

30-025-42988

Caza Operating, LLC

Lea County, NM (NAD 83 NME)

Eagleclaw

8-5 Federal #1H

ST1

Survey: SDI Survey #2

TRRC FINAL Survey Report for Submission

05 October, 2017

TRRC FINAL Survey Report for Submission

Company:	Caza Operating, LLC	Local Co-ordinate Reference:	Well 8-5 Federal #1H
Project:	Lea County, NM (NAD 83 NME)	TVD Reference:	KB = 25' @ 3721.00usft (Felderhoff 27)
Site:	Eagleclaw	MD Reference:	KB = 25' @ 3721.00usft (Felderhoff 27)
Well:	8-5 Federal #1H	North Reference:	Grid
Wellbore:	ST1	Survey Calculation Method:	Minimum Curvature
Design:	ST1	Database:	Midland District

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

Site	Eagleclaw		
Site Position:		Northing:	586,346.00 usft
From:	Map	Easting:	802,083.00 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 36' 32.624 N
		Longitude:	103° 29' 11.595 W
		Grid Convergence:	0.46 °

Well	8-5 Federal #1H		
Well Position	+N/-S	0.00 usft	Northing: 586,346.00 usft
	+E/-W	0.00 usft	Easting: 802,082.80 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft
		Latitude:	32° 36' 32.624 N
		Longitude:	103° 29' 11.597 W
		Ground Level:	3,696.00 usft

Wellbore	ST1		
Magnetics	Model Name	Sample Date	Declination
	HDGM	8/17/2017	(°) 6.68
			Dip Angle (°) 60.62
			Field Strength (nT) 48,274

Design	ST1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	10,443.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
		Direction	(bearing)
		178.81	

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Wellbore: ST1
Design: ST1

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Survey Program		Date 10/5/2017		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
276.00	10,443.00	SDI Survey #1 (Pilot Hole)	MWD+HDGM	OWSG MWD + HDGM
10,443.00	18,532.00	SDI Survey #2 (ST1)	MWD+HDGM	OWSG MWD + HDGM

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (bearing)	TVD (usft)	N/S (usft)	E/W (usft)	DLeg (°/100usft)	Closure Azimuth (bearing)	Closure Distance (usft)
10,443.00	0.57	172.69	10,435.64	178.34	10.88	0.00	3.49	178.67
10,613.00	7.63	180.13	10,605.10	166.20	10.96	4.16	3.77	166.56
10,671.00	13.04	181.57	10,662.14	155.80	10.77	9.34	3.95	156.17
10,718.00	17.03	182.88	10,707.52	143.62	10.28	8.52	4.09	143.98
10,766.00	18.83	181.06	10,753.19	128.85	9.78	3.93	4.34	129.22
10,813.00	22.50	179.56	10,797.16	112.27	9.71	7.89	4.94	112.69
10,860.00	24.50	182.09	10,840.26	93.53	9.42	4.77	5.75	94.01
10,907.00	26.62	183.96	10,882.66	73.29	8.34	4.83	6.49	73.76
10,955.00	29.86	183.33	10,924.94	50.63	6.90	6.78	7.77	51.09
11,002.00	36.00	181.65	10,964.37	25.11	5.83	13.21	13.06	25.78
11,049.00	43.28	180.30	11,000.54	-4.85	5.34	15.60	132.20	7.21
11,091.00	49.54	179.60	11,029.48	-35.25	5.38	14.95	171.32	35.66
11,150.00	55.35	178.70	11,065.43	-82.00	6.09	9.92	175.75	82.22
11,181.00	59.71	178.24	11,082.07	-108.14	6.79	14.12	176.41	108.35
11,192.06	60.20	178.19	11,087.60	-117.70	7.09	4.43	176.55	117.92
POP[EF#1H]								
11,244.00	62.49	177.98	11,112.51	-163.25	8.61	4.43	176.98	163.48
11,291.00	68.44	177.83	11,132.02	-205.96	10.17	12.66	177.17	206.21
11,339.00	74.41	177.82	11,147.30	-251.41	11.90	12.44	177.29	251.69
11,403.00	81.25	178.23	11,160.79	-313.90	14.05	10.71	177.44	314.21
11,434.00	84.02	176.76	11,164.76	-344.61	15.40	10.10	177.44	344.95

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Design: ST1

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Survey									
MD (usft)	Inc (°)	Azi (azimuth) (bearing)	TVD (usft)	N/S (usft)	E/W (usft)	DLeg (°/100usft)	Closure Azimuth (bearing)	Closure Distance (usft)	
11,486.12	87.15	176.31	11,168.77	-396.47	18.53	6.07	177.32	396.91	
LP[EF#1H]									
11,529.00	89.73	175.95	11,169.94	-439.23	21.43	6.07	177.21	439.76	
11,623.00	92.05	175.83	11,168.48	-532.97	28.16	2.47	176.98	533.72	
11,718.00	91.48	176.94	11,165.55	-627.74	34.15	1.31	176.89	628.67	
11,813.00	89.77	177.52	11,164.51	-722.62	38.74	1.90	176.93	723.66	
11,907.00	88.46	178.30	11,165.97	-816.54	42.17	1.62	177.04	817.63	
12,002.00	89.56	178.20	11,167.61	-911.48	45.07	1.16	177.17	912.60	
12,096.00	88.56	179.01	11,169.15	-1,005.44	47.35	1.37	177.30	1,006.55	
12,191.00	89.97	179.09	11,170.37	-1,100.42	48.93	1.49	177.45	1,101.50	
12,285.00	88.02	178.89	11,172.02	-1,194.38	50.59	2.09	177.57	1,195.45	
12,380.00	89.03	178.57	11,174.46	-1,289.33	52.69	1.12	177.66	1,290.40	
12,474.00	90.87	178.02	11,174.54	-1,383.28	55.49	2.04	177.70	1,384.39	
12,569.00	88.56	178.60	11,175.02	-1,478.23	58.29	2.51	177.74	1,479.38	
12,664.00	89.26	178.61	11,176.82	-1,573.18	60.60	0.74	177.79	1,574.35	
12,758.00	87.82	178.51	11,179.22	-1,667.12	62.96	1.54	177.84	1,668.31	
12,851.00	87.48	177.71	11,183.03	-1,759.99	66.03	0.93	177.85	1,761.23	
12,946.00	89.03	177.39	11,185.92	-1,854.86	70.09	1.67	177.84	1,856.18	
13,041.00	87.82	178.24	11,188.54	-1,949.75	73.71	1.56	177.84	1,951.14	
13,089.36	87.68	177.97	11,190.43	-1,998.05	75.30	0.62	177.84	1,999.47	
T1[ECF#1H]									
13,135.00	87.55	177.72	11,192.33	-2,043.62	77.02	0.62	177.84	2,045.07	
13,230.00	88.46	176.99	11,195.64	-2,138.46	81.40	1.23	177.82	2,140.00	
13,325.00	88.99	178.60	11,197.75	-2,233.36	85.05	1.78	177.82	2,234.98	
13,419.00	90.54	179.22	11,198.14	-2,327.34	86.84	1.78	177.86	2,328.96	
13,514.00	87.65	179.71	11,199.64	-2,422.31	87.73	3.09	177.93	2,423.90	
13,608.00	87.95	179.99	11,203.25	-2,516.24	87.97	0.44	178.00	2,517.78	

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Design: ST1

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Survey									
MD (usft)	Inc (°)	Azi (azimuth) (bearing)	TVD (usft)	N/S (usft)	E/W (usft)	DLeg (°/100usft)	Closure Azimuth (bearing)	Closure Distance (usft)	
13,703.00	90.07	180.14	11,204.89	-2,611.22	87.87	2.24	178.07	2,612.70	
13,797.00	87.85	179.63	11,206.60	-2,705.20	88.06	2.42	178.14	2,706.63	
13,892.00	88.49	179.07	11,209.63	-2,800.14	89.13	0.89	178.18	2,801.56	
13,986.00	89.90	178.97	11,210.95	-2,894.12	90.74	1.50	178.20	2,895.54	
14,080.00	88.05	179.33	11,212.63	-2,988.09	92.13	2.00	178.23	2,989.51	
14,090.51	87.96	179.38	11,213.00	-2,998.59	92.25	0.96	178.24	3,000.01	
T2[ECF#1H]									
14,175.00	87.25	179.76	11,216.53	-3,083.00	92.89	0.96	178.27	3,084.40	
14,270.00	89.03	180.07	11,219.61	-3,177.95	93.03	1.90	178.32	3,179.31	
14,364.00	89.30	181.21	11,220.98	-3,271.93	91.98	1.25	178.39	3,273.23	
14,459.00	88.66	182.75	11,222.67	-3,366.86	88.70	1.76	178.49	3,368.03	
14,553.00	90.47	182.70	11,223.39	-3,460.75	84.23	1.93	178.61	3,461.77	
14,648.00	90.03	181.52	11,222.97	-3,555.68	80.73	1.33	178.70	3,556.59	
14,742.00	90.24	180.59	11,222.75	-3,649.66	79.00	1.01	178.76	3,650.52	
14,837.00	88.69	180.34	11,223.64	-3,744.65	78.23	1.65	178.80	3,745.47	
14,932.00	87.52	180.49	11,226.78	-3,839.59	77.54	1.24	178.84	3,840.38	
15,027.00	89.50	180.31	11,229.25	-3,934.55	76.88	2.09	178.88	3,935.31	
15,091.03	88.47	179.85	11,230.38	-3,998.58	76.79	1.76	178.90	3,999.31	
T3[ECF#1H]									
15,121.00	87.99	179.64	11,231.31	-4,028.53	76.92	1.76	178.91	4,029.26	
15,216.00	88.15	178.66	11,234.51	-4,123.46	78.33	1.04	178.91	4,124.21	
15,311.00	90.44	177.98	11,235.67	-4,218.41	81.11	2.51	178.90	4,219.19	
15,406.00	88.19	178.43	11,236.81	-4,313.35	84.09	2.42	178.88	4,314.17	
15,501.00	88.46	178.46	11,239.59	-4,408.27	86.67	0.29	178.87	4,409.13	
15,595.00	89.80	177.34	11,241.01	-4,502.20	90.11	1.86	178.85	4,503.10	
15,690.00	88.59	177.75	11,242.35	-4,597.10	94.18	1.34	178.83	4,598.06	
15,784.00	88.62	178.50	11,244.64	-4,691.02	97.25	0.80	178.81	4,692.03	

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MD (usft)	Inc (°)	Azi (azimuth) (bearing)	TVD (usft)	N/S (usft)	E/W (usft)	DLeg (°/100usft)	Closure Azimuth (bearing)	Closure Distance (usft)
15,879.00	90.74	178.30	11,245.17	-4,785.97	99.91	2.24	178.80	4,787.02
15,974.00	89.03	178.98	11,245.36	-4,880.94	102.16	1.94	178.80	4,882.01
16,068.00	88.05	178.91	11,247.75	-4,974.90	103.89	1.05	178.80	4,975.98
16,091.81	88.25	178.74	11,248.52	-4,998.69	104.38	1.11	178.80	4,999.78
T4[ECF#1H]								
16,163.00	88.86	178.24	11,250.32	-5,069.83	106.25	1.11	178.80	5,070.94
16,257.00	91.11	177.80	11,250.34	-5,163.77	109.50	2.44	178.79	5,164.93
16,352.00	89.53	177.77	11,249.81	-5,258.69	113.17	1.66	178.77	5,259.91
16,446.00	87.62	178.19	11,252.15	-5,352.60	116.48	2.08	178.75	5,353.87
16,541.00	86.95	178.65	11,256.65	-5,447.46	119.10	0.86	178.75	5,448.76
16,635.00	88.12	177.74	11,260.69	-5,541.32	122.06	1.58	178.74	5,542.66
16,730.00	90.07	177.12	11,262.19	-5,636.21	126.32	2.15	178.72	5,637.62
16,825.00	89.03	177.24	11,262.94	-5,731.09	130.99	1.10	178.69	5,732.59
16,919.00	87.41	178.72	11,265.86	-5,824.98	134.30	2.33	178.68	5,826.53
17,014.00	87.42	180.38	11,270.14	-5,919.88	135.05	1.75	178.69	5,921.42
17,092.24	88.81	179.87	11,272.71	-5,998.07	134.88	1.89	178.71	5,999.59
T5[ECF#1H]								
17,108.00	89.09	179.77	11,273.00	-6,013.83	134.93	1.89	178.71	6,015.34
17,202.00	91.01	178.94	11,272.92	-6,107.82	135.98	2.23	178.72	6,109.33
17,297.00	89.13	178.81	11,272.81	-6,202.80	137.85	1.98	178.73	6,204.33
17,391.00	85.94	179.33	11,276.85	-6,296.68	139.37	3.44	178.73	6,298.23
17,486.00	86.17	179.26	11,283.38	-6,391.45	140.54	0.25	178.74	6,393.00
17,581.00	88.05	178.59	11,288.17	-6,486.31	142.32	2.10	178.74	6,487.87
17,675.00	90.20	178.01	11,289.61	-6,580.25	145.11	2.37	178.74	6,581.85
17,770.00	88.46	179.90	11,290.72	-6,675.22	146.84	2.70	178.74	6,676.84
17,864.00	90.00	180.77	11,291.98	-6,769.21	146.29	1.88	178.76	6,770.79
17,959.00	88.42	180.45	11,293.29	-6,864.19	145.28	1.70	178.79	6,865.73

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Wellbore: ST1
Design: ST1

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18,054.00	89.90	180.47	11,294.69	-6,959.17	144.52	1.56	178.81	6,960.67
18,093.29	90.05	180.45	11,294.70	-6,998.46	144.20	0.40	178.82	6,999.95
T6[ECF#1H]								
18,148.00	90.27	180.43	11,294.55	-7,053.17	143.78	0.40	178.83	7,054.64
18,243.00	90.23	182.37	11,294.13	-7,148.14	141.46	2.04	178.87	7,149.54
18,337.00	91.48	182.70	11,292.73	-7,242.03	137.30	1.38	178.91	7,243.33
18,432.00	92.35	182.49	11,289.55	-7,336.88	133.00	0.94	178.96	7,338.09
18,484.00	92.95	182.30	11,287.15	-7,388.78	130.83	1.21	178.99	7,389.94
FINAL MWD Survey (18484.00' MD)								
18,532.00	92.95	182.30	11,284.68	-7,436.68	128.91	0.00	179.01	7,437.79
FINAL Proj. to Bit (18532.00' MD) - BHL[ECF#1H]								

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
18,484.00	11,287.15	-7,388.78	130.83	FINAL MWD Survey (18484.00' MD)
18,532.00	11,284.68	-7,436.68	128.91	FINAL Proj. to Bit (18532.00' 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

