

85-10009



Noble Energy PENS1AHS Gyro+MWD 0ft to 12955ft MD Survey Report



Received Office of Oil & Gas NOV 21 2014

(Def Survey)

Report Date: November 19, 2013 - 10:50 AM
Client: Noble Energy
Field: WV Ritchie County (NAD27)
Structure / Slot: Noble Energy PENS1 Pad / PENS1AHS
Well: PENS1AHS
Original Borehole: Unknown / Unknown
UWI / APIS: Noble Energy PENS1AHS Gyro+MWD 0ft to 12955ft MD
Survey Date: November 10, 2013
Tort / AHD / DDI / ERD Rate: 189.733' / 7812.577 ft / 6.478' / 1.223
Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Feet
Location Lat / Long: N 39° 20' 6.17700", W 80° 59' 34.27800"
Location Grid N/E Y/X: N 307650.092 ftUS, E 1577757.007 ftUS
CRS Grid Convergence Angle: -0.9521"
Grid Scale Factor: 0.999995356
Version / Patch: 2.7.998.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 125.833 * (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: KB
Seabed / Ground Elevation: 1138.050 ft above MSL
Magnetic Declination: -7.800 *
Total Gravity Field Strength: 999.3062mgm (g 80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 52301.889 nT
Magnetic Dip Angle: 66.883 *
Declination Date: November 10, 2013
Magnetic Declination Model: HDGM 2013
North Reference: Grid North
Grid Convergence Used: -0.9521"
Total Cor Mag North-Grid: -6.8476 *
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/100ft), BR (ft/100ft), TR (ft/100ft), Northing (ftUS), Easting (ftUS), Latitude (NS ° ' "), Longitude (EW ° ' "), Directional Difficulty Index

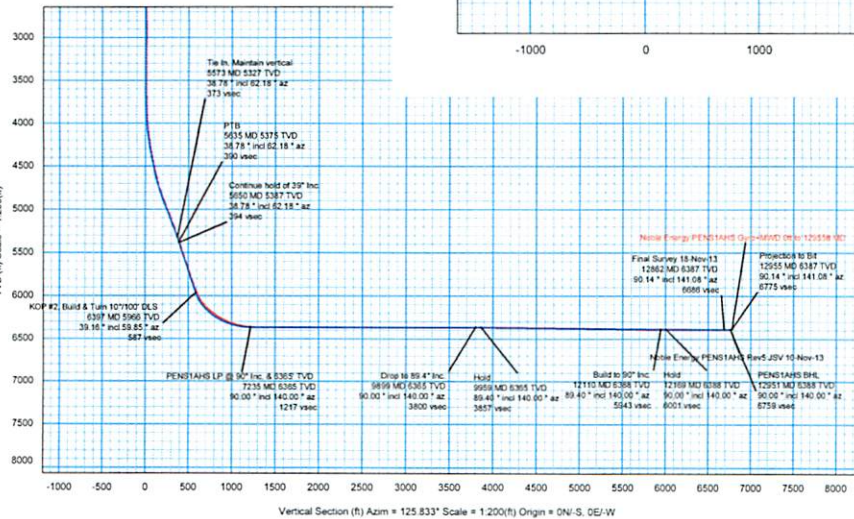
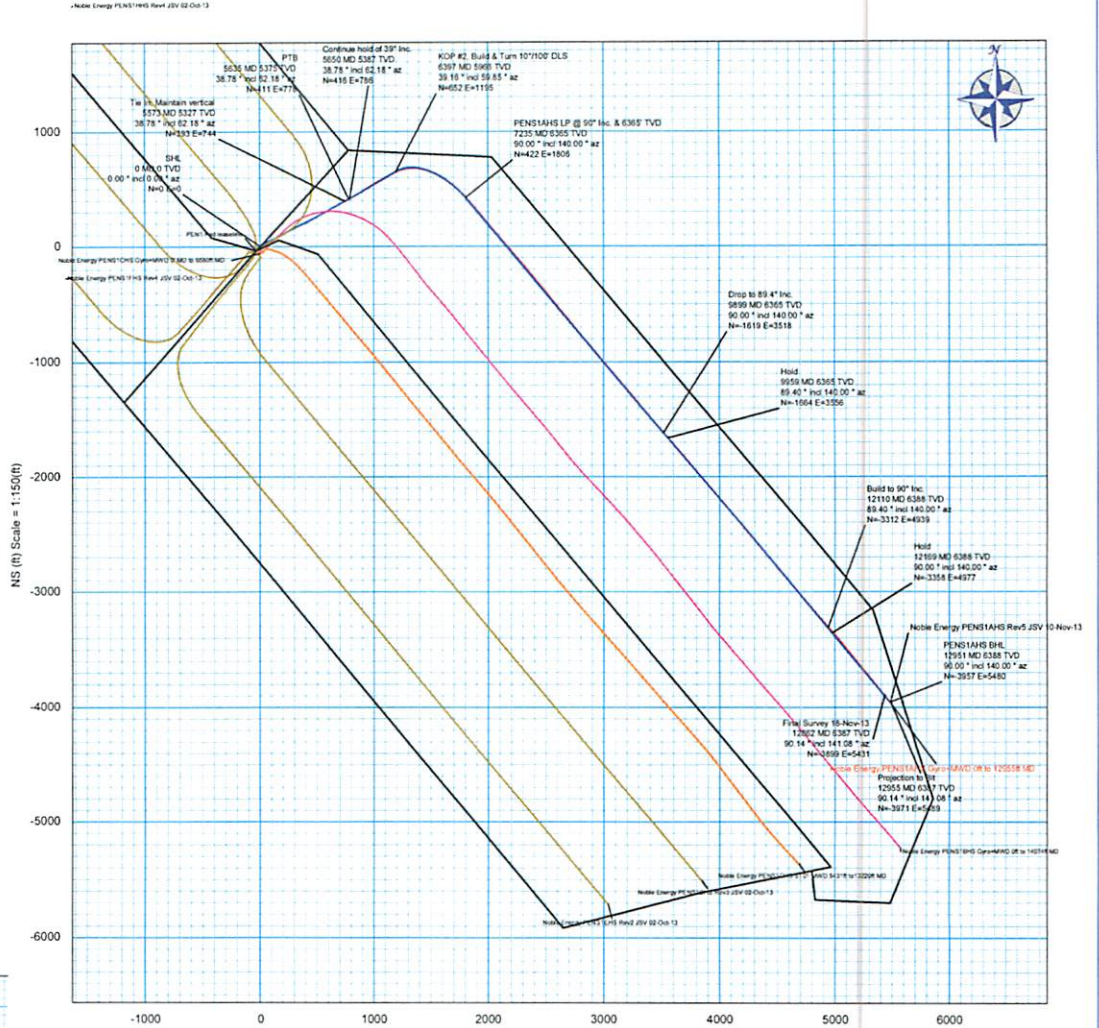
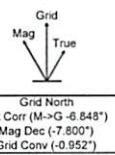
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Borehole:	Original Borehole	Well:	PENS1AHS	Field:	WV Ritchie County (NAD27)	Structure:	Nomac 78
Gravity & Magnetic Parameters	Model: HDGM 2013 MagDec: -7.8°	Dip: 66.833° FS: 52301.889T	Date: 11/10/2013 999.306mg Gravity FS: (L30655, Blank)	Surface Location Lat: N 39 20 6.18 Lon: W 80 59 34.28	NAD27 West Virginia State Plane, Northern Zone, US Feet Northing: 307650.092TUS Easting: 157757.007TUS Scale Fact: 1	Grid Conv: -0.952°	Macellaneous Slot: PENS1AHS Plan: Noble Energy PENS1AHS Gyro-MWD Off to 12955R MD

Noble Energy PENS1AHS Rev5 JGV 10-Nov-13

PTB 5635 MD 5375 TVD 38.78° incl 82.18° az N=111 E=477	Continue hold of 39° Inc 5650 MD 5387 TVD 38.78° incl 82.18° az N=415 E=756	KOP #2 Build & Turn 10°/100' DLS 6397 MD 5969 TVD 39.16° incl 59.85° az N=652 E=1195
Tie In, Maintain vertical 5573 MD 5327 TVD 38.78° incl 82.18° az N=159 E=484	PENS1AHS LP @ 50° Inc. & 6365 TVD 7235 MD 6365 TVD 90.00° incl 140.00° az N=422 E=1808	PENS1AHS BHL 12951 MD 6388 TVD 90.00° incl 140.00° az N=357 E=540
SI# 0.00° incl 0.00° az N=0 E=0	Drop to 89.4° Inc 6899 MD 6365 TVD 90.00° incl 140.00° az N=1619 E=3518	Hold 9959 MD 6365 TVD 89.40° incl 140.00° az N=1564 E=3356
0.00° incl 0.00° az N=0 E=0	Build to 90° Inc 12110 MD 6388 TVD 89.40° incl 140.00° az N=3312 E=4939	Hold 12189 MD 6388 TVD 90.00° incl 140.00° az N=3358 E=4877
0.00° incl 0.00° az N=0 E=0	Final Survey 10-Nov-13 12957 MD 6387 TVD 90.14° incl 141.08° az N=3089 E=5431	Hold 12189 MD 6388 TVD 90.00° incl 140.00° az N=3358 E=4877
0.00° incl 0.00° az N=0 E=0	Final Survey 10-Nov-13 12955 MD 6387 TVD 90.14° incl 141.08° az N=3071 E=5433	Noble Energy PENS1AHS Rev5 JGV 10-Nov-13
0.00° incl 0.00° az N=0 E=0	Noble Energy PENS1AHS Gyro-MWD Off to 12955R MD 12955 MD 6387 TVD 90.14° incl 141.08° az N=3071 E=5433	PENS1AHS BHL 12951 MD 6388 TVD 90.00° incl 140.00° az N=357 E=540
0.00° incl 0.00° az N=0 E=0	Noble Energy PENS1AHS Rev5 JGV 10-Nov-13	Hold 12189 MD 6388 TVD 90.00° incl 140.00° az N=3358 E=4877
0.00° incl 0.00° az N=0 E=0	Noble Energy PENS1AHS Rev5 JGV 10-Nov-13	Noble Energy PENS1AHS Gyro-MWD Off to 12955R MD 12955 MD 6387 TVD 90.14° incl 141.08° az N=3071 E=5433
0.00° incl 0.00° az N=0 E=0	Noble Energy PENS1AHS Rev5 JGV 10-Nov-13	Noble Energy PENS1AHS Gyro-MWD Off to 12955R MD 12955 MD 6387 TVD 90.14° incl 141.08° az N=3071 E=5433



EW (ft) Scale = 1:1500 (ft)

FAIT	Seq	Survey Tool	Vendor/Tool	Hold Size	Down	MWD From	MD To	MD To	N	E	Corr	Comments
1	1	SLR-DCI/DCI/CP/CP/CP/CP	30	30	0	26	637	637	Act Str	1.25	1.25	
1	2	SLR-NSO-MSHKOT	30	30	26	637	637	Act Str	2.66	1.83		
1	3	SLR-INC-ONLY+10	30	30	637	3642	3727	Act Str	20.79	29.21		
1	4	SLR-MWD-STD	30	30	3642	3727	3727	Act Str	22.23	21.95		
1	5	SLR-INC-ONLY+10	30	30	3727	3632	3632	Act Str	25.49	25.36		
1	6	SLR-MWD-STD	30	30	3632	3628	3628	Act Str	33.83	33.8		
1	7	SLR-INC-ONLY+10	30	30	3628	4023	4023	Act Str	36.23	36.82		
1	8	SLR-MWD-STD	30	30	4023	7262	7262	Act Str	149.27	53.91		
1	9	SLR-INC+TRENDS	30	30	7262	7260	7260	Act Str	221.31	88.83		

Critical Point	MD	INCL	AZIM	TVD	VSRIC	N (ft)	E (ft)	DLR
SPL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Final Survey 10-Nov-13	7262.00	90.14	141.08	6387.41	3668.72	3088.18	5431.54	0.37
Production SR	7265.00	90.14	141.08	6387.18	3775.44	3081.46	5448.47	0.00

Target Description	Common	Latitude	Longitude	Northing	Easting	TVD	VSRIC	N (ft)	E (ft)	DLR
PTB	NA	N 39 20 6.17	W 80 59 34.28	307650.09	157757.01	1138.08	-0.05	0.30	-0.27	
PENS1AHS LP	Point	N 39 18 27.87	W 80 58 21.72	305892.87	158225.43	6362.89	6768.94	3066.91	5476.69	
PENS1AHS BHL	Point	N 38 59 14.84	W 80 58 21.72	306071.70	157982.91	6382.94	1271.14	527.82	1483.78	

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