



KB - 19' above GL

Cimarex Energy Co. of Colorado

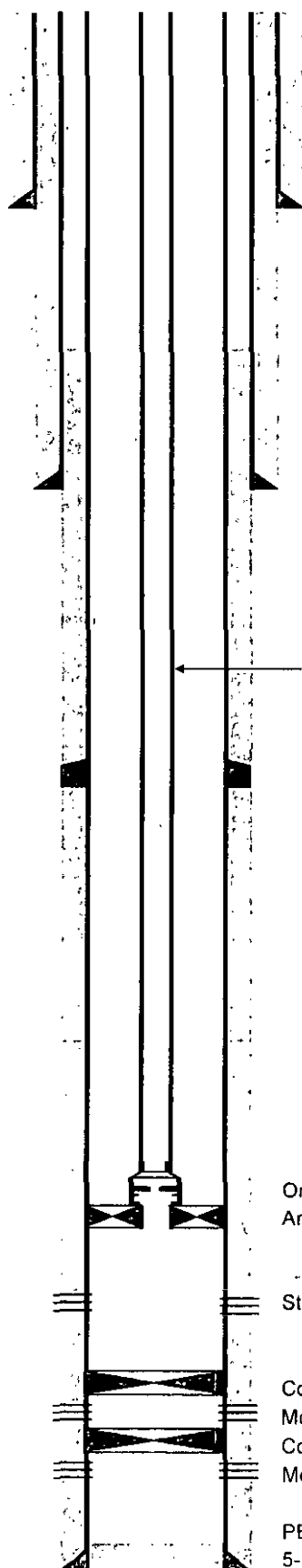
Marquardt 1 Penn Federal #3

1780' FSL & 735' FWL

Sec. 1, T-25-S, R-26-E, Eddy Co., NM

S. Gengler

06/03/2013



13-3/8", 54.5# J-55 csg @ 215'
cmtd w/ 250 sx, cmt circ

TOC N/A; CBL stops w/ good cmt up to 7200.

9-5/8", 40# J-55 csg @ 2770'
cmtd w/ 850 sx, cmt circ

362 jts 2-7/8" 6.5# L-80 Tbg

DV Tool @ 7638'
cmtd w/ 925 sx

On-off Tool w/ 1.87" F Profile Nipple @ 10260'
Arrowset 1-X pkr @ 10268'

Strawn perfs (10336' - 10392')

Comp. BP @ 11050'
Morrow perfs (11128' - 11214')
Comp. BP @ 11290'
Morrow perfs (11327' - 11388')

PBTD @ 11767'
5-1/2" 17# P-110 @ 11875' cmtd w/ 935 sx, cmt circ
TD @ 11875'



Cimarex Hackberry 23 Federal #3H XEM + Gyro + MWD 0ft to 19317 Survey

Report

(Non-Def Survey)

Report Date:

December 19, 2014 - 09:44 AM

Client:

Cimarex

Field:

NM Eddy County (NAD 83)

Cimarex Hackberry 23 Federal #3H / Cimarex Hackberry 23 Federal #3H

Structure / Slot:

Cimarex Hackberry 23 Federal #3H

Well:

Original Borehole

UWI / API#:

Unknown / Unknown

Survey Name:

Cimarex Hackberry 23 Federal #3H XEM + Gyro + MWD 0ft to 19317

Survey Date:

November 05, 2014

Tort / AHD / DDI / ERD Ratio:

289.021' / 11382.107 ft / 6.871' / 1.332

Coordinate Reference System:

NAD83 New Mexico State Plane, Eastern Zone, US Feet

Location Lat / Long:

N 32° 38' 39.96603", W 103° 56' 0.63921"

Location Grid N/E Y/X:

N 598408.000 ftUS, E 664403.400 ftUS

CRS Grid Convergence Angle:

0.2157°

Grid Scale Factor:

0.99992644

Version / Patch:

2.7.1043.0

Survey / DLS Computation:

Vertical Section Azimuth: 261.844° (Grid North)

Vertical Section Origin:

0.000 ft, 0.000 ft

TVD Reference Datum:

RKB

TVD Reference Elevation:

3272.000 ft above MSL

Seabed / Ground Elevation:

3248.000 ft above MSL

Magnetic Declination:

7.728°

Total Gravity Field Strength:

998.5205mgn (9.80665 Based)

Gravity Model:

GARM

Total Magnetic Field Strength:

48565.888 nT

Magnetic Dip Angle:

60.590°

Declination Date:

November 18, 2014

Magnetic Declination Model:

HDGM 2014

North Reference:

Grid North

Grid Convergence Used:

0.2157°

Total Corr Mag North->Grid North:

7.5128°

Local Coord Referenced To:

Structure Reference Point

Minimum Curvature / Lubinski

261.844° (Grid North)

0.000 ft, 0.000 ft

RKB

3272.000 ft above MSL

3248.000 ft above MSL

7.728°

998.5205mgn (9.80665 Based)

GARM

48565.888 nT

60.590°

November 18, 2014

HDGM 2014

Grid North

0.2157°

7.5128°

Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
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SHL - Hackberry 23 Federal #3H	0.00	0.00	181.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	OM
	120.00	0.38	0.00	120.00	-0.06	0.40	0.00	0.40	0.00	0.32	OM
	203.00	0.64	0.00	203.00	-0.16	1.14	0.00	1.14	0.00	0.31	OM
	232.00	0.20	0.00	231.99	-0.19	1.35	0.00	1.35	0.00	1.52	235.77M
	266.80	0.10	235.77	266.79	-0.17	1.39	-0.03	1.39	358.97	0.77	256.62M
	354.40	0.27	256.62	354.39	0.10	1.30	-0.29	1.33	347.48	0.21	300.1M
	445.20	0.54	300.10	445.19	0.65	1.47	-0.87	1.70	329.41	0.43	312.22M
	531.30	0.85	312.22	531.29	1.38	2.10	-1.69	2.70	321.15	0.40	333.47M
	595.00	0.94	333.47	594.98	1.84	2.88	-2.27	3.67	321.74	0.54	346.05M
	687.40	1.12	346.05	687.36	2.17	4.44	-2.83	5.27	327.48	0.31	0.56M
	780.30	0.88	0.56	780.25	2.16	6.03	-3.04	6.76	333.24	0.37	356.84M
	871.60	0.93	356.84	871.54	1.99	7.47	-3.08	8.08	337.63	0.08	346.9M
	964.60	0.80	346.90	964.53	1.98	8.86	-3.27	9.44	339.77	0.21	0.54M
	1055.80	0.70	0.54	1055.72	1.95	10.04	-3.40	10.60	341.26	0.22	19.41M
	1147.90	0.67	19.41	1147.81	1.61	11.11	-3.22	11.57	343.83	0.25	46.83M

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
	1149.70	0.89	48.83	1149.61	1.60	11.13	-3.21	11.58	343.92	23.73	48.09M
	1244.60	1.11	48.09	1244.50	0.23	12.25	-1.99	12.41	350.79	0.23	44.97M
	1339.50	1.27	44.97	1339.38	-1.38	13.60	-0.56	13.62	357.85	0.18	48.82M
	1434.40	1.41	48.82	1434.25	-3.20	15.12	1.06	15.15	4.03	0.18	48.01M
	1529.40	1.20	48.01	1529.23	-5.00	16.55	2.68	16.77	9.21	0.22	45.02M
	1624.30	0.80	45.02	1624.11	-6.36	17.69	3.89	18.11	12.41	0.42	40.35M
	1719.20	0.86	40.35	1719.00	-7.42	18.70	4.82	19.31	14.46	0.10	33M
	1814.10	0.88	33.00	1813.89	-8.44	19.85	5.68	20.65	15.96	0.12	29.88M
	1909.00	0.67	29.88	1908.78	-9.26	20.94	6.35	21.88	16.87	0.23	42.84M
	2004.00	0.16	42.84	2003.78	-9.70	21.52	6.72	22.55	17.34	0.54	38.32M
	2098.90	0.17	38.32	2098.68	-9.91	21.73	6.90	22.80	17.61	0.02	44.12M
	2193.80	0.16	44.12	2193.58	-10.12	21.93	7.08	23.05	17.88	0.02	59.47M
	2288.70	0.13	59.47	2288.48	-10.32	22.08	7.26	23.25	18.20	0.05	58.65M
	2383.60	0.13	58.65	2383.38	-10.52	22.20	7.45	23.41	18.54	0.00	52.69M
	2478.60	0.14	52.69	2478.38	-10.72	22.32	7.63	23.59	18.87	0.02	48.92M
	2573.50	0.14	48.92	2573.28	-10.92	22.47	7.81	23.79	19.17	0.01	44.29M
	2668.20	0.13	44.29	2667.98	-11.10	22.62	7.97	23.98	19.41	0.02	44.89M
	2763.30	0.13	44.89	2763.08	-11.27	22.77	8.12	24.18	19.63	0.00	38.13M
	2858.20	0.14	38.13	2857.98	-11.44	22.94	8.27	24.39	19.82	0.02	37.26M
	2953.20	0.12	37.26	2952.98	-11.60	23.11	8.40	24.59	19.98	0.02	35.77M
	3048.10	0.14	35.77	3047.88	-11.75	23.29	8.53	24.80	20.12	0.02	33.3M
	3143.00	0.13	33.30	3142.78	-11.90	23.47	8.66	25.02	20.25	0.01	31.94M
	3237.90	0.13	31.94	3237.68	-12.04	23.65	8.77	25.23	20.35	0.00	29.69M
	3332.90	0.13	29.69	3332.68	-12.18	23.84	8.88	25.44	20.44	0.01	31.11M
	3427.80	0.13	31.11	3427.58	-12.31	24.02	8.99	25.65	20.52	0.00	38.2M
Last Gyro Survey	3495.40	0.14	38.20	3495.18	-12.42	24.15	9.08	25.80	20.61	0.03	131.85M
	3570.72	0.09	131.85	3570.50	-12.52	24.19	9.18	25.87	20.79	0.23	288.82M
	3603.39	0.22	288.82	3603.17	-12.48	24.19	9.14	25.86	20.71	0.93	139.79M
	3694.45	0.22	139.79	3694.23	-12.42	24.11	9.09	25.77	20.66	0.47	269.13M
	3781.06	0.09	269.13	3780.84	-12.44	23.98	9.13	25.66	20.84	0.33	305.53M
	3876.61	0.09	305.53	3876.39	-12.31	24.03	8.99	25.65	20.52	0.06	180.99M
	3965.59	0.80	180.99	3965.36	-12.16	23.45	8.93	25.09	20.84	0.96	188.31M
	4062.33	3.14	188.31	4062.04	-11.30	20.15	8.53	21.88	22.95	2.43	187.6M
	4154.18	5.52	187.60	4153.62	-9.39	13.28	7.58	15.29	29.73	2.59	186.32M
	4249.39	5.52	186.32	4248.39	-7.00	4.19	6.47	7.71	57.10	0.13	183.42M
	4346.07	5.44	183.42	4344.63	-4.92	-5.01	5.69	7.58	131.36	0.30	176.89M
	4440.18	5.44	176.89	4438.31	-3.63	-13.92	5.67	15.02	157.85	0.66	174.16M
	4535.72	5.44	174.16	4533.42	-3.05	-22.94	6.37	23.81	164.48	0.27	172.18M
	4632.84	5.44	172.18	4630.11	-2.84	-32.08	7.47	32.94	166.90	0.19	177.6M
	4729.94	5.52	177.60	4726.76	-2.34	-41.31	8.29	42.13	168.65	0.54	181.61M
	4827.21	5.51	181.61	4823.56	-1.08	-50.65	8.35	51.34	170.64	0.40	186.41M
	4923.54	5.61	186.41	4919.46	0.89	-59.95	7.70	60.45	172.68	0.49	188.79M
	5020.20	5.52	188.79	5015.67	3.43	-69.24	6.46	69.54	174.67	0.26	191.61M

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
	5117.19	5.52	191.61	5112.21	6.37	-78.42	4.81	78.57	176.49	0.28	194.83M
	5200.36	5.52	194.83	5194.99	9.28	-86.21	2.98	86.26	178.02	0.37	194.74M
	5296.47	5.61	194.74	5290.65	12.91	-95.22	0.60	95.22	179.64	0.09	192.32M
	5393.65	5.52	192.32	5387.37	16.40	-104.38	-1.61	104.38	180.88	0.26	189.63M
	5489.65	5.61	189.63	5482.92	19.45	-113.52	-3.38	113.57	181.70	0.29	188.79M
	5580.22	5.52	188.79	5573.06	22.07	-122.19	-4.78	122.28	182.24	0.13	188.53M
	5677.79	5.52	188.53	5670.18	24.78	-131.47	-6.19	131.61	182.70	0.03	189.94M
	5773.71	5.61	189.94	5765.65	27.56	-140.65	-7.69	140.86	183.13	0.17	190.2M
	5870.86	5.61	190.20	5862.33	30.53	-150.00	-9.35	150.29	183.57	0.03	186.02M
	5966.69	5.52	186.02	5957.71	33.14	-159.19	-10.66	159.55	183.83	0.43	182.71M
	6050.10	5.52	182.71	6040.73	34.88	-167.19	-11.27	167.57	183.86	0.38	178.48M
	6145.66	5.52	178.48	6135.85	36.27	-176.37	-11.37	176.74	183.69	0.43	177.47M
	6243.56	5.52	177.47	6233.30	37.28	-185.78	-11.03	186.11	183.40	0.10	180.59M
	6339.66	5.52	180.59	6328.95	38.44	-195.02	-10.88	195.33	183.19	0.31	182.4M
	6430.42	5.21	182.40	6419.31	39.85	-203.51	-11.10	203.81	183.12	0.39	182.18M
	6528.35	4.73	182.18	6516.87	41.39	-211.98	-11.44	212.29	183.09	0.49	178.79M
	6624.40	4.24	178.79	6612.63	42.53	-219.49	-11.51	219.79	183.00	0.58	177.77M
	6714.38	4.64	177.77	6702.34	43.31	-226.45	-11.30	226.73	182.86	0.45	172.88M
	6810.95	4.95	172.88	6798.57	43.79	-234.49	-10.63	234.73	182.60	0.53	175.26M
	6908.36	4.02	175.26	6895.68	44.07	-242.06	-9.83	242.26	182.33	0.97	175.97M
	6998.00	3.93	175.97	6985.11	44.48	-248.26	-9.35	248.43	182.16	0.11	182M
	7094.85	3.93	182.00	7081.73	45.30	-254.89	-9.24	255.05	182.08	0.43	188.13M
	7191.01	3.62	188.13	7177.68	46.73	-261.18	-9.78	261.37	182.14	0.53	194.74M
	7287.18	3.71	194.74	7273.66	48.80	-267.20	-11.00	267.43	182.36	0.45	182.09M
	7377.13	3.80	182.09	7363.41	50.46	-272.99	-11.85	273.25	182.49	0.92	176.76M
	7473.87	4.11	176.76	7459.92	51.32	-279.66	-11.77	279.90	182.41	0.50	166.45M
	7570.53	3.40	166.45	7556.38	51.35	-285.90	-10.90	286.11	182.18	1.01	154.73M
	7662.82	3.23	154.73	7648.51	50.33	-290.91	-9.15	291.06	181.80	0.76	154.73M
	7755.89	3.00	174.15	7741.45	48.84	-295.49	-6.99	295.57	181.36	0.25	160.02M
	7852.71	3.00	160.02	7838.13	47.58	-300.16	-5.05	300.20	180.96	0.29	163.06M
	7945.59	2.83	163.06	7930.89	46.73	-304.64	-3.55	304.66	180.67	0.25	163.94M
	7999.00	2.55	163.94	7984.24	46.36	-307.04	-2.83	307.05	180.53	0.53	173.65M
	8031.00	4.09	173.65	8016.19	46.30	-308.86	-2.51	308.87	180.47	5.11	180.21M
	8062.00	7.48	180.21	8047.03	46.63	-311.98	-2.40	311.99	180.44	11.12	179.44M
	8094.00	11.38	179.44	8078.59	47.35	-317.22	-2.37	317.22	180.43	12.19	13.35R
	8125.00	14.08	182.06	8108.82	48.42	-324.05	-2.48	324.05	180.44	8.90	12.12R
	8156.00	16.62	183.96	8138.72	50.02	-332.24	-2.92	332.25	180.50	8.35	5.31R
	8188.00	21.58	185.21	8168.95	52.35	-342.67	-3.77	342.69	180.63	15.55	11.04L
	8220.00	25.14	183.58	8198.32	55.09	-355.32	-4.73	355.35	180.76	11.31	22.54L
	8252.00	29.36	180.05	8226.76	57.59	-369.96	-5.16	369.99	180.80	14.12	2.36L
	8283.00	33.66	179.73	8253.18	59.86	-386.15	-5.13	386.19	180.76	13.88	0.85R
	8315.00	37.34	179.82	8279.23	62.42	-404.73	-5.06	404.76	180.72	11.50	15.1R
	8346.00	39.99	180.93	8303.44	65.30	-424.10	-5.19	424.13	180.70	8.84	23.14R

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
	8378.00	42.50	182.51	8327.49	68.92	-445.18	-5.83	445.22	180.75	8.49	24.27R
	8410.00	44.94	184.06	8350.62	73.32	-467.26	-7.10	467.31	180.87	8.33	28.49R
	8441.00	48.40	186.55	8371.89	78.58	-489.70	-9.20	489.79	181.08	12.60	13.21R
	8472.00	52.25	187.69	8391.68	84.87	-513.37	-12.16	513.52	181.36	12.74	30.11R
	8504.00	55.26	189.80	8410.60	92.38	-538.87	-16.10	539.12	181.71	10.80	43.21R
	8536.00	57.56	192.33	8428.30	101.16	-565.03	-21.22	565.43	182.15	9.75	33.71R
	8567.00	59.80	194.05	8444.42	110.80	-590.81	-27.27	591.44	182.64	8.64	15.73R
	8598.00	62.35	194.86	8459.41	121.24	-617.08	-34.04	618.02	183.16	8.54	16.44R
	8630.00	64.90	195.69	8473.62	132.64	-644.73	-41.59	646.07	183.69	8.30	29R
	8662.00	67.68	197.35	8486.49	144.87	-672.82	-49.93	674.67	184.24	9.90	45.22R
	8694.00	70.34	200.17	8497.96	158.40	-701.10	-59.54	703.62	184.85	11.70	50.69R
	8725.00	72.84	203.33	8507.75	173.07	-728.41	-70.44	731.81	185.52	12.59	53.67R
	8757.00	74.28	205.35	8516.80	189.55	-756.37	-83.09	760.92	186.27	7.54	70.38R
	8789.00	75.53	208.89	8525.14	207.40	-783.86	-97.18	789.86	187.07	11.37	75.45R
	8820.00	76.57	212.88	8532.62	226.34	-809.67	-112.62	817.47	187.92	12.93	52.35R
	8852.00	78.48	215.39	8539.53	247.37	-835.53	-130.15	845.61	188.85	9.71	42.23R
	8883.00	82.59	219.13	8544.63	269.14	-859.85	-148.66	872.61	189.81	17.81	18.48R
	8914.00	87.59	220.80	8547.28	292.13	-883.52	-168.50	899.44	190.80	17.00	19.62R
	8945.00	90.79	221.94	8547.72	315.71	-906.78	-188.98	926.26	191.77	10.96	90.6R
	9113.00	90.67	232.21	8545.57	453.51	-1021.03	-311.82	1067.58	196.98	6.11	99.11R
	9208.00	89.95	236.69	8545.06	537.84	-1076.25	-399.09	1144.42	199.88	4.78	46.52L
	9304.00	90.50	236.11	8544.68	624.52	-1129.37	-469.05	1222.90	202.55	0.83	62.37L
	9345.00	90.69	235.74	8544.25	661.40	-1152.34	-503.01	1257.34	203.58	1.02	62.38L
	9399.00	90.95	235.25	8543.48	709.78	-1182.93	-547.51	1303.49	204.84	1.02	85.6L
	9494.00	90.98	234.86	8541.88	794.57	-1237.34	-625.37	1386.39	206.81	0.41	50.89R
	9599.00	92.19	236.35	8539.25	879.75	-1290.98	-703.72	1470.32	208.60	2.02	84.92R
	9684.00	92.81	243.54	8535.10	967.75	-1338.48	-785.82	1552.11	210.42	7.59	81.56R
	9778.00	93.84	250.66	8529.64	1058.44	-1374.98	-872.20	1628.28	212.39	7.64	105.45R
	9874.00	92.15	256.71	8524.62	1153.29	-1401.89	-964.17	1701.44	214.52	6.53	119.52R
	9970.00	89.33	261.68	8523.38	1249.14	-1419.88	-1058.42	1770.96	216.70	5.95	5.71R
	10066.00	90.23	261.77	8523.75	1345.14	-1433.69	-1153.42	1840.07	218.82	0.94	42.71L
	10161.00	90.36	261.65	8523.26	1440.14	-1447.39	-1247.42	1910.76	220.76	0.19	118.18L
	10257.00	90.06	261.09	8522.91	1536.13	-1461.80	-1342.33	1984.62	222.56	0.66	78.93R
	10353.00	90.33	262.47	8522.58	1632.13	-1475.52	-1437.35	2059.88	224.25	1.46	112.73R
	10447.00	89.40	264.69	8522.80	1726.08	-1486.03	-1530.75	2133.42	225.85	2.56	68.27R
	10543.00	92.50	272.48	8521.21	1821.32	-1488.40	-1626.62	2204.82	227.54	8.73	89.08L
	10637.00	92.57	267.51	8517.05	1914.25	-1488.41	-1720.50	2274.97	229.14	5.28	105.11R
	10732.00	91.98	269.69	8513.28	2008.51	-1490.73	-1815.39	2349.02	230.61	2.38	97.48R
	10828.00	91.63	272.34	8510.25	2103.23	-1489.03	-1911.32	2422.88	232.08	2.78	96.49R
	10924.00	91.32	275.05	8507.78	2197.14	-1482.84	-2007.08	2495.43	233.54	2.84	122.2R
	11017.00	90.98	275.59	8505.92	2287.56	-1474.22	-2099.66	2585.52	234.91	0.69	92.47L
	11111.00	90.88	279.29	8504.39	2379.28	-1466.96	-2193.36	2638.70	236.22	2.45	93.7L
	11204.00	90.76	271.44	8503.06	2470.70	-1463.11	-2286.26	2714.35	237.38	1.99	69.67L

Cross Hard Line

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
	11297.00	90.96	270.90	8501.66	2562.46	-1461.21	-2379.23	2792.11	238.44	0.62	79.56L
	11388.00	91.03	270.52	8500.08	2652.36	-1460.08	-2470.21	2869.46	239.41	0.42	90L
	11481.00	91.03	270.30	8498.41	2744.31	-1459.42	-2563.20	2949.56	240.34	0.24	74.98L
	11575.00	91.14	269.89	8496.63	2837.32	-1459.26	-2657.18	3031.51	241.23	0.45	94.57L
	11669.00	91.10	269.39	8494.79	2930.43	-1459.85	-2751.16	3114.49	242.05	0.53	115.02L
	11762.00	91.03	269.24	8493.07	3022.63	-1460.97	-2844.14	3197.43	242.81	0.18	129.29L
	11857.00	90.76	268.91	8491.58	3116.86	-1462.50	-2939.11	3282.88	243.55	0.45	38.66L
	11950.00	90.96	268.75	8490.19	3209.16	-1464.40	-3032.08	3367.19	244.22	0.28	102.1L
	12043.00	90.93	268.61	8488.65	3301.49	-1466.54	-3125.04	3452.05	244.86	0.15	51.33L
	12136.00	91.13	268.36	8486.98	3393.85	-1469.00	-3218.00	3537.44	245.46	0.34	132.88L
	12232.00	91.00	268.22	8485.20	3489.22	-1471.86	-3313.94	3626.09	246.05	0.20	176.63L
	12327.00	90.83	268.21	8483.68	3583.63	-1474.82	-3408.88	3714.24	246.60	0.18	32.34L
	12424.00	91.13	268.02	8482.02	3680.03	-1478.01	-3505.81	3804.63	247.14	0.37	114.44L
	12527.00	90.83	267.36	8480.26	3782.48	-1482.16	-3608.71	3901.23	247.67	0.70	63.43R
	12623.00	90.86	267.42	8478.84	3878.02	-1486.53	-3704.60	3991.72	248.14	0.07	85.68R
	12705.00	90.90	267.95	8477.58	3959.58	-1489.84	-3786.53	4069.08	248.52	0.65	108.44R
	12804.00	90.83	268.16	8476.09	4057.99	-1493.20	-3885.46	4162.50	248.98	0.22	144.06R
	12903.00	90.03	268.74	8475.35	4156.33	-1495.88	-3984.42	4255.97	249.42	1.00	7.97R
	12999.00	91.03	268.88	8474.46	4251.62	-1497.88	-4080.39	4346.63	249.84	1.05	64.98L
	13091.00	91.10	268.73	8472.75	4342.92	-1499.79	-4172.36	4433.73	250.23	0.18	84.46R
	13189.00	91.27	270.49	8470.72	4440.00	-1500.46	-4270.33	4526.27	250.64	1.80	90R
	13283.00	91.27	272.24	8468.64	4532.68	-1498.22	-4364.28	4614.28	251.05	1.86	93.41R
	13378.00	91.20	273.41	8466.59	4625.92	-1493.54	-4459.14	4702.61	251.48	1.23	98.56L
	13473.00	90.93	271.62	8464.82	4719.25	-1489.37	-4554.02	4791.39	251.89	1.91	81.27L
	13568.00	91.14	270.25	8463.11	4813.04	-1487.82	-4648.99	4881.27	252.25	1.46	150.26L
	13664.00	90.65	269.97	8461.61	4908.03	-1487.64	-4744.98	4972.72	252.59	0.59	72.35R
	13757.00	90.72	270.19	8460.50	5000.07	-1487.51	-4837.97	5061.48	252.91	0.25	118.85L
	13950.00	90.45	269.70	8458.53	5191.13	-1487.70	-5030.96	5246.32	253.53	0.29	2.86L
	14046.00	90.65	269.69	8457.60	5286.23	-1488.21	-5126.96	5338.58	253.81	0.21	108.88L
	14142.00	90.52	269.31	8456.62	5381.37	-1489.04	-5222.95	5431.06	254.09	0.42	100.56L
	14237.00	90.41	268.72	8455.85	5475.62	-1490.68	-5317.93	5522.91	254.34	0.63	78.05L
	14331.00	90.52	268.20	8455.09	5568.99	-1493.20	-5411.89	5614.11	254.58	0.57	95.71R
	14427.00	90.48	268.60	8454.25	5664.36	-1495.88	-5507.85	5707.37	254.81	0.42	66.03R
	14522.00	91.00	269.77	8453.03	5758.57	-1497.23	-5602.83	5799.44	255.04	1.35	74.51R
	14616.00	91.31	270.89	8451.13	5851.52	-1496.69	-5696.81	5890.14	255.28	1.24	80.11R
	14711.00	91.55	272.27	8448.76	5945.12	-1494.08	-5791.74	5981.35	255.53	1.47	93.6R
	14807.00	91.41	274.48	8446.28	6039.15	-1488.43	-5887.54	6072.77	255.81	2.31	103.27R
	14902.00	91.20	275.37	8444.12	6131.66	-1480.27	-5982.16	6162.59	256.10	0.96	133.93L
	14996.00	90.41	274.55	8442.80	6223.19	-1472.15	-6075.80	6251.60	256.38	1.21	65.91L
	15093.00	90.79	273.70	8441.78	6317.97	-1465.17	-6172.54	6344.05	256.65	0.96	111.09L
	15188.00	90.52	273.00	8440.69	6411.05	-1459.62	-6267.37	6435.09	256.89	0.79	97.12L
	15283.00	90.41	272.12	8439.92	6504.39	-1455.37	-6362.27	6526.61	257.12	0.93	103.71L
	15378.00	90.10	270.85	8439.50	6598.05	-1452.91	-6457.24	6618.68	257.32	1.38	29.27L

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
	15473.00	90.76	270.48	8438.79	6691.92	-1451.81	-6552.23	6711.14	257.51	0.80	88.79L
	15569.00	90.79	269.05	8437.49	6786.99	-1452.20	-6648.22	6804.97	257.68	1.49	65.71L
	15666.00	91.48	267.52	8435.57	6883.36	-1455.11	-6745.15	6900.32	257.83	1.73	93L
	15762.00	91.44	266.76	8433.12	6978.92	-1459.89	-6841.00	6995.04	257.95	0.79	90L
	15857.00	91.44	266.62	8430.73	7073.55	-1465.38	-6935.81	7088.92	258.07	0.15	134.31R
	15953.00	91.03	267.04	8428.66	7169.16	-1470.69	-7031.64	7183.79	258.19	0.61	61.46R
	16048.00	91.72	268.31	8426.38	7263.64	-1474.54	-7126.53	7277.48	258.31	1.52	108.07L
	16144.00	91.07	266.32	8424.05	7359.17	-1479.03	-7222.39	7372.28	258.43	2.18	90R
	16238.00	91.07	267.15	8422.29	7452.81	-1484.39	-7316.22	7465.29	258.53	0.88	90R
	16333.00	91.07	267.26	8420.52	7547.38	-1489.02	-7411.09	7559.20	258.64	0.12	175.33L
	16428.00	90.58	267.22	8419.15	7641.95	-1493.59	-7505.97	7653.13	258.75	0.52	24.24L
	16524.00	91.69	266.72	8417.25	7737.54	-1498.67	-7601.82	7748.14	258.85	1.27	132.05R
	16620.00	90.86	267.64	8415.11	7833.10	-1503.39	-7697.68	7843.11	258.95	1.29	61.49R
	16715.00	91.24	268.34	8413.37	7927.54	-1506.72	-7792.60	7936.93	259.06	0.84	84.64R
	16811.00	91.41	270.16	8411.15	8022.71	-1507.97	-7888.56	8031.40	259.18	1.90	90R
	16906.00	91.41	271.82	8408.81	8116.47	-1506.33	-7983.52	8124.38	259.32	1.75	129.6R
	17000.00	90.45	272.98	8407.29	8208.86	-1502.40	-8077.42	8215.96	259.46	1.60	26.56R
	17095.00	90.89	273.20	8406.18	8302.03	-1497.28	-8172.28	8308.31	259.62	0.52	111.22L
	17190.00	90.28	271.63	8405.21	8395.41	-1493.28	-8267.18	8400.96	259.76	1.77	40.91R
	17285.00	91.03	272.28	8404.12	8488.93	-1490.03	-8362.12	8493.84	259.90	1.04	109.8L
	17381.00	90.45	270.67	8402.88	8583.57	-1487.56	-8458.08	8587.89	260.03	1.78	25.06R
	17475.00	91.07	270.96	8401.63	8676.41	-1486.23	-8552.06	8680.24	260.14	0.73	116.1R
	17570.00	90.58	271.96	8400.27	8770.06	-1483.81	-8647.02	8773.40	260.26	1.17	59.74R
	17664.00	90.86	272.44	8399.09	8862.52	-1480.20	-8740.94	8865.38	260.39	0.59	166.68L
	17759.00	90.48	272.35	8397.97	8955.91	-1476.23	-8835.85	8958.32	260.52	0.41	48.23R
	17854.00	91.89	273.93	8396.01	9049.04	-1471.03	-8930.68	9051.02	260.65	2.23	131.91L
	17949.00	90.48	272.36	8394.04	9142.18	-1465.82	-9025.51	9143.77	260.78	2.22	70.25L
	18044.00	90.76	271.58	8393.02	9235.69	-1462.55	-9120.45	9236.97	260.89	0.87	99.92L
	18139.00	90.38	269.41	8392.07	9329.60	-1461.73	-9215.44	9330.64	260.99	2.32	76.3L
	18235.00	90.76	267.85	8391.12	9424.92	-1464.03	-9311.40	9425.79	261.06	1.67	52.9L
	18329.00	91.07	267.44	8389.62	9518.43	-1467.89	-9405.31	9519.17	261.13	0.55	86.38R
	18424.00	91.13	268.39	8387.79	9612.87	-1471.34	-9500.23	9613.49	261.20	1.00	86.76L
	18518.00	91.20	267.15	8385.88	9706.35	-1475.00	-9594.14	9706.86	261.26	1.32	103.39L
	18613.00	91.00	266.31	8384.06	9800.99	-1480.42	-9688.96	9801.41	261.31	0.91	85.6R
	18709.00	91.03	266.70	8382.36	9896.66	-1486.27	-9784.77	9897.00	261.36	0.41	80.53R
	18804.00	91.17	267.54	8380.53	9991.23	-1491.04	-9879.63	9991.51	261.42	0.90	126.41R
	18897.00	90.58	268.34	8379.11	10083.70	-1494.38	-9972.56	10083.90	261.48	1.07	107.05R
	18992.00	90.00	270.23	8378.63	10177.89	-1495.57	-10067.54	10178.02	261.55	2.08	150.35L
	19087.00	89.35	269.86	8379.17	10271.92	-1495.49	-10162.54	10271.99	261.63	0.79	65.02L
	19182.00	90.31	267.80	8379.45	10366.21	-1497.43	-10257.52	10366.24	261.69	2.39	35.66R
	19273.00	92.58	269.43	8377.16	10456.53	-1499.63	-10348.45	10456.55	261.75	3.07	HS
	19317.00	92.58	269.43	8375.18	10500.10	-1500.07	-10392.40	10500.11	261.79	0.00	

Survey 18-Dec-2014
Proj to Bit - TD

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS ("/100ft)	TF (°)
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Survey Type: Non-Def Survey

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	24.000	Act Sins	30.000	30.000	SLB_MWD-POOR-Depth Only	Original Borehole / Cimarex Hackberry 23 Federal #3H XEM +
	1	24.000	232.000	Act Sins	30.000	30.000	SLB_MWD-POOR	Original Borehole / Cimarex Hackberry 23 Federal #3H XEM +
	1	232.000	3495.400	Act Sins	30.000	30.000	SLB_NSG+MSHOT	Original Borehole / Cimarex Hackberry 23 Federal #3H XEM +
	1	3495.400	19273.000	Act Sins	30.000	30.000	SLB_MWD-STD	Original Borehole / Cimarex Hackberry 23 Federal #3H XEM +
	1	19273.000	19317.000	Act Sins	30.000	30.000	SLB_BLIND+TREND	Original Borehole / Cimarex Hackberry 23 Federal #3H XEM +

[illegible]

Comments	Critical Points												
	Survey MDN	Inclination(deg)	Altitude(deg)	TVD(ft)	VS(ft)	NIS(ft)	Flt(H)	Latitude(deg)	Longitude(deg)	Eastings(ftUS)	Northings(ftUS)	DLSP(100ft)	Tool Feed(deg)
SHL - Hackberry 23 Federal #3H	0.00	0.00	181.00	0.00	-3272.00	0.00	0.00	N 32 38 39.966 W 103 56 0.639	664403.40	598408.00			0.00

