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

October 24, 2013

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-8510055, 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: PEN2CHS
Farm Name: KIESSLING, TERRY & HELEN
API Well Number: 47-8510055
Permit Type: Horizontal 6A Well
Date Issued: 10/24/2013

10/25/2013

API Number: 85-10055

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. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACOE). Through this permit, you are hereby being advised to consult with USACOE 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.

10/25/2013

85-10055

Noble Energy Addendum

Pennsboro site proposed well procedures

- Intermediate casing has been revised to extend below the Alexander and ETS
- Southern laterals will be fractured while surrounding Consol offset wells are being pressure monitored
- Northern laterals will be fractured while surrounding Consol offset wells are being pressure monitored
- Operators of all offset wells will be contacted for monitoring as per tables below:

Southern lateral offsets:

API	TD	Lease	Current Operator	TVD_SS
4708508880	5057	Walnut Investment Co 2	Key Oil Co.	3997
4708507336	5128	Mary Jo Stephens	Consol Gas Company	4059
4708507979	5130	J Ralph Hammond	Consol Gas Company	4060
4708508068	5158	Howard D Owings	Consol Gas Company	4069
4708507343	5352	WV Pulp&Papr	Consol Gas Company	4240
4708507977	5453	John A Smith 9	Pardee Exploration Co	4391
4708507534	5400	Harlan Hogue	Consol Gas Company	4470
4708503611	5985	James A Hogue	Consol Gas Company	4877
4708506894	5992	Richard L Goff	Seneca-Upshur Petroleum, LLC	5012
4708507211	5911	James H Kiger	Seneca-Upshur Petroleum, LLC	5086
4708509672	6300	Russell Fox Sr	Antero Resources Appalachian Corp.	5238
4708510042	6600	SCHMIDLE UNIT	Antero Resources Appalachian Corp.	5480
4708510043	6600	SCHMIDLE UNIT	Antero Resources Appalachian Corp.	5480

Northern lateral offsets:

API	TD	Lease	Current Operator	TVD_SS
4707331065	4200	WV FARMING COMM	Hanlon Oil & Gas Co.	3560
4707302089	5015	Laura Whaley 1	Consol Gas Company	4015
4708507972	5054	Robert P Jackson 3	Consol Gas Company	4026
4708507993	5005	HERSCHEL H PIFER 2	Consol Gas Company	4036
4708507992	5032	Herschel H Pifer 1	Consol Gas Company	4041
4707301356	4880	Mary Elizabeth Jones 1	Pardee Exploration Co.	4042
4707302092	5095	Coastal Lumber 1	Consol Gas Company	4076
4707302088	5124	Mary Elizabeth Jones 3	Pardee Exploration Co	4093
4708507995	5006	Richard/Kenda Jones 1	Consol Gas Company	4176
4708507976	5300	John A Smith 8	Pardee Exploration Co	4246
4707302081	5026	Mary E Jones 2	Paulico Resourses, Inc.	4248
4707302080	5234	Edna V Smith 1	Glass Development Company	4259

85-10055

4708507985	5176	Edna V Smith 6	Pardee Exploration Co	4301
4708507974	5399	John A Smith 2	Pardee Exploration Co	4378
4708507975	5296	John A Smith 3	Pardee Exploration Co	4421
4708505456	5500	Edna Smith 4	Triad Hunter LLC	4505

- Noble will contact these operators prior to fracturing and guarantee that we can monitor all of the Consol operated offset wells unless the WVDEP deems it unnecessary based on the results from the PENS-1 neighboring pad pressure monitoring results.

Description of Pressure Monitoring

Pressure transducers, on both the tubing and annulus, shall monitor the flowing tubing pressures unless it is deemed necessary to shut in the well for safety reasons. For the deepest wells in the Rhinestreet and Marcellus we will recommend shutting in the wells for pressure monitoring.

- We anticipate setting low and high pressure triggers in our automated pressure monitoring system. Anything more than 100 psi above expected pressures or at 0 psi would trigger an event.
- Our fracturing treatments will be designed to reach close to 90 bpm, use a slick water formulation. Typically our sand volumes will be between 300,000 and 500,000 pounds of sand per stage.
- The plan is to fracture all of the laterals prior to flowback procedures. However, in the event of a trigger, we will cease pumping that frac stage and continue with the following stage until that lateral is fully stimulated. If we see high pressure in any monitor well, we will immediately cease fracing operations and flow back the well to alleviate pressure seen in the offset well.

Noble will audit the surrounding wells to be pressure monitored and install temporary 3000 psi wellheads as necessary.

Contingency:

1) Offset wells watering out – We are recommending that an affected offset operator wait for Noble to complete operations on that particular lateral including flowback to alleviate potential pressure surges before any offset operator intervenes.

85-10055

WW - 6B
(3/13)

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

539

1) Well Operator:	Noble Energy, Inc.	494501907	085	Clay	Pennsboro
		Operator ID	County	District	Quadrangle

2) Operator's Well Number: PEN2CHS Well Pad Name: PEN2

3 Elevation, current ground: 1074.85 Elevation, proposed post-construction: 1075.4

4) Well Type: (a) Gas ■ Oil _____ Underground Storage _____

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- 6262-66324; Thickness- 62"; Pressure- 4174 # psi

LKC

7) Proposed Total Vertical Depth: 6423'

8) Formation at Total Vertical Depth: Onondaga (99' into the Onondaga)

9) Proposed Total Measured Depth: 15029'

10) Approximate Fresh Water Strata Depths: 454'

11) Method to Determine Fresh Water Depth: Closest well & Seneca Technology data base

12) Approximate Saltwater Depths: 1244'

13) Approximate Coal Seam Depths: no coal

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

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: no

RECEIVED
Office of Oil and Gas
OCT 11 2013
WV Department of
Environmental Protection

16) Describe proposed well work: Drill the vertical depth to aprox. 99' but not more than 100' into the Onondaga, plug back with a solid cement plug to the base of the Marcellus (KOP) at an estimated total vertical depth of approximately 6324feet. Drill Horizontal leg - stimulate and produce the Marcellus Formation.

Should we encounter a unanticipated void we will install a minimum of 20' of casing below the void but not more than 50' 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): 8.43

19) Area to be disturbed for well pad only, less access road (acres): 8.0

10/25/2013

85-10055

WW - 6B
(3/13)

20) **CASING AND TUBING PROGRAM**

10/21/13
LKC

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	40'	40'	CTS
Fresh Water	13 3/8"	N	J-55	54.5	650'	650'	CTS
Coal							
Intermediate	9 5/8"	N	J-55	36.0	5410'	5410'	CTS
Production	5 1/2"	N	P-110	20.0	15029'	15029'	200' above 9.625 shoe
Tubing							
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20"	24"	.438	2730	Type 1	1.2
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"	8.75"	.361	12,640	Class A	1.27
Tubing						
Liners						

PACKERS

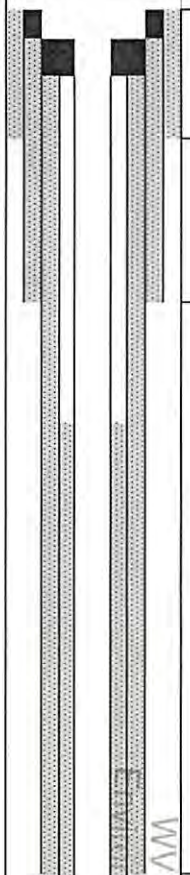
Kind:				
Sizes:				
Depths Set:				

10/25/2013

PENS-2 WELLBORE DIAGRAM

Marcellus Shale Horizontal
Ritchie County, WV
Ground Elevation 1076'

	PENS-2C Pilot SHL (Lat/Long)	(308280.93N, 1572150.36E) (NAD27)
Ground Elevation 1076'	PENS-2C Pilot LP (Lat/Long)	(307793.3N, 1571819.23E) (NAD27)
Azm 139.06°	PENS-2C Pilot BHL (Lat/Long)	(301525.28N, 1577076.77E) (NAD27)



HOLE	CASING	GEOLOGY	TVD Top	TVD Bottom	MUD	CEMENT	CENTRALIZERS	CONDITIONING	COMMENTS
26"	20" 52#				AIR	Grouted to surface	N/A	Ensure the hole is clean at TD.	Stabilize surface fill/soil. Conductor casing = 0.25" wall thickness
		Conductor		**40**					
17.5"	13-3/8" 54.5# J-55 BTC				AIR	15.6 ppg Type 1 + 2% CaCl, 0.25# Lost Circ 40% Excess Yield = 1.18	Bow Spring every 3 joints to 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.	Protect freshwater. Surface casing = 0.380" thick. Burst=2730 psi
		Surface Casing		**579**					
12.25"	9-5/8" 36# HCK-55 BTC	Maxton	1929	1973	SOBM 8.0 - 8.5 ppg	50 bbls 10 ppg spacer, 12.0 ppg lead slurry, (800') of 15.6 ppg Class A tail slurry cemented to surface.	Bow Spring centralizers on every joint to KOP, one every third joint from KOP to 100' from surface	Once at TD, circulate at least 2x bottoms up. Once casing is at setting depth, circulate a minimum of one hole volume pripr to pumping cement	Casing to be ran below the Alexander. Intermediate casing = 0.352" wall thickness Burst=3520 psi, Collapse 2980 psi
		Big Lime	2005	2082					
		Big Injun	2082	2130					
		Weir	2449	2465					
		Fifth	2921	2927					
		Gordon	2950	2952					
		Warren	3532	3566					
		Speechley	3850	4404					
		Riley	4601	4615					
		Benson	4955	4961					
		Alexander	5204	5210					
		Intermediate Casing	**5410**						
8.75/8.5"	5-1/2" 20# HCP-110 TXP BTC	Rhinestreet	5740	5908	SOBM 12.5- 13.0 ppg	120 bbls spacer with density and rheology heirarchy, lead slurry to 2000' to recover SOBM, 14.8 ppg Class A tail slurry to inside intermediate casing	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
		Marcellus	6262	6324			Rigid Bow Spring every joint to KOP		
		TD	**15029**						

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

85-10055

WW - 6B
(3/13)

85 10055

21) Describe centralizer placement for each casing string. Conductor - No centralizers used. Fresh Water & Coal - Bow spring centralizers on first 2 joints then every third joint to 100 feet 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.

22) Describe all cement additives associated with each cement type. Conductor - 1.15% CaCl2.
Fresh Water - 1.15% CaCl2. Coal - 1.15% CaCl2, 0.6% Gas migration control additive, 0.5% fluid loss additive, 0.4% Salt tolerant dispersant, and 0.3% defoamer. Intermediate - 10.0% BWOW NaCl, 0.2% BWOB Anti-foam, 0.3% BWOW Dispersant, 0.4% BWOB Cement retarder. Production: 2.6% Cement extender, 0.7% Fluid Loss additive, 0.5% high temperature retarder, 0.2% friction reducer.

23) 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 -The hole is drilled w/air and casing is run in air. Once casing is on bottom, the hole is filled w/ KCl water and a minimum of one hole volume is circulated prior to pumping cement. Coal - The hole is drilled w/air and casing is run in air. Once casing is at setting depth, the hole is filled w/ KCl water and a minimum of one hole volume is circulated prior to pumping cement. Intermediate - Once surface casing is set and cemented Intermediate hole is drilled either on air or SOBM and filled w/ KCl water once filled w/ KCl water once drilled to TD. The well is conditioned with KCl 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 a drilling pump rate for at least three hours. Once the torque and drag trends indicate the hole is clean the drilling BHA is pulled and casing is run. Once on bottom w/ casing the hole is circulated a minimum of one hole volume prior to pumping cement.

*Note: Attach additional sheets as needed.

10/25/2013

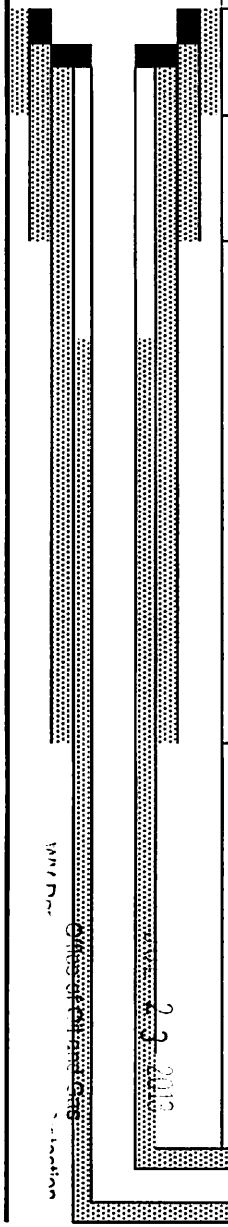
- 85 10055

AWS Cement Additives- Noble Energy

	Product Name	Product Use	Chemical Name	CAS Number
Surface & Intermediate	Calcium Chloride Flake	Cement Accelerator	Calcium Chloride Potassium Chloride Water Sodium Chloride	10043-52-4 7447-40-7 7732-18-5 7647-14-5
	C-41L	De-foamer	Methyl Alcohol Tributyl Phosphate	67-56-1 126-73-8
	Pol-E-Flake	LCM	Polyester	Non-Hazardous
Spacer	Bentonite Gel	Viscosifier	Crystalline Silica, Quartz	14808-60-7
	Baro-Seal	LCM	Mixture	Non-Hazardous
	Pol-E-Flake	LCM	Polyester	Non-Hazardous

	Product Name	Product Use	Chemical Name	CAS Number
Intermediate	D046	Antifoam	Fuller's earth (attapulgite)	8031-18-3
			Polypropylene glycol	25322-69-4
	D130	Polyester Flake	polyethylene terephthalate	25038-59-9
	D013	Retarder	Sodium lignosulfonate	8061-51-6
			Calcium lignosulfonate	8061-52-7
	D202	Solid Dispersant	sulphonated synthetic polymer	proprietary
			formaldehyde (impurity)	50-00-0
	SPACER			
	D020	bentonite extender	bentonite	1302-78-9
	D130	polyester flake - lcm	polyethylene terephthalate	25038-59-9

	D020	Bentonide Extender	Bentonite	1302-78-9
	D065	Dispersant	Sodium Polynaphthalene sulfonate	9008-63-3
			Sodium Sulfate	7757-82-6
	D046	Antifoam	Fuller's earth (attapulgite)	8031-18-3
			Polypropylene glycol	25322-69-4
	D013	Retarder	Sodium lignosulfonate	8061-51-6
			Calcium lignosulfonate	8061-52-7
	D167	Fluid Loss	Aliphatic amide polymer	proprietary
	SPACER			
	D182	MUSPUSH* II Spacer	sulfonated organic polymer	proprietary
			glucoside polymer	proprietary
	D031	barite	barium sulfate	7727-43-7
	B220	surfactant	fatty acid amine	proprietary
			ethoxylated alcohol	proprietary
			glycerol	56-81-5
			2.2'-Iminodiethanol	111-42-2



HOLE	CASING	GEOLOGY	TVD Top	TVD Bottom	MUD	CEMENT	DIRECTIONAL	COMMENTS
20"	20" 81.3# LS				AIR	Grouted to surface	N/A	Stabilize surface fill/soil
		Conductor		**40**				
17.5"	13-3/8" 54.5# J-55 BTC				AIR	15.6 ppg cemented to surface		Protect freshwater
		Surface Casing		**650**				
12.25"	9-5/8" 36# HCK-55 BTC				SOBM 8.0 - 8.5 ppg Maintain lower MW to prevent seepage to depleted formations	50 bbls 9.0 ppg spacer, 12.0 ppg lead slurry, 62 bbl (800') of 15.6 ppg tail slurry cemented to surface (displace with water). Max pump rate of 5 bpm due to potential for losses in depleted formations (Benson expected to be worst case)	Vertical BHA: 1.5° bend, low speed motor, 1/4" UG near bit and string stabilizers. 7 blade PDC bit. 650 GPM, tight TFA. Optimize WOB, Minimize RPM (<120 rpm at bit)	Offset data shows potential for Red Rock instability (driver for oil based mud system) Abrasive sands will wear out bits (Big Injun expected to be worst case). Back off parameters before transition into sands. Depleted formations from 2500 - 5300' TVD.
		Maxton Sand	1929	1973				
		Big Lime	2005	2082				
		Big Injun	2082	2130				
		Weir Sand	2449	2465				
		5th Sand	2921	2927				
		Gordon	2950	2952				
		Warren Sand	3532	3566			Nudge/Tangent BHA: Same as above, but increase bend angle (3 wells to ~12° INC, 4 wells to 40° INC, 2 wells stay vertical)	
		Speechley	3850	4404				
		Riley	4601	4615				
		Benson	4955	4961				
		Alexander	5204	5210				Required to set intermediate casing below the Alexander
		Intermediate Casing	**+/-5410 TVD**					
8.75/8.5"	5-1/2" 20# HCP-110 TXP BTC Toe sleeve for completions	Rhinestreet	5740	5908	SOBM 12.5- 13.0 ppg	120 bbls spacer with density and rheology heirarchy, lead slurry to 2000' to recover SOBM, 14.8 ppg tail slurry	Curve BHA: 2.38° bend, high speed motor, slick	F.I.T will be performed 0.5 ppg more than highest anticipated MW. Geosteering +/-10' above Onondaga, Onondaga 6369-6372' TVD
		Burkett	6240	6254				
		Tully Limestone	6254	6256				
		Hamilton	6256	6262				
		Marcellus	6262	6324			Lateral BHA: Powerdrive Vortex RSS (Tight TFA, 100 topdrive rpm, tracking PU/SO/TQ	
		Cherry Valley	6292	6294				
		Lateral TD Range	**12,500-15,810 MD**					

8.75/8.5" Hole - Cemented Long String 5-1/2" 20# HCP-110 TXP BTC - Lateral Length- 1933'. TVD - 6314' MD- 9247'

WW-9
(5/13)

Page _____ of _____

API Number 47 - 085 - 10055

Operator's Well No. PEN2CHS

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) North Fork of Hughs River HUC 10 / Bonds Creek Quadrangle Pennsboro

Elevation 1074.85 County Ritchie District Clay

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes X No _____

Will a pit be used for drill cuttings? Yes _____ No X

If so, please describe anticipated pit waste: closed loop-no utilization of a pit

Will a synthetic liner be used in the pit? Yes _____ No X If so, what ml.? _____

Proposed Disposal Method For Treated Pit Wastes:

_____ Land Application
_____ Underground Injection (UIC Permit Number _____)
■ Reuse (at API Number at next anticipated well)
■ Off Site Disposal (Supply form WW-9 for disposal location)
_____ Other (Explain _____

Will closed loop system be used? yes

Drilling medium anticipated for this well? Air, freshwater, oil based, etc. Air/water based mud through intermediate string then SOBM

-If oil based, what type? Synthetic, petroleum, etc. Synthetic

Additives to be used in drilling medium? Please see attached list

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. _____

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) _____

-Landfill or offsite name/permit number? Please see attached list

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature _____

Company Official (Typed Name) Dee Swiger

Company Official Title Regulatory Analyst

Received
Office of Oil and Gas
Dept. of Environmental Protection

OFFICIAL SEAL
Notary Public, State Of West Virginia
LAURA L. ADKINS
Hard Rock Exploration, Inc.
P.O. Box 13059 Charleston, WV 25360
My Commission Expires November 23, 2015

Subscribed and sworn before me this 18th day of July, 2013

Laura L. Adkins Notary Public

My commission expires November 23, 2015

10/25/2013

85-10055

Form WW-9

Operator's Well No. PEN2CHS

Noble Energy, Inc.

Proposed Revegetation Treatment: Acres Disturbed 11.2 Prevegetation pH 6.0

Lime 2 to 3 Tons/acre or to correct to pH _____

Fertilizer (10-20-20 or equivalent) 500 lbs/acre (500 lbs minimum)

Mulch Hay or Straw at 2 Tons/acre

Seed Mixtures

Area I		Area II	
Seed Type	lbs/acre	Seed Type	lbs/acre
Tall Fescue	40	Tall Fescue	40
Ladino Clover	5	Ladino Clover	5

Attach:
Drawing(s) of road, location,pit and proposed area for land application.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: David Watkins

Comments: Prseed and mulch all adisa - maintain all E&S structures

Received

JUL 23 2013

Title: Oil and Gas Inspector Date: 7-16-13

Office of Oil and Gas
WV Dept. of Environmental Protection

Field Reviewed? (✓) Yes ( ) No

10/25/2013

Site Water/Cuttings Disposal

85 10055

Cuttings

Haul off Company:

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

Disposal Locations:

Apex Environmental, 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 (Allied Waste) R30-07900105-2010
4301 Sycamore Ridge Road
Hurricane, WV 25526
304-562-2611

Water

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

Disposal Location:

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

app recd 7/23

Water Management Plan:
Primary Water Sources

WMP-01439	API/ID Number:	047-085-10055	Operator:	Noble Energy, Inc
		PEN2CHS		

Important:

For each proposed primary water source (including source intakes for purchased water sources) identified in your water management plan, and summarized herein, DEP has made an evaluation concerning water availability over the specified date range. DEP's assessment is based on the following considerations:

- Statistical analysis of historical USGS stream gauge data (transferred to un-gauged locations as necessary);
- Identification of sensitive aquatic life (endangered species, mussels, etc.);
- Quantification of known existing demands on the water supply (Large Quantity Users);
- Minimum flows required by the Army Corps of Engineers; and
- Designated stream uses.

Based on these factors, DEP has provided, for each intake location (and origination point for purchased water), a reference gauge location and discharge flow reading which must be surpassed prior to withdrawals. Additionally, DEP has established a minimum passby flow at the withdrawal location which must also be surpassed prior to withdrawals. These thresholds are considered terms of the permit and are enforceable as such.

DEP is aware that some intake points will be used for mutiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interepreted as total withdrawal limits for each location over the specified date range regardless of how many wells are supported by that intake.

For all purchased water intakes, determinations of water availability are made at the original source intake location. It is the responsibility of the Oil and Gas Operator, not the seller, to cease withdrawal of water from the seller when flows are less than the minimum gauge reading at the stream gauge referenced by the Water Management Plan in order to protect stream uses.

Note that the determinations made herein are based on the best available data, but it is impossible to predict water availability in the future. While the DEP has carefully established these minimum withdrawal thresholds, it remains the operator's responsibility to protect aquatic life at all times. Approval to withdrawal is contingent upon permission from the land owner. It is the responsibility of the operator to secure and maintain permission prior to any withdrawals.

The operator is reminded that 24-48 hours prior to withdrawing (or purchasing) water, DEP must be notified by email at DEP.water.use@wv.gov.

APPROVED OCT 0 9 2013

10/25/2013

Source Summary

WMP- 01439	API Number:	047-085-10055	Operator:	Noble Energy, Inc
		PEN2CHS		

Purchased Water

- Source **Ohio River @ Select Energy** Pleasants Owner: **Select Energy**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/16/2013	7/16/2014	11,000,000	500,000	39.346473	-81.338727

☑ Regulated Stream? Ohio River Min. Flow Ref. Gauge ID: 9999998 Ohio River Station: Racine Dam

Max. Pump rate (gpm): **1,680** **Min. Gauge Reading (cfs):** **7,216.00** **Min. Passby (cfs)**

DEP Comments: Refer to the specified station on the National Weather Service's Ohio River forecast website: http://www.erh.noaa.gov/ohrfc//flows.shtml

- Source **West Virginia American Water - Weston Water Treatme** Lewis Owner: **West Virginia American Water**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/16/2013	7/16/2014	11,000,000	500,000	-	-

☑ Regulated Stream? Stonewall Jackson Dam Ref. Gauge ID: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Max. Pump rate (gpm): **0** **Min. Gauge Reading (cfs):** **170.57** **Min. Passby (cfs)**

DEP Comments:

- Source **Glenville Utility** Gilmer Owner: **Glenville Utility**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
7/16/2013	7/16/2014	11,000,000	10,000	-	-

☐ Regulated Stream? Burnsville Dam Ref. Gauge ID: 3155000 LITTLE KANAWHA RIVER AT PALESTINE, WV

Max. Pump rate (gpm): **0** **Min. Gauge Reading (cfs):** **303.75** **Min. Passby (cfs)**

DEP Comments:

10/25/2013

Source Detail

WMP-01439 | API/ID Number: 047-085-10055 | Operator: Noble Energy, Inc

PEN2CHS

Source ID: 26197 | Source Name: Ohio River @ Select Energy

Select Energy

Source Latitude: 39.346473

Source Longitude: -81.338727

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 25000 | County: Pleasants

Anticipated withdrawal start date: 7/16/2013

Anticipated withdrawal end date: 7/16/2014

Total Volume from Source (gal): 11,000,000

Max. Pump rate (gpm): 1,680

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm)

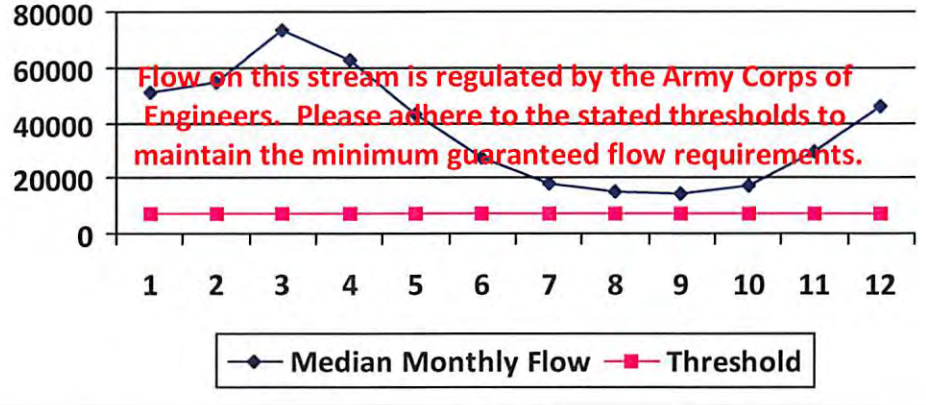
- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [x] Regulated Stream? — Ohio River Min. Flow
- [ ] Proximate PSD?
- [x] Gauged Stream?

Reference Gaug: 9999998 | Ohio River Station: Racine Dam

Drainage Area (sq. mi.): 25,000.00 | Gauge Threshold (cfs): 7216

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	50,956.00	-	-
2	54,858.00	-	-
3	73,256.00	-	-
4	62,552.00	-	-
5	43,151.00	-	-
6	27,095.00	-	-
7	17,840.00	-	-
8	14,941.00	-	-
9	14,272.00	-	-
10	17,283.00	-	-
11	29,325.00	-	-
12	46,050.00	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	3.74
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

10/25/2013

Source Detail

WMP- 01439 | API/ID Number: 047-085-10055 | Operator: Noble Energy, Inc

PEN2CHS

Source ID: 26198 | Source Name: West Virginia American Water - Weston Water Treat

West Virginia American Water

Source Latitude: -

Source Longitude: -

HUC-8 Code: 5020002

Drainage Area (sq. mi.): 104.83 | County: Lewis

Anticipated withdrawal start date: 7/16/2013

Anticipated withdrawal end date: 7/16/2014

Total Volume from Source (gal): 11,000,000

Max. Pump rate (gpm): 0

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm)

- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [x] Regulated Stream?
- [x] Proximate PSD?
- [x] Gauged Stream?

Stonewall Jackson Dam

Weston WTP

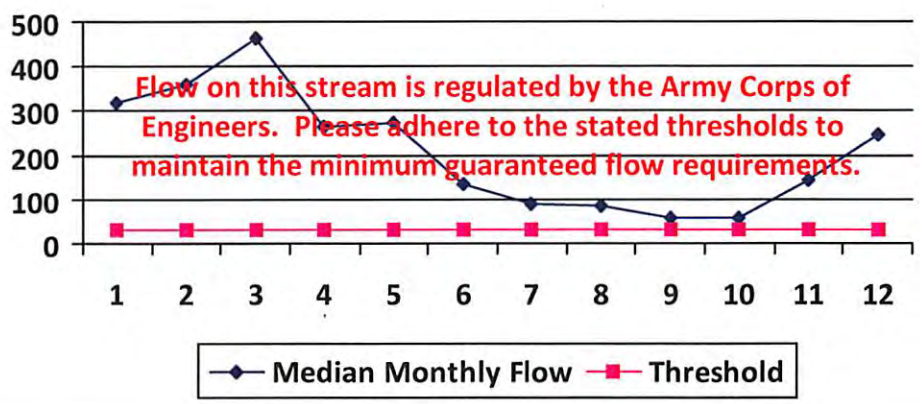
Reference Gaug: 3061000 WEST FORK RIVER AT ENTERPRISE, WV

Drainage Area (sq. mi.): 759.00

Gauge Threshold (cfs): 234

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	321.23	-	-
2	361.67	-	-
3	465.85	-	-
4	266.43	-	-
5	273.47	-	-
6	137.03	-	-
7	88.78	-	-
8	84.77	-	-
9	58.98	-	-
10	57.83	-	-
11	145.12	-	-
12	247.76	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	24.32
Downstream Demand (cfs):	0.00
Pump rate (cfs):	0.00
Headwater Safety (cfs):	8.08
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

10/25/2013

Source Detail

WMP-01439 | API/ID Number: 047-085-10055 | Operator: Noble Energy, Inc

PEN2CHS

Source ID: 26199 | Source Name: Glenville Utility

Glenville Utility

Source Latitude: -

Source Longitude: -

HUC-8 Code: 5030203

Drainage Area (sq. mi.): 385.94 | County: Gilmer

Anticipated withdrawal start date: 7/16/2013

Anticipated withdrawal end date: 7/16/2014

Total Volume from Source (gal): 11,000,000

Max. Pump rate (gpm): 0

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm)

- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [x] Gauged Stream?

Burnsville Dam

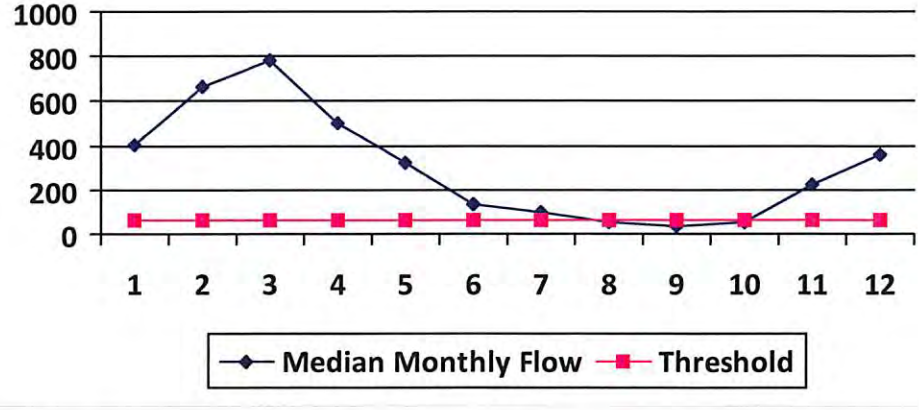
Reference Gaug: 3155000 | LITTLE KANAWHA RIVER AT PALESTINE, WV

Drainage Area (sq. mi.): 1,516.00

Gauge Threshold (cfs): 243

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	407.80	77.33	331.59
2	669.98	77.33	593.76
3	785.33	77.33	709.12
4	505.51	77.33	429.29
5	324.07	77.33	247.85
6	132.12	77.33	55.90
7	99.89	77.33	23.68
8	56.28	77.33	-19.94
9	35.11	77.33	-41.11
10	52.89	77.33	-23.32
11	223.44	77.33	147.23
12	363.54	77.33	287.32

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	61.86
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	0.00
Headwater Safety (cfs):	15.47
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	**303.75**
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

10/25/2013

Water Management Plan:
Secondary Water Sources

WMP- 01439 | API/ID Number 047-085-10055 | Operator: Noble Energy, Inc

PEN2CHS

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Lake/Reservior

Source ID: 26200 Source Name Bonds Creek Site No. 1 (WV08503)

Source start date: 7/16/2013

Source end date: 7/16/2014

Source Lat: 39.316142 Source Long: -80.98423 County Ritchie

Max. Daily Purchase (gal)

Total Volume from Source (gal): 11,000,000

DEP Comments: Location also known as Tracy Lake or Bonds Creek Lake

10/25/2013

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Multi-site impoundment

Source ID: 26201 Source Name FLG Tank Pad
Source start date: 7/16/2013
Source end date: 7/16/2014

Source Lat: 39.335467 Source Long: -80.001958 County Ritchie

Max. Daily Purchase (gal) Total Volume from Source (gal): 11,000,000

DEP Comments:

Recycled Frac Water

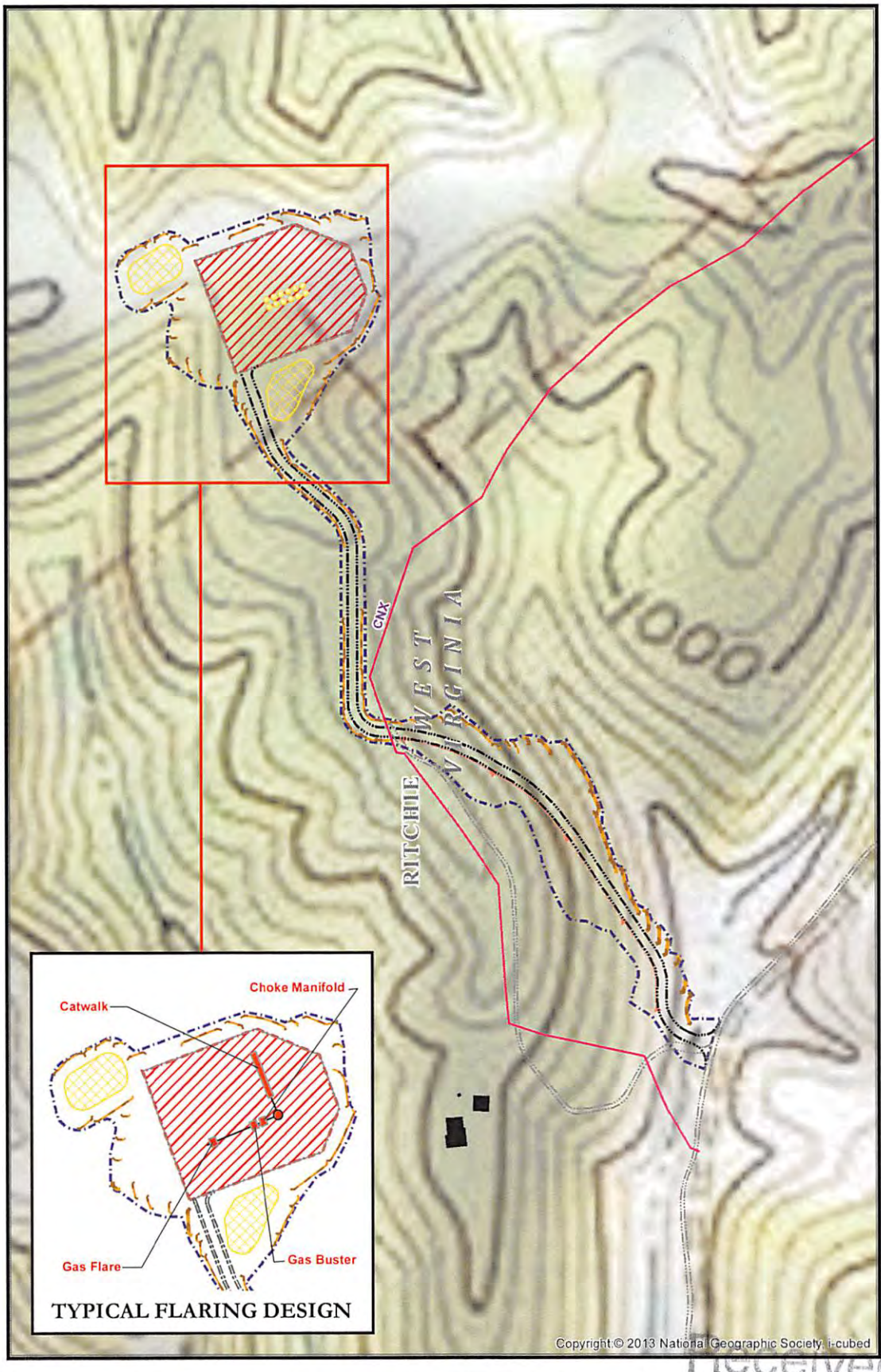
Source ID: 26202 Source Name Various
Source start date: 7/16/2013
Source end date: 7/16/2014

Source Lat: Source Long: County

Max. Daily Purchase (gal) Total Volume from Source (gal): 11,000,000

DEP Comments: Sources include, but are not limited to, the PEN1 and PEN2 well pads.

85 10055



Well Heads
Existing Gas Line
Proposed Road
EXISTING
Building
Ditch Flow
Silt Fence
Topsoil Stockpile
Well Pad Boundary
Limits of Disturbance

Prevailing Wind Direction: Ritchie County, WV - Northeast

"The prevailing wind is from the Southwest (Heading Northeast.) Average windspeed is highest, 8 miles per hour, in March."

** Information quoted from the "Soil Survey of Ritchie County, West Virginia" prepared by the Soil Conservation Service, the USDA, and West Virginia

0 150 300 600 Feet Scale 1" = 300'

PEN2 SITE SAFETY PLAN
- SITE DESIGN/ TYPICAL FLARING -

Author: ChristopherGlover
Date: 7/17/2013

Projection: NAD_1927_StatePlane_West_Virginia_North_FIPS_4701 Units: Foot US

noble energy

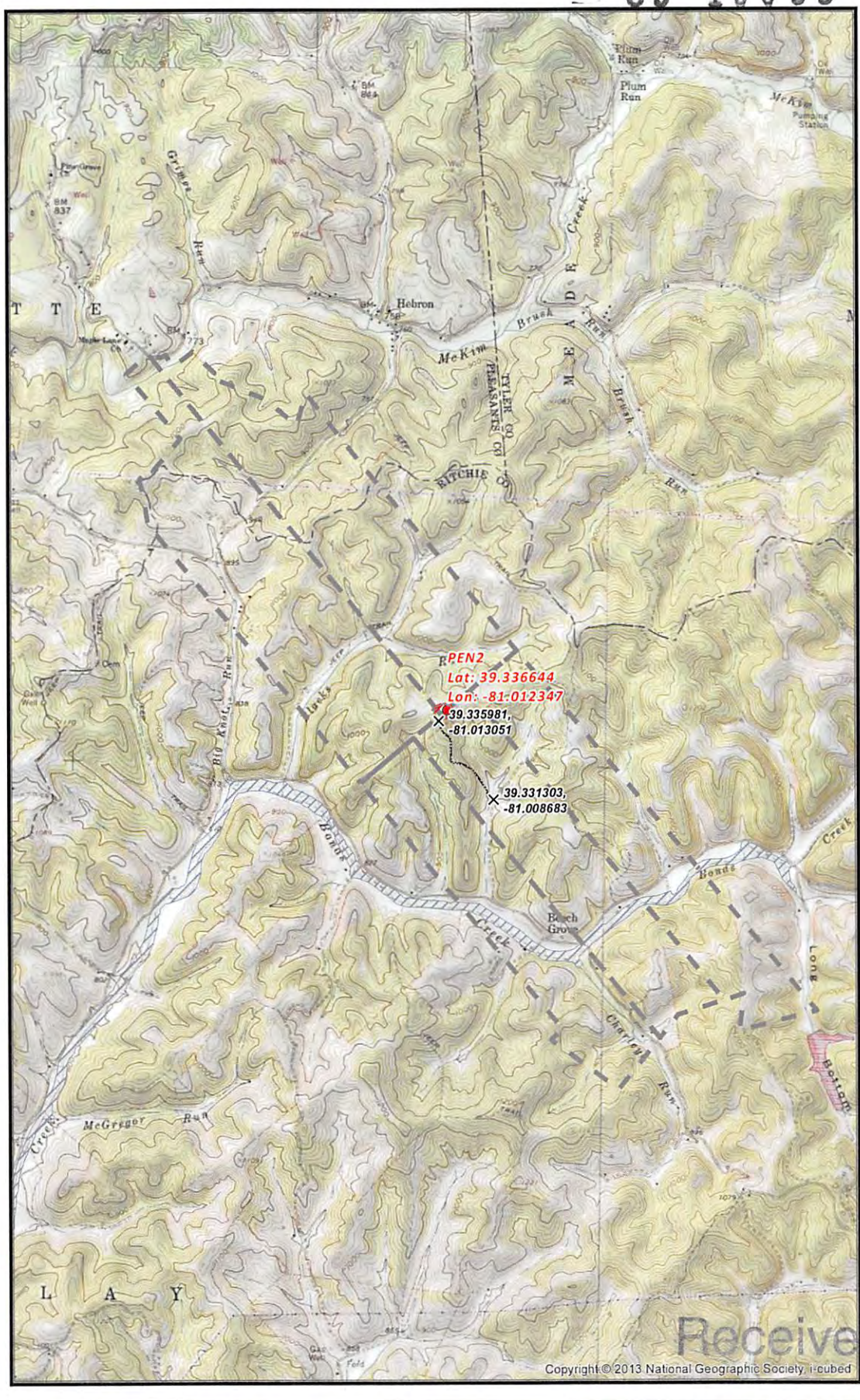
3 of 6

Received
OCT 25 2013
WV Dept. of Environmental Protection

10/25/2013

Document Path: G:\Denver\GIS-Denver\Projects\District_30\Appalachia\MXDs\EHSR\Permitting\Pennsboro\PEN2\D30_PA_WV_PEN2_Land_Use_Site_Design_Flares.mxd

85 10055



PEN2 SITE SAFETY PLAN
- FLOODPLAIN ZONES -

0 1,250 2,500 5,000 Feet

Scale 1" = 2,500'

Projection: NAD_1927_StatePlane_West_Virginia_North_FIPS_4701
Units: Foot US

noble energy

Disclaimer: All data is licensed for use by Noble Energy Inc. use only.

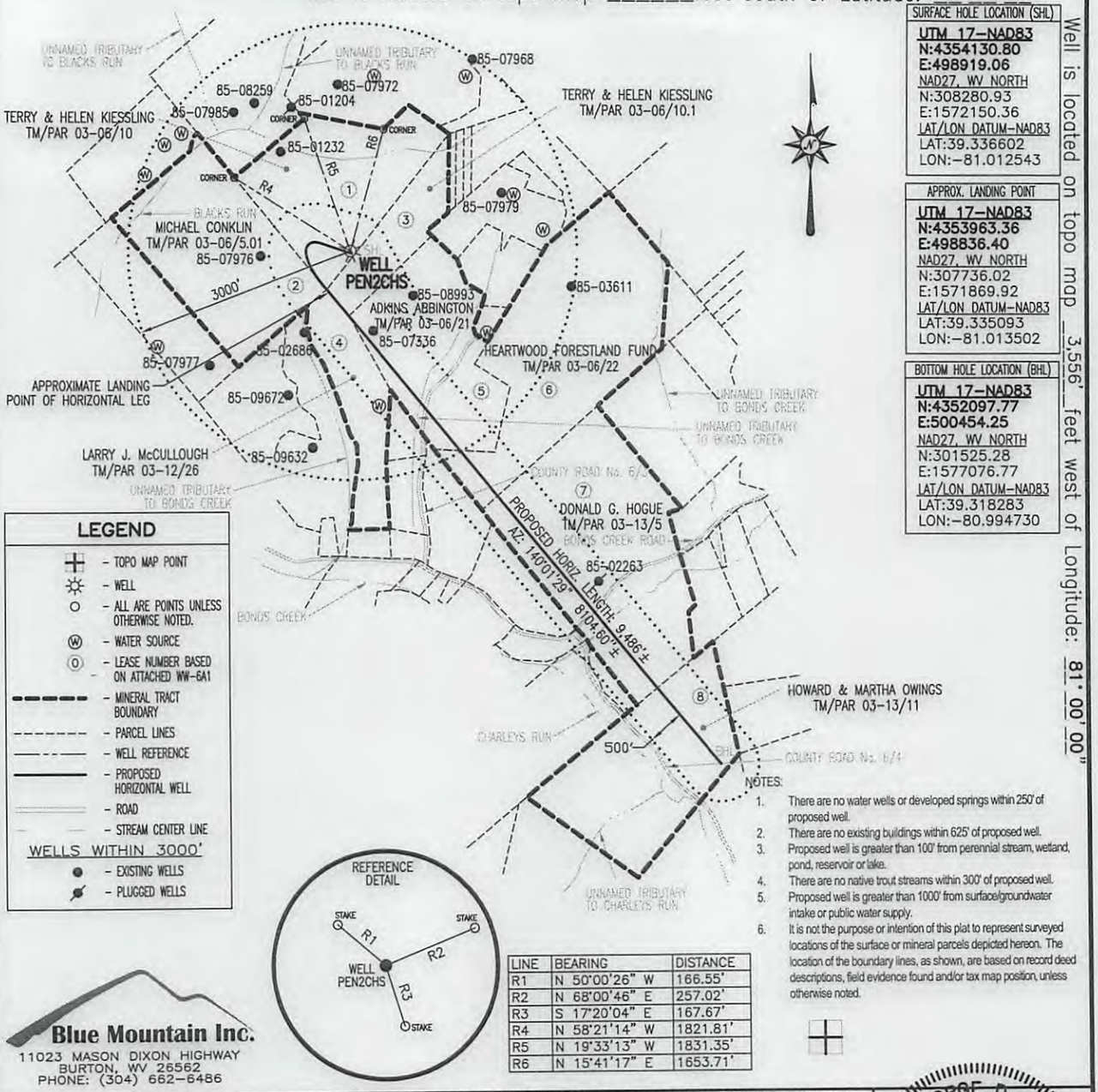
Date: 7/16/2013
Author: ChristopherGlover

2 / 6

Document Path: G:\Denver\GIS-Denver\Projects\District_30\Appalachia\MXDs\EHSR\Permitting\Pennsboro\PEN2\D30_PA_WV_PEN2_Floodplains.mxd

Well is located on topo map 13,979' feet south of Latitude: 39° 22' 30"

Well is located on topo map 3,556' feet west of Longitude: 81° 00' 00"



SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83
N:4354130.80
E:498919.06
NAD27, WV NORTH
N:308280.93
E:1572150.36
LAT/LON DATUM-NAD83
LAT:39.336602
LON:-81.012543

APPROX. LANDING POINT
UTM 17-NAD83
N:4353963.36
E:498836.40
NAD27, WV NORTH
N:307736.02
E:1571869.92
LAT/LON DATUM-NAD83
LAT:39.335093
LON:-81.013502

BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83
N:4352097.77
E:500454.25
NAD27, WV NORTH
N:301525.28
E:1577076.77
LAT/LON DATUM-NAD83
LAT:39.318283
LON:-80.994730

LEGEND

- ⊕ – TOPO MAP POINT
- ☼ – WELL
- ○ – ALL ARE POINTS UNLESS OTHERWISE NOTED.
- Ⓦ – WATER SOURCE
- ⓪ – LEASE NUMBER BASED ON ATTACHED WW-6A1
- – – – – MINERAL TRACT BOUNDARY
- ——— PARCEL LINES
- —·—·— WELL REFERENCE
- ——— PROPOSED HORIZONTAL WELL
- ROAD
- STREAM CENTER LINE

WELLS WITHIN 3000'

- ● – EXISTING WELLS
- ✐ – PLUGGED WELLS

LINE	BEARING	DISTANCE
R1	N 50°00'26" W	166.55'
R2	N 68°00'46" E	257.02'
R3	S 17°20'04" E	167.67'
R4	N 58°21'14" W	1821.81'
R5	N 19°33'13" W	1831.35'
R6	N 15°41'17" E	1653.71'

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.

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

FILE #: PEN2CHS

DRAWING #: PEN2CHS

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: _____

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 15, 2013

OPERATOR'S WELL #: PEN2CHS

API WELL #: 47 (STATE) 85 (COUNTY) 10055H6A (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: SEE ATTACHED WW-6A1 ACREAGE: 684.969±

10/25/2013

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: 6,314'± TMD: 15,029'±

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