



Cactus 101

Cimarex

FINAL PVA

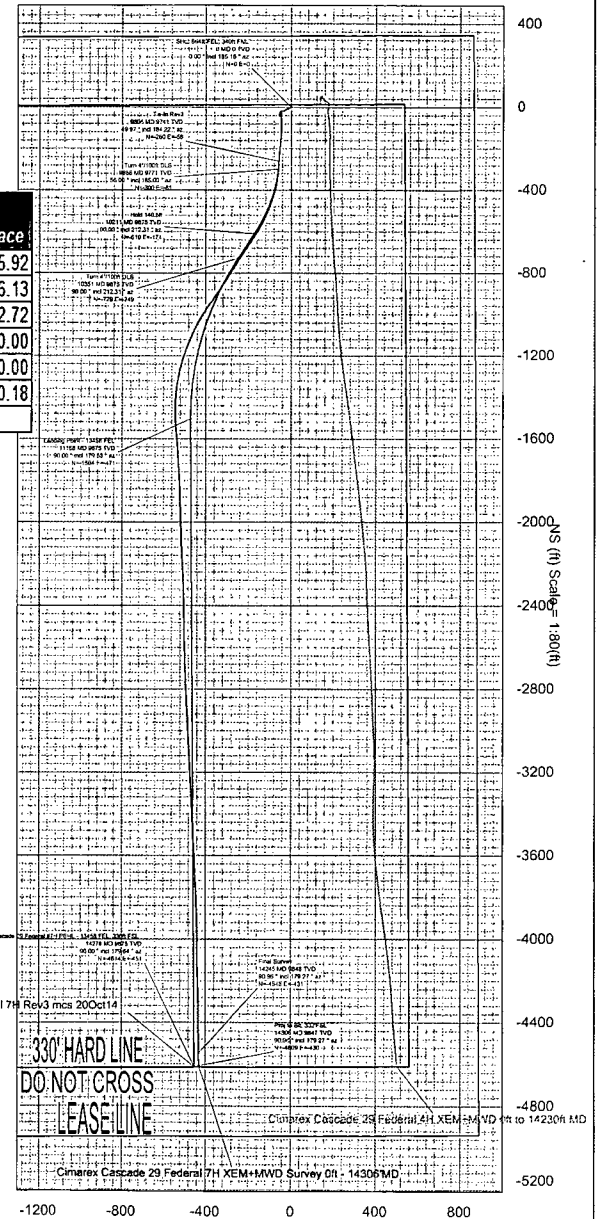
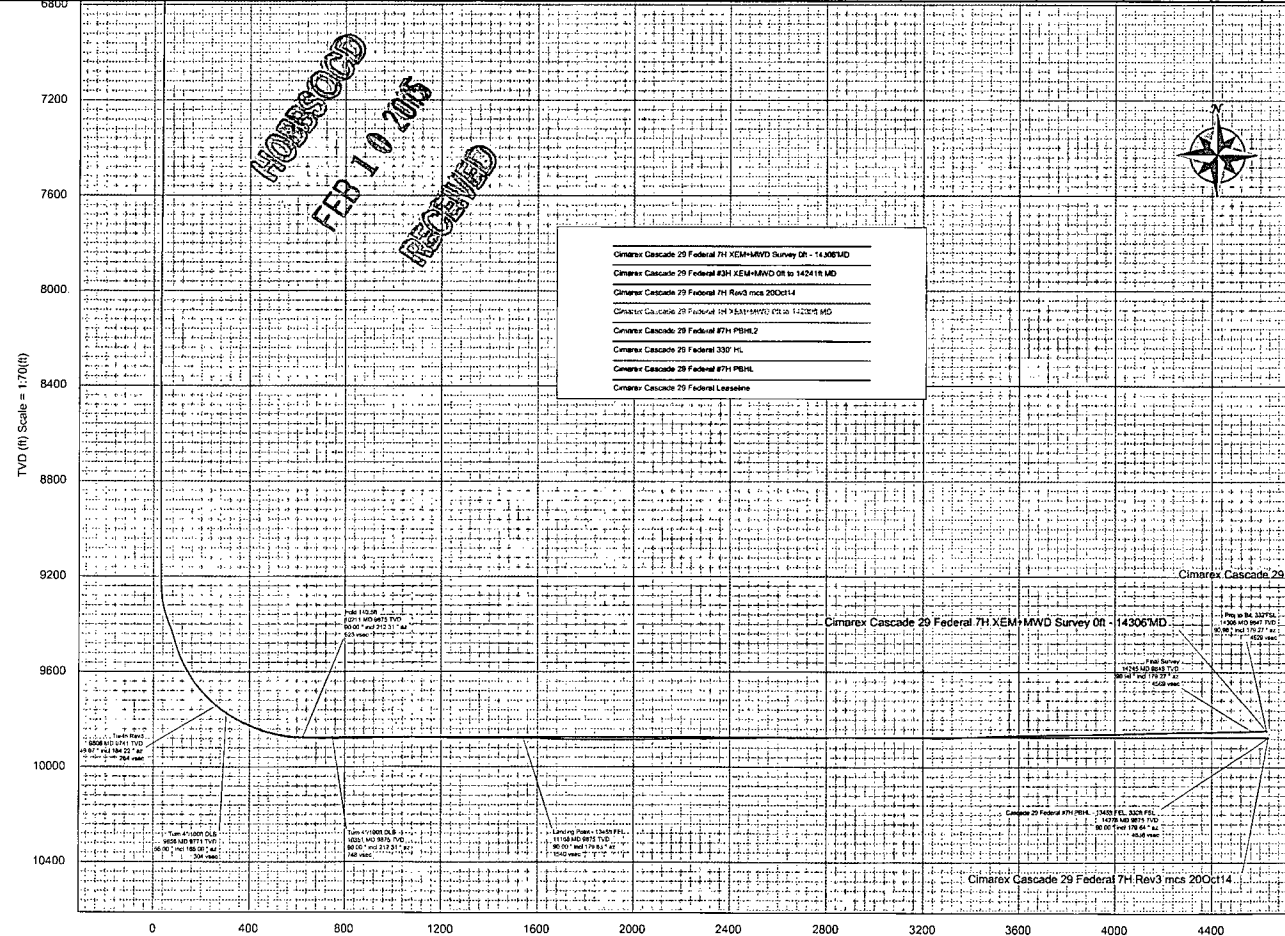


Borehole:	Well:	Field:	Structure:
Original Hole	Cascade 29 Federal 7H	Lea County, NM	Cactus 101

Gravity & Magnetic Parameters	Surface Location	Miscellaneous
Model: HDGM 2014 Dip: 59.867° Date: 09-Oct-2014	NADES New Mexico State Plane, Eastern Zone, US Feet	Slot: Cascade 29
MagDec: 7.101° FS: 48249.884mT Gravity FS: 998.433mgm (9.80665 Based)	Lat: N 32 6 28.41 Northings: 403783.71US Grid Conv: 0.3959°	TVD Ref: RKB(3414ft above MSL)
	Long: W 103 35 18.82 Eastings: 771940.41US Scale Fact: 0.99997	Plan: XEM-MWD Survey Off - 14306MD

Critical Points

Comments	Survey MD	Inc	Azim	TVD	SSTVD	VS	NS	EW	Longitude	Latitude	Eastings	Northings	DLS	Tool Face
SHL: 864ft FEL 340ft FNL	0.00	0.00	185.15	0.00	-3414.00	0.00	0.00	0.00	W 103 35 18.816	N 32 6 28.406	771940.40	403783.70		205.92
Tie-In Rev3	9806.00	49.97	184.22	9740.94	6326.94	264.13	-259.73	-57.86	W 103 35 19.510	N 32 6 25.840	771882.54	403523.98	10.10	6.13
Turn 4"/100ft DLS	9856.00	56.00	185.00	9771.02	6357.02	304.03	-299.51	-61.08	W 103 35 19.551	N 32 6 25.447	771879.32	403484.20	12.12	42.72
Hold 140.5ft	10210.62	90.00	212.31	9875.00	6461.00	624.25	-610.22	-173.90	W 103 35 20.887	N 32 6 22.380	771766.51	403173.50	12.00	0.00
Turn 4"/100ft DLS	10351.12	90.00	212.31	9875.00	6461.00	749.74	-728.97	-249.00	W 103 35 21.770	N 32 6 21.210	771691.41	403054.76	0.00	-90.00
Landing Point - 1345ft FEL	11168.12	90.00	179.63	9875.00	6461.00	1542.51	-1503.83	-470.75	W 103 35 24.410	N 32 6 13.558	771469.67	402279.92	4.00	90.18
PBHL: 1345ft FEL, 330ft FSL	14278.15	90.00	179.63	9875.00	6461.00	4635.77	-4613.80	-450.80	W 103 35 24.427	N 32 5 42.783	771489.62	399170.05	0.00	



Vertical Section (ft) Azim = 185.15° Scale = 1:70(ft) Origin = 0N/-S, 0E/-W

FEB 17 2015



Cimarex Cascade 29 Federal 7H XEM+MWD Survey 0ft - 14306'MD Survey

Geodetic Report

(Def Survey)



Report Date:	November 05, 2014 - 09:23 AM	Survey / DLS Computation:	Minimum Curvature / Lubinski
Client:	Cimarex	Vertical Section Azimuth:	185.585 ° (Grid North)
Field:	NM Lea County (NAD 83)	Vertical Section Origin:	0.000 ft, 0.000 ft
Structure / Slot:	Cimarex Cascade 29 Federal #7H / Cascade 29 Federal #7H	TVD Reference Datum:	RKB
Well:	Cascade 29 Federal #7H	TVD Reference Elevation:	3414.000 ft above MSL
Borehole:	Original Hole	Seabed / Ground Elevation:	3396.000 ft above MSL
UWI / API#:	Cactus 101 / Unknown	Magnetic Declination:	7.101 °
Survey Name:	Cimarex Cascade 29 Federal 7H XEM+MWD Survey 0ft - 14306'MD	Total Gravity Field Strength:	998.4335mgn (9.80665 Based)
Survey Date:	September 26, 2014	Gravity Model:	GARM
Tort / AHD / DDI / ERD Ratio:	204.795 ° / 4812.258 ft / 6.154 / 0.487	Total Magnetic Field Strength:	48249.884 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	Magnetic Dip Angle:	59.867 °
Location Lat / Long:	N 32° 6' 28.40646", W 103° 35' 18.81643"	Declination Date:	October 09, 2014
Location Grid N/E Y/X:	N 403783.700 ftUS, E 771940.400 ftUS	Magnetic Declination Model:	HDGM 2014
CRS Grid Convergence Angle:	0.3959 °	North Reference:	Grid North
Grid Scale Factor:	0.99997	Grid Convergence Used:	0.3959 °
Version / Patch:	2.7.1043.0	Total Corr Mag North->Grid North:	6.7051 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Closure Azimuth (°)	Closure (ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL: 864ft FEL, 340ft FNL	0.00	0.00	185.15	0.00	-3414.00	0.00	0.00	0.00	N/A	0.00	0.00	403783.70	771940.40	N 32 6 28.41	W 103 35 18.82
	171.00	0.40	205.92	171.00	-3243.00	0.56	-0.54	-0.26	0.23	205.92	0.60	403783.16	771940.14	N 32 6 28.40	W 103 35 18.82
	210.00	0.40	213.42	210.00	-3204.00	0.81	-0.77	-0.40	0.13	207.09	0.87	403782.93	771940.00	N 32 6 28.40	W 103 35 18.82
	270.00	0.40	253.83	270.00	-3144.00	1.07	-1.01	-0.71	0.46	215.28	1.23	403782.69	771939.69	N 32 6 28.40	W 103 35 18.82
	329.00	0.49	263.08	328.99	-3085.01	1.20	-1.09	-1.16	0.19	226.89	1.59	403782.61	771939.24	N 32 6 28.40	W 103 35 18.83
	387.00	0.49	265.06	386.99	-3027.01	1.30	-1.15	-1.65	0.03	235.30	2.01	403782.55	771938.75	N 32 6 28.40	W 103 35 18.84
	452.00	0.49	253.83	451.99	-2962.01	1.45	-1.25	-2.20	0.15	240.44	2.53	403782.45	771938.20	N 32 6 28.39	W 103 35 18.84
	509.00	0.40	237.21	508.99	-2905.01	1.67	-1.42	-2.60	0.27	241.31	2.96	403782.28	771937.80	N 32 6 28.39	W 103 35 18.85
	657.00	0.31	244.13	656.99	-2757.01	2.20	-1.88	-3.39	0.07	241.06	3.88	403781.82	771937.01	N 32 6 28.39	W 103 35 18.86
	747.00	0.40	278.81	746.98	-2687.02	2.31	-1.93	-3.92	0.25	243.75	4.37	403781.77	771936.48	N 32 6 28.39	W 103 35 18.86
	843.00	0.40	240.30	842.98	-2571.02	2.48	-2.05	-4.54	0.27	245.73	4.99	403781.65	771935.86	N 32 6 28.39	W 103 35 18.87
	938.00	0.49	240.12	937.98	-2476.02	2.91	-2.42	-5.19	0.09	245.02	5.72	403781.28	771935.21	N 32 6 28.38	W 103 35 18.88
	991.00	0.40	257.84	990.98	-2423.02	3.10	-2.57	-5.56	0.31	245.22	6.13	403781.13	771934.84	N 32 6 28.38	W 103 35 18.88
	1113.00	0.71	246.64	1112.97	-2301.03	3.59	-2.96	-6.67	0.27	246.10	7.30	403780.74	771933.73	N 32 6 28.38	W 103 35 18.89
	1208.00	0.88	247.22	1207.96	-2206.04	4.22	-3.47	-7.89	0.18	246.23	8.62	403780.23	771932.51	N 32 6 28.37	W 103 35 18.91
	1303.00	1.10	247.22	1302.95	-2111.05	5.00	-4.11	-9.40	0.23	246.39	10.26	403779.59	771931.00	N 32 6 28.37	W 103 35 18.93
	1493.00	1.02	245.41	1492.92	-1921.08	6.72	-5.52	-12.62	0.05	246.38	13.77	403778.18	771927.78	N 32 6 28.35	W 103 35 18.96
	1587.00	1.10	245.72	1586.90	-1827.10	7.59	-6.24	-14.20	0.09	246.29	15.51	403777.46	771926.20	N 32 6 28.35	W 103 35 18.98
	1681.00	1.10	251.36	1680.88	-1733.12	8.41	-6.90	-15.88	0.12	246.52	17.31	403776.80	771924.52	N 32 6 28.34	W 103 35 19.00
	1775.00	1.19	245.23	1774.86	-1639.14	9.27	-7.59	-17.62	0.16	246.68	19.19	403776.11	771922.78	N 32 6 28.33	W 103 35 19.02
	1870.00	1.19	244.70	1869.84	-1544.16	10.28	-8.43	-19.41	0.01	246.52	21.16	403775.27	771920.99	N 32 6 28.32	W 103 35 19.04
	1964.00	1.10	244.70	1963.82	-1450.18	11.24	-9.23	-21.11	0.10	246.37	23.04	403774.47	771919.29	N 32 6 28.32	W 103 35 19.06
	2059.00	1.02	241.00	2058.81	-1355.19	12.19	-10.03	-22.67	0.11	246.13	24.79	403773.67	771917.73	N 32 6 28.31	W 103 35 19.08
	2249.00	1.19	237.78	2248.77	-1165.23	14.36	-11.90	-25.82	0.10	245.25	28.43	403771.80	771914.58	N 32 6 28.29	W 103 35 19.12
	2344.00	1.10	239.28	2343.75	-1070.25	15.50	-12.90	-27.44	0.10	244.83	30.32	403770.81	771912.96	N 32 6 28.28	W 103 35 19.14
	2438.00	1.10	236.82	2437.74	-976.26	16.60	-13.85	-28.97	0.05	244.45	32.11	403769.85	771911.43	N 32 6 28.27	W 103 35 19.15
	2532.00	1.19	247.52	2531.72	-882.28	17.63	-14.72	-30.62	0.25	244.33	33.98	403768.98	771909.78	N 32 6 28.26	W 103 35 19.17
	2626.00	1.10	240.83	2625.70	-788.30	18.60	-15.53	-32.31	0.17	244.33	35.85	403768.17	771908.09	N 32 6 28.25	W 103 35 19.19
	2719.00	1.02	244.92	2718.68	-695.32	19.53	-16.32	-33.84	0.12	244.26	37.57	403767.38	771906.56	N 32 6 28.25	W 103 35 19.21
	2801.00	1.02	244.53	2800.67	-613.33	20.28	-16.94	-35.16	0.01	244.28	39.03	403766.76	771905.24	N 32 6 28.24	W 103 35 19.23
	2909.00	1.02	257.04	2908.65	-505.35	21.08	-17.57	-36.97	0.21	244.58	40.93	403766.13	771903.43	N 32 6 28.24	W 103 35 19.25
	3008.00	0.80	257.97	3007.64	-406.36	21.57	-17.91	-38.50	0.22	245.05	42.46	403765.79	771901.90	N 32 6 28.23	W 103 35 19.27

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Closure Azimuth (°)	Closure (ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	3102.00	0.71	244.70	3101.63	-312.37	22.07	-18.30	-39.67	0.21	245.24	43.69	403765.41	771890.73	N 32	6 28.23 W 103 35 19.28
	3198.00	0.40	254.46	3197.63	-216.37	22.50	-18.64	-40.53	0.34	245.30	44.61	403765.06	771899.87	N 32	6 28.22 W 103 35 19.29
	3293.00	0.40	249.82	3292.63	-121.37	22.76	-18.84	-41.16	0.03	245.40	45.27	403764.86	771899.24	N 32	6 28.22 W 103 35 19.30
	3386.00	0.49	284.94	3385.62	-28.38	22.84	-18.85	-41.85	0.30	245.75	45.90	403764.85	771898.55	N 32	6 28.22 W 103 35 19.30
	3481.00	0.31	280.84	3480.62	66.62	22.75	-18.70	-42.50	0.19	246.25	46.43	403765.00	771897.90	N 32	6 28.22 W 103 35 19.31
	3576.00	0.49	277.80	3575.62	161.62	22.71	-18.60	-43.15	0.19	246.69	46.99	403765.10	771897.25	N 32	6 28.23 W 103 35 19.32
	3670.00	0.49	279.52	3669.61	255.61	22.66	-18.47	-43.95	0.02	247.20	47.67	403765.23	771896.46	N 32	6 28.23 W 103 35 19.33
	3763.00	0.49	261.05	3762.61	348.61	22.74	-18.47	-44.73	0.17	247.56	48.39	403765.23	771895.67	N 32	6 28.23 W 103 35 19.34
	3858.00	0.49	259.95	3857.61	443.61	22.95	-18.80	-45.53	0.01	247.77	49.19	403765.10	771894.87	N 32	6 28.23 W 103 35 19.35
	3953.00	0.62	271.50	3952.60	538.60	23.09	-18.66	-46.45	0.18	248.11	50.06	403765.04	771893.96	N 32	6 28.22 W 103 35 19.36
	4045.00	0.62	239.28	4044.60	630.60	23.42	-18.90	-47.37	0.37	248.25	51.00	403764.80	771893.03	N 32	6 28.22 W 103 35 19.37
	4145.00	0.88	235.10	4144.59	730.59	24.24	-19.62	-48.47	0.27	247.96	52.29	403764.08	771891.94	N 32	6 28.22 W 103 35 19.38
	4240.00	0.88	241.53	4239.58	825.58	25.13	-20.38	-49.71	0.10	247.70	53.72	403763.32	771890.70	N 32	6 28.21 W 103 35 19.40
	4335.00	1.02	225.75	4334.57	920.57	26.18	-21.32	-50.95	0.31	247.29	55.23	403762.38	771889.45	N 32	6 28.20 W 103 35 19.41
	4429.00	1.10	220.64	4428.55	1014.55	27.56	-22.59	-52.14	0.13	246.57	56.82	403761.11	771888.26	N 32	6 28.19 W 103 35 19.42
	4525.00	1.10	198.48	4524.53	1110.53	29.21	-24.16	-53.03	0.44	245.50	58.28	403759.54	771887.37	N 32	6 28.17 W 103 35 19.43
	4619.00	1.50	196.10	4618.51	1204.51	31.30	-26.20	-53.66	0.43	243.97	59.71	403757.50	771886.74	N 32	6 28.15 W 103 35 19.44
	4714.00	1.33	185.57	4713.48	1299.48	33.82	-28.49	-54.11	0.33	242.23	61.15	403755.21	771886.29	N 32	6 28.13 W 103 35 19.45
	4809.00	1.41	180.45	4808.45	1394.45	35.89	-30.76	-54.23	0.15	240.44	62.34	403752.94	771886.17	N 32	6 28.11 W 103 35 19.45
	4878.00	1.33	186.05	4877.43	1463.43	37.54	-32.40	-54.32	0.23	239.18	63.25	403751.30	771886.08	N 32	6 28.09 W 103 35 19.45
	5019.00	1.19	188.65	5018.40	1604.40	40.64	-35.48	-54.71	0.11	237.04	65.21	403748.22	771885.69	N 32	6 28.06 W 103 35 19.46
	5113.00	1.19	192.26	5112.38	1698.38	42.58	-37.40	-55.07	0.08	235.82	66.56	403746.30	771885.34	N 32	6 28.04 W 103 35 19.46
	5208.00	1.33	197.20	5207.35	1793.35	44.64	-39.42	-55.60	0.19	234.67	68.15	403744.29	771884.80	N 32	6 28.02 W 103 35 19.47
	5303.00	1.19	195.48	5302.33	1888.33	46.69	-41.42	-56.19	0.15	233.60	69.81	403742.28	771884.21	N 32	6 28.00 W 103 35 19.47
	5397.00	0.40	157.89	5396.32	1982.32	47.94	-42.66	-56.33	0.96	232.86	70.66	403741.04	771884.07	N 32	6 27.99 W 103 35 19.47
	5492.00	0.40	88.09	5491.32	2077.32	48.19	-42.96	-55.87	0.48	232.44	70.48	403740.74	771884.53	N 32	6 27.99 W 103 35 19.47
	5586.00	0.49	82.18	5585.32	2171.32	48.06	-42.89	-55.14	0.11	232.12	69.86	403740.81	771885.26	N 32	6 27.99 W 103 35 19.46
	5681.00	0.40	66.14	5680.31	2266.31	47.80	-42.71	-54.44	0.16	231.89	69.19	403741.00	771885.96	N 32	6 27.99 W 103 35 19.45
	5775.00	0.49	76.94	5774.31	2360.31	47.51	-42.48	-53.75	0.13	231.68	68.51	403741.22	771886.65	N 32	6 27.99 W 103 35 19.44
	5871.00	0.40	90.78	5870.31	2456.31	47.35	-42.39	-53.01	0.15	231.35	67.88	403741.31	771887.39	N 32	6 27.99 W 103 35 19.44
	5967.00	0.40	91.00	5966.31	2552.31	47.30	-42.40	-52.34	0.00	230.99	67.36	403741.30	771888.06	N 32	6 27.99 W 103 35 19.43
	6062.00	0.22	93.51	6061.31	2647.31	47.26	-42.42	-51.83	0.19	230.70	66.98	403741.28	771888.57	N 32	6 27.99 W 103 35 19.42
	6156.00	0.09	101.22	6155.31	2741.31	47.26	-42.45	-51.58	0.14	230.55	66.80	403741.25	771888.83	N 32	6 27.99 W 103 35 19.42
	6251.00	0.49	357.25	6250.30	2836.30	46.87	-42.06	-51.52	0.55	230.78	66.51	403741.65	771888.88	N 32	6 27.99 W 103 35 19.42
	6345.00	0.62	2.23	6344.30	2930.30	45.96	-41.15	-51.52	0.15	231.39	65.94	403742.56	771888.88	N 32	6 28.00 W 103 35 19.42
	6442.00	0.62	1.44	6441.29	3027.29	44.92	-40.10	-51.49	0.01	232.09	65.26	403743.60	771888.91	N 32	6 28.01 W 103 35 19.42
	6536.00	0.62	351.43	6535.29	3121.29	43.92	-39.09	-51.55	0.12	232.83	64.69	403744.62	771888.85	N 32	6 28.02 W 103 35 19.42
	6629.00	0.49	358.35	6628.28	3214.28	43.03	-38.19	-51.64	0.16	233.51	64.23	403745.51	771888.76	N 32	6 28.03 W 103 35 19.42
	6724.00	0.62	8.37	6723.28	3309.28	42.12	-37.28	-51.57	0.17	234.14	63.64	403746.43	771888.83	N 32	6 28.04 W 103 35 19.42
	6818.00	0.62	11.98	6817.27	3403.27	41.10	-36.27	-51.40	0.04	234.79	62.91	403747.43	771889.01	N 32	6 28.05 W 103 35 19.42
	6915.00	0.49	355.22	6914.27	3500.27	40.18	-35.35	-51.32	0.21	235.44	62.32	403748.35	771889.08	N 32	6 28.06 W 103 35 19.42
	7009.00	0.49	345.31	7008.27	3594.27	39.40	-34.56	-51.46	0.09	236.11	61.98	403749.14	771888.95	N 32	6 28.07 W 103 35 19.42
	7101.00	0.49	319.84	7100.26	3686.26	38.76	-33.88	-51.81	0.23	236.82	61.90	403749.82	771888.59	N 32	6 28.07 W 103 35 19.42
	7196.00	0.40	317.24	7195.26	3781.26	38.26	-33.32	-52.30	0.10	237.49	62.01	403750.38	771888.10	N 32	6 28.08 W 103 35 19.43
	7290.00	0.31	333.68	7289.26	3875.26	37.82	-32.85	-52.63	0.14	238.03	62.05	403750.85	771887.77	N 32	6 28.08 W 103 35 19.43
	7385.00	0.31	300.18	7384.26	3970.26	37.50	-32.50	-52.97	0.19	238.47	62.14	403751.21	771887.43	N 32	6 28.09 W 103 35 19.43
	7479.00	0.40	288.02	7478.26	4064.26	37.32	-32.27	-53.50	0.12	238.91	62.48	403751.44	771886.90	N 32	6 28.09 W 103 35 19.44
	7574.00	0.88	22.38	7573.25	4159.25	36.55	-31.49	-53.54	1.05	239.54	62.11	403752.21	771886.86	N 32	6 28.10 W 103 35 19.44
	7668.00	0.80	43.05	7667.24	4253.24	35.34	-30.34	-52.82	0.33	240.12	60.91	403753.36	771887.59	N 32	6 28.11 W 103 35 19.43
	7765.00	0.80	57.11	7764.23	4350.23	34.38	-29.48	-51.78	0.20	240.35	59.59	403754.22	771888.62	N 32	6 28.12 W 103 35 19.42
	7859.00	0.71	65.53	7858.22	4444.22	33.68	-28.88	-50.70	0.15	240.33	58.35	403754.82	771889.70	N 32	6 28.12 W 103 35 19.41
	7955.00	0.71	60.81	7954.22	4540.22	33.04	-28.35	-49.64	0.06	240.27	57.16	403755.36	771890.76	N 32	6 28.13 W 103 35 19.40
	8050.00	0.71	55.61	8049.21	4635.21	32.33	-27.73	-48.64	0.07	240.32	55.99	403755.98	771891.76	N 32	6 28.14 W 103 35 19.38
	8146.00	0.49	59.62	8145.20	4731.20	31.70	-27.18	-47.80	0.23	240.37	54.99	403756.52	771892.60	N 32	6 28.14 W 103 35 19.37
	8241.00	0.40	64.42	8240.20	4826.20	31.29	-26.83	-47.15	0.10	240.35	54.25	403756.87	771893.25	N 32	6 28.14 W 103 35 19.37
	8336.00	0.31	87.47	8335.20	4921.20	31.09	-26.68	-46.59	0.18	240.20	53.69	403757.02	771893.81	N 32	6 28.15 W 103 35 19.36
	8430.00	0.40	144.23	8429.20	5015.20	31.30	-26.93	-46.15	0.37	239.73	53.43	403756.77	771894.25	N 32	6 28.14 W 103 35 19.36
	8523.00	0.40	161.20	8522.19	5108.19	31.84	-27.50	-45.85	0.13	239.04	53.47	403756.20	771894.55	N 32	6 28.14 W 103 35 19.35

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Closure Azimuth (°)	Closure (ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	8618.00	0.62	56.80	8617.19	5203.19	31.82	-27.54	-45.32	0.86	238.71	53.03	403756.16	771895.09	N 32 6 28.14	W 103 35 19.35
	8712.00	0.40	77.07	8711.19	5297.19	31.39	-27.19	-44.57	0.30	238.62	52.21	403756.52	771895.83	N 32 6 28.14	W 103 35 19.34
	8808.00	0.49	108.62	8807.19	5393.19	31.38	-27.24	-43.85	0.27	238.15	51.63	403756.46	771896.55	N 32 6 28.14	W 103 35 19.33
	8902.00	0.62	141.85	8901.18	5487.18	31.84	-27.77	-43.16	0.36	237.24	51.32	403755.93	771897.24	N 32 6 28.13	W 103 35 19.32
	8997.00	0.22	331.25	8996.18	5582.18	32.06	-28.01	-42.93	0.88	236.87	51.26	403755.69	771897.47	N 32 6 28.13	W 103 35 19.32
	9092.00	0.80	257.75	9091.18	5677.18	32.11	-27.99	-43.67	0.81	237.34	51.87	403755.71	771896.74	N 32 6 28.13	W 103 35 19.33
	9185.00	1.14	230.80	9184.16	5770.16	32.96	-28.72	-45.02	0.60	237.47	53.40	403754.98	771895.38	N 32 6 28.13	W 103 35 19.34
	9239.00	1.12	230.80	9238.15	5824.15	33.71	-29.39	-45.84	0.04	237.34	54.45	403754.31	771894.56	N 32 6 28.12	W 103 35 19.35
	9271.00	4.52	180.78	9270.11	5856.11	35.19	-30.85	-46.10	12.17	236.21	55.47	403752.85	771894.30	N 32 6 28.10	W 103 35 19.35
	9303.00	9.48	176.45	9301.86	5887.86	39.05	-34.74	-45.96	15.58	232.91	57.61	403748.96	771894.45	N 32 6 28.07	W 103 35 19.35
	9334.00	14.29	177.35	9332.19	5918.19	45.36	-41.12	-45.62	15.53	227.97	61.41	403742.59	771894.78	N 32 6 28.00	W 103 35 19.35
	9366.00	17.85	178.99	9362.94	5948.94	54.14	-49.97	-45.35	11.21	222.23	67.48	403733.73	771895.05	N 32 6 27.92	W 103 35 19.35
	9397.00	20.54	180.96	9392.21	5978.21	64.29	-60.16	-45.36	8.92	217.02	75.34	403723.54	771895.04	N 32 6 27.81	W 103 35 19.35
	9429.00	19.18	181.28	9422.31	6008.31	75.12	-71.03	-45.57	4.26	212.68	84.39	403712.68	771894.83	N 32 6 27.71	W 103 35 19.35
	9461.00	16.39	181.27	9452.77	6038.77	84.87	-80.80	-45.79	8.72	209.54	92.87	403702.91	771894.61	N 32 6 27.61	W 103 35 19.36
	9492.00	17.71	181.34	9482.41	6068.41	93.93	-89.88	-45.99	4.26	207.10	100.97	403693.82	771894.41	N 32 6 27.52	W 103 35 19.36
	9524.00	20.31	180.79	9512.66	6098.66	104.32	-100.31	-46.19	8.14	204.72	110.43	403683.40	771894.22	N 32 6 27.42	W 103 35 19.36
	9555.00	23.77	180.39	9541.39	6127.39	115.91	-111.94	-46.30	11.17	202.47	121.13	403671.77	771894.10	N 32 6 27.30	W 103 35 19.36
	9587.00	26.68	181.99	9570.34	6156.34	129.51	-125.57	-46.60	9.34	200.36	133.93	403658.14	771893.81	N 32 6 27.17	W 103 35 19.37
	9618.00	29.32	183.77	9597.71	6183.71	144.04	-140.10	-47.34	8.93	198.67	147.88	403643.61	771893.07	N 32 6 27.02	W 103 35 19.38
	9649.00	32.40	184.73	9624.32	6210.32	159.94	-155.95	-48.52	10.06	197.28	163.33	403627.75	771891.88	N 32 6 26.87	W 103 35 19.39
	9681.00	36.37	185.24	9650.72	6236.72	178.00	-173.95	-50.09	12.44	196.07	181.02	403609.75	771890.31	N 32 6 26.69	W 103 35 19.41
	9712.00	40.86	185.15	9674.94	6260.94	197.34	-193.22	-51.85	14.49	195.02	200.05	403590.49	771888.56	N 32 6 26.50	W 103 35 19.43
	9743.00	43.69	185.71	9697.87	6283.87	218.20	-213.97	-53.82	9.21	194.12	220.64	403569.73	771886.58	N 32 6 26.29	W 103 35 19.46
	9774.00	46.82	185.18	9719.69	6305.69	240.21	-235.89	-55.91	10.17	193.33	242.42	403547.82	771884.49	N 32 6 26.08	W 103 35 19.49
	9806.00	49.97	184.22	9740.94	6326.94	264.13	-259.73	-57.86	10.10	192.56	266.10	403523.98	771882.54	N 32 6 25.84	W 103 35 19.51
	9837.00	53.78	182.77	9760.07	6346.07	288.50	-284.07	-59.34	12.83	191.80	290.20	403499.64	771881.06	N 32 6 25.60	W 103 35 19.53
	9869.00	57.16	184.27	9778.21	6364.21	314.84	-310.38	-60.97	11.25	191.11	316.31	403473.33	771879.44	N 32 6 25.34	W 103 35 19.55
	9900.00	60.85	188.06	9794.17	6380.17	341.40	-336.78	-63.84	15.86	190.73	342.78	403446.93	771876.57	N 32 6 25.08	W 103 35 19.59
	9932.00	64.25	191.31	9808.93	6394.93	369.71	-364.76	-68.62	13.93	190.65	371.16	403418.95	771871.78	N 32 6 24.80	W 103 35 19.64
	9964.00	66.68	193.87	9822.22	6408.22	398.60	-393.17	-74.97	10.52	190.80	400.25	403390.55	771865.43	N 32 6 24.52	W 103 35 19.72
	9995.00	69.41	196.34	9833.81	6419.81	426.95	-420.92	-82.47	11.50	191.09	428.92	403362.79	771857.93	N 32 6 24.25	W 103 35 19.81
	10027.00	72.16	198.38	9844.34	6430.34	456.52	-449.75	-91.49	10.49	191.50	458.96	403333.96	771848.91	N 32 6 23.96	W 103 35 19.92
	10059.00	75.10	200.28	9853.36	6439.36	486.34	-478.72	-101.65	10.81	191.99	489.39	403305.00	771838.75	N 32 6 23.68	W 103 35 20.04
	10090.00	77.95	202.38	9860.58	6446.58	515.35	-506.80	-112.62	11.31	192.53	519.16	403276.92	771827.78	N 32 6 23.40	W 103 35 20.17
	10122.00	81.05	205.07	9866.41	6452.41	545.24	-535.59	-125.28	12.73	193.17	550.05	403248.12	771815.12	N 32 6 23.12	W 103 35 20.32
	10153.00	84.08	207.89	9870.42	6456.42	573.95	-563.10	-138.99	13.30	193.86	580.00	403220.62	771801.42	N 32 6 22.84	W 103 35 20.48
	10185.00	85.39	209.64	9873.36	6459.36	603.24	-591.03	-154.32	6.81	194.63	610.85	403192.69	771786.08	N 32 6 22.57	W 103 35 20.66
	10216.00	86.87	211.55	9875.45	6461.45	631.27	-617.65	-170.06	7.78	195.39	640.64	403166.07	771770.34	N 32 6 22.31	W 103 35 20.84
	10248.00	88.38	211.86	9876.78	6462.78	659.98	-644.85	-186.86	4.82	196.16	671.38	403138.87	771753.54	N 32 6 22.04	W 103 35 21.04
	10279.00	89.00	212.29	9877.49	6463.49	687.72	-671.11	-203.32	2.43	196.85	701.24	403112.61	771737.09	N 32 6 21.78	W 103 35 21.23
	10380.00	89.48	212.32	9878.83	6464.83	777.92	-756.47	-257.29	0.48	198.78	799.03	403027.25	771683.11	N 32 6 20.94	W 103 35 21.87
	10474.00	90.65	212.82	9878.72	6464.72	861.69	-835.69	-307.90	1.35	200.23	890.60	402948.04	771632.51	N 32 6 20.16	W 103 35 22.46
	10551.00	90.86	213.03	9877.71	6463.71	930.08	-900.31	-349.74	0.39	201.23	965.86	402883.41	771590.67	N 32 6 19.52	W 103 35 22.95
	10593.00	91.31	214.03	9876.91	6462.91	967.17	-935.32	-372.94	2.61	201.74	1006.93	402848.41	771567.47	N 32 6 19.18	W 103 35 23.23
	10687.00	90.72	209.52	9875.24	6461.24	1051.49	-1015.20	-422.42	4.84	202.59	1099.57	402768.54	771518.00	N 32 6 18.39	W 103 35 23.81
	10782.00	88.80	204.16	9875.64	6461.64	1139.99	-1099.93	-465.29	5.99	202.93	1194.29	402683.81	771475.12	N 32 6 17.55	W 103 35 24.31
	10877.00	88.87	198.20	9877.58	6463.58	1231.43	-1188.45	-499.59	6.27	202.80	1289.19	402595.29	771440.82	N 32 6 16.68	W 103 35 24.72
	10972.00	90.07	192.46	9878.46	6464.46	1325.02	-1280.03	-524.70	6.17	202.29	1383.39	402503.71	771415.72	N 32 6 15.78	W 103 35 25.02
	11066.00	91.14	186.57	9877.46	6463.46	1418.75	-1372.69	-540.23	6.37	201.48	1475.17	402411.06	771400.19	N 32 6 14.86	W 103 35 25.21
	11161.00	89.83	179.37	9876.66	6462.66	1513.58	-1467.49	-545.15	7.70	200.38	1565.48	402316.26	771395.27	N 32 6 13.92	W 103 35 25.27
	11256.00	87.39	173.92	9878.96	6464.96	1607.36	-1562.62	-539.59	6.28	199.05	1652.82	402221.49	771400.82	N 32 6 12.98	W 103 35 25.21
	11351.00	88.00	176.31	9882.78	6468.78	1700.69	-1656.83	-531.51	2.59	197.79	1740.00	402126.92	771408.91	N 32 6 12.05	W 103 35 25.13
	11446.00	89.72	177.45	9884.67	6470.67	1794.57	-1751.66	-526.34	2.17	196.72	1829.03	402032.09	771414.08	N 32 6 11.11	W 103 35 25.08
	11540.00	89.76	177.83	9885.10	6471.10	1887.67	-1845.58	-522.47	0.41	195.81	1918.11	401938.18	771417.95	N 32 6 10.18	W 103 35 25.04
	11635.00	89.97	178.31	9885.32	6471.32	1981.85	-1940.53	-519.27	0.55	194.98	2008.80	401843.23	771421.15	N 32 6 9.24	W 103 35 25.01
	11729.00	91.75	177.84	9883.91	6469.91	2075.03	-2034.46	-516.11	1.96	194.23	2098.91	401749.30	771424.30	N 32 6 8.31	W 103 35 24.98
	11824.00	90.83	177.69	9881.77	6467.77	2169.12	-2129.36	-512.41	0.98	193.53	2190.15	401654.40	771428.01	N 32 6 7.37	W 103 35 24.94
	11919.00	89.86	177.24	9881.20	6467.20	2263.17	-2224.27	-508.21	1.13	192.87	2281.59	401559.50	771432.21	N 32 6 6.43	W 103 35 24.90

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (%/100ft)	Closure Azimuth (°)	Closure (ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	12014.00	92.06	178.52	9879.61	6465.61	2357.29	-2319.18	-504.70	2.68	192.28	2373.46	401464.59	771435.72	N 32 6 5.49	W 103 35 24.87
	12109.00	91.45	178.67	9876.70	6462.70	2451.54	-2414.11	-502.37	0.66	191.76	2465.82	401369.67	771438.05	N 32 6 4.55	W 103 35 24.85
	12203.00	90.79	178.92	9874.86	6460.86	2544.86	-2508.07	-500.39	0.75	191.28	2557.50	401275.71	771440.03	N 32 6 3.62	W 103 35 24.83
	12298.00	89.04	178.75	9875.01	6461.01	2639.20	-2603.05	-498.46	1.85	190.84	2650.34	401180.74	771441.96	N 32 6 2.68	W 103 35 24.82
	12393.00	90.14	178.22	9875.69	6461.69	2733.47	-2698.01	-495.95	1.29	190.42	2743.21	401085.78	771444.47	N 32 6 1.74	W 103 35 24.80
	12488.00	90.83	177.37	9874.88	6460.88	2827.59	-2792.93	-492.29	1.15	190.00	2835.99	400990.86	771448.12	N 32 6 0.80	W 103 35 24.76
	12583.00	89.24	177.24	9874.82	6460.82	2921.59	-2887.82	-487.83	1.68	189.59	2928.74	400895.97	771452.59	N 32 5 59.86	W 103 35 24.72
	12679.00	89.42	177.07	9875.95	6461.95	3016.55	-2983.70	-483.06	0.26	189.20	3022.55	400800.10	771457.35	N 32 5 58.92	W 103 35 24.67
	12774.00	89.93	177.31	9876.48	6462.48	3110.53	-3078.58	-478.40	0.59	188.83	3115.53	400705.22	771462.01	N 32 5 57.98	W 103 35 24.62
	12869.00	90.10	177.30	9876.46	6462.46	3204.54	-3173.48	-473.94	0.18	188.49	3208.67	400610.32	771466.48	N 32 5 57.04	W 103 35 24.58
	12964.00	90.83	177.36	9875.69	6461.69	3298.55	-3268.37	-469.51	0.77	188.17	3301.92	400515.43	771470.90	N 32 5 56.10	W 103 35 24.54
	13059.00	91.72	177.24	9873.57	6459.57	3392.53	-3363.24	-465.04	0.95	187.87	3395.24	400420.57	771475.38	N 32 5 55.16	W 103 35 24.49
	13154.00	91.89	177.33	9870.58	6456.58	3486.49	-3458.09	-460.54	0.20	187.59	3488.62	400325.72	771479.87	N 32 5 54.22	W 103 35 24.45
	13249.00	92.27	177.14	9867.13	6453.13	3580.42	-3552.91	-455.96	0.45	187.31	3582.05	400230.90	771484.45	N 32 5 53.28	W 103 35 24.40
	13340.00	90.55	176.88	9864.90	6450.90	3670.38	-3643.76	-451.22	1.91	187.06	3671.59	400140.06	771489.20	N 32 5 52.38	W 103 35 24.35
	13435.00	90.69	177.68	9863.87	6449.87	3764.37	-3738.65	-446.71	0.85	186.81	3765.24	400045.17	771493.71	N 32 5 51.44	W 103 35 24.31
	13531.00	90.89	177.95	9862.54	6448.54	3859.48	-3834.57	-443.05	0.35	186.59	3860.08	399949.26	771497.37	N 32 5 50.49	W 103 35 24.27
	13626.00	90.96	178.39	9861.01	6447.01	3953.68	-3929.51	-440.01	0.47	186.39	3954.06	399854.32	771500.40	N 32 5 49.55	W 103 35 24.25
	13721.00	91.79	180.11	9858.73	6444.73	4048.06	-4024.47	-438.77	2.01	186.22	4048.31	399759.36	771501.64	N 32 5 48.61	W 103 35 24.24
	13817.00	91.72	179.17	9855.79	6441.79	4143.50	-4120.42	-438.17	0.98	186.07	4143.65	399663.41	771502.25	N 32 5 47.66	W 103 35 24.24
	13911.00	90.72	178.19	9853.79	6439.79	4236.80	-4214.37	-436.00	1.49	185.91	4236.86	399569.47	771504.41	N 32 5 46.73	W 103 35 24.22
	14006.00	90.65	178.63	9852.65	6438.65	4331.05	-4309.33	-433.37	0.47	185.74	4331.06	399474.51	771507.05	N 32 5 45.79	W 103 35 24.20
	14101.00	91.38	179.95	9850.97	6436.97	4425.46	-4404.30	-432.19	1.59	185.60	4425.46	399379.54	771508.22	N 32 5 44.85	W 103 35 24.19
	14196.00	91.13	179.14	9848.89	6434.89	4519.90	-4499.27	-431.44	0.89	185.48	4519.91	399284.57	771508.98	N 32 5 43.92	W 103 35 24.19
Final Survey Proj to Bit: 332'FSL	14245.00	90.96	179.27	9848.00	6434.00	4568.59	-4548.26	-430.76	0.44	185.41	4568.61	399235.58	771509.66	N 32 5 43.43	W 103 35 24.19
	14306.00	90.96	179.27	9846.97	6432.97	4629.21	-4609.25	-429.98	0.00	185.33	4629.26	399174.60	771510.43	N 32 5 42.83	W 103 35 24.18

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	18.000	Act Stns	30.000	30.000	SLB_MWD-POOR-Depth Only	Original Hole / Cimarex Cascade 29 Federal 7H XEM+MWD Survey
	1	18.000	9239.000	Act Stns	30.000	30.000	SLB_MWD-POOR	Original Hole / Cimarex Cascade 29 Federal 7H XEM+MWD Survey
	1	9239.000	14245.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Hole / Cimarex Cascade 29 Federal 7H XEM+MWD Survey
	1	14245.000	14306.000	Act Stns	30.000	30.000	SLB_BLIND+TREND	Original Hole / Cimarex Cascade 29 Federal 7H XEM+MWD Survey