

51-01368

Schlumberger

[Original Borehole] Actual Survey Survey Report
(Non-Def Survey)

Report Date: December 31, 2011 - 09:12 AM
 Client: CNX
 Field: WV Marshall County (NAD 27)
 Structure / Slot: CNX SHL-3Pad / CNX SHL-3B-HS
 Well: SHL-3B-HS
 Borehole: Original Borehole
 UWI / API#: Unknown / Unknown
 Survey Name: [Original Borehole] Actual Survey
 Survey Date: December 22, 2011
 Tort / AHD / DDI / ERD Ratio: 163.680' / 4439.801 ft / 6.059 / 0.664
 Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Feet
 Location Lat / Long: N 39° 58' 16.03621", W 80° 33' 24.77948"
 Location Grid N/E Y/X: N 537565.675 ftUS, E 1703786.971 ftUS
 CRS Grid Convergence Angle: -0.67405154 °
 Grid Scale Factor: 0.99995885

Survey / DLS Computation: Minimum Curvature / Lubinski
 Vertical Section Azimuth: 133.419 ° (Grid North)
 Vertical Section Origin: 0.000 ft, 0.000 ft
 TVD Reference Datum: KB
 TVD Reference Elevation: 1312.160 ft above Unknown
 Seabed / Ground Elevation: 1289.180 ft above Unknown
 Magnetic Declination: -8.751 °
 Total Field Strength: 52882.369 nT
 Magnetic Dip Angle: 67.557 °
 Declination Date: December 22, 2011
 Magnetic Declination Model: BGGM 2011
 North Reference: Grid North
 Grid Convergence Used: -0.674 °
 Total Corr Mag North->Grid North: -8.077 °
 Local Coord Referencad To: Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (N/S ft)	EW (E/W ft)	Closure (ft)	Closure Azim (ft)	DLS (*/100ft)	TF (°)
SHL	0.00	0.00	0.00	0.00	0.00	N 0.00	E 0.00	0.00	0.00	N/A	159.87M
	108.00	0.10	159.87	108.00	0.08	S 0.09	E 0.03	0.09	159.87	0.09	60.24M
	208.00	0.14	60.24	208.00	0.20	S 0.11	E 0.17	0.20	123.08	0.19	165.75M
	308.00	0.14	165.75	308.00	0.34	S 0.17	E 0.30	0.35	118.81	0.22	114.62M
	408.00	0.11	114.62	408.00	0.53	S 0.33	E 0.42	0.53	127.68	0.11	145.15M
	508.00	0.17	145.15	508.00	0.77	S 0.49	E 0.59	0.77	129.39	0.09	163.75M
	608.00	0.16	163.75	608.00	1.03	S 0.74	E 0.72	1.03	136.00	0.05	117.74M
	708.00	0.13	117.74	708.00	1.26	S 0.93	E 0.86	1.27	137.34	0.12	86.57M
	808.00	0.14	86.57	808.00	1.45	S 0.98	E 1.08	1.46	132.11	0.07	278.28M
	908.00	0.06	278.28	908.00	1.50	S 0.96	E 1.15	1.50	129.89	0.20	287.62M
	1008.00	0.06	287.62	1008.00	1.41	S 0.94	E 1.05	1.41	131.81	0.01	113.83M
	1108.00	0.10	113.83	1108.00	1.44	S 0.96	E 1.08	1.44	131.60	0.16	286.25M
	1208.00	0.29	286.25	1208.00	1.30	S 0.92	E 0.91	1.30	135.20	0.39	326.33M
	1308.00	0.25	326.33	1308.00	0.86	S 0.67	E 0.55	0.87	140.53	0.19	263.52M
	1408.00	0.42	263.52	1408.00	0.41	S 0.53	E 0.07	0.53	172.80	0.38	272.19M
	1508.00	0.24	272.19	1507.99	0.02	S 0.56	W 0.51	0.76	222.08	0.19	316.76M
	1608.00	0.18	316.76	1607.99	-0.30	S 0.44	W 0.82	0.93	241.92	0.17	308.25M
	1708.00	0.22	308.25	1707.99	-0.64	S 0.21	W 1.08	1.10	259.20	0.05	180.00M
	1808.00	0.16	9.44	1807.99	-0.91	N 0.05	W 1.21	1.21	272.37	0.20	337.49M
	1908.00	0.14	337.49	1907.99	-1.10	N 0.30	W 1.23	1.27	283.69	0.08	355.62M
	2008.00	0.16	355.62	2007.99	-1.32	N 0.55	W 1.29	1.41	293.16	0.05	1.79M
	2108.00	0.23	1.79	2107.99	-1.56	N 0.89	W 1.30	1.57	304.55	0.07	358.54M
	2208.00	0.17	358.54	2207.99	-1.79	N 1.24	W 1.29	1.79	313.82	0.06	8.57M
	2308.00	0.16	8.57	2307.99	-1.98	N 1.63	W 1.28	1.99	320.11	0.03	302.31M
	2408.00	0.15	302.31	2407.99	-2.19	N 1.74	W 1.37	2.21	321.79	0.17	307.59M
	2508.00	0.10	307.59	2507.99	-2.40	N 1.86	W 1.55	2.42	320.24	0.05	305.96M
	2608.00	0.18	305.96	2607.99	-2.64	N 2.00	W 1.74	2.66	319.00	0.08	324.03M
	2708.00	0.28	324.03	2707.99	-3.04	N 2.29	W 2.01	3.05	318.73	0.12	268.73M
	2808.00	0.27	268.73	2807.99	-3.45	N 2.49	W 2.39	3.45	316.11	0.26	266.94M
	2908.00	0.20	266.94	2907.99	-3.73	N 2.47	W 2.80	3.74	311.42	0.07	255.76M
	3008.00	0.22	255.76	3007.99	-3.96	N 2.42	W 3.16	3.98	307.38	0.05	234.94M
	3108.00	0.40	234.94	3107.98	-4.13	N 2.17	W 3.63	4.23	300.82	0.21	242.39M
	3208.00	0.39	242.39	3207.98	-4.31	N 1.81	W 4.22	4.59	293.21	0.05	267.61M
	3308.00	0.53	267.61	3307.98	-4.74	N 1.63	W 4.99	5.25	288.14	0.24	266.03M
	3408.00	0.31	266.03	3407.98	-5.25	N 1.60	W 5.72	5.94	285.59	0.22	171.44M
	3508.00	0.06	171.44	3507.98	-5.39	N 1.52	W 5.98	6.17	284.30	0.32	278.12M
	3608.00	0.29	278.12	3607.97	-5.56	N 1.51	W 6.22	6.40	283.63	0.31	267.25M
	3708.00	0.21	267.25	3707.97	-5.89	N 1.54	W 6.66	6.83	282.99	0.09	276.44M
	3808.00	0.42	276.40	3807.97	-6.31	N 1.57	W 7.20	7.37	282.28	0.22	293.19M
	3908.00	0.46	293.19	3907.97	-6.98	N 1.77	W 7.94	8.13	282.55	0.13	282.99M
	4008.00	0.34	282.99	4007.97	-7.61	N 1.99	W 8.59	8.82	283.04	0.14	3.45M
	4108.00	0.60	3.45	4107.96	-8.20	N 2.58	W 8.85	9.22	286.25	0.64	0.99M
	4208.00	0.43	0.99	4207.96	-8.79	N 3.48	W 8.81	9.48	281.54	0.17	12.92M
	4308.00	0.96	12.92	4307.95	-9.47	N 4.67	W 8.62	9.80	298.45	0.55	351.17M
	4408.00	0.83	351.17	4407.94	-10.47	N 6.20	W 8.54	10.56	305.98	0.36	0.44M
	4508.00	1.00	0.44	4507.93	-11.64	N 7.79	W 8.65	11.64	312.01	0.22	14.57M
	4608.00	0.78	14.57	4607.92	-12.56	N 9.32	W 8.47	12.60	317.74	0.31	16.74M
	4708.00	0.52	16.74	4707.91	-13.09	N 10.42	W 8.17	13.24	321.89	0.26	3.08M
	4808.00	0.75	3.08	4807.90	-13.72	N 11.50	W 8.00	14.01	325.17	0.27	359.91M
	4908.00	0.74	359.91	4907.89	-14.59	N 12.80	W 7.97	15.08	328.10	0.04	1.74M
	5008.00	0.71	1.74	5007.89	-15.44	N 14.07	W 7.95	16.16	330.52	0.04	29.05M
	5108.00	0.81	29.05	5107.88	-16.45	N 15.30	W 7.59	17.08	333.63	0.37	23.77M
	5208.00	0.83	23.77	5207.87	-16.45	N 16.59	W 6.95	17.98	337.25	0.08	22.09M
	5308.00	0.89	22.09	5307.86	-16.98	N 17.97	W 6.37	19.06	340.48	0.07	32.35M
Tie-In	5441.00	1.02	32.35	5440.84	-17.58	N 19.93	W 5.35	20.63	344.98	0.16	41.3M
	5486.00	0.67	41.30	5485.83	-17.67	N 20.46	W 4.96	21.05	346.37	0.83	71.02M
	5533.00	2.93	71.02	5532.81	-17.12	N 21.06	W 3.64	21.37	350.19	5.05	72.3M
	5581.00	8.35	72.30	5580.56	-14.87	N 22.52	E 0.84	22.53	2.14	11.29	1.09M
	5628.00	11.66	72.51	5626.84	-10.90	N 24.98	E 8.63	26.42	19.06	7.04	5.54M
	5675.00	15.00	73.86	5672.56	-5.50	N 28.09	E 19.00	33.91	34.08	7.13	104.68L
	5721.00	14.88	71.96	5717.01	0.34	N 31.57	E 30.34	43.79	43.86	1.10	107.85L
	5768.00	14.55	67.31	5762.47	5.61	N 35.72	E 41.52	54.77	49.30	2.61	156.47M
	5815.00	14.24	67.86	5807.99	10.39	N 40.17	E 52.33	65.97	52.48	0.72	39.49M
	5863.00	15.36	71.32	5854.40	15.82	N 44.44	E 63.82	77.77	55.15	3.00	47.58L
	5910.00	15.53	70.71	5899.70	21.62	N 48.51	E 75.67	89.88	57.34	0.47	6.45M
	5958.00	19.13	71.95	5945.51	28.32	N 53.07	E 89.22	103.81	59.25	7.54	4.46L
	6005.00	24.52	70.94	5989.13	36.51	N 58.65	E 105.77	120.94	60.99	11.50	3.33M
	6053.00	29.23	71.50	6031.93	46.64	N 65.62	E 126.31	142.34	62.55	9.83	17.47M
	6103.00	32.32	69.69	6074.89	58.30	N 74.14	E 150.43	167.70	63.76	6.45	0.63M
	6148.00	35.48	69.75	6112.23	69.42	N 82.84	E 173.97	192.68	64.54	7.02	3.03M
	6195.00	38.93	70.04	6149.66	82.09	N 92.60	E 200.65	220.99	65.23	7.35	1.89M
	6243.00	43.29	70.25	6185.82	96.29	N 103.32	E 230.33	252.44	65.84	9.09	12.57M

51-01368

Comments	MD (ft)	Incl (°)	Adm Grd (°)	TVD (ft)	VSEC (ft)	NS (N/S ft)	EW (E/W ft)	Closure (ft)	Closure Arithm	DLS (1/100th)	TF (°)
	6390.00	47.25	71.45	6318.89	11.60	N 114.26	E 267.87	265.71	66.43	8.62	83.28R
	6340.00	47.86	76.90	6282.65	130.54	N 124.30	E 297.34	322.28	67.31	8.13	78.2R
	6385.00	48.70	81.63	6282.60	130.20	N 130.55	E 330.33	365.19	68.44	8.06	92.19R
	6432.00	48.67	86.95	6313.65	173.29	N 134.06	E 365.43	389.24	69.85	8.50	78.91R
	6480.00	49.20	90.21	6343.18	198.95	N 134.95	E 401.60	423.67	71.43	5.24	60.74R
	6528.00	51.25	94.70	6374.62	225.94	N 133.41	E 436.90	456.82	73.02	8.72	58.8R
	6573.00	53.18	98.55	6403.42	255.99	N 129.11	E 473.78	491.06	74.76	7.67	42.16R
	6623.00	56.15	101.74	6431.18	288.12	N 122.20	E 512.31	526.68	76.98	8.23	8.23
	6669.00	59.60	104.61	6458.18	322.51	N 113.11	E 551.05	562.54	78.40	8.22	46.99R
	6716.00	61.86	107.59	6479.72	359.59	N 101.68	E 591.28	609.96	80.24	6.22	8.22
	6763.00	63.42	109.55	6501.40	397.35	N 88.67	E 630.86	637.05	82.01	5.97	41.35R
	6810.00	65.75	111.78	6523.57	436.50	N 73.58	E 670.57	674.60	83.74	6.55	44.28R
	6857.00	67.39	113.50	6546.26	476.81	N 58.98	E 710.37	712.65	85.41	4.64	82.34R
	6905.00	68.05	116.34	6569.46	519.16	N 46.81	E 750.30	758.24	87.13	4.82	86.14R
	6952.00	70.01	121.64	6592.38	561.84	N 15.63	E 788.30	788.46	88.36	4.64	88.14R
	6999.00	69.97	125.75	6615.98	605.36	N 15.53	E 826.04	825.00	90.92	7.77	81.38R
	7047.00	70.21	131.35	6639.73	650.30	N 6.90	E 863.90	861.11	92.46	8.22	87.3R
	7094.00	72.89	135.32	6662.61	694.87	S 67.58	E 892.72	895.28	94.55	10.99	55.2R
	7142.00	76.69	137.99	6685.20	741.10	S 101.26	E 924.50	930.03	96.23	9.83	36.16R
	7189.00	81.09	141.23	6707.73	786.33	S 136.38	E 954.36	964.04	98.13	11.55	35.2R
	7236.00	86.29	143.57	6730.20	832.98	S 171.01	E 982.90	997.97	100.00	8.60	5.13R
	7283.00	88.42	143.74	6752.81	879.07	S 211.04	E 1020.55	1032.36	101.80	4.04	HS
	7330.00	88.56	143.09	6775.46	918.38	S 243.26	E 1059.80	1062.42	103.24	5.33	77.85L
	7376.00	89.79	142.82	6798.07	958.60	S 319.51	E 1147.41	1136.63	106.33	0.70	34.41R
	7418.00	89.59	143.45	6820.68	1011.91	S 394.52	E 1204.40	1233.04	108.97	0.44	42.88L
	7460.00	89.87	143.52	6843.27	1051.88	S 470.52	E 1280.47	1303.63	111.34	0.20	58.3R
	7512.00	89.93	143.32	6865.86	1091.81	S 546.57	E 1373.78	1373.63	113.42	0.42	90L
	7564.00	89.53	143.66	6888.45	1131.76	S 622.33	E 1466.89	1466.62	115.29	0.29	111.9R
	7607.00	89.79	143.16	6911.04	1171.64	S 698.48	E 1541.87	1541.15	116.95	0.62	103.8R
	7650.00	89.90	143.32	6933.63	1211.51	S 773.59	E 1626.10	1626.10	118.41	0.29	96.68R
	7693.00	89.86	143.52	6956.22	1251.38	S 849.90	E 1709.64	1709.64	120.99	1.01	83.65R
	7736.00	89.79	144.67	6978.81	1291.25	S 926.14	E 1796.64	1796.64	122.17	0.69	130.6R
	7779.00	89.90	144.87	7001.40	1331.12	S 1003.95	E 1885.42	1885.42	123.47	0.38	162.07L
	7822.00	89.86	145.32	7023.99	1370.99	S 1082.20	E 1974.33	1974.33	124.75	0.62	103.8R
	7865.00	89.82	145.60	7046.58	1410.86	S 1159.71	E 2060.71	2060.71	126.01	0.85	53.5R
	7908.00	89.28	145.49	7069.17	1450.73	S 1237.61	E 2149.75	2149.75	127.45	0.30	103.58R
	7951.00	89.36	144.69	7091.76	1490.60	S 1315.24	E 2239.44	2239.44	128.75	0.45	85.5R
	7994.00	89.52	144.92	7114.35	1530.47	S 1393.18	E 2329.38	2329.38	130.09	0.46	104.50R
	8037.00	89.42	145.34	7136.94	1570.34	S 1470.57	E 2419.61	2419.61	131.45	0.72	104.30L
	8080.00	89.28	145.60	7159.53	1610.21	S 1548.60	E 2509.44	2509.44	132.75	0.59	66.63L
	8123.00	89.42	144.15	7182.12	1650.08	S 1625.99	E 2599.27	2599.27	134.09	0.87	85.90L
	8166.00	89.63	144.65	7204.71	1689.94	S 1702.42	E 2689.10	2689.10	135.44	0.44	112.79R
	8209.00	89.45	144.12	7227.30	1729.81	S 1778.16	E 2778.16	2778.16	136.79	1.61	88.88L
	8252.00	89.45	143.12	7249.89	1769.68	S 1855.73	E 2867.04	2867.04	138.14	0.50	90L
	8295.00	89.52	141.89	7272.48	1808.94	S 1933.18	E 2956.48	2956.48	139.49	0.76	117.98L
	8338.00	89.18	141.25	7295.07	1848.29	S 2010.61	E 3045.91	3045.91	140.84	0.85	77.74L
	8381.00	89.28	140.79	7317.66	1887.64	S 2088.04	E 3135.34	3135.34	142.19	0.76	81.59R
	8424.00	89.32	139.99	7340.25	1926.99	S 2165.47	E 3224.77	3224.77	143.54	0.85	87.14L
	8467.00	89.21	138.87	7362.84	1966.34	S 2242.90	E 3314.20	3314.20	144.89	1.19	83.56R
	8510.00	89.14	138.44	7385.43	2005.69	S 2320.33	E 3403.63	3403.63	146.24	0.41	81.59R
	8553.00	89.28	138.11	7408.02	2045.04	S 2397.76	E 3493.06	3493.06	147.59	0.66	95.5R
	8596.00	89.38	138.82	7430.61	2084.39	S 2475.19	E 3582.49	3582.49	148.94	1.10	81.35R
	8639.00	89.20	140.86	7453.20	2123.74	S 2552.62	E 3671.92	3671.92	150.29	0.99	91.57R
	8682.00	89.42	141.78	7475.79	2163.09	S 2630.05	E 3761.35	3761.35	151.64	1.16	100.02R
	8725.00	89.39	142.88	7498.38	2202.44	S 2707.48	E 3850.78	3850.78	152.99	1.29	79.99R
	8768.00	89.18	144.07	7520.97	2241.79	S 2784.91	E 3940.21	3940.21	154.34	1.33	HS
	8811.00	89.21	144.24	7543.56	2281.14	S 2862.34	E 4029.64	4029.64	155.69	0.00	

Survey Type: Non-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)	Survey Tool Type	Borehole / Survey
0.00	22.980	Ac1 Sns	SLE_B UNKNOWN-Depth Only	Original Borehole / Original Borehole / Actual Survey
22.980	22.980	Ac1 Sns	SLE_B UNKNOWN-Depth Only	Original Borehole / Original Borehole / Actual Survey
22.980	5441.000	Ac1 Sns	SLE_B UNKNOWN-Depth Only	Original Borehole / Original Borehole / Actual Survey
5441.000	10457.000	Ac1 Sns	SLE_B MWD-DIAG	Original Borehole / Original Borehole / Actual Survey
10457.000	10536.000	Ac1 Sns	SLE_B BLIND	Original Borehole / Original Borehole / Actual Survey