



Shell Nunemaker 2509 #32-1H DEF MWD 0ft to 6744ft MD

(Def Survey)

Report Date: January 22, 2013 - 10:19 AM
Client: Shell
Field: Reno County (NAD 27)
Structure / Slot: Patterson #264 / Shell Nunemaker 2509 #32-1H
Well: Shell Nunemaker 2509 #32-1H
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
Survey Name: Shell Nunemaker 2509 #32-1H DEF MWD 0ft to 6744ft MD
Survey Date: January 17, 2013
Tort / AHD / DDI / ERD Ratio: 126.092 ° / 3137.337 ft / 5.833 / 0.800
Coordinate Reference System: NAD27 Kansas State Plane, Southern Zone, US Feet
Location Lat / Long: N 37° 50' 17.37504", W 98° 19' 32.88692"
Location Grid N/E Y/X: N 426603.610 ftUS, E 2050305.720 ftUS
CRS Grid Convergence Angle: 0.1070 °
Grid Scale Factor: 0.99993688

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 0.138 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 1684.600 ft above MSL
Seabed / Ground Elevation: 1661.000 ft above MSL
Magnetic Declination: 4.796 °
Total Gravity Field Strength: 999.1393mgn (9.80665 Based)
Total Magnetic Field Strength: 52142.057 nT
Magnetic Dip Angle: 65.825 °
Declination Date: January 17, 2013
Magnetic Declination Model: BGGM 2012
North Reference: Grid North
Grid Convergence Used: 0.1070 °
Total Corr Mag North->Grid North: 4.6890 °
Local Coord Referenced To: Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	BR (°/100ft)	TR (°/100ft)	TVDSS (ft)	Closure (ft)	Closure Azimuth (°)	TF (°)	Northing (ftUS)	Easting (ftUS)
SHL Nunemaker#32-1H	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	-1684.60	0.00	0.00	353.15M	426603.61	2050305.72
First SLB MWD	141.00	0.05	353.15	141.00	0.06	0.06	-0.01	0.04	0.04	0.00	-1543.60	0.06	353.15	181.24M	426603.67	2050305.71
	233.00	0.79	181.24	233.00	-0.53	-0.53	-0.03	0.91	0.80	-186.86	-1451.60	0.53	182.78	176.99M	426603.08	2050305.69
	326.00	1.78	176.99	325.97	-2.62	-2.62	0.04	1.07	1.06	-4.57	-1358.63	2.62	179.21	177.61M	426600.99	2050305.76
	418.00	2.84	177.61	417.90	-6.32	-6.32	0.21	1.15	1.15	0.67	-1266.70	6.32	178.13	173.96M	426597.29	2050305.93
	549.00	2.84	173.96	548.74	-12.79	-12.79	0.68	0.14	0.00	-2.79	-1135.86	12.81	176.94	171.79M	426590.82	2050306.40
	643.00	2.59	171.79	642.63	-17.21	-17.21	1.23	0.29	-0.27	-2.31	-1041.97	17.25	175.91	164.61M	426586.40	2050306.95
	736.00	1.86	164.61	735.56	-20.74	-20.74	1.93	0.84	-0.78	-7.72	-949.04	20.83	174.68	162.48M	426582.87	2050307.65
	830.00	1.13	162.48	829.53	-23.09	-23.10	2.62	0.78	-0.78	-2.27	-855.07	23.25	173.54	148.13M	426580.51	2050308.34
	924.00	0.82	148.13	923.51	-24.55	-24.55	3.25	0.42	-0.33	-15.27	-761.09	24.77	172.46	164.13M	426579.06	2050308.97
	1018.00	0.65	164.13	1017.51	-25.63	-25.64	3.75	0.28	-0.18	17.02	-667.09	25.91	171.68	164.27M	426577.97	2050309.47
	1112.00	0.83	164.27	1111.50	-26.80	-26.81	4.08	0.19	0.19	0.15	-573.10	27.11	171.34	146.21M	426576.81	2050309.80
	1206.00	0.39	146.21	1205.49	-27.72	-27.73	4.44	0.51	-0.47	-19.21	-479.11	28.08	170.89	171.07M	426575.89	2050310.16
	1299.00	0.45	171.07	1298.49	-28.34	-28.35	4.68	0.20	0.06	26.73	-386.11	28.73	170.63	155.85M	426575.26	2050310.40
	1393.00	0.51	155.85	1392.49	-29.09	-29.10	4.91	0.06	0.06	-16.19	-292.11	29.51	170.43	160.83M	426574.51	2050310.62
	1487.00	0.57	160.83	1486.48	-29.91	-29.92	5.23	0.08	0.06	5.30	-198.12	30.37	170.09	177.63M	426573.69	2050310.95
	1579.00	0.31	177.63	1578.48	-30.59	-30.60	5.39	0.31	-0.28	18.26	-106.12	31.07	170.01	199.22M	426573.01	2050311.11
	1671.00	0.20	199.22	1670.48	-30.99	-31.00	5.35	0.16	-0.12	23.45	-14.12	31.46	170.21	185.39M	426572.61	2050311.07
	1764.00	0.46	185.39	1763.48	-31.51	-31.53	5.26	0.29	0.28	-14.85	78.88	31.96	170.53	253.06M	426572.09	2050310.98
	1885.00	0.22	253.06	1884.48	-32.07	-32.08	4.99	0.35	-0.20	55.93	199.88	32.46	171.16	247.29M	426571.53	2050310.71
	1947.00	0.28	247.29	1946.47	-32.16	-32.17	4.74	0.10	0.10	-9.31	261.87	32.52	171.62	178.56M	426571.44	2050310.46
	2039.00	0.12	178.56	2038.47	-32.34	-32.35	4.53	0.28	-0.17	-74.71	353.87	32.67	172.02	318.66M	426571.26	2050310.25
	2131.00	0.11	318.66	2130.47	-32.37	-32.38	4.48	0.24	-0.01	152.28	445.87	32.69	172.13	191.6M	426571.23	2050310.20
	2224.00	0.18	191.60	2223.47	-32.45	-32.46	4.39	0.28	0.08	-136.62	538.87	32.76	172.30	80.48M	426571.15	2050310.11
	2316.00	0.05	80.48	2315.47	-32.58	-32.60	4.40	0.22	-0.14	-120.78	630.87	32.89	172.31	159.78M	426571.02	2050310.12
	2408.00	0.12	159.78	2407.47	-32.67	-32.68	4.47	0.13	0.08	86.20	722.87	32.98	172.21	145.25M	426570.93	2050310.19
	2502.00	0.27	145.25	2501.47	-32.94	-32.95	4.63	0.17	0.16	-15.46	816.87	33.28	172.00	147.35M	426570.66	2050310.35
	2596.00	0.34	147.35	2595.47	-33.36	-33.37	4.91	0.08	0.07	2.23	910.87	33.73	171.63	122.39M	426570.24	2050310.63
	2971.00	0.20	122.39	2970.47	-34.64	-34.66	6.06	0.05	-0.04	-6.66	1285.87	35.18	170.08	117.42M	426568.95	2050311.78
	3064.00	0.37	117.42	3063.47	-34.87	-34.88	6.47	0.18	0.18	-5.34	1378.87	35.48	169.50	68.42M	426568.73	2050312.19
	3158.00	0.35	68.42	3157.47	-34.90	-34.92	7.00	0.32	-0.02	-52.13	1472.87	35.61	168.66	69.72M	426568.70	2050312.72
	3335.00	0.12	69.72	3334.46	-34.64	-34.65	7.68	0.13	-0.13	0.73	1649.86	35.49	167.51	351.5M	426568.96	2050313.40
	3402.00	2.23	351.50	3401.45	-33.34	-33.34	7.55	3.30	-116.75	1716.85	176.85	34.18	167.24	358.5M	426570.27	2050313.27
	3439.00	8.07	358.50	3438.28	-30.01	-30.03	7.38	15.85	15.78	18.92	1753.68	30.92	166.20	9.58R	426573.58	2050313.10
	3471.00	13.18	2.26	3469.72	-24.12	-24.13	7.46	16.11	15.97	11.75	1785.12	25.26	162.82	3.78R	426579.48	2050313.18
	3496.00	17.39	3.19	3493.83	-17.53	-17.55	7.78	16.87	16.84	3.72	1809.23	19.20	156.09	4.87R	426586.06	2050313.50
	3533.00	23.68	4.52	3528.46	-4.59	-4.61	8.68	17.05	17.00	3.59	1843.86	9.83	118.00	1.75L	426599.00	2050314.40
	3564.00	26.94	4.30	3556.49	8.62	8.60	9.69	10.52	10.52	-0.71	1871.89	12.96	48.42	12.67L	426612.21	2050315.41

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	BR (°/100ft)	TR (°/100ft)	TVDSS (ft)	Closure (ft)	Closure Azimuth (°)	TF (°)	Northing (ftUS)	Easting (ftUS)
	3589.00	30.32	2.80	3578.43	20.58	20.55	10.43	13.82	13.52	-6.00	1893.83	23.05	26.90	14.1L	426624.16	2050316.15
	3627.00	36.02	0.38	3610.22	41.35	41.32	10.97	15.40	15.00	-6.37	1925.62	42.76	14.87	14.28L	426644.93	2050316.69
	3658.00	39.18	359.11	3634.78	60.26	60.24	10.88	10.50	10.19	-4.10	1950.18	61.21	10.24	27.56L	426663.84	2050316.60
	3683.00	40.35	358.17	3654.00	76.25	76.22	10.50	5.26	4.68	-3.76	1969.40	76.94	7.84	24.92L	426679.83	2050316.22
	3720.00	42.62	356.62	3681.71	100.72	100.70	9.38	6.73	6.14	-4.19	1997.11	101.14	5.32	0.85L	426704.31	2050315.10
	3751.00	44.50	356.58	3704.18	122.05	122.03	8.11	6.07	6.06	-0.13	2019.58	122.30	3.80	1.31R	426725.63	2050313.83
	3778.00	47.06	356.66	3723.01	141.36	141.34	6.97	9.48	9.48	0.30	2038.41	141.51	2.82	8.5R	426744.94	2050312.69
	3814.00	51.41	357.49	3746.51	168.58	168.56	5.58	12.21	12.08	2.31	2061.91	168.66	1.90	4.96L	426772.16	2050311.30
	3845.00	54.12	357.20	3765.26	193.23	193.22	4.44	8.77	8.74	-0.94	2080.66	193.27	1.32	29.18R	426796.81	2050310.16
	3871.00	54.72	357.61	3780.39	214.35	214.34	3.48	2.64	2.31	1.58	2095.79	214.37	0.93	3.6R	426817.94	2050309.20
	3908.00	59.38	357.95	3800.51	245.36	245.36	2.28	12.62	12.59	0.92	2115.91	245.37	0.53	5.27R	426848.95	2050308.00
	3939.00	61.77	358.20	3815.74	272.34	272.34	1.38	7.74	7.71	0.81	2131.14	272.34	0.29	9.48R	426875.93	2050307.10
	3965.00	63.16	358.46	3827.76	295.39	295.39	0.71	5.42	5.35	1.00	2143.16	295.39	0.14	6.92R	426898.98	2050306.43
	4001.00	68.14	359.11	3842.60	328.16	328.17	0.01	13.93	13.83	1.81	2158.00	328.17	0.00	5.26R	426931.75	2050305.73
	4033.00	70.81	359.37	3853.81	358.13	358.13	-0.38	8.38	8.34	0.81	2169.21	358.13	359.94	3.96L	426961.72	2050305.34
	4059.00	71.91	359.29	3862.12	382.76	382.76	-0.67	4.24	4.23	-0.31	2177.52	382.76	359.90	7.21R	426986.35	2050305.05
	4095.00	76.37	359.87	3871.96	417.38	417.38	-0.92	12.49	12.39	1.61	2187.36	417.38	359.87	16.93L	427020.97	2050304.80
	4126.00	77.88	359.40	3878.87	447.60	447.60	-1.12	5.09	4.87	-1.52	2194.27	447.60	359.86	20.92R	427051.18	2050304.60
	4153.00	80.02	0.23	3884.04	474.10	474.10	-1.20	8.48	7.93	3.07	2199.44	474.10	359.85	18.35R	427077.68	2050304.52
	4201.00	85.29	1.98	3890.18	521.68	521.68	-0.28	11.56	10.98	3.65	2205.58	521.68	359.97	2.29R	427125.25	2050303.44
	4263.00	89.79	2.16	3892.84	583.57	583.56	1.96	7.26	7.26	0.29	2208.24	583.57	0.19	141.89L	427187.14	2050303.68
	4358.00	89.28	1.76	3893.61	678.52	678.51	5.21	0.68	-0.54	-0.42	2209.01	678.53	0.44	43.15L	427282.07	2050310.93
	4451.00	90.24	0.86	3894.00	771.49	771.48	7.33	1.41	1.03	-0.97	2209.40	771.51	0.54	174.56L	427375.04	2050313.05
	4544.00	90.03	0.84	3893.78	864.49	864.47	8.71	0.23	-0.23	-0.02	2209.18	864.51	0.58	116.57L	427468.02	2050314.43
	4638.00	89.97	0.72	3893.78	958.48	958.46	9.99	0.14	-0.06	-0.13	2209.18	958.51	0.60	161.01L	427562.01	2050315.71
	4731.00	89.04	0.40	3894.58	1051.47	1051.45	10.90	1.06	-1.00	-0.34	2209.98	1051.51	0.59	61.61R	427654.99	2050316.62
	4825.00	89.24	0.77	3895.99	1145.46	1145.43	11.86	0.45	0.21	0.39	2211.39	1145.50	0.59	177.75L	427748.97	2050317.58
	4919.00	88.73	0.75	3897.66	1239.44	1239.41	13.11	0.54	-0.54	-0.02	2213.06	1239.48	0.61	116.59L	427842.94	2050318.83
	5014.00	88.14	359.57	3900.25	1334.40	1334.37	13.37	1.39	-0.62	-1.24	2215.65	1334.44	0.57	54.03R	427937.90	2050319.09
	5108.00	88.59	0.19	3902.94	1428.36	1428.33	13.18	0.81	0.48	0.66	2218.34	1428.39	0.53	166.34L	428031.85	2050318.90
	5198.00	87.11	359.83	3906.31	1518.29	1518.27	13.19	1.69	-1.64	-0.40	2221.71	1518.32	0.50	69.39L	428121.78	2050318.91
	5291.00	87.52	358.74	3910.67	1611.18	1611.16	12.03	1.25	0.44	-1.17	2226.07	1611.20	0.43	63.08L	428214.66	2050317.75
	5385.00	88.45	356.91	3913.97	1705.04	1705.03	8.47	2.18	0.99	-1.95	2229.37	1705.05	0.28	82.98R	428308.52	2050314.19
Tie-In	5475.00	88.66	358.61	3916.24	1794.93	1794.93	4.95	1.80	0.23	1.89	2231.64	1794.93	0.16	115.47L	428398.42	2050310.67
	5569.00	88.56	358.40	3918.52	1888.87	1888.87	2.50	0.25	-0.11	-0.22	2233.92	1888.87	0.08	4.02R	428492.35	2050308.22
	5662.00	90.41	358.53	3919.36	1981.82	1981.82	0.01	1.99	1.99	0.14	2234.76	1981.82	0.00	49.26L	428585.31	2050305.73
Survey 18Jan13	5752.00	90.72	358.17	3918.47	2071.77	2071.78	-2.58	0.53	0.34	-0.40	2233.87	2071.78	359.93	68.96L	428675.26	2050303.14
	5844.00	90.82	357.91	3917.24	2163.70	2163.72	-5.73	0.30	0.11	-0.28	2232.64	2163.73	359.85	172.12L	428767.19	2050299.99
	5937.00	90.17	357.82	3916.43	2256.62	2256.65	-9.19	0.71	-0.70	-0.10	2231.83	2256.67	359.77	108.43L	428860.11	2050296.53
	6030.00	90.07	357.52	3916.24	2349.54	2349.57	-12.97	0.34	-0.11	-0.32	2231.64	2349.61	359.68	43.53L	428953.03	2050292.75
	6124.00	90.27	357.33	3915.96	2443.43	2443.48	-17.20	0.29	0.21	-0.20	2230.42	2443.54	359.60	47.64R	429046.93	2050288.52
Survey 19Jan13	6217.00	90.89	358.01	3915.02	2536.34	2536.40	-20.98	0.99	0.67	0.73	2230.42	2536.48	359.53	46.19R	429139.84	2050284.74
	6312.00	91.82	358.98	3912.77	2631.27	2631.33	-23.47	1.41	0.98	1.02	2228.17	2631.44	359.49	28.94L	429234.77	2050282.25
	6405.00	93.03	358.31	3908.84	2724.15	2724.22	-25.67	1.49	1.30	-0.72	2224.24	2724.34	359.46	106.49R	429327.66	2050280.05
	6497.00	92.41	0.40	3904.47	2816.11	2816.11	-26.70	2.37	-0.67	2.27	2219.87	2816.23	359.46	169.22L	429419.53	2050279.02
	6591.00	92.20	0.36	3900.69	2909.96	2910.03	-26.08	0.23	-0.22	-0.04	2216.09	2910.15	359.49	109.94R	429513.45	2050279.64
Final Survey	6684.00	91.55	2.15	3897.65	3002.89	3002.95	-24.05	2.05	-0.70	1.92	2213.05	3003.05	359.54	HS	429606.37	2050281.68
Proj to TD	6744.00	91.55	2.15	3896.02	3062.83	3062.89	-21.79	0.00	0.00	0.00	2211.42	3062.97	359.59		429666.30	2050283.93

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	23.600		30.000	30.000	SLB_MWD-STD-Depth Only	Original Borehole / Shell Nunemaker 2509 #32-1H DEF
	23.600	2596.000		30.000	30.000	SLB_MWD-STD	Original Borehole / Shell Nunemaker 2509 #32-1H DEF

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	BR (°/100ft)	TR (°/100ft)	TVDSS (ft)	Closure (ft)	Closure Azimuth (°)	TF (°)	Northing (ftUS)	Easting (ftUS)	
	2596.000		2971.000		1/98.425	30.000	30.000	SLB_MWD-STD									
	2971.000		6684.000		Act Stns	30.000	30.000	SLB_MWD-STD									
	6684.000		6744.000		Act Stns	30.000	30.000	SLB_BLIND+TREND									