

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

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 Office of Oil and Gas

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug **APR 09 2015**
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

WV Department of Environmental Protection

Reviewed by:
A.L. 5/26/15
WA.S. 05/06/15 **06/12/2015**

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 ³ /sks)	Volume (ft ³)	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 15.6	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 _____

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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							

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Please insert additional pages as applicable.

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 ² / 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	-	-	-	-	-	-	-	
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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>	
Marcellus	6,199	TVD 16,241 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 DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
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	0		0		
	SEE ATTACHED FORMATION SHEET				

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
Signature *Regina A. Logue* Title Regulatory Analyst

Telephone 724-820-3859
Date 4/6/2015

Submittal of Hydraulic Fracturing Chemical Disclosure Information

Attach copy of FRACFOCUS Registry

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WV Department of Environmental Protection
06/12/2015

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	J.S. Well Services	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	6.61063	
100 Mesh Sand	J.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	3.48070	
HCL Acid (12.6%-18.0%)	J.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.50000	0.15856	
APB	J.S. Well Services, LLC	Friction Reducer	Hydrogen Chloride	7647-01-0	18.00000	0.03787	
WVBA-1000	J.S. Well Services, LLC	Friction Reducer	Water	7732-18-5	40.00000	0.01956	
WVBA-1000	J.S. Well Services, LLC	Friction Reducer	Anionic Polyacrylamide	Proprietary	40.00000	0.01956	
WVBA-1000	J.S. Well Services, LLC	Friction Reducer	Petroleum Distillates	54742-47-8	40.00000	0.01575	
WVBA-1000	J.S. Well Services, LLC	Friction Reducer	Ethoxylated alcohol blend	Proprietary	5.00000	0.00245	
WVBA-1000	J.S. Well Services, LLC	Friction Reducer	Crystalline Salt	12125-02-9	5.00000	0.00245	
WVBA-1000	J.S. Well Services, LLC	Scale Inhibitor	DI Water	7732-18-5	80.00000	0.01311	
WVBA-1000	J.S. Well Services, LLC	Scale Inhibitor	Ethylene Glycol	107-21-1	40.00000	0.00741	

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			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) triamine 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	J.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	J.S. Well Services	Iron Control Additive				
			Ethylene Glycol	107-21-1	20.00000	0.00052
			Triethanolamine hydroxyacetate	38299-02-5	20.00000	0.00037
			Glycolic Acid	79-14-1	2.50000	0.00006
AI-301	J.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	38603-67-8	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)

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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 KESSLING ET AL
2	JOHN A. SMITH ET AL
3	COASTAL FOREST RESOURCES COMPANY
4	MARY JANE MATHESSE ET AL
5	JAMES P. JONES JR ET AL

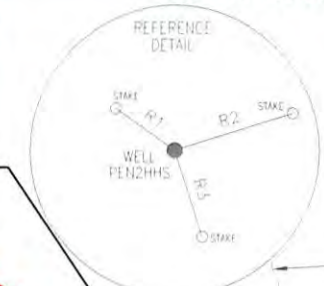
LEGEND

- TOPO MAP POINT
- WELL
- ALL ARE POINTS UNLESS OTHERWISE NOTED
- LEASE NUMBER
- MINERAL TRACT BOUNDARY
- PARCEL LINES
- WELL REFERENCE
- PROPOSED HORIZONTAL WELL
- ROAD
- STREAM CENTER LINE
- AS DRILLED

EXISTING WELLS

- EXISTING WELLS
- PLUGGED WELLS

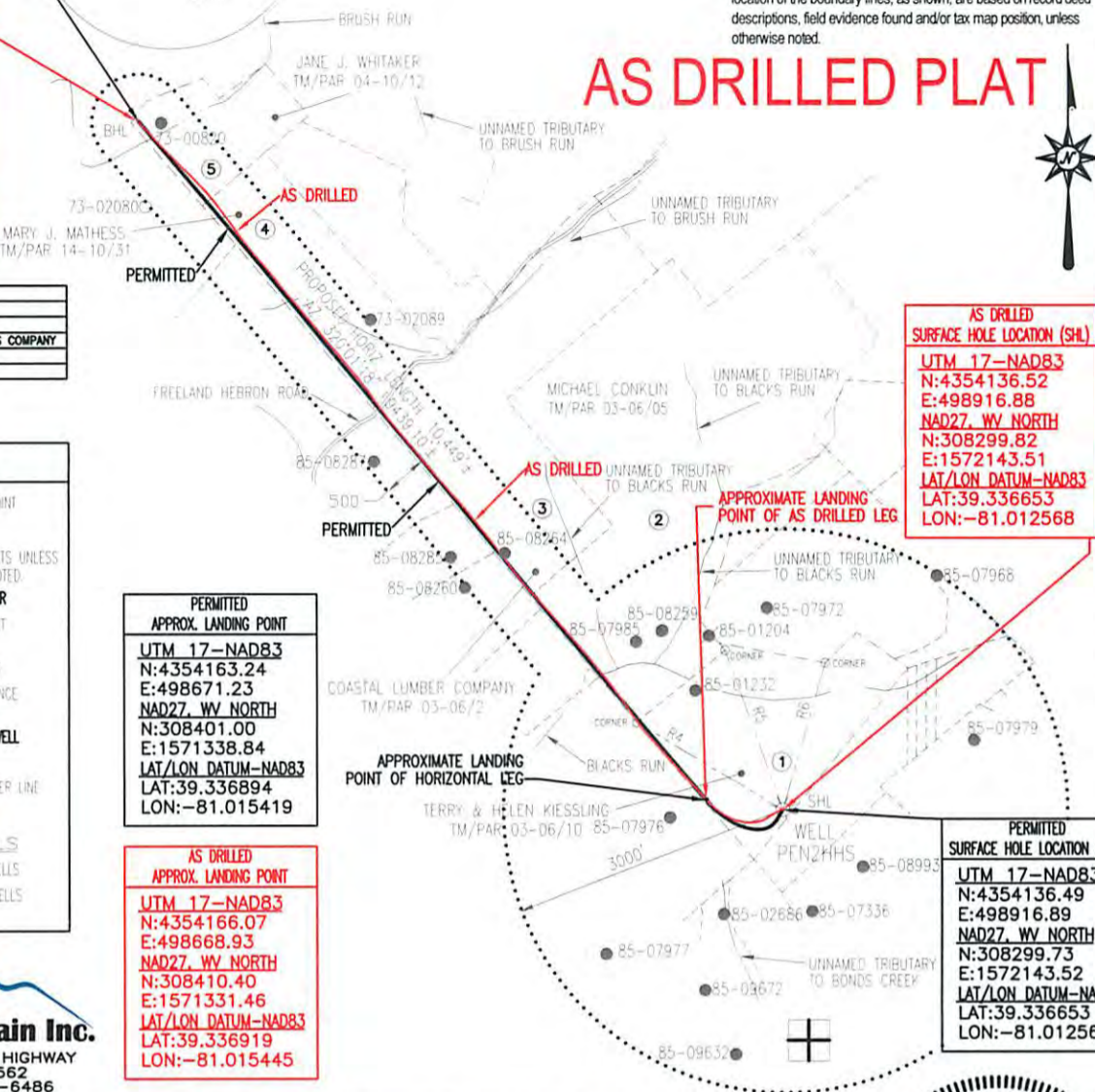
Blue Mountain Inc.
10125 MASON DIXON HIGHWAY
BURTON, WV 26562
PHONE: (304) 662-6486



LINE	BEARING	DISTANCE
R1	N 53°50'58" W	149.56'
R2	N 72°28'22" E	257.11'
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	1637.50'

- 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.

AS DRILLED PLAT



**AS DRILLED
SURFACE HOLE LOCATION (SHL)**
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
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

**PERMITTED
SURFACE HOLE LOCATION (SHL)**
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

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'

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



(+) 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 OF WEST VIRGINIA PERMIT

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

WATERSHED: NORTH FORK HUGHES RIVER
COUNTY/DISTRICT: RITCHIE / CLAY QUADRANGLE: ELLINGBOURNE 75'
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

06/12/2015