

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

API 47 - 085 - 10071 County Ritche District Clay
Quad Pennsboro Pad Name PEN 2 Field/Pool Name NA
Farm name Terry & Helen Kiessling Well Number PEN 2 FHS
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 4354140.83 Easting 498928.13
Landing Point of Curve Northing 4354437.43 Easting 499049.93
Bottom Hole Northing 4356234.66 Easting 497473.95

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 01/08/2014 Date drilling ceased 03/16/2014
Date completion activities began 10/26/2014 Date completion activities ceased 2/24/2015
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

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Reviewed by:
A.L. 5/26/15
W.S. 06/12/2015

API 47-085 - 10071 Farm name Terry & Helen Kiessling Well number PEN 2 FHS

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	594.5	N	J-55 54.5#		Y
Coal							
Intermediate 1	12 3/8	9 5/8	5,481.6	N	K-55 36#		Y
Intermediate 2							
Intermediate 3							
Production	8 3/4	5 1/2	14,649.0	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	532	15.6	1.20	113	0	8
Coal							
Intermediate 1	Class A	Lead 982.4 Tail 293.5	Lead 12.0 Tail 15.6	Lead 1.85 Tail 1.19	Lead 201 Tail 208	0	8
Intermediate 2							
Intermediate 3							
Production	Class A	Lead 410 Tail 1692	Lead 13.0 Tail 14.8	Lead 1.61 Tail 1.41	Lead 118 Tail 207	5506	8
Tubing							

Drillers TD (ft) 14,664 Loggers TD (ft) 14,566
 Deepest formation penetrated Marcellus Plug back to (ft) Not a Pilot Hole
 Plug back procedure Not a Pilot Hole

Kick off depth (ft) 6,954

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 - 69 centralizers - bow spring centralizers on every joint to KOP, on every third joint from KOP to 100' from surface.
Production - 282 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 _____

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WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

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WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____

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Perforation Record

API: 47-085-10071

Farm name: TERRY & HELEN KIESSLING

Well Name: PEN-2-F-HS

Stage No.	Stim Date	Top Perf	Bottom Perf	# of Perfs	Formation
Trigger Toe	10/25/2014	14519	14,522	-	Marcellus
1	10/26/2014	14269	14,506	50	Marcellus
2	10/26/2014	13974	14,212	50	Marcellus
3	10/27/2014	13680	13,917	50	Marcellus
4	10/27/2014	13385	13,622	50	Marcellus
4 Inj Test	10/29/2014	0	-	-	Marcellus
4B (Reperf)	10/29/2014	13365	13,377	24	Marcellus
5	10/30/2014	13091	13,328	50	Marcellus
6	10/30/2014	12796	13,034	50	Marcellus
7	10/31/2014	12502	12,739	50	Marcellus
8	11/1/2014	12207	12,445	50	Marcellus
9	11/2/2014	11913	12,150	50	Marcellus
10	11/2/2014	11618	11,856	50	Marcellus
11	11/3/2014	11324	11,561	50	Marcellus
11 Inj test 1	11/4/2014	-	-	-	Marcellus
11 Inj Test 2	11/5/2014	-	-	-	Marcellus
11B (Reperf)	11/5/2014	11314	11,332	24	Marcellus
12	11/5/2014	11029	11,267	50	Marcellus
13	11/6/2014	10735	10,972	50	Marcellus
14	11/7/2014	10440	10,678	50	Marcellus
15	11/7/2014	10146	10,383	50	Marcellus
16	11/8/2014	9851	10,089	50	Marcellus
17	11/14/2014	9557	9,794	50	Marcellus
18	11/15/2014	9262	9,500	50	Marcellus
19	11/15/2014	8968	9,205	50	Marcellus
20	11/15/2014	8673	8,911	50	Marcellus
21	11/15/2014	8379	8,616	50	Marcellus
22	11/16/2014	8084	8,322	50	Marcellus
23	11/16/2014	7790	8,027	50	Marcellus
24	11/16/2014	7495	7,733	50	Marcellus
25	11/17/2014	7201	7,438	50	Marcellus
26	11/17/2014	6906	7,144	50	Marcellus
27	11/17/2014	6612	6,849	50	Marcellus

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STIMULATION INFORMATION PER STAGE

API: 47-085-10071

Farm name: TERRY & HELEN KIESSLING

Well Name: PEN-2 -F-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	10/25/2014	-	-	9,470	6,175	-	201	
1	10/26/2014	87.9	7,219	5,555	4,865	598,500	12,387	
2	10/26/2014	88.5	7,331	5,301	4,297	600,300	12,873	
3	10/27/2014	90.0	7,430	5,169	3,532	599,500	12,221	
4	10/27/2014	80.8	7,789	5,894	8,766	334,300	10,587	
4 Inj Test	10/29/2014	9.9	5,519	-	5,765	-	721	
4B (Reperf)	10/29/2014	67.0	7,947	6,430	4,438	264,150	9,642	
5	10/30/2014	87.7	7,604	5,665	3,390	601,800	12,202	
6	10/30/2014	85.9	7,839	5,540	3,190	600,400	12,666	
7	10/31/2014	87.0	7,671	6,098	2,854	600,000	13,844	
8	11/1/2014	70.0	7,587	5,863	4,148	601,400	19,269	
9	11/2/2014	89.3	7,490	5,751	3,122	601,500	11,796	
10	11/2/2014	83.5	7,712	5,722	2,918	600,300	13,319	
11	11/3/2014	88.7	8,131	5,429	-	382,250	9,647	
11 Inj test 1	11/4/2014	4.7	5,145	-	5,068	-	538	
11 Inj Test 2	11/5/2014	9.1	7,091	-	5,196	-	1,881	
11B (Reperf)	11/5/2014	68.0	8,364	6,877	4,989	141,000	7,421	
12	11/5/2014	87.1	8,016	4,982	3,068	679,650	13,500	
13	11/6/2014	86.7	7,520	5,118	3,076	602,150	12,587	
14	11/7/2014	87.7	8,310	5,500	2,918	602,350	12,509	
15	11/7/2014	89.4	8,062	5,636	2,661	601,450	12,454	
16	11/8/2014	84.9	8,088	5,522	3,061	600,250	12,495	
17	11/14/2014	87.3	7,885	5,118	2,707	604,650	14,182	
18	11/15/2014	90.0	7,942	4,946	2,861	601,450	13,556	
19	11/15/2014	89.7	7,628	5,525	3,076	600,350	12,431	
20	11/15/2014	88.2	7,803	4,821	2,900	600,550	13,361	
21	11/15/2014	85.0	8,120	5,136	2,772	600,800	14,530	
22	11/16/2014	85.0	7,919	5,543	2,747	602,500	14,130	
23	11/16/2014	87.1	7,829	5,314	3,072	600,350	13,424	
24	11/16/2014	85.0	7,909	5,339	4,807	570,900	13,144	
25	11/17/2014	89.0	7,529	5,136	3,076	634,950	13,112	
26	11/17/2014	89.9	7,227	5,608	2,875	599,300	12,249	
27	11/17/2014	90.2	6,713	5,114	2,725	599,800	12,093	

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API 47- 085 - 10071 Farm name Terry & Helen Kiessling Well number PEN 2 FHS

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
<u>Marcellus</u>	<u>6,250</u>	<u>TVD</u>	<u>14,664</u> <u>MD</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

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 2496 mcfpd Oil 111 bpd NGL 406 bpd Water 772 bpd GAS MEASURED BY Estimated Orifice Pilot

<u>LITHOLOGY/ FORMATION</u>	<u>TOP DEPTH IN FT NAME TVD</u>	<u>BOTTOM DEPTH IN FT TVD</u>	<u>TOP DEPTH IN FT MD</u>	<u>BOTTOM DEPTH IN FT MD</u>	<u>DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H₂S, ETC)</u>
	<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 _____

Please insert additional pages as applicable.

Completed by Regina A. Logue Telephone 724-820-3559
 Signature Regina A. Logue Title Regulatory Analyst

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 State WV Zip _____
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 Attach copy of FRACFOCUS Registry

Submittal of Hydraulic Fracturing Chemical Disclosure Information

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	10/26/2014
Job End Date:	11/17/2014
State:	West Virginia
County:	Ritchie
API Number:	47-085-10071-00-00
Operator Name:	Noble Energy, Inc.
Well Name and Number:	Pen 2 F
Longitude:	-81.01260600
Latitude:	39.33661400
Datum:	NAD27
Federal/Tribal Well:	NO
True Vertical Depth:	6,250
Total Base Water Volume (gal):	15,580,824
Total Base Non Water Volume:	807,235



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	88.59607	
40/70 Sand	J.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	7.68097	
100 Mesh Sand	J.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	3.38252	
HF Acid (12.6% - 14.5%)	J.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.50000	0.15657	
WFR-405	J.S. Well Services	Friction Reducer	Hydrogen Chloride	7647-01-0	18.00000	0.03740	
WFR-405	J.S. Well Services	Friction Reducer	Water	7732-18-5	40.00000	0.01787	
WFR-405	J.S. Well Services	Friction Reducer	Anionic Polyacrylamide	Proprietary	40.00000	0.01787	
WFR-405	J.S. Well Services	Friction Reducer	Sodium Chloride	7647-14-5	20.00000	0.00894	
WFR-405	J.S. Well Services	Friction Reducer	Petroleum Distillates	34742-47-8	20.00000	0.00719	
WFR-405	J.S. Well Services, LLC	Friction Reducer	Ethoxylated alcohol blend	Proprietary	5.00000	0.00223	
WFR-405	J.S. Well Services, LLC	Friction Reducer	Water	7732-18-5	40.00000	0.01662	

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SI-1100	J.S. Well Services	Scale Inhibitor	Anionic Polyacrylamide	Proprietary	40.00000	0.01662
			Petroleum Distillates	34742-47-8	40.00000	0.01338
			Ethoxylated alcohol blend	Proprietary	5.00000	0.00208
			Crystalline Salt	12125-02-9	5.00000	0.00208
			DI Water	7732-18-5	80.00000	0.01070
			Ethylene Glycol	107-21-1	40.00000	0.00605
			Potassium salt of diethylene triamine penta (methylene phosphonic acid)	15827-60-8	10.00000	0.00181
			2-Phosphonobutane 1,2,4 tricarboxylic salt	37971-36-1	10.00000	0.00173
			hexamethylenediamine tetra (methylene phosphonic acid)	38820-59-6	10.00000	0.00167
			Copolymer of Maleic and Acrylic acid	26677-99-6	10.00000	0.00158
			bis (hexamethylene) triamine penta (methylene phosphonic acid) - phosphate acid	40623-75-4	10.00000	0.00154
			Acrylic polymer	52255-49-9	5.00000	0.00067
X-BAC 1020	J.S. Well Services, LLC	Anti-Bacterial Agent				
			2,2-dibromo-3-nitripropionamide	10222-01-2	20.00000	0.00562
LGC-15	J.S. Well Services, LLC	Gelling Agents	Deionized Water	7732-18-5	28.00000	0.00321
			Guar Gum	9000-30-0	50.00000	0.00280
			Petroleum Distillates	34742-47-8	60.00000	0.00265
			Suspending agent (solid)	14808-60-7	3.00000	0.00043
			Surfactant	38439-51-0	3.00000	0.00017
AI-301	J.S. Well Services, LLC	Acid Corrosion Inhibitors				
			Diethylene Glycol	111-46-6	30.00000	0.00024
			Methanamine	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
CA-800	J.S. Well Services	Iron Control Additive				
AP-001	J.S. Well Services, LLC	Gel Breakers	Erythorbic Acid	89-65-6	100.00000	0.00021
			Ammonium Persulfate	7727-54-0	100.00000	0.00013

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 13,946' feet south of Latitude: 39° 22' 30"

Well is located on topo map 3,526' feet west of Longitude: 81° 00' 00"

AS DRILLED PLAT

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



**AS DRILLED
BOTTOM HOLE LOCATION (BHL)**
 UTM 17-NAD83
 N:4356234.66
 E:497473.95
 NAD27, WV NORTH
 N:315264.10
 E:1567523.41
 LAT/LON DATUM-NAD83
 LAT:39.355556
 LON:-81.029319

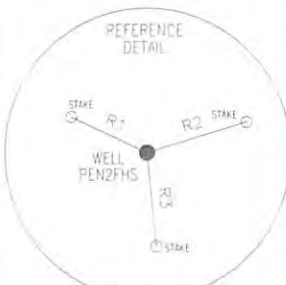
**PERMITTED
BOTTOM HOLE LOCATION (BHL)**
 UTM 17-NAD83
 N:4356216.61
 E:497500.02
 NAD27, WV NORTH
 N:315203.41
 E:1567608.00
 LAT/LON DATUM-NAD83
 LAT:39.355394
 LON:-81.029017

**AS DRILLED
APPROX. LANDING POINT**
 UTM 17-NAD83
 N:4354437.43
 E:499049.93
 NAD27, WV NORTH
 N:309279.99
 E:1572596.61
 LAT/LON DATUM-NAD83
 LAT:39.339365
 LON:-81.011025

**PERMITTED
APPROX. LANDING POINT**
 UTM 17-NAD83
 N:4354432.51
 E:499047.21
 NAD27, WV NORTH
 N:309263.99
 E:1572587.40
 LAT/LON DATUM-NAD83
 LAT:39.339321
 LON:-81.011056

LEASE	LESSORS
1	TERRY KIESSLING ET AL
2	TERRY KIESSLING ET AL
3	ST LUKE'S UNITED METHODIST CHURCH ET AL
4	JOHN A. SMITH ET AL
5	JOHN A. SMITH ET AL
6	COASTAL FOREST RESOURCES COMPANY
7	JAMES P. JONES JR ET AL
8	COASTAL FOREST RESOURCES COMPANY

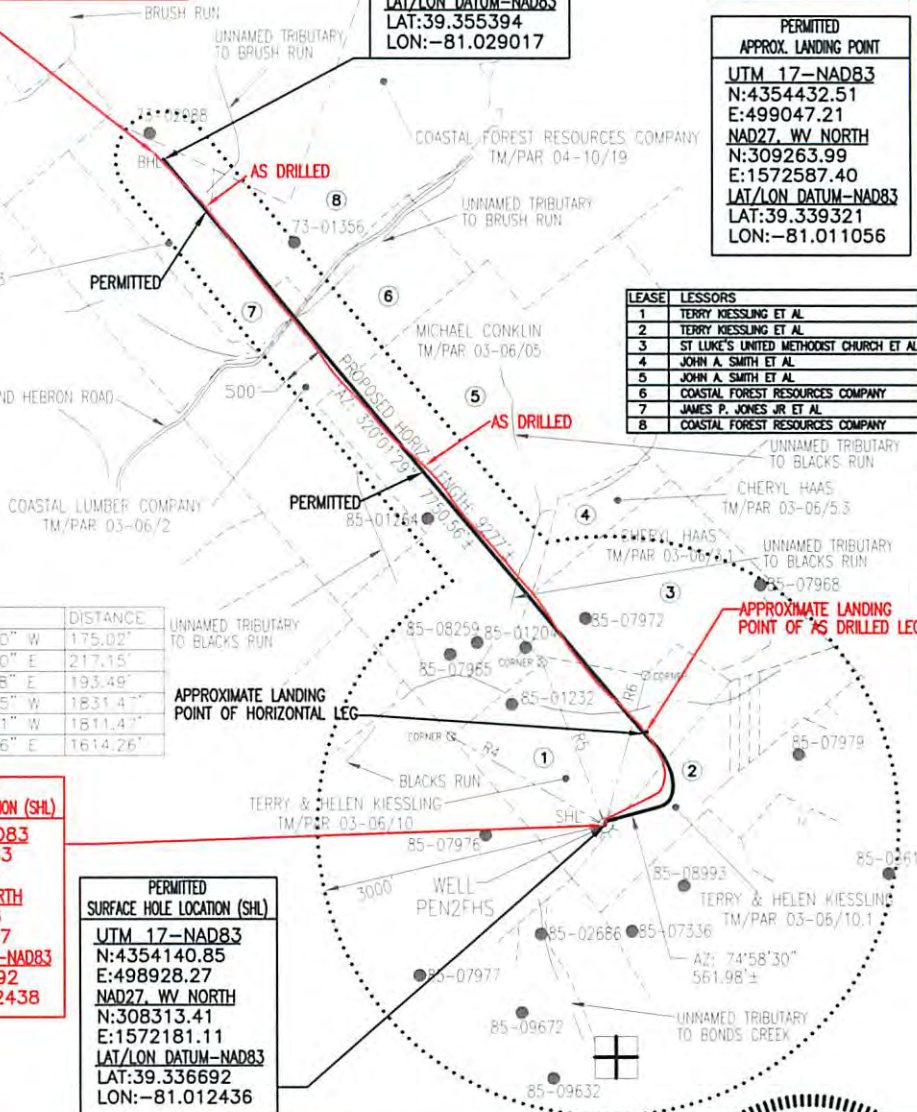
- NOTES:
- There are no water wells or developed springs within 250' of proposed well.
 - There are no existing buildings within 625' of proposed well.
 - Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
 - There are no native trout streams within 300' of proposed 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.



LINE	BEARING	DISTANCE
R1	N 64°47'10" W	175.02'
R2	N 72°55'40" E	217.15'
R3	S 05°41'48" E	193.49'
R4	N 59°43'25" W	1831.4'
R5	N 20°48'51" W	1811.4'
R6	N 14°56'56" E	1614.26'

**AS DRILLED
SURFACE HOLE LOCATION (SHL)**
 UTM 17-NAD83
 N:4354140.83
 E:498928.13
 NAD27, WV NORTH
 N:308313.36
 E:1572180.67
 LAT/LON DATUM-NAD83
 LAT:39.336692
 LON:-81.012438

**PERMITTED
SURFACE HOLE LOCATION (SHL)**
 UTM 17-NAD83
 N:4354140.85
 E:498928.27
 NAD27, WV NORTH
 N:308313.41
 E:1572181.11
 LAT/LON DATUM-NAD83
 LAT:39.336692
 LON:-81.012436



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

FILE #: PEN2FHS-AS DRILLED
 DRAWING #: PEN2FHS-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] Office of Oil and Gas
 R.P.E.: _____ L.L.S.: P.S. APR 20 2015



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

DATE: WV Department of Environmental Protection
 OPERATOR'S WELL #: PEN2FHS-AS DRILLED
 API WELL #: 47 85 10071
 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: 694.583±

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: 14,783'±
 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