



LEA COUNTY, NM (NAD 83 NME)
EAGLECLAW
8-5 FEDERAL #1H
STI
STI PLAN #4
FELDERHOFF 27

WELL DETAILS:

Ground Level:	3696.00				
+N-S	+E-W	Northing	Easting	Latitude	Longitude
0.00	0.00	588346.00	802082.80	32° 36' 32.624 N	103° 29' 11.597 W



To convert Magnetic North to Grid, Add 6.23°
To convert True North to Grid, Subtract 0.46°

Azimuths to Grid North
True North: -0.46°
Magnetic North: 6.23°

Magnetic Field
Strength: 48274.4nT
Dip Angle: 60.82°
Date: 8/17/2017
Model: HDGM

GL ELEV. 3696.00

DEPTH REF. KB = 25' @ 3721.00SFT (FELDERHOFF 27)

SITE DETAILS: Eagleclaw
Site Centre Northing: 588346.00
Easting: 802083.00

Positional Uncertainty: 0.00
Convergence: 0.46
Local North: Grid

PROJECT DETAILS: Lea County, NM (NAD 83 NME)
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone
System Datum: Mean Sea Level

FORMATION TOP DETAILS

No formation data is available

CASING DETAILS

No casing data is available

Map System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone Name: New Mexico Eastern Zone

Local Origin: Well 8-5 Federal #1H, Grid North
Latitude: 32° 36' 32.624 N
Longitude: 103° 29' 11.597 W

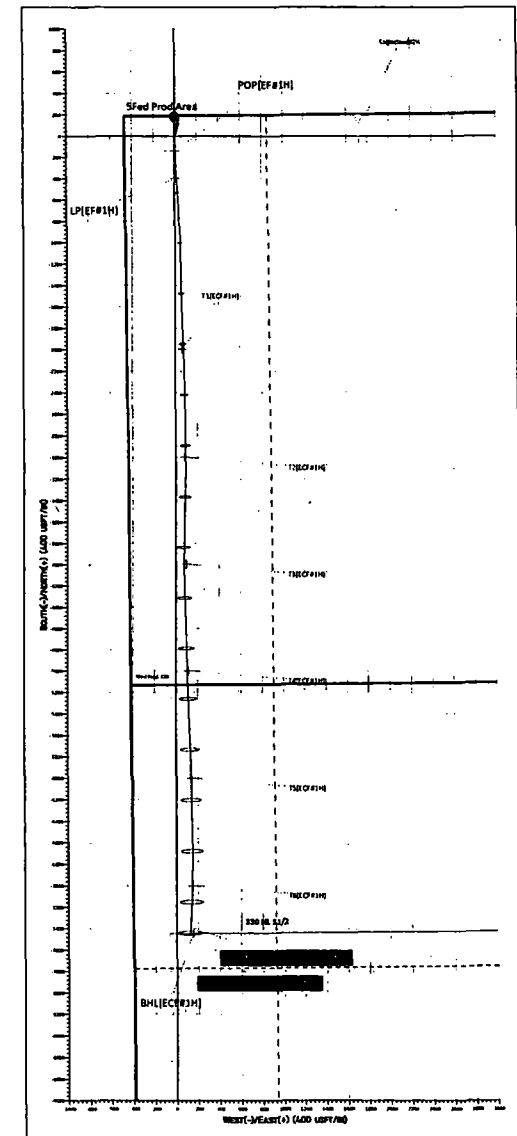
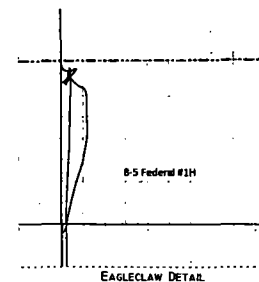
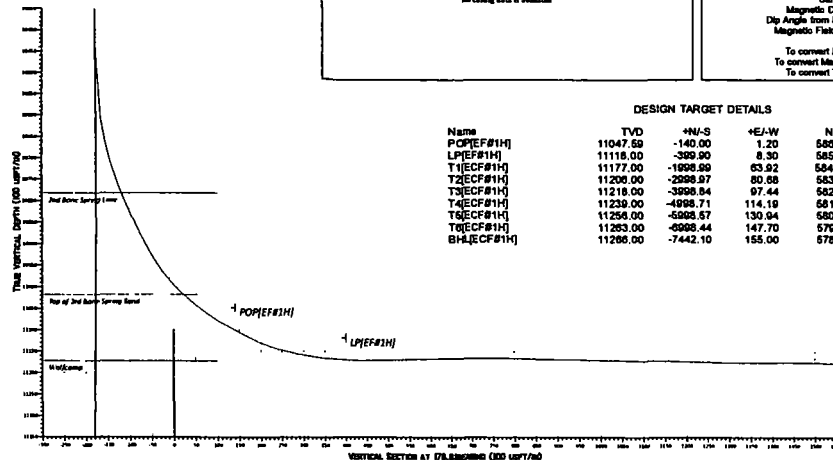
Grid East: 802082.80
Grid North: 588346.00
Scale Factor: 1.000

Geomagnetic Model: HDGM
Sample Date: 17-Aug-17
Magnetic Declination: 6.69°
Dip Angle from Horizontal: 60.82°
Magnetic Field Strength: 48274

To convert Magnetic North to Grid, Add 6.23°
To convert True North to Grid, Subtract 0.46°

DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting
POPEF#1H	11047.59	-140.00	1.20	588208.00	802084.00
LP(EF#1H)	11118.00	-399.90	8.30	585846.10	802081.10
T1(EF#1H)	11177.00	-1998.59	63.92	584347.01	802148.72
T2(EF#1H)	11208.00	-2998.97	80.88	583347.03	802183.48
T3(EF#1H)	11218.00	-3998.94	97.44	582347.16	802180.24
T4(EF#1H)	11239.00	-4998.71	114.19	581347.29	802186.99
T5(EF#1H)	11258.00	-5998.57	130.94	580347.43	802213.74
T6(EF#1H)	11283.00	-6998.44	147.70	579347.58	802230.50
BH(EF#1H)	11286.00	-7442.10	155.00	578903.90	802237.80



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
Project: Lea County, NM (NAD 83 NME)
Site: Eagleclaw
Well: 8-5 Federal #1H
Wellbore: ST1
Design: ST1

Local Co-ordinate Reference: Well 8-5 Federal #1H
TVD Reference: KB = 25' @ 3721.00usft (Felderhoff 27)
MD Reference: KB = 25' @ 3721.00usft (Felderhoff 27)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Midland District

Project Lea County, NM (NAD 83 NME)

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

System Datum: Mean Sea Level

Site Eagleclaw

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

Well 8-5 Federal #1H

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

Wellbore ST1

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

Design ST1

Audit Notes:

Version: 1.0 **Phase:** ACTUAL **Tie On Depth:** 10,443.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (bearing)
	0.00	0.00	0.00	178.81

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Design: ST1

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Survey Calculation Method: Minimum Curvature
Database: Midland District

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	38.00	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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 Wellbore: ST1
 Design: ST1

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 Survey Calculation Method: Minimum Curvature
 Database: Midland District

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	178.99	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

TRRC FINAL Survey Report for Submission

Company: Caza Operating, LLC
 Project: Lea County, NM (NAD 83 NME)
 Site: Eagleclaw
 Well: 8-5 Federal #1H
 Wellbore: ST1
 Design: ST1

Local Co-ordinate Reference: Well 8-5 Federal #1H
 TVD Reference: KB = 25' @ 3721.00usft (Felderhoff 27)
 MD Reference: KB = 25' @ 3721.00usft (Felderhoff 27)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: Midland District

Survey

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
T6[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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Survey

MD (usft)	Inc (°)	Azi (azimuth) (bearing)	TVD (usft)	N/S (usft)	E/W (usft)	DLeg (°/100usft)	Closure Azimuth (bearing)	Closure Distance (usft)
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	7,148.54
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: _____