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

PM

API 47-051-01641 County Marshall District Sandhill  
Quad Valley Grove Pad Name SHL-13 Field/Pool Name \_\_\_\_\_  
Farm name Paul H. and Annette Hemsley Well Number SHL13EHS  
Operator (as registered with the OOG) Noble Energy, Inc.  
Address 333 Technology Drive, Suite 116 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 4428319.85 Easting 539637.07  
Landing Point of Curve Northing 4428102.82 Easting 538996.49  
Bottom Hole Northing 4429534.83 Easting 537947.32

Elevation (ft) 1288.25 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 6/19/2013 Date drilling commenced 8/16/2013 Date drilling ceased 12/6/2013  
Date completion activities began 5/3/14 Date completion activities ceased 7/25/14  
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 561', 763' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft 1600' Void(s) encountered (Y/N) depths N  
Coal depth(s) ft 763 - 785.04' Pittsburgh, 1266.74' - 1269.77' Mahoning Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) Y

RECEIVED  
Office of Oil and Gas

OCT 10 2014

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

10/31/2014

API 47-051 - 01641 Farm name Paul H. and Annette Hemsley Well number SHL13EHS

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	N			Y
Surface	24	20	418	N	J-55 94#		Y
Coal							
Intermediate 1	17-1/2	13-3/8	1221	N	J-55 54.5#		Y
Intermediate 2	12-3/8	9-5/8	3228	N	J-55 36#		Y
Intermediate 3							
Production	8-3/4	5-1/2	13369	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	484	15.6	1.19	103	0	8
Coal							
Intermediate 1	Type 1	1029	15.6	1.19	218	0	8
Intermediate 2	Type 1	1264	15.6	1.19	268	0	8
Intermediate 3							
Production	Class A	1933	14.8	1.41	496	0	8
Tubing							

Drillers TD (ft) <sup>13390</sup> \_\_\_\_\_ Loggers TD (ft) <sup>13358</sup> \_\_\_\_\_

Deepest formation penetrated Marcellus \_\_\_\_\_ Plug back to (ft) NA \_\_\_\_\_

Plug back procedure \_\_\_\_\_

Kick off depth (ft) <sup>6776</sup> \_\_\_\_\_

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 \_\_\_\_\_

4 Centralizers on Surface (Every third joint), 10 on Intermediate 1 (Every third joint), 60 on Intermediate 2 (Every third joint), and 193 on Production casing (Every third joint, till Curve, then Every Joint).

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 \_\_\_\_\_



Perforation Record

API: 47-051-01641

Farm name: \_\_\_\_\_

Paul H & Annette A  
Hemsley

Well Name: SHL-13E-HS

Stage No.	Stim Date	Top Perf	Bottom Perf	# of Perfs	Formation
1	5/4/2014	13072	13214	48	Marcellus
2	5/5/2014	12773	13027	40	Marcellus
3	5/5/2014	12473	12727	40	Marcellus
4	5/6/2014	12173	12427	40	Marcellus
5	5/7/2014	11873	12127	40	Marcellus
6	5/8/2014	11573	11827	40	Marcellus
7	5/8/2014	11273	11527	40	Marcellus
8	5/9/2014	10973	11227	40	Marcellus
08-B Reperf	5/9/2014	10963	11028	24	Marcellus
9	5/10/2014	10673	10927	40	Marcellus
10	5/11/2014	10373	10627	40	Marcellus
11	5/11/2014	10073	10352	40	Marcellus
12	5/12/2014	9773	10027	40	Marcellus
13	5/13/2014	9473	9727	40	Marcellus
14	5/14/2014	9173	9427	40	Marcellus
15	5/15/2014	8873	9127	40	Marcellus
16	5/16/2014	8573	8827	40	Marcellus
17	5/16/2014	8273	8527	40	Marcellus
18	5/17/2014	7973	8227	40	Marcellus
19	5/18/2014	7725	7927	40	Marcellus

10/31/2014

STIMULATION INFORMATION PER STAGE

API: 47-051-01641

Farm name:

Paul H & Annette A Hemsley

Well Name: SHL-13E-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
1	5/3/2014	85.5	8114	6285	3747	602853	15026.00	
2	5/5/2014	88.0	8055	6292	3722	602059	11337.02	
3	5/6/2014	82.4	8008	7323	4308	600114	19284.93	
4	5/6/2014	84.7	8096	6126	4468	579254	12727.07	
5 Inj Test	5/7/2014	5.5	7896		4851	0	388.60	
5	5/8/2014	87.0	7920	5777	4150	620002	11169.83	
6	5/8/2014	87.9	7864	6563	4075	608162	11324.40	
7	5/9/2014	88.3	7640	6363	4309	608471	10936.86	
8	5/9/2014	72.8	8152	6158	5002	0	12778.50	
8 Reperf	5/10/2014	86.6	8302	5804	4201	630366	5707.90	
9	5/10/2014	88.3	8098	6246	4194	570530	11639.26	
10	5/11/2014	87.0	7979	6428	4513	618349	11604.03	
11	5/12/2014	87.2	7689	6504	4748	602494	12358.67	
12	5/12/2014	89.9	7807	7152	4351	600834	10999.70	
12 Inj Test	5/13/2014	4.2	7735		4642	0	659.19	
13	5/14/2014	87.9	7365	5713	4330	603510	11281.26	
14	5/15/2014	90.1	7405	6599	4304	603917	10841.96	
15	5/15/2014	88.7	7428	7175	3926	601852	10524.55	
16	5/16/2014	88.8	7200	6913	4734	595469	11406.00	
17	5/17/2014	88.2	7144	5759	4060	598788	12515.22	
18	5/17/2014	87.9	7207	6075	3825	601233	10589.31	
19	5/18/2014	90.0	7373	7027	4287	495509	9961.40	

10/31/2014

API 47- 051 - 01641 Farm name Paul H. and Annette Hemsley Well number SHL13EHS

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
<u>Marcellus</u>	<u>6709.0</u>	<u>TVD</u>	<u>13390</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 4857 mcfpd Oil 36 bpd NGL 232 bpd Water 820 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>PLEASE SEE ATTACHED FORMATION SHEET</u>				

Please insert additional pages as applicable.

Drilling Contractor Precision Drilling  
Address 5400 D Big Tyler Road City Charleston State WV Zip 25313

Logging Company Diversified Well Logging  
Address 711 West 10th Street City Reserve State LA Zip 70084

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

Stimulating Company Halliburton Energy SRCS  
Address 121 Champion Way, Suite 110 City Canonsburg State PA Zip 15317

Please insert additional pages as applicable.

Completed by Regina A. Logue Telephone 724-820-3559  
Signature Regina A. Logue Title Regulatory Analyst Date 10/6/14

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

SHL 13E  
47-051-01641

Formations	Top TVD	Base TVD	Top MD	Base MD	Fluid
Shale	0	732	0	732	
Pittsburgh Coal	732	742	732	742	
Shale and Sandstone	742	1516	742	1516	
Gas Sand	1516	1574	1516	1574	
Shale	1574	1693	1574	1693	
1st Salt Sand	1693	1756	1693	1756	
2nd Salt Sand	1756	1765	1756	1765	
3rd Salt Sand	1765	1815	1765	1815	
Shale	1815	1841	1815	1841	
Maxton Sand	1841	1958	1841	1958	
Shale	1958	1978	1958	2509	
Big Lime	1978	2023	1978	2023	
Big Injun	2023	2165	2023	2165	
Price	2165	2509	2165	2509	
Murrysville	2509	2522	2509	2872	
Shale	2522	2726	2522	2726	
50' Sand	2726	2743	2726	2743	
Shale	2743	2829	2743	2829	
Gordon Stray	2829	2841	2829	2841	
Shale	2841	2872	2841	2872	
Gordon	2872	2890	2872	2890	
Shale	2890	2985	2890	2985	
Fifth Sand	2985	3023	2985	3023	
Shale	3023	3423	3023	3423	
Speechley Sand	3423	3447	3423	3447	
Shale	3447	4331	3447	4349	
Warren Sand	4331	4345	4349	4365	
Shale	4345	5252	4365	5513	
Java Shale	5252	5322	5513	5603	
Pipe Creek Shale	5322	5366	5603	5660	
Angola Shale	5366	5992	5660	6492	
Rhinestreet	5992	6406	6492	7055	
Cashaqua	6406	6498	7055	7206	
Middlesex	6498	6535	7206	7277	
West River	6535	6576	7277	7360	
Burkett	6576	6609	7360	7432	
Tully Limestone	6609	6637	7432	7501	
Hamilton	6637	6751	7501	8257	
Marcellus	6751	6802	8257	not encountered	Gas
Onondaga	6802	6807	not encountered	not encountered	
Huntersville	6807	not encountered	not encountered	not encountered	

# Hydraulic Fracturing Fluid Product Component Information Disclosure



51-01641

Job Start Date:	5/3/2014
Job End Date:	5/18/2014
State:	West Virginia
County:	Marshall
API Number:	47-051-01641-00-00
Operator Name:	Noble Energy, Inc.
Well Name and Number:	SHL13 E
Longitude:	-80.53582500
Latitude:	40.00406400
Datum:	NAD27
Federal/Tribal Well:	NO
True Vertical Depth:	6,709
Total Base Water Volume (gal):	9,872,591
Total Base Non Water Volume:	0

## 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
Fresh Water	Operator	Base Fluid	Fresh Water	7732-18-5	100.00000	87.30304	Density = 8.340
SAND - PREMIUM WHITE	Halliburton	Proppant	Crystalline silica, quartz	14808-60-7	100.00000	9.51876	
SAND - COMMON WHITE	Halliburton	Proppant	Crystalline silica, quartz	14808-60-7	100.00000	2.41215	
HYDROCHLORIC ACID 5-10%	Halliburton	Solvent	Hydrochloric acid	7647-01-0	10.00000	0.06005	
FR-66	Halliburton	Friction Reducer	Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.02403	
FE-1A ACIDIZING COMPOSITION	Halliburton	Additive	Acetic anhydride	108-24-7	100.00000	0.00311	
			Acetic acid	64-19-7	60.00000	0.00187	
HYDROCHLORIC ACID 10-30%	Halliburton	Solvent	Hydrochloric acid	7647-01-0	30.00000	0.00424	
BE-9	Halliburton	Biocide					



			Tributyl tetradecyl phosphonium chloride	81741-28-8	10.00000	0.00403	
LP-65MC	Halliburton	Scale Inhibitor					
			Ammonium chloride	12125-02-9	10.00000	0.00255	
LoSurf-300D	Halliburton	Non-ionic Surfactant					
			Ethanol	64-17-5	60.00000	0.00063	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00031	
			Naphthalene	91-20-3	5.00000	0.00005	
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00000	0.00005	
			1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00001	
LCA-1	Halliburton	Solvent					
			Paraffinic solvent	Confidential	100.00000	0.00051	Denise Tuck, Halliburton 3000 N. Sam Houston Pkwy E., Houston, TX 77032 281-871-6226
HAI-OS ACID INHIBITOR	Halliburton	Corrosion Inhibitor					
			Methanol	67-56-1	60.00000	0.00032	
			Propargyl alcohol	107-19-7	10.00000	0.00005	
WG-36 GELLING AGENT	Halliburton	Gelling Agent					
			Guar gum	9000-30-0	100.00000	0.00030	
SP BREAKER	Halliburton	Breaker					
			Sodium persulfate	7775-27-1	100.00000	0.00001	
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.							
		Other Ingredient(s)					
			Water	7732-18-5		0.71830	
		Other Ingredient(s)					
			Polyacrylamide copolymer	Confidential		0.02403	
		Other Ingredient(s)					
			Organic phosphonate	Confidential		0.01528	
		Other Ingredient(s)					
			Alcohols, C12-16, ethoxylated	68551-12-2		0.00401	
		Other Ingredient(s)					
			Sodium chloride	7647-14-5		0.00401	
		Other Ingredient(s)					
			Ammonium chloride	12125-02-9		0.00401	
		Other Ingredient(s)					
			Fatty acid tall oil amide	Confidential		0.00401	
		Other Ingredient(s)					
			Sorbitan monooleate polyoxyethylene derivative	9005-65-6		0.00080	
		Other Ingredient(s)					
			Sorbitan, mono-9-octadecenoate, (Z)	1338-43-8		0.00080	

H1014

	Other Ingredient(s)				
		Oxyalkylated phenolic resin	Confidential		0.00031
	Other Ingredient(s)				
		Formaldehyde	50-00-0		0.00025
	Other Ingredient(s)				
		Reaction product of acetophenone, formaldehyde, thiourea and oleic acid in dimethyl formamide	68527-49-1		0.00016
	Other Ingredient(s)				
		Fatty acids, tall oil	Confidential		0.00016
	Other Ingredient(s)				
		Alcohols, C14-C15, ethoxylated	68951-67-7		0.00016
	Other Ingredient(s)				
		Oxyalkylated phenolic resin	Confidential		0.00010
	Other Ingredient(s)				
		Olefins	Confidential		0.00003
	Other Ingredient(s)				
		Olefins	Confidential		0.00003
	Other Ingredient(s)				
		Bentonite, benzyl(hydrogenated tallow alkyl) dimethylammonium stearate complex	121888-68-4		0.00002
	Other Ingredient(s)				
		Olefins	Confidential		0.00001
	Other Ingredient(s)				
		Olefins	Confidential		0.00001
	Other Ingredient(s)				
		Surfactant mixture	Confidential		0.00000
	Other Ingredient(s)				
		Surfactant mixture	Confidential		0.00000
	Other Ingredient(s)				
		Silica gel	112926-00-8		0.00000
	Other Ingredient(s)				
		Crystalline Silica, Quartz	14808-60-7		0.00000
	Other Ingredient(s)				
		Sodium sulfate	7757-82-6		0.00000

51-0164

\* Total Water Volume sources may include fresh water, produced water, and/or recycled water

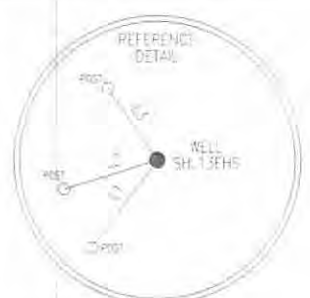
\*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

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)

Well is located on topo map 13,689' feet south of Latitude: 40° 02' 30"

Well is located on topo map 10,038' feet west of Longitude: 80° 30' 00"



LINE	BEARING	DISTANCE
L1	S 37°06'48" W	236.18'
L2	S 73°09'26" W	211.48'
L3	N 34°30'14" W	189.17'

APPROX LANDING POINT	
UTM 17-NAD83	N:4428102.82 E:538996.40
NAD27, WV NORTH	N:548819.13 E:1707742.87

- 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 BOTTOM HOLE LOCATION (BHL)	PERMITTED BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83 N:4429534.83 E:537947.32	UTM 17-NAD83 N:4429534.46 E:537957.88
NAD27, WV NORTH N:553575.92 E:1704348.77	NAD27, WV NORTH N:553574.12 E:1704383.39

PERMITTED SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83 N:4428319.94 E:539637.04
NAD27, WV NORTH N:549496.40 E:1709826.68

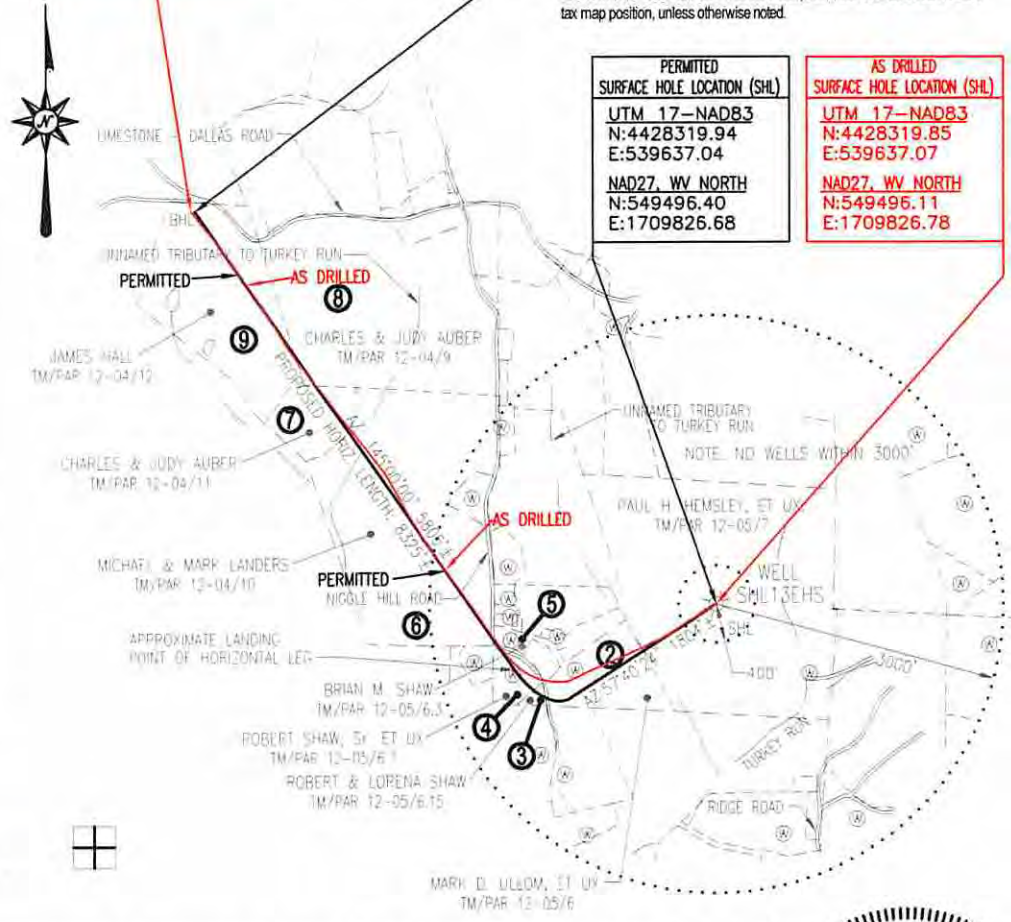
AS DRILLED SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83 N:4428319.85 E:539637.07
NAD27, WV NORTH N:549496.11 E:1709826.78

**LEGEND**

- TOP MAP POINT
- WELL
- ALL ARE POINTS UNLESS OTHERWISE NOTED
- WATER SOURCE
- LEASE NUMBER BASED (ON ATTACHED) WW-6A1
- MINERAL TRACT BOUNDARY
- PARCEL LINES
- WELL REFERENCE
- PROPOSED HORIZONTAL WELL
- ROAD
- STREAM CENTER LINE
- AS DRILLED

WELLS WITHIN 3000'

- EXISTING WELLS
- PROPOSED WELLS



**Blue Mountain Inc.**  
11023 MASON DIXON HIGHWAY  
BURTON, WV 26562  
PHONE: (304) 662-6486

FILE #: SHL13EHS-AS DRILLED  
DRAWING #: SHL13EHS-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

**GEORGE D. SIX**  
LICENSED  
No. 2000  
STATE OF WEST VIRGINIA  
PROFESSIONAL SURVEYOR

PLACE SEAL HERE

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



DATE: OCTOBER 2, 2014  
OPERATOR'S WELL #: SHL13EHS-AS DRILLED  
API WELL #: 47 51  
STATE COUNTY PERMIT

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

WATERSHED: TURKEY RUN ELEVATION: 1288.25'  
COUNTY/DISTRICT: MARSHALL / SAND HILL QUADRANGLE: VALLEY GROVE, WV 7.5'  
SURFACE OWNER: PAUL H. & ANNETTE A. HEMSLEY ACREAGE: 121.65±  
OIL & GAS ROYALTY OWNER: SEE ATTACHED WW-6A1 ACREAGE: 393.282±

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: 6781'± TMD: 13521'±  
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

10/31/2014