	MDR#10000000	KB=27' @ 3176.00usft
Well:	#8H	North Arrow	Grid
Wellbore:	ST 1	Surveyed by: Morris	Minimum Curvature
Ditch:	ST 1	Reference:	Midland District

Station	North (ft)	East (ft)	Depth (ft)	True Azimuth (deg)	True Dip (deg)	True Strike (ft)	True Dip (deg)	True Strike (ft)	True Dip (deg)
16,248.00	92.62	179.35	9,192.99	-7,106.23	-19.04	7,106.24	1.53	1.29	0.81
16,342.00	93.43	180.13	9,188.03	-7,200.10	-18.61	7,200.10	1.20	0.86	0.83
16,397.00	94.10	179.16	9,184.42	-7,254.97	-18.27	7,254.98	2.14	1.22	-1.76
Final MWD Survey (16397.00' MD)									
16,456.00	94.10	179.16	9,180.20	-7,313.82	-17.41	7,313.82	0.00	0.00	0.00
Final PTB (16456.00' MD)									

Station	North (ft)	East (ft)	Depth (ft)	True Azimuth (deg)	True Dip (deg)	True Strike (ft)	True Dip (deg)	True Strike (ft)	True Dip (deg)
16,397.00	9,184.42	-7,254.97	-18.27	Final MWD Survey (16397.00' MD)					
16,456.00	9,180.20	-7,313.82	-17.41	Final PTB (16456.00' MD)					

Checked By: _____ Approved By: _____ Date: _____

This survey is correct to the best of my knowledge and is supported by actual field data.
Steve Morris

