

**MORCOR
ENGINEERING**

**NM OIL CONSERVATION
ARTESIA DISTRICT**

OCT 19 2018

RECEIVED

Caza Operating LLC

**Forehand Ranch 22-21 State Com 3H
Forehand Ranch 22-21 State Com 3H
Forehand Ranch 22-21 State Com 3H
Forehand Ranch 22-21 State Com 3H**

30-015-45365

Plan: 181019 Forehand Ranch 22-21 State Com 3H

Morcor Standard Plan

19 October, 2018

**MORCOR
ENGINEERING**

Company: Caza Operating LLC
Project: Forehand Ranch 22-21 State Com 3H
Site: Forehand Ranch 22-21 State Com 3H
Well: Forehand Ranch 22-21 State Com 3H
Wellbore: Forehand Ranch 22-21 State Com 3H
Design: 181019 Forehand Ranch 22-21 State Com 3H

Local Co-ordinate Reference: Well Forehand Ranch 22-21 State Com 3H
TVD Reference: WELL @ 3162.0usft (Original Well Elev)
MD Reference: WELL @ 3162.0usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Project Forehand Ranch 22-21 State Com 3H

Map System: US State Plane 1983
Geo Datum: North American Datum 1983
Map Zone: New Mexico Eastern Zone

System Datum: Mean Sea Level

Site Forehand Ranch 22-21 State Com 3H

Site Position: Northing: 470,805.98 usft Latitude: 32° 17' 39.170 N
From: Lat/Long Easting: 591,717.89 usft Longitude: 104° 10' 13.033 W
Position Uncertainty: 1.0 usft Slot Radius: 17-1/2 " Grid Convergence: 0.09 "

Well Forehand Ranch 22-21 State Com 3H

Well Position: +N-S 0.0 usft Northing: 470,805.98 usft Latitude: 32° 17' 39.170 N
+E-W 0.0 usft Easting: 591,717.89 usft Longitude: 104° 10' 13.033 W
Position Uncertainty: 1.0 usft Wellhead Elevation: usft Ground Level: 3,140.0 usft

Wellbore Forehand Ranch 22-21 State Com 3H

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/19/2018	6.96	59.97	47,885

Design 181019 Forehand Ranch 22-21 State Com 3H

Audit Notes:
Version: Phase: PLAN Tie On Depth: 0.0
Vertical Section: Depth From (TVD) +N-S +E-W Direction
(usft) (usft) (usft) (°)
0.0 0.0 0.0 274.61

Survey Tool Program Date 10/19/2018

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	20,044.0	181019 Forehand Ranch 22-21 State Com	MWD	MWD - Standard

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0.0	0.00	0.00	0.0	-3,162.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
100.0	0.00	13.50	100.0	-3,062.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
181.0	0.00	13.50	181.0	-2,981.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
Rustler										
200.0	0.00	13.50	200.0	-2,962.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
206.0	0.00	13.50	206.0	-2,956.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
20" Conductor										
300.0	0.00	13.50	300.0	-2,882.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
400.0	0.00	13.50	400.0	-2,782.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
472.0	0.00	13.50	472.0	-2,690.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
Top of Salt										
500.0	0.00	13.50	500.0	-2,662.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
600.0	0.00	13.50	600.0	-2,562.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
700.0	0.00	13.50	700.0	-2,462.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
765.0	0.00	13.50	765.0	-2,397.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
Base of Salt										
800.0	0.00	13.50	800.0	-2,362.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
856.0	0.00	13.50	856.0	-2,306.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
Castile										
900.0	0.00	13.50	900.0	-2,262.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
1,000.0	0.00	13.50	1,000.0	-2,162.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
1,100.0	0.00	13.50	1,100.0	-2,062.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
1,200.0	0.00	13.50	1,200.0	-1,962.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
1,300.0	0.00	13.50	1,300.0	-1,862.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
1,400.0	0.00	13.50	1,400.0	-1,762.0	0.0	0.0	591,717.89	470,805.98	0.00	0.00
Start Build 3.90										
1,500.0	3.90	13.50	1,499.9	-1,662.1	3.3	0.8	591,718.68	470,809.28	-0.53	3.90

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1,600.0	7.80	13.50	1,599.4	-1,562.6	13.2	3.2	591,721.06	470,819.19	-2.10	3.90
Start 7400.0 hold at 1600.0 MD										
1,700.0	7.80	13.50	1,698.5	-1,463.5	26.4	6.3	591,724.23	470,832.39	-4.20	0.00
1,800.0	7.80	13.50	1,797.5	-1,364.5	39.6	9.5	591,727.40	470,845.59	-6.30	0.00
1,900.0	7.80	13.50	1,896.6	-1,265.4	52.8	12.7	591,730.57	470,858.78	-8.39	0.00
2,000.0	7.80	13.50	1,995.7	-1,166.3	66.0	15.8	591,733.73	470,871.98	-10.49	0.00
2,100.0	7.80	13.50	2,094.8	-1,067.2	79.2	19.0	591,736.90	470,885.18	-12.59	0.00
2,146.7	7.80	13.50	2,141.0	-1,021.0	85.4	20.5	591,738.38	470,891.34	-13.57	0.00
13 3/8" Surface Casing										
2,171.9	7.80	13.50	2,166.0	-996.0	88.7	21.3	591,739.18	470,894.67	-14.09	0.00
Delaware										
2,200.0	7.80	13.50	2,193.8	-968.2	92.4	22.2	591,740.07	470,898.37	-14.68	0.00
2,300.0	7.80	13.50	2,292.9	-869.1	105.6	25.4	591,743.24	470,911.57	-16.78	0.00
2,400.0	7.80	13.50	2,392.0	-770.0	118.8	28.5	591,746.41	470,924.77	-18.88	0.00
2,500.0	7.80	13.50	2,491.1	-670.9	132.0	31.7	591,749.57	470,937.96	-20.98	0.00
2,600.0	7.80	13.50	2,590.1	-571.9	145.2	34.9	591,752.74	470,951.16	-23.07	0.00
2,700.0	7.80	13.50	2,689.2	-472.8	158.4	38.0	591,755.91	470,964.36	-25.17	0.00
2,800.0	7.80	13.50	2,788.3	-373.7	171.6	41.2	591,759.08	470,977.55	-27.27	0.00
2,900.0	7.80	13.50	2,887.4	-274.6	184.8	44.4	591,762.25	470,990.75	-29.38	0.00
2,912.8	7.80	13.50	2,900.0	-262.0	186.5	44.8	591,762.65	470,992.43	-29.63	0.00
Cherry Canyon										
3,000.0	7.80	13.50	2,986.4	-175.6	198.0	47.5	591,765.42	471,003.95	-31.46	0.00
3,100.0	7.80	13.50	3,085.5	-76.5	211.2	50.7	591,768.58	471,017.14	-33.56	0.00
3,200.0	7.80	13.50	3,184.6	22.6	224.4	53.9	591,771.75	471,030.34	-35.66	0.00
3,300.0	7.80	13.50	3,283.7	121.7	237.6	57.0	591,774.92	471,043.54	-37.75	0.00
3,400.0	7.80	13.50	3,382.7	220.7	250.8	60.2	591,778.09	471,056.73	-39.85	0.00
3,500.0	7.80	13.50	3,481.8	319.8	264.0	63.4	591,781.26	471,069.93	-41.95	0.00
3,600.0	7.80	13.50	3,580.9	418.9	277.1	66.5	591,784.42	471,083.13	-44.05	0.00

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3,700.0	7.80	13.50	3,880.0	518.0	290.3	89.7	591,787.59	471,096.32	-46.14	0.00
3,800.0	7.80	13.50	3,779.0	617.0	303.5	72.9	591,790.76	471,109.52	-48.24	0.00
3,900.0	7.80	13.50	3,878.1	716.1	316.7	76.0	591,793.93	471,122.72	-50.34	0.00
4,000.0	7.80	13.50	3,977.2	815.2	329.9	79.2	591,797.10	471,135.91	-52.43	0.00
4,100.0	7.80	13.50	4,076.3	914.3	343.1	82.4	591,800.27	471,149.11	-54.53	0.00
4,200.0	7.80	13.50	4,175.3	1,013.3	356.3	85.5	591,803.43	471,162.30	-56.63	0.00
4,273.4	7.80	13.50	4,248.0	1,086.0	366.0	87.9	591,805.76	471,171.98	-58.17	0.00
Brushy Canyon										
4,300.0	7.80	13.50	4,274.4	1,112.4	369.5	88.7	591,806.60	471,175.50	-58.73	0.00
4,400.0	7.80	13.50	4,373.5	1,211.5	382.7	91.9	591,809.77	471,188.70	-60.82	0.00
4,500.0	7.80	13.50	4,472.6	1,310.6	395.9	95.1	591,812.94	471,201.89	-62.92	0.00
4,600.0	7.80	13.50	4,571.6	1,409.6	409.1	98.2	591,816.11	471,215.09	-65.02	0.00
4,700.0	7.80	13.50	4,670.7	1,508.7	422.3	101.4	591,819.28	471,228.29	-67.12	0.00
4,800.0	7.80	13.50	4,769.8	1,607.8	435.5	104.6	591,822.44	471,241.48	-69.21	0.00
4,900.0	7.80	13.50	4,868.9	1,706.9	448.7	107.7	591,825.61	471,254.68	-71.31	0.00
5,000.0	7.80	13.50	4,967.9	1,805.9	461.9	110.9	591,828.78	471,267.88	-73.41	0.00
5,100.0	7.80	13.50	5,067.0	1,905.0	475.1	114.1	591,831.95	471,281.07	-75.50	0.00
5,200.0	7.80	13.50	5,166.1	2,004.1	488.3	117.2	591,835.12	471,294.27	-77.60	0.00
5,300.0	7.80	13.50	5,265.1	2,103.1	501.5	120.4	591,838.28	471,307.47	-79.70	0.00
5,400.0	7.80	13.50	5,364.2	2,202.2	514.7	123.6	591,841.45	471,320.66	-81.80	0.00
5,500.0	7.80	13.50	5,463.3	2,301.3	527.9	126.7	591,844.62	471,333.86	-83.89	0.00
5,600.0	7.80	13.50	5,562.4	2,400.4	541.1	129.9	591,847.79	471,347.06	-85.99	0.00
5,649.1	7.80	13.50	5,611.0	2,449.0	547.6	131.5	591,849.34	471,353.53	-87.02	0.00
Bone Spring										
5,700.0	7.80	13.50	5,661.4	2,499.4	554.3	133.1	591,850.96	471,360.25	-88.09	0.00
5,800.0	7.80	13.50	5,760.5	2,598.5	567.5	136.2	591,854.13	471,373.45	-90.19	0.00
5,900.0	7.80	13.50	5,859.6	2,697.6	580.7	139.4	591,857.29	471,386.65	-92.28	0.00

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6,000.0	7.80	13.50	5,958.7	2,796.7	593.9	142.6	591,860.46	471,399.84	-94.38	0.00
6,100.0	7.80	13.50	6,057.7	2,895.7	607.1	145.7	591,863.63	471,413.04	-96.48	0.00
6,200.0	7.80	13.50	6,156.8	2,994.8	620.3	148.9	591,866.80	471,426.24	-98.57	0.00
6,300.0	7.80	13.50	6,255.9	3,093.9	633.5	152.1	591,869.97	471,439.43	-100.67	0.00
6,400.0	7.80	13.50	6,355.0	3,193.0	646.7	155.2	591,873.13	471,452.63	-102.77	0.00
6,500.0	7.80	13.50	6,454.0	3,292.0	659.8	158.4	591,876.30	471,465.83	-104.87	0.00
6,600.0	7.80	13.50	6,553.1	3,391.1	673.0	161.6	591,879.47	471,479.02	-106.96	0.00
6,700.0	7.80	13.50	6,652.2	3,490.2	686.2	164.8	591,882.64	471,492.22	-109.06	0.00
6,736.1	7.80	13.50	6,688.0	3,526.0	691.0	165.9	591,883.78	471,496.99	-109.82	0.00
1st Bone Spring Sand										
6,800.0	7.80	13.50	6,751.3	3,589.3	699.4	167.9	591,885.81	471,505.42	-111.16	0.00
6,900.0	7.80	13.50	6,850.3	3,688.3	712.6	171.1	591,888.98	471,518.61	-113.26	0.00
7,000.0	7.80	13.50	6,949.4	3,787.4	725.8	174.3	591,892.14	471,531.81	-115.35	0.00
7,100.0	7.80	13.50	7,048.5	3,886.5	739.0	177.4	591,895.31	471,545.01	-117.45	0.00
7,200.0	7.80	13.50	7,147.6	3,985.6	752.2	180.6	591,898.48	471,558.20	-119.55	0.00
7,300.0	7.80	13.50	7,246.6	4,084.6	765.4	183.8	591,901.65	471,571.40	-121.64	0.00
7,318.5	7.80	13.50	7,265.0	4,103.0	767.9	184.3	591,902.24	471,573.84	-122.03	0.00
2nd Bone Spring Sand										
7,400.0	7.80	13.50	7,345.7	4,183.7	778.6	186.9	591,904.82	471,584.60	-123.74	0.00
7,457.8	7.80	13.50	7,403.0	4,241.0	786.2	188.8	591,906.65	471,592.22	-124.95	0.00
2nd Bone Spring Sand Base										
7,500.0	7.80	13.50	7,444.8	4,282.8	791.8	190.1	591,907.99	471,597.79	-125.84	0.00
7,508.3	7.80	13.50	7,453.0	4,291.0	792.9	190.4	591,908.25	471,598.88	-126.01	0.00
9 5/8" Intermediate Casing										
7,600.0	7.80	13.50	7,543.9	4,381.9	805.0	193.3	591,911.15	471,610.99	-127.94	0.00
7,700.0	7.80	13.50	7,642.9	4,480.9	818.2	196.4	591,914.32	471,624.18	-130.03	0.00
7,800.0	7.80	13.50	7,742.0	4,580.0	831.4	199.6	591,917.49	471,637.38	-132.13	0.00
7,900.0	7.80	13.50	7,841.1	4,679.1	844.6	202.8	591,920.66	471,650.58	-134.23	0.00

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8,000.0	7.80	13.50	7,940.2	4,778.2	857.8	205.9	591,923.83	471,663.77	-138.33	0.00
8,100.0	7.80	13.50	8,039.2	4,877.2	871.0	209.1	591,926.99	471,676.97	-138.42	0.00
8,163.3	7.80	13.50	8,102.0	4,940.0	879.4	211.1	591,929.00	471,685.33	-139.75	0.00
Harkey Sand										
8,200.0	7.80	13.50	8,138.3	4,976.3	884.2	212.3	591,930.16	471,690.17	-140.52	0.00
8,300.0	7.80	13.50	8,237.4	5,075.4	897.4	215.4	591,933.33	471,703.36	-142.62	0.00
8,400.0	7.80	13.50	8,336.5	5,174.5	910.6	218.6	591,936.50	471,716.56	-144.71	0.00
8,500.0	7.80	13.50	8,435.5	5,273.5	923.8	221.8	591,939.67	471,729.76	-146.81	0.00
8,600.0	7.80	13.50	8,534.6	5,372.6	937.0	224.9	591,942.84	471,742.95	-148.91	0.00
8,700.0	7.80	13.50	8,633.7	5,471.7	950.2	228.1	591,946.00	471,756.15	-151.01	0.00
8,759.9	7.80	13.50	8,693.0	5,531.0	958.1	230.0	591,947.90	471,764.05	-152.26	0.00
3rd Bone Spring Sand										
8,800.0	7.80	13.50	8,732.8	5,570.8	963.4	231.3	591,949.17	471,769.35	-153.10	0.00
8,900.0	7.80	13.50	8,831.8	5,669.8	976.6	234.5	591,952.34	471,782.54	-155.20	0.00
9,000.0	7.80	13.50	8,930.9	5,768.9	989.8	237.6	591,955.51	471,795.74	-157.30	0.00
Start Drop -3.90										
9,008.2	7.48	13.50	8,939.0	5,777.0	990.8	237.9	591,955.76	471,796.79	-157.47	3.90
Wolfcamp										
9,100.0	3.90	13.50	9,030.4	5,868.4	999.7	240.0	591,957.89	471,805.65	-158.87	3.90
9,200.0	0.00	0.00	9,130.3	5,968.3	1,003.0	240.8	591,958.68	471,808.96	-159.40	3.90
Start 125.0 hold at 9200.0 MD										
9,300.0	0.00	269.00	9,230.3	6,068.3	1,003.0	240.8	591,958.68	471,808.96	-159.40	0.00
9,325.0	0.00	269.00	9,255.3	6,093.3	1,003.0	240.8	591,958.68	471,808.96	-159.40	0.00
Start Build 11.12										
9,400.0	8.34	269.00	9,330.0	6,168.0	1,002.9	235.3	591,953.23	471,808.88	-153.98	11.12
9,497.9	19.23	269.00	9,425.0	6,263.0	1,002.5	212.1	591,929.94	471,808.46	-130.79	11.12
Wolfcamp B										
9,500.0	19.46	269.00	9,427.0	6,265.0	1,002.5	211.4	591,929.25	471,808.44	-130.10	11.12

Company: Caza Operating LLC
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Design: 181019 Forehand Ranch 22-21 State Com 3H

Local Co-ordinate Reference: Well Forehand Ranch 22-21 State Com 3H
TVD Reference: WELL @ 3162.0usft (Original Well Elev)
MD Reference: WELL @ 3162.0usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLag (°/100usft)
9,600.0	30.58	269.00	9,517.4	6,355.4	1,001.7	189.1	591,887.03	471,807.71	-88.08	11.12
9,700.0	41.70	269.00	9,598.1	6,438.1	1,000.7	110.3	591,828.15	471,806.68	-29.48	11.12
9,800.0	52.82	269.00	9,665.8	6,503.8	999.4	38.9	591,754.84	471,805.40	43.50	11.12
9,900.0	63.94	269.00	9,718.2	6,556.2	997.9	-48.1	591,669.83	471,803.92	128.12	11.12
10,000.0	75.06	269.00	9,753.1	6,591.1	996.3	-141.6	591,576.32	471,802.28	221.19	11.12
10,100.0	86.18	269.00	9,769.4	6,607.4	994.6	-240.1	591,477.83	471,800.56	319.23	11.12
10,140.0	90.63	269.00	9,770.5	6,608.5	993.9	-280.0	591,437.86	471,799.87	359.01	11.12
Start 9904.0 hold at 10140.0 MD										
10,200.0	90.63	269.00	9,769.8	6,607.8	992.8	-340.0	591,377.87	471,798.82	418.72	0.00
10,300.0	90.63	269.00	9,768.7	6,606.7	991.1	-440.0	591,277.89	471,797.07	518.23	0.00
10,400.0	90.63	269.00	9,767.8	6,605.8	989.4	-540.0	591,177.91	471,795.33	617.75	0.00
10,500.0	90.63	269.00	9,766.5	6,604.5	987.6	-640.0	591,077.93	471,793.58	717.26	0.00
10,600.0	90.63	269.00	9,765.4	6,603.4	985.9	-739.9	590,977.96	471,791.84	816.78	0.00
10,700.0	90.63	269.00	9,764.3	6,602.3	984.1	-839.9	590,877.98	471,790.09	916.29	0.00
10,800.0	90.63	269.00	9,763.3	6,601.3	982.4	-939.9	590,778.00	471,788.35	1,015.81	0.00
10,900.0	90.63	269.00	9,762.2	6,600.2	980.6	-1,039.9	590,678.02	471,786.60	1,115.32	0.00
11,000.0	90.63	269.00	9,761.1	6,599.1	978.9	-1,139.8	590,578.04	471,784.86	1,214.84	0.00
11,100.0	90.63	269.00	9,760.0	6,598.0	977.1	-1,239.8	590,478.06	471,783.11	1,314.35	0.00
11,200.0	90.63	269.00	9,758.9	6,596.9	975.4	-1,339.8	590,378.08	471,781.37	1,413.87	0.00
11,300.0	90.63	269.00	9,757.8	6,595.8	973.6	-1,439.8	590,278.10	471,779.62	1,513.38	0.00
11,400.0	90.63	269.00	9,756.7	6,594.7	971.9	-1,539.8	590,178.13	471,777.88	1,612.90	0.00
11,500.0	90.63	269.00	9,755.6	6,593.6	970.2	-1,639.7	590,078.15	471,776.13	1,712.41	0.00
11,600.0	90.63	269.00	9,754.5	6,592.5	968.4	-1,739.7	589,978.17	471,774.39	1,811.93	0.00
11,700.0	90.63	269.00	9,753.4	6,591.4	966.7	-1,839.7	589,878.19	471,772.64	1,911.44	0.00
11,800.0	90.63	269.00	9,752.3	6,590.3	964.9	-1,939.7	589,778.21	471,770.90	2,010.96	0.00
11,900.0	90.63	269.00	9,751.2	6,589.2	963.2	-2,039.7	589,678.23	471,769.15	2,110.47	0.00
12,000.0	90.63	269.00	9,750.1	6,588.1	961.4	-2,139.6	589,578.25	471,767.41	2,209.99	0.00

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Wellbore: Forehand Ranch 22-21 State Com 3H
Design: 181019 Forehand Ranch 22-21 State Com 3H

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well Forehand Ranch 22-21 State Com 3H
WELL @ 3182.0usft (Original Well Elev)
WELL @ 3182.0usft (Original Well Elev)
Grid
Minimum Curvature
EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLog (°/100usft)
12,100.0	90.63	269.00	9,749.0	6,587.0	959.7	-2,239.6	589,478.27	471,765.66	2,309.50	0.00
12,200.0	90.63	269.00	9,747.9	6,585.9	957.9	-2,339.6	589,378.30	471,763.92	2,409.02	0.00
12,300.0	90.63	269.00	9,746.8	6,584.8	956.2	-2,439.6	589,278.32	471,762.17	2,508.53	0.00
12,400.0	90.63	269.00	9,745.7	6,583.7	954.4	-2,539.5	589,178.34	471,760.43	2,608.05	0.00
12,500.0	90.63	269.00	9,744.6	6,582.6	952.7	-2,639.5	589,078.36	471,758.68	2,707.56	0.00
12,600.0	90.63	269.00	9,743.5	6,581.5	951.0	-2,739.5	588,978.38	471,756.94	2,807.08	0.00
12,700.0	90.63	269.00	9,742.4	6,580.4	949.2	-2,839.5	588,878.40	471,755.19	2,906.59	0.00
12,800.0	90.63	269.00	9,741.3	6,579.3	947.5	-2,939.5	588,778.42	471,753.45	3,006.11	0.00
12,900.0	90.63	269.00	9,740.2	6,578.2	945.7	-3,039.4	588,678.44	471,751.70	3,105.62	0.00
13,000.0	90.63	269.00	9,739.1	6,577.1	944.0	-3,139.4	588,578.47	471,749.96	3,205.14	0.00
13,100.0	90.63	269.00	9,738.0	6,576.0	942.2	-3,239.4	588,478.49	471,748.21	3,304.65	0.00
13,200.0	90.63	269.00	9,736.9	6,574.9	940.5	-3,339.4	588,378.51	471,746.47	3,404.17	0.00
13,300.0	90.63	269.00	9,735.8	6,573.8	938.7	-3,439.4	588,278.53	471,744.72	3,503.68	0.00
13,400.0	90.63	269.00	9,734.7	6,572.7	937.0	-3,539.3	588,178.55	471,742.97	3,603.20	0.00
13,500.0	90.63	269.00	9,733.6	6,571.6	935.3	-3,639.3	588,078.57	471,741.23	3,702.71	0.00
13,600.0	90.63	269.00	9,732.5	6,570.5	933.5	-3,739.3	587,978.59	471,739.48	3,802.23	0.00
13,700.0	90.63	269.00	9,731.4	6,569.4	931.8	-3,839.3	587,878.61	471,737.74	3,901.74	0.00
13,800.0	90.63	269.00	9,730.3	6,568.3	930.0	-3,939.3	587,778.64	471,735.99	4,001.26	0.00
13,900.0	90.63	269.00	9,729.2	6,567.2	928.3	-4,039.2	587,678.66	471,734.25	4,100.77	0.00
14,000.0	90.63	269.00	9,728.1	6,566.1	926.5	-4,139.2	587,578.68	471,732.50	4,200.29	0.00
14,100.0	90.63	269.00	9,727.0	6,565.0	924.8	-4,239.2	587,478.70	471,730.76	4,299.80	0.00
14,200.0	90.63	269.00	9,725.9	6,563.9	923.0	-4,339.2	587,378.72	471,729.01	4,399.32	0.00
14,300.0	90.63	269.00	9,724.8	6,562.8	921.3	-4,439.1	587,278.74	471,727.27	4,498.83	0.00
14,400.0	90.63	269.00	9,723.7	6,561.7	919.5	-4,539.1	587,178.76	471,725.52	4,598.35	0.00
14,500.0	90.63	269.00	9,722.6	6,560.6	917.8	-4,639.1	587,078.78	471,723.78	4,697.86	0.00
14,600.0	90.63	269.00	9,721.5	6,559.5	916.1	-4,739.1	586,978.81	471,722.03	4,797.38	0.00
14,700.0	90.63	269.00	9,720.4	6,558.4	914.3	-4,839.1	586,878.83	471,720.29	4,896.89	0.00

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Design: 181019 Forehand Ranch 22-21 State Com 3H

Local Co-ordinate Reference: Well Forehand Ranch 22-21 State Com 3H
TVD Reference: WELL @ 3162.0usft (Original Well Elev)
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Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLag (°/100usft)
14,800.0	90.63	269.00	9,719.3	6,557.3	912.6	-4,939.0	588,778.85	471,716.54	4,996.41	0.00
14,900.0	90.63	269.00	9,718.2	6,556.2	910.8	-5,039.0	588,678.87	471,716.80	5,095.92	0.00
15,000.0	90.63	269.00	9,717.1	6,555.1	909.1	-5,139.0	588,578.89	471,715.05	5,195.44	0.00
15,100.0	90.63	269.00	9,716.0	6,554.0	907.3	-5,239.0	588,478.91	471,713.31	5,294.95	0.00
15,200.0	90.63	269.00	9,714.9	6,552.9	905.6	-5,339.0	588,378.93	471,711.56	5,394.47	0.00
15,300.0	90.63	269.00	9,713.8	6,551.8	903.8	-5,438.9	588,278.96	471,709.82	5,493.98	0.00
15,400.0	90.63	269.00	9,712.7	6,550.7	902.1	-5,538.9	588,178.98	471,708.07	5,593.50	0.00
15,500.0	90.63	269.00	9,711.6	6,549.6	900.4	-5,638.9	588,079.00	471,706.33	5,693.01	0.00
15,600.0	90.63	269.00	9,710.5	6,548.5	898.6	-5,738.9	585,979.02	471,704.58	5,792.53	0.00
15,700.0	90.63	269.00	9,709.4	6,547.4	896.9	-5,838.8	585,879.04	471,702.84	5,892.04	0.00
15,800.0	90.63	269.00	9,708.3	6,546.3	895.1	-5,938.8	585,779.06	471,701.09	5,991.56	0.00
15,900.0	90.63	269.00	9,707.2	6,545.2	893.4	-6,038.8	585,679.08	471,699.35	6,091.07	0.00
16,000.0	90.63	269.00	9,706.1	6,544.1	891.6	-6,138.8	585,579.10	471,697.60	6,190.59	0.00
16,100.0	90.63	269.00	9,705.0	6,543.0	889.9	-6,238.8	585,479.13	471,695.86	6,290.10	0.00
16,200.0	90.63	269.00	9,703.9	6,541.9	888.1	-6,338.7	585,379.15	471,694.11	6,389.62	0.00
16,300.0	90.63	269.00	9,702.8	6,540.8	886.4	-6,438.7	585,279.17	471,692.37	6,489.13	0.00
16,400.0	90.63	269.00	9,701.7	6,539.7	884.6	-6,538.7	585,179.19	471,690.62	6,588.65	0.00
16,500.0	90.63	269.00	9,700.6	6,538.6	882.9	-6,638.7	585,079.21	471,688.88	6,688.16	0.00
16,600.0	90.63	269.00	9,699.5	6,537.5	881.2	-6,738.7	584,979.23	471,687.13	6,787.68	0.00
16,700.0	90.63	269.00	9,698.4	6,536.4	879.4	-6,838.6	584,879.25	471,685.39	6,887.19	0.00
16,800.0	90.63	269.00	9,697.3	6,535.3	877.7	-6,938.6	584,779.27	471,683.64	6,986.71	0.00
16,900.0	90.63	269.00	9,696.2	6,534.2	875.9	-7,038.6	584,679.30	471,681.90	7,086.22	0.00
17,000.0	90.63	269.00	9,695.1	6,533.1	874.2	-7,138.6	584,579.32	471,680.15	7,185.74	0.00
17,100.0	90.63	269.00	9,694.0	6,532.0	872.4	-7,238.5	584,479.34	471,678.40	7,285.25	0.00
17,200.0	90.63	269.00	9,692.9	6,530.9	870.7	-7,338.5	584,379.36	471,676.66	7,384.77	0.00
17,300.0	90.63	269.00	9,691.8	6,529.8	868.9	-7,438.5	584,279.38	471,674.91	7,484.28	0.00
17,400.0	90.63	269.00	9,690.7	6,528.7	867.2	-7,538.5	584,179.40	471,673.17	7,583.80	0.00

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17,500.0	90.63	269.00	9,689.6	6,527.6	865.4	-7,638.5	584,079.42	471,671.42	7,683.31	0.00
17,600.0	90.63	269.00	9,688.5	6,526.5	863.7	-7,738.4	583,979.44	471,669.68	7,782.83	0.00
17,700.0	90.63	269.00	9,687.4	6,525.4	862.0	-7,838.4	583,879.47	471,667.93	7,882.34	0.00
17,800.0	90.63	269.00	9,686.3	6,524.3	860.2	-7,938.4	583,779.49	471,666.19	7,981.86	0.00
17,900.0	90.63	269.00	9,685.2	6,523.2	858.5	-8,038.4	583,679.51	471,664.44	8,081.37	0.00
18,000.0	90.63	269.00	9,684.1	6,522.1	856.7	-8,138.4	583,579.53	471,662.70	8,180.89	0.00
18,100.0	90.63	269.00	9,683.0	6,521.0	855.0	-8,238.3	583,479.55	471,660.95	8,280.40	0.00
18,200.0	90.63	269.00	9,681.9	6,519.9	853.2	-8,338.3	583,379.57	471,659.21	8,379.92	0.00
18,300.0	90.63	269.00	9,680.8	6,518.8	851.5	-8,438.3	583,279.59	471,657.46	8,479.43	0.00
18,400.0	90.63	269.00	9,679.7	6,517.7	849.7	-8,538.3	583,179.61	471,655.72	8,578.95	0.00
18,500.0	90.63	269.00	9,678.6	6,516.6	848.0	-8,638.3	583,079.64	471,653.97	8,678.46	0.00
18,600.0	90.63	269.00	9,677.5	6,515.5	846.3	-8,738.2	582,979.66	471,652.23	8,777.98	0.00
18,700.0	90.63	269.00	9,676.4	6,514.4	844.5	-8,838.2	582,879.68	471,650.48	8,877.49	0.00
18,800.0	90.63	269.00	9,675.3	6,513.3	842.8	-8,938.2	582,779.70	471,648.74	8,977.01	0.00
18,900.0	90.63	269.00	9,674.2	6,512.2	841.0	-9,038.2	582,679.72	471,646.99	9,076.52	0.00
19,000.0	90.63	269.00	9,673.1	6,511.1	839.3	-9,138.1	582,579.74	471,645.25	9,176.04	0.00
19,100.0	90.63	269.00	9,672.0	6,510.0	837.5	-9,238.1	582,479.76	471,643.50	9,275.55	0.00
19,200.0	90.63	269.00	9,670.9	6,508.9	835.8	-9,338.1	582,379.78	471,641.76	9,375.07	0.00
19,300.0	90.63	269.00	9,669.8	6,507.8	834.0	-9,438.1	582,279.81	471,640.01	9,474.58	0.00
19,400.0	90.63	269.00	9,668.7	6,506.7	832.3	-9,538.1	582,179.83	471,638.27	9,574.10	0.00
19,500.0	90.63	269.00	9,667.6	6,505.6	830.5	-9,638.0	582,079.85	471,636.52	9,673.61	0.00
19,600.0	90.63	269.00	9,666.5	6,504.5	828.8	-9,738.0	581,979.87	471,634.78	9,773.13	0.00
19,700.0	90.63	269.00	9,665.4	6,503.4	827.1	-9,838.0	581,879.89	471,633.03	9,872.64	0.00
19,800.0	90.63	269.00	9,664.3	6,502.3	825.3	-9,938.0	581,779.91	471,631.29	9,972.16	0.00
19,900.0	90.63	269.00	9,663.2	6,501.2	823.6	-10,038.0	581,679.93	471,629.54	10,071.67	0.00
20,000.0	90.63	269.00	9,662.1	6,500.1	821.8	-10,137.9	581,579.95	471,627.80	10,171.19	0.00

Company: Caza Operating LLC
Project: Forehand Ranch 22-21 State Com 3H
Site: Forehand Ranch 22-21 State Com 3H
Well: Forehand Ranch 22-21 State Com 3H
Wellbore: Forehand Ranch 22-21 State Com 3H
Design: 181019 Forehand Ranch 22-21 State Com 3H

Local Co-ordinate Reference: Well Forehand Ranch 22-21 State Com 3H
TVD Reference: WELL @ 3162.0usft (Original Well Elev)
MD Reference: WELL @ 3162.0usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLog (°/100usft)
20,044.0	90.83	289.00	9,661.6	6,499.6	821.1	-10,181.9	581,535.96	471,627.03	10,214.97	0.00

TD at 20044.0 - 5 1/2" Production Casing

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
7,508.3	7,453.0	9 5/8" Intermediate Casing	9-5/8	12-1/4
20,044.0	9,661.6	5 1/2" Production Casing	5-1/2	8-1/2
206.0	206.0	20" Conductor	20	26
2,146.7	2,141.0	13 3/8" Surface Casing	13-3/8	17-1/2

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,649.1	5,611.0	Bone Spring		0.00	
765.0	765.0	Base of Salt		0.00	
856.0	856.0	Castile		0.00	
2,171.9	2,166.0	Delaware		0.00	
4,273.4	4,248.0	Brushy Canyon		0.00	
8,759.9	8,693.0	3rd Bone Spring Sand		0.00	
2,912.6	2,900.0	Cherry Canyon		0.00	
7,457.8	7,403.0	2nd Bone Spring Sand Base		0.00	
9,008.2	8,939.0	Wolfcamp		0.00	
6,736.1	6,688.0	1st Bone Spring Sand		0.00	
472.0	472.0	Top of Salt		0.00	
8,163.3	8,102.0	Harkey Sand		0.00	
181.0	181.0	Rustler		0.00	
9,497.9	9,425.0	Wolfcamp B		0.00	
7,318.5	7,265.0	2nd Bone Spring Sand		0.00	

Company:	Caiza Operating LLC	Local Co-ordinate Reference:	Well Forehand Ranch 22-21 State Com 3H
Project:	Forehand Ranch 22-21 State Com 3H	TVD Reference:	WELL @ 3162.0usft (Original Well Elev)
Site:	Forehand Ranch 22-21 State Com 3H	MD Reference:	WELL @ 3162.0usft (Original Well Elev)
Well:	Forehand Ranch 22-21 State Com 3H	North Reference:	Grid
Wellbore:	Forehand Ranch 22-21 State Com 3H	Survey Calculation Method:	Minimum Curvature
Design:	181019 Forehand Ranch 22-21 State Com 3H	Database:	EDM 5000.1 Single User Db

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,400.0	1,400.0	0.0	0.0	Start Build 3.90
1,600.0	1,599.4	13.2	3.2	Start 7400.0 hold at 1600.0 MD
9,000.0	8,930.9	989.8	237.6	Start Drop -3.90
9,200.0	9,130.3	1,003.0	240.8	Start 125.0 hold at 9200.0 MD
9,325.0	9,255.3	1,003.0	240.8	Start Build 11.12
10,140.0	9,770.5	993.9	-280.0	Start 9904.0 hold at 10140.0 MD
20,044.0	9,981.6	821.1	-10,181.9	TD at 20044.0

Checked By: _____	Approved By: _____	Date: _____
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Project: Forehand Ranch 22-21 State Com 3H
 Site: Forehand Ranch 22-21 State Com 3H
 Well: Forehand Ranch 22-21 State Com 3H
 Wellbore: Forehand Ranch 22-21 State Com 3H
 Design: 181019 Forehand Ranch 22-21 State Com 3H



**Caza
Petroleum**



Azimuths to Grid North
 True North: -0.09°
 Magnetic North: 6.88°

Magnetic Field
 Strength: 47864.9snT
 Dip Angle: 59.97°
 Date: 10/19/2018
 Model: IGRF2010

CASING DETAILS

TVD	MD	Name	Size
206.0	206.0	20" Conductor	20
2141.0	2146.7	13 3/8" Surface Casing	13-3/8
7453.0	7508.3	9 5/8" Intermediate Casing	9-5/8
9661.6	20044.0	5 1/2" Production Casing	5-1/2

FORMATION TOP DETAILS

TVDPath	MDPath	Formation	DipAngle	DipDir
181.0	181.0	Rustler	0.00	
472.0	472.0	Top of Salt	0.00	
765.0	765.0	Base of Salt	0.00	
856.0	856.0	Castile	0.00	
2166.0	2171.9	Delaware	0.00	
2900.0	2912.8	Cherry Canyon	0.00	
4248.0	4273.4	Brushy Canyon	0.00	
5611.0	5649.1	Bone Spring	0.00	
6688.0	6736.1	1st Bone Spring Sand	0.00	
7265.0	7318.5	2nd Bone Spring Sand	0.00	
7403.0	7457.8	2nd Bone Spring Sand Base	0.00	
8102.0	8163.3	Harkey Sand	0.00	
8693.0	8759.9	3rd Bone Spring Sand	0.00	
8939.0	9008.2	Wolfcamp	0.00	
9425.0	9497.9	Wolfcamp B	0.00	

