

Results of Directional Survey

API number:	30-025-40447		
OGRID:		Operator:	CIMAREX ENERGY CO. OF COLORADO
		Property:	SNODDY FEDERAL # 20H

surface	ULSTR:	A	26	T 20S	R 32E
				727 FNL	526 FEL

BH Loc	ULSTR:	D	26	T 20S	R 32E
14154	MD	9880.9	TVD	662 FNL	330 FWL
					4950 FEL

Top Perf/OH	ULSTR:	A	26	T 20S	R 32E
9900	MD	9827.7	TVD	655 FNL	718 FEL

Bot Perf/OH	ULSTR:	D	26	T 20S	R 32E
14096	MD	9881.6	TVD	661 FNL	388 FWL
					4892 FEL

	MD	N/S	E/W	VD
	9886	73.06	-180.81	9819.1
TOP PERFS/OH	9900	71.56	-191.76	9827.69
	9918	69.64	-205.84	9838.74
	14010	66.44	-4279.69	9882.24
BOT PERFS/OH	14096	65.67	-4365.68	9881.59
	14097	65.66	-4366.68	9881.58

NEXT TO LAST	14097	65.66	-4366.68	9881.58
LAST READING	14154	64.98	-4423.67	9880.92
TD	14154	64.98	-4423.67	9880.92

Surface Location	727 FN	526 FE
Projected BHL	662 FN	4950 FE
Location of		
Top Perfs/OH	655 FN	718 FE
Bottom Perfs/OH	661 FN	4892 FE

SUMMARY of Subsurface Locations

Surface Location	A-26-20S-32E	727 FN	526 FE	Vert. Depth
Top Perfs/OH	A-26-20S-32E	655 FN	718 FE	9827.69
Bottom Perfs/OH	D-26-20S-32E	661 FN	4892 FE	9881.59
Projected TD	D-26-20S-32E	662 FN	4950 FE	9880.92

MAR 21 2013

A Gyrodata Directional Survey

for

CIMAREX ENERGY

**Lease: SNODDY FEDERAL Well: 20H, 4 1/2" DRILLPIPE
Location: KEY #881, LEA COUNTY, NEW MEXICO**

Job Number: MD0812GDM439

Run Date: 04 Aug 2012

Surveyor: Michael Hattar

Calculation Method: MINIMUM CURVATURE

Survey surface coordinates obtained from: Well Plan/Plot

Survey Latitude: 33.437778 deg. N Longitude: 105.090833 deg. W

Azimuth Correction:

Gyro: 0.42000 deg to Grid North

Depth Reference: Rotary Table

Rotary Table Elevation: 19.00

Vertical Section Calculated from Well Head Location

Closure Calculated from Well Head Location

Horizontal Coordinates Calculated from Well Head Location

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MEASURED DEPTH feet	INCL deg.	AZIMUTH deg.	DOGLEG SEVERITY deg./ 100 ft.	VERTICAL DEPTH feet	CLOSURE DIST. AZIMUTH feet deg.	HORIZONTAL COORDINATES feet
0.00	0.00	0.00	0.00	0.00	0.0 0.0	0.00 N 0.00 E
0 - 4591 FT. RATE GYROSCOPIC MULTISHOT SURVEY RUN INSIDE 4 1/2" DRILLPIPE ALL MEASURED DEPTHS AND COORDINATES REFERENCED TO KEY DRILLING RIG # 881 R.K.B. HEIGHT OF 19 FT.						
102.10	0.21	148.15	0.21	102.10	0.2 148.2	0.16 S 0.10 E
165.70	0.24	157.38	0.07	165.70	0.4 151.0	0.38 S 0.21 E
229.20	0.25	169.58	0.08	229.20	0.7 155.8	0.64 S 0.29 E
292.80	0.28	176.14	0.07	292.80	1.0 160.9	0.93 S 0.32 E
356.40	0.29	197.43	0.17	356.40	1.3 167.0	1.24 S 0.29 E
419.90	0.45	205.74	0.27	419.90	1.6 175.4	1.62 S 0.13 E
483.50	0.65	226.51	0.44	483.49	2.1 186.6	2.09 S 0.24 W
547.10	0.96	221.36	0.50	547.09	2.9 197.3	2.74 S 0.85 W
610.70	1.21	224.66	0.41	610.68	4.0 204.9	3.62 S 1.68 W
674.20	1.39	226.95	0.29	674.16	5.4 210.4	4.62 S 2.71 W
737.80	1.50	231.66	0.25	737.74	6.9 214.8	5.66 S 3.93 W
801.40	1.26	257.41	1.03	801.32	8.2 219.7	6.33 S 5.27 W
864.90	1.24	257.09	0.03	864.81	9.4 224.9	6.64 S 6.62 W
928.50	1.36	258.51	0.20	928.39	10.6 229.1	6.94 S 8.03 W
992.10	1.47	274.26	0.63	991.97	11.9 233.7	7.03 S 9.58 W
1055.70	1.47	280.19	0.24	1055.55	13.1 238.6	6.83 S 11.20 W
1119.20	1.35	285.67	0.28	1119.03	14.3 243.0	6.48 S 12.72 W

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MEASURED DEPTH feet	INCL deg.	AZIMUTH deg.	DOGLEG SEVERITY deg./ 100 ft.	VERTICAL DEPTH feet	CLOSURE DIST. AZIMUTH feet deg.	HORIZONTAL COORDINATES feet
1182.80	1.12	289.52	0.38	1182.62	15.3 246.6	6.07 S 14.03 W
1246.40	0.62	326.85	1.15	1246.21	15.8 249.4	5.57 S 14.80 W
1309.90	0.72	26.52	1.06	1309.70	15.6 251.6	4.93 S 14.81 W
1373.50	0.83	38.86	0.31	1373.30	14.9 253.6	4.21 S 14.34 W
1437.10	0.46	9.43	0.76	1436.89	14.5 255.6	3.60 S 14.01 W
1500.60	0.43	15.44	0.09	1500.39	14.3 257.3	3.12 S 13.91 W
1564.20	0.45	6.23	0.12	1563.99	14.1 259.2	2.64 S 13.81 W
1627.80	0.37	4.87	0.13	1627.59	13.9 261.0	2.19 S 13.77 W
1691.30	0.35	355.73	0.10	1691.09	13.9 262.6	1.79 S 13.77 W
1754.90	0.38	350.10	0.07	1754.69	13.9 264.3	1.39 S 13.82 W
1818.50	0.38	2.56	0.13	1818.29	13.9 266.0	0.97 S 13.84 W
1882.10	0.39	8.03	0.06	1881.88	13.8 267.7	0.55 S 13.81 W
1945.60	0.40	357.70	0.11	1945.38	13.8 269.5	0.11 S 13.78 W
2009.20	0.39	18.09	0.22	2008.98	13.7 271.3	0.32 N 13.73 W
2072.80	0.50	26.19	0.20	2072.58	13.6 273.3	0.77 N 13.54 W
2136.30	0.60	30.71	0.17	2136.08	13.3 275.6	1.30 N 13.24 W
2199.90	0.81	38.27	0.36	2199.67	12.9 278.6	1.94 N 12.80 W
2263.50	1.19	68.27	1.00	2263.26	12.2 282.1	2.54 N 11.90 W
2327.10	1.58	59.96	0.69	2326.84	11.0 287.0	3.22 N 10.53 W
2390.60	1.92	65.20	0.59	2390.31	9.7 295.0	4.11 N 8.81 W
2454.20	2.22	60.82	0.53	2453.87	8.5 307.3	5.16 N 6.76 W
2517.80	2.30	57.55	0.24	2517.42	7.9 324.4	6.44 N 4.61 W

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Lease: SNODDY FEDERAL Well: 20H, 4 1/2" DRILLPIPE

Location: KEY #881, LEA COUNTY, NEW MEXICO

Job Number: MD0812GDM439

MEASURED DEPTH feet	INCL deg.	AZIMUTH deg.	DOGLEG SEVERITY deg./ 100 ft.	VERTICAL DEPTH feet	CLOSURE DIST. AZIMUTH feet deg.	HORIZONTAL COORDINATES feet
2581.30	2.27	69.83	0.77	2580.87	7.9 342.7	7.56 N 2.36 W
2644.90	2.10	76.63	0.49	2644.43	8.3 359.7	8.26 N 0.04 W
2708.50	2.06	81.31	0.27	2707.98	9.0 14.3	8.71 N 2.22 E
2772.00	2.10	88.06	0.39	2771.44	10.0 26.8	8.92 N 4.51 E
2835.60	2.11	80.75	0.42	2835.00	11.4 36.8	9.14 N 6.83 E
2899.20	2.08	73.65	0.41	2898.56	13.3 43.3	9.66 N 9.10 E
2962.80	1.98	72.25	0.18	2962.12	15.3 47.5	10.32 N 11.25 E
3026.30	1.79	68.24	0.36	3025.58	17.2 50.2	11.02 N 13.22 E
3089.90	1.47	69.83	0.51	3089.16	18.9 51.9	11.67 N 14.91 E
3153.50	1.37	65.17	0.24	3152.74	20.5 53.1	12.27 N 16.36 E
3217.00	1.13	70.06	0.41	3216.22	21.8 54.0	12.80 N 17.64 E
3280.60	1.03	65.46	0.21	3279.81	23.0 54.7	13.25 N 18.75 E
3344.20	1.35	71.58	0.54	3343.40	24.2 55.5	13.73 N 19.98 E
3407.70	1.14	81.87	0.48	3406.88	25.5 56.6	14.05 N 21.31 E
3471.30	1.04	84.54	0.18	3470.47	26.6 57.8	14.20 N 22.51 E
3534.90	1.03	67.83	0.47	3534.06	27.7 58.5	14.47 N 23.62 E
3598.40	0.96	56.29	0.33	3597.55	28.8 58.7	14.98 N 24.59 E
3662.00	0.93	72.15	0.41	3661.14	29.8 58.8	15.43 N 25.52 E
3725.60	0.94	88.16	0.41	3724.73	30.8 59.5	15.61 N 26.54 E
3789.20	0.97	82.69	0.15	3788.33	31.7 60.4	15.69 N 27.59 E
3852.70	0.97	84.57	0.05	3851.82	32.7 61.1	15.81 N 28.66 E

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Job Number: MD0812GDM439

MEASURED DEPTH feet	INCL deg.	AZIMUTH deg.	DOGLEG SEVERITY deg./ 100 ft.	VERTICAL DEPTH feet	CLOSURE DIST. AZIMUTH feet deg.	HORIZONTAL COORDINATES feet
3916.30	1.05	80.59	0.17	3915.41	33.8 61.8	15.96 N 29.77 E
3979.90	1.18	77.98	0.22	3978.99	35.0 62.4	16.19 N 30.99 E
4043.40	1.12	67.81	0.33	4042.48	36.2 62.8	16.56 N 32.20 E
4107.00	1.03	69.51	0.15	4106.07	37.4 63.0	17.00 N 33.31 E
4170.60	0.96	75.54	0.20	4169.66	38.5 63.2	17.33 N 34.36 E
4234.10	0.93	78.22	0.08	4233.15	39.5 63.6	17.57 N 35.38 E
4297.70	0.87	83.86	0.17	4296.74	40.5 64.0	17.72 N 36.37 E
4361.30	0.78	81.65	0.15	4360.34	41.3 64.4	17.84 N 37.28 E
4424.90	0.73	83.32	0.09	4423.93	42.1 64.8	17.95 N 38.11 E
4488.40	0.67	84.12	0.10	4487.43	42.9 65.1	18.03 N 38.88 E
4552.00	0.47	86.01	0.32	4551.02	43.5 65.4	18.09 N 39.51 E
4579.00	0.38	86.17	0.33	4578.02	43.6 65.5	18.10 N 39.71 E

Final Station Closure: Distance: 43.64 ft Az: 65.49 deg.



Job Number: MD120809
 Company: CIMAREX
 Lease/Well: Snoddy Fed #20H
 Location: Hobbs, NM
 Rig Name: Key 881
 RKB: ☐
 G.L. or M.S.L.: MSL

State/Country: NM, USA
 Declination: 7.54
 Grid: North
 File name: C:\WINSERVE\0809.SVY
 Date/Time: 22-Aug-12 / 04:31
 Curve Name: 0809 As Drilled

LEAM Drilling Systems, Inc.

WINSERVE SURVEY CALCULATIONS
 Minimum Curvature Method
 Vertical Section Plane 270.81
 Vertical Section Referenced to Wellhead
 Rectangular Coordinates Referenced to Wellhead

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
GyroData Tie-In									
4579.00	.38	86.17	4578.02	18.10	39.71	-39.45	43.64	65.50	.00
4790.00	.26	297.96	4789.02	18.37	39.99	-39.72	44.00	65.32	.29
4981.00	.26	354.21	4980.02	19.01	39.56	-39.29	43.89	64.34	.13
5170.00	.35	51.87	5169.01	19.79	39.97	-39.69	44.60	63.66	.16
5360.00	.18	32.01	5359.01	20.40	40.58	-40.29	45.42	63.31	.10
5550.00	.53	29.72	5549.01	21.42	41.18	-40.87	46.41	62.52	.18
5741.00	.53	55.91	5740.00	22.68	42.35	-42.02	48.04	61.83	.13
5932.00	.44	47.16	5930.99	23.67	43.62	-43.28	49.63	61.51	.06
6122.00	.62	13.72	6120.99	25.17	44.40	-44.04	51.03	60.45	.18
6313.00	.53	17.24	6311.98	27.01	44.90	-44.52	52.40	58.97	.05
6504.00	.62	72.26	6502.97	28.17	46.15	-45.75	54.07	58.60	.28
6693.00	.70	355.27	6691.96	29.64	47.03	-46.60	55.59	57.78	.44

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
6882.00	.79	348.41	6880.94	32.06	46.67	-46.21	56.62	55.51	.07
7073.00	.97	334.88	7071.92	34.82	45.72	-45.22	57.47	52.71	.14
7264.00	.70	324.20	7262.90	37.23	44.35	-43.82	57.90	49.99	.16
7455.00	.79	336.99	7453.88	39.38	43.15	-42.59	58.42	47.61	.10
7646.00	.70	11.26	7644.87	41.74	42.87	-42.27	59.83	45.76	.23
7837.00	.70	15.13	7835.85	44.01	43.40	-42.77	61.81	44.60	.02
8026.00	1.49	4.06	8024.82	47.58	43.87	-43.20	64.72	42.68	.43
8217.00	2.02	17.60	8215.73	53.26	45.07	-44.31	69.77	40.24	.35
8408.00	2.02	21.63	8406.61	59.60	47.33	-46.48	76.11	38.45	.07
8598.00	2.02	18.47	8596.49	65.89	49.62	-48.69	82.48	36.98	.06
8789.00	1.49	32.01	8787.40	71.19	52.00	-50.99	88.16	36.15	.35
8980.00	1.85	20.76	8978.32	76.18	54.41	-53.33	93.61	35.54	.25
9170.00	2.55	13.02	9168.18	83.16	56.45	-55.27	100.51	34.17	.40
9234.00	2.73	14.08	9232.11	86.03	57.14	-55.92	103.28	33.59	.29
9251.00	2.73	16.18	9249.09	86.81	57.36	-56.12	104.05	33.45	.59
9281.00	2.37	3.88	9279.06	88.11	57.60	-56.35	105.27	33.17	2.18
9314.00	3.52	298.14	9312.03	89.27	56.75	-55.48	105.78	32.44	10.12
9346.00	6.50	280.03	9343.90	90.05	54.10	-52.82	105.05	31.00	10.43
9377.00	11.08	273.88	9374.53	90.56	49.40	-48.11	103.16	28.61	15.06
9409.00	13.81	275.64	9405.78	91.14	42.53	-41.23	100.58	25.01	8.61
9441.00	15.65	273.53	9436.73	91.78	34.42	-33.12	98.02	20.56	5.99
9472.00	16.44	269.31	9466.52	91.99	25.86	-24.55	95.55	15.70	4.54
9504.00	18.99	270.19	9497.00	91.95	16.12	-14.82	93.35	9.94	8.01
9536.00	21.54	272.12	9527.02	92.19	5.04	-3.74	92.32	3.13	8.24
9567.00	24.27	273.18	9555.57	92.75	-7.01	8.32	93.01	355.68	8.91
9599.00	25.24	271.24	9584.63	93.26	-20.40	21.71	95.47	347.66	3.95
9631.00	27.08	268.26	9613.35	93.19	-34.50	35.81	99.37	339.69	7.06
9663.00	28.40	266.50	9641.67	92.50	-49.38	50.68	104.86	331.91	4.85
9695.00	29.99	264.39	9669.61	91.26	-64.93	66.22	112.00	324.57	5.92
9727.00	32.10	262.63	9697.02	89.38	-81.33	82.58	120.84	317.70	7.18
9758.00	34.47	260.17	9722.94	86.83	-98.14	99.36	131.04	311.50	8.80
9790.00	36.32	259.64	9749.02	83.58	-116.39	117.56	143.29	305.68	5.86
9822.00	40.71	261.05	9774.05	80.25	-136.03	137.15	157.94	300.54	13.99
9854.00	44.93	260.70	9797.52	76.80	-157.50	158.57	175.23	295.99	13.21

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
9886.00	50.21	261.05	9819.10	73.06	-180.81	181.83	195.01	292.00	16.52
9918.00	54.08	263.33	9838.74	69.64	-205.84	206.80	217.30	288.69	13.34
9950.00	58.39	265.44	9856.52	67.05	-232.30	233.23	241.79	286.10	14.54
9981.00	62.78	266.85	9871.74	65.24	-259.24	260.14	267.32	284.13	14.70
10013.00	68.50	265.97	9884.94	63.41	-288.32	289.19	295.21	282.40	18.05
10045.00	72.55	265.27	9895.60	61.10	-318.40	319.23	324.21	280.86	12.82
10077.00	77.82	265.62	9903.78	58.65	-349.22	350.02	354.11	279.53	16.50
10109.00	83.27	265.44	9909.04	56.19	-380.68	381.44	384.81	278.40	17.04
10141.00	86.26	268.61	9911.96	54.54	-412.50	413.23	416.09	277.53	13.59
10204.00	88.72	271.07	9914.72	54.36	-475.43	476.15	478.52	276.52	5.52
10268.00	90.04	270.01	9915.41	54.97	-539.42	540.14	542.21	275.82	2.65
10330.00	90.40	269.31	9915.17	54.60	-601.42	602.13	603.89	275.19	1.27
10394.00	91.01	270.72	9914.38	54.62	-665.41	666.11	667.65	274.69	2.40
10458.00	90.57	271.42	9913.50	55.81	-729.39	730.11	731.52	274.38	1.29
10584.00	90.13	269.66	9912.73	57.00	-855.38	856.10	857.27	273.81	1.44
10711.00	89.69	269.31	9912.93	55.86	-982.37	983.06	983.96	273.25	.44
10838.00	91.45	268.43	9911.67	53.35	-1109.33	1109.98	1110.62	272.75	1.55
10963.00	91.19	267.55	9908.79	48.97	-1234.22	1234.79	1235.19	272.27	.73
11087.00	90.04	268.08	9907.46	44.24	-1358.12	1358.61	1358.84	271.87	1.02
11215.00	90.40	268.96	9906.97	40.94	-1486.08	1486.51	1486.64	271.58	.74
11341.00	89.87	269.84	9906.67	39.62	-1612.07	1612.47	1612.56	271.41	.82
11468.00	89.16	268.78	9907.74	38.09	-1739.05	1739.42	1739.47	271.25	1.00
11595.00	90.04	267.73	9908.63	34.22	-1865.99	1866.29	1866.30	271.05	1.08
11723.00	90.13	268.43	9908.44	29.93	-1993.92	1994.14	1994.14	270.86	.55
11850.00	92.15	269.49	9905.91	27.63	-2120.86	2121.04	2121.04	270.75	1.80
11977.00	92.15	269.31	9901.15	26.30	-2247.76	2247.91	2247.92	270.67	.14
12104.00	92.07	268.96	9896.47	24.38	-2374.66	2374.77	2374.79	270.59	.28
12231.00	92.07	270.72	9891.89	24.03	-2501.57	2501.66	2501.69	270.55	1.38
12358.00	89.69	273.18	9889.93	28.35	-2628.47	2628.61	2628.62	270.62	2.69
12485.00	89.87	271.95	9890.42	34.03	-2755.34	2755.54	2755.55	270.71	.98
12612.00	89.87	270.54	9890.71	36.79	-2882.30	2882.54	2882.54	270.73	1.11
12739.00	90.13	271.24	9890.71	38.76	-3009.29	3009.53	3009.54	270.74	.59
12866.00	90.84	271.77	9889.64	42.10	-3136.24	3136.52	3136.52	270.77	.70
12993.00	91.19	271.07	9887.39	45.25	-3263.18	3263.49	3263.49	270.79	.62

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
13120.00	90.04	269.84	9886.02	46.26	-3390.16	3390.48	3390.48	270.78	1.33
13248.00	91.19	271.42	9884.65	47.66	-3518.14	3518.46	3518.46	270.78	1.53
13374.00	91.36	270.54	9881.85	49.82	-3644.09	3644.43	3644.43	270.78	.71
13501.00	88.90	273.35	9881.56	54.13	-3770.99	3771.38	3771.38	270.82	2.94
13629.00	91.19	272.95	9881.46	61.16	-3898.79	3899.27	3899.27	270.90	1.82
13756.00	88.81	270.89	9881.46	65.41	-4025.70	4026.23	4026.24	270.93	2.48
13883.00	90.13	270.19	9882.63	66.61	-4152.69	4153.22	4153.22	270.92	1.18
14010.00	90.22	269.66	9882.24	66.44	-4279.69	4280.20	4280.20	270.89	.42
14097.00	90.66	269.31	9881.58	65.66	-4366.68	4367.17	4367.18	270.86	.65
PBHL									
14154.00	90.66	269.31	9880.92	64.98	-4423.67	4424.15	4424.15	270.84	.00