Schlumberger **Cimarex** Final PvA **CIMAREX**

Borehole:	Well:	Field:	Structure:
Original Borehole	Cimarex Cascade 28 Federal 85H	NM Lea County (NAD 83)	Cimarex Cascade 28 Federal 85H

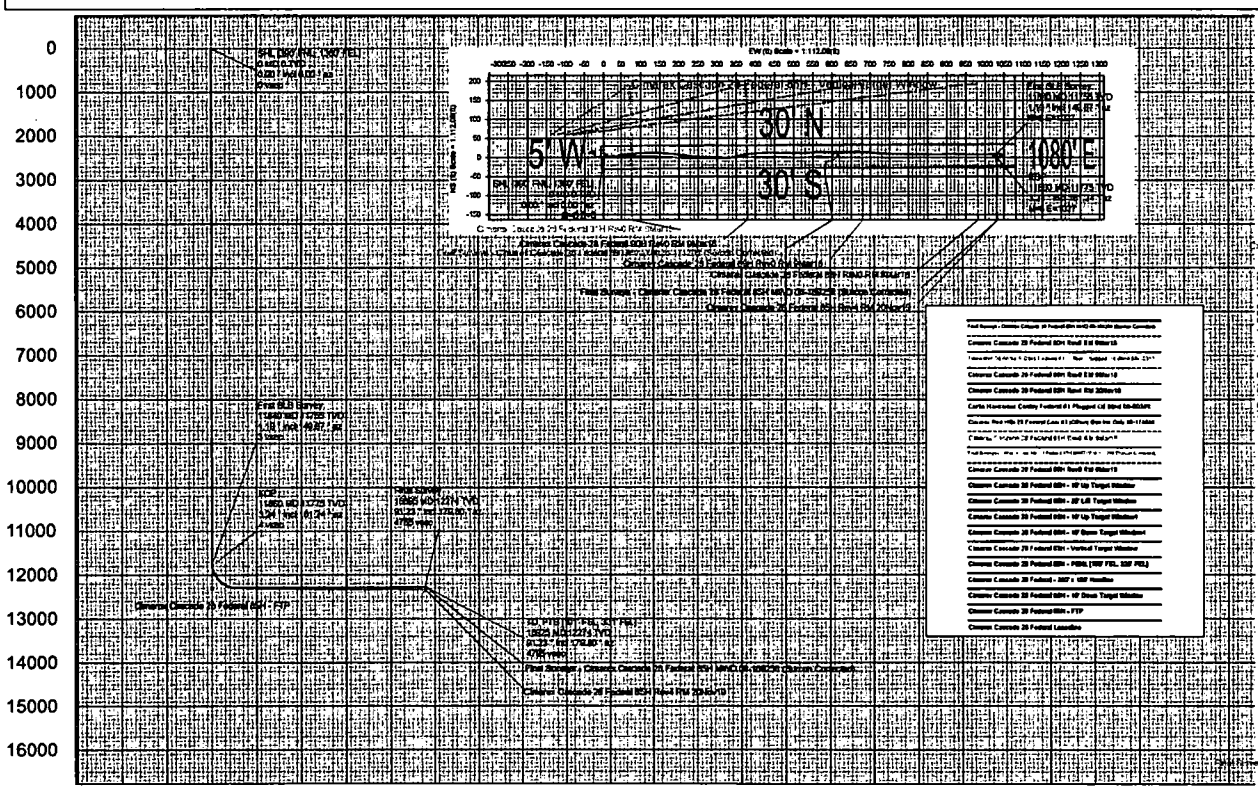
Gravity & Magnetic Parameters						Surface Location	NAD83 New Mexico State Plane, Eastern Zone, US Feet				Miscellaneous		
Model:	HDGM 2019	Dip:	59.7°	Date:	20-Nov-2019	Lat:	N 32 8 37.80	Northing:	403788.51ftUS	Grid Conv:	0.404°	Slot:	Cimarex Cascade 28 Federal 85H	TVD Ref:	RKB(3336ft above MSL)
MagDec:	6.593°	FS:	47721.611nT	Gravity FS:	998.437mgn (9.80665 Based)	Lon:	W 103 34 23.45	Easting:	776702.77ftUS	Scale Fact:	0.99997254	Plan:	Final Surveys - Cimarex Cascade 28 Federal 85H MWD 09-18925R (Surcon Corrected)		

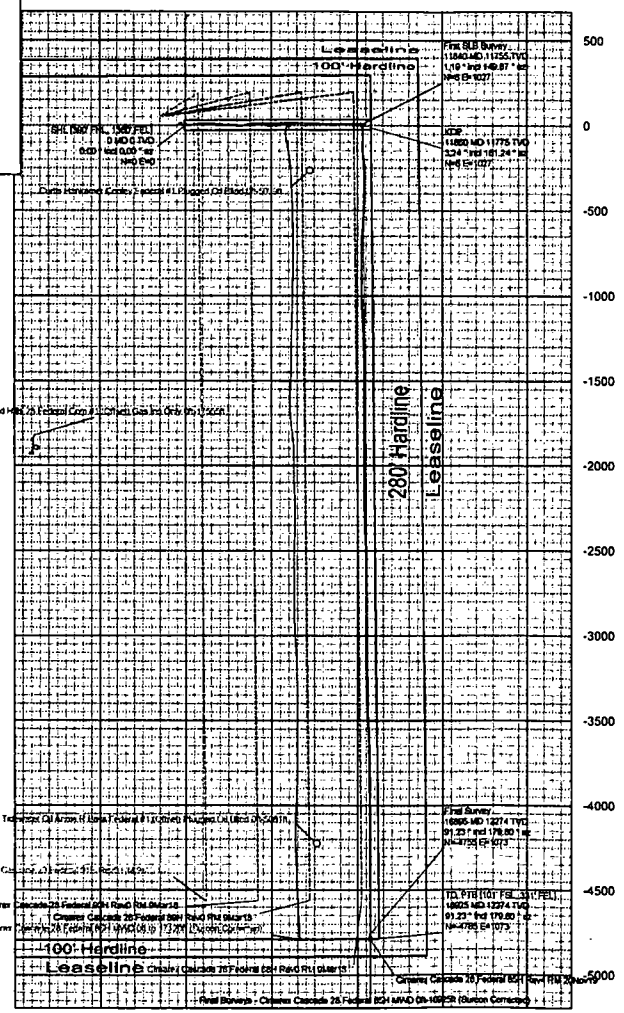
Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL [360' FNL, 1360' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
First SLB Survey	11840.00	1.19	149.87	11755.17	3.04	6.46	1026.89	1.87
KOP	11860.03	3.24	161.24	11775.18	3.78	5.74	1027.18	10.39
Final Survey	18925.00	91.23	179.80	12274.24	4764.72	-4754.99	1073.37	1.91
TD, PTB [101' FSL, 331' FEL]	18925.00	91.23	179.80	12273.59	4764.71	-4764.99	1073.47	0.00

Grid
True Mag
Grid North
Tot Corr (M->G 6.189°)
Mag Dec (6.593°)
Grid Conv (0.404°)

CONTROLLED





Schlumberger

Final Surveys - Cimarex Cascade 28 Federal 85H MWD 0ft-16925ft (Surcon Corrected) Survey Geodetic Report

(Def Survey)

CIMAREX

Report Date:	December 03, 2019 - 02:19 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Cimarex	**Vertical Section Azimuth:**	179.470 ° (Grid North)
Field:	NM Lea County (NAD 83)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Cimarex Cascade 28 Federal 85H / Cimarex Cascade 28 Federal 85H	**TVD Reference Datum:**	RKB
Well:	Cimarex Cascade 28 Federal 85H	**TVD Reference Elevation:**	3390.000 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3364.000 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	6.593 °
Survey Name:	Final Surveys - Cimarex Cascade 28 Federal 85H MWD 0ft-16925ft (Surcon Corrected)	**Total Gravity Field Strength:**	998.4373mgn (9.80665 Based)
Survey Date:	October 15, 2019	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	216.401 ° / 5898.360 ft / 6.245 / 0.480	**Total Magnetic Field Strength:**	47721.511 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.700 °
Location Lat / Long:	N 32° 6' 27.79854", W 103° 34' 23.45237"	**Declination Date:**	November 20, 2019
Location Grid N/E Y/X:	N 403755.510 ftUS, E 776702.700 ftUS	**Magnetic Declination Model:**	HDGM 2019
CRS Grid Convergence Angle:	0.4040 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99997254	**Grid Convergence Used:**	0.4040 °
Version / Patch:	2.10.787.0	**Total Corr Mag North->Grid North:**	6.1892 °
		Local Coord Referenced To:	Structure Reference Point

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 ° ' ")	Closure Azimuth (°)	Closure (ft)
SHL [390' FNL, 1360' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	403755.51	776702.70	N 32 6 27.80	W 103 34 23.45	0.00	0.00
	200.00	0.62	11.21	200.00	-1.06	1.06	0.21	0.31	403756.57	776702.91	N 32 6 27.81	W 103 34 23.45	11.21	1.08
	301.00	0.70	21.51	300.99	-2.17	2.17	0.54	0.14	403757.68	776703.24	N 32 6 27.82	W 103 34 23.45	14.03	2.24
	484.00	0.72	8.85	483.98	-4.34	4.35	1.13	0.09	403759.86	776703.83	N 32 6 27.84	W 103 34 23.44	14.56	4.49
	666.00	0.73	351.45	665.96	-6.61	6.62	1.13	0.12	403762.13	776703.83	N 32 6 27.86	W 103 34 23.44	9.71	6.72
	757.00	0.71	341.88	756.95	-7.72	7.73	0.87	0.13	403763.24	776703.57	N 32 6 27.87	W 103 34 23.44	6.43	7.78
	848.00	0.82	337.78	847.95	-8.87	8.87	0.45	0.13	403764.38	776703.15	N 32 6 27.89	W 103 34 23.45	2.90	8.88
	933.00	0.76	337.22	932.94	-9.95	9.95	0.00	0.07	403765.46	776702.70	N 32 6 27.90	W 103 34 23.45	0.01	9.95
	1035.00	0.89	344.15	1034.93	-11.34	11.34	-0.48	0.16	403766.85	776702.22	N 32 6 27.91	W 103 34 23.46	357.59	11.35
	1129.00	0.70	352.05	1128.92	-12.62	12.61	-0.76	0.23	403768.12	776701.94	N 32 6 27.92	W 103 34 23.46	356.57	12.63
	1224.00	0.73	116.44	1223.91	-12.92	12.92	-0.29	1.33	403768.43	776702.41	N 32 6 27.93	W 103 34 23.45	358.70	12.92
	1413.00	1.24	136.92	1412.89	-10.87	10.89	2.18	0.32	403766.40	776704.88	N 32 6 27.91	W 103 34 23.43	11.33	11.10
	1507.00	1.18	142.64	1506.87	-9.34	9.37	3.46	0.14	403764.88	776706.16	N 32 6 27.89	W 103 34 23.41	20.28	9.99
	1602.00	1.01	149.52	1601.85	-7.83	7.88	4.48	0.23	403763.39	776707.18	N 32 6 27.88	W 103 34 23.40	29.64	9.06
	1696.00	1.73	113.03	1695.82	-6.55	6.61	6.21	1.17	403762.12	776708.91	N 32 6 27.86	W 103 34 23.38	43.22	9.07
	1791.00	1.72	114.40	1790.78	-5.37	5.46	8.83	0.04	403760.97	776711.53	N 32 6 27.85	W 103 34 23.35	58.27	10.38
	1885.00	1.53	115.24	1884.74	-4.23	4.34	11.25	0.20	403759.85	776713.95	N 32 6 27.84	W 103 34 23.32	68.90	12.05
	1980.00	1.48	114.88	1979.71	-3.16	3.28	13.51	0.05	403758.79	776716.21	N 32 6 27.83	W 103 34 23.30	76.34	13.90
	2074.00	1.53	107.57	2073.68	-2.25	2.39	15.80	0.21	403757.90	776718.50	N 32 6 27.82	W 103 34 23.27	81.39	15.98
	2263.00	1.44	100.40	2262.61	-1.01	1.20	20.54	0.11	403756.71	776723.24	N 32 6 27.81	W 103 34 23.21	86.65	20.58
	2358.00	1.57	91.52	2357.58	-0.74	0.95	23.02	0.28	403756.46	776725.72	N 32 6 27.81	W 103 34 23.18	87.63	23.04
	2452.00	1.80	83.83	2451.54	-0.84	1.08	25.77	0.34	403756.59	776728.47	N 32 6 27.81	W 103 34 23.15	87.61	25.80
	2547.00	2.11	76.51	2546.48	-1.38	1.64	28.96	0.42	403757.15	776731.66	N 32 6 27.81	W 103 34 23.12	86.75	29.01
	2641.00	2.25	75.09	2640.42	-2.22	2.52	32.42	0.16	403758.03	776735.12	N 32 6 27.82	W 103 34 23.08	85.55	32.52
	2736.00	2.40	77.14	2735.34	-3.11	3.45	36.17	0.18	403758.96	776738.86	N 32 6 27.83	W 103 34 23.03	84.56	36.33
	2830.00	4.54	78.83	2829.16	-4.22	4.60	41.73	2.28	403760.11	776744.43	N 32 6 27.84	W 103 34 22.97	83.70	41.99
	2924.00	7.04	79.33	2922.67	-5.92	6.39	51.05	2.66	403761.90	776753.75	N 32 6 27.86	W 103 34 22.86	82.86	51.45
	3019.00	9.62	84.42	3016.66	-7.64	8.24	64.67	2.82	403763.75	776767.37	N 32 6 27.88	W 103 34 22.70	82.74	65.19
	3113.00	9.75	84.63	3109.32	-9.01	9.75	80.41	0.14	403765.26	776783.11	N 32 6 27.89	W 103 34 22.52	83.09	81.00
	3207.00	9.95	83.55	3201.94	-10.52	11.41	96.41	0.29	403766.92	776799.10	N 32 6 27.90	W 103 34 22.33	83.25	97.08
	3302.00	11.64	88.27	3295.26	-11.56	12.62	114.14	2.01	403768.13	776816.84	N 32 6 27.92	W 103 34 22.12	83.69	114.84
	3396.00	11.48	89.94	3387.35	-11.68	12.92	132.98	0.39	403768.42	776835.67	N 32 6 27.92	W 103 34 21.91	84.45	133.60
	3585.00	11.19	95.90	3572.67	-9.48	11.05	170.03	0.64	403766.56	776872.72	N 32 6 27.90	W 103 34 21.47	86.28	170.39
	3679.00	10.61	96.21	3664.97	-7.44	9.18	187.70	0.62	403764.69	776890.40	N 32 6 27.88	W 103 34 21.27	87.20	187.93

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 ° ' ")	Closure Azimuth (°)	Closure (ft)
	3774.00	10.31	97.44	3758.39	-5.23	7.13	204.83	0.39	403762.64	776907.52	N 32 6 27.85	W 103 34 21.07	88.01	204.95
	3962.00	8.05	93.56	3943.98	-1.96	4.13	234.65	1.25	403759.64	776937.34	N 32 6 27.82	W 103 34 20.72	88.99	234.69
	4057.00	7.41	97.01	4038.11	-0.68	2.97	247.37	0.83	403758.48	776950.06	N 32 6 27.81	W 103 34 20.58	89.31	247.39
	4151.00	6.46	92.59	4131.43	0.40	1.99	258.67	1.16	403757.50	776961.36	N 32 6 27.80	W 103 34 20.45	89.56	258.68
	4245.00	6.67	88.56	4224.81	0.60	1.89	269.41	0.54	403757.40	776972.10	N 32 6 27.80	W 103 34 20.32	89.60	269.42
	4339.00	6.95	91.72	4318.15	0.74	1.86	280.55	0.50	403757.37	776983.24	N 32 6 27.80	W 103 34 20.19	89.62	280.56
	4528.00	8.43	92.51	4505.44	1.92	0.91	305.82	0.79	403756.42	777008.51	N 32 6 27.79	W 103 34 19.90	89.83	305.82
	4623.00	8.16	97.13	4599.45	3.19	-0.23	319.47	0.76	403755.28	777022.16	N 32 6 27.77	W 103 34 19.74	90.04	319.47
	4717.00	7.39	85.70	4692.59	3.68	-0.61	332.12	1.83	403754.90	777034.81	N 32 6 27.77	W 103 34 19.59	90.10	332.12
	4811.00	7.33	75.02	4785.82	1.79	1.40	343.94	1.45	403756.91	777046.63	N 32 6 27.79	W 103 34 19.45	89.77	343.94
	4906.00	8.01	75.82	4879.97	-1.29	4.58	356.21	0.72	403760.09	777058.90	N 32 6 27.82	W 103 34 19.31	89.26	356.24
	5000.00	9.74	81.35	4972.84	-3.96	7.38	370.42	2.05	403762.89	777073.11	N 32 6 27.85	W 103 34 19.15	88.86	370.50
	5095.00	10.58	85.15	5066.35	-5.75	9.33	387.06	1.13	403764.84	777089.75	N 32 6 27.86	W 103 34 18.95	88.62	387.17
	5190.00	10.71	85.16	5159.72	-7.07	10.81	404.55	0.14	403766.32	777107.23	N 32 6 27.88	W 103 34 18.75	88.47	404.69
	5284.00	10.77	85.62	5252.07	-8.32	12.22	422.01	0.11	403767.73	777124.69	N 32 6 27.89	W 103 34 18.55	88.34	422.18
	5379.00	10.72	88.29	5345.41	-9.09	13.16	439.69	0.53	403768.67	777142.37	N 32 6 27.90	W 103 34 18.34	88.29	439.88
	5473.00	10.94	91.57	5437.73	-8.95	13.18	457.34	0.70	403768.69	777160.03	N 32 6 27.90	W 103 34 18.13	88.35	457.53
	5568.00	10.62	91.51	5531.06	-8.30	12.70	475.10	0.34	403768.21	777177.79	N 32 6 27.89	W 103 34 17.93	88.47	475.27
	5662.00	9.99	91.18	5623.54	-7.75	12.30	491.92	0.67	403767.81	777194.60	N 32 6 27.89	W 103 34 17.73	88.57	492.07
	5757.00	9.87	90.39	5717.12	-7.38	12.08	508.30	0.19	403767.59	777210.98	N 32 6 27.88	W 103 34 17.54	88.64	508.44
	5851.00	9.76	89.26	5809.74	-7.28	12.13	524.32	0.24	403767.64	777227.00	N 32 6 27.88	W 103 34 17.36	88.68	524.46
	5946.00	9.88	87.93	5903.35	-7.52	12.52	540.52	0.27	403768.03	777243.20	N 32 6 27.88	W 103 34 17.17	88.67	540.66
	6040.00	10.44	87.82	5995.87	-7.99	13.14	557.09	0.60	403768.65	777259.77	N 32 6 27.89	W 103 34 16.97	88.65	557.24
	6134.00	10.18	88.89	6088.36	-8.32	13.63	573.90	0.34	403769.13	777276.58	N 32 6 27.89	W 103 34 16.78	88.64	574.06
	6229.00	10.60	90.68	6181.80	-8.22	13.68	591.03	0.56	403769.19	777293.71	N 32 6 27.89	W 103 34 16.58	88.67	591.19
	6323.00	10.21	89.92	6274.25	-7.97	13.59	608.01	0.44	403769.10	777310.69	N 32 6 27.89	W 103 34 16.38	88.72	608.16
	6417.00	9.90	88.76	6366.81	-8.00	13.78	624.42	0.39	403769.29	777327.10	N 32 6 27.89	W 103 34 16.19	88.74	624.57
	6512.00	10.34	87.85	6460.33	-8.35	14.28	641.10	0.49	403769.79	777343.78	N 32 6 27.90	W 103 34 16.00	88.72	641.26
	6606.00	12.20	88.92	6552.51	-8.68	14.78	659.46	1.99	403770.29	777362.15	N 32 6 27.90	W 103 34 15.78	88.72	659.63
	6795.00	12.30	94.29	6737.22	-7.18	13.65	699.51	0.60	403769.16	777402.19	N 32 6 27.88	W 103 34 15.32	88.88	699.64
	6984.00	11.00	93.32	6922.32	-4.28	11.10	737.59	0.70	403766.61	777440.26	N 32 6 27.86	W 103 34 14.88	89.14	737.67
	7079.00	10.60	93.05	7015.64	-3.12	10.11	755.36	0.42	403765.62	777458.04	N 32 6 27.85	W 103 34 14.67	89.23	755.43
	7173.00	10.16	91.77	7108.10	-2.25	9.39	772.28	0.53	403764.90	777474.96	N 32 6 27.84	W 103 34 14.47	89.30	772.34
	7268.00	9.44	90.81	7201.71	-1.73	9.03	788.44	0.78	403764.53	777491.12	N 32 6 27.83	W 103 34 14.29	89.34	788.50
	7362.00	9.07	90.93	7294.49	-1.36	8.80	803.56	0.39	403764.31	777506.24	N 32 6 27.83	W 103 34 14.11	89.37	803.61
	7457.00	8.43	89.68	7388.38	-1.15	8.71	818.01	0.70	403764.22	777520.69	N 32 6 27.83	W 103 34 13.94	89.39	818.06
	7551.00	8.91	89.87	7481.31	-1.07	8.77	832.18	0.51	403764.28	777534.86	N 32 6 27.83	W 103 34 13.78	89.40	832.23
	7646.00	9.43	92.64	7575.09	-0.59	8.43	847.31	0.72	403763.94	777549.99	N 32 6 27.82	W 103 34 13.60	89.43	847.35
	7740.00	8.93	92.51	7667.89	0.22	7.75	862.29	0.53	403763.26	777564.97	N 32 6 27.81	W 103 34 13.43	89.48	862.33
	7835.00	8.47	88.98	7761.80	0.56	7.55	876.66	0.74	403763.06	777579.33	N 32 6 27.81	W 103 34 13.26	89.51	876.69
	7930.00	9.18	85.04	7855.67	-0.09	8.33	891.20	0.98	403763.84	777593.87	N 32 6 27.82	W 103 34 13.09	89.46	891.24
	8024.00	9.23	87.78	7948.46	-0.89	9.27	906.20	0.47	403764.78	777608.88	N 32 6 27.83	W 103 34 12.92	89.41	906.25
	8119.00	9.96	92.54	8042.13	-0.68	9.21	922.02	1.13	403764.71	777624.70	N 32 6 27.83	W 103 34 12.73	89.43	922.07
	8213.00	9.29	92.16	8134.81	0.12	8.56	937.73	0.72	403764.07	777640.40	N 32 6 27.82	W 103 34 12.55	89.48	937.77
	8308.00	8.84	91.96	8228.62	0.79	8.02	952.69	0.47	403763.53	777655.36	N 32 6 27.81	W 103 34 12.38	89.52	952.72
	8402.00	8.10	90.95	8321.60	1.28	7.66	966.53	0.80	403763.17	777669.20	N 32 6 27.81	W 103 34 12.22	89.55	966.56
	8497.00	7.50	90.03	8415.72	1.51	7.55	979.42	0.65	403763.06	777682.09	N 32 6 27.80	W 103 34 12.07	89.56	979.45
	8591.00	6.94	89.73	8508.97	1.60	7.57	991.23	0.60	403763.08	777693.90	N 32 6 27.80	W 103 34 11.93	89.56	991.26
	8686.00	6.47	87.68	8603.32	1.46	7.82	1002.32	0.56	403763.33	777704.99	N 32 6 27.81	W 103 34 11.80	89.55	1002.35
	8780.00	5.95	89.14	8696.77	1.26	8.10	1012.48	0.58	403763.61	777715.15	N 32 6 27.81	W 103 34 11.68	89.54	1012.52
	8875.00	5.44	86.32	8791.30	0.99	8.47	1021.90	0.61	403763.98	777724.57	N 32 6 27.81	W 103 34 11.57	89.53	1021.93
	8969.00	4.37	85.21	8884.96	0.48	9.05	1029.92	1.14	403764.56	777732.59	N 32 6 27.82	W 103 34 11.48	89.50	1029.96
	9064.00	2.91	87.86	8979.76	0.14	9.44	1035.93	1.55	403764.95	777738.60	N 32 6 27.82	W 103 34 11.41	89.48	1035.98
	9158.00	2.71	91.06	9073.65	0.13	9.49	1040.54	0.27	403765.00	777743.21	N 32 6 27.82	W 103 34 11.35	89.48	1040.58
	9253.00	1.53	103.80	9168.58	0.51	9.15	1044.02	1.33	403764.66	777746.68	N 32 6 27.82	W 103 34 11.31	89.50	1044.06
	9348.00	1.12	120.07	9263.56	1.30	8.38	1046.05	0.58	403763.89	777748.72	N 32 6 27.81	W 103 34 11.29	89.54	1046.08
	9442.00	0.72	160.93	9357.55	2.32	7.36	1047.04	0.79	403762.87	777749.71	N 32 6 27.80	W 103 34 11.28	89.60	1047.06
	9535.00	1.05	209.97	9450.54	3.61	6.07	1046.80	0.85	403761.58	777749.47	N 32 6 27.79	W 103 34 11.28	89.67	1046.82
	9630.00	1.84	233.73	9545.51	5.25	4.42	1045.14	1.03	403759.92	777747.81	N 32 6 27.77	W 103 34 11.30	89.76	1045.15
	9724.00	1.52	236.92	9639.47	6.81	2.84	1042.88	0.35	403758.35	777745.55	N 32 6 27.75	W 103 34 11.33	89.84	1042.88
	9818.00	1.05	291.08	9733.44	7.16	2.47	1041.03	1.32	403757.98	777743.70	N 32 6 27.75	W 103 34 11.35	89.86	1041.03
	9913.00	1.67	278.77	9828.42	6.61	3.00	1038.85	0.72	403758.51	777741.52	N 32 6 27.76	W 103 34 11.37	89.83	1038.85
	10008.00	1.70	273.27	9923.38	6.30	3.29	1036.07	0.17	403758.80	777738.74	N 32 6 27.76	W 103 34 11.41	89.82	1036.08
	10102.00	1.70	268.45	10017.33	6.23	3.33	1033.29	0.15	403758.84	777735.96	N 32 6 27.76	W 103 34 11.44	89.82	1033.29
	10197.00	1.60	264.40	10112.30	6.37	3.16	1030.56	0.16	403758.67	777733.23	N 32 6 27.76	W 103 34 11.47	89.82	1030.57
	10291.00	1.46	272.31	10206.26	6.43	3.08	1028.06	0.27	403758.59	777730.73	N 32 6 27.76	W 103 34 11.50	89.83	1028.06
	10385.00	1.26	290.98	10300.24	5.99	3.50	1025.90	0.51	403759.01	777728.57	N 32 6 27.76	W 103 34 11.53	89.80	1025.90
	10480.00	1.11	284.89	10395.22	5.36	4.11	1024.03	0.21	403759.62	777726.70	N 32 6 27.77	W 103 34 11.55	89.77	1024.04

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 ° ' ")	Closure Azimuth (°)	Closure (ft)
	10574.00	0.65	271.70	10489.20	5.10	4.36	1022.62	0.53	403759.87	777725.29	N 32 6 27.77	W 103 34 11.56	89.76	1022.63
	10669.00	0.52	283.57	10584.20	4.97	4.48	1021.66	0.19	403759.99	777724.33	N 32 6 27.77	W 103 34 11.57	89.75	1021.67
	10763.00	0.43	13.19	10678.20	4.53	4.92	1021.33	0.72	403760.43	777724.00	N 32 6 27.78	W 103 34 11.58	89.72	1021.34
	10858.00	0.44	21.60	10773.19	3.84	5.61	1021.54	0.07	403761.12	777724.21	N 32 6 27.78	W 103 34 11.58	89.69	1021.56
	10952.00	0.36	19.21	10867.19	3.23	6.22	1021.77	0.09	403761.73	777724.44	N 32 6 27.79	W 103 34 11.57	89.65	1021.79
	11047.00	0.33	72.94	10962.19	2.87	6.58	1022.13	0.33	403762.09	777724.80	N 32 6 27.79	W 103 34 11.57	89.63	1022.15
	11236.00	0.36	100.68	11151.19	2.83	6.63	1023.24	0.09	403762.14	777725.91	N 32 6 27.79	W 103 34 11.56	89.63	1023.26
	11425.00	0.10	88.92	11340.19	2.95	6.53	1023.98	0.14	403762.04	777726.65	N 32 6 27.79	W 103 34 11.55	89.63	1024.01
	11519.00	0.28	91.79	11434.19	2.95	6.52	1024.30	0.19	403762.03	777726.97	N 32 6 27.79	W 103 34 11.54	89.64	1024.32
	11614.00	0.55	109.60	11529.18	3.12	6.36	1024.96	0.31	403761.87	777727.63	N 32 6 27.79	W 103 34 11.54	89.64	1024.98
	11709.00	0.52	56.16	11624.18	3.04	6.45	1025.75	0.51	403761.96	777728.42	N 32 6 27.79	W 103 34 11.53	89.64	1025.77
	11752.00	0.76	37.03	11667.18	2.71	6.78	1026.08	0.74	403762.29	777728.75	N 32 6 27.79	W 103 34 11.52	89.62	1026.10
First SLB Survey	11840.00	1.19	149.87	11755.17	3.04	6.46	1026.89	1.87	403761.97	777729.56	N 32 6 27.79	W 103 34 11.51	89.64	1026.91
KOP	*11860.03*	*3.24*	*161.24*	*11775.18*	*3.76*	*5.74*	*1027.18*	*10.39*	*403761.25*	*777729.85*	*N 32 6 27.78*	*W 103 34 11.51*	*89.68*	*1027.19*
	11871.00	4.37	162.93	11786.13	4.45	5.05	1027.40	10.39	403760.56	777730.07	N 32 6 27.78	W 103 34 11.51	89.72	1027.41
	11902.00	9.64	167.19	11816.89	8.12	1.39	1028.32	17.07	403756.90	777730.99	N 32 6 27.74	W 103 34 11.50	89.92	1028.32
	11934.00	13.56	169.32	11848.23	14.44	-4.91	1029.61	12.32	403750.60	777732.28	N 32 6 27.68	W 103 34 11.48	90.27	1029.62
	11966.00	17.74	170.99	11879.03	22.96	-13.42	1031.07	13.14	403742.09	777733.74	N 32 6 27.59	W 103 34 11.47	90.75	1031.16
	12011.00	23.82	177.71	11921.09	38.84	-29.29	1032.51	14.49	403726.22	777735.18	N 32 6 27.44	W 103 34 11.45	91.62	1032.92
	12060.00	28.09	180.52	11965.14	60.27	-50.72	1032.80	9.07	403704.79	777735.47	N 32 6 27.22	W 103 34 11.45	92.81	1034.04
	12105.00	29.08	181.78	12004.66	81.79	-72.24	1032.36	2.58	403683.27	777735.03	N 32 6 27.01	W 103 34 11.46	94.00	1034.89
	12155.00	33.90	182.23	12047.28	107.87	-98.34	1031.44	9.65	403657.18	777734.11	N 32 6 26.75	W 103 34 11.47	95.45	1036.12
	12200.00	38.40	180.05	12083.61	134.40	-124.87	1030.94	10.40	403630.65	777733.61	N 32 6 26.49	W 103 34 11.48	96.91	1038.48
	12249.00	43.83	175.13	12120.52	166.57	-157.02	1032.37	12.89	403598.49	777735.04	N 32 6 26.17	W 103 34 11.46	98.65	1044.24
	12294.00	50.47	174.10	12151.11	199.42	-189.85	1035.48	14.85	403565.67	777738.15	N 32 6 25.85	W 103 34 11.43	100.39	1052.74
	12344.00	54.23	174.80	12181.65	238.85	-229.24	1039.30	7.60	403526.27	777741.97	N 32 6 25.46	W 103 34 11.39	102.44	1064.28
	12376.00	56.15	177.42	12199.91	265.07	-255.45	1041.08	9.01	403500.06	777743.75	N 32 6 25.20	W 103 34 11.37	103.79	1071.96
	12407.00	58.53	180.38	12216.64	291.16	-281.54	1041.57	11.11	403473.98	777744.24	N 32 6 24.94	W 103 34 11.37	105.13	1078.95
	12439.00	62.08	181.00	12232.49	318.95	-309.33	1041.23	11.22	403446.19	777743.90	N 32 6 24.66	W 103 34 11.37	106.55	1086.21
	12470.00	67.49	180.74	12245.70	346.98	-337.36	1040.81	17.47	403418.16	777743.48	N 32 6 24.39	W 103 34 11.38	107.96	1094.12
	12544.00	76.62	179.95	12268.47	417.29	-407.69	1040.40	12.38	403347.83	777743.07	N 32 6 23.69	W 103 34 11.39	111.40	1117.42
	12576.00	78.81	180.99	12275.28	448.55	-438.95	1040.14	7.54	403316.57	777742.81	N 32 6 23.38	W 103 34 11.40	112.88	1128.97
	12607.00	80.72	182.12	12280.79	479.04	-469.44	1039.31	7.13	403286.08	777741.98	N 32 6 23.08	W 103 34 11.41	114.31	1140.41
	12639.00	83.03	182.82	12285.31	510.67	-501.09	1037.94	7.54	403254.43	777740.61	N 32 6 22.77	W 103 34 11.43	115.77	1152.57
	12702.00	86.08	183.60	12291.29	573.25	-563.70	1034.43	5.00	403191.83	777737.10	N 32 6 22.15	W 103 34 11.47	118.59	1178.05
	12797.00	90.17	184.38	12294.40	667.88	-658.40	1027.83	4.38	403097.13	777730.50	N 32 6 21.21	W 103 34 11.56	122.64	1220.62
	12892.00	91.40	180.24	12293.09	762.73	-753.29	1024.00	4.55	403002.24	777726.67	N 32 6 20.27	W 103 34 11.61	126.34	1271.23
	12987.00	90.46	179.90	12291.55	857.71	-848.28	1023.88	1.05	402907.26	777726.55	N 32 6 19.33	W 103 34 11.62	129.64	1329.63
	13082.00	90.41	178.71	12290.83	952.71	-943.27	1025.03	1.25	402812.27	777727.70	N 32 6 18.39	W 103 34 11.61	132.62	1393.00
	13176.00	90.16	177.82	12290.36	1046.68	-1037.22	1027.88	0.98	402718.32	777730.55	N 32 6 17.46	W 103 34 11.59	135.26	1460.26
	13272.00	89.58	177.62	12290.58	1142.64	-1133.14	1031.70	0.64	402622.40	777734.37	N 32 6 16.51	W 103 34 11.55	137.68	1532.45
	13366.00	90.01	177.43	12290.92	1236.58	-1227.05	1035.76	0.50	402528.49	777738.43	N 32 6 15.58	W 103 34 11.51	139.83	1605.76
	13461.00	90.17	178.17	12290.77	1331.54	-1321.98	1039.41	0.80	402433.56	777742.07	N 32 6 14.64	W 103 34 11.48	141.82	1681.67
	13556.00	90.05	180.07	12290.59	1426.54	-1416.97	1040.86	2.00	402338.58	777743.53	N 32 6 13.70	W 103 34 11.47	143.70	1758.18
	13650.00	90.27	180.32	12290.32	1520.53	-1510.97	1040.54	0.35	402244.59	777743.21	N 32 6 12.77	W 103 34 11.48	145.45	1834.60
	13745.00	91.52	180.50	12288.84	1615.50	-1605.95	1039.86	1.33	402149.61	777742.53	N 32 6 11.83	W 103 34 11.50	147.08	1913.22
	13840.00	91.14	179.78	12286.63	1710.47	-1700.92	1039.63	0.86	402054.64	777742.30	N 32 6 10.90	W 103 34 11.51	148.57	1993.48
	13935.00	91.23	179.74	12284.67	1805.45	-1795.90	1040.03	0.10	401959.66	777742.70	N 32 6 9.96	W 103 34 11.51	149.92	2075.32
	14029.00	91.26	179.72	12282.63	1899.42	-1889.88	1040.47	0.04	401865.69	777743.14	N 32 6 9.03	W 103 34 11.51	151.17	2157.37
	14124.00	89.05	179.28	12282.37	1994.42	-1984.87	1041.30	2.37	401770.70	777743.97	N 32 6 8.09	W 103 34 11.51	152.32	2241.43
	14219.00	89.44	179.55	12283.62	2089.41	-2079.86	1042.27	0.50	401675.71	777744.94	N 32 6 7.15	W 103 34 11.51	153.38	2326.40
	14409.00	90.85	180.01	12283.14	2279.40	-2269.85	1043.00	0.78	401485.73	777745.67	N 32 6 5.27	W 103 34 11.51	155.32	2498.01
	14504.00	89.42	177.60	12282.92	2374.38	-2364.82	1044.98	2.95	401390.76	777747.65	N 32 6 4.33	W 103 34 11.50	156.16	2585.41
	14599.00	88.72	176.35	12284.46	2469.28	-2459.67	1050.00	1.51	401295.91	777752.66	N 32 6 3.39	W 103 34 11.45	156.88	2674.41
	14694.00	89.62	180.53	12285.84	2564.23	-2554.60	1052.58	4.50	401200.98	777755.25	N 32 6 2.45	W 103 34 11.43	157.61	2762.96
	14788.00	89.02	179.68	12286.95	2658.22	-2648.60	1052.41	1.11	401106.99	777755.08	N 32 6 1.52	W 103 34 11.44	158.33	2850.02
	14883.00	88.56	180.28	12288.96	2753.19	-2743.57	1052.44	0.80	401012.02	777755.11	N 32 6 0.58	W 103 34 11.44	159.01	2938.51
	14977.00	89.71	180.07	12290.38	2847.17	-2837.56	1052.15	1.24	400918.03	777754.82	N 32 5 59.65	W 103 34 11.45	159.66	3026.35
	15072.00	90.10	180.53	12290.53	2942.16	-2932.56	1051.66	0.63	400823.04	777754.33	N 32 5 58.71	W 103 34 11.47	160.27	3115.43
	15166.00	90.18	180.22	12290.31	3036.15	-3026.56	1051.04	0.34	400729.04	777753.71	N 32 5 57.78	W 103 34 11.48	160.85	3203.86
	15261.00	91.82	180.23	12288.65	3131.12	-3121.54	1050.67	1.73	400634.06	777753.34	N 32 5 56.84	W 103 34 11.49	161.40	3293.62
	15355.00	89.90	178.26	12287.24	3225.10	-3215.51	1051.91	2.93	400540.09	777754.58	N 32 5 55.91	W 103 34 11.49	161.89	3383.20
	15544.00	90.32	177.75	12286.87	3414.04	-3404.40	1058.49	0.35	400351.22	777761.16	N 32 5 54.04	W 103 34 11.43	162.73	3565.15
	15638.00	90.45	177.72	12286.24	3508.00	-3498.32	1062.20	0.14	400257.29	777764.87	N 32 5 53.11	W 103 34 11.39	163.11	3656.02
	15734.00	88.98	178.46	12286.72	3603.96	-3594.26	1065.40	1.71	400161.35	777768.07	N 32 5 52.16	W 103 34 11.36	163.49	3748.84
	15828.00	89.59	177.91	12287.89	3697.93	-3688.21	1068.38	0.87	400067.41	777771.05	N 32 5 51.23	W 103 34 11.34	163.85	3839.83
	15922.00	89.09	179.70	12288.98	3791.91	-3782.18	1070.34	1.98	399973.45	777773.01	N 32 5 50.30	W 103 34 11.32	164.20	3930.71

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 ° ' ")	Closure Azimuth (°)	Closure (ft)
	16017.00	91.27	179.81	12288.68	3886.91	-3877.17	1070.74	2.30	399878.46	777773.41	N 32 5 49.36	W 103 34 11.32	164.56	4022.30
	16112.00	91.35	180.14	12286.50	3981.88	-3972.14	1070.79	0.36	399783.48	777773.45	N 32 5 48.42	W 103 34 11.33	164.91	4113.94
	16206.00	91.27	178.70	12284.36	4075.85	-4066.11	1071.74	1.53	399689.52	777774.41	N 32 5 47.49	W 103 34 11.33	165.23	4204.98
	16301.00	90.43	179.98	12282.95	4170.84	-4161.09	1072.83	1.61	399594.54	777775.50	N 32 5 46.55	W 103 34 11.32	165.54	4297.17
	16396.00	89.27	179.89	12283.20	4265.83	-4256.09	1072.94	1.22	399499.55	777775.61	N 32 5 45.61	W 103 34 11.33	165.85	4389.25
	16491.00	91.71	180.09	12282.38	4360.82	-4351.08	1072.96	2.58	399404.56	777775.62	N 32 5 44.67	W 103 34 11.34	166.15	4481.42
	16585.00	91.12	180.20	12280.06	4454.78	-4445.05	1072.72	0.64	399310.59	777775.39	N 32 5 43.74	W 103 34 11.35	166.43	4572.66
	16680.00	91.16	180.12	12278.17	4549.76	-4540.03	1072.45	0.09	399215.61	777775.12	N 32 5 42.80	W 103 34 11.36	166.71	4664.98
	16870.00	90.93	179.43	12274.71	4739.72	-4730.00	1073.20	0.38	399025.65	777775.87	N 32 5 40.92	W 103 34 11.37	167.22	4850.22
Final Survey	16895.00	91.23	179.80	12274.24	4764.72	-4754.99	1073.37	1.91	399000.66	777776.04	N 32 5 40.67	W 103 34 11.37	167.28	4874.63
TD, PTB [101' FSL, 331' FEL]	16925.00	91.23	179.80	12273.59	4794.71	-4784.98	1073.47	0.00	398970.67	777776.14	N 32 5 40.38	W 103 34 11.37	167.36	4903.92

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	26.000	1/98.425	14.750	10.750	NAL_MWD_IFR1+MS-Depth Only	Original Borehole / Final Surveys - Cimarex Cascade 28 Federal 85H MWD 0ft-16925ft (Surcon
	1	26.000	26.000	Act Stns	14.750	10.750	NAL_MWD_IFR1+MS-Depth Only	Original Borehole / Final Surveys - Cimarex Cascade 28 Federal 85H MWD 0ft-16925ft (Surcon
	1	26.000	1020.000	Act Stns	14.750	10.750	NAL_MWD_IFR1+MS	Original Borehole / Final Surveys - Cimarex Cascade 28 Federal 85H
	1	1020.000	11835.000	Act Stns	9.875	7.625	NAL_MWD_IFR1+MS	Original Borehole / Final Surveys - Cimarex Cascade 28 Federal 85H
	1	11835.000	12535.000	Act Stns	8.750	7.000	NAL_MWD_IFR1+MS	Original Borehole / Final Surveys - Cimarex Cascade 28 Federal 85H
	1	12535.000	16925.000	Act Stns	6.000	4.500	NAL_MWD_IFR1+MS	Original Borehole / Final Surveys - Cimarex Cascade 28 Federal 85H