

Reservoir Development

PathFinder, a Schlumberger Company

9200 West Reno Avenue

Oklahoma City, Oklahoma 73127 USA

Phone: (405) 789-1515

Fax: (405) 789-1519

PATHFINDER
A Schlumberger Company**NM OIL CONSERVATION**
ARTESIA DISTRICT

NOV 20 2015

September 1, 2015

Cimarex

600 N MARIENFELD STREET SUITE 600

MIDLAND, TX 79701

RECEIVED

Re:

CLIENT: Cimarex Energy Co
WELL: Marquardt 1 Federal #15H
FIELD: Cottonwood Draw; B. S.
RIG: H&P 371
COUNTY: EDDY
API NO: 30-015-42471
JOB NO: 15MLD2226SEC1-T25S-R26E
N 32.15235 W 104.25027

Enclosed, please find the original copy of the survey performed on the referenced well by PathFinder, 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>
Charles Lorence MWD	Marquardt 1 Federal #15H Original Hole	6612.00 Ft to 11708.00 Ft	August 25, 2015 to August 31, 2015	SlimPulse

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

Joseph Hogan
Field Service Manager

Reservoir Development

PathFinder, a Schlumberger Company

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Well Reference:

SEC1-T25S-R26E

N 32.15235 W 104.25027

PATHFINDER
A Schlumberger Company

I, Charles Lorence certify that; I am employed by PathFinder, a division of Schlumberger Technology Corporation; that I did on the day(s) of August 25, 2015 through August 31, 2015, conduct or supervise the taking of the SlimPulse surveys from a depth of 6612.00 feet to a depth of 11708.00 feet referenced to driller's depth; that the data is true, correct, complete and within the limitations of the tool as set forth by PathFinder, 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 for the Marquardt 1 Federal #15H Well (Original Hole) API No. 30-015-42471 and that I have reviewed this report and find that it conforms to the principals and procedures as set forth by PathFinder, a division of Schlumberger Technology Corporation.

By
Charles Lorence
MWD

Charles Lorence

Subscribed and Sworn to before me this 9th day of September (month) 2015 (yr)

My Commission expires:

September 5, 2016

Michelle Ellwood
Notary Public



(signature)

Michelland, TX
(County State)

Cimarex Energy Co. Marquardt 1 Federal #15H MWD

PATHFINDER
A Schlumberger Company

Report Date: 10/22/2015	Survey / DLS Computation Method: Minimum Curvature / Lubinski
Client: Cimarex Energy Co.	Vertical Section Azimuth: 4.146° (GridNorth)
Field: Cottonwood Draw, B. S.	Vertical Section Origin: 0 ft, 0 ft
Structure / Slot: Cimarex Energy Co. Marquardt 1 Federal #15H	TVD Reference Datum: DF
Well: Marquardt 1 Federal #15H	TVD Reference Elevation: 3311 ft above MSL
Borehole: Original Borehole	Sea Bed / Ground Level Elevation: 3286 ft above MSL
UWI/API#: 30-015-42471	Magnetic Declination: 7.6751°
Survey Name / Date: Cimarex Energy Co. Marquardt 1 Federal #15H MWD 01-Sep-2015	Total Field Strength: 48268.11 nT
Grid Coordinate System: NAD83 New Mexico State Pla	Magnetic Dip: 59.9192°
Location Lat/Long: 32° 9' 8.48" N, 104° 15' 0.99" W	Declination Date: 8/29/2015
Location Grid N/E Y/X: Easting: 567042.300 ftUS Northing: 419171.900 ftUS	Magnetic Declination Model: HDGM 2015
Grid Convergence Angle: 0.0442°	North Reference: GridNorth
Grid Scale Factor: 0.99990985	Total Corr Mag North -> Grid North: 7.63°
Local Coordinates Referenced To: Structure Reference Point	

MD	INCL	AZIM	TVD	VSEC	ND	ED	DLS	CLOSURE	ATAZIM	COURSE	ROT	ROB
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	90.00	-999.25	-999.25	-999.25
178.00	0.31	163.42	178.00	-0.45	-0.46	0.14	0.17	0.48	163.42	178.00	91.81	0.17
207.00	0.31	180.74	207.00	-0.60	-0.62	0.16	0.32	0.64	165.53	29.00	59.72	0
305.00	0.31	206.75	305.00	-1.11	-1.12	0.04	0.14	1.12	178.15	98.00	26.54	0
365.00	0.22	299.26	365.00	-1.21	-1.21	-0.14	0.65	1.21	186.51	60.00	154.18	-0.15
457.00	0.22	287.83	457.00	-1.10	-1.07	-0.46	0.05	1.16	203.35	92.00	-12.42	0
518.00	0.09	271.35	518.00	-1.07	-1.03	-0.62	0.22	1.2	211.05	61.00	-27.02	-0.21
579.00	0.22	274.65	579.00	-1.07	-1.02	-0.78	0.21	1.28	217.60	61.00	5.41	0.21
610.00	0.22	230.75	610.00	-1.11	-1.05	-0.89	0.53	1.38	220.25	31.00	-141.61	0
671.00	0.22	193.92	671.00	-1.31	-1.24	-1.01	0.23	1.6	219.15	61.00	-60.38	0
762.00	0.31	211.63	761.99	-1.70	-1.62	-1.18	0.13	2	216.09	91.00	19.46	0.1
853.00	0.31	194.45	852.99	-2.16	-2.07	-1.37	0.10	2.48	213.55	91.00	-18.88	0
944.00	0.31	155.73	943.99	-2.62	-2.53	-1.33	0.23	2.86	207.75	91.00	-42.55	0
1036.00	0.09	134.15	1035.99	-2.88	-2.81	-1.18	0.25	3.04	202.74	92.00	-23.46	-0.24
1128.00	0.22	123.65	1127.99	-3.02	-2.95	-0.98	0.14	3.11	198.30	92.00	-11.41	0.14
1218.00	0.40	93.72	1217.99	-3.10	-3.07	-0.52	0.26	3.11	189.61	90.00	-33.26	0.2
1310.00	1.01	97.55	1309.98	-3.15	-3.20	0.60	0.66	3.25	169.29	92.00	4.16	0.66
1401.00	1.49	96.05	1400.96	-3.23	-3.43	2.58	0.53	4.29	143.07	91.00	-1.65	0.53

1496.00	1.49	98.43	1495.93	-3.37	-3.74	5.03	0.07	6.26	126.64	95.00	2.51	0
1591.00	2.29	100.62	1590.88	-3.67	-4.27	8.11	0.85	9.17	117.75	95.00	2.31	0.84
1686.00	3.21	100.62	1685.77	-4.19	-5.11	12.59	0.97	13.59	112.08	95.00	0	0.97
1780.00	1.71	127.83	1779.68	-5.26	-6.45	16.29	1.98	17.52	111.62	94.00	28.95	-1.6
1875.00	1.80	131.56	1874.63	-6.95	-8.31	18.52	0.15	20.3	114.17	95.00	3.93	0.09
1973.00	1.89	122.16	1972.58	-8.65	-10.20	21.04	0.32	23.38	115.85	98.00	-9.59	0.09
2068.00	1.80	120.44	2067.53	-10.04	-11.78	23.66	0.11	26.43	116.48	95.00	-1.81	-0.09
2162.00	1.80	120.36	2161.49	-11.35	-13.28	26.20	0.00	29.38	116.87	94.00	-0.09	0
2257.00	1.71	118.86	2256.44	-12.60	-14.72	28.73	0.11	32.28	117.12	95.00	-1.58	-0.09
2352.00	1.71	121.63	2351.40	-13.85	-16.14	31.18	0.09	35.11	117.37	95.00	2.92	0
2447.00	1.58	122.16	2446.36	-15.12	-17.59	33.50	0.14	37.83	117.70	95.00	0.56	-0.14
2542.00	1.58	122.33	2541.33	-16.35	-18.98	35.71	0.00	40.44	117.99	95.00	0.18	0
2637.00	1.49	123.74	2636.29	-17.58	-20.37	37.85	0.10	42.98	118.29	95.00	1.48	-0.09
2731.00	1.49	122.86	2730.26	-18.77	-21.71	39.89	0.02	45.41	118.56	94.00	-0.94	0
2826.00	1.49	125.15	2825.23	-20.00	-23.09	41.94	0.06	47.87	118.84	95.00	2.41	0
2919.00	1.49	128.05	2918.20	-21.30	-24.53	43.88	0.08	50.27	119.21	93.00	3.12	0
3016.00	1.58	129.06	3015.16	-22.77	-26.15	45.91	0.10	52.83	119.67	97.00	1.04	0.09
3111.00	1.58	131.65	3110.13	-24.31	-27.85	47.90	0.08	55.41	120.17	95.00	2.73	0
3206.00	1.58	138.49	3205.09	-26.03	-29.70	49.75	0.20	57.94	120.84	95.00	7.2	0
3301.00	1.32	145.62	3300.06	-27.80	-31.58	51.24	0.33	60.19	121.65	95.00	7.51	-0.27
3396.00	1.10	152.13	3395.04	-29.43	-33.29	52.28	0.27	61.98	122.49	95.00	6.85	-0.23
3490.00	1.01	158.72	3489.02	-30.94	-34.86	53.00	0.16	63.44	123.34	94.00	7.01	-0.1
3585.00	1.01	166.23	3584.01	-32.49	-36.46	53.51	0.14	64.74	124.27	95.00	7.91	0
3680.00	1.01	173.22	3678.99	-34.11	-38.10	53.80	0.13	65.93	125.30	95.00	7.36	0
3775.00	1.01	167.86	3773.98	-35.74	-39.75	54.08	0.10	67.12	126.32	95.00	-5.64	0
3870.00	0.88	172.83	3868.96	-37.26	-41.29	54.35	0.16	68.25	127.23	95.00	5.23	-0.14
3964.00	0.48	169.13	3962.96	-38.34	-42.40	54.51	0.43	69.06	127.87	94.00	-3.94	-0.43
4059.00	0.31	207.06	4057.96	-38.97	-43.02	54.47	0.32	69.41	128.30	95.00	39.93	-0.18
4154.00	0.40	194.84	4152.95	-39.53	-43.57	54.27	0.12	69.59	128.76	95.00	-12.86	0.09
4249.00	0.48	199.72	4247.95	-40.24	-44.26	54.05	0.09	69.86	129.31	95.00	5.14	0.08
4343.00	0.79	193.52	4341.95	-41.26	-45.26	53.76	0.34	70.28	130.09	94.00	-6.6	0.33
4438.00	0.88	190.93	4436.94	-42.63	-46.61	53.47	0.10	70.94	131.08	95.00	-2.73	0.09
4533.00	1.01	196.42	4531.92	-44.17	-48.13	53.10	0.17	71.67	132.19	95.00	5.78	0.14
4628.00	1.10	195.85	4626.91	-45.88	-49.81	52.61	0.10	72.45	133.44	95.00	-0.6	0.09
4723.00	1.01	192.73	4721.89	-47.60	-51.51	52.18	0.11	73.32	134.63	95.00	-3.28	-0.09
4818.00	1.10	191.94	4816.87	-49.33	-53.22	51.80	0.10	74.27	135.77	95.00	-0.83	0.09
4912.00	1.19	189.04	4910.86	-51.20	-55.06	51.46	0.11	75.37	136.94	94.00	-3.09	0.1

5007.00	1.19	184.12	5005.83	-53.17	-57.02	51.24	0.11	76.66	138.06	95.00	-5.18	0
5102.00	1.19	185.92	5100.81	-55.14	-58.99	51.07	0.04	78.02	139.12	95.00	1.89	0
5197.00	1.32	179.15	5195.79	-57.22	-61.06	50.98	0.21	79.55	140.14	95.00	-7.13	0.14
5292.00	1.41	176.12	5290.76	-59.46	-63.32	51.08	0.12	81.35	141.11	95.00	-3.19	0.09
5387.00	1.49	182.76	5385.73	-61.86	-65.72	51.09	0.20	83.25	142.14	95.00	6.99	0.08
5482.00	1.41	190.14	5480.70	-64.25	-68.11	50.83	0.21	84.98	143.27	95.00	7.77	-0.08
5576.00	1.71	188.25	5574.67	-66.80	-70.63	50.42	0.32	86.79	144.48	94.00	-2.01	0.32
5671.00	1.49	184.25	5669.63	-69.45	-73.27	50.13	0.26	88.78	145.62	95.00	-4.21	-0.23
5766.00	1.32	163.73	5764.60	-71.71	-75.55	50.34	0.56	90.79	146.32	95.00	-21.6	-0.18
5861.00	1.41	149.75	5859.58	-73.70	-77.61	51.24	0.36	93	146.57	95.00	-14.72	0.09
5956.00	1.80	124.35	5954.54	-75.42	-79.46	53.06	0.84	95.55	146.27	95.00	-26.74	0.41
6050.00	2.50	134.15	6048.47	-77.48	-81.72	55.75	0.84	98.93	145.70	94.00	10.43	0.74
6145.00	1.89	146.94	6143.40	-80.06	-84.48	58.09	0.82	102.52	145.49	95.00	13.46	-0.64
6240.00	2.02	145.36	6238.35	-82.61	-87.17	59.90	0.15	105.76	145.51	95.00	-1.66	0.14
6335.00	1.89	135.56	6333.29	-84.95	-89.66	61.95	0.38	108.98	145.36	95.00	-10.32	-0.14
6429.00	1.71	126.86	6427.25	-86.74	-91.61	64.15	0.35	111.84	145.00	94.00	-9.26	-0.19
6524.00	1.32	111.65	6522.22	-87.83	-92.87	66.31	0.59	114.11	144.47	95.00	-16.01	-0.41
6564.00	1.01	104.53	6562.21	-88.03	-93.13	67.07	0.85	114.77	144.24	40.00	-17.8	-0.78
6612.00	1.51	42.10	6610.20	-87.61	-92.76	67.91	2.87	114.96	143.79	48.00	-130.05	1.05
6647.00	5.53	13.79	6645.13	-85.58	-90.78	68.62	12.17	113.8	142.91	35.00	-80.91	11.48
6694.00	9.84	359.19	6691.70	-79.34	-84.56	69.10	9.99	109.21	140.74	47.00	-31.06	9.17
6742.00	14.98	355.11	6738.56	-69.12	-74.27	68.52	10.85	101.05	137.31	48.00	-8.5	10.7
6789.00	20.85	359.21	6783.26	-54.78	-59.84	67.88	12.78	90.5	131.40	47.00	8.73	12.5
6837.00	25.45	4.83	6827.39	-35.94	-41.01	68.64	10.61	79.96	120.86	48.00	11.71	9.57
6884.00	29.57	8.86	6869.07	-14.28	-19.49	71.27	9.62	73.89	105.29	47.00	8.56	8.77
6931.00	31.00	9.39	6909.66	9.33	3.92	75.04	3.11	75.14	87.01	47.00	1.13	3.06
6963.00	33.67	8.71	6936.69	26.38	20.82	77.72	8.42	80.46	75.01	32.00	-2.11	8.34
7028.00	40.54	9.63	6988.50	65.42	59.50	84.00	10.60	102.94	54.69	65.00	1.41	10.57
7060.00	46.17	8.27	7011.76	87.31	81.20	87.40	17.84	119.3	47.11	32.00	-4.24	17.6
7092.00	51.77	6.15	7032.76	111.40	105.14	90.41	18.17	138.66	40.69	32.00	-6.62	17.48
7123.00	58.00	5.05	7050.58	136.74	130.36	92.87	20.31	160.06	35.47	31.00	-3.55	20.11
7155.00	64.71	4.43	7065.91	164.80	158.33	95.19	21.06	184.74	31.01	32.00	-1.96	20.99
7218.00	78.53	4.05	7085.73	224.44	217.81	99.59	21.93	239.5	24.57	63.00	-0.6	21.93
7274.00	89.11	4.44	7091.75	280.04	273.26	103.70	18.90	292.27	20.78	56.00	0.71	18.89
7348.00	90.03	4.59	7092.31	354.03	347.02	109.53	1.27	363.9	17.52	74.00	0.21	1.26
7443.00	90.41	2.66	7091.94	449.02	441.83	115.54	2.07	456.68	14.65	95.00	-2.04	0.4
7537.00	89.59	3.90	7091.94	543.01	535.67	120.92	1.59	549.15	12.72	94.00	1.32	-0.88

7632.00	89.55	5.83	7092.65	638.00	630.32	128.97	2.03	643.38	11.56	95.00	2.03	-0.04
7727.00	89.69	8.78	7093.28	732.84	724.54	141.05	3.11	738.14	11.02	95.00	3.11	0.14
7822.00	89.69	11.94	7093.79	827.27	817.98	158.12	3.33	833.12	10.94	95.00	3.33	0
7916.00	90.17	13.12	7093.90	920.26	909.74	178.51	1.36	927.09	11.10	94.00	1.26	0.51
8011.00	90.07	13.85	7093.71	1014.00	1002.12	200.66	0.78	1022.01	11.32	95.00	0.77	-0.11
8106.00	89.97	11.77	7093.68	1107.91	1094.75	221.72	2.19	1116.98	11.45	95.00	-2.19	-0.11
8201.00	89.45	9.00	7094.16	1202.34	1188.18	238.85	2.97	1211.95	11.37	95.00	-2.91	-0.54
8296.00	89.00	6.49	7095.45	1297.14	1282.30	251.65	2.68	1306.76	11.10	95.00	-2.64	-0.47
8390.00	88.90	4.44	7097.17	1391.09	1375.85	260.60	2.18	1400.31	10.73	94.00	-2.18	-0.11
8485.00	88.42	3.84	7099.39	1486.06	1470.58	267.46	0.81	1494.7	10.31	95.00	-0.64	-0.51
8580.00	88.86	3.48	7101.65	1581.03	1565.36	273.52	0.60	1589.07	9.91	95.00	-0.37	0.47
8675.00	88.55	3.86	7103.79	1676.01	1660.14	279.60	0.52	1683.52	9.56	95.00	0.4	-0.33
8769.00	88.28	3.80	7106.39	1769.97	1753.89	285.88	0.30	1777.04	9.26	94.00	-0.07	-0.29
8864.00	88.28	4.87	7109.24	1864.92	1848.57	293.06	1.12	1871.66	9.01	95.00	1.12	0
8959.00	88.31	6.41	7112.06	1959.85	1943.07	302.39	1.63	1966.46	8.85	95.00	1.63	0.04
9054.00	88.80	7.92	7114.46	2054.68	2037.29	314.24	1.66	2061.39	8.77	95.00	1.58	0.51
9148.00	88.62	7.91	7116.58	2148.45	2130.38	327.18	0.18	2155.35	8.73	94.00	0	-0.18
9243.00	88.76	6.03	7118.75	2243.31	2224.64	338.71	1.98	2250.28	8.66	95.00	-1.98	0.14
9338.00	88.18	3.95	7121.29	2338.26	2319.24	346.97	2.28	2345.05	8.51	95.00	-2.19	-0.61
9433.00	88.49	2.85	7124.05	2433.21	2414.04	352.60	1.20	2439.65	8.31	95.00	-1.15	0.33
9528.00	88.90	3.23	7126.22	2528.17	2508.88	357.63	0.59	2534.24	8.11	95.00	0.4	0.43
9623.00	88.79	2.77	7128.13	2623.13	2603.73	362.60	0.50	2628.85	7.93	95.00	-0.49	-0.11
9717.00	87.87	3.68	7130.87	2717.07	2697.54	367.88	1.39	2722.51	7.77	94.00	0.97	-0.99
9812.00	88.62	3.45	7133.78	2812.02	2792.31	373.79	0.83	2817.22	7.62	95.00	-0.24	0.8
9907.00	88.52	1.74	7136.15	2906.96	2887.18	378.10	1.80	2911.83	7.46	95.00	-1.8	-0.11
10002.00	88.38	0.50	7138.72	3001.79	2982.12	379.96	1.32	3006.23	7.26	95.00	-1.31	-0.14
10096.00	88.48	359.92	7141.29	3095.53	3076.09	380.30	0.63	3099.51	7.05	94.00	-0.62	0.11
10191.00	88.59	358.54	7143.72	3190.15	3171.04	379.02	1.46	3193.61	6.82	95.00	-1.46	0.11
10286.00	88.76	358.19	7145.91	3284.64	3265.98	376.30	0.41	3287.59	6.57	95.00	-0.37	0.18
10381.00	88.97	358.11	7147.80	3379.10	3360.91	373.24	0.23	3381.57	6.34	95.00	-0.08	0.22
10476.00	88.97	358.20	7149.51	3473.57	3455.85	370.18	0.09	3475.62	6.11	95.00	0.09	0
10571.00	88.93	357.63	7151.25	3567.99	3550.77	366.72	0.60	3569.65	5.90	95.00	-0.6	-0.04
10665.00	88.76	356.99	7153.14	3661.30	3644.64	362.31	0.71	3662.61	5.68	94.00	-0.69	-0.18
10760.00	89.00	357.53	7154.99	3755.60	3739.52	357.77	0.63	3756.59	5.47	95.00	0.58	0.25
10855.00	89.21	358.54	7156.48	3850.04	3834.45	354.52	1.08	3850.8	5.28	95.00	1.06	0.22
10950.00	89.11	359.62	7157.87	3944.66	3929.42	352.99	1.14	3945.25	5.13	95.00	1.13	-0.11
11045.00	88.97	0.23	7159.47	4039.39	4024.41	352.86	0.66	4039.85	5.01	95.00	0.65	-0.15

11140.00	88.90	1.66	7161.24	4134.22	4119.38	354.43	1.50	4134.6	4.92	95.00	1.5	-0.07
11234.00	90.14	1.89	7162.03	4228.14	4213.33	357.34	1.34	4228.45	4.85	94.00	0.25	1.32
11329.00	89.24	2.13	7162.55	4323.07	4308.27	360.67	0.97	4323.34	4.79	95.00	0.25	-0.94
11424.00	88.97	1.69	7164.03	4417.98	4403.20	363.83	0.55	4418.21	4.72	95.00	-0.46	-0.29
11518.00	89.28	1.50	7165.47	4511.88	4497.16	366.45	0.38	4512.06	4.66	94.00	-0.19	0.33
11613.00	90.52	2.31	7165.64	4606.80	4592.10	369.61	1.56	4606.95	4.60	95.00	0.85	1.3
11708.00	89.90	1.16	7165.30	4701.72	4687.05	372.49	1.37	4701.83	4.54	95.00	-1.21	-0.65
11788.00	89.90	1.16	7165.44	4781.61	4767.04	374.11	0.01	4781.69	4.49	80.00	0	0