



Caza Operating LLC

Mad River 13 State 8H

Mad River 13 State 8H

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Plan: 190214 Mad River 13 State 8H

Morcor Standard Plan

14 February, 2019

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DISTRICT II-ARTESIA O.C.D.



Morcor Engineering
Morcor Standard Plan

Company:	Caza Operating LLC	Local Co-ordinate Reference:	Well Mad River 13 State 8H
Project:	Mad River 13 State 8H	TVD Reference:	WELL @ 3124.0usft (Original Well Elev)
Site:	Mad River 13 State 8H	MD Reference:	WELL @ 3124.0usft (Original Well Elev)
Well:	Mad River 13 State 8H	North Reference:	Grid
Wellbore:	Mad River 13 State 8H	Survey Calculation Method:	Minimum Curvature
Design:	190214 Mad River 13 State 8H	Database:	EDM 5000.1 Single User Db

Project	Mad River 13 State 8H		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Mad River 13 State 8H		
Site Position:		Northing:	440,953.83 usft
From:	Lat/Long	Easting:	602,346.26 usft
Position Uncertainty:	1.0 usft	Slot Radius:	17-1/2 "
		Latitude:	32° 12' 43.578 N
		Longitude:	104° 8' 9.845 W
		Grid Convergence:	0.11 °

Well	Mad River 13 State 8H		
Well Position	+N/-S	0.0 usft	Northing: 440,953.83 usft
	+E/-W	0.0 usft	Easting: 602,346.26 usft
Position Uncertainty	1.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 12' 43.578 N
		Longitude:	104° 8' 9.845 W
		Ground Level:	3,102.0 usft

Wellbore	Mad River 13 State 8H		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2010	2/14/2019	6.90
			Dip Angle (°) 59.89
			Field Strength (nT) 47,788

Design	190214 Mad River 13 State 8H		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.0	0.0	0.0
			Direction (°) 273.83

Survey Tool Program	Date 2/14/2019		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
0.0	15,270.0	190214 Mad River 13 State 8H (Mad River	MWD
			Description MWD - Standard



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0.0	0.00	0.00	0.0	-3,124.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
100.0	0.00	0.00	100.0	-3,024.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
120.0	0.00	0.00	120.0	-3,004.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
20" Conductor										
200.0	0.00	0.00	200.0	-2,924.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
300.0	0.00	0.00	300.0	-2,824.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
400.0	0.00	0.00	400.0	-2,724.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
500.0	0.00	0.00	500.0	-2,624.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
600.0	0.00	0.00	600.0	-2,524.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
700.0	0.00	0.00	700.0	-2,424.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
728.0	0.00	0.00	728.0	-2,396.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
13 3/8"										
753.0	0.00	0.00	753.0	-2,371.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
Salado										
800.0	0.00	0.00	800.0	-2,324.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
900.0	0.00	0.00	900.0	-2,224.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
1,000.0	0.00	0.00	1,000.0	-2,124.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
1,100.0	0.00	0.00	1,100.0	-2,024.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
1,200.0	0.00	0.00	1,200.0	-1,924.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
1,300.0	0.00	0.00	1,300.0	-1,824.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
1,400.0	0.00	0.00	1,400.0	-1,724.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
1,500.0	0.00	0.00	1,500.0	-1,624.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
1,600.0	0.00	0.00	1,600.0	-1,524.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
1,700.0	0.00	0.00	1,700.0	-1,424.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
1,800.0	0.00	0.00	1,800.0	-1,324.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
1,900.0	0.00	0.00	1,900.0	-1,224.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
2,000.0	0.00	0.00	2,000.0	-1,124.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
2,100.0	0.00	0.00	2,100.0	-1,024.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00



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2,200.0	0.00	0.00	2,200.0	-924.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
2,208.0	0.00	0.00	2,208.0	-916.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
Base of Salt										
2,300.0	0.00	0.00	2,300.0	-824.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
2,400.0	0.00	0.00	2,400.0	-724.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
2,413.0	0.00	0.00	2,413.0	-711.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
Delaware										
2,500.0	0.00	0.00	2,500.0	-624.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
2,600.0	0.00	0.00	2,600.0	-524.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
2,700.0	0.00	0.00	2,700.0	-424.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
2,800.0	0.00	0.00	2,800.0	-324.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
2,900.0	0.00	0.00	2,900.0	-224.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
3,000.0	0.00	0.00	3,000.0	-124.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
3,048.0	0.00	0.00	3,048.0	-76.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
Cherry Canyon										
3,100.0	0.00	0.00	3,100.0	-24.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
3,200.0	0.00	0.00	3,200.0	76.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
3,300.0	0.00	0.00	3,300.0	176.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
3,400.0	0.00	0.00	3,400.0	276.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
3,500.0	0.00	0.00	3,500.0	376.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
3,600.0	0.00	0.00	3,600.0	476.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
3,700.0	0.00	0.00	3,700.0	576.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
3,800.0	0.00	0.00	3,800.0	676.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
3,900.0	0.00	0.00	3,900.0	776.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
4,000.0	0.00	0.00	4,000.0	876.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
4,100.0	0.00	0.00	4,100.0	976.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
4,200.0	0.00	0.00	4,200.0	1,076.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
4,300.0	0.00	0.00	4,300.0	1,176.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00



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4,349.0	0.00	0.00	4,349.0	1,225.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
Brushy Canyon										
4,400.0	0.00	0.00	4,400.0	1,276.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
4,500.0	0.00	0.00	4,500.0	1,376.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
4,600.0	0.00	0.00	4,600.0	1,476.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
4,650.0	0.00	0.00	4,650.0	1,526.0	0.0	0.0	602,346.26	440,953.83	0.00	0.00
Start Build 3.00										
4,700.0	1.50	19.00	4,700.0	1,576.0	0.6	0.2	602,346.47	440,954.45	-0.17	3.00
4,750.0	3.00	19.00	4,750.0	1,626.0	2.5	0.9	602,347.11	440,956.31	-0.69	3.00
Start Build 3.00										
4,800.0	4.50	19.00	4,799.8	1,675.8	5.6	1.9	602,348.18	440,959.40	-1.54	3.00
4,850.0	6.00	19.00	4,849.6	1,725.6	9.9	3.4	602,349.67	440,963.73	-2.74	3.00
Start 4550.0 hold at 4850.0 MD										
4,900.0	6.00	19.00	4,899.4	1,775.4	14.8	5.1	602,351.37	440,968.67	-4.11	0.00
5,000.0	6.00	19.00	4,998.8	1,874.8	24.7	8.5	602,354.77	440,978.55	-6.84	0.00
5,100.0	6.00	19.00	5,098.3	1,974.3	34.6	11.9	602,358.18	440,988.44	-9.58	0.00
5,200.0	6.00	19.00	5,197.7	2,073.7	44.5	15.3	602,361.58	440,998.32	-12.31	0.00
5,300.0	6.00	19.00	5,297.2	2,173.2	54.4	18.7	602,364.98	441,008.20	-15.05	0.00
5,400.0	6.00	19.00	5,396.6	2,272.6	64.3	22.1	602,368.38	441,018.09	-17.79	0.00
5,500.0	6.00	19.00	5,496.1	2,372.1	74.1	25.5	602,371.79	441,027.97	-20.52	0.00
5,600.0	6.00	19.00	5,595.5	2,471.5	84.0	28.9	602,375.19	441,037.85	-23.26	0.00
5,700.0	6.00	19.00	5,695.0	2,571.0	93.9	32.3	602,378.59	441,047.74	-25.99	0.00
5,800.0	6.00	19.00	5,794.4	2,670.4	103.8	35.7	602,382.00	441,057.62	-28.73	0.00
5,900.0	6.00	19.00	5,893.9	2,769.9	113.7	39.1	602,385.40	441,067.50	-31.46	0.00
5,945.4	6.00	19.00	5,939.0	2,815.0	118.2	40.7	602,386.94	441,071.99	-32.70	0.00
Bone Spring										
6,000.0	6.00	19.00	5,993.3	2,869.3	123.6	42.5	602,388.80	441,077.39	-34.20	0.00
6,100.0	6.00	19.00	6,092.8	2,968.8	133.4	45.9	602,392.21	441,087.27	-36.94	0.00



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6,200.0	6.00	19.00	6,192.2	3,068.2	143.3	49.3	602,395.61	441,097.15	-39.67	0.00
6,300.0	6.00	19.00	6,291.7	3,167.7	153.2	52.8	602,399.01	441,107.04	-42.41	0.00
6,400.0	6.00	19.00	6,391.1	3,267.1	163.1	56.2	602,402.42	441,116.92	-45.14	0.00
6,500.0	6.00	19.00	6,490.6	3,366.6	173.0	59.6	602,405.82	441,126.80	-47.88	0.00
6,600.0	6.00	19.00	6,590.0	3,466.0	182.9	63.0	602,409.22	441,136.69	-50.61	0.00
6,700.0	6.00	19.00	6,689.5	3,565.5	192.7	66.4	602,412.63	441,146.57	-53.35	0.00
6,800.0	6.00	19.00	6,789.0	3,665.0	202.6	69.8	602,416.03	441,156.45	-56.09	0.00
6,900.0	6.00	19.00	6,888.4	3,764.4	212.5	73.2	602,419.43	441,166.34	-58.82	0.00
6,907.6	6.00	19.00	6,896.0	3,772.0	213.3	73.4	602,419.69	441,167.09	-59.03	0.00
1st Bone Spring Sand										
7,000.0	6.00	19.00	6,987.9	3,863.9	222.4	76.6	602,422.83	441,176.22	-61.56	0.00
7,100.0	6.00	19.00	7,087.3	3,963.3	232.3	80.0	602,426.24	441,186.10	-64.29	0.00
7,200.0	6.00	19.00	7,186.8	4,062.8	242.2	83.4	602,429.64	441,195.99	-67.03	0.00
7,300.0	6.00	19.00	7,286.2	4,162.2	252.0	86.8	602,433.04	441,205.87	-69.76	0.00
7,400.0	6.00	19.00	7,385.7	4,261.7	261.9	90.2	602,436.45	441,215.75	-72.50	0.00
7,500.0	6.00	19.00	7,485.1	4,361.1	271.8	93.6	602,439.85	441,225.64	-75.24	0.00
7,600.0	6.00	19.00	7,584.6	4,460.6	281.7	97.0	602,443.25	441,235.52	-77.97	0.00
7,656.7	6.00	19.00	7,641.0	4,517.0	287.3	98.9	602,445.18	441,241.13	-79.52	0.00
2nd Bone Spring Sand										
7,700.0	6.00	19.00	7,684.0	4,560.0	291.6	100.4	602,446.66	441,245.40	-80.71	0.00
7,800.0	6.00	19.00	7,783.5	4,659.5	301.5	103.8	602,450.06	441,255.29	-83.44	0.00
7,847.8	6.00	19.00	7,831.0	4,707.0	306.2	105.4	602,451.69	441,260.01	-84.75	0.00
2nd Bone Spring Sand Base										
7,900.0	6.00	19.00	7,882.9	4,758.9	311.3	107.2	602,453.46	441,265.17	-86.18	0.00
7,987.6	6.00	19.00	7,970.0	4,846.0	320.0	110.2	602,456.44	441,273.82	-88.57	0.00
9 5/8"										
8,000.0	6.00	19.00	7,982.4	4,858.4	321.2	110.6	602,456.87	441,275.05	-88.92	0.00



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8,100.0	6.00	19.00		8,081.8	4,957.8	331.1	114.0	602,460.27	441,284.94	-91.65	0.00
8,200.0	6.00	19.00		8,181.3	5,057.3	341.0	117.4	602,463.67	441,294.82	-94.39	0.00
8,291.2	6.00	19.00		8,272.0	5,148.0	350.0	120.5	602,466.78	441,303.83	-96.88	0.00
Harkey											
8,300.0	6.00	19.00		8,280.7	5,156.7	350.9	120.8	602,467.08	441,304.70	-97.12	0.00
8,400.0	6.00	19.00		8,380.2	5,256.2	360.8	124.2	602,470.48	441,314.59	-99.86	0.00
8,500.0	6.00	19.00		8,479.6	5,355.6	370.6	127.6	602,473.88	441,324.47	-102.59	0.00
8,600.0	6.00	19.00		8,579.1	5,455.1	380.5	131.0	602,477.28	441,334.35	-105.33	0.00
8,700.0	6.00	19.00		8,678.5	5,554.5	390.4	134.4	602,480.69	441,344.24	-108.07	0.00
8,800.0	6.00	19.00		8,778.0	5,654.0	400.3	137.8	602,484.09	441,354.12	-110.80	0.00
8,822.1	6.00	19.00		8,800.0	5,676.0	402.5	138.6	602,484.84	441,356.31	-111.41	0.00
3rd Bone Spring Sand											
8,900.0	6.00	19.00		8,877.4	5,753.4	410.2	141.2	602,487.49	441,364.00	-113.54	0.00
9,000.0	6.00	19.00		8,976.9	5,852.9	420.1	144.6	602,490.90	441,373.89	-116.27	0.00
9,100.0	6.00	19.00		9,076.4	5,952.4	429.9	148.0	602,494.30	441,383.77	-119.01	0.00
9,172.0	6.00	19.00		9,148.0	6,024.0	437.1	150.5	602,496.75	441,390.89	-120.98	0.00
Wolfcamp											
9,200.0	6.00	19.00		9,175.8	6,051.8	439.8	151.4	602,497.70	441,393.65	-121.74	0.00
9,300.0	6.00	19.00		9,275.3	6,151.3	449.7	154.8	602,501.11	441,403.54	-124.48	0.00
9,400.0	6.00	19.00		9,374.7	6,250.7	459.6	158.2	602,504.51	441,413.42	-127.22	0.00
Start DLS 3.00 TFO 180.00											
9,500.0	3.00	19.00		9,474.4	6,350.4	467.0	160.8	602,507.06	441,420.84	-129.27	3.00
Start Drop -3.00											
9,600.0	0.00	0.00		9,574.3	6,450.3	469.5	161.7	602,507.92	441,423.31	-129.95	3.00
Start 170.0 hold at 9600.0 MD											
9,697.7	0.00	0.00		9,672.0	6,548.0	469.5	161.7	602,507.92	441,423.31	-129.95	0.00
Wolfcamp B											
9,700.0	0.00	0.00		9,674.3	6,550.3	469.5	161.7	602,507.92	441,423.31	-129.95	0.00



Morcor Engineering
Morcor Standard Plan

Company: Caza Operating LLC
Project: Mad River 13 State 8H
Site: Mad River 13 State 8H
Well: Mad River 13 State 8H
Wellbore: Mad River 13 State 8H
Design: 190214 Mad River 13 State 8H

Local Co-ordinate Reference: Well Mad River 13 State 8H
TVD Reference: WELL @ 3124.0usft (Original Well Elev)
MD Reference: WELL @ 3124.0usft (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)	DLeg (°/100usft)
9,770.0	0.00	0.00	9,744.3	6,620.3	469.5	161.7	602,507.92	441,423.31	-129.95	0.00
Start Build 8.00										
9,800.0	2.40	268.50	9,774.3	6,650.3	469.5	161.0	602,507.29	441,423.30	-129.33	8.00
9,870.0	8.00	268.50	9,844.0	6,720.0	469.3	154.7	602,500.95	441,423.13	-123.01	8.00
Start Build 9.00										
9,900.0	10.70	268.50	9,873.6	6,749.6	469.2	149.8	602,496.08	441,423.00	-118.16	9.00
9,970.0	17.00	268.50	9,941.5	6,817.5	468.7	133.1	602,479.33	441,422.56	-101.49	9.00
Start Build 10.00										
10,000.0	20.00	268.50	9,970.0	6,846.0	468.5	123.6	602,469.82	441,422.31	-92.01	10.00
10,070.0	27.00	268.50	10,034.1	6,910.1	467.7	95.7	602,441.93	441,421.58	-64.23	10.00
Start Build 11.00										
10,091.4	29.35	268.50	10,053.0	6,929.0	467.5	85.6	602,431.84	441,421.32	-54.18	11.00
Wolfcamp C										
10,100.0	30.30	268.50	10,060.5	6,936.5	467.4	81.3	602,427.56	441,421.21	-49.91	11.00
10,170.0	38.00	268.50	10,118.4	6,994.4	466.3	42.0	602,388.30	441,420.18	-10.82	11.00
Start Build 12.00										
10,200.0	41.60	268.50	10,141.4	7,017.4	465.8	22.8	602,369.11	441,419.68	8.30	12.00
10,270.0	50.00	268.50	10,190.2	7,066.2	464.5	-27.3	602,318.99	441,418.36	58.22	12.00
Start Build 12.00										
10,300.0	53.60	268.50	10,208.7	7,084.7	463.9	-50.8	602,295.43	441,417.75	81.69	12.00
10,370.0	62.00	268.50	10,246.0	7,122.0	462.4	-110.0	602,236.27	441,416.20	140.62	12.00
Start Build 12.00										
10,400.0	65.60	268.50	10,259.2	7,135.2	461.7	-136.9	602,209.36	441,415.49	167.41	12.00
10,470.0	74.00	268.50	10,283.4	7,159.4	459.9	-202.5	602,143.75	441,413.78	232.76	12.00
Start Build 12.00										
10,500.0	77.60	268.50	10,290.7	7,166.7	459.2	-231.6	602,114.68	441,413.01	261.72	12.00
10,570.0	86.00	268.50	10,300.7	7,176.7	457.4	-300.8	602,045.48	441,411.20	330.64	12.00
Start Build 12.02										
10,600.0	89.61	268.50	10,301.9	7,177.9	456.6	-330.7	602,015.52	441,410.42	360.48	12.02



Morcor Engineering
Morcor Standard Plan

Company:	Caza Operating LLC	Local Co-ordinate Reference:	Well Mad River 13 State 8H
Project:	Mad River 13 State 8H	TVD Reference:	WELL @ 3124.0usft (Original Well Elev)
Site:	Mad River 13 State 8H	MD Reference:	WELL @ 3124.0usft (Original Well Elev)
Well:	Mad River 13 State 8H	North Reference:	Grid
Wellbore:	Mad River 13 State 8H	Survey Calculation Method:	Minimum Curvature
Design:	190214 Mad River 13 State 8H	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)	DLeg (°/100usft)
10,614.5	91.35	268.50	10,301.7	7,177.7	456.2	-345.2	602,001.02	441,410.04	374.92	12.02
Start Turn 0.00										
10,700.0	91.35	268.50	10,299.7	7,175.7	454.0	-430.7	601,915.58	441,407.80	460.03	0.00
10,800.0	91.35	268.50	10,297.4	7,173.4	451.3	-530.6	601,815.64	441,405.18	559.57	0.00
10,900.0	91.35	268.50	10,295.0	7,171.0	448.7	-630.6	601,715.70	441,402.57	659.11	0.00
11,000.0	91.35	268.50	10,292.7	7,168.7	446.1	-730.5	601,615.76	441,399.95	758.65	0.00
11,100.0	91.35	268.50	10,290.3	7,166.3	443.5	-830.4	601,515.83	441,397.33	858.19	0.00
11,200.0	91.35	268.50	10,287.9	7,163.9	440.9	-930.4	601,415.89	441,394.72	957.73	0.00
11,300.0	91.35	268.50	10,285.6	7,161.6	438.3	-1,030.3	601,315.95	441,392.10	1,057.27	0.00
11,400.0	91.35	268.50	10,283.2	7,159.2	435.6	-1,130.3	601,216.01	441,389.48	1,156.81	0.00
11,500.0	91.35	268.50	10,280.9	7,156.9	433.0	-1,230.2	601,116.07	441,386.87	1,256.35	0.00
11,600.0	91.35	268.50	10,278.5	7,154.5	430.4	-1,330.1	601,016.14	441,384.25	1,355.89	0.00
11,700.0	91.35	268.50	10,276.2	7,152.2	427.8	-1,430.1	600,916.20	441,381.63	1,455.43	0.00
11,800.0	91.35	268.50	10,273.8	7,149.8	425.2	-1,530.0	600,816.26	441,379.01	1,554.97	0.00
11,900.0	91.35	268.50	10,271.4	7,147.4	422.6	-1,629.9	600,716.32	441,376.40	1,654.51	0.00
12,000.0	91.35	268.50	10,269.1	7,145.1	419.9	-1,729.9	600,616.38	441,373.78	1,754.05	0.00
12,100.0	91.35	268.50	10,266.7	7,142.7	417.3	-1,829.8	600,516.45	441,371.16	1,853.59	0.00
12,200.0	91.35	268.50	10,264.4	7,140.4	414.7	-1,929.8	600,416.51	441,368.55	1,953.13	0.00
12,300.0	91.35	268.50	10,262.0	7,138.0	412.1	-2,029.7	600,316.57	441,365.93	2,052.67	0.00
12,400.0	91.35	268.50	10,259.7	7,135.7	409.5	-2,129.6	600,216.63	441,363.31	2,152.21	0.00
12,500.0	91.35	268.50	10,257.3	7,133.3	406.9	-2,229.6	600,116.69	441,360.70	2,251.75	0.00
12,600.0	91.35	268.50	10,255.0	7,131.0	404.2	-2,329.5	600,016.76	441,358.08	2,351.30	0.00
12,700.0	91.35	268.50	10,252.6	7,128.6	401.6	-2,429.4	599,916.82	441,355.46	2,450.84	0.00
12,800.0	91.35	268.50	10,250.2	7,126.2	399.0	-2,529.4	599,816.88	441,352.84	2,550.38	0.00
12,900.0	91.35	268.50	10,247.9	7,123.9	396.4	-2,629.3	599,716.94	441,350.23	2,649.92	0.00
13,000.0	91.35	268.50	10,245.5	7,121.5	393.8	-2,729.3	599,617.00	441,347.61	2,749.46	0.00
13,100.0	91.35	268.50	10,243.2	7,119.2	391.2	-2,829.2	599,517.07	441,344.99	2,849.00	0.00



Morcor Engineering
Morcor Standard Plan

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Project:	Mad River 13 State 8H	TVD Reference:	WELL @ 3124.0usft (Original Well Elev)
Site:	Mad River 13 State 8H	MD Reference:	WELL @ 3124.0usft (Original Well Elev)
Well:	Mad River 13 State 8H	North Reference:	Grid
Wellbore:	Mad River 13 State 8H	Survey Calculation Method:	Minimum Curvature
Design:	190214 Mad River 13 State 8H	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)	DLeg (°/100usft)
13,200.0	91.35	268.50	10,240.8	7,116.8	388.5	-2,929.1	599,417.13	441,342.38	2,948.54	0.00
13,300.0	91.35	268.50	10,238.5	7,114.5	385.9	-3,029.1	599,317.19	441,339.76	3,048.08	0.00
13,400.0	91.35	268.50	10,236.1	7,112.1	383.3	-3,129.0	599,217.25	441,337.14	3,147.62	0.00
13,500.0	91.35	268.50	10,233.8	7,109.8	380.7	-3,228.9	599,117.31	441,334.53	3,247.16	0.00
13,600.0	91.35	268.50	10,231.4	7,107.4	378.1	-3,328.9	599,017.38	441,331.91	3,346.70	0.00
13,700.0	91.35	268.50	10,229.0	7,105.0	375.5	-3,428.8	598,917.44	441,329.29	3,446.24	0.00
13,800.0	91.35	268.50	10,226.7	7,102.7	372.8	-3,528.8	598,817.50	441,326.68	3,545.78	0.00
13,900.0	91.35	268.50	10,224.3	7,100.3	370.2	-3,628.7	598,717.56	441,324.06	3,645.32	0.00
14,000.0	91.35	268.50	10,222.0	7,098.0	367.6	-3,728.6	598,617.62	441,321.44	3,744.86	0.00
14,100.0	91.35	268.50	10,219.6	7,095.6	365.0	-3,828.6	598,517.69	441,318.82	3,844.40	0.00
14,200.0	91.35	268.50	10,217.3	7,093.3	362.4	-3,928.5	598,417.75	441,316.21	3,943.94	0.00
14,300.0	91.35	268.50	10,214.9	7,090.9	359.8	-4,028.5	598,317.81	441,313.59	4,043.48	0.00
14,400.0	91.35	268.50	10,212.5	7,088.5	357.1	-4,128.4	598,217.87	441,310.97	4,143.02	0.00
14,500.0	91.35	268.50	10,210.2	7,086.2	354.5	-4,228.3	598,117.93	441,308.36	4,242.56	0.00
14,600.0	91.35	268.50	10,207.8	7,083.8	351.9	-4,328.3	598,018.00	441,305.74	4,342.10	0.00
14,700.0	91.35	268.50	10,205.5	7,081.5	349.3	-4,428.2	597,918.06	441,303.12	4,441.64	0.00
14,800.0	91.35	268.50	10,203.1	7,079.1	346.7	-4,528.1	597,818.12	441,300.51	4,541.18	0.00
14,900.0	91.35	268.50	10,200.8	7,076.8	344.1	-4,628.1	597,718.18	441,297.89	4,640.72	0.00
15,000.0	91.35	268.50	10,198.4	7,074.4	341.4	-4,728.0	597,618.24	441,295.27	4,740.26	0.00
15,100.0	91.35	268.50	10,196.1	7,072.1	338.8	-4,828.0	597,518.31	441,292.65	4,839.80	0.00
15,200.0	91.35	268.50	10,193.7	7,069.7	336.2	-4,927.9	597,418.37	441,290.04	4,939.34	0.00
15,270.0	91.35	268.50	10,192.1	7,068.1	334.4	-4,997.9	597,348.41	441,288.21	5,009.02	0.00

TD at 15270.0 - 5 1/2"

Company:	Caza Operating LLC	Local Co-ordinate Reference:	Well Mad River 13 State 8H
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Site:	Mad River 13 State 8H	MD Reference:	WELL @ 3124.0usft (Original Well Elev)
Well:	Mad River 13 State 8H	North Reference:	Grid
Wellbore:	Mad River 13 State 8H	Survey Calculation Method:	Minimum Curvature
Design:	190214 Mad River 13 State 8H	Database:	EDM 5000.1 Single User Db

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
7,987.6	7,970.0	9 5/8"	9-5/8	12-1/4	
15,270.0	10,192.1	5 1/2"	5-1/2	8-1/2	
728.0	728.0	13 3/8"	13-3/8	17-1/2	
120.0	120.0	20" Conductor	20	26	

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,413.0	2,413.0	Delaware		0.00	
4,349.0	4,349.0	Brushy Canyon		0.00	
7,847.8	7,831.0	2nd Bone Spring Sand Base		0.00	
2,208.0	2,208.0	Base of Salt		0.00	
10,091.4	10,053.0	Wolfcamp C		0.00	
9,697.7	9,672.0	Wolfcamp B		0.00	
8,291.2	8,272.0	Harkey		0.00	
5,945.4	5,939.0	Bone Spring		0.00	
753.0	753.0	Salado		0.00	
7,656.7	7,641.0	2nd Bone Spring Sand		0.00	
8,822.1	8,800.0	3rd Bone Spring Sand		0.00	
9,172.0	9,148.0	Wolfcamp		0.00	
6,907.6	6,896.0	1st Bone Spring Sand		0.00	
3,048.0	3,048.0	Cherry Canyon		0.00	



Morcor Engineering
Morcor Standard Plan

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Site:	Mad River 13 State 8H	MD Reference:	WELL @ 3124.0usft (Original Well Elev)
Well:	Mad River 13 State 8H	North Reference:	Grid
Wellbore:	Mad River 13 State 8H	Survey Calculation Method:	Minimum Curvature
Design:	190214 Mad River 13 State 8H	Database:	EDM 5000.1 Single User Db

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,650.0	4,650.0	0.0	0.0	Start Build 3.00
4,750.0	4,750.0	2.5	0.9	Start Build 3.00
4,850.0	4,849.6	9.9	3.4	Start 4550.0 hold at 4850.0 MD
9,400.0	9,374.7	459.6	158.2	Start DLS 3.00 TFO 180.00
9,500.0	9,474.4	467.0	160.8	Start Drop -3.00
9,600.0	9,574.3	469.5	161.7	Start 170.0 hold at 9600.0 MD
9,770.0	9,744.3	469.5	161.7	Start Build 8.00
9,870.0	9,844.0	469.5	154.7	Start Build 9.00
9,970.0	9,941.5	469.5	133.1	Start Build 10.00
10,070.0	10,034.1	469.5	95.6	Start Build 11.00
10,170.0	10,118.4	469.5	42.0	Start Build 12.00
10,270.0	10,190.2	469.5	-27.3	Start Build 12.00
10,370.0	10,246.0	469.5	-110.1	Start Build 12.00
10,470.0	10,283.4	469.5	-202.6	Start Build 12.00
10,570.0	10,300.7	469.5	-300.9	Start Build 12.02
10,614.5	10,301.7	469.5	-345.4	Start Turn 0.00
15,270.0	10,192.1	469.5	-4,999.6	TD at 15270.0

Checked By: _____	Approved By: _____	Date: _____
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Project: Mad River 13 State 8H
 Site: Mad River 13 State 8H
 Well: Mad River 13 State 8H
 Wellbore: Mad River 13 State 8H
 Design: 190214 Mad River 13 State 8H



Azimuths to Grid North
 True North: -0.10°
 Magnetic North: 6.80°

Magnetic Field
 Strength: 47787.8snT
 Dip Angle: 59.89°
 Date: 2/14/2019
 Model: IGRF2010

CASING DETAILS

TVD	MD	Name	Size
120.0	120.0	20" Conductor	20
728.0	728.0	13 3/8"	13-3/8
7970.0	7987.6	9 5/8"	9-5/8
10192.1	15270.0	5 1/2"	5-1/2

FORMATION TOP DETAILS

TVDPATH	MDPATH	Formation	DipAngle	DipDir
753.0	753.0	Salado	0.00	
2208.0	2208.0	Base of Salt	0.00	
2413.0	2413.0	Delaware	0.00	
3048.0	3048.0	Cherry Canyon	0.00	
4349.0	4349.0	Brushy Canyon	0.00	
5939.0	5945.4	Bone Spring	0.00	
6896.0	6907.6	1st Bone Spring Sand	0.00	
7641.0	7656.7	2nd Bone Spring Sand	0.00	
7831.0	7847.8	2nd Bone Spring Sand Base	0.00	
8272.0	8291.2	Harkey	0.00	
8800.0	8822.1	3rd Bone Spring Sand	0.00	
9148.0	9172.0	Wolfcamp	0.00	
9672.0	9697.7	Wolfcamp B	0.00	
10053.0	10091.4	Wolfcamp C	0.00	

