30-015-44522

Schlumberger

Oxy Cedar Canyon 29 Federal Com 25H Gyro+MWD 0-13320 ftMD Survey
Geodetic Report
(Def Survey)

Report Date:	January 03, 2018 - 12:33 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	OXY	**Vertical Section Azimuth:**	93.089 ° (Grid North)
Field:	NM Eddy County (NAD 83)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Oxy Cedar Canyon 29 Federal Com 25H / Oxy Cedar Canyon 29 Federal Com 25H	**TVD Reference Datum:**	RKB=26.5'
Well:	Oxy Cedar Canyon 29 Federal Com 25H	**TVD Reference Elevation:**	2955.100 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	2928.600 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.147 °
Survey Name:	Oxy Cedar Canyon 29 Federal Com 25H Gyro+MWD 0-13320 ftMD	**Total Gravity Field Strength:**	998.4649mgn (9.80665 Based)
Survey Date:	December 07, 2017	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	169.277 ° / 5417.955 ft / 6.152 / 0.629	**Total Magnetic Field Strength:**	48053.082 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.977 °
Location Lat / Long:	N 32° 11' 8.32300", W 104° 0' 49.68856"	**Declination Date:**	December 07, 2017
Location Grid N/E Y/X:	N 431419.170 ftUS, E 640188.410 ftUS	**Magnetic Declination Model:**	HDGM 2017
CRS Grid Convergence Angle:	0.1702 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99992028	**Grid Convergence Used:**	0.1702 °
Version / Patch:	2.10.696.0	**Total Corr Mag North->Grid North:**	6.9765 °
		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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	431419.17	640188.41	N 32 11 8.32	W 104 0 49.69
	67.10	0.43	163.39	67.10	0.08	-0.24	0.07	0.64	431418.93	640188.48	N 32 11 8.32	W 104 0 49.69
	153.10	0.26	200.39	153.10	0.14	-0.73	0.10	0.32	431418.44	640188.51	N 32 11 8.32	W 104 0 49.69
	244.40	0.54	146.07	244.40	0.33	-1.26	0.26	0.48	431417.89	640188.67	N 32 11 8.31	W 104 0 49.69
	336.90	0.47	130.67	336.89	0.90	-1.89	0.80	0.16	431417.28	640189.21	N 32 11 8.30	W 104 0 49.68
	431.50	0.26	91.34	431.49	1.42	-2.15	1.30	0.33	431417.02	640189.71	N 32 11 8.30	W 104 0 49.67
	525.80	0.20	49.02	525.79	1.75	-2.05	1.64	0.19	431417.12	640190.05	N 32 11 8.30	W 104 0 49.67
Last Gyro	598.70	0.24	354.26	598.69	1.82	-1.81	1.72	0.28	431417.36	640190.13	N 32 11 8.31	W 104 0 49.67
	705.00	0.48	326.97	704.99	1.52	-1.22	1.46	0.27	431417.95	640189.87	N 32 11 8.31	W 104 0 49.67
	805.00	0.13	323.99	804.99	1.20	-0.78	1.16	0.35	431418.39	640189.57	N 32 11 8.32	W 104 0 49.68
	985.00	0.20	334.14	984.98	0.92	-0.33	0.91	0.04	431418.84	640189.32	N 32 11 8.32	W 104 0 49.68
	1164.00	0.16	64.48	1163.98	0.99	0.08	1.00	0.14	431419.23	640189.41	N 32 11 8.32	W 104 0 49.68
	1254.00	0.20	201.18	1253.98	1.05	-0.03	1.05	0.37	431419.14	640189.46	N 32 11 8.32	W 104 0 49.68
	1344.00	0.20	328.35	1343.98	0.91	-0.04	0.91	0.40	431419.13	640189.32	N 32 11 8.32	W 104 0 49.68
	1533.00	0.28	226.57	1532.98	0.41	-0.08	0.40	0.20	431419.09	640188.81	N 32 11 8.32	W 104 0 49.68
	1723.00	0.23	291.87	1722.98	-0.27	-0.26	-0.29	0.15	431418.91	640188.12	N 32 11 8.32	W 104 0 49.69
	1911.00	0.20	164.13	1910.98	-0.52	-0.43	-0.55	0.21	431418.74	640187.86	N 32 11 8.32	W 104 0 49.69
	2006.00	0.06	205.08	2005.98	-0.49	-0.64	-0.52	0.17	431418.53	640187.89	N 32 11 8.32	W 104 0 49.69
	2101.00	0.28	116.10	2100.98	-0.29	-0.78	-0.34	0.30	431418.39	640188.07	N 32 11 8.32	W 104 0 49.69
	2195.00	0.18	154.43	2194.98	-0.01	-1.02	-0.07	0.19	431418.15	640188.34	N 32 11 8.31	W 104 0 49.69
	2290.00	0.20	94.37	2289.98	0.23	-1.17	0.16	0.20	431418.00	640188.57	N 32 11 8.31	W 104 0 49.69
	2480.00	0.11	42.89	2479.98	0.67	-1.06	0.62	0.08	431418.11	640189.03	N 32 11 8.31	W 104 0 49.68
	2575.00	0.11	244.52	2574.98	0.65	-1.03	0.60	0.23	431418.14	640189.01	N 32 11 8.31	W 104 0 49.68
	2670.00	0.13	71.97	2669.98	0.67	-1.04	0.62	0.25	431418.13	640189.03	N 32 11 8.31	W 104 0 49.68
	2765.00	0.13	310.17	2764.98	0.69	-0.93	0.64	0.24	431418.24	640189.05	N 32 11 8.31	W 104 0 49.68
	2860.00	0.13	69.06	2859.98	0.70	-0.82	0.66	0.24	431418.35	640189.07	N 32 11 8.31	W 104 0 49.68
	2955.00	0.16	325.79	2954.98	0.72	-0.68	0.68	0.24	431418.49	640189.09	N 32 11 8.32	W 104 0 49.68
	3050.00	0.16	350.15	3049.98	0.81	-0.44	0.59	0.07	431418.73	640189.00	N 32 11 8.32	W 104 0 49.68
	3144.00	0.16	2.44	3143.98	0.58	-0.18	0.57	0.04	431418.99	640188.98	N 32 11 8.32	W 104 0 49.68
	3334.00	0.16	359.45	3333.98	0.58	0.35	0.58	0.00	431419.52	640188.99	N 32 11 8.33	W 104 0 49.68
	3524.00	0.16	87.93	3523.98	0.81	0.63	0.84	0.12	431419.80	640189.25	N 32 11 8.33	W 104 0 49.68
	3619.00	0.16	170.23	3618.98	0.97	0.50	1.00	0.22	431419.67	640189.41	N 32 11 8.33	W 104 0 49.68
	3809.00	0.16	278.16	3808.97	0.76	0.28	0.78	0.14	431419.45	640189.19	N 32 11 8.33	W 104 0 49.68
	3903.00	0.20	210.25	3902.97	0.58	0.16	0.57	0.22	431419.33	640188.98	N 32 11 8.32	W 104 0 49.68
	3998.00	0.20	15.57	3997.97	0.52	0.17	0.53	0.42	431419.34	640188.94	N 32 11 8.32	W 104 0 49.68
	4093.00	0.16	119.75	4092.97	0.67	0.27	0.69	0.30	431419.44	640189.10	N 32 11 8.33	W 104 0 49.68
	4283.00	0.20	345.95	4282.97	0.81	0.46	0.84	0.17	431419.63	640189.25	N 32 11 8.33	W 104 0 49.68
	4473.00	0.88	236.99	4472.97	-0.20	0.16	-0.19	0.40	431419.33	640188.22	N 32 11 8.32	W 104 0 49.69
	4663.00	1.76	237.80	4662.92	-3.49	-2.00	-3.60	0.57	431417.17	640184.81	N 32 11 8.30	W 104 0 49.73
	4852.00	3.06	234.40	4851.75	-9.80	-6.49	-10.16	0.69	431412.68	640178.25	N 32 11 8.26	W 104 0 49.81
	4948.00	3.58	233.61	4947.59	-14.11	-9.76	-14.66	0.54	431409.41	640173.75	N 32 11 8.23	W 104 0 49.86
	5043.00	3.65	230.50	5042.40	-18.63	-13.44	-19.38	0.22	431405.73	640169.03	N 32 11 8.19	W 104 0 49.91
	5232.00	7.58	242.47	5230.46	-33.79	-23.03	-35.08	2.16	431396.14	640153.33	N 32 11 8.10	W 104 0 50.10
	5422.00	9.99	241.61	5418.22	-58.63	-36.66	-60.70	1.27	431382.51	640127.72	N 32 11 7.96	W 104 0 50.40
	5517.00	9.84	241.58	5511.80	-72.58	-44.44	-75.09	0.16	431374.73	640113.33	N 32 11 7.89	W 104 0 50.56
	5707.00	9.82	241.30	5699.01	-100.19	-59.95	-103.58	0.03	431359.22	640084.84	N 32 11 7.73	W 104 0 50.90
	5896.00	9.72	239.69	5885.27	-127.21	-75.74	-131.49	0.15	431343.43	640056.93	N 32 11 7.58	W 104 0 51.22
	5991.00	9.84	238.46	5978.89	-140.59	-84.04	-145.33	0.25	431335.14	640043.09	N 32 11 7.50	W 104 0 51.38
	6086.00	9.61	238.87	6072.53	-153.87	-92.62	-158.89	0.37	431326.56	640029.53	N 32 11 7.41	W 104 0 51.54
	6275.00	9.34	237.73	6258.95	-178.90	-109.43	-185.07	0.18	431309.75	640003.38	N 32 11 7.25	W 104 0 51.85
	6370.00	9.59	237.86	6352.65	-191.65	-117.75	-198.29	0.26	431301.43	639990.14	N 32 11 7.16	W 104 0 52.00
	6465.00	9.35	239.59	6446.36	-204.55	-125.87	-211.64	0.39	431293.31	639976.79	N 32 11 7.08	W 104 0 52.16
	6560.00	9.19	241.54	6540.12	-217.45	-133.39	-224.97	0.37	431285.79	639963.46	N 32 11 7.01	W 104 0 52.31
	6655.00	8.85	238.43	6633.95	-229.93	-140.83	-237.86	0.63	431278.35	639950.57	N 32 11 6.94	W 104 0 52.46
	6750.00	9.29	236.65	6727.76	-242.11	-148.87	-250.49	0.55	431270.31	639937.94	N 32 11 6.86	W 104 0 52.61
	6939.00	9.14	238.74	6914.32	-266.77	-165.05	-276.07	0.19	431254.13	639912.36	N 32 11 6.70	W 104 0 52.91
	7034.00	9.54	239.95	7008.06	-279.59	-172.91	-289.33	0.47	431246.28	639899.10	N 32 11 6.62	W 104 0 53.06
	7128.00	8.98	244.00	7100.84	-292.51	-180.02	-302.66	0.93	431239.17	639885.78	N 32 11 6.55	W 104 0 53.22
	7223.00	7.69	247.45	7194.83	-304.71	-185.70	-315.18	1.44	431233.49	639873.26	N 32 11 6.49	W 104 0 53.36
	7318.00	5.02	243.36	7289.24	-314.05	-190.00	-324.76	2.85	431229.18	639863.67	N 32 11 6.45	W 104 0 53.47
	7412.00	3.27	241.34	7382.99	-319.90	-193.13	-330.79	1.87	431226.05	639857.65	N 32 11 6.42	W 104 0 53.54
	7507.00	1.84	239.26	7477.90	-323.47	-195.21	-334.48	1.51	431223.98	639853.98	N 32 11 6.40	W 104 0 53.59
	7602.00	1.07	232.03	7572.87	-325.41	-196.54	-336.49	0.83	431222.65	639851.95	N 32 11 6.39	W 104 0 53.61
	7697.00	0.24	24.08	7667.86	-326.01	-196.90	-337.11	1.35	431222.29	639851.33	N 32 11 6.38	W 104 0 53.62
	7792.00	2.14	62.73	7762.84	-324.41	-195.91	-335.45	2.06	431223.28	639852.99	N 32 11 6.39	W 104 0 53.60
	7846.00	2.71	72.39	7816.79	-322.34	-195.06	-333.34	1.30	431224.13	639855.10	N 32 11 6.40	W 104 0 53.57
	8022.00	8.17	115.11	7992.27	-309.67	-197.81	-320.60	2.59	431221.37	639867.84	N 32 11 6.38	W 104 0 53.43
	8117.00	16.32	129.82	8085.34	-294.20	-208.56	-305.89	11.02	431210.63	639882.55	N 32 11 6.27	W 104 0 53.25
	8212.00	23.33	116.64	8174.70	-268.21	-225.57	-279.77	8.71	431193.62	639909.66	N 32 11 6.10	W 104 0 52.94
	8307.00	26.91	95.40	8260.88	-227.39	-236.05	-240.46	10.15	431183.14	639947.97	N 32 11 5.99	W 104 0 52.49

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 ° ' ")
	8402.00	36.20	83.64	8341.82	-178.09	-234.96	191.03	11.69	431184.23	639997.40	N 32 11 6.00	W 104 0 51.92
	8497.00	47.05	83.95	8412.73	-115.90	-228.17	128.38	11.42	431191.02	640060.04	N 32 11 6.07	W 104 0 51.19
	8592.00	60.20	85.19	8468.94	-40.41	-221.02	52.40	13.88	431198.17	640136.01	N 32 11 6.14	W 104 0 50.31
	8687.00	71.57	83.08	8507.70	45.08	-212.10	33.70	12.14	431207.08	640222.11	N 32 11 6.22	W 104 0 49.30
	8782.00	84.77	83.11	8527.13	136.45	-200.95	125.80	13.89	431218.24	640314.20	N 32 11 6.33	W 104 0 48.23
	8833.00	87.18	87.21	8530.71	186.82	-196.66	176.48	9.31	431222.52	640364.88	N 32 11 6.37	W 104 0 47.64
	8877.00	89.11	88.02	8532.14	230.60	-194.83	220.42	4.76	431224.35	640408.81	N 32 11 6.39	W 104 0 47.13
	8972.00	91.89	93.10	8531.47	325.46	-195.76	315.37	6.00	431223.43	640503.76	N 32 11 6.38	W 104 0 46.03
	9081.00	89.35	91.48	8530.48	434.44	-200.11	424.27	2.61	431219.07	640612.65	N 32 11 6.33	W 104 0 44.76
	9176.00	88.14	91.21	8532.56	529.37	-202.34	519.22	1.30	431216.84	640707.59	N 32 11 6.31	W 104 0 43.65
	9271.00	88.14	91.01	8535.65	624.26	-204.18	614.15	0.21	431215.00	640802.51	N 32 11 6.28	W 104 0 42.55
	9366.00	87.66	91.43	8539.13	719.15	-206.20	709.07	0.67	431212.98	640897.42	N 32 11 6.26	W 104 0 41.45
	9461.00	87.83	91.16	8542.87	814.03	-208.35	803.97	0.34	431210.84	640992.31	N 32 11 6.24	W 104 0 40.34
	9556.00	87.56	90.62	8546.69	908.88	-209.82	898.88	0.64	431209.36	641087.21	N 32 11 6.22	W 104 0 39.24
	9651.00	88.21	91.24	8550.19	1003.75	-211.38	993.80	0.95	431207.82	641182.13	N 32 11 6.20	W 104 0 38.13
	9746.00	87.73	91.29	8553.56	1098.64	-213.46	1088.72	0.51	431205.73	641277.04	N 32 11 6.18	W 104 0 37.03
	9841.00	87.94	91.17	8557.15	1193.52	-215.50	1183.63	0.25	431203.69	641371.94	N 32 11 6.16	W 104 0 35.92
	10032.00	88.97	91.58	8562.30	1384.36	-220.08	1374.50	0.58	431199.11	641562.80	N 32 11 6.10	W 104 0 33.70
	10127.00	89.00	91.41	8563.96	1479.31	-222.56	1469.45	0.18	431196.63	641657.74	N 32 11 6.08	W 104 0 32.60
	10222.00	88.80	91.67	8565.80	1574.26	-225.11	1564.40	0.35	431194.08	641752.68	N 32 11 6.05	W 104 0 31.49
	10317.00	90.24	93.07	8566.60	1669.24	-229.04	1659.31	2.11	431190.15	641847.59	N 32 11 6.01	W 104 0 30.39
	10412.00	90.35	92.79	8566.11	1764.24	-233.89	1754.19	0.32	431185.29	641942.45	N 32 11 5.96	W 104 0 29.29
	10507.00	89.14	91.57	8566.53	1859.23	-237.51	1849.11	1.81	431181.68	642037.37	N 32 11 5.92	W 104 0 28.18
	10602.00	88.80	91.37	8568.24	1954.17	-239.94	1944.07	0.42	431179.24	642132.32	N 32 11 5.89	W 104 0 27.08
	10792.00	88.94	91.47	8571.99	2144.05	-244.65	2133.97	0.09	431174.54	642322.21	N 32 11 5.84	W 104 0 24.87
	10887.00	89.35	91.68	8573.41	2239.01	-247.26	2228.92	0.48	431171.93	642417.15	N 32 11 5.81	W 104 0 23.78
	10982.00	88.67	91.20	8574.88	2333.96	-249.65	2323.88	0.71	431169.54	642512.10	N 32 11 5.78	W 104 0 22.66
	11077.00	89.11	91.22	8576.56	2428.89	-251.66	2418.85	0.25	431167.53	642607.06	N 32 11 5.76	W 104 0 21.55
	11268.00	88.80	90.07	8580.04	2619.88	-253.81	2609.80	0.62	431165.38	642798.00	N 32 11 5.73	W 104 0 19.33
	11363.00	88.90	90.34	8581.95	2714.54	-254.15	2704.78	0.30	431165.05	642892.97	N 32 11 5.73	W 104 0 18.23
	11458.00	88.87	90.19	8583.79	2809.41	-254.58	2799.76	0.16	431164.61	642987.94	N 32 11 5.72	W 104 0 17.12
	11553.00	88.83	90.18	8585.70	2904.27	-254.89	2894.74	0.04	431164.30	643082.91	N 32 11 5.71	W 104 0 16.02
	11648.00	89.18	90.77	8587.35	2999.16	-255.68	2989.72	0.72	431163.51	643177.89	N 32 11 5.70	W 104 0 14.91
	11743.00	88.90	90.25	8588.94	3094.05	-256.52	3084.70	0.62	431162.67	643272.86	N 32 11 5.69	W 104 0 13.80
	11838.00	89.42	91.34	8590.34	3188.96	-257.84	3179.68	1.27	431161.35	643367.83	N 32 11 5.68	W 104 0 12.70
	11933.00	88.73	90.49	8591.87	3283.88	-259.36	3274.66	1.15	431159.83	643462.80	N 32 11 5.66	W 104 0 11.59
	12028.00	89.80	91.19	8593.09	3378.79	-260.75	3369.64	1.35	431158.44	643557.77	N 32 11 5.64	W 104 0 10.49
	12123.00	88.90	89.52	8594.17	3473.67	-261.34	3464.62	2.00	431157.85	643652.75	N 32 11 5.63	W 104 0 9.38
	12218.00	89.18	89.90	8595.76	3568.50	-260.86	3559.61	0.50	431158.33	643747.73	N 32 11 5.64	W 104 0 8.28
	12313.00	88.73	89.44	8597.49	3663.31	-260.31	3654.59	0.68	431158.88	643842.70	N 32 11 5.64	W 104 0 7.17
	12407.00	89.07	89.43	8599.29	3757.10	-259.39	3748.57	0.36	431159.80	643936.67	N 32 11 5.64	W 104 0 6.08
	12502.00	88.76	89.41	8601.09	3851.89	-258.42	3843.55	0.33	431160.77	644031.64	N 32 11 5.65	W 104 0 4.98
	12597.00	89.07	89.83	8602.89	3946.70	-257.79	3938.53	0.55	431161.40	644126.62	N 32 11 5.65	W 104 0 3.87
	12787.00	88.66	89.77	8606.66	4136.35	-257.13	4128.49	0.22	431162.06	644316.56	N 32 11 5.65	W 104 0 1.66
	12883.00	89.21	90.30	8608.44	4232.19	-257.19	4224.47	0.80	431162.00	644412.54	N 32 11 5.65	W 104 0 0.54
	12978.00	89.31	90.20	8609.67	4327.07	-257.60	4319.46	0.15	431161.59	644507.52	N 32 11 5.64	W 103 59 59.44
	13168.00	89.62	90.10	8611.44	4516.81	-258.10	4509.45	0.17	431161.09	644697.50	N 32 11 5.63	W 103 59 57.23
Final MWD survey	13263.00	89.73	90.01	8611.98	4611.68	-258.19	4604.45	0.15	431161.00	644792.49	N 32 11 5.63	W 103 59 56.12
Proj to bit	13320.00	89.73	90.01	8612.25	4668.59	-258.20	4661.45	0.00	431160.99	644849.48	N 32 11 5.63	W 103 59 55.46

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_NSG+MSHOT-Depth Only	Original Borehole / Oxy Cedar Canyon 29 Federal Com 25H Gyro+MWD 0-13320 ftMD
	1	26.500	26.500	Act Stns	30.000	30.000	NAL_NSG+MSHOT-Depth Only	Original Borehole / Oxy Cedar Canyon 29 Federal Com 25H Gyro+MWD 0-13320 ftMD
	1	26.500	598.700	Act Stns	30.000	30.000	NAL_NSG+MSHOT	Original Borehole / Oxy Cedar Canyon 29 Federal Com 25H
	1	598.700	13320.000	Act Stns	30.000	30.000	NAL_MWD_PLUS_0.5_DEG	Original Borehole / Oxy Cedar Canyon 29 Federal Com 25H

Final PvA

H&P 636 (RKB=26.5')

Schlumberger

OXY

Borehole:	Well:	Field:	Structure:
Original Borehole	Oxy Cedar Canyon 29 Federal Com 25H	NM Eddy County (NAD 83)	Oxy Cedar Canyon 29 Federal Com 25H

Gravity & Magnetic Parameters
Model: HDGM 2017 Dip: 59.577° Date: 07-Dec-2017
MagDec: 7.147° FS: 48963.982nT Gravity FS: 998.466mgn (9.80665 Based)

Surface Location NAD83 New Mexico State Plane, Eastern Zone, US Feet
Lat: N 32 11 6.32 Northing: 431419.17RUS Grid Conv: 0.1702°
Long: W 104 0 40.69 Easting: 640198.41RUS Scale Fact: 0.99992028

Miscellaneous
Slot: Oxy Cedar Canyon 29 Federal Com 25H TVD Ref: RKB=26.5'(2956.16 above MSL)
Plan: Oxy Cedar Canyon 29 Federal Com 25H REV0 LBN 09Nov17