

WR-35  
Rev. 8/23/13

State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Well Operator's Report of Well Work  
WV Department of Environmental Protection

API 47-085-10073 County Ritche District Clay  
Quad Pennsboro Pad Name PEN 2 Field/Pool Name NA  
Farm name Terry & Helen Kiessling Well Number PEN 2 HHS  
Operator (as registered with the OOG) Noble Energy, Inc.  
Address 1000 Noble Energy Drive City Canonsburg State PA Zip 15317

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4354136.52 Easting 498916.88  
Landing Point of Curve Northing 4354166.07 Easting 498668.93  
Bottom Hole Northing 4356336.28 Easting 496785.30

Elevation (ft) 1074.85 GL Type of Well  New  Existing Type of Report  Interim  Final  
Permit Type  Deviated  Horizontal  Horizontal 6A  Vertical Depth Type  Deep  Shallow  
Type of Operation  Convert  Deepen  Drill  Plug Back  Redrilling  Rework  Stimulate  
Well Type  Brine Disposal  CBM  Gas  Oil  Secondary Recovery  Solution Mining  Storage  Other \_\_\_\_\_  
Type of Completion  Single  Multiple Fluids Produced  Brine  Gas  NGL  Oil  Other \_\_\_\_\_  
Drilled with  Cable  Rotary

Drilling Media Surface hole  Air  Mud  Fresh Water Intermediate hole  Air  Mud  Fresh Water  Brine  
Production hole  Air  Mud  Fresh Water  Brine  
Mud Type(s) and Additive(s)  
Synthetic Oil Based

Date permit issued 10/30/2013 Date drilling commenced 01/11/2014 Date drilling ceased 04/20/2014  
Date completion activities began 1/23/2015 Date completion activities ceased 2/17/2015  
Verbal plugging (Y/N) N Date permission granted \_\_\_\_\_ Granted by \_\_\_\_\_

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 454 Open mine(s) (Y/N) depths none  
Salt water depth(s) ft None noted for Offsets Void(s) encountered (Y/N) depths none  
Coal depth(s) ft no coal Cavern(s) encountered (Y/N) depths none  
Is coal being mined in area (Y/N) N

Reviewed by: \_\_\_\_\_

**APPROVED**

NAME: Michael Goff

DATE: 1/30/17

3/30/17  
AX RBDMS

API 47- 085 - 10073 Farm name Terry & Helen Kiessling Well number PEN 2 HHS

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	36	30	40				
Surface	17 1/2	13 3/8	591.4	N	J-55 54.5#		Y
Coal							
Intermediate 1	12 3/8	9 5/8	5,412.0	N	K-55 36#		Y
Intermediate 2							
Intermediate 3							
Production	8 3/4	5 1/2	16,227.0	N	P-110 20#		Y
Tubing							
Packer type and depth set							

Comment Details \_\_\_\_\_

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	TYPE 1	535	15.6	1.20	114.5	0	8
Coal							
Intermediate 1	Class A	Lead 1012 Tail 290	Lead 12.0 Tail 15.8	Lead 1.93 Tail 1.19	Lead 202 Tail 167	0	8
Intermediate 2							
Intermediate 3							
Production	Class A	Lead 400 Tail 2035	Lead 12.3 Tail 14.8	Lead 1.61 Tail 1.36	Lead 167 Tail 207	5249	8
Tubing							

Drillers TD (ft) 16,241      Loggers TD (ft) 16,158  
 Deepest formation penetrated Marcellus      Plug back to (ft) Not a Pilot Hole  
 Plug back procedure Not a Pilot Hole

Kick off depth (ft) 6,942

Check all wireline logs run       caliper     density     deviated/directional     induction  
     neutron     resistivity     gamma ray                     temperature     sonic

Well cored     Yes     No     Conventional     Sidewall                    Were cuttings collected     Yes     No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING    Conductor - No centralizers used. Fresh Water/Surface-  
Surface - 5 centralizers used, one every third joint    Intermediate - 66 centralizers - bow spring centralizers on every joint to KOP, on every third joint from KOP to 100' from surface.  
Production - 292 centralizers - rigid bow spring every third joint from KOP to TOC, rigid bow spring every joint to KOP.

WAS WELL COMPLETED AS SHOT HOLE     Yes     No    DETAILS \_\_\_\_\_

WAS WELL COMPLETED OPEN HOLE?     Yes     No    DETAILS \_\_\_\_\_

WERE TRACERS USED     Yes     No    TYPE OF TRACER(S) USED \_\_\_\_\_

API 47- 085 - 10073 Farm name Terry & Helen Kiessling Well number PEN 2 HHS

**PERFORATION RECORD**

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
	SEE ATTACHED PERFORATION RECORD				

Please insert additional pages as applicable.

**STIMULATION INFORMATION PER STAGE**

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
	SEE ATTACHED STIMULATION INFORMATION PER STAGE RECORD							

Please insert additional pages as applicable.

Perforation Record

API: 47-085-10073

Farm name: TERRY & HELEN KIESSLING

Well Name: PEN-2-H-HS

Stage No.	Stim Date	Top Perf	Bottom Perf	# of Perfs	Formation
Trigger Toe	1/17/2015	15,852	16,083	-	Marcellus
1	1/23/2015	15,852	16,084	50	Marcellus
2	1/23/2015	15,564	15,796	50	Marcellus
3	1/23/2015	15,277	15,509	50	Marcellus
4	1/23/2015	14,989	15,221	50	Marcellus
5	1/24/2015	14,702	14,934	50	Marcellus
6	1/24/2015	14,414	14,646	50	Marcellus
7	1/25/2015	14,127	14,359	50	Marcellus
7 Inj Test	1/27/2015	-	-	-	Marcellus
8	-	-	-	-	Marcellus
9	-	-	-	-	Marcellus
10	-	-	-	-	Marcellus
11	-	-	-	-	Marcellus
12	-	-	-	-	Marcellus
13	-	-	-	-	Marcellus
14	-	-	-	-	Marcellus
15	-	-	-	-	Marcellus
16	-	-	-	-	Marcellus
17	-	-	-	-	Marcellus
18	-	-	-	-	Marcellus
19	-	-	-	-	Marcellus
20	-	-	-	-	Marcellus
21	-	-	-	-	Marcellus
22	-	-	-	-	Marcellus
23	-	-	-	-	Marcellus
24	-	-	-	-	Marcellus
25	-	-	-	-	Marcellus
26	-	-	-	-	Marcellus
27	-	-	-	-	Marcellus
28	-	-	-	-	Marcellus
29	-	-	-	-	Marcellus
30	-	-	-	-	Marcellus
31	-	-	-	-	Marcellus
32	-	-	-	-	Marcellus
33	-	-	-	-	Marcellus

03/31/2017

STIMULATION INFORMATION PER STAGE

API: 47-085-10073

Farm name: TERRY & HELEN KIESSLING

Well Name: PEN-2 -H-HS

Stage No.	Stim Date	Avg Rate (bpm)	ATP (psi)	Max BD Pressure	ISIP (psi)	Proppant (lbs)	Water (BBLs)	Amount of N <sup>2</sup> / other (units)
Trigger Toe	1/17/2015	20.0	8,591	9,777	5,665	-	377	
1	1/23/2015	85.0	8,049	4,914	2,668	605,940	15,887	
2	1/23/2015	85.0	8,146	5,171	3,036	601,010	12,909	
3	1/23/2015	88.0	8,230	5,726	3,430	600,650	14,091	
4	1/23/2015	88.6	8,054	5,414	3,306	599,600	13,038	
5	1/24/2015	86.9	8,220	6,112	3,409	599,450	12,973	
6	1/24/2015	80.0	8,672	5,516	4,741	459,000	15,573	
7	1/25/2015	88.2	8,422	5,380	4,537	246,200	8,323	
7 Inj Test	1/27/2015	5.8	4,622	1,910	4,467	-	924	
8	-	-	-	-	-	-	-	
9	-	-	-	-	-	-	-	
10	-	-	-	-	-	-	-	
11	-	-	-	-	-	-	-	
12	-	-	-	-	-	-	-	
13	-	-	-	-	-	-	-	
14	-	-	-	-	-	-	-	
15	-	-	-	-	-	-	-	
16	-	-	-	-	-	-	-	
17	-	-	-	-	-	-	-	
18	-	-	-	-	-	-	-	
19	-	-	-	-	-	-	-	
20	-	-	-	-	-	-	-	
21	-	-	-	-	-	-	-	
22	-	-	-	-	-	-	-	
23	-	-	-	-	-	-	-	
24	-	-	-	-	-	-	-	
25	-	-	-	-	-	-	-	
26	-	-	-	-	-	-	-	
27	-	-	-	-	-	-	-	
28	-	-	-	-	-	-	-	
29	-	-	-	-	-	-	-	
30	-	-	-	-	-	-	-	
31	-	-	-	-	-	-	-	
32	-	-	-	-	-	-	-	

API 47- 085 - 10073 Farm name Terry & Helen Kiessling Well number PEN 2 HHS

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
<u>Marcellus</u>	<u>6,199</u> TVD	<u>16,241</u> MD
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface \_\_\_\_\_ psi Bottom Hole \_\_\_\_\_ psi DURATION OF TEST \_\_\_\_\_ hrs

OPEN FLOW Gas 3893 mcfpd Oil 135 bpd NGL 493 bpd Water 748 bpd GAS MEASURED BY  Estimated  Orifice  Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	<u>0</u>		<u>0</u>		
	<u>SEE ATTACHED FORMATION SHEET</u>				

Please insert additional pages as applicable.

Drilling Contractor NOMAC  
Address 171 Locust Avenue Ext. City Mt. Morris State PA Zip 15349

Logging Company \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Cementing Company Schlumberger  
Address 4600 J Barry Court, Suite 200 City Canonsburg State PA Zip 15317

Stimulating Company U. S Well Service  
Address 533 Industrial Park Drive City Jane Lew State WV Zip 26378

Please insert additional pages as applicable.

Completed by Regina A. Logue Telephone 724-820-3559  
Signature Regina A. Logue Title Regulatory Analyst Date 4/6/2015

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

Formations	Top TVD	Base TVD	Top MD	Base MD	Fluid
Shale and Sandstone	0	1309	0	1309	
Sandstone	1309	1433	1309	1423	
Shale and Sandstone	1423	1593	1423	1593	
Sandstone	1593	1635	1593	1635	
Shale and Sandstone	1635	1737	1635	1737	
Maxton Sand	1737	1820	1737	1820	
Shale and Sandstone	1820	1943	1820	1943	
Big Lime	1943	1998	1943	1998	
Big Injun	1998	2133	1998	2133	
Price	2133	2405	2133	2405	
Weir	2405	2444	2405	2444	
Shale	2444	2724	2444	2724	
Gordon	2724	2741	2724	6301	
Shale and Sandstone	2741	2921	2741	6302	
5th Sand	2921	2933	2921	6371	
Shale	2933	3076	2933	not encountered	
Sandstone	3076	3090	3076	not encountered	
Shale	3090	3498	3090	not encountered	
Warren	3498	3560	3500	6300	
Shale	3560	3894	3562	6301	
Sandstone	3894	3931	3900	6302	
Shale and Sandstone	3931	4925	3937	6371	
Benson	4925	4987	4941	not encountered	
Shale	4987	5147	5004	not encountered	
Alexander	5147	5215	5166	not encountered	
Shale	5215	5725	5234	not encountered	
Rheinstreet	5725	6051	5750	not encountered	
Cashaqua	6051	6143	6080	not encountered	
Middlesex	6143	6172	6176	not encountered	
West River	6172	6216	6206	not encountered	
Burkett	6216	6259	6253	not encountered	
Tully Limestone	6259	6260	6300	not encountered	
Hamilton	6260	6261	6301	6302	Gas
Marcellus	6261	6320	6302	6371	
Onondaga	6320		6371	not encountered	

# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date	1/23/2015
Job End Date	1/27/2015
State	West Virginia
County	Ritchie
API Number	47-085-10073-00-00
Operator Name	Noble Energy, Inc.
Well Name and Number	Pen 2 H
Longitude	-81.01273600
Latitude	39.33657500
Datum	NAD27
Federal/Tribal Well	NO
True Vertical Depth	6,199
Total Base Water Volume (gal)	3,951,990
Total Base Non Water Volume	184,097



## Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Noble Energy	Base Fluid	Water	7732-18-5	100.00000	89.60661	
40/70 Sand	U.S. Well Services	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	6.61063	
100 Mesh Sand	U.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	3.48070	
HCL Acid (12.6%-18.0%)	U.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.50000	0.15856	
			Hydrogen Chloride	7647-01-0	18.00000	0.03787	
WFRA-1000	U.S. Well Services, LLC	Friction Reducer	Water	7732-18-5	40.00000	0.01956	
			Anionic Polyacrylamide	Proprietary	40.00000	0.01956	
			Petroleum Distillates	64742-47-8	40.00000	0.01575	
			Ethoxylated alcohol blend	Proprietary	5.00000	0.00245	
			Crystalline Salt	12125-02-9	5.00000	0.00245	
SI-1100	U.S. Well Services	Scale Inhibitor	DI Water	7732-18-5	80.00000	0.01311	
			Ethylene Glycol	107-21-1	40.00000	0.00741	



			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8	10.00000	0.00221
			2-Phosphonobutane 1,2,4 tricarboxylic salt	37971-36-1	10.00000	0.00211
			hexamethylenediamine tetra (methylene phosphonic acid)	38820-59-6	10.00000	0.00205
			Copolymer of Maleic and Acrylic acid	26677-99-6	10.00000	0.00193
			bis (hexamethylene) tramine penta (methylene phosphonic acid) - phosphate acid	40623-75-4	10.00000	0.00189
			Acrylic polymer	52255-49-9	5.00000	0.00082
K-BAC 1020	U.S. Well Services, LLC	Anti-Bacterial Agent				
			2,2-dibromo-3-nitripropionamide	10222-01-2	20.00000	0.00811
			Deionized Water	7732-18-5	28.00000	0.00463
CA-4000	U.S. Well Services	Iron Control Additive				
			Ethylene Glycol	107-21-1	20.00000	0.00052
			Triethanolamine hydroxyacetate	58299-02-5	20.00000	0.00037
			Glycolic Acid	79-14-1	2.50000	0.00006
AI-301	U.S. Well Services, LLC	Acid Corrosion Inhibitors				
			Diethylene Glycol	111-46-6	30.00000	0.00024
			Methenamine	100-97-0	20.00000	0.00019
			Hydrogen Chloride	7647-01-0	10.00000	0.00008
			Polyethylene polyamine	58603-67-8	10.00000	0.00007
			Coco amine	51791-14-8	5.00000	0.00003

Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

- \* Total Water Volume sources may include fresh water, produced water, and/or recycled water
- \*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided. Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)



Noble Energy PEN2HHS Surveys 0ft to 16241ft MD Survey Geodetic Report

(Def Survey)

Report Date: April 16, 2014 - 08:26 AM
Client: Noble Energy
Field: WV Ritchie County (NAD27)
Structure / Slot: Noble Energy PEN2 Pad / PEN2HHS
Well: PEN2HHS
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
Survey Name: Noble Energy PEN2HHS Surveys 0ft to 16241ft MD
Survey Date: April 02, 2014
Tort / AHD / DDI / ERD Ratio: 248.404' \* / 10414.154 ft / 6.825' / 1.657
Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Feet
Location Lat / Long: N 39° 20' 11.67000", W 81° 0' 45.85000"
Location Grid N/E Y/X: N 308299.820 ftUS, E 1572143.508 ftUS
CRS Grid Convergence Angle: -0.9648 °
Grid Scale Factor: 0.99995343
Version / Patch: 2.7.1043.0
Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 316.875 \* (Grid North)
Vertical Saction Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: KB
TVD Reference Elevation: 1100.100 ft above MSL
Seabed / Ground Elevation: 1074.100 ft above MSL
Magnetic Declination: -7.859 \*
Total Gravity Field Strength: 999.3087mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 52240.400 nT
Magnetic Dip Angle: 66.845 \*
Declination Date: April 02, 2014
Magnetic Declination Model: HDGM 2013
North Reference: Grid North
Grid Convergence Used: -0.9648 \*
Total Corr Mag North->Grid North: -8.8944 \*
Local Coord Referenced To: Well Head

Table with columns: Comments, MD (ft), Incl (\*), Azim Grid (\*), TVD (ft), VSEC (ft), NS (ft), EW (ft), DLS (\*/100ft), Northing (ftUS), Easting (ftUS), Latitude (N/S \* \*\*), Longitude (E/W \* \*\*)



Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ft)	Easting (ft)	Latitude (N/S ° ° °)	Longitude (E/W ° ° °)
	12659.00	90.28	319.88	6249.87	6479.05	4821.07	-4544.08	1.85	312920.66	1567599.65	N 39 20 58.58	W 81 1 48.88
	12753.00	90.58	320.08	6249.18	6572.91	4893.05	-4804.53	0.30	312992.65	1567539.21	N 39 20 57.28	W 81 1 45.48
	12849.00	90.85	320.18	6249.22	6668.75	4768.73	-4686.08	0.11	313056.32	1567477.67	N 39 20 58.00	W 81 1 48.28
	12945.00	89.87	318.92	6247.78	6784.84	4839.78	-4726.34	1.44	313139.37	1567415.39	N 39 20 58.71	W 81 1 47.07
	13040.00	90.17	318.81	6247.87	6859.58	4811.33	-4790.84	0.24	313210.91	1567352.90	N 39 20 59.40	W 81 1 47.88
	13135.00	90.24	318.04	6247.33	6954.55	4882.40	-4853.88	0.81	313281.98	1567289.86	N 39 21 0.09	W 81 1 48.70
	13231.00	90.58	319.36	6248.64	7050.49	5054.52	-4917.24	1.42	313354.09	1567226.51	N 39 21 0.80	W 81 1 49.52
	13327.00	90.85	319.72	6245.61	7148.39	5127.55	-4978.53	0.38	313427.13	1567164.22	N 39 21 1.51	W 81 1 50.33
	13422.00	90.79	319.57	6244.41	7241.27	5199.94	-5041.04	0.22	313499.51	1567102.71	N 39 21 2.21	W 81 1 51.13
	13518.00	90.76	318.72	6243.12	7337.15	5273.09	-5103.20	0.18	313572.88	1567040.56	N 39 21 2.93	W 81 1 51.93
	13613.00	90.79	319.32	6241.83	7432.04	5345.35	-5164.88	0.42	313644.91	1566978.90	N 39 21 3.63	W 81 1 52.73
	13709.00	90.98	319.39	6240.37	7527.93	5418.18	-5227.39	0.19	313717.74	1566916.38	N 39 21 4.34	W 81 1 53.54
	13804.00	90.82	319.24	6239.14	7622.84	5490.21	-5289.31	0.49	313789.78	1566854.45	N 39 21 5.04	W 81 1 54.35
	13899.00	91.31	321.41	6237.62	7717.65	5563.32	-5349.85	2.43	313862.87	1566793.82	N 39 21 5.75	W 81 1 55.14
	13995.00	91.07	321.16	6235.83	7813.34	5638.21	-5409.88	0.30	313937.75	1566733.79	N 39 21 6.48	W 81 1 55.92
	14090.00	90.83	319.99	6234.05	7908.13	5711.58	-5470.30	1.28	314011.12	1566673.47	N 39 21 7.20	W 81 1 56.70
	14184.00	90.83	319.83	6232.89	8001.99	5783.48	-5530.83	0.17	314083.02	1566612.95	N 39 21 7.90	W 81 1 57.49
	14280.00	90.89	319.99	6231.25	8097.84	5856.92	-5592.85	0.18	314156.45	1566551.13	N 39 21 8.61	W 81 1 58.28
	14375.00	90.83	320.09	6229.74	8192.69	5929.73	-5653.85	0.11	314229.29	1566490.13	N 39 21 9.32	W 81 1 59.08
	14470.00	91.00	320.83	6228.14	8287.49	6002.98	-5714.12	0.78	314302.51	1566429.88	N 39 21 10.04	W 81 1 59.87
	14566.00	91.00	322.90	6226.47	8383.10	6078.47	-5773.39	2.16	314378.00	1566370.40	N 39 21 10.77	W 81 2 0.84
	14660.00	90.79	324.19	6225.00	8478.45	6154.07	-5829.24	1.39	314453.59	1566314.55	N 39 21 11.51	W 81 2 1.38
	14756.00	90.41	324.87	6223.99	8571.58	6232.29	-5884.87	0.90	314531.81	1566258.92	N 39 21 12.27	W 81 2 2.09
	14851.00	90.83	324.20	6223.83	8665.72	6306.72	-5939.92	0.90	314609.23	1566203.87	N 39 21 13.03	W 81 2 2.81
	14945.00	90.98	323.26	6222.81	8759.04	6388.50	-5995.53	1.41	314685.01	1566148.27	N 39 21 13.77	W 81 2 3.53
	15040.00	91.89	321.58	6220.45	8853.57	6460.76	-6053.48	2.02	314760.27	1566090.38	N 39 21 14.50	W 81 2 4.29
	15135.00	92.00	320.25	6217.23	8948.27	6534.45	-6113.31	1.40	314833.98	1566030.50	N 39 21 15.22	W 81 2 5.06
	15230.00	92.27	318.52	6213.69	9043.11	6608.52	-6175.10	1.84	314908.02	1565988.71	N 39 21 15.92	W 81 2 5.87
	15325.00	91.51	318.41	6210.55	9138.05	6678.48	-6239.29	2.38	314975.97	1565904.52	N 39 21 16.60	W 81 2 6.70
	15420.00	90.89	315.56	6208.57	9233.02	6744.78	-6305.28	1.11	315044.27	1565838.53	N 39 21 17.27	W 81 2 7.55
	15516.00	90.83	315.22	6207.12	9328.97	6813.11	-6372.89	0.38	315112.80	1565771.12	N 39 21 17.93	W 81 2 8.43
	15612.00	90.65	315.24	6205.88	9424.92	6881.26	-6440.30	0.19	315180.75	1565703.52	N 39 21 18.59	W 81 2 9.30
	15708.00	90.45	315.01	6204.96	9520.88	6949.29	-6500.03	0.32	315248.77	1565635.80	N 39 21 19.25	W 81 2 10.18
	15805.00	90.48	315.44	6204.18	9617.83	7018.15	-6576.35	0.44	315317.83	1565587.48	N 39 21 19.92	W 81 2 11.06
	15901.00	90.83	315.20	6203.75	9713.80	7088.41	-6643.85	0.53	315385.88	1565499.98	N 39 21 20.58	W 81 2 11.94
	15996.00	90.82	318.37	6203.21	9808.77	7154.49	-6710.09	1.38	315453.96	1565433.74	N 39 21 21.25	W 81 2 12.79
Final Survey	16092.00	91.00	318.03	6201.85	9904.76	7224.92	-6775.31	1.77	315524.39	1565388.53	N 39 21 21.93	W 81 2 13.64
Final Survey	16156.00	91.20	318.18	6200.89	9970.73	7274.04	-6819.37	0.38	315573.51	1565324.46	N 39 21 22.41	W 81 2 14.21
Projection to TD	16241.00	91.20	318.18	6198.85	10053.69	7335.88	-6874.71	0.00	315635.35	1565289.14	N 39 21 23.01	W 81 2 14.93

Survey Type: Def Survey  
Survey Error Model: ISCWSA Rev 0 \*\*\* 3-0 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	26.000	Act Strs	30.000	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Noble Energy PEN2HHS Surveys 0ft to 16241ft MD
	1	26.000	654.000	Act Strs	30.000	30.000	SLB_NSG+MSHOT	Original Borehole / Noble Energy PEN2HHS Surveys 0ft to 16241ft
	1	654.000	698.000	Act Strs	30.000	30.000	SLB_NSG+SSHOT	Original Borehole / Noble Energy PEN2HHS Surveys 0ft to 16241ft
	1	698.000	711.040	Act Strs	30.000	30.000	SLB_INC_ONLY<10	Original Borehole / Noble Energy PEN2HHS Surveys 0ft to 16241ft
	1	711.040	948.000	Act Strs	30.000	30.000	SLB_NSG+SSHOT	Original Borehole / Noble Energy PEN2HHS Surveys 0ft to 16241ft
	1	948.000	5559.000	Act Strs	30.000	30.000	SLB_INC_ONLY<10	Original Borehole / Noble Energy PEN2HHS Surveys 0ft to 16241ft
	1	5559.000	5848.000	Act Strs	30.000	30.000	SLB_MWD-INC_ONLY>10	Original Borehole / Noble Energy PEN2HHS Surveys 0ft to 16241ft
	1	5848.000	16158.000	Act Strs	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy PEN2HHS Surveys 0ft to 16241ft
	1	16158.000	16241.000	Act Strs	30.000	30.000	SLB_BLIND+TREND	Original Borehole / Noble Energy PEN2HHS Surveys 0ft to 16241ft



# Noble Energy



**Borehole:** Original Borehole      **Well:** PEN2HHS      **Field:** WV Ritchie County (NAD27)      **Structure:** Nomac 78

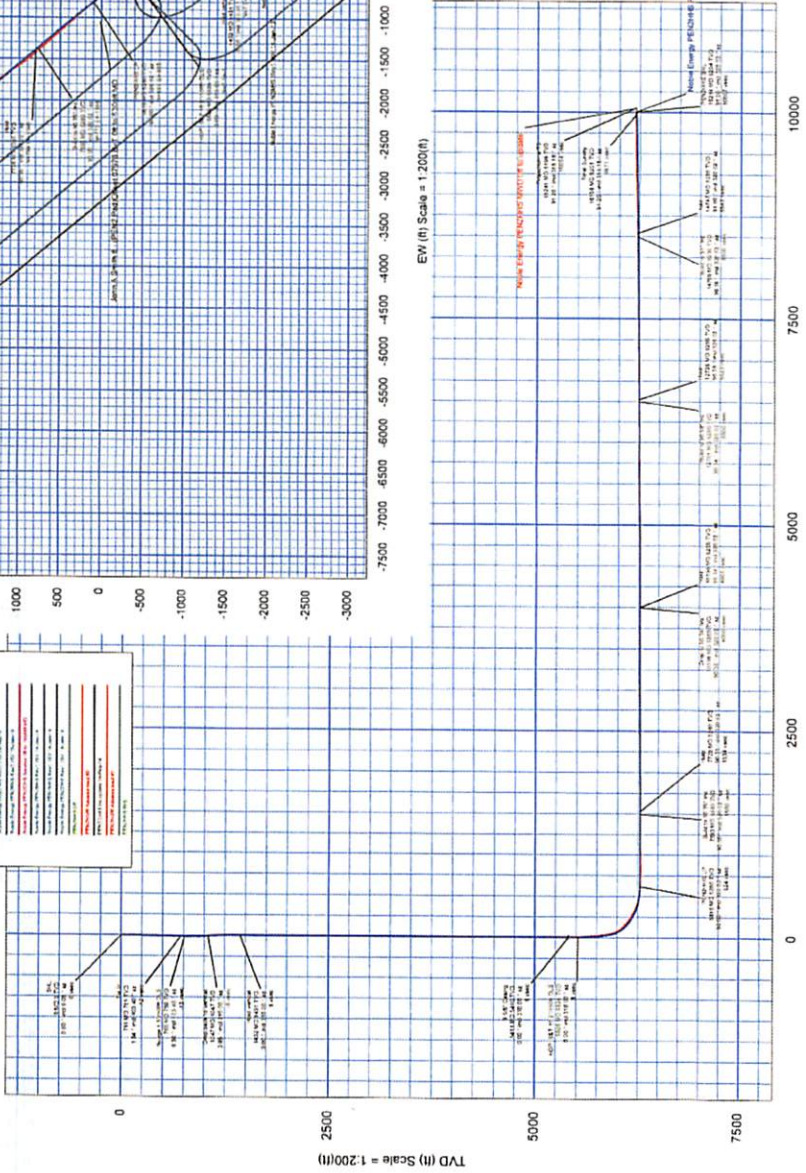
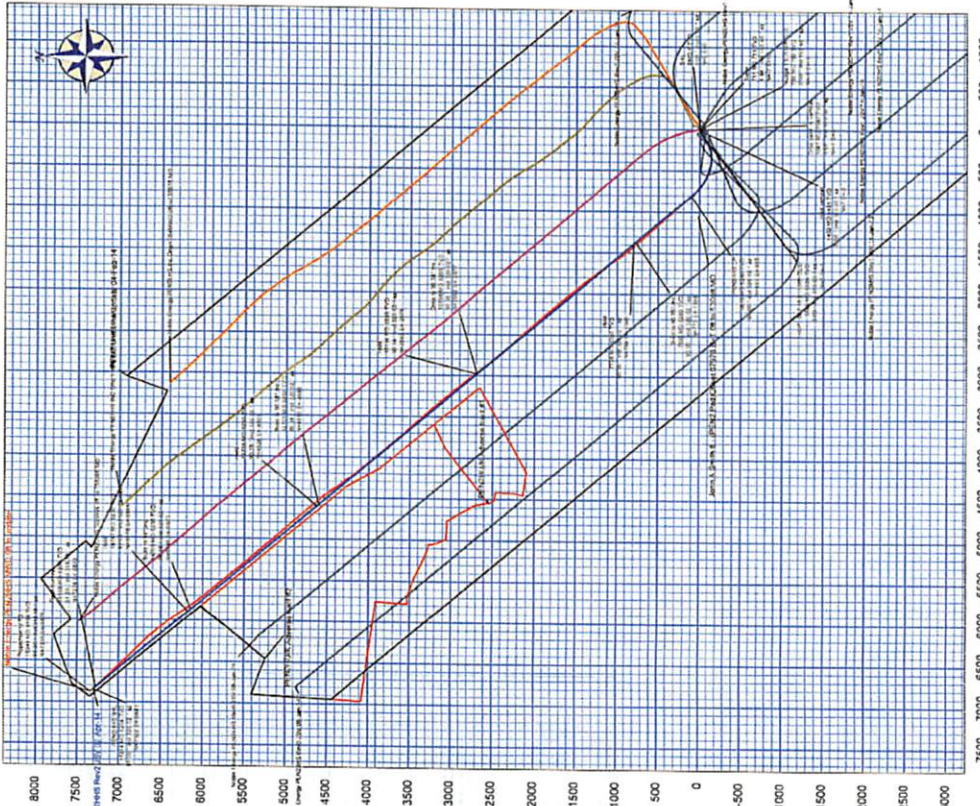
**Gravity & Magnetic Parameters**  
 Model: NDCM 2013    Dip: 86.34°    Date: 02-20-2014  
 MagDec: -7.33°    Gravity F3: 999.20mgals (86868 Based)

**Surface Location**  
 Location: MD27 West Virginia State Plane, Northern Zone, US Feet  
 UTM Zone: 18QUD    UTM Easting: 177143.09m    UTM Northing: 388259.12m    Grid Contour: -8.264°  
 Meters Above MSL: 819991313    Scale Factor: 0.999991313

Core Piece	MS	INCH	CM	INCH	CM	INCH	CM	INCH	CM	INCH	CM
1	3.0	0.06	1.52	3.81	9.65	24.45	6.20	1.57	3.99	10.16	25.91
2	3.0	0.06	1.52	3.81	9.65	24.45	6.20	1.57	3.99	10.16	25.91
3	3.0	0.06	1.52	3.81	9.65	24.45	6.20	1.57	3.99	10.16	25.91
4	3.0	0.06	1.52	3.81	9.65	24.45	6.20	1.57	3.99	10.16	25.91
5	3.0	0.06	1.52	3.81	9.65	24.45	6.20	1.57	3.99	10.16	25.91
6	3.0	0.06	1.52	3.81	9.65	24.45	6.20	1.57	3.99	10.16	25.91
7	3.0	0.06	1.52	3.81	9.65	24.45	6.20	1.57	3.99	10.16	25.91
8	3.0	0.06	1.52	3.81	9.65	24.45	6.20	1.57	3.99	10.16	25.91
9	3.0	0.06	1.52	3.81	9.65	24.45	6.20	1.57	3.99	10.16	25.91
10	3.0	0.06	1.52	3.81	9.65	24.45	6.20	1.57	3.99	10.16	25.91

Depth (ft)	Depth (m)	Tool Joint (ft)	Tool Joint (m)	Tool Joint (ft)	Tool Joint (m)	Tool Joint (ft)	Tool Joint (m)
0	0.00	0	0.00	0	0.00	0	0.00
1	0.30	0	0.00	0	0.00	0	0.00
2	0.60	0	0.00	0	0.00	0	0.00
3	0.90	0	0.00	0	0.00	0	0.00
4	1.20	0	0.00	0	0.00	0	0.00
5	1.50	0	0.00	0	0.00	0	0.00
6	1.80	0	0.00	0	0.00	0	0.00
7	2.10	0	0.00	0	0.00	0	0.00
8	2.40	0	0.00	0	0.00	0	0.00
9	2.70	0	0.00	0	0.00	0	0.00
10	3.00	0	0.00	0	0.00	0	0.00

Depth (ft)	Depth (m)	Tool Joint (ft)	Tool Joint (m)	Tool Joint (ft)	Tool Joint (m)	Tool Joint (ft)	Tool Joint (m)
0	0.00	0	0.00	0	0.00	0	0.00
1	0.30	0	0.00	0	0.00	0	0.00
2	0.60	0	0.00	0	0.00	0	0.00
3	0.90	0	0.00	0	0.00	0	0.00
4	1.20	0	0.00	0	0.00	0	0.00
5	1.50	0	0.00	0	0.00	0	0.00
6	1.80	0	0.00	0	0.00	0	0.00
7	2.10	0	0.00	0	0.00	0	0.00
8	2.40	0	0.00	0	0.00	0	0.00
9	2.70	0	0.00	0	0.00	0	0.00
10	3.00	0	0.00	0	0.00	0	0.00



Grid North  
 Mag Dec (7° 35' 59")  
 Grid Conv. (0.9857)

Vertical Section (ft) Azim = 316.86° Scale = 1:200(ft) Origin = 0N/1S, 0E/W

Well is located on topo map 13,960' feet south of Latitude: 39° 22' 30"

Well is located on topo map 3,551' feet west of Longitude: 81° 00' 00"

**PERMITTED  
BOTTOM HOLE LOCATION (BHL)**  
UTM 17-NAD83  
N:4356335.92  
E:496786.86  
NAD27\_WV NORTH  
N:315634.07  
E:1565274.24  
LAT/LON DATUM-NAD83  
LAT:39.356466  
LON:-81.037295

**AS DRILLED  
BOTTOM HOLE LOCATION (BHL)**  
UTM 17-NAD83  
N:4356336.28  
E:496785.30  
NAD27\_WV NORTH  
N:315635.34  
E:1565269.14  
LAT/LON DATUM-NAD83  
LAT:39.356470  
LON:-81.037313

**LEASE LESSORS**  
1 TERRY KIESSLING ET AL  
2 JOHN A. SMITH ET AL  
3 COASTAL FOREST RESOURCES COMPANY  
4 MARY JANE MATHESIC ET AL  
5 JAMES P. JONES JR ET AL

**LEGEND**  
TOPO MAP BOUNDARY  
WELL  
ALL ARE POINTS UNLESS OTHERWISE NOTED  
LEASE NUMBER  
MINERAL TRACT BOUNDARY  
PARCEL LINES  
WELL REFERENCE  
PROPOSED HORIZONTAL WELL  
ROAD  
STREAM OTHER LINE  
AS DRILLED  
EXISTING WELLS  
EXISTING WELLS  
PLUGGED WELLS

**Blue Mountain Inc.**  
10125 MASON DIXON HIGHWAY  
BURTON WV 26562  
PHONE: (304) 662-6486

REFERENCE DETAIL

LINE	BEARING	DISTANCE
R1	N 2°50'36" W	149.56'
R2	N 72°26'22" E	267.11'
R3	S 17°37'04" E	187.65'
R4	N 58°44'52" W	1806.16'
R5	N 19°32'56" W	1811.34'
R6	N 16°05'47" E	1637.55'

- NOTES:
- There are no water wells or developed springs within 250' of proposed well.
  - There are no existing buildings within 625' of proposed well.
  - Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
  - There are no native trout streams within 300' of proposed well.
  - Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
  - It is not the purpose or intention of this plat to represent surveyed locations of the surface or mineral parcels depicted hereon. The location of the boundary lines, as shown, are based on record deed descriptions, field evidence found and/or tax map position, unless otherwise noted.

**PERMITTED  
APPROX. LANDING POINT**  
UTM 17-NAD83  
N:4354163.24  
E:498671.23  
NAD27\_WV NORTH  
N:308401.00  
E:1571338.84  
LAT/LON DATUM-NAD83  
LAT:39.336894  
LON:-81.015419

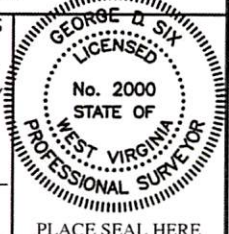
**AS DRILLED  
APPROX. LANDING POINT**  
UTM 17-NAD83  
N:4354166.07  
E:498668.93  
NAD27\_WV NORTH  
N:308410.40  
E:1571331.46  
LAT/LON DATUM-NAD83  
LAT:39.336919  
LON:-81.015445

**AS DRILLED  
SURFACE HOLE LOCATION (SHA)**  
UTM 17-NAD83  
N:4354136.52  
E:498916.88  
NAD27\_WV NORTH  
N:308299.82  
E:1572143.51  
LAT/LON DATUM-NAD83  
LAT:39.336653  
LON:-81.012568

**PERMITTED  
SURFACE HOLE LOCATION (SHA)**  
UTM 17-NAD83  
N:4354136.49  
E:498916.89  
NAD27\_WV NORTH  
N:308299.73  
E:1572143.52  
LAT/LON DATUM-NAD83  
LAT:39.336653  
LON:-81.012568

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Signed: *[Signature]*  
R.P.E.: \_\_\_\_\_ L.L.S.: P.S. No. 2000



FILE #: PEN2HHS-AS DRILLED  
DRAWING #: PEN2HHS-AS DRILLED  
SCALE: 1" = 2000'  
MINIMUM DEGREE OF ACCURACY: 1/2500  
PROVEN SOURCE OF ELEVATION: U.S.G.S. MONUMENT THOMAS 1498.81'

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS WVDEP  
OFFICE OF OIL & GAS  
601 57TH STREET  
CHARLESTON, WV 25304



DATE: FEBRUARY 11, 2015  
OPERATOR'S WELL #: PEN2HHS-AS DRILLED  
API WELL #: 47 85 10073  
STATE COUNTY PERMIT

Well Type:  Oil  Waste Disposal  Production  Deep  
 Gas  Liquid Injection  Storage  Shallow

WATERSHED: NORTH FORK HUGHES RIVER ELEVATION: 1084±  
COUNTY/DISTRICT: RITCHIE / CLAY QUADRANGLE: ELLENBORO, WV 7.5'  
SURFACE OWNER: TERRY & HELEN KIESSLING ACREAGE: 79.242±  
OIL & GAS ROYALTY OWNER: TERRY KIESSLING ET AL ACREAGE: 514.618±

DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE   
PLUG OFF OLD FORMATION  PERFORATE NEW FORMATION  PLUG & ABANDON   
CLEAN OUT & REPLUG  OTHER CHANGE  (SPECIFY): \_\_\_\_\_

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6,314± TMD: 16,331±  
WELL OPERATOR NOBLE ENERGY, INC. DESIGNATED AGENT STEVEN M. GREEN  
Address 333 TECHNOLOGY DRIVE, SUITE 116 Address 500 VIRGINIA STREET EAST, UNITED CENTER SUITE 590  
City CANONSBURG State PA Zip Code 15317 City CHARLESTON State WV Zip Code 25301

03/31/2017