

Cimarex Energy Perry 22 Federal 4H MWD Final(Surcon corrected) Survey

Geodetic Report

(Def Survey)



30-025-4/608

Report Date: January 15, 2018 - 04:51 PM
 Client: Cimarex Energy
 Field: NM Lea County (NAD 83)
 Structure / Slot: Cimarex Perry 22 Federal 4H / Perry 22 Federal 4H
 Well: Perry 22 Federal 4H
 Borehole: Original Borehole
 UWI / API#: Unknown / Unknown
 Survey Name: Cimarex Energy Perry 22 Federal 4H MWD Final(Surcon corrected)
 Survey Date: December 14, 2017
 Tort / AHD / DDI / ERD Ratio: 165.107 ° / 4512.721 ft / 6.003 / 0.401
 Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
 Location Lat / Long: N 32° 33' 50.86125", W 103° 33' 19.53993"
 Location Grid N/E Y/X: N 569836.200 ftUS, E 780993.950 ftUS
 CRS Grid Convergence Angle: 0.4187 °
 Grid Scale Factor: 0.99997487
 Version / Patch: 2.10.696.0
 Survey / DLS Computation: Minimum Curvature / Lubinski
 Vertical Section Azimuth: 179.590 ° (Grid North)
 Vertical Section Origin: 0.000 ft, 0.000 ft
 TVD Reference Datum: RKB
 TVD Reference Elevation: 3673.600 ft above MSL
 Seabed / Ground Elevation: 3647.100 ft above MSL
 Magnetic Declination: 6.725 °
 Total Gravity Field Strength: 998.5012mgn (9.80665 Based)
 Gravity Model: GARM
 Total Magnetic Field Strength: 48276.737 nT
 Magnetic Dip Angle: 60.519 °
 Declination Date: December 14, 2017
 Magnetic Declination Model: HDGM 2017
 North Reference: Grid North
 Grid Convergence Used: 0.4187 °
 Total Corr Mag North->Grid North: 6.3065 °
 Local Coord Referenced To: Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL [630' FNL, 380' FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	569836.20	780993.95	N 32 33 50.86	W 103 33 19.54
	118.00	0.22	6.30	118.00	-0.22	0.23	0.02	0.19	569836.43	780993.97	N 32 33 50.86	W 103 33 19.54
	179.00	0.48	135.29	179.00	-0.16	0.16	0.22	1.05	569836.36	780994.17	N 32 33 50.86	W 103 33 19.54
	271.00	0.28	113.15	271.00	0.21	-0.20	0.70	0.27	569836.00	780994.65	N 32 33 50.86	W 103 33 19.53
	337.00	0.23	106.59	337.00	0.31	-0.30	0.97	0.09	569835.90	780994.92	N 32 33 50.86	W 103 33 19.53
	429.00	0.20	114.50	429.00	0.43	-0.42	1.29	0.05	569835.78	780995.24	N 32 33 50.86	W 103 33 19.52
	521.00	0.16	148.75	521.00	0.61	-0.60	1.51	0.12	569835.60	780995.46	N 32 33 50.86	W 103 33 19.52
	613.00	0.21	123.62	613.00	0.81	-0.80	1.71	0.10	569835.40	780995.66	N 32 33 50.86	W 103 33 19.52
	704.00	0.36	127.66	703.99	1.08	-1.07	2.08	0.17	569835.13	780996.03	N 32 33 50.85	W 103 33 19.52
	796.00	0.36	129.25	795.99	1.45	-1.43	2.53	0.01	569834.77	780996.48	N 32 33 50.85	W 103 33 19.51
	983.00	0.50	156.27	982.99	2.57	-2.55	3.31	0.13	569833.65	780997.26	N 32 33 50.84	W 103 33 19.50
	1172.00	0.31	181.30	1171.98	3.84	-3.81	3.63	0.14	569832.39	780997.58	N 32 33 50.82	W 103 33 19.50
	1267.00	0.42	195.39	1266.98	4.43	-4.41	3.54	0.15	569831.79	780997.49	N 32 33 50.82	W 103 33 19.50
	1362.00	0.56	193.84	1361.98	5.22	-5.19	3.33	0.15	569831.01	780997.28	N 32 33 50.81	W 103 33 19.50
	1552.00	0.52	197.35	1551.97	6.94	-6.92	2.85	0.03	569829.28	780996.80	N 32 33 50.79	W 103 33 19.51
	1628.00	0.37	189.05	1627.97	7.51	-7.49	2.71	0.21	569828.71	780996.66	N 32 33 50.79	W 103 33 19.51
	1805.00	0.51	176.59	1804.96	8.86	-8.84	2.67	0.10	569827.36	780996.62	N 32 33 50.77	W 103 33 19.51
	1900.00	0.52	138.97	1899.96	9.61	-9.59	2.98	0.35	569826.61	780996.93	N 32 33 50.77	W 103 33 19.51
	1995.00	0.36	166.34	1994.95	10.23	-10.20	3.33	0.27	569826.00	780997.28	N 32 33 50.76	W 103 33 19.50
	2090.00	0.57	153.96	2089.95	10.94	-10.92	3.61	0.24	569825.28	780997.56	N 32 33 50.75	W 103 33 19.50
	2185.00	0.45	139.96	2184.95	11.66	-11.63	4.06	0.18	569824.57	780998.01	N 32 33 50.75	W 103 33 19.49
	2279.00	0.47	135.84	2278.94	12.22	-12.19	4.56	0.04	569824.01	780998.51	N 32 33 50.74	W 103 33 19.49
	2374.00	0.51	149.58	2373.94	12.87	-12.83	5.05	0.13	569823.37	780999.00	N 32 33 50.73	W 103 33 19.48
	2468.00	0.68	155.45	2467.94	13.74	-13.70	5.49	0.19	569822.50	780999.44	N 32 33 50.73	W 103 33 19.48
	2563.00	0.55	137.35	2562.93	14.59	-14.55	6.03	0.24	569821.65	780999.98	N 32 33 50.72	W 103 33 19.47
	2657.00	0.82	136.00	2656.92	15.41	-15.36	6.81	0.29	569820.84	781000.76	N 32 33 50.71	W 103 33 19.46
	2752.00	1.04	122.10	2751.91	16.37	-16.31	8.01	0.33	569819.89	781001.96	N 32 33 50.70	W 103 33 19.45
	2847.00	1.54	109.94	2846.89	17.27	-17.20	9.94	0.60	569819.00	781003.89	N 32 33 50.69	W 103 33 19.43
	2941.00	1.61	107.96	2940.85	18.13	-18.04	12.38	0.09	569818.16	781006.33	N 32 33 50.68	W 103 33 19.40
	3036.00	1.21	98.86	3035.82	18.71	-18.61	14.64	0.48	569817.59	781008.59	N 32 33 50.68	W 103 33 19.37
	3130.00	1.14	94.51	3129.80	18.95	-18.83	16.56	0.12	569817.37	781010.51	N 32 33 50.67	W 103 33 19.35
	3225.00	0.83	353.93	3224.79	18.35	-18.22	17.43	1.61	569817.98	781011.38	N 32 33 50.68	W 103 33 19.34
	3319.00	0.79	17.76	3318.79	17.05	-16.93	17.55	0.36	569819.27	781011.50	N 32 33 50.69	W 103 33 19.34
	3414.00	0.61	358.01	3413.78	15.93	-15.80	17.73	0.31	569820.40	781011.68	N 32 33 50.70	W 103 33 19.33
	3508.00	0.89	317.77	3507.77	14.88	-14.76	17.23	0.62	569821.44	781011.18	N 32 33 50.71	W 103 33 19.34
	3603.00	1.69	308.34	3602.75	13.46	-13.34	15.63	0.87	569822.86	781009.58	N 32 33 50.73	W 103 33 19.36
	3698.00	1.48	313.24	3697.71	11.73	-11.63	13.64	0.26	569824.57	781007.59	N 32 33 50.75	W 103 33 19.38
	3792.00	0.97	306.22	3791.69	10.42	-10.33	12.11	0.56	569825.87	781006.06	N 32 33 50.76	W 103 33 19.40
	3887.00	0.99	299.60	3886.67	9.53	-9.45	10.75	0.12	569826.75	781004.70	N 32 33 50.77	W 103 33 19.42
	3982.00	1.04	293.61	3981.66	8.77	-8.70	9.25	0.12	569827.50	781003.20	N 32 33 50.77	W 103 33 19.43
	4076.00	1.21	290.13	4075.64	8.07	-8.02	7.53	0.19	569828.18	781001.48	N 32 33 50.78	W 103 33 19.45
	4171.00	1.41	287.95	4170.62	7.35	-7.32	5.48	0.22	569828.89	780999.43	N 32 33 50.79	W 103 33 19.48
	4265.00	1.74	290.78	4264.58	6.47	-6.45	3.04	0.36	569829.75	780996.99	N 32 33 50.80	W 103 33 19.50
	4455.00	1.88	289.39	4454.49	4.38	-4.39	-2.59	0.08	569831.81	780991.36	N 32 33 50.82	W 103 33 19.57
	4549.00	1.91	290.75	4548.43	3.29	-3.33	-5.51	0.06	569832.87	780988.44	N 32 33 50.83	W 103 33 19.60
	4644.00	2.00	292.62	4643.38	2.07	-2.13	-8.52	0.12	569834.07	780985.43	N 32 33 50.84	W 103 33 19.64
	4738.00	2.02	293.74	4737.32	0.75	-0.83	-11.55	0.05	569835.37	780982.40	N 32 33 50.85	W 103 33 19.67
	4833.00	2.06	291.10	4832.26	-0.56	0.46	-14.68	0.11	569836.66	780979.27	N 32 33 50.87	W 103 33 19.71
	4928.00	2.06	291.23	4927.20	-1.82	1.69	-17.86	0.00	569837.89	780976.09	N 32 33 50.88	W 103 33 19.75
	5022.00	2.02	287.10	5021.14	-2.94	2.79	-21.02	0.16	569838.99	780972.93	N 32 33 50.89	W 103 33 19.79
	5117.00	2.02	289.57	5116.08	-4.02	3.84	-24.20	0.09	569840.04	780969.75	N 32 33 50.90	W 103 33 19.82
	5211.00	2.07	289.06	5210.02	-5.15	4.95	-27.36	0.06	569841.15	780966.59	N 32 33 50.91	W 103 33 19.86
	5261.00	2.08	290.51	5259.99	-5.77	5.56	-29.07	0.11	569841.76	780964.88	N 32 33 50.92	W 103 33 19.88
	5383.00	1.85	287.08	5381.92	-7.15	6.92	-33.02	0.21	569843.12	780960.93	N 32 33 50.93	W 103 33 19.93
	5478.00	2.42	300.42	5476.85	-8.64	8.38	-36.22	0.79	569844.58	780957.73	N 32 33 50.95	W 103 33 19.96
	5572.00	2.75	306.55	5570.76	-11.02	10.73	-39.74	0.46	569846.93	780954.21	N 32 33 50.97	W 103 33 20.00
	5667.00	3.22	306.52	5665.63	-13.99	13.68	-43.72	0.49	569849.88	780950.23	N 32 33 51.00	W 103 33 20.05
	5762.00	1.58	309.54	5760.54	-16.43	16.10	-46.87	1.73	569852.30	780947.08	N 32 33 51.02	W 103 33 20.09
	5856.00	1.08	10.74	5854.52	-18.14	17.79	-47.71	1.51	569853.99	780946.25	N 32 33 51.04	W 103 33 20.10
	5950.00	2.26	89.40	5948.49	-19.01	18.68	-45.69	2.45	569854.88	780946.26	N 32 33 51.05	W 103 33 20.07
	6045.00	2.33	91.54	6043.41	-18.95	18.65	-41.88	0.12	569854.85	780952.07	N 32 33 51.05	W 103 33 20.03
	6140.00	2.33	92.81	6138.33	-18.78	18.51	-38.02	0.05	569854.71	780955.93	N 32 33 51.05	W 103 33 19.98
	6234.00	2.13	105.76	6232.26	-18.18	17.94	-34.44	0.58	569854.14	780959.52	N 32 33 51.04	W 103 33 19.94
	6329.00	1.71	120.54	6327.21	-16.96	16.74	-31.52	0.68	569852.94	780962.44	N 32 33 51.03	W 103 33 19.91
	6423.00	1.85	114.07	6421.16	-15.61	15.41	-28.92	0.26	569851.61	780965.03	N 32 33 51.02	W 103 33 19.88

[illegible]

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
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Survey Type: 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	26.500	1/98.425	30.000	30.000	NAL_MWD_IFR1-Depth Only	Original Borehole / Cimarex Energy Perry 22 Federal 4H MWD Final(Surcon corrected)
	1	26.500	26.500	Act Stns	30.000	30.000	NAL_MWD_IFR1-Depth Only	Original Borehole / Cimarex Energy Perry 22 Federal 4H MWD Final(Surcon corrected)
	1	26.500	15215.000	Act Stns	30.000	30.000	NAL_MWD_IFR1	Original Borehole / Cimarex Energy Perry 22 Federal 4H MWD

Schlumberger

Cimarex Energy

Final PvA

CIMAREX

Borehole:	Original Borehole	Well:	Perry 22 Federal 4H	Field:	NM Lea County (NAD 83)	Structure:	Cimarex Perry 22 Federal 4H
Gravity & Magnetic Parameters	Model: HOGM 2017	Dip: 60.51°	Date: 14-Dec-2017	Surface Location	NAD83 New Mexico State Plane, Eastern Zone, US Feet	Miscellaneous	Perry 22 Federal
MagDec: 6.725°	FS: 48276.737nT	Gravity FS: 988.501mgal (3.80665 Based)		Lat: N 32 33 50.86	Northings: 569933.291US	Grid Conv: 0.4187°	Slot: Cimarex Energy Perry 22 Federal 4H MWD Final(Surcon corrected)
				Lon: W 103 33 19.54	Easting: 780993.851US	Scale Fact: 0.99997487	TVD Ref: RKB(3673.6ft above MSL)

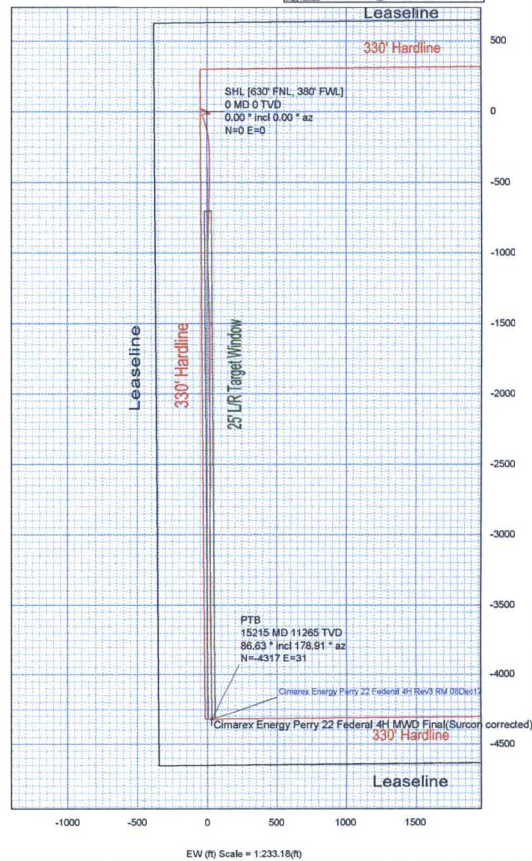
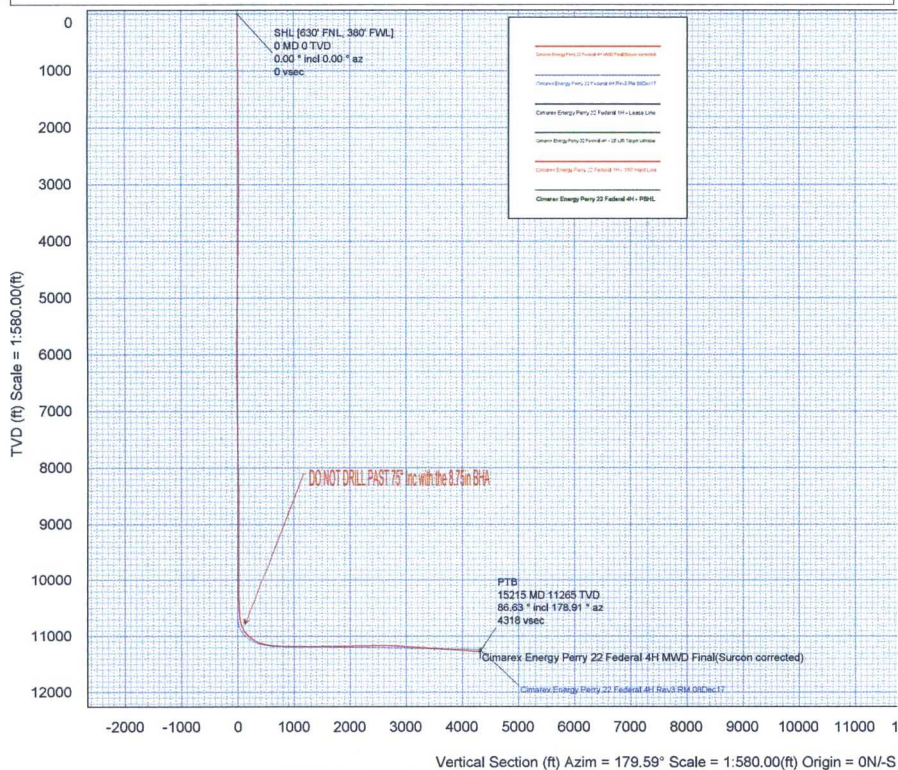
Critical Points								
Critical Point	MD	INCL	AZIM	TVD	VSEC	N(°)/S(°)	E(°)/W(°)	DLS
SHL [630° FNL, 380° FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PTB	15215.00	86.63	178.91	11265.21	4317.55	-4317.44	30.58	0.00



Grid
True
Mag

Grid North
Tot Corr (M-G 6.306°)
Mag Dec (6.725°)
Grid Conv (0.4187°)

CONTROLLED	
Printed	Cimarex Energy Perry 22 Federal 4H MWD Final
Drawn	14-Dec-2017
Checked	
Approved	
Scale	1:233.16



Borehole:	Original Borehole	Well:	Perry 22 Federal 4H	Field:	NM Lea County (NAD 83)	Structure:	Cimarex Perry 22 Federal 4H
Gravity & Magnetic Parameters		Surface Location		Miscellaneous		TVD Ref:	
Model:	HDGM 2017	Dip:	60.519°	Date:	14-Dec-2017	Slot:	Perry 22 Federal
MagDec:	6.725°	FS:	46276.737nT	Gravity FS:	998.501mgN (9.80665 Based)	Plan:	Cimarex Energy Perry 22 Federal 4H MWD Final(Surcon corrected)
		NAD83 New Mexico State Plane, Eastern Zone, US Feet		Perry 22 Federal		RKB(3673.6ft above MSL)	
		Lat: N 32 33 50.86		Northing: 568836.2RUS		TVD Ref:	
		Lon: W 103 33 19.54		Easting: 780993.95RUS		Cimarex Energy Perry 22 Federal 4H MWD Final(Surcon corrected)	
				Grid Conv: 0.4187°			
				Scale Fact: 0.99997487			

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL [630' FNL, 380' FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PTB	15215.00	86.63	178.91	11265.21	4317.55	-4317.44	30.58	0.00



Grid
True
Mag
Grid North
Tot Corr (M→G 6.306°)
Mag Dec (6.725°)
Grid Conv (0.419°)

CONTROLLED	
Plan ref	Cimarex Energy Perry 22 Federal 4H MWD
Drawing ref	_Final(Surcon corrected)
Copy number	of 3
Date	19-Jan-2018
1 Client	
2 Client	
3 Office	
4 Office	
Copy number	for

