west virginia department of environmental protection

Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304
(304) 926-0450
(304) 926-0452 fax

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

PERMIT MODIFICATION APPROVAL

August 14, 2013

NOBLE ENERGY, INC.
333 TECHNOLOGY DRIVE, SUITE 110
CANONSBURG, PA 15317

Re: Permit Modification Approval for API Number 9502114 , Well #: SHR 1 FHS
modified casing & extended lateral

Oil and Gas Operator:
The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

Please call James Martin at 304-926-0499, extension 1654 if you have any questions.

Sincerely,

for Gene Smith
Regulatory/Compliance Manager
Office of Oil and Gas

08/16/2013

95-02114 MOD

noble energy

July 25, 2013

West Virginia Department of Environmental Protection
Office of Oil and Gas
1478 Claylick Road
Ripley, WV 25271

Re: Casing Modification for the SHR 1 Wells

Dear Laura,

Enclosed please find casing modifications for the Shirley (SHR) 1 wells. The driller would like to extend the conductor string to 120' from 40' and shorten the Intermediate casing setting it at 2500' or 100' below the Big Injun they were asking to set it at 3627', I believe they are realizing the issues with the red rock in the area and are trying to plan ahead to avoid some of the drilling issues.

We would also like to extend the lateral legs on the 47-095-02109, 47-095-02110 and 47-095-02114. I have enclosed new casing program for those along with new plat and mineral exhibits.

If you have any questions, or need any additional information, please do not hesitate to get in touch with me office 724-820-3061 cell 412-310-8967 or email me at dswiger@nobleenergyinc.com.

Sincerely,

Dee Swiger,
Regulatory Analyst

Enclosures:

/DS

Received
JUL 29 2013
Office of Oil and Gas
WV Dept. of Environmental Protection

08/16/2013

95-2114 MOD

WW - 6B
(1/12)

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
W.VA. CODE §22-6A - WELL WORK PERMIT APPLICATION

API 05-02114

1) Well Operator:	Noble Energy, Inc	494501907	Tyler	Centerville	Shirley
		Operator ID	County	District	Quadrangle

2) Operator's Well Number: SHR 1 FHS Well Pad Name: SHR 1

3 Elevation, current ground: 1016.74 Elevation, proposed post-construction: 994.5'

4) Well Type: (a) Gas ■ Oil _____
Other _____
(b) If Gas: Shallow ■ Deep _____
Horizontal ■

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Target - Marcellus, Depth - 6570', Thickness - 61', Pressure - 4376#

7) Proposed Total Vertical Depth: 6621'

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 15907'

10) Approximate Fresh Water Strata Depths: 321, 351, 599'

11) Method to Determine Fresh Water Depth: Offset well data - Seneca Technology data base

12) Approximate Saltwater Depths: 1501'

13) Approximate Coal Seam Depths: No Coal

14) Approximate Depth to Possible Void (coal mine, karst, other): None

15) Does land contain coal seams tributary or adjacent to, active mine? No

16) Describe proposed well work: Drill the vertical depth to the Marcellus at an estimated total vertical depth of approximately 6,621 feet. Drill Horizontal leg - stimulate and produce the Marcellus Formation.
**If we should encounter an unanticipated void we will install casing at a minimum of 20' below the void but not more than 50' below the void, set a basket and grout to surface.

17) Describe fracturing/stimulating methods in detail:
The stimulation will be multiple stages divided over the lateral length of the well. Stage spacing is dependent upon engineering design. Slickwater fracturing technique will be utilized on each stage using sand, water, and chemicals.

18) Total area to be disturbed, including roads, stockpile area, pits, etc. (acres): 14.36 acres

19) Area to be disturbed for well pad only, less access road (acres): 3.89 acres

Received
AUG 13 2013
Office of Oil and Gas
WV Dept. of Environmental Protection
08/16/2013

WW - 6B
(1/12)

95-2114 MOD

API: 47-95-02114
SHRIFHS

20) **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	N	LS	94	120'	120'	CTS
Fresh Water	13 3/8"	N	J55	54.5	699'	699'	CTS / 15.6 ppg Yield 1.18
Coal							
Intermediate	9 5/8"	N	J55	36.0	2500' or 100' below Big Injun	2500' or 100' below Big Injun	CTS / 15.6 ppg Yield 1.19
Production	5 1/2"	N	P110	20.0	15907'	15907'	TOC 200' above 9.625 shoe
Tubing							
Liners							

**We would like to drill through all the freshwater zones into a more stable rock before setting casing. Once we set the casing string will be circulated with cement to the surface.

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20"	26"	.25		Type 1	cts
Fresh Water	13 3/8"	17 1/2"	.380	2730	Type 1	1.18
Coal						
Intermediate	9 5/8"	12 3/8"	.352	3520	Class A	1.19
Production	5 1/2"	8 3/4" & 8 1/2"	.361	12,640	Class A	1.27
Tubing						
Liners						

PACKERS

Kind:				
Sizes:				
Depths Set:				

DWR
7-16-13

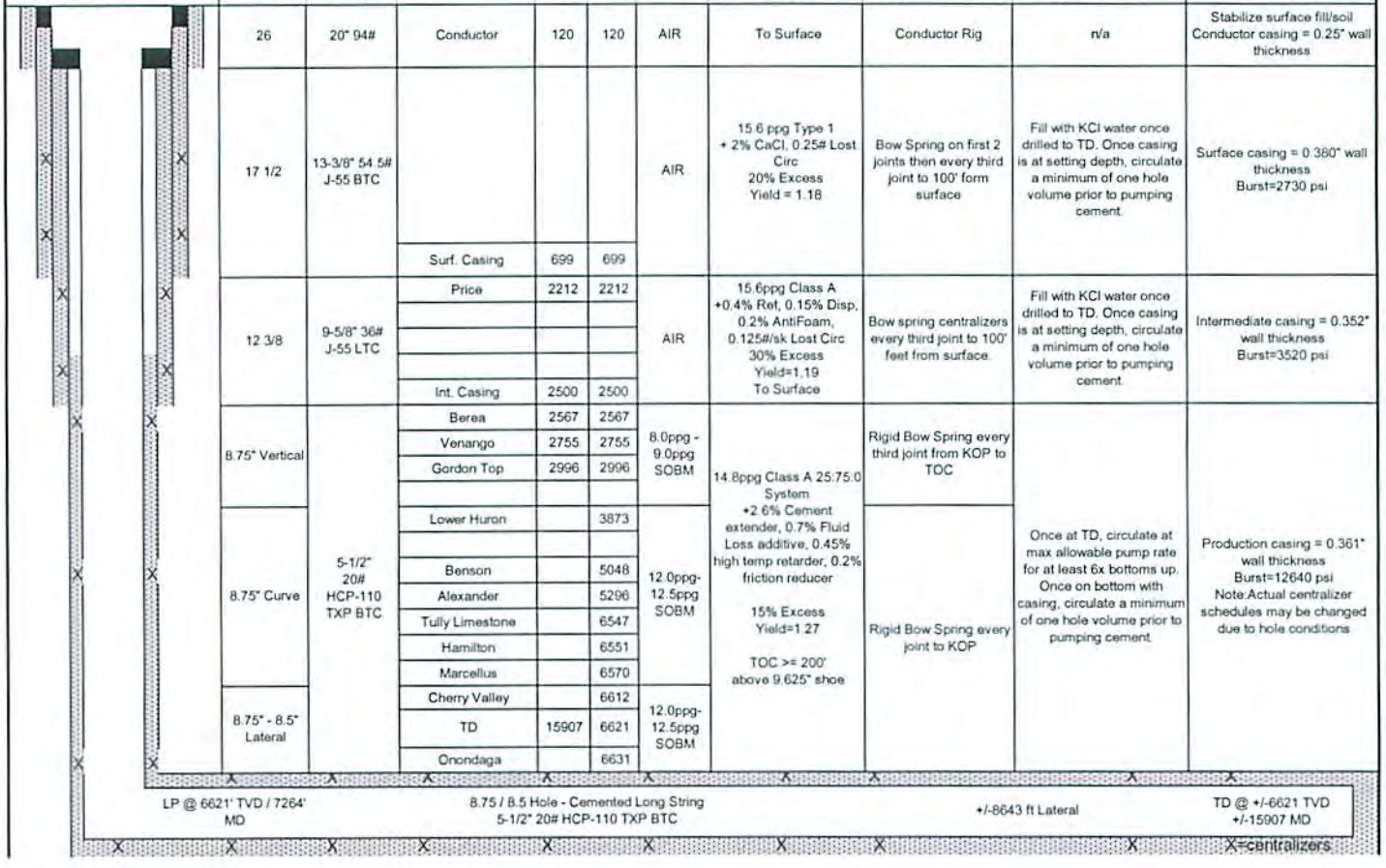
08/16/2013

95-2114 MOD

noble energy

DRILLING WELL PLAN
SHRL-1F-HS
Macellus Shale Horizontal
Tyler County, WV

		SHRL-1F SHL (Lat/Long)	(336021.51N, 1619654.64E) (NAD27 WV NORTH)
Ground Elevation	1013'	SHRL-1F LP (Lat/Long)	(335258.80N, 1618886.17E) (NAD27 WV NORTH)
Azm	160°	SHRL-1F BHL (Lat/Long)	(327137.57N, 1621842.05E) (NAD27 WV NORTH)

WELLBORE DIAGRAM	HOLE	CASING	GEOLOGY	MD	TVD	MUD	CEMENT	CENTRALIZERS	CONDITIONING	COMMENTS
	26	20" 94#	Conductor	120	120	AIR	To Surface	Conductor Rig	n/a	Stabilize surface fill/soil Conductor casing = 0.25" wall thickness
	17 1/2	13-3/8" 54.5# J-55 BTC				AIR	15.6 ppg Type 1 + 2% CaCl, 0.25# Lost Circ 20% Excess Yield = 1.18	Bow Spring on first 2 joints then every third joint to 100' form surface	Fill with KCl water once drilled to TD. Once casing is at setting depth, circulate a minimum of one hole volume prior to pumping cement.	Surface casing = 0.380" wall thickness Burst=2730 psi
			Surf. Casing	699	699					
	12 3/8	9-5/8" 36# J-55 LTC	Price	2212	2212	AIR	15.6ppg Class A +0.4% Ret, 0.15% Disp, 0.2% AntiFoam, 0.125#/sk Lost Circ 30% Excess Yield=1.19 To Surface	Bow spring centralizers every third joint to 100' feet from surface.	Fill with KCl water once drilled to TD. Once casing is at setting depth, circulate a minimum of one hole volume prior to pumping cement.	Intermediate casing = 0.352" wall thickness Burst=3520 psi
			Int. Casing	2500	2500					
	8.75" Vertical	5-1/2" 20# HCP-110 TXP BTC	Berea	2567	2567	8.0ppg - 9.0ppg SOBM	14.8ppg Class A 25:75:0 System +2.6% Cement extender, 0.7% Fluid Loss additive, 0.45% high temp retarder, 0.2% friction reducer 15% Excess Yield=1.27 TOC >= 200' above 9.625" shoe	Rigid Bow Spring every third joint from KOP to TOC	Once at TD, circulate at max allowable pump rate for at least 6x bottoms up. Once on bottom with casing, circulate a minimum of one hole volume prior to pumping cement.	Production casing = 0.361" wall thickness Burst=12640 psi Note:Actual centralizer schedules may be changed due to hole conditions
			Venango	2755	2755					
			Gordon Top	2996	2996					
	8.75" Curve		Lower Huron		3873	12.0ppg-12.5ppg SOBM		Rigid Bow Spring every joint to KOP		
			Benson		5048					
			Alexander		5296					
			Tully Limestone		6547					
			Hamilton		6551					
			Marcellus		6570					
	8.75" - 8.5" Lateral		Cherry Valley		6612	12.0ppg-12.5ppg SOBM				
			TD	15907	6621					
			Onondaga		6631					

LP @ 6621' TVD / 7264' MD

8.75 / 8.5 Hole - Cemented Long String
5-1/2" 20# HCP-110 TXP BTC

+/-8643 ft Lateral

TD @ +/-6621 TVD
+/-15907 MD

X=centralizers

08/16/2013

Well is located on topo map 700' feet south of Latitude: 39°25'00"

LINE	BEARING	DISTANCE
L1	S 73°15'25" E	251.12'
L2	S 25°18'41" W	181.75'
L3	N 47°22'11" W	223.12'

NOTES:
1. There are no water wells or developed springs within 250' of proposed well.
2. There are no existing buildings within 625' of proposed well.
3. Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
4. There are no native trout streams within 300' of proposed well.
5. Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
6. 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.

SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83
N:4362824.007
E:513250.168
NAD27, WV NORTH
N:336021.512
E:1619654.644

APPROX. LANDING POINT
UTM 17-NAD83
N:4362587.73
E:513019.93
NAD27, WV NORTH
N:335258.80
E:1618886.17

BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83
N:4360128.62
E:513961.74
NAD27, WV NORTH
N:327137.57
E:1621842.05

LEGEND
- TOPO MAP POINT
- PROPOSED GAS WELL
- ALL ARE POINTS UNLESS OTHERWISE NOTED.
- WATER SOURCE
- SURFACE BOUNDARY
- LEASE BOUNDARY
- PARCEL LINES
- WELL REFERENCE
- PROPOSED HORIZONTAL WELL
- ROAD
- STREAM CENTER LINE

WELLS WITHIN 3000'
- EXISTING WELLS
- PLUGGED WELLS

Well is located on topo map 3,604' feet west of Longitude: 80°50'00"

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

FILE #: SHR1FHS
DRAWING #: SHR1FHS
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: JULY 9, 2013
OPERATOR'S WELL #: SHR1FHS
API WELL #: 47 (STATE) 95 (COUNTY) MOD 02114H6A (PERMIT)

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

WATERSHED: MIDDLE ISLAND CREEK ELEVATION: 1016.74'
COUNTY/DISTRICT: TYLER COUNTY / CENTERVILLE DISTRICT QUADRANGLE: SHIRLEY, WV 7.5'
SURFACE OWNER: NOBLE ENERGY, INC. ACREAGE: 580.207±
OIL & GAS ROYALTY OWNER: SEE ATTACHED WW-6A1 ACREAGE: 948.797±

08/16/2013

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: 6,621'± TMD: 15,907'±

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