

51-01625



Noble Energy MND9AHS MWD 0' MD to update Survey Report

(Non-Def Survey)

Report Date: December 27, 2013 - 09:48 AM
Client: Noble Energy
Field: WV Marshall County (NAD 27)
Structure / Slot: Noble Energy MND9 Pad / MND9AHS MND9AHS
Well: MND9AHS
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
Survey Name: Noble Energy MND9AHS MWD 0' MD to update
Survey Date: December 10, 2013
Tort / AHD / DDI / ERD Ratio: 223.373 / 11722.453 ft / 6.838 / 1.841
Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Feet
Location Lat / Long: N 39° 47' 52.72700"; W 80° 47' 14.34800"
Location Grid NE YX: N 487487.57279US, E 1638479.98470US
CRS Grid Convergence Angle: -0.8210"
Grid Scale Factor: 0.99994715
Version / Patch: 2.7.998.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 314.161 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: KB
TVD Reference Elevation: 1245.600 ft above MSL
Seated / Ground Elevation: 1219.520 ft above MSL
Magnetic Declination: -7.554 °
Total Gravity Field Strength: 969.3452mg (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 52833.045 nT
Magnetic Dip Angle: 67.342 °
Declination Date: December 10, 2013
Magnetic Declination Model: HDGM 2013
North Reference: Grid North
Total Corr Mag North->Grid North: -0.8210 °
Total Corr Mag ->Grid North: -6.7728 °
Local Coord Referenced To: Well Head

Table with columns: Comments, MD (ft), Incl (°), Azim Grid (°), TVD (ft), TVSSD (ft), VSEC (ft), NS (ft), EW (ft), DLS (ft/100ft), BR (ft/100ft), TR (ft/100ft), Northing (ftUS), Easting (ftUS), Latitude (N/S °), Longitude (W/E °), Directional Difficulty Index.

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Comments MD (ft) Incl (°) Azim Grid (°) TVD (ft) TVDSS (ft) VSEC (ft) NS (ft) EW (ft) DLB (°/100ft) BR (°/100ft) TR (°/100ft) Northing (ftUS) Easting (ftUS) Latitude (NS ° ' ") Longitude (EW ° ' ") Directional Difficulty Index

Survey Type: Non-Def Survey

Survey Error Model: ISCVSA 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 Strs	30.000	30.000	SLB_MWD-STD-Depth Only	Original Borehole / Noble Energy MND9AHS MWD 0' MD to update
	1	25.980	660.000	Act Strs	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy MND9AHS MWD 0' MD to update
	1	660.000	1002.000	1/98.425	30.000	30.000	SLB_INC_ONLY<10	Original Borehole / Noble Energy MND9AHS MWD 0' MD to update
	1	1002.000	1569.000	Act Strs	30.000	30.000	SLB_INC_ONLY<10	Original Borehole / Noble Energy MND9AHS MWD 0' MD to update
	1	1569.000	1851.000	Act Strs	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy MND9AHS MWD 0' MD to update
	1	1851.000	2029.000	Act Strs	30.000	30.000	SLB_INC_ONLY<10	Original Borehole / Noble Energy MND9AHS MWD 0' MD to update
	1	2029.000	2322.000	Act Strs	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy MND9AHS MWD 0' MD to update
	1	2322.000	2456.000	Act Strs	30.000	30.000	SLB_INC_ONLY<10	Original Borehole / Noble Energy MND9AHS MWD 0' MD to update
	1	2456.000	18748.000	Act Strs	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy MND9AHS MWD 0' MD to update

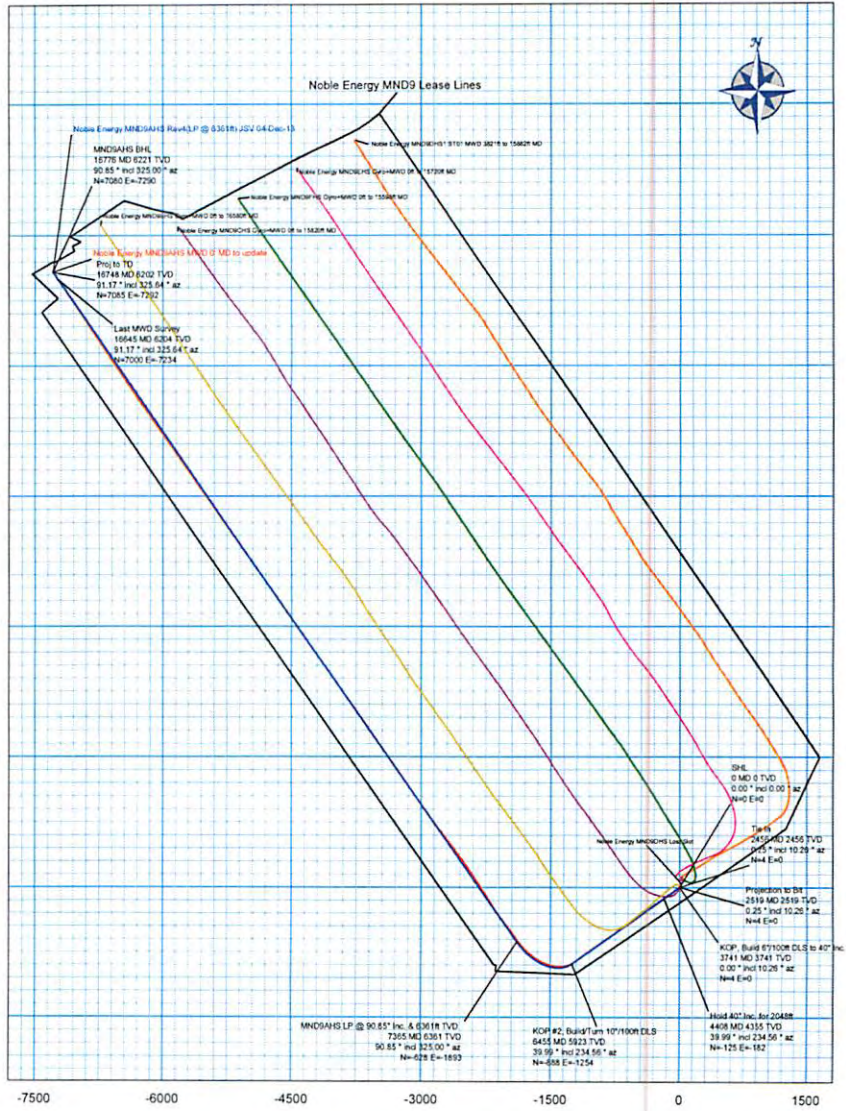
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Noble Energy



Borehole: Original Borehole	Well: MND9AHS	Field: WV Marshall County (NAD 27)	Structure: Nomac 79
Gravity & Magnetic Parameters		Surface Location	Miscellaneous
Model: HDGM 2013 MagDec: -7.594°	Dip: 67.342° FS: 52833.045mT	Date: 12/10/2013 999.345mgm (3.80645 Flared)	Lat: N 39 49 52.73 Lon: W 80 47 14.35
		NAD27 West Virginia State Plane, Northern Zone, US Feet Northing: 487487.572RUS Easting: 1638476.984RUS Grid Conv: -0.821" Scale Factor: 1	Slot: MND9AHS Plan: Noble Energy MND9AHS MWD 0' MD to update
TVD Ref: KB(1245.6ft above MSL)			

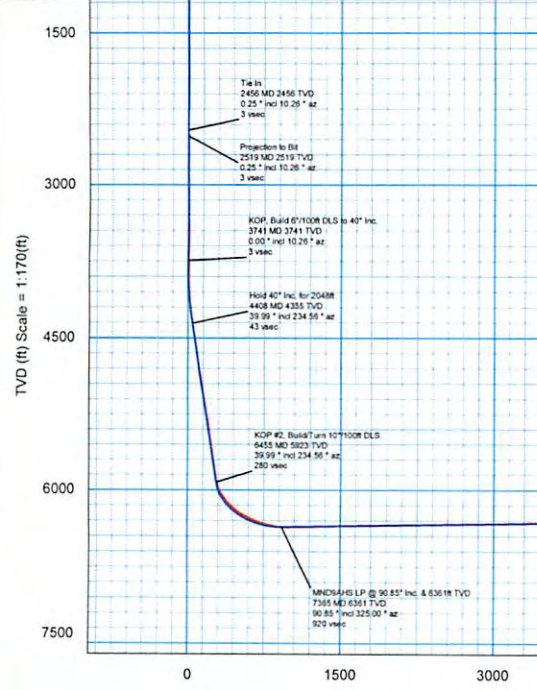


Well	Seq	Survey Tool	Survey Tool Code	Vertical Foot	Horizontal Foot	MD From Bit	MD To	MD From	MD To	Depth	Depth	Curvature	Curvature
1	1	SLB MWD-STD	Only	30	30	0	25.98	860	Act Str	1.25	1.25		
1	2	SLB MWD-STD		30	30	25.98	860	Act Str	1.38	1.38			
1	3	SLB_NC_ONLY+10		30	30	860	1002	Act Str	1.68	1.68	6.43	6.43	
1	4	SLB_NC_ONLY+10		30	30	1002	1868	Act Str	12.8	12.8			
1	5	SLB MWD-STD		30	30	1868	1881	Act Str	12.61	12.61			
1	6	SLB_NC_ONLY+10		30	30	1881	2039	Act Str	12.72	12.72			
1	7	SLB MWD-STD		30	30	2039	2322	Act Str	12.8	12.8			
1	8	SLB_NC_ONLY+10		30	30	2322	2456	Act Str	12.88	12.88			
1	9	SLB MWD-STD		30	30	2456	2518	Act Str	11.67	11.67			

Surface Location	
Northing: 487487.572	Easting: 1638476.984
Latitude: N 39 49 52.73	Longitude: W 80 47 14.35
WGS Azimuth: 314.161	

Target Name	Shape	Dimension	Latitude	Longitude	Northing	Easting	TVD	VSec	N+Y(ft)	E+X(ft)
Noble Energy MND9 Lease Lines	Point	ft	N 39 49 52.73	W 80 47 14.35	487487.572	1638476.984	1245.60	0.46	0.48	-0.17

Critical Point	MD	INCL	AZIM	TVD	VSEC	N+Y(ft)	E+X(ft)	DLR
Surf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Last MWD Survey	1864.30	61.11	325.64	6204.17	10066.33	7066.32	7233.72	0.50
Plg to TD	1874.80	61.11	325.54	6202.07	10167.24	7088.33	7261.84	0.00



Vertical Section (ft) Azim = 314.161° Scale = 1:170(ft) Origin = 0N/-S, 0E/-W

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