

Results of Directional Survey

API number:	30-025-41069		
OGRID:		Operator:	CIMAREX ENERGY CO. OF COLORADO
		Property:	HALLERTAU 4 FEDERAL # 1H

surface	ULSTR:	D	04	T 26S	R 32E
				330 FNL	560 FWL

BH Loc	ULSTR:	M	04	T 26S	R 32E
13558	MD	9034.1	TVD	272 FSL	420 FWL
				5008 FNL	

Top Perf/OH	ULSTR:	D	04	T 26S	R 32E
9395	MD	9066.7	TVD	849 FNL	520 FWL

Bot Perf/OH	ULSTR:	M	04	T 26S	R 32E
13422	MD	9036.4	TVD	408 FSL	418 FWL
				4872 FNL	

	MD	N/S	E/W	VD
	9361	-485.03	-40.15	9067.07
TOP PERFS/OH	9395	-519.02	-39.81	9066.65
	9457	-581.01	-39.20	9065.89
	13341	-4461.19	-143.26	9037.24
BOT PERFS/OH	13422	-4542.18	-142.33	9036.37
	13436	-4556.18	-142.17	9036.22

NEXT TO LAST	13500	-4620.16	-141.04	9035.14
LAST READING	13558	-4678.14	-139.81	9034.10
TD	13558	-4678.14	-139.81	9034.10

Surface Location	330	FN	560	FW
Projected BHL	5008	FN	420	FW
Location of				
Top Perfs/OH	849	FN	520	FW
Bottom Perfs/OH	4872	FN	418	FW

SUMMARY of Subsurface Locations

Surface Location	D-04-26S-32E	330	FN	560	FW	Vert. Depth
Top Perfs/OH	D-04-26S-32E	849	FN	520	FW	9066.65
Bottom Perfs/OH	M-04-26S-32E	4872	FN	418	FW	9036.37
Projected TD	M-04-26S-32E	5008	FN	420	FW	9034.10

OCT 03 2013



Cimarex Hallertau 4 Federal #1H Gyro+MWD 0ft to 13558ft MD

(Def Survey)

Report Date: April 19, 2013 - 07:08 AM
Client: Cimarex
Field: NM Lea County (NAD 83)
Structure / Slot: Noram 23 / Cimarex Hallertau 4 Federal #1H
Well: Cimarex Hallertau 4 Federal #1H
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
Survey Name: Cimarex Hallertau 4 Federal #1H Gyro+MWD 0ft to 13558ft MD
Survey Date: April 05, 2013
Tort / AHD / DDI / ERD Ratio: 146.719 ° / 4748.110 ft / 6.018 / 0.524
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 4' 43.40038", W 103° 41' 12.71196"
Location Grid N/E Y/X: N 392976.300 ftUS, E 741565.600 ftUS
CRS Grid Convergence Angle: 0.3433 °
Grid Scale Factor: 0.99995501

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 182.120 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3338.000 ft above MSL
Seabed / Ground Elevation: 3310.000 ft above MSL
Magnetic Declination: 7.511 °
Total Gravity Field Strength: 998.4834mgn (9.80665 Based)
Total Magnetic Field Strength: 48310.670 nT
Magnetic Dip Angle: 59.942 °
Declination Date: April 05, 2013
Magnetic Declination Model: BGGM 2012
North Reference: Grid North
Grid Convergence Used: 0.3433 °
Total Corr Mag North->Grid North: 7.1674 °

Local Coord Referenced To: Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
SHL Hallertau 4 Federal #1H	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	89.4M
	100.00	0.85	89.40	100.00	-0.04	0.01	0.74	0.74	89.40	0.85	105.16M
	200.00	0.74	105.16	199.99	0.08	-0.15	2.11	2.11	94.16	0.24	89.72M
	300.00	0.77	89.72	299.98	0.19	-0.32	3.40	3.42	95.36	0.21	112.31M
	400.00	0.82	112.31	399.97	0.41	-0.59	4.74	4.77	97.07	0.32	100.71M
	500.00	0.69	100.71	499.96	0.75	-0.97	5.99	6.07	99.21	0.20	102.57M
	519.20	0.70	102.57	519.16	0.79	-1.02	6.22	6.30	99.30	0.13	93.84M
	611.20	0.72	93.84	611.15	0.91	-1.18	7.34	7.44	99.12	0.12	77.8M
	702.40	0.75	77.80	702.34	0.78	-1.09	8.50	8.57	97.32	0.23	56.97M
	794.50	0.86	56.97	794.44	0.23	-0.59	9.67	9.68	93.47	0.34	51.42M
	886.30	0.94	51.42	886.22	-0.66	0.26	10.83	10.84	88.63	0.13	62.56M
	978.40	1.05	62.56	978.31	-1.57	1.12	12.17	12.22	84.75	0.24	63.88M
	1070.40	1.25	63.88	1070.29	-2.46	1.95	13.82	13.96	81.98	0.22	61.39M
	1164.50	1.11	61.39	1164.37	-3.41	2.84	15.54	15.80	79.66	0.16	65.84M
	1259.20	0.81	65.84	1259.06	-4.17	3.55	16.96	17.33	78.18	0.33	26.93M
	1353.80	0.58	26.93	1353.65	-4.91	4.25	17.79	18.29	76.56	0.54	24.97M
	1448.30	0.61	24.97	1448.15	-5.80	5.13	18.22	18.92	74.26	0.04	42.89M
	1543.00	0.36	42.89	1542.84	-6.49	5.81	18.63	19.51	72.69	0.31	17.1M
	1637.60	0.28	17.10	1637.44	-6.94	6.25	18.90	19.91	71.71	0.17	30.53M

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
	1732.40	0.42	30.53	1732.24	-7.47	6.77	19.15	20.31	70.53	0.17	21M
	1827.60	0.45	21.00	1827.44	-8.13	7.42	19.46	20.82	69.13	0.08	29.46M
	1922.30	0.40	29.46	1922.13	-8.78	8.05	19.75	21.33	67.82	0.08	46.45M
	2017.00	0.40	46.45	2016.83	-9.31	8.57	20.15	21.90	66.97	0.12	21.94M
	2111.70	0.45	21.94	2111.53	-9.89	9.14	20.53	22.48	66.00	0.20	334.04M
	2206.40	0.50	334.04	2206.23	-10.61	9.86	20.49	22.74	64.31	0.41	343.51M
	2301.00	0.54	343.51	2300.82	-11.39	10.66	20.18	22.82	62.17	0.10	284.65M
	2490.60	0.72	284.65	2490.41	-12.50	11.81	18.78	22.18	57.83	0.34	267.58M
	2585.30	0.53	267.58	2585.11	-12.59	11.95	17.76	21.41	56.08	0.28	268.06M
	2680.00	0.66	268.06	2679.80	-12.52	11.91	16.78	20.58	54.64	0.14	269.27M
	2774.70	0.89	269.27	2774.49	-12.45	11.88	15.50	19.53	52.53	0.24	267.41M
	2869.60	0.94	267.41	2869.38	-12.35	11.84	13.99	18.32	49.76	0.06	262.43M
	2964.40	0.83	262.43	2964.17	-12.17	11.71	12.53	17.15	46.94	0.14	244.67M
	3059.00	0.54	244.67	3058.76	-11.84	11.43	11.45	16.18	45.04	0.38	219.26M
	3153.70	0.47	219.26	3153.46	-11.33	10.94	10.80	15.37	44.63	0.25	204.61M
	3248.40	0.47	204.61	3248.16	-10.66	10.28	10.39	14.62	45.30	0.13	208.19M
	3343.20	0.42	208.19	3342.95	-9.99	9.62	10.06	13.93	46.28	0.06	205.74M
	3437.80	0.32	205.74	3437.55	-9.44	9.08	9.79	13.35	47.14	0.11	215.23M
	3532.50	0.24	215.23	3532.25	-9.03	8.68	9.56	12.91	47.75	0.10	212.6M
	3627.20	0.19	212.60	3626.95	-8.73	8.39	9.36	12.57	48.13	0.05	195.79M
	3721.70	0.20	195.79	3721.45	-8.43	8.10	9.23	12.28	48.74	0.06	182.06M
	3816.40	0.23	182.06	3816.15	-8.08	7.75	9.18	12.01	49.83	0.06	145.5M
	3911.30	0.39	145.50	3911.05	-7.63	7.29	9.35	11.86	52.07	0.26	135.67M
	4006.00	0.52	135.67	4005.74	-7.08	6.72	9.84	11.91	55.67	0.16	130.05M
	4100.60	0.85	130.05	4100.34	-6.35	5.96	10.67	12.22	60.83	0.36	133.49M
	4195.30	1.26	133.49	4195.02	-5.23	4.79	11.97	12.89	68.19	0.44	129.56M
	4290.00	1.60	129.56	4289.69	-3.74	3.23	13.74	14.11	76.77	0.37	128.13M
	4384.70	1.51	128.13	4384.36	-2.20	1.62	15.74	15.82	84.13	0.10	128.26M
Final Gyro	4416.50	1.34	128.26	4416.15	-1.73	1.13	16.36	16.40	86.05	0.53	132.15M
	4551.62	1.10	132.15	4551.24	0.03	-0.72	18.56	18.58	92.22	0.19	129.95M
	4838.26	0.79	129.95	4837.84	3.01	-3.83	22.12	22.45	99.83	0.11	145.38M
	5121.25	0.79	145.38	5120.80	5.77	-6.69	24.72	25.61	105.15	0.07	152.06M
	5500.35	0.79	152.06	5499.86	10.13	-11.15	27.43	29.61	112.12	0.02	143.97M
	5785.12	0.70	143.97	5784.61	13.20	-14.29	29.38	32.67	115.95	0.05	168.05M
	6164.02	0.31	168.05	6163.50	16.01	-17.17	30.95	35.39	119.02	0.12	144.06M
	6541.08	0.22	144.06	6540.55	17.57	-18.75	31.59	36.73	120.70	0.04	325.07M
	6920.75	0.09	325.07	6920.22	17.91	-19.10	31.84	37.13	120.95	0.08	200.35M
	7300.45	0.62	200.35	7299.91	19.62	-20.78	30.96	37.28	123.87	0.18	226.59M
	7583.49	0.22	226.59	7582.95	21.46	-22.59	30.03	37.58	126.95	0.15	222.59M
	7867.33	0.70	222.59	7866.78	23.17	-24.24	28.46	37.38	130.42	0.17	213.89M
	8152.31	1.01	213.89	8151.72	26.63	-27.61	25.88	37.84	136.85	0.12	218.59M
Final Extreme Survey	8536.78	0.88	218.59	8536.14	31.88	-32.73	22.15	39.52	145.91	0.04	198.08M
	8618.00	2.41	198.08	8617.33	34.03	-34.84	21.23	40.80	148.64	1.99	194.96M

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
	8650.00	4.93	194.96	8649.26	36.02	-36.81	20.67	42.21	150.68	7.90	195.19M
	8681.00	6.58	195.19	8680.10	39.05	-39.81	19.86	44.49	153.49	5.32	198.48M
	8713.00	8.21	196.48	8711.83	43.02	-43.74	18.65	47.56	156.90	5.26	4.13L
	8744.00	10.84	197.47	8742.40	47.96	-48.62	17.08	51.54	160.65	8.50	7.94L
	8775.00	14.54	195.42	8772.64	54.56	-55.16	15.17	57.21	164.63	12.02	14.43L
	8808.00	18.13	192.47	8804.30	63.65	-64.17	12.96	65.46	168.59	11.16	7.6L
	8839.00	22.12	191.06	8833.41	74.16	-74.61	10.79	75.39	171.77	12.96	5.11R
	8871.00	25.88	191.83	8862.63	87.00	-87.36	8.21	87.75	174.63	11.79	4.47R
Survey 12-Apr-13	8902.00	29.40	192.39	8890.09	101.16	-101.42	5.18	101.55	177.07	11.39	1.54R
	8934.00	32.82	192.56	8917.49	117.42	-117.56	1.61	117.57	179.21	10.69	0.46R
	8967.00	36.52	192.61	8944.62	135.88	-135.88	-2.48	135.90	181.04	11.21	1.43R
	8999.00	41.27	192.79	8969.52	155.62	-155.47	-6.89	155.63	182.54	14.85	2.39R
	9031.00	47.46	193.14	8992.39	177.59	-177.27	-11.92	177.67	183.85	19.36	2.14R
	9062.00	53.50	193.42	9012.10	201.04	-200.53	-17.41	201.28	184.96	19.50	8.2L
	9094.00	59.24	192.46	9029.82	227.20	-226.49	-23.37	227.69	185.89	18.11	15.72L
	9124.00	65.47	190.54	9043.73	253.41	-252.52	-28.65	254.14	186.47	21.53	21.72L
	9155.00	71.25	188.12	9055.16	281.98	-280.94	-33.31	282.91	186.76	20.01	20.83L
	9187.00	77.86	185.56	9063.68	312.70	-311.55	-36.97	313.73	186.77	22.05	19.37L
Survey 13-Apr-13	9206.00	82.58	183.89	9066.91	331.40	-330.20	-38.51	332.44	186.65	26.31	23.31L
	9235.00	88.49	181.35	9069.16	360.29	-359.07	-39.82	361.27	186.33	22.17	31.07L
Survey 14-Apr-13	9267.00	91.03	179.82	9069.30	392.28	-391.06	-40.15	393.12	185.86	9.27	28.29R
	9361.00	91.68	180.17	9067.08	486.19	-485.03	-40.14	486.69	184.73	0.79	142.93L
	9457.00	89.72	178.69	9065.90	582.07	-581.02	-39.19	582.34	183.86	2.56	149.33L
	9551.00	89.13	178.34	9066.85	675.88	-674.98	-36.75	675.98	183.12	0.73	27.08R
	9646.00	90.89	179.24	9066.83	770.71	-769.95	-34.75	770.74	182.58	2.08	41.81R
	9740.00	91.27	179.58	9065.06	864.59	-863.93	-33.78	864.59	182.24	0.54	32.77R
	9835.00	91.86	179.96	9062.46	959.47	-958.89	-33.40	959.47	181.99	0.74	43.13R
	9930.00	92.34	180.41	9058.98	1054.35	-1053.83	-33.70	1054.37	181.83	0.69	166.68L
	10024.00	91.96	180.32	9055.46	1148.24	-1147.76	-34.30	1148.27	181.71	0.42	29.73R
	10119.00	92.17	180.44	9052.03	1243.14	-1242.70	-34.93	1243.19	181.61	0.25	174.74R
	10214.00	91.41	180.51	9049.06	1338.05	-1337.65	-35.72	1338.12	181.53	0.80	132.47R
	10308.00	90.76	181.22	9047.28	1432.01	-1431.62	-37.14	1432.10	181.49	1.02	156.23L
Survey 15-Apr-13	10403.00	88.83	180.37	9047.62	1526.98	-1526.60	-38.46	1527.09	181.44	2.22	150.03R
	10497.00	88.31	180.67	9049.97	1620.91	-1620.57	-39.31	1621.05	181.39	0.64	24.9R
	10592.00	88.87	180.93	9052.31	1715.86	-1715.53	-40.63	1716.01	181.36	0.65	124.12R
	10687.00	88.66	181.24	9054.36	1810.82	-1810.49	-42.43	1810.99	181.34	0.39	150L
	10782.00	87.76	180.72	9057.32	1905.76	-1905.43	-44.06	1905.94	181.32	1.09	7.16R
	10876.00	89.83	180.98	9059.30	1999.71	-1999.39	-45.45	1999.91	181.30	2.22	157.33L
	10971.00	88.49	180.42	9060.69	2094.66	-2094.37	-46.61	2094.89	181.27	1.53	29.93R
	11065.00	89.48	180.99	9062.36	2188.62	-2188.35	-47.77	2188.87	181.25	1.22	111.66R
	11160.00	89.21	181.67	9063.44	2283.60	-2283.32	-49.97	2283.86	181.25	0.77	87.23R
	11255.00	89.24	182.29	9064.73	2378.59	-2378.25	-53.25	2378.85	181.28	0.65	125.4R
	11349.00	88.97	182.67	9066.20	2472.58	-2472.15	-57.32	2472.82	181.33	0.50	29.65R
	11444.00	89.62	183.04	9067.37	2567.56	-2567.03	-62.05	2567.78	181.38	0.79	34.16L

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
	11539.00	89.90	182.85	9067.76	2662.55	-2661.90	-66.93	2662.74	181.44	0.36	95.57R
	11633.00	89.86	183.26	9067.96	2756.54	-2755.77	-71.94	2756.70	181.50	0.44	32.09R
	11728.00	90.45	183.63	9067.70	2851.51	-2850.59	-77.65	2851.65	181.56	0.73	36.87R
	11823.00	90.69	183.81	9066.76	2946.47	-2945.39	-83.82	2946.58	181.63	0.32	0.73L
	11917.00	91.48	183.80	9064.98	3040.41	-3039.16	-90.05	3040.50	181.70	0.84	5.6L
	12012.00	91.99	183.75	9062.10	3135.33	-3133.91	-96.30	3135.39	181.76	0.54	152.38L
	12107.00	90.48	182.96	9060.06	3230.28	-3228.73	-101.86	3230.33	181.81	1.79	24.62R
Survey 16-Apr-13	12201.00	91.20	183.29	9058.68	3324.26	-3322.57	-106.99	3324.30	181.84	0.84	16.96R
	12296.00	91.79	183.47	9056.20	3419.20	-3417.38	-112.58	3419.23	181.89	0.65	151.9L
	12391.00	90.76	182.92	9054.08	3514.16	-3512.20	-117.88	3514.18	181.92	1.23	133.67R
Survey 17-Apr-13	12486.00	90.55	183.14	9053.00	3609.14	-3607.06	-122.90	3609.16	181.95	0.32	32.17R
	12582.00	91.17	183.53	9051.56	3705.11	-3702.89	-128.48	3705.12	181.99	0.76	20.54R
	12677.00	92.37	183.98	9048.62	3800.02	-3797.64	-134.70	3800.03	182.03	1.35	90L
Survey 18-Apr-13	12772.00	92.37	182.67	9044.69	3894.92	-3892.40	-140.21	3894.92	182.06	1.38	133.33L
	12867.00	91.20	181.43	9041.74	3989.87	-3987.29	-143.60	3989.87	182.06	1.79	117.61L
	12962.00	90.86	180.78	9040.03	4084.84	-4082.25	-145.43	4084.84	182.04	0.77	40.96L
	13056.00	91.24	180.45	9038.31	4178.79	-4176.23	-146.44	4178.80	182.01	0.54	128.55L
	13151.00	90.10	179.02	9037.19	4273.70	-4271.22	-146.00	4273.71	181.96	1.92	169.29R
	13246.00	89.73	179.09	9037.34	4368.56	-4366.21	-144.44	4368.59	181.89	0.40	32.59R
	13341.00	90.34	179.48	9037.28	4463.44	-4461.20	-143.25	4463.50	181.84	0.76	26.14L
Final Survey	13436.00	90.89	179.21	9036.26	4558.33	-4556.19	-142.17	4558.40	181.79	0.64	71.96L
Proj to TD	13500.00	91.03	178.78	9035.19	4622.22	-4620.17	-141.04	4622.32	181.75	0.71	HS
	13558.00	91.03	178.78	9034.14	4680.11	-4678.14	-139.81	4680.23	181.71	0.00	

Survey Type: Def Survey

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

Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	28.000	Act Stns	30.000	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Cimarex Hallertau 4 Federal #1H Gyro+MWD Off to 13558ft MD
	28.000	4416.500	Act Stns	30.000	30.000	SLB_NSG+MSHOT	Original Borehole / Cimarex Hallertau 4 Federal #1H
	4416.500	5121.250	Act Stns	30.000	30.000	SLB_MWD-POOR	Original Borehole / Cimarex Hallertau 4 Federal #1H
	5121.250	5500.350	1/379.100	30.000	30.000	SLB_MWD-POOR	Original Borehole / Cimarex Hallertau 4 Federal #1H
	5500.350	5785.120	Act Stns	30.000	30.000	SLB_MWD-POOR	Original Borehole / Cimarex Hallertau 4 Federal #1H
	5785.120	6164.020	1/98.425	30.000	30.000	SLB_MWD-POOR	Original Borehole / Cimarex Hallertau 4 Federal #1H

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
		6164.020	6164.020		Act Stns	30.000	30.000	SLB_MWD-POOR		Original Borehole / Cimarex Hallertau 4 Federal #1H	
		6164.020	6541.080		1/98.425	30.000	30.000	SLB_MWD-POOR		Original Borehole / Cimarex Hallertau 4 Federal #1H	
		6541.080	6541.080		Act Stns	30.000	30.000	SLB_MWD-POOR		Original Borehole / Cimarex Hallertau 4 Federal #1H	
		6541.080	6920.750		1/98.425	30.000	30.000	SLB_MWD-POOR		Original Borehole / Cimarex Hallertau 4 Federal #1H	
		6920.750	6920.750		Act Stns	30.000	30.000	SLB_MWD-POOR		Original Borehole / Cimarex Hallertau 4 Federal #1H	
		6920.750	7300.450		1/98.425	30.000	30.000	SLB_MWD-POOR		Original Borehole / Cimarex Hallertau 4 Federal #1H	
		7300.450	8152.310		Act Stns	30.000	30.000	SLB_MWD-POOR		Original Borehole / Cimarex Hallertau 4 Federal #1H	
		8152.310	8536.780		1/98.425	30.000	30.000	SLB_MWD-POOR		Original Borehole / Cimarex Hallertau 4 Federal #1H	
		8536.780	8536.780		Act Stns	30.000	30.000	SLB_MWD-POOR		Original Borehole / Cimarex Hallertau 4 Federal #1H	
		8536.780	13500.000		Act Stns	30.000	30.000	SLB_MWD-STD		Original Borehole / Cimarex Hallertau 4 Federal #1H	
		13500.000	13558.000		Act Stns	30.000	30.000	SLB_BLIND+TREND		Original Borehole / Cimarex Hallertau 4 Federal #1H	



Reservoir Development

Drilling & Measurements (Anadrill)

4301 SW 44th St

Oklahoma City, Oklahoma 73119 USA

Phone: (405) 682-2284

Fax: (405) 682-3937

April 23, 2013

Cimarex Energy Co. of Colorado

600 N MARIENFELD STREET SUITE 600

MIDLAND, TX 79701

Re:

Sec 4, T26S, R32E Lea, NM
N 32.07872 W 103.68686

CLIENT: Cimarex Energy Co. of Colorado
WELL: Hallertau 4 Federal 1H
FIELD: Jennings, Upper Bone Spring Shale
RIG: NorAm 23
COUNTY: Lea
API NO: 30-025-41069
JOB NO: 13MLD0174

Enclosed, please find the original copy of the survey performed on the referenced well by Drilling & Measurements, a division of Schlumberger Technology Corporation.
Other information required by your office is as follows.

<u>Name & Title of Surveyor</u>	<u>Drainhole Number</u>	<u>Surveyed Depths</u>	<u>Dates Performed</u>	<u>Type of Survey</u>
Dev Kumar MWD	Hallertau 4 Federal 1H Original Hole	8618.00 Ft to 13500.00 Ft	April 8, 2013 to April 18, 2013	SlimPulse

If any other information is required, please contact the undersigned at the above letterhead and phone number.
Sincerely,

Jasem Alharer
Field Service Manager



Reservoir Development

Drilling & Measurements (Anadrill)

4301 SW 44th St

Oklahoma City, Oklahoma 73119 USA

Phone: (405) 682-2284

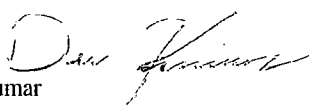
Fax: (405) 682-3937

Well Reference:

Sec 4, T26S, R32E Lea, NM

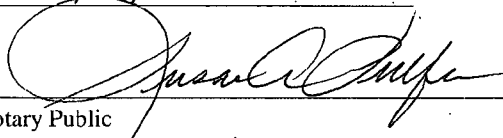
N 32.07872 W 103.68686

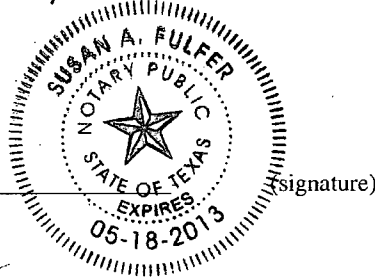
I, Dev Kumar certify that; I am employed by Drilling & Measurements (formerly Anadrill), a division of Schlumberger Technology Corporation; that I did on the day(s) of April 08, 2013 through April 18, 2013, conduct or supervise the taking of the SlimPulse surveys from a depth of 8618.00 feet to a depth of 13500.00 feet referenced to driller's depth; that the data is true, correct, complete and within the limitations of the tool as set forth by Drilling & Measurements, a division of Schlumberger Technology Corporation; that I am authorized and qualified to make this report; that this survey was conducted at the request of Cimarex Energy Co. of Colorado for the Hallertau 4 Federal 1H Well (Original Hole) API No. 30-025-41069 and that I have reviewed this report and find that it conforms to the principals and procedures as set forth by Drilling & Measurements, a division of Schlumberger Technology Corporation.

By 
Dev Kumar
MWD

Subscribed and Sworn to before me this 23rd day of April (month) 2013 (yr)

My Commission expires:

5-18-13

Notary Public



Midland Texas
(County State)

SCHLUMBERGER
Survey Report

22-Apr-2013

Client..... Cimarex Energy Co. of Colorado
Field..... Jennings, Upper Bone Springs Shale

Well..... Hallertau 4 Federal 1H
API number..... 30-025-41069
Engineer..... Dev Kumar

County..... Lea
State..... New Mexico
Rig..... NorAm 23

Spud date..... 1-Apr-13
Last survey date..... 18-Apr-13
Total accepted surveys.... 67
MD of first survey..... 8618.00 ft
MD of last survey..... 13500.00 ft

Latitude..... 32 4' 43.4" N
Longitude..... 103 41' 12.712" W

----- Survey calculation methods-----
Method for positions...: Minimum curvature
Method for DLS.....: Lubinski

----- Depth reference -----
Permanent datum.....: MSL
Depth reference.....: Driller's Depth
GL above permanent.....: 3310.00
KB above permanent.....: 3338.00
DF above permanent.....: 3338.00

----- Vertical section origin-----
Latitude (+N/S-).....: 0.00 ft
Departure (+E/W-).....: 0.00 ft

----- Grid Coordinates -----
NAD27 Texas State Plane, Central Zone, US Feet
X.....: 392976.300ft
Y.....: 741565.600ft

Azimuth from Vsect Origin to target: 182.12 degrees

-----MWD Survey Reference Criteria-----

-----Run1----- Calculation Date: 9-Apr-2013
Location G.....: 998.81488 mgn Tolerance G.....: 2.50 mgn
Location B.....: 48309.27 nT Tolerance B.....: 300.00 nT
Magnetic Dip: 59.94135 degrees Tolerance Dip: 0.45 degrees

-----Run2----- Calculation Date: 10-Apr-2013
Location G.....: 998.81488 mgn Tolerance G.....: 2.50 mgn
Location B.....: 48308.92 nT Tolerance B.....: 300.00 nT
Magnetic Dip: 59.94126 degrees Tolerance Dip: 0.45 degrees

-----Run3----- Calculation Date: 11-Apr-2013
Location G.....: 998.81488 mgn Tolerance G.....: 2.50 mgn
Location B.....: 48308.57 nT Tolerance B.....: 300.00 nT
Magnetic Dip: 59.94117 degrees Tolerance Dip: 0.45 degrees

-----Run4----- Calculation Date: 13-Apr-2013
Location G.....: 998.81488 mgn Tolerance G.....: 2.50 mgn
Location B.....: 48307.88 nT Tolerance B.....: 300.00 nT
Magnetic Dip: 59.94099 degrees Tolerance Dip: 0.45 degrees

-----Run5----- Calculation Date: 17-Apr-2013
Location G.....: 998.81488 mgn Tolerance G.....: 2.50 mgn
Location B.....: 48306.48 nT Tolerance B.....: 300.00 nT
Magnetic Dip: 59.94062 degrees Tolerance Dip: 0.45 degrees

BGGM Model: 2012

-----Run1-----
Magnetic dec (+E/W-).....: 7.50948 degrees
Grid Conv (+E/W-).....: 0.3433 degrees
Total Azim Corr (+E/W-)...: 7.16618 degrees

-----Run2-----
Magnetic dec (+E/W-).....: 7.50916 degrees
Grid Conv (+E/W-).....: 0.3433 degrees
Total Azim Corr (+E/W-)...: 7.16586 degrees

-----Run3-----
Magnetic dec (+E/W-).....: 7.50884 degrees

Grid Conv (+E/W-).....: 0.3433 degrees
Total Azim Corr (+E/W-)...: 7.16554 degrees

-----Run4-----
Magnetic dec (+E/W-).....: 7.5082 degrees
Grid Conv (+E/W-).....: 0.3433 degrees
Total Azim Corr (+E/W-)...: 7.1649 degrees

-----Run5-----
Magnetic dec (+E/W-).....: 7.50693 degrees
Grid Conv (+E/W-).....: 0.3433 degrees
Total Azim Corr (+E/W-)...: 7.16363 degrees

-----Survey Correction Index Description-----
0 = Uncorrected 1 = Sag Corrected
2 = DMAG Corrected 3 = Sag + DMAG Corrected

===== Survey List =====													
Seq	MD (ft)	Incl (deg)	Azim (deg)	Course (ft)	TVD (ft)	V Sec (ft)	N/-S (ft)	E/-W (ft)	Closure (ft)	at Azi (deg)	DLS (deg/100ft)	Tool	Correction
1	0.00	0.00	0.00	-999.25	0.00	0.00	0.00	0.00	0	90.00	0.00	TIP	0
2	100.00	0.85	89.40	100.00	100.00	-0.04	0.01	0.74	0.74175	89.40	0.85	GyroTool	0
3	200.00	0.74	105.16	100.00	199.99	0.08	-0.15	2.11	2.11226	94.16	0.24	GyroTool	0
4	300.00	0.77	89.72	100.00	299.98	0.19	-0.32	3.40	3.41681	95.36	0.21	GyroTool	0
5	400.00	0.82	112.31	100.00	399.97	0.41	-0.59	4.74	4.7721	97.07	0.32	GyroTool	0
6	500.00	0.69	100.71	100.00	499.96	0.75	-0.97	5.99	6.06762	99.21	0.20	GyroTool	0
7	519.20	0.70	102.57	19.20	519.16	0.79	-1.02	6.22	6.30028	99.30	0.13	GyroTool	0
8	611.20	0.72	93.84	92.00	611.15	0.91	-1.18	7.34	7.4368	99.12	0.12	GyroTool	0
9	702.40	0.75	77.80	91.20	702.34	0.78	-1.09	8.50	8.56766	97.32	0.23	GyroTool	0
10	794.50	0.86	56.97	92.10	794.44	0.23	-0.59	9.67	9.68434	93.47	0.34	GyroTool	0
11	886.30	0.94	51.42	91.80	886.22	-0.66	0.26	10.83	10.83585	88.63	0.13	GyroTool	0
12	978.40	1.05	62.56	92.10	978.31	-1.57	1.12	12.17	12.22353	84.75	0.24	GyroTool	0
13	1070.40	1.25	63.88	92.00	1070.29	-2.46	1.95	13.82	13.95805	81.98	0.22	GyroTool	0
14	1164.50	1.11	61.39	94.10	1164.37	-3.41	2.84	15.54	15.79986	79.66	0.16	GyroTool	0
15	1259.20	0.81	65.84	94.70	1259.06	-4.18	3.55	16.96	17.32668	78.18	0.33	GyroTool	0
16	1353.80	0.58	26.93	94.60	1353.65	-4.91	4.25	17.79	18.28691	76.56	0.54	GyroTool	0
17	1448.30	0.61	24.97	94.50	1448.15	-5.80	5.13	18.22	18.92445	74.26	0.04	GyroTool	0
18	1543.00	0.36	42.89	94.70	1542.84	-6.49	5.81	18.63	19.51463	72.69	0.31	GyroTool	0
19	1637.60	0.28	17.10	94.60	1637.44	-6.94	6.25	18.90	19.90605	71.71	0.17	GyroTool	0
20	1732.40	0.42	30.53	94.80	1732.24	-7.47	6.77	19.15	20.306	70.53	0.17	GyroTool	0
21	1827.60	0.45	21.00	95.20	1827.44	-8.13	7.42	19.46	20.82212	69.13	0.08	GyroTool	0
22	1922.30	0.40	29.46	94.70	1922.13	-8.78	8.05	19.75	21.33033	67.82	0.08	GyroTool	0
23	2017.00	0.40	46.45	94.70	2016.83	-9.31	8.57	20.15	21.89978	66.97	0.12	GyroTool	0
24	2111.70	0.45	21.94	94.70	2111.53	-9.89	9.14	20.53	22.47538	66.00	0.20	GyroTool	0
25	2206.40	0.50	334.04	94.70	2206.23	-10.61	9.86	20.49	22.73836	64.31	0.41	GyroTool	0
26	2301.00	0.54	343.51	94.60	2300.82	-11.40	10.66	20.18	22.8236	62.17	0.10	GyroTool	0
27	2490.60	0.72	284.65	189.60	2490.41	-12.50	11.81	18.78	22.18444	57.83	0.34	GyroTool	0
28	2585.30	0.53	267.58	94.70	2585.11	-12.60	11.95	17.76	21.40697	56.08	0.28	GyroTool	0
29	2680.00	0.66	268.06	94.70	2679.80	-12.52	11.91	16.78	20.57737	54.64	0.14	GyroTool	0
30	2774.70	0.89	269.27	94.70	2774.49	-12.45	11.88	15.50	19.53015	52.53	0.24	GyroTool	0
31	2869.60	0.94	267.41	94.90	2869.38	-12.35	11.84	13.99	18.32232	49.76	0.06	GyroTool	0
32	2964.40	0.83	262.43	94.80	2964.17	-12.17	11.71	12.53	17.14948	46.94	0.14	GyroTool	0
33	3059.00	0.54	244.67	94.60	3058.76	-11.85	11.43	11.45	16.17584	45.04	0.38	GyroTool	0
34	3153.70	0.47	219.26	94.70	3153.46	-11.33	10.94	10.80	15.36947	44.63	0.25	GyroTool	0
35	3248.40	0.47	204.61	94.70	3248.16	-10.66	10.28	10.39	14.61881	45.30	0.13	GyroTool	0
36	3343.20	0.42	208.19	94.80	3342.95	-9.99	9.62	10.06	13.92503	46.28	0.06	GyroTool	0
37	3437.80	0.32	205.74	94.60	3437.55	-9.44	9.08	9.79	13.34958	47.14	0.11	GyroTool	0
38	3532.50	0.24	215.23	94.70	3532.25	-9.03	8.68	9.56	12.91002	47.75	0.10	GyroTool	0
39	3627.20	0.19	212.60	94.70	3626.95	-8.73	8.39	9.36	12.56512	48.13	0.05	GyroTool	0
40	3721.70	0.20	195.79	94.50	3721.45	-8.43	8.10	9.23	12.27551	48.74	0.06	GyroTool	0
41	3816.40	0.23	182.06	94.70	3816.15	-8.08	7.75	9.18	12.00858	49.83	0.06	GyroTool	0
42	3911.30	0.39	145.50	94.90	3911.05	-7.63	7.29	9.35	11.85768	52.07	0.26	GyroTool	0
43	4006.00	0.52	135.67	94.70	4005.74	-7.08	6.72	9.84	11.90981	55.67	0.16	GyroTool	0
44	4100.60	0.85	130.05	94.60	4100.34	-6.35	5.96	10.67	12.22276	60.83	0.36	GyroTool	0
45	4195.30	1.26	133.49	94.70	4195.02	-5.23	4.79	11.97	12.88834	68.19	0.44	GyroTool	0
46	4290.00	1.60	129.56	94.70	4289.69	-3.74	3.23	13.74	14.11481	76.77	0.37	GyroTool	0
47	4384.70	1.51	128.13	94.70	4384.36	-2.20	1.62	15.74	15.82382	84.13	0.10	GyroTool	0
48	4416.50	1.34	128.26	31.80	4416.15	-1.74	1.13	16.36	16.40132	86.05	0.53	GyroTool	0
49	4551.62	1.10	132.15	135.12	4551.24	0.03	-0.72	18.56	18.57844	92.22	0.19	SingleShot	0
50	4838.26	0.79	129.95	286.64	4837.84	3.01	-3.83	22.12	22.44913	99.83	0.11	SingleShot	0
51	5121.25	0.79	145.38	282.99	5120.80	5.77	-6.69	24.72	25.613	105.15	0.07	SingleShot	0
52	5500.35	0.79	152.06	379.10	5499.86	10.13	-11.15	27.43	29.61269	112.12	0.02	SingleShot	0
53	5785.12	0.70	143.97	284.77	5784.61	13.19	-14.29	29.38	32.6683	115.95	0.05	SingleShot	0
54	6164.02	0.31	168.05	378.90	6163.50	16.01	-17.17	30.95	35.3919	119.02	0.12	SingleShot	0
55	6541.08	0.22	144.06	377.06	6540.55	17.57	-18.75	31.59	36.73231	120.70	0.04	SingleShot	0
56	6920.75	0.09	325.07	379.67	6920.22	17.90	-19.10	31.84	37.13021	120.95	0.08	SingleShot	0
57	7300.45	0.62	200.35	379.70	7299.91	19.62	-20.78	30.96	37.28436	123.87	0.18	SingleShot	0
58	7583.49	0.22	226.59	283.04	7582.95	21.46	-22.59	30.03	37.57702	126.95	0.15	SingleShot	0
59	7867.33	0.70	222.59	283.84	7866.78	23.17	-24.24	28.46	37.38393	130.42	0.17	SingleShot	0
60	8152.31	1.01	213.89	284.98	8151.72	26.63	-27.61	25.88	37.8414	136.85	0.12	SingleShot	0
61	8536.78	0.88	218.59	384.47	8536.14	31.88	-32.73	22.15	39.5183	145.91	0.04	SingleShot	0

62	8618.00	2.41	198.08	81.22	8617.33	34.03	-34.84	21.23	40.79695	148.64	1.99	SlimPulse	0
63	8650.00	4.93	194.96	32.00	8649.26	36.01	-36.80	20.67	42.21075	150.68	7.90	SlimPulse	0
64	8681.00	6.58	195.19	31.00	8680.10	39.04	-39.80	19.86	44.48391	153.48	5.32	SlimPulse	0
65	8713.00	8.21	198.48	32.00	8711.83	43.02	-43.74	18.66	47.55268	156.90	5.27	SlimPulse	0
66	8744.00	10.84	197.47	31.00	8742.40	47.96	-48.62	17.08	51.53361	160.65	8.50	SlimPulse	0
67	8775.00	14.54	195.42	31.00	8772.64	54.56	-55.16	15.17	57.20344	164.62	12.02	SlimPulse	0
68	8808.00	18.13	192.47	33.00	8804.30	63.64	-64.17	12.96	65.46132	168.58	11.17	SlimPulse	0
69	8839.00	22.12	191.06	31.00	8833.41	74.16	-74.61	10.79	75.38469	171.77	12.95	SlimPulse	0
70	8871.00	25.88	191.83	32.00	8862.64	87.00	-87.36	8.21	87.7449	174.63	11.80	SlimPulse	0
71	8902.00	29.40	192.39	31.00	8890.09	101.16	-101.42	5.19	101.5501	177.07	11.37	SlimPulse	0
72	8934.00	32.82	192.56	32.00	8917.49	117.42	-117.56	1.61	117.56884	179.21	10.71	SlimPulse	0
73	8967.00	36.52	192.61	33.00	8944.62	135.87	-135.88	-2.47	135.89777	181.04	11.20	SlimPulse	0
74	8999.00	41.27	192.79	32.00	8969.52	155.62	-155.47	-6.89	155.62338	182.54	14.87	SlimPulse	0
75	9031.00	47.46	193.14	32.00	8992.39	177.58	-177.26	-11.91	177.66464	183.84	19.34	SlimPulse	0
76	9062.00	53.50	193.42	31.00	9012.11	201.03	-200.53	-17.41	201.28057	184.96	19.49	SlimPulse	0
77	9094.00	59.24	192.46	32.00	9029.82	227.19	-226.48	-23.36	227.68621	185.89	18.13	SlimPulse	0
78	9124.00	65.47	190.54	30.00	9043.73	253.40	-252.51	-28.65	254.13431	186.47	21.52	SlimPulse	0
79	9155.00	71.25	188.12	31.00	9055.16	281.98	-280.94	-33.31	282.90266	186.76	19.99	SlimPulse	0
80	9187.00	77.86	185.56	32.00	9063.68	312.70	-311.54	-36.97	313.72655	186.77	22.05	SlimPulse	0
81	9206.00	82.58	183.89	19.00	9066.91	331.40	-330.20	-38.51	332.43318	186.65	26.35	SlimPulse	0
82	9235.00	88.49	181.35	29.00	9069.17	360.29	-359.06	-39.83	361.26401	186.33	22.14	SlimPulse	0
83	9267.00	91.03	179.82	32.00	9069.30	392.28	-391.06	-40.15	393.11258	185.86	9.28	SlimPulse	0
84	9361.00	91.68	180.17	94.00	9067.07	486.18	-485.03	-40.15	486.68831	184.73	0.79	SlimPulse	0
85	9457.00	89.72	178.69	96.00	9065.89	582.06	-581.01	-39.20	582.33098	183.86	2.56	SlimPulse	0
86	9551.00	89.14	178.34	94.00	9066.82	675.87	-674.97	-36.76	675.97396	183.12	0.73	SlimPulse	0
87	9646.00	90.89	179.24	95.00	9066.79	770.71	-769.95	-34.75	770.73147	182.58	2.07	SlimPulse	0
88	9740.00	91.27	179.58	94.00	9065.02	864.58	-863.93	-33.78	864.58559	182.24	0.54	SlimPulse	0
89	9835.00	91.86	179.96	95.00	9062.42	959.47	-958.89	-33.40	959.46996	181.99	0.74	SlimPulse	0
90	9930.00	92.34	180.41	95.00	9058.94	1054.35	-1053.82	-33.70	1054.36256	181.83	0.69	SlimPulse	0
91	10024.00	91.96	180.32	94.00	9055.42	1148.24	-1147.76	-34.30	1148.26803	181.71	0.41	SlimPulse	0
92	10119.00	92.17	180.44	95.00	9052.00	1243.13	-1242.69	-34.93	1243.18275	181.61	0.25	SlimPulse	0
93	10214.00	91.41	180.51	95.00	9049.04	1338.05	-1337.64	-35.72	1338.11851	181.53	0.80	SlimPulse	0
94	10308.00	90.76	181.22	94.00	9047.26	1432.01	-1431.61	-37.14	1432.09473	181.49	1.02	SlimPulse	0
95	10403.00	88.83	180.37	95.00	9047.60	1526.97	-1526.60	-38.46	1527.0823	181.44	2.21	SlimPulse	0
96	10497.00	88.31	180.67	94.00	9049.94	1620.91	-1620.56	-39.31	1621.04121	181.39	0.63	SlimPulse	0
97	10592.00	88.87	180.93	95.00	9052.28	1715.85	-1715.53	-40.63	1716.0072	181.36	0.64	SlimPulse	0
98	10687.00	88.66	181.24	95.00	9054.33	1810.82	-1810.49	-42.43	1810.98384	181.34	0.40	SlimPulse	0
99	10782.00	87.76	180.72	95.00	9057.30	1905.75	-1905.43	-44.05	1905.93447	181.32	1.09	SlimPulse	0
100	10876.00	89.83	180.98	94.00	9059.27	1999.70	-1999.39	-45.45	1999.9055	181.30	2.21	SlimPulse	0
101	10971.00	88.49	180.42	95.00	9060.67	2094.66	-2094.37	-46.62	2094.88772	181.28	1.53	SlimPulse	0
102	11065.00	89.48	180.99	94.00	9062.33	2188.61	-2188.35	-47.77	2188.86701	181.25	1.22	SlimPulse	0
103	11160.00	89.21	181.67	95.00	9063.41	2283.60	-2283.31	-49.98	2283.86009	181.25	0.77	SlimPulse	0
104	11255.00	89.24	182.29	95.00	9064.70	2378.59	-2378.25	-53.26	2378.84361	181.28	0.65	SlimPulse	0
105	11349.00	88.97	182.67	94.00	9066.17	2472.57	-2472.15	-57.33	2472.81224	181.33	0.49	SlimPulse	0
106	11444.00	89.62	183.04	95.00	9067.33	2567.56	-2567.02	-62.06	2567.77197	181.38	0.79	SlimPulse	0
107	11539.00	89.90	182.85	95.00	9067.73	2662.55	-2661.90	-66.94	2662.73695	181.44	0.35	SlimPulse	0
108	11633.00	89.86	183.26	94.00	9067.93	2756.53	-2755.76	-71.96	2756.70035	181.50	0.44	SlimPulse	0
109	11728.00	90.45	183.63	95.00	9067.67	2851.51	-2850.59	-77.67	2851.64621	181.56	0.73	SlimPulse	0
110	11823.00	90.69	183.81	95.00	9066.73	2946.47	-2945.38	-83.83	2946.57635	181.63	0.31	SlimPulse	0
111	11917.00	91.48	183.80	94.00	9064.96	3040.41	-3039.16	-90.05	3040.49346	181.70	0.84	SlimPulse	0
112	12012.00	91.99	183.75	95.00	9062.08	3135.33	-3133.91	-96.30	3135.38921	181.76	0.55	SlimPulse	0
113	12107.00	90.48	182.96	95.00	9060.02	3230.28	-3228.72	-101.85	3230.32801	181.81	1.80	SlimPulse	0
114	12201.00	91.20	183.29	94.00	9058.64	3324.25	-3322.57	-106.97	3324.29301	181.84	0.85	SlimPulse	0
115	12296.00	91.79	183.47	95.00	9056.16	3419.20	-3417.37	-112.57	3419.22699	181.89	0.64	SlimPulse	0
116	12391.00	90.76	182.92	95.00	9054.06	3514.16	-3512.20	-117.87	3514.17783	181.92	1.23	SlimPulse	0
117	12486.00	90.55	183.14	95.00	9052.97	3609.14	-3607.06	-122.89	3609.15427	181.95	0.32	SlimPulse	0
118	12582.00	91.17	183.53	96.00	9051.53	3705.10	-3702.89	-128.47	3705.11544	181.99	0.76	SlimPulse	0
119	12677.00	92.37	183.98	95.00	9048.60	3800.02	-3797.64	-134.70	3800.02388	182.03	1.35	SlimPulse	0
120	12772.00	92.37	182.67	95.00	9044.66	3894.91	-3892.39	-140.20	3894.9168	182.06	1.38	SlimPulse	0
121	12867.00	91.20	181.43	95.00	9041.70	3989.86	-3987.28	-143.59	3989.86706	182.06	1.79	SlimPulse	0
122	12962.00	90.86	180.78	95.00	9039.99	4084.83	-4082.25	-145.43	4084.83814	182.04	0.77	SlimPulse	0
123	13056.00	91.24	180.45	94.00	9038.27	4178.79	-4176.23	-146.45	4178.79378	182.01	0.54	SlimPulse	0
124	13151.00	90.10	179.02	95.00	9037.16	4273.69	-4271.22	-146.01	4273.71019	181.96	1.92	SlimPulse	0
125	13246.00	89.73	179.09	95.00	9037.30	4368.56	-4366.20	-144.44	4368.59084	181.89	0.41	SlimPulse	0
126	13341.00	90.34	179.48	95.00	9037.24	4463.44	-4461.19	-143.26	4463.49379	181.84	0.77	SlimPulse	0
127	13436.00	90.89	179.21	95.00	9036.22	4558.32	-4556.18	-142.17	4558.39943	181.79	0.65	SlimPulse	0
128	13500.00	91.03	178.78	64.00	9035.14	4622.22	-4620.16	-141.04	4622.31513	181.75	0.70	SlimPulse	0
129	13558.00	91.03	178.78	58.00	9034.10	4680.11	-4678.14	-139.81	4680.22882	181.71	0.01	Other	7