



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

April 12, 2016

WELL WORK PLUGGING PERMIT

Plugging

This permit, API Well Number: 47-2300015, issued to CHESAPEAKE APPALACHIA, L.L.C., 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.

Upon completion of the plugging well work, the above named operator will reclaim the site according to the provisions of WV Code 22-6-30. The above named operator will also file, as required in WV Code 22-6-23, an affidavit on form WR-38 by two experienced persons in the operator's employment and the Oil and Gas inspector that the work authorized under this permit was performed and a description given. Failure to abide by all statutory and regulatory provisions governing all duties and operations here under may result in suspensions or revocation of this permit and in addition may result in civil and/or criminal penalties being imposed upon the operator.

This permit will expire in two (2) years from date of issue. If there are any questions, please free to contact me at (304) 926-0499 ext. 1654.


James Martin
Chief

Operator's Well No: 2120
Farm Name: U. S. FOREST SERVICE
API Well Number: 47-2300015
Permit Type: Plugging
Date Issued: 04/12/2016

Promoting a healthy environment.

CK# 6001782
\$100⁰⁰

23000157

FORM WW-4 (B)
Observe
File Copy
(Rev. 2/01)

1) Date: 3/17/2016
2) Operator's Well No. 821584
3) API Well No. 47-023-00015

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

APPLICATION FOR A PERMIT TO PLUG AND ABANDON

4) Well Type: Oil _____ Gas X Liquid injection _____ Waste disposal _____
(Is Gas, Production X or Underground storage _____) Deep _____ Shallow X

5) Location: Elevation 2,533' Watershed Broad Run of Jordan Run
District Union County Grant Quadrangle Blackbird Knob, WV 7.5'

6) Well Operator Chesapeake Appalachia, L.L.C. 7) Designated Agent Jessica Greathouse
Address P.O. Box 18496 Address P.O. Box 6070
Oklahoma City, OK 73154-0496 Charleston, WV 25362

8) Oil and Gas Inspector to be notified 9) Plugging Contractor
Name Bryan Harris Name Chesapeake Appalachia, L.L.C.
Address P.O. Box 157 Address P.O. Box 18496
Volga, WV 26238 Oklahoma City, OK 73154-0496

10) Work Order: The work order for the manner of plugging this well is as follows:

See Attached Sheet

OK Gamm

Notification must be given to the district oil and gas inspector 24 hours before permitted work can commence.

Work Order approved by Inspector _____

MAR 20 2016 Date

WV Department of
Environmental Protection

PERMIT CONDITIONS

West Virginia Code §22-6-11 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. All pits must be lined with a minimum of 20 mil thickness synthetic liner.
2. In the event of an accident or explosion causing loss of life or serious personal injury in or about the well or while working on the well, the well operator or its contractor shall give notice, stating the particulars of the accident or explosion, to the oil and gas inspector and the Chief within twenty-four (24) hours.
3. Well work activities shall not constitute a hazard to the safety of persons.

PLUGGING PROCEDURE

- 1) Prepare road and location, MIRU Service Rig
- 2) Check pressure on tubing and casing
- 3) Blow well down to tank
- 4) If needed, kill well with enough fluid to kill the highest pressure, plus 25% safety factor
- 5) Install BOP, if needed, TOH with 2 3/8" tubing
- 6) Remove cage/seating nipple and inspect tubing. If tubing is in suitable condition, use as W.S. – if not replace
- 7) TIH with W.S. to approximately 8225' or until PBTD is tagged, spot gel, pull W.S. to 8185'
- 8) Spot 300' cement plug 8185'-7885', pull W.S.
- 9) RIH with tools to check top of plug. If TOC is below ^{7985'}7975', then add cement to top of plug
- 10) Pull or run W.S. to 7000', spot gel
- 11) Spot 150' cement plug 7000'-6850', pull W.S.
- 12) Cut 5 1/2" at free-point (approximately ^{4500'}2500') and pull
- 13) TIH with W.S. to casing cut and spot gel
- 14) Spot ^{150'}100' cement plug at casing cut (approximately 2500'-2400') and pull W.S. . GEL HOLE TO 2500'.
- 15) Spot 150' cement ^{2500' TO 2350'}, pull W.S.
- 16) Run in hole with tools to check top of plug. If TOC is below ^{2350'}1465', then add cement to top of plug
- 17) Run W.S. to 800', spot gel
- 18) Spot 150' cement plug 800'-650', pull W.S. to 150'
- 19) Spot 150' cement plug 150'-surface
- 20) Pull W.S. and top off with cement
- 21) Erect monument and reclaim as prescribed by law



16 a. GEL HOLE TO 1570'.
 16 b. SET 150' CEMENT PLUG FROM 1570' TO 1420'. AND POOL W/ WICK STANG.
 16 c. RIH w/ TOOLS TO CHECK TOC, ADD CEMENT IF NECESSARY.

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MUST HAVE A
 MINIMUM OF 60%
 GEL BETWEEN
 ALL CEMENT PLUGS,

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IV-35
(Rev 8-81)

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MAR 02 1987

W. VA. OIL & GAS
CONSERVATION COMMISSION

State of West Virginia
Department of Mines
Oil and Gas Division

Date February 27, 1987
Operator's
Well No. 1 - 2120
Farm U.S.A. #1B
API No. 47 - 023 - 0015
TO BE HELD CONFIDENTIAL

**WELL OPERATOR'S REPORT
OF
DRILLING, FRACTURING AND/OR STIMULATING, OR PHYSICAL CHANGE**

WELL TYPE: Oil ___ / Gas X / Liquid Injection ___ / Waste Disposal ___ /
(If "Gas," Production ___ / Underground Storage ___ / Deep XX / Shallow ___ /)

LOCATION: Elevation: 2510' Watershed Broad Run of Jordan Run
District: Union County Grant Quadrangle Blackbird Knob

COMPANY Union Drilling, Inc.
ADDRESS P.O. Drawer 40, Buckhannon, WV 26201
DESIGNATED AGENT Joseph C. Pettey
ADDRESS P.O. Drawer 40, Buckhannon, WV 26201
SURFACE OWNER United States Forest Service
ADDRESS Potomac Ranger Dist., Rt.3, Box 240
Petersburg, WV 26847
MINERAL RIGHTS OWNER
ADDRESS

Casing Tubing	Used in Drilling	Left in Well	Cement fill up Cu. ft.
Size 20-16 Cond.			
13-10"	30.00	30.00	
9 5/8	1517.60	1517.60	631 cf
8 5/8			
7			
5 1/2		8323.34	943 cf
4 1/2			
3			
2 3/8" Tubing		8019.00'	
Liners used			

OIL AND GAS INSPECTOR FOR THIS WORK
Donald Ellis ADDRESS 2604 Crab Apple Lane, Fairmont, WV 26554
PERMIT ISSUED 7/16/86
DRILLING COMMENCED 10/21/86
DRILLING COMPLETED 12/8/86

IF APPLICABLE: PLUGGING OF DRY HOLE ON
CONTINUOUS PROGRESSION FROM DRILLING OR
REWORKING. VERBAL PERMISSION OBTAINED
ON

GEOLOGICAL TARGET FORMATION Oriskany Depth 8000' feet
Depth of completed well 8351' feet Rotary XXX / Cable Tools
Water strata depth: Fresh 765' feet; Salt _____ feet
Coal seam depths: none Is coal being mined in the area? no

OPEN FLOW DATA

Producing formation Oriskany Pay zone depth 8135' feet
Gas: Initial open flow 900 Mcf/d Oil: Initial open flow _____ Bbl/d
Final open flow 15 MMCF Mcf/d Final open flow _____ Bbl/d
Time of open flow between initial and final tests 2 hours
Static rock pressure 2546# psig (surface measurement) after 72 hours shut in
(If applicable due to multiple completion--)
Second producing formation _____ Pay zone depth _____ feet
Gas: Initial open flow _____ Mcf/d Oil: Initial open flow _____ Bbl/d
Final open flow _____ Mcf/d Oil: Final open flow _____ Bbl/d
Time of open flow between initial and final tests _____ hours
Static rock pressure _____ psig (surface measurement) after _____ hours shut in

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Department of Environmental Protection
(continue on reverse side)

Well 821584 2300015P
API 47-023-00015
Page 2 of 2

DETAILS OF PERFORATED INTERVALS, FRACTURING OR STIMULATING, PHYSICAL CHANGE, ETC.

Halliburton - 1 stage Frac - 1/7/87

8074/8135 - Oriskany - 218,500# sand, 5000 gal methanol, 2000 gal fluid and 29 ton liquid CO2

WELL LOG

FORMATION	COLOR	HARD OR SOFT	TOP FEET	BOTTOM FEET	REMARKS
					Including indication of all fresh and salt water, coal, oil and gas
Red Shale			0	147	
Sand			147	214	
Sand & Shale			214	297	
Red & Gray Shale			297	480	
Sand & Shale			480	872	1" stream water @765'
Base of Hampshire			872	1114	
Pound Sandstone			1115	1218	
Briery Gap Sandstone			1539	1558	
First Sand			2381	2412	
Second Sand			2640	2657	
Harrell Shale			6721	7134	
Tully Horizon			7134	7150	
Upper Marcellus			7522	7542	
Purcell Limestone			7542	7618	
Lower Marcellus			7618	7658	
Tioga Metabentonite			7658	7663	
Needmore			7672	7948	
Oriskany			7948	8162	
Helderberg			8162	8351'	TD Gas Check @TD 4/10ths thru 7" w/w = 900 mcf

(Attach separate sheets as necessary)

Union Drilling, Inc.

Well Operator

By:

Joseph C. Petty

Date: Joseph C. Petty, Vice President of Production

2/27/87

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Note: Regulation 2.02(i) provides as follows:
"The term 'log' or 'well log' shall mean a systematic detailed geological record of all formations, including coal, encountered in the drilling of a well."

WW4-A
Revised
2/01

1) Date: 3/17/2016
2) Operator's Well No. 821584
3) API Well No. 47-023-00015

STATE OF WEST VIRGINIA - BUREAU OF ENVIRONMENT
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF APPLICATION TO PLUG AND ABANDON A WELL

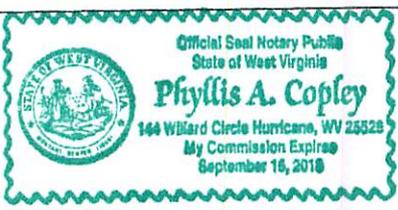
4) Surface Owner(s) to be served:
(a) Name U.S. Department of Agriculture ✓
Address U.S. Forest Service/
Mon. National Forest
200 Sycamore Street
Elkins, WV 26241-3962
(b) Name U.S. Department of Interior ✓
Address Bureau of Land Mgmt - Eastern States
626 E. Wisconsin Ave., Suite 200
Milwaukee, WI 53202-4617
(c) Name _____
Address _____
6) Inspector Bryan Harris
Address P.O. Box 157
Volga, WV 26238
Telephone 304-553-6087

5) Coal Operator
(a) Name _____
Coal Owner(s) with Declaration
(b) Name _____
Address _____
Name _____
Address _____
Name _____
Address _____
Coal Lessee with Declaration
(c) Name _____
Address _____

TO THE PERSONS NAMED ABOVE: You should have received this Form and the following documents:

- (1) The application to Plug and Abandon a Well on Form WW-4B, which sets out the parties involved in the work and describes the well its and the plugging work order; and
 - (2) The plat (surveyor's map) showing the well location on Form WW-6.
- The reason you received these documents is that you have rights regarding the application which are summarized in the instructions on the reverses side. However, you are not required to take any action at all.

Take notice that under Chapter 22-6 of the West Virginia Code, the undersigned well operator proposes to file or has filed the Notice and Application and accompanying documents for a permit to plug and abandon a well with the Chief of the Office of Oil and Gas, West Virginia Department of Environmental Protection, with respect to the well at the location described on the attached Application and depicted on the attached Form WW-6. Copies of the Notice, the Application, and the plat have been mailed by registered or certified mail or delivered by hand to the person(s) named above (or by publication in certain circumstances) on or before the day of mailing or delivery to the Chief.



Well Operator: Chesapeake Appalachia, L.L.C.
By: [Signature]
Its: Manager - Operations, Appalachia South
Address: P.O. Box 18496
Oklahoma City, OK 73154-0496
Telephone: 405-935-4073

Subscribed and sworn before me this 17th day of March the year of 2016
Phyllis A. Copley
My Commission Expires September 16, 2018
Form WW-9

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Office of Oil and Gas
MAR 21 2016
WV Department of
Environmental Protection

Rev. 02/01

API Number 47-023-00015
Operator's Well No. 821584

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
CONSTRUCTION AND RECLAMATION PLAN AND SITE REGISTRATION APPLICATION FORM
GENERAL PERMIT FOR OIL AND GAS PIT WASTE DISCHARGE

Operator Name Chesapeake Appalachia, L.L.C. OP Code 494477557

Watershed Broad Run of Jordan Run Quadrangle Blackbird Knob, WV 7.5'

Elevation 2,533' County Grant District Union

Description of anticipated Pit Waste: Plugging Returns/Cement

Will a synthetic liner be used in the pit? Yes *minimum of 20 mil liner must be used*

- Proposed Disposal Method For Treated Pit Wastes:
- Land Application
 - Underground Injection (UIC Permit Number _____)
 - Reuse (at API Number _____)
 - Off Site Disposal (Supply form WW-9 for disposal location)
 - Other (Explain _____)

- Proposed Work For Which Pit Will Be Used:
- Drilling
 - Workover
 - Swabbing
 - Plugging
 - Other (Explain _____)

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on December 31, 1999, 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 *[Signature]*

Company Official (Typed Name) Dave Gocke

Company Official Title Manager - Operations, Appalachia South

Subscribed and sworn before me this 17th day of March, 2015.

Phyllis A. Copley

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Office of Oil and Gas
Notary Public
MAR 24 2016

My Commission Expires September 16, 2018



WV Department of Environmental Protection

Attachment #1

API #: 47-023-00015
Operator's Well No. 821584

LEGEND

- Property Boundary
- Road
- Existing Fence
- Planned Fence
- Stream
- Open Ditch
- Rock
- North
- Buildings
- Water wells
- Drill site

- Diversion
- Spring
- Wet Spot
- Drain Pipe with size in inches
- Waterway
- Cross Drain
- Artificial Filter Strip
- Pit: cut walls
- Pit: compacted fill walls
- Area for Land Application of Pit Waste

Seed mix/mulch/revegetation treatment rates to be determined by the USFS representative

Gas

MAR 2 2016

WV Department of Environmental Protection

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: _____

Title: _____

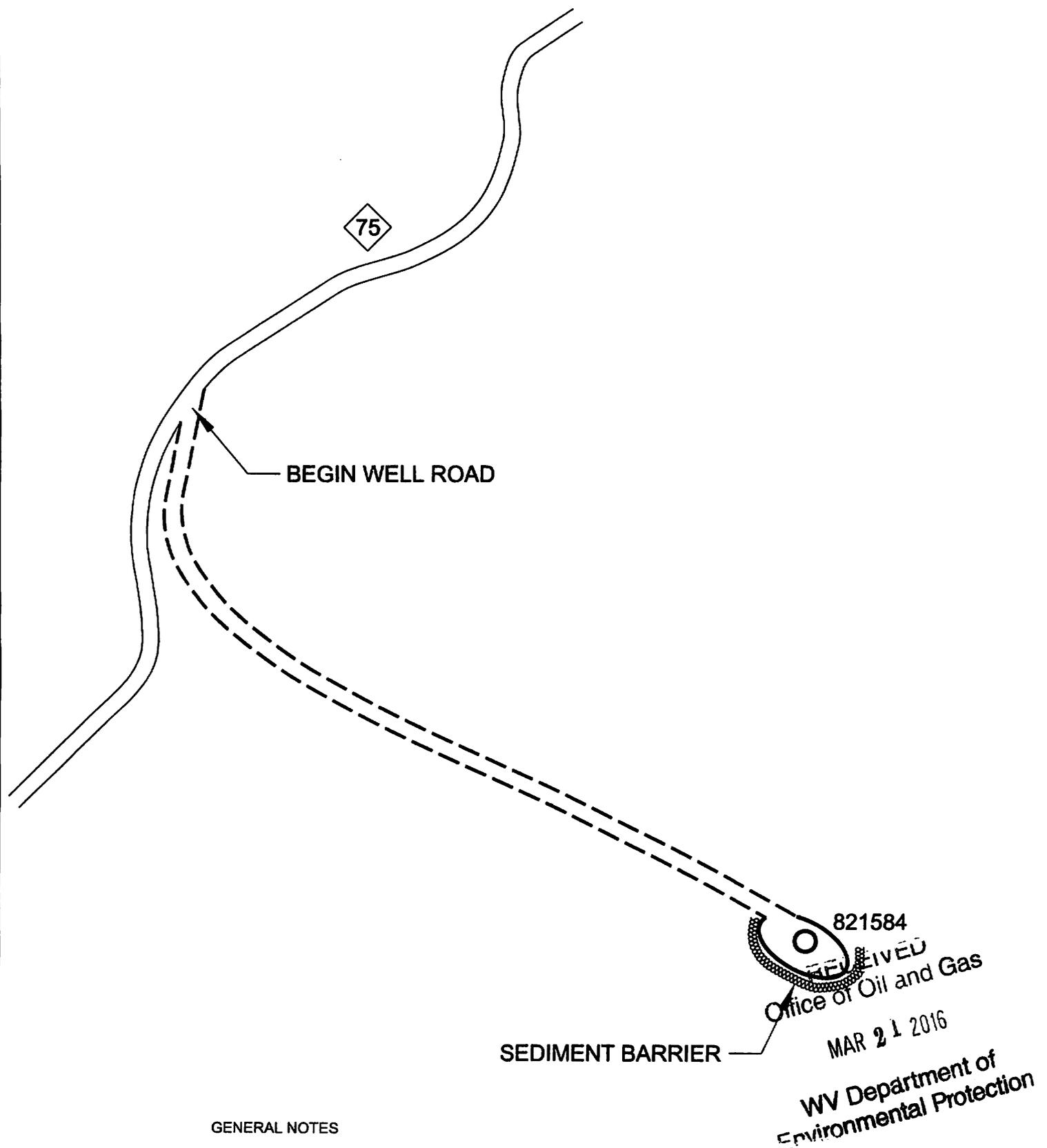
Date: _____

Field Reviewed? () Yes () No

CHESAPEAKE APPALACHIA, L.L.C.

RECLAMATION DIAGRAM
WELL LOCATION 821584

API 47-023-00015



GENERAL NOTES

This drawing is a schematic representation of the well site and access road. Proposed structures such as well site, drilling pit, roadways, culverts, sediment barriers, etc. are shown in approximate pre-planning configurations.

All culvert pipes will be a minimum of 15 inches in diameter. All culvert pipes installed will be accompanied by an entrance sump with dimensions no less than 3 feet (width) x 3 feet (length) x 4 feet (deep). Culverts will be installed at an angle to ensure proper flow. The out fall of culverts will be protected from erosion and sedimentation using large rocks or other sediment controls deemed necessary in the prevention of erosion and sedimentation. Storm water from the ditches to the culverts will be directed to stable natural vegetative areas. Where culverts are not practical, operator will have other sediment control in place to minimize erosion sedimentation.

Cross drains, broad based dips, water bars, and diversion ditches, will be employed during the construction phase. These erosion and sediment control structures will be used to control erosion and sedimentation during the construction phase, where applicable, and in areas that will allow. These structures will be considered permanent and used as such.

Permanent seeding: See Attachment #1.

CHESAPEAKE ENERGY CORPORATION - EASTERN DIVISION
P.O. BOX 579 - 8165 COURT AVENUE - HARTWOOD, WV 25523
304 824-5141 - FAX 304 824-2247

MAR 2 - 2015
WV Department of
Environmental Protection

23000157

CHESAPEAKE APPALACHIA, L.L.C.

TOPOGRAPHICAL MAP OF ACCESS AND
WELL LOCATION 821584

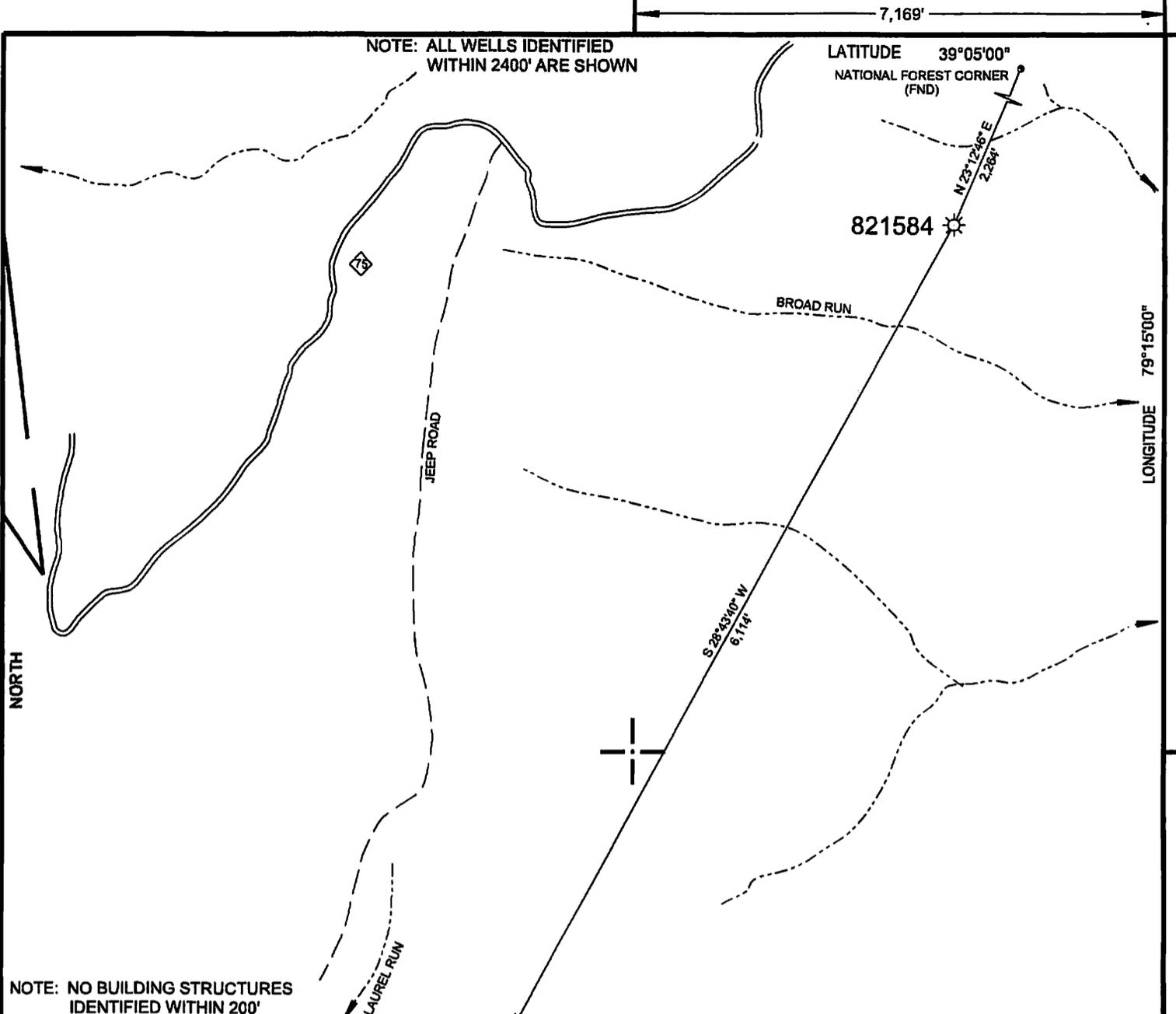
API 47-023-00015



MAR 21 2016

CHESAPEAKE ENERGY CORPORATION - EASTERN DIVISION
P.O. BOX 579 - 8165 COURT AVENUE - HAMLIN, WV 25523
304 824-5141 - FAX 304 824-2247

WV Department of
Environmental Protection



WELL SITE	
STATE PLANE WV NORTH ZONE NAD 1927 N - 202,945.58 : E - 2,063,829.99	
LATITUDE: (N) 39.0569845° LONGITUDE: (W) 79.2752328°	
UTM NAD83 17 - 84W TO 78W, METERS N - 4,324,528.287 : E - 649,255.636	

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS

FILE NO.	CA 821584 P&A.DGN
DRAWING NO.	CA 821584 P&A
SCALE	1" = 1000'
MINIMUM DEGREE OF ACCURACY	1 : 200
PROVEN SOURCE OF ELEVATION	MAPPING GRADE GPS

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) *Paul E. Miller*
R.P.E. _____ L.L.S. 647



STATE OF WEST VIRGINIA DIVISION OF ENVIRONMENTAL PROTECTION OIL AND GAS DIVISION		DATE <u>NOVEMBER 16</u> , 20 <u>15</u>	
		OPERATOR'S WELL NO. <u>821584</u>	
		API WELL NO. <u>47 023 00015 P</u>	
WELL TYPE: OIL <input type="checkbox"/> GAS <input checked="" type="checkbox"/> LIQUID INJECTION <input type="checkbox"/> WASTE DISPOSAL <input type="checkbox"/>		STATE	COUNTY
(IF "GAS,") PRODUCTION <input type="checkbox"/> STORAGE <input type="checkbox"/> DEEP <input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/>			
LOCATION: ELEVATION <u>2,533'</u> WATER SHED <u>BROAD RUN OF JORDAN RUN</u>			
DISTRICT <u> </u> UNION <u> </u> COUNTY <u>GRANT</u>			
QUADRANGLE <u>BLACKBIRD KNOB, WV 7.5'</u>			
SURFACE OWNER <u>UNITED STATES OF AMERICA</u> ACREAGE <u> </u>			
OIL & GAS ROYALTY OWNER <u>US BUREAU OF LAND MANAGEMENT</u> LEASE ACREAGE <u> </u>			
LEASE NO. <u> </u>			
PROPOSED WORK: DRILL <input type="checkbox"/> CONVERT <input type="checkbox"/> DRILL DEEPER <input type="checkbox"/> REDRILL <input type="checkbox"/> FRACTURE OR STIMULATE <input type="checkbox"/> PLUG OFF OLD FORMATION <input type="checkbox"/> PERFORATE NEW FORMATION <input type="checkbox"/> OTHER PHYSICAL CHANGE IN WELL (SPECIFY) <u> </u>			
PLUG AND ABANDON <input checked="" type="checkbox"/> CLEAN OUT AND REPLUG <input type="checkbox"/>			
TARGET FORMATION <u> </u> ESTIMATED DEPTH <u> </u>			
WELL OPERATOR <u>CHESAPEAKE APPALACHIA, L.L.C.</u> DESIGNATED AGENT <u>JESSICA GREATHOUSE</u>			
ADDRESS <u>P.O. BOX 18496, OKLAHOMA CITY, OK 73154-0496</u> ADDRESS <u>CHESAPEAKE APPALACHIA, L.L.C. PO BOX 8070, CHARLESTON, WV 25382</u>			

FORM WW-6

COUNTY NAME
PERMIT