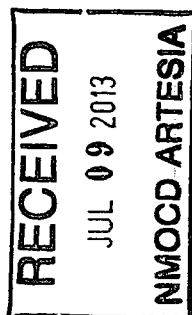


30-015-40837



Cimarex Crescent Hale 12 Federal Com #3H Gyro+MWD 0ft to 12989ft MD

PATHFINDER
A Schlumberger Company

(Def Survey)

Report Date:	January 08, 2013 - 08:53 AM	Survey / DLS Computation:	Minimum Curvature / Lubinski
Client:	Cimarex	Vertical Section Azimuth:	175.730 ° (Grid North)
Field:	NM Eddy County (NAD 83)	Vertical Section Origin:	0.000 ft, 0.000 ft
Structure / Slot:	Noram 23 / Cimarex Crescent Hale 12 Federal Com #3H	TVD Reference Datum:	KB
Well:	Cimarex Crescent Hale 12 Federal Com #3H	TVD Reference Elevation:	3481.000 ft above
Borehole:	Original Borehole	Seabed / Ground Elevation:	3453.000 ft above
UWI / API#:	Unknown / Unknown	Magnetic Declination:	7.701 °
Survey Name:	Cimarex Crescent Hale 12 Federal Com #3H Gyro+MWD 0ft to 12989ft MD	Total Gravity Field Strength:	999.1974 mgn (9.8 based)
Survey Date:	December 29, 2012	Total Magnetic Field Strength:	43680.063 nT
Tort / AHD / DDI / ERD Ratio:	155.834 ° / 4749.462 ft / 6.045 / 0.548	Magnetic Dip Angle:	60.475 °
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	Declination Date:	December 29, 2012
Location Lat / Long:	N 32° 40' 52.31974", W 103° 55' 27.93177"	Magnetic Declination Model:	BGGM 2012
Location Grid N/E Y/X:	N 611794.100 ftUS, E 667148.400 ftUS	North Reference:	Grid North
CRS Grid Convergence Angle:	0.2208 °	Grid Convergence Used:	0.2208 °
Grid Scale Factor:	0.99992722	Total Corr Mag North->Grid North:	7.4803 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
SHL Crescent Hale 12 Federal Com #3H	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	292.13M
	100.00	0.53	292.13	100.00	-0.21	0.17	-0.43	0.46	292.13	0.53	276.72M
	200.00	0.81	276.72	199.99	-0.55	0.43	-1.56	1.62	285.46	0.33	261.17M
	300.00	1.04	261.17	299.98	-0.61	0.37	-3.16	3.18	276.77	0.34	244.4M
	400.00	1.13	244.40	399.96	-0.16	-0.19	-4.94	4.95	267.79	0.33	236.56M
	500.00	0.98	236.56	499.94	0.60	-1.09	-6.55	6.64	260.56	0.21	235.69M
	621.60	0.76	235.89	621.53	1.51	-2.11	-8.08	8.35	255.35	0.18	239.76M
	716.30	1.07	239.76	716.22	2.21	-2.91	-9.37	9.81	252.73	0.33	231.61M
	810.90	1.17	231.61	810.80	3.13	-3.96	-10.89	11.58	250.03	0.20	219.01M
	905.80	0.75	219.01	905.49	4.13	-5.04	-12.03	13.05	247.29	0.49	228.96M
	1000.30	0.97	228.96	1000.18	5.06	-6.05	-13.03	14.36	245.11	0.28	210.83M
	1095.00	0.76	210.83	1094.66	6.07	-7.13	-13.96	15.68	242.97	0.35	205.39M
	1189.70	0.58	205.39	1189.56	7.01	-8.11	-14.50	16.61	240.77	0.22	179.34M
	1284.40	0.31	179.34	1284.26	7.88	-8.80	-14.70	17.13	239.09	0.35	113.61M
	1379.10	0.38	113.61	1378.95	8.08	-9.19	-14.41	17.09	237.49	0.40	117.7M
	1473.80	0.44	117.70	1473.65	8.42	-9.48	-13.80	16.74	235.52	0.07	104.59M

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
	1568.50	0.64	104.59	1568.35	8.79	-9.78	-12.97	16.24	232.98	0.25	97.63M
	1663.20	0.79	97.63	1663.04	9.09	-10.00	-11.81	15.47	229.74	0.18	88.45M
	1757.80	0.95	88.45	1757.63	9.26	-10.07	-10.38	14.46	225.88	0.22	92.18M
	1852.50	1.17	92.18	1852.31	9.41	-10.08	-8.63	13.27	220.56	0.24	92.09M
	1947.20	1.28	92.09	1946.99	9.64	-10.16	-6.60	12.11	213.04	0.12	94.58M
	2041.90	1.29	94.58	2041.67	9.92	-10.28	-4.46	11.22	203.57	0.06	110.37M
	2136.60	0.76	110.37	2136.35	10.34	-10.58	-2.83	10.96	194.99	0.63	115.99M
	2231.30	0.46	115.99	2231.05	10.80	-10.97	-1.90	11.13	189.84	0.32	94.69M
	2326.00	0.34	94.69	2325.74	11.03	-11.16	-1.28	11.23	186.55	0.20	121.09M
	2420.70	0.42	121.09	2420.44	11.28	-11.35	-0.70	11.38	183.55	0.20	88.9M
	2515.40	0.39	88.90	2515.14	11.50	-11.53	-0.08	11.53	180.42	0.24	74.3M
	2610.10	0.36	74.30	2609.84	11.45	-11.45	0.52	11.46	177.38	0.11	66.71M
	2704.70	0.38	66.71	2704.44	11.29	-11.24	1.10	11.30	174.42	0.06	59.83M
	2799.40	0.49	59.83	2799.13	11.01	-10.91	1.74	11.05	170.96	0.13	65M
	2894.10	0.54	65.00	2893.83	10.68	-10.52	2.49	10.81	166.66	0.07	60.03M
	2988.80	0.38	60.03	2988.53	10.38	-10.18	3.17	10.66	162.71	0.17	43.49M
	3083.50	0.26	43.49	3083.22	10.10	-9.86	3.59	10.50	160.01	0.16	37.5M
	3178.20	0.26	37.50	3177.92	9.80	-9.54	3.87	10.29	157.93	0.03	17.67M
	3272.90	0.15	17.67	3272.62	9.52	-9.25	4.03	10.09	155.43	0.14	313.14M
	3367.60	0.11	313.14	3367.32	9.34	-9.07	4.01	9.91	156.17	0.15	274.59M
	3462.30	0.15	274.59	3462.02	9.26	-9.00	3.82	9.77	157.01	0.10	259.88M
	3556.90	0.19	259.88	3556.62	9.25	-9.01	3.54	9.68	158.57	0.06	300.9M
	3651.60	0.22	300.90	3651.32	9.16	-8.95	3.23	9.51	160.17	0.15	302.59M
	3746.30	0.19	302.59	3746.02	8.97	-8.77	2.94	9.25	161.47	0.03	254.27M
	3841.00	0.10	254.27	3840.72	8.89	-8.71	2.73	9.13	162.61	0.15	252.95M
	3935.70	0.30	252.95	3935.42	8.96	-8.80	2.41	9.13	164.68	0.21	300.53M
	4030.40	0.41	300.53	4030.12	8.82	-8.70	1.88	8.91	167.80	0.32	307.15M
	4125.10	0.49	307.15	4124.82	8.36	-8.29	1.27	8.38	171.30	0.10	311.67M
	4219.80	0.59	311.67	4219.51	7.74	-7.72	0.58	7.74	175.70	0.11	317.85M
	4314.50	0.64	317.85	4314.21	6.97	-7.00	-0.14	7.00	181.13	0.09	304.26M
	4409.20	0.69	304.26	4408.90	6.20	-6.29	-0.96	6.36	188.72	0.17	305.05M
	4503.90	0.77	305.05	4503.59	5.44	-5.60	-1.96	5.94	199.25	0.09	309.16M
	4598.50	0.86	309.16	4598.18	4.55	-4.79	-3.03	5.67	212.30	0.11	306.56M
	4693.20	0.78	306.56	4692.87	3.64	-3.96	-4.10	5.70	225.99	0.09	297.7M
	4787.90	0.93	297.70	4787.56	2.81	-3.22	-5.29	6.19	238.72	0.21	305.2M
	4882.60	1.08	305.20	4882.25	1.84	-2.34	-6.70	7.10	250.73	0.21	305.09M
	4977.30	1.08	305.09	4976.93	0.71	-1.32	-8.16	8.27	260.84	0.00	291.99M
	5072.00	1.11	291.99	5071.61	-0.27	-0.46	-9.74	9.76	267.30	0.27	290.73M
	5166.70	1.23	290.73	5166.29	-1.10	0.24	-11.55	11.55	271.21	0.13	287.55M
	5261.40	1.22	287.55	5260.97	-1.91	0.91	-13.46	13.49	273.85	0.07	293.55M
	5356.10	1.26	293.55	5355.65	-2.77	1.63	-15.37	15.46	276.04	0.14	290.05M
	5450.80	1.27	290.05	5450.33	-3.68	2.40	-17.31	17.48	277.90	0.08	281.82M
	5545.40	1.25	281.82	5544.90	-4.40	2.97	-19.31	19.54	278.75	0.19	295.74M
	5640.10	1.08	295.74	5639.59	-5.14	3.57	-21.12	21.42	279.60	0.35	293.9M

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS ("/100ft)	TF (°)
	5734.80	1.04	293.90	5734.27	-5.99	4.31	-22.71	23.12	280.74	0.06	288.63M
	5829.50	1.24	288.63	5828.95	-6.79	4.99	-24.47	24.97	281.51	0.24	303M
	5924.20	1.31	303.00	5923.63	-7.85	5.90	-26.35	27.00	282.52	0.34	318.54M
	6018.90	1.33	318.54	6018.30	-9.38	7.31	-27.96	28.92	284.55	0.38	291.83M
	6113.60	1.43	291.83	6112.98	-10.77	8.58	-29.81	31.02	286.05	0.69	290.83M
	6208.30	1.32	290.83	6207.65	-11.76	9.40	-31.93	33.28	286.41	0.12	286.54M
	6303.00	1.25	286.54	6302.32	-12.58	10.09	-33.93	35.40	286.55	0.13	295.06M
	6397.60	1.48	295.06	6396.90	-13.54	10.89	-36.02	37.63	286.82	0.31	301.3M
	6492.30	1.35	301.30	6491.57	-14.78	11.99	-38.06	39.90	287.47	0.20	296.2M
	6587.00	0.98	296.20	6586.25	-15.84	12.92	-39.74	41.79	288.01	0.41	281.62M
	6681.70	0.89	281.62	6680.94	-16.45	13.42	-41.19	43.32	288.05	0.27	266.75M
	6776.40	0.87	286.75	6775.63	-16.67	13.53	-42.63	44.72	287.61	0.24	266.27M
	6871.10	0.74	286.27	6870.32	-16.69	13.45	-43.95	45.97	287.01	0.14	264.64M
	6965.80	0.62	264.64	6965.01	-16.68	13.36	-45.08	47.01	286.51	0.13	273.71M
	7060.50	0.50	273.71	7059.71	-16.73	13.34	-46.00	47.89	286.17	0.16	280.7M
	7155.20	0.58	280.70	7154.40	-16.91	13.46	-46.88	48.77	286.02	0.11	291.81M
	7249.90	0.61	291.81	7249.10	-17.26	13.73	-47.82	49.75	286.02	0.13	291.73M
	7344.60	0.66	291.73	7343.79	-17.72	14.12	-48.79	50.80	286.14	0.05	264.31M
	7439.20	0.71	264.31	7438.38	-17.94	14.27	-49.88	51.88	285.96	0.35	226.12M
	7533.90	0.59	226.12	7533.08	-17.62	13.67	-50.82	52.68	285.27	0.46	195.36M
	7628.60	0.52	195.36	7627.77	-16.90	13.12	-51.28	52.94	284.35	0.32	184.32M
	7723.30	0.58	184.32	7722.47	-16.02	12.23	-51.43	52.87	283.37	0.13	175.88M
	7818.00	0.46	175.88	7817.17	-15.17	11.37	-51.44	52.68	282.46	0.15	171.74M
	7833.00	0.45	171.74	7832.17	-15.05	11.25	-51.43	52.65	282.34	0.23	53.76M
	7922.00	0.35	53.76	7921.16	-14.84	11.07	-51.16	52.34	282.20	0.77	176.53M
	7986.00	0.44	176.53	7985.16	-14.70	10.94	-50.99	52.15	282.10	1.09	167.26M
	8017.00	2.20	167.26	8016.15	-13.99	10.24	-50.85	51.87	281.36	5.70	173.16M
	8049.00	5.35	173.16	8048.08	-11.89	8.15	-50.54	51.19	279.16	9.94	178.82M
	8080.00	9.15	178.82	8078.83	-7.98	4.25	-50.31	50.49	274.83	12.43	3.03L
	8112.00	13.10	177.90	8110.22	-1.82	-1.92	-50.13	50.16	267.81	12.36	2.28L
	8143.00	16.62	177.41	8140.18	6.13	-9.86	-49.80	50.77	258.80	11.36	12.79L
	8175.00	20.05	175.15	8170.55	16.19	-19.90	-49.13	53.01	247.95	10.94	2.93L
	8206.00	22.77	174.79	8199.41	27.50	-31.18	-48.13	57.35	237.07	8.78	6.76L
	8238.00	25.06	174.15	8228.66	40.47	-44.09	-46.88	64.35	226.76	7.20	2.68R
	8269.00	27.00	174.35	8256.51	54.07	-57.62	-45.52	73.43	216.31	6.26	2.4L
	8301.00	29.72	174.12	8284.67	69.27	-72.74	-43.99	85.01	211.16	8.51	7.27L
	8332.00	33.68	173.21	8311.04	85.54	-88.93	-42.19	98.43	205.38	12.87	5.77R
	8364.00	36.76	173.73	8337.18	103.98	-107.25	-40.09	114.51	200.49	9.67	17.42R
	8395.00	38.51	174.61	8361.73	122.90	-126.09	-38.17	131.74	196.84	5.91	14.56R
	8427.00	41.42	175.75	8386.25	143.45	-146.57	-36.45	151.04	193.97	9.38	11.46R
	8458.00	44.76	176.71	8408.89	164.62	-167.70	-35.06	171.33	191.81	10.98	4.94R
	8490.00	46.87	176.96	8431.19	187.56	-190.61	-33.80	193.58	190.05	6.62	12.98L
	8521.00	48.63	176.42	8452.03	210.51	-213.52	-32.47	215.97	188.65	5.82	18.96L
	8553.00	51.70	175.08	8472.53	235.08	-238.02	-30.64	239.96	187.34	10.12	6.58R
	8584.00	54.52	175.48	8491.13	259.87	-262.73	-28.61	264.28	186.21	9.16	27.68L

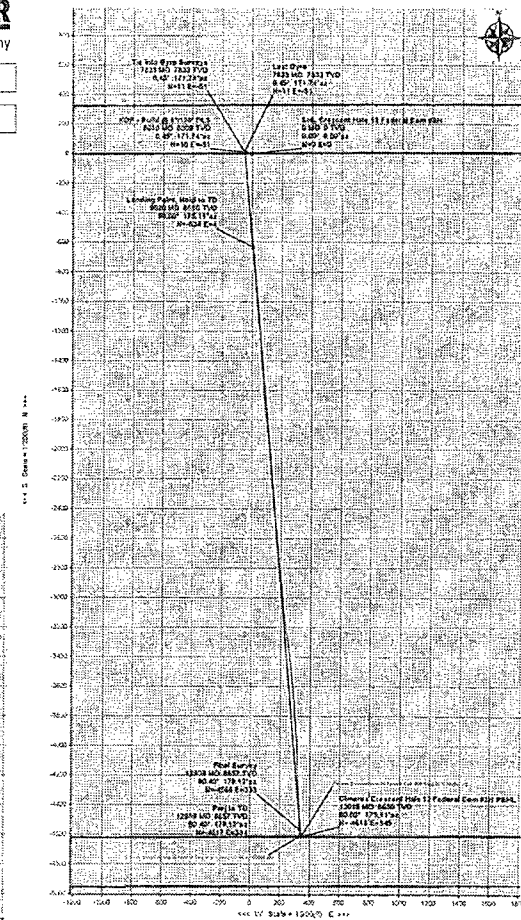
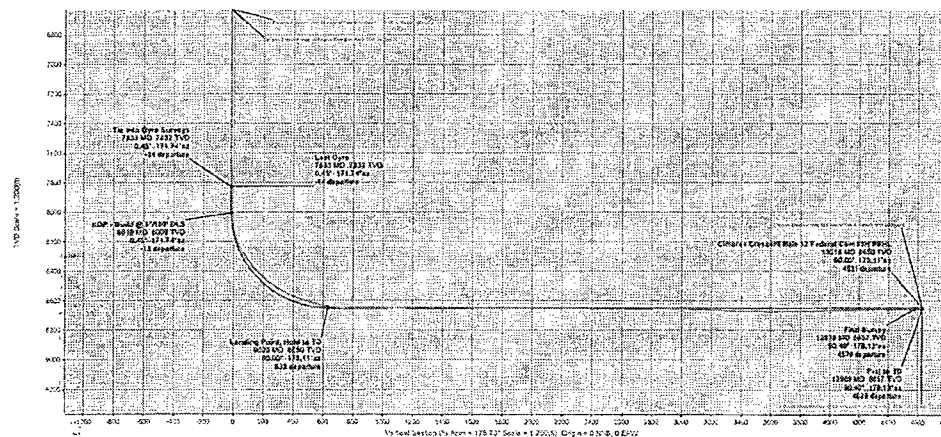
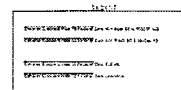
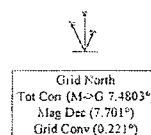
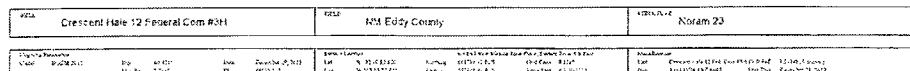
Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
	8616.00	56.81	174.05	8509.18	286.28	-289.04	-26.19	290.22	185.18	8.05	4.44L
	8648.00	59.36	173.82	8526.10	313.43	-316.04	-23.32	316.90	184.22	7.99	8.61L
	8679.00	61.64	173.52	8541.36	340.39	-342.86	-20.34	343.46	183.40	7.40	10.93L
	8711.00	63.40	173.14	8556.13	368.76	-371.05	-17.05	371.45	182.63	5.60	10.93R
	8742.00	65.86	173.66	8569.41	396.74	-398.88	-13.83	399.12	181.99	8.08	13.25R
	8774.00	68.59	174.35	8581.80	426.23	-428.22	-10.75	428.35	181.44	8.76	11.12R
	8805.00	70.17	174.68	8592.71	455.24	-457.10	-7.98	457.17	181.00	5.19	11.45R
	8837.00	71.67	175.00	8603.17	485.47	-487.22	-5.26	487.25	180.62	4.78	18.19R
	8868.00	72.98	175.45	8612.59	515.01	-516.65	-2.80	516.66	180.31	4.45	5.87L
	8900.00	74.48	175.29	8621.55	545.73	-547.27	-0.32	547.27	180.03	4.71	3.07R
	8932.00	77.21	175.44	8629.38	576.75	-578.19	2.19	578.20	179.78	8.54	9.15L
	8963.00	79.84	175.01	8635.54	607.13	-608.46	4.72	608.48	179.56	8.59	3.21L
	8995.00	80.72	174.86	8640.94	638.66	-639.88	7.47	639.83	179.33	2.75	4.09L
	9026.00	83.36	174.77	8645.24	669.36	-670.46	10.22	670.54	179.13	8.54	17.84L
Survey 1-Jan-13	9058.00	85.30	174.14	8648.40	701.19	-702.15	13.30	702.28	178.91	6.37	13.61R
	9166.00	89.60	175.18	8653.20	809.04	-809.55	23.34	809.89	178.35	4.10	0.5R
	9261.00	90.75	175.19	8652.91	904.03	-904.21	31.31	904.75	178.02	1.21	15.8R
	9355.00	91.28	175.34	8651.25	998.02	-997.88	39.07	998.64	177.76	0.59	141.84R
	9450.00	90.30	176.11	8649.94	1093.01	-1092.60	46.15	1093.58	177.58	1.31	38.75R
	9545.00	91.01	176.68	8648.85	1187.99	-1187.41	52.12	1188.55	177.49	0.96	67.12R
	9639.00	91.28	177.32	8646.97	1281.95	-1281.26	57.04	1282.53	177.45	0.74	137.38L
Survey 3-Jan-13	9734.00	89.16	175.37	8646.61	1376.93	-1376.05	63.10	1377.50	177.37	3.03	159.45L
	9829.00	89.08	175.34	8648.07	1471.92	-1470.73	70.79	1472.43	177.24	0.09	88.86R
	9924.00	89.16	179.26	8649.53	1566.85	-1565.60	75.26	1567.40	177.25	4.13	84.61L
	10018.00	89.69	173.68	8650.47	1660.80	-1659.38	81.05	1661.35	177.20	5.96	41.63R
	10113.00	89.78	173.76	8650.91	1755.74	-1753.80	91.44	1756.19	177.02	0.13	33.69R
	10208.00	89.87	173.82	8651.20	1850.69	-1848.25	101.72	1851.04	176.85	0.11	82.78R
	10303.00	89.96	174.53	8651.34	1945.65	-1942.76	111.36	1945.94	176.72	0.75	97.03R
	10398.00	89.87	175.26	8651.48	2040.64	-2037.38	119.81	2040.90	176.63	0.77	53.02R
	10492.00	90.48	176.07	8651.20	2134.64	-2131.11	126.92	2134.88	176.59	1.08	108.97L
	10587.00	90.04	174.79	8650.76	2229.64	-2225.80	134.48	2229.86	176.54	1.42	57.72L
	10682.00	90.40	174.22	8650.40	2324.61	-2320.36	143.58	2324.80	176.46	0.71	59.6L
	10776.00	90.84	173.47	8649.38	2418.56	-2413.82	153.66	2419.70	176.36	0.93	17.89L
	10871.00	91.80	173.16	8647.19	2513.45	-2508.14	164.71	2513.55	176.24	1.06	142.14R
	10966.00	89.95	174.59	8645.73	2608.38	-2602.58	174.85	2608.45	176.16	2.45	163.04R
Survey 4-Jan-13	11060.00	88.55	175.02	8646.98	2702.36	-2696.19	183.36	2702.41	176.11	1.57	107.25L
	11155.00	88.37	174.44	8649.51	2797.31	-2790.75	192.08	2797.35	176.06	0.64	35.16R
	11250.00	88.81	174.75	8651.85	2892.26	-2885.30	201.03	2892.29	176.01	0.57	115.92L
	11345.00	88.64	174.40	8653.96	2987.22	-2979.85	210.01	2987.24	175.97	0.41	153.16L
Survey 5-Jan-13	11440.00	87.85	174.00	8656.87	3082.14	-3074.32	219.60	3082.15	175.91	0.93	125.6L
	11534.00	86.70	172.39	8661.34	3175.93	-3167.55	230.73	3175.94	175.83	2.10	15.5L
	11629.00	86.88	172.34	8666.66	3270.62	-3261.56	243.33	3270.62	175.73	0.20	20.15R
	11724.00	88.46	172.92	8670.52	3365.40	-3355.69	255.50	3365.40	175.65	1.77	27.6R
Survey 6-Jan-13	11818.00	90.22	173.84	8671.60	3459.31	-3449.05	266.34	3459.32	175.58	2.11	135.21L

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (°)	DLS ("/100ft)	TF (°)
	11913.00	89.25	172.91	8672.04	3554.23	-3543.42	277.30	3554.25	175.53	1.41	64.2R
	12007.00	90.13	174.73	8672.55	3648.17	-3636.86	287.42	3648.20	175.48	2.15	45.45R
	12102.00	91.36	175.98	8671.32	3743.15	-3731.54	295.11	3743.19	175.48	1.85	174.05R
	12197.00	90.40	176.08	8669.86	3838.14	-3826.30	301.69	3838.17	175.49	1.02	45R
	12291.00	90.48	176.16	8669.14	3932.14	-3920.08	308.05	3932.17	175.51	0.12	38.08R
	12386.00	92.24	177.54	8666.88	4027.08	-4014.90	313.27	4027.11	175.54	2.35	170.33R
	12481.00	91.36	177.69	8663.90	4121.99	-4109.77	317.22	4122.00	175.59	0.94	147.85L
	12576.00	91.01	177.47	8661.93	4216.92	-4204.67	321.23	4216.92	175.63	0.44	90R
	12671.00	91.01	177.76	8660.26	4311.85	-4299.57	325.18	4311.85	175.67	0.31	125.84R
	12766.00	90.75	178.12	8658.80	4406.77	-4394.50	328.60	4406.77	175.72	0.47	108.12R
	12861.00	90.57	178.67	8657.71	4501.66	-4489.46	331.26	4501.66	175.78	0.61	110.69R
Final Survey	12938.00	90.40	179.12	8657.05	4578.54	-4566.44	332.74	4578.54	175.83	0.62	HS
Proj to TD	12989.00	90.40	179.12	8656.70	4629.45	-4617.43	333.52	4629.46	175.87	0.00	

Survey Type: Def Survey

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
Survey Program:

Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	28.000	Act Stns	30.000	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Cimarex Crescent Hale 12 Federal Com #3H Gyro+MWD 0ft to 12989ft
	28.000	7833.000	Act Stns	30.000	30.000	SLB_NSG+MSHOT	Original Borehole / Cimarex Crescent Hale 12 Federal Com
	7833.000	12938.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Cimarex Crescent Hale 12 Federal Com
	12938.000	12989.000	Act Stns	30.000	30.000	SLB_BLIND+TREND	Original Borehole / Cimarex Crescent Hale 12 Federal Com



Date By: 2/28/2012
 Entered By: [Signature]
 Approved By: [Signature]
 Approved Date: 2/28/2012