

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

December 18, 2014

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-9502213, issued to NOBLE ENERGY, INC., is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926-0499 ext. 1654.

James Martin

Chief

Operator's Well No: SHR 40 EHS

Farm Name: NOBLE ENERGY, INC.

API Well Number: 47-9502213

Permit Type: Horizontal 6A Well

Date Issued: 12/18/2014

API Number:

PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. <u>Failure to adhere to the specified permit</u> conditions may result in enforcement action.

CONDITIONS

- 1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
- 2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
- 3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
- 4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
- 5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
- 6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
- 7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
- 8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.
- 9. Operator shall provide the Office of Oil & Gas notification of the date that drilling commenced on this well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov within 30 days of commencement of drilling.

STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS WELL WORK PERMIT APPLICATION

					7	60 1
1) Well Operato	r: Noble Energ	gy, Inc.	494501907	095-Tyler	Centerville	Shirley
			Operator ID	County	District	Quadrangle
2) Operator's W	ell Number: S	HR 40 EHS	Well Pac	Name: SHR	40	
3) Farm Name/S	Surface Owner	Noble Energy, Inc.	Public Roa	d Access: Cou	unty Rt. 1	8
4) Elevation, cur	rrent ground:	<u>771'</u> El	evation, proposed	post-construction	on: <u>771'</u>	
5) Well Type	(a) Gas	■ Oil	Unde	erground Storag	ge	
	Other					
	(b)If Gas Sl	nallow	Deep			
	Н	orizontal =				MAG
6) Existing Pad:	Yes or No N	0				9-9-14
7) Proposed Tar	get Formation	(s), Depth(s), Antic	ipated Thickness a	nd Associated	Pressure(s):	
157 77 19		Thick / 4161 psi	*			
8) Proposed Total	al Vertical De	oth: 6,295'				
9) Formation at						
10) Proposed To		3				
11) Proposed Ho	orizontal Leg I	Length: <u>8560'</u>				
12) Approximate	e Fresh Water	Strata Depths:	79',109',357'			
13) Method to D	etermine Fres	h Water Depths:	nearest offset well	s		
14) Approximate	e Saltwater De	pths: 1259'				
15) Approximate	e Coal Seam D	epths: None				_
16) Approximate	e Depth to Pos	sible Void (coal mi	ne, karst, other):	None	Rece	SINGO GAS
		on contain coal sear to an active mine?	ns Yes	No	Office of	06 2014
(a) If Yes, prov	vide Mine Info	: Name: NA				
		Depth:				
		Seam:				
		Owner:				

18)

CASING AND TUBING PROGRAM

TYPE	Size	New	Grade	Weight per ft.	FOOTAGE: For	INTERVALS:	CEMENT:
		<u>or</u> Used		<u>(lb/ft)</u>	Drilling	Left in Well	Fill-up (Cu. Ft.)
		Oscu					<u>1 t. j</u>
Conductor	20"	New	LS	94	40'	40' minimum or to the next component formation, but no deeper than 1st freshwater	GTS
Fresh Water	13 3/8"	New	J-55	54.5	457'	457'	CTS 30% excess Yield =1.18
Coal							
Intermediate	9 5/8"	New	J-55	36.0	2184' or 250' below the fifth sand	2184 or 250' below the fifth sand	CTS 20% excess Yield = 1.19
Production	5 1/2"	New	P-110	20.0	16,010'	16,010'	10% excess Yield = 1.27 TOC=200' above 9.625" shoe
Tubing							
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	26"	0.438	2730	Stabilize to surface with fill/soil	to surface
Fresh Water	13 3/8"	17.5"	0.380	2730	Type 1	30% excess Yield = 1.18
Coal						
Intermediate	9 5/8"	12.38"	.352	3520	Class A	20% excess Yield = 1.19 to surface
Production	5 1/2"	8.75" - 8.5"	.361	12,640	Class A	10% excess Yield = 1.27 TOC=200' above 9.625" shoe
Tubing						
Liners						

Michael Loff 9-9-14

PACKERS

Kind:	aeceived Gas
Sizes:	Office of On 2014
Depths Set:	Oc. 1

4709502213

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:
Drill the vertical depth to the Marcellus at an estimated total vertical depth of approximately 6295 feet. Drill Horizontal leg - stimulate and of produce the Burkett Formation. Should we encounter a unanticipated void we will install a minimum of 20' of casing below the void but not more than 100' below the void, set a basket and grout to surface.
20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:
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 our maximum pressure is not to exceed 10,000 lbs. Please refer to attached list.
21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 5.42
22) Area to be disturbed for well pad only, less access road (acres):
23) Describe centralizer placement for each casing string:
Conductor - No centralizers used. Fresh Water/Surface - Bow spring centralizers on first two joints then every third joint to 100' from surface. Intermediate - Bow Spring centralizers every third joint to 100' from Surface. Production - Rigid bow spring every third joint from KOP to TOC, rigid bow spring every joint to KOP.
24) Describe all coment additives associated with each coment type:
24) Describe all cement additives associated with each cement type: See attached sheets - Conductor - fill/soil to surface. Fresh Water - 15.6 ppg Type 1 cement +2% CaCl, 0.25# lost circ., 30%excess yield =1.18. Intermediate- 15.6 ppg Class A +0.4% Ret, 0.15% Disp, 0.2% Anti Foam, 0.125# sk Lost circ. 20% Excess Yield =1.19 To Surface. Production - 14.8 ppg Class A 25:75:0 System +2.6% cement extender, 0.7% Fluid Loss additive, 0.45% high temp retarder, 0.2% fiction reducer 10% excess Yield =1.27 TOC >= 200' above 9.625" shoe. See attached approved variance from WV DEP.

25) Proposed borehole conditioning procedures:

Conductor - The hole is drilled w/ air and casing is run in air. Apart from insuring the hole is clean via air circulation at TD, there are no other conditioning procedures. Fresh Water/Surface -The hole is drilled w/air and casing is run in air. Once casing is at setting depth, circulate a minimum of one hole volume prior to pumping cement. Intermediate - Once surface casing is set and cemented Intermediate hole is drilled either on air or SOBM and filled w/ KCI water once filled w/ KCI water once drilled to TD. The well is conditioned with KCI circulation prior to running casing. Once casing is at setting depth, the well is circulated a minimum of one hole volume prior to pumping cement. Production - The hole is drilled with synthetic oil base mud and once at TD the hole is circulated at maximum allowable drilling pump rate for at least 6X bottoms up. Once on bottom with casing, circulate a minimum of one hole volume prior to pumping cement.

*Note: Attach additional sheets as needed.



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 dep.wv.gov

October 31, 2013

Schlumberger Attn: Daniel L. Sikorski 4600 J Barry Court Suite 200 Canonsburg, PA 15317

RE: Cement Variance Request

Dear Sir:

This agency has approved a variance request for the cement blend listed below to be used on surface and coal protection casing only. The variance cannot be used without an oil and gas operator requesting its use on a permit application and approved by this agency:

- 2% Accelerator (S001)
- 0.2% Antifoam (D046)
- 0.125 lb/sk Polyester Flake (D0130)

If you have any questions regarding this matter feel free to contact me at 304-926-0499. ext. 1653.

Sincerely,



DRILLING WELL PLAN SHR-40E-HS (Burkett HZ) **Burkett Shale Horizontal**

Tyler County, WV

									i yier Col	ility, vvv		
						SHR-40	E SHL	(Lat/Long)	(16229	21.13N, 335996.95	E) (NAD27)	
Ground Ele	vation		771'			SHR-4	0E LP (Lat/Long)	(16255	525.81N, 336137.82	E) (NAD27)	
Azm			160°			SHR-40	E BHL	(Lat/Long)	(16284	53.34N, 328094.49	49E) (NAD27)	
WELLBORE DI	AGRAM	HOLE	CASING	GEOLOGY	ТОР	BASE	MUD	CEMENT	CENTRALIZERS	CONDITIONING	COMMENTS	
		26	20" 94#	Conductor	40	40	AIR	⁻To Surface	N/A	Ensure the hole is clean at TD.	Stabilize surface fill/soil. Conductor casing = 0.438" wall thickness	
	X	17 1/2	13-3/8" 54.5#				AIR	15.6 ppg Type 1 + 2% CaCl, 0.25# Lost Circ	Bow Spring on first 2 joints then every third	Fill with KCl water once drilled to TD. Once casing is at setting depth, circulate	Intermediate casing = 0.380' wall thickness	
	X		J-55 BTC	Fresh Water Casing	457	457		30% Excess Yield = 1.18	joint to 100' form surface	a minimum of one hole volume prior to pumping cement.	Burst=2730 psi	
x	x			Big Lime	1859	1930		15.6ppg Class A		Fill with KCI water once		
			0.510#.00#	Big Injun	1930	1984		+0.4% Ret, 0.15% Disp, 0.2% AntiFoam,	Bow spring centralizers	drilled to TD. Once casing	Casing to be ran 250' below	
		12 3/8	9-5/8" 36# J-55 LTC	Price	1984		AIR	0.125#/sk Lost Circ	every third joint to 100'	is at setting depth, circulate a minimum of one hole	the 5th Sand. Intermediate casing = 0.352" wall thickness	
X	x			Weir	2137	2241		20% Excess Yield=1.19	feet from surface.	volume prior to pumping	Burst=3520 psi	
				Int. Casing	2184	2184		To Surface		cement.		
×	X			Gordon	2754	2773						
		8.75" Vertical		Warren Sand	3247	3293	8.0ppg - 9.0ppg	14.8ppg Class A 25:75:0	Rigid Bow Spring every third joint from KOP to			
		8.75 Vertical		Lower Huron	3645		SOBM	System +2.6% Cement	TOC			
			1	Benson	4815	4859		extender, 0.7% Fluid		Once at TD, circulate at		
	9	C.	5-1/2"	Alexander	5059	5117		Loss additive, 0.45% high temp retarder,		max allowable pump rate	Production casing = 0.361" wall thickness	
		5 2	20#	Cashaqua	6058	6169	12.0ppg-	0.2% friction reducer		for at least 6x bottoms up. Once on bottom with	Burst=12640 psi	
X	x 8	®75 @urve	HCP-110 TXP BTC	Middlesex	6169	6203	12.5ppg	10% Excess		casing, circulate a minimum	Note:Actual centralizer schedules may be changed	
		20		West River	6203	6271	SOBM	Yield=1.27	Rigid Bow Spring every	of one hole volume prior to pumping cement.	due to hole conditions	
		· = 0		Burkett	6271	6305		TOC >= 200'	joint to KOP			
		8 75" 98.5" Laterary		TD	6295	16010	12.0ppg- 12.5ppg	above 9.625" shoe				
×	X			Marcellus	6325	6389	SOBM					
	LP @ 62	X 95' TVD / 7450' MD	X	8.75 / 8.5		emented Lo P-110 TXP		X	+/-856	O'ft Lateral	TD @ +/-6295' TVD +/-16010' MD	
X		X	X	X	X		X	X	X	X	X=centralizers	

STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF OIL AND GAS

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name_Noble Energy, Inc.	OP Code 494501907
Watershed (HUC 10) Headwaters Middle I	sland Creek Quadrangle Shirley
Elevation 771' Co	nty_095-Tyler District_Centerville
Will a pit be used? Yes No	f water to complete the proposed well work? Yes No
	closed loop-no utilization of a pit
Will a synthetic liner be used in the pi	
Proposed Disposal Method For Treate	1 Pit Wastes:
Reuse (at API Num Off Site Disposal (S	on (UIC Permit Number_see attached sheet) per_at next anticipated well) upply form WW-9 for disposal location)
Will closed loop system be used? If so, describ	e: yes
Drilling medium anticipated for this well (verti	eal and horizontal)? Air, freshwater, oil based, etc. Alr/water based mud through intermediate string then
-If oil based, what type? Synthetic, pe	
Additives to be used in drilling medium? Pleas	e see attached sheet
	ndfill, removed offsite, etc
-If left in pit and plan to solidify what	medium will be used? (cement, lime, sawdust)
-Landfill or offsite name/permit numb	
on August 1, 2005, by the Office of Oil and Ga provisions of the permit are enforceable by lar law or regulation can lead to enforcement actio I certify under penalty of law that I application form and all attachments thereto	have personally examined and am familiar with the information submitted on this and that, based on my inquiry of those individuals immediately responsible for information is true, accurate, and complete. I am aware that there are significant ding the possibility of fine or imprisonment. Official Section 1990
Subscribed and sworn before me this 30	day of 5 ptember, 20 14
- We Swiger	Notary Public 12/19/201
My commission expires 09/19/2023	

Proposed Revegetation Treatment: Acres Disturbed	5.42	Prevegetation r	oH
Lima Tanalagus au ta agus			
Lime Tons/acre or to corre			
Fertilizer type			
Fertilizer amount 500	lbs/acre		
Mulch_ Hay or Straw at 2	_Tons/acre		
	Seed Mixtures		
Temporary		Perm	anent
Seed Type lbs/acre		Seed Type	lbs/acre
Tall Fescue 40	Tall Fe	scue	40
Ladino Clover 5	Ladino	Clover	5
**alternative seed mixtures are shown on the Site Design	gn.		
Orawing(s) of road, location, pit and proposed area for provided)		s engineered plans i	ncluding this info have bee
Photocopied section of involved 7.5' topographic sheet	<u> </u>	<u> </u>	
Photocopied section of involved 7.5' topographic sheet Plan Approved by: Pre seed and mulch all cut area, maintain	ain all E & S during o		
Plan Approved by: Muchael Surface mainta	ain all E & S during o	peration.	
Plan Approved by: Muchael Surface mainta	ain all E & S during o	peration.	
Plan Approved by: Muchael Surface mainta	ain all E & S during o	peration.	Received Gas ice of Oil & 2014
Plan Approved by: Muchael Surface mainta	Date:	peration.	

Cuttings Disposal/Site Water

Cuttings -Haul off Company:

Eap Industries, Inc. DOT # 0876278 1575 Smith Two State Rd. Atlasburg, PA 15004 1-888-294-5227

Waste Management 200 Rangos Lane Washington, PA 15301 724-222-3272

Environmental Coordination Services & Recycling (ECS&R) 3237 US Highway 19
Cochranton, PA 16314
814-425-7773

Disposal Locations:

Apex Environnemental, LLC Permit # 06-08438 11 County Road 78 Amsterdam, OH 43903 740-543-4389

Westmoreland Waste, LLC Permit # 100277 111 Conner Lane Belle Vernon, PA 15012 724-929-7694

Sycamore Landfill Inc. Permit #R30-079001 05-2010 4301 Sycamore Ridge Road Hurricane, WV 25526 304-562-2611

Max Environnemental Technologies, Inc. facility Permit # PAD004835146 / 301071 233 Max Lane Yukon, PA 25968 724-722-3500

Max Environnemental Technologies, Inc. Facility Permit # PAD05087072 / 301359 200 Max Drive Bulger, PA 15019 724-796-1571

Waste Management Kelly Run Permit # 100663 1901 Park Side Drive Elizabeth, PA 15037

Waste Management South Hills (Arnoni) Permit # 100592 3100 Hill Road Library, PA 15129 724-348-7013

Waste Management Arden Permit # 100172 200 Rangos Lane Washington, PA 15301 724-222-3272

Waste Management Meadowfill Permit # 1032 1488 Dawson Drive Bridgeport, WV 26330

Brooke County Landfill Permit # SWF-103-97 / WV 0109029 Rd 2 Box 410 Colliers, WV 26035 304-748-0014 Office of Oil & Gas

Wetzel County Landfill Permit # SWF-1021-97 / WV 0109185 Rt 1 Box 156A New Martinsville, WV 26035 304-455-3800

Energy Solutions, LLC Permit # UT 2300249 423 West 300 South Suite 200 Salt Lake City, UT 84101

Energy Solutions Services, Inc. Permit # R-73006-L24 1560 Bear Creek Road Oak Ridge, TN 37830

Water Haul off Companies:

Dynamic Structures, Clear Creek DOT # 720485 3790 State Route 7 New Waterford, OH 44445 330-892-0164

Disposal Locations:

Solidification Waste Management, Arden Landfill Permit # 100172 200 Rangos Lane Washington, PA 15301 724-225-1589

Solidification/Incineration Soil Remediation, Inc. Permit # 02-20753 6065 Arrel-Smith Road Lowelville, OH 44436 330-536-6825

Adams #1 Permit # 34-031-2-7177 23986 Airport Road Coshocton, OH 43812 740-575-4484

Adams #2 Permit # 34-031-2-7178 740-575-4484 Office of Oil & Gas

OCT 06 2014



Site Safety Plan Noble Energy, Inc. SHR 40 Well Pad 9777 Middle Island Rd Alma, WV

EHS

August 2014: Version 1

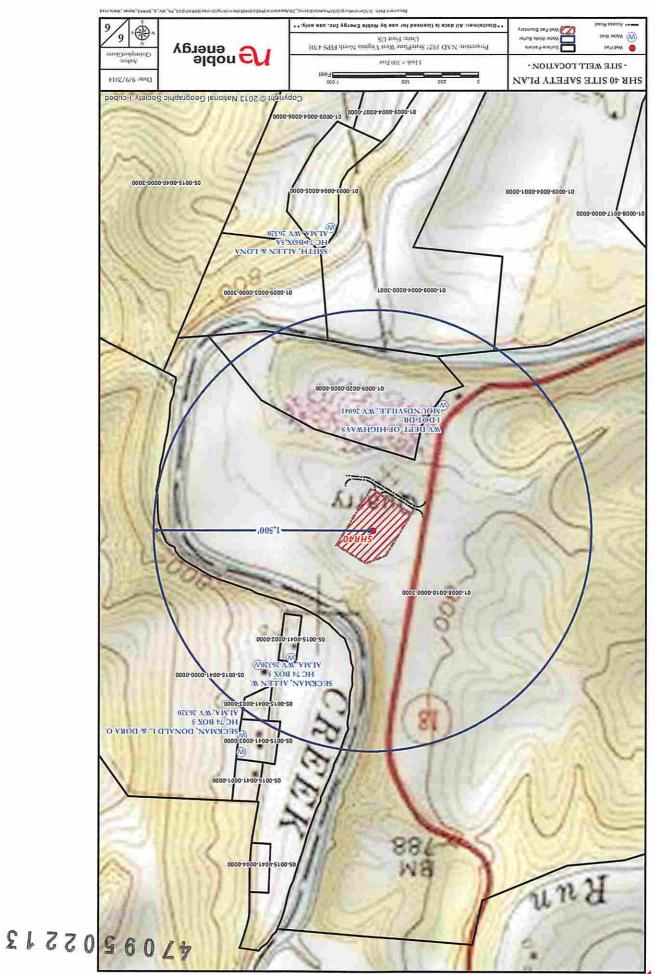
For Submission to West Virginia Department of Environmental Protection, Michael I Office of Oil and Gas

9-9-14

Noble Energy, Inc. Office of Oil & Gas **Appalachia Offices**

Received OCT 06 2014

333 Technology Drive, Suite 116 Canonsburg, PA 15317-9504



12/19/2014

