

85.10011



Noble Energy PENS1CHS ST01 MWD 5431ft to 13220ft MD Survey Report



Received Office of Oil & Gas NOV 21 2014

(Def Survey)

Report Date: October 30, 2013 - 02:25 PM
Client: Noble Energy
Field: WV Ritchie County (NAD27)
Structure / Slot: Noble Energy PENS1 Pad / PENS1CHS ST01
Well: PENS1CHS
Borehole: Unknown / Unknown
Survey Name: Noble Energy PENS1CHS ST01 MWD 5431ft to 13220ft MD
Survey Date: October 20, 2013
Tort / AHD / DDI / ERD Ratio: 184.923' / 7242.365 ft / 6.443 / 1.135
Coordinates Reference System: NAD27 West Virginia State Plane, Northern Zone, US Feet
Location Lat / Long: N 39° 23' 5.613" W 80° 34' 54.611"
Location Grid N/E / X/Y: N 307616.057 MJS, E 1577735.211 MJS
CRS Grid Convergence Angle: -0.9522 \*
Grid Scale Factor: 0.9995357
Version / Patch: 2.7.998.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 138.443 \* (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: K1
TVD Reference Elevation: 1138.030 ft above MSL
Seabed / Ground Elevation: 1112.050 ft above MSL
Magnetic Declination: -7.706 \*
Total Gravity Field Strength: 969.3062mpm (2.80065 Banded)
Gravity Model: GARM
Total Magnetic Field Strength: 52309.462 nT
Magnetic Dip Angle: 60.888 \*
Declination Date: October 20, 2013
Magnetic Declination Model: HDGM 2013
North Reference: Grid North
Grid Convergence Used: -0.9522 \*
Total Corr Mag North-Grid North: -6.8458 \*
Local Coord Referenced To: Well Head

Table with columns: Comments, MD (ft), Incl (°), Azim Grid (°), TVD (ft), TVDSS (ft), VSEC (ft), NS (ft), EW (ft), DLS (ft/100m), BR (ft/100m), TR (ft/100m), Northing (ftUS), Easting (ftUS), Latitude (N/S °'"), Longitude (E/W °'"), Directional Difficulty Index. The table contains multiple rows of survey data points.

Final 12 1/4" Survey 01- Oct-13

12/05/2014

85-10011

Table with columns: Comments, MD (ft), Incl (°), Azim Grid (°), TVD (ft), TVDSS (ft), VBEC (ft), NS (ft), EW (ft), DLS (ft/100ft), BR (ft/100ft), TR (ft/100ft), Northing (ft), Easting (ft), Latitude (N/S ° ' ''), Longitude (E/W ° ' ''), Directional Difficulty Index. Contains well log data for various depths.

Survey Type: Def Survey

Survey Error Model: ISCB&A Rev 0 \*\*\* 3-D 06.000% Confidence 2.7055 sigma

Survey Program:

Table with columns: Description, Part, MD From (ft), MD To (ft), EOU Freq, Hole Size, Casing Diameter (in), Survey Tool Type, Borehole / Survey. Lists survey parameters for various depths.

Received  
Office of Oil & Gas  
NOV 21 2014

12/05/2014

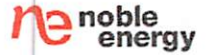
85-10011

Comments	MD (R)	Incl (°)	Adm Grid (°)	TYD (R)	TVDBS (R)	VSEC (R)	NS (R)	EW (R)	DLS (*100R)	BR (*100R)	TR (*100R)	Northing (RUS)	Eastng (RUS)	Latitude (N/S °'")	Longitude (E/W °'")	Directional Difficulty Index
		1	4971.000	5252.000	Act Str	30.000	30.000	SLB_MWD-STD		Original Borehole / Noble Energy PENS1CHS Gyro-MWD 0' MD to Original Borehole / Noble Energy PENS1CHS Gyro-MWD 0' MD to						
		1	5252.000	5312.000	Act Str	30.000	30.000	SLB_MWD-INC_ONLY		Original Borehole / Noble Energy PENS1CHS Gyro-MWD 0' MD to Original Borehole / Noble Energy PENS1CHS Gyro-MWD 0' MD to						
		1	5312.000	5431.000	Act Str	30.000	30.000	SLB_MWD-STD		Original Borehole / Noble Energy PENS1CHS Gyro-MWD 0' MD to ST01 / Noble Energy PENS1CHS ST01 MWD 5431ft to 13220ft MD						
		1	5431.000	13140.000	Act Str	30.000	30.000	SLB_MWD-STD		Original Borehole / Noble Energy PENS1CHS ST01 MWD 5431ft to 13220ft MD						
		1	13140.000	13220.000	Act Str	30.000	30.000	SLB_BLIND-TREND		ST01 / Noble Energy PENS1CHS ST01 MWD 6431ft to 13220ft MD						

Received  
 Office of Oil & Gas  
 NOV 21 2014

12/05/2014

85-10011



Noble Energy PENS1CHS ST01 MWD 5312ft to update Survey Report

(Non-Def Survey)

Report Date: October 29, 2013 - 11:30 AM
Client: Noble Energy
Field: WV Ritchie County (NAD27)
Structure / Slot: Noble Energy PENS1 Pad / PENS1CHS
Well: PENS1CHS
Borehole: ST01
UWI / API#: Unknown / Unknown
Survey Name: Noble Energy PENS1CHS ST01 MWD 5312ft to update
Survey Date: October 20, 2013
Tort / AHD / DDI / ERD Ratio: 184.923 \* / 7242.365 ft / 6.443 / 1.135
Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Feet
Location Lat / Long: N 39° 20' 5.83706", W 80° 59' 34.54618"
Location Grid N/E Y/X: N 307616.057 ftUS, E 1577735.211 ftUS
CRS Grid Convergence Angle: -0.9522 \*
Grid Scale Factor: 0.99995357
Version / Patch: 2.7.998.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 138.443 \* (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: KB
TVD Reference Elevation: 1138.030 ft above MSL
Seabed / Ground Elevation: 1112.050 ft above MSL
Magnetic Declination: -7.798 \*
Total Gravity Field Strength: 999.3062mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 52309.462 nT
Magnetic Dip Angle: 66.888 \*
Declination Date: October 20, 2013
Magnetic Declination Model: HDGM 2013
North Reference: Grid North
Total Corr Mag North->Grid North: -0.9522 \*
Total Corr Mag ->Grid North: -6.8458 \*
Local Coord Referenced To: Well Head

Received
Office of Oil & Gas
NOV 21 2014

Table with columns: Comments, MD (ft), Incl (°), Azim Grid (°), TVD (ft), VSEC (ft), NS (N/S ft), EW (E/W ft), Closure (ft), Closure Azimuth (°), DLS (°/100ft), TF (°). It contains a list of survey points from 5312.00 to 10477.00.

12/05/2014

85-10011

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (N/S ft)	EW (E/W ft)	Closure (ft)	Closure Azimuth (°)	DLS (*/100ft)	TF (°)
	10572.00	90.07	138.88	6357.44	4468.51	S 3305.07	E 3004.89	4466.86	137.72	0.59	142.91L
	10667.00	89.66	138.57	6357.66	4561.51	S 3376.46	E 3067.56	4561.85	137.74	0.54	124.16L
	10763.00	89.47	138.29	6358.39	4657.50	S 3448.28	E 3131.26	4657.84	137.76	0.35	117.51R
	10858.00	89.09	139.02	6359.58	4752.49	S 3519.60	E 3194.01	4752.82	137.78	0.87	73.2L
	10953.00	89.25	138.49	6360.96	4847.48	S 3591.02	E 3256.63	4847.79	137.80	0.58	90R
	11049.00	89.25	138.88	6362.22	4943.47	S 3663.12	E 3320.01	4943.77	137.81	0.41	97.39R
	11145.00	89.18	139.42	6363.53	5039.46	S 3735.73	E 3382.79	5039.74	137.84	0.57	124.39L
	11240.00	88.92	139.04	6365.11	5134.43	S 3807.67	E 3444.82	5134.70	137.86	0.48	150.03R
	11337.00	88.66	139.19	6367.15	5231.41	S 3880.98	E 3508.30	5231.65	137.89	0.31	95.5L
	11433.00	88.61	138.67	6369.44	5327.38	S 3953.34	E 3571.35	5327.61	137.91	0.54	85.04R
	11480.00	88.67	139.36	6370.56	5374.36	S 3988.81	E 3602.17	5374.59	137.92	1.47	88.59L
	11528.00	88.69	138.55	6371.66	5422.34	S 4025.00	E 3633.68	5422.57	137.93	1.69	71.56R
	11577.00	88.76	138.76	6372.75	5471.33	S 4061.78	E 3666.04	5471.55	137.93	0.45	138.59R
	11624.00	88.59	138.91	6373.84	5518.32	S 4097.15	E 3696.97	5518.53	137.94	0.48	40.91L
	11671.00	88.74	138.78	6374.93	5565.30	S 4132.53	E 3727.89	5565.51	137.95	0.42	93.54R
	11718.00	88.69	139.59	6375.99	5612.29	S 4168.09	E 3758.60	5612.49	137.96	1.73	81.47L
	11767.00	88.78	138.99	6377.07	5661.27	S 4205.22	E 3790.55	5661.46	137.97	1.24	94.77L
	11814.00	88.77	138.87	6378.07	5708.26	S 4240.65	E 3821.42	5708.45	137.98	0.26	77.99R
	11910.00	88.87	139.34	6380.05	5804.23	S 4313.20	E 3884.26	5804.41	138.00	0.50	68.35R
	12006.00	89.76	141.58	6381.20	5900.16	S 4387.22	E 3945.36	5900.31	138.04	2.51	87.3R
	12102.00	89.82	142.85	6381.55	5995.95	S 4463.09	E 4004.18	5996.05	138.10	1.32	77.78R
	12197.00	89.95	143.45	6381.74	6090.63	S 4539.11	E 4061.16	6090.69	138.18	0.65	46.68L
	12293.00	90.28	143.10	6381.55	6186.28	S 4616.06	E 4118.56	6186.32	138.26	0.50	160.97L
	12388.00	89.99	143.00	6381.33	6280.98	S 4691.98	E 4175.67	6280.99	138.33	0.32	112.62R
	12484.00	89.89	143.24	6381.43	6376.66	S 4768.77	E 4233.28	6376.66	138.40	0.27	55.62R
	12579.00	90.02	143.43	6381.50	6471.31	S 4844.97	E 4290.01	6471.31	138.48	0.24	113.8L
	12675.00	89.46	142.16	6381.94	6567.03	S 4921.43	E 4348.05	6567.04	138.54	1.45	71.16L
	12770.00	89.89	140.90	6382.48	6661.89	S 4995.80	E 4407.15	6661.91	138.58	1.40	86.33L
	12859.00	90.01	139.03	6382.55	6750.85	S 5063.94	E 4464.40	6750.88	138.60	2.11	52.29L
	12958.00	90.76	138.06	6381.89	6849.85	S 5138.14	E 4529.94	6849.88	138.60	1.24	96.54L
	13055.00	90.69	137.45	6380.66	6946.83	S 5209.94	E 4595.14	6946.88	138.59	0.63	100.62L
	13140.00	90.54	136.65	6379.75	7031.80	S 5272.15	E 4653.06	7031.82	138.57	0.96	HS
Proj To Bit	13220.00	90.54	136.65	6378.99	7111.76	S 5330.32	E 4707.97	7111.77	138.55	0.00	

Survey Type: Non-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	25.980	Act Stns	30.000	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to 6580ft MD
	1	25.980	623.000	Act Stns	30.000	30.000	SLB_NSG+MSHOT	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	623.000	1452.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	1452.000	1643.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	1643.000	1739.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	1739.000	1833.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	1833.000	1928.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	1928.000	2022.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	2022.000	2117.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	2117.000	2213.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	2213.000	2308.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	2308.000	2403.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	2403.000	2687.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	2687.000	2781.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	2781.000	2877.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	2877.000	2972.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	2972.000	3164.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	3164.000	3259.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	3259.000	3450.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	3450.000	3546.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	3546.000	3737.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	3737.000	3832.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	3832.000	4023.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	4023.000	4213.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	4213.000	4308.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to
	1	4308.000	4402.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to

Received  
 Office of Oil & Gas  
 NOV 21 2014

12/05/2014

85-10011

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (N/S ft)	EW (E/W ft)	Closure (ft)	Closure Azimuth (°)	DLS (°/100ft)	TF (°)
		1	4402.000	4782.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY		Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to Original Borehole / Noble Energy PENS1CHS Gyro+MWD 0' MD to ST01 / Noble Energy PENS1CHS ST01 MWD 5312ft to update	
		1	4782.000	4876.000	Act Stns	30.000	30.000	SLB_MWD-STD			
		1	4876.000	4971.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY			
		1	4971.000	5252.000	Act Stns	30.000	30.000	SLB_MWD-STD			
		1	5252.000	5312.000	Act Stns	30.000	30.000	SLB_MWD-INC_ONLY			
		1	5312.000	13220.000	Act Stns	30.000	30.000	SLB_MWD-STD			

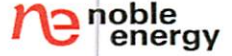
Received  
Office of Oil & Gas  
NOV 21 2014

12/05/2014

85-10011



# Noble Energy



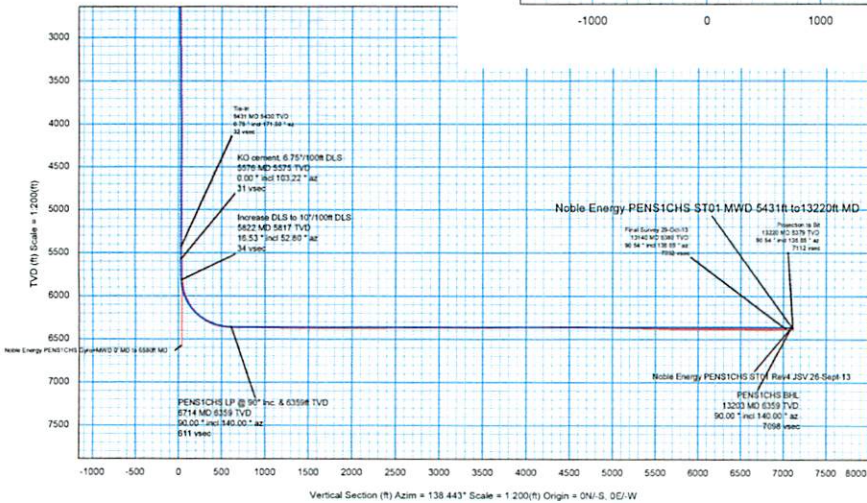
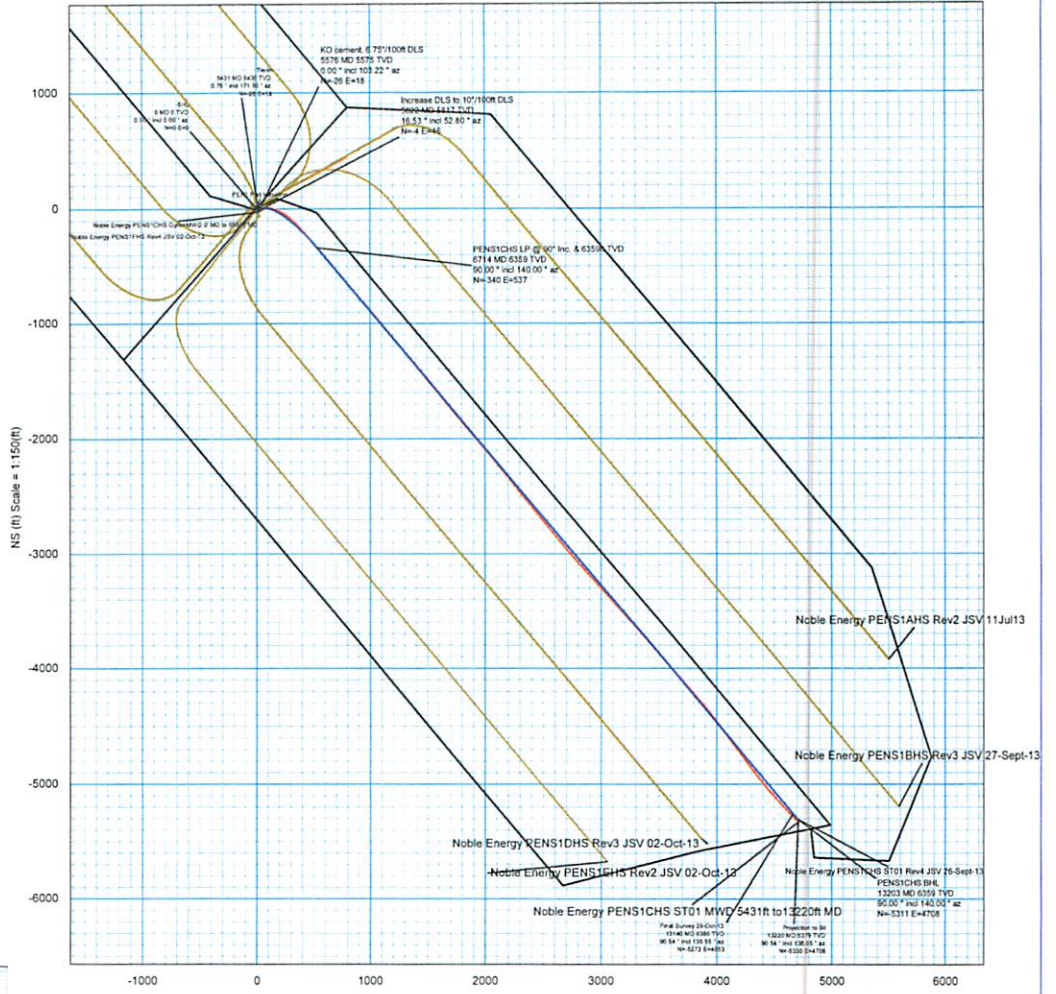
<b>Borehole:</b> ST01	<b>Well:</b> Noble Energy PENS1JHS Rev3 JSV 02-Oct-13	<b>Field:</b> PENS1CHS	<b>Structure:</b> Nomac 78
<b>Surface Location</b> NAD27 West Virginia State Plane, Northern Zone, US Feet Lat: N 39 29 5.84    Northing: 307616.037RUS    Grid Conv: -0.952" Lon: W 89 59 34.55    Easting: 1577735.211RUS    Scale Fact: 1		<b>Miscellaneous</b> Slot: PENS1CHS    TVD Ref: KB(1138.03ft above MSL) Plan: Noble Energy PENS1CHS ST01 MWD 5431ft to 13220ft MD	

Noble Energy PENS1JHS Rev3 JSV 02-Oct-13

Well Name	PENS1CHS ST01
Well Type	MWD
Well Status	Active
Well Depth	13220 ft
Well Completion	Open Hole
Well Orientation	Vertical
Well Location	Noble Energy PENS1CHS ST01 MWD 5431ft to 13220ft MD
Well Operator	Noble Energy
Well Completion Date	02-Oct-13
Well Completion Time	10:20:13
Well Completion Location	Noble Energy PENS1CHS ST01 MWD 5431ft to 13220ft MD
Well Completion Status	Completed
Well Completion Reason	Well Completion
Well Completion Method	Open Hole
Well Completion Equipment	Open Hole
Well Completion Personnel	Open Hole
Well Completion Notes	Open Hole



Grid	North
Mag	True
Grid North Tot Corr (M+G -6.846") Mag Dec (-7.798") Grid Conv (-0.952")	



Part	Seq	Tool	Depth (ft)	Rate (ft/hr)	Temp (°F)	Pressure (psi)	Surf Temp (°F)	Surf Pressure (psi)	Surf Temp (°F)	Surf Pressure (psi)	Surf Temp (°F)	Surf Pressure (psi)
1	3	DTG	25.88	833	Aut Strm	2.25	1.84					
1	3	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	4	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	5	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	6	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	7	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	8	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	9	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	10	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	11	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	12	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	13	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	14	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	15	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	16	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	17	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	18	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	19	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	20	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	21	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	22	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	23	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	24	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	25	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	26	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	27	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	28	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	29	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	30	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	31	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	32	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	33	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	34	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					
1	35	SLB MWD-INC ONLY	30	30	Aut Strm	1.55	1.16					

Critical Point	MD	INCL	ADW	TVD	VSEC	Wt (lb)	Slurry Wt	DLS
Top	5431.00	0.76	171.50	5430.14	21.50	26.62	17.74	
Final Survey 28 Oct-13	13220.00	90.94	136.65	6379.78	7023.80	6212.15	4833.08	0.98
Injection to Bit	13220.00	90.94	136.65	6379.98	7111.78	6330.22	4707.87	0.90

Northing	38718.857	Easting	157718.211	Latitude	N 39 29 5.84	Longitude	W 89 59 34.55	Vic Azimuth	138.443
Target Description	Dimension	Offset	Longitude	Northing	TVD	Vsec	Wt (lb)	Slurry Wt	DLS
PEN1 Well base	NA	N 29 20 6.11	W 89 59 28.28	30768.79	157718.73	118.03	-10.87	12.74	21.83
PENS1CHS LP	NA	N 29 20 5.43	W 89 59 28.87	30768.83	157818.89	6292.87	486.87	287.24	482.90
PENS1CHS DLS	NA	N 29 19 14.12	W 89 58 52.32	30768.17	158202.24	6292.87	782.80	6211.14	4788.28

12/05/2014