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

January 04, 2016

EQT PRODUCTION COMPANY
120 PROFESSIONAL PLACE
BRIDGEPORT, WV 26330

Re: Permit Modification Approval for API Number 9502279, Well #: 512891

Adjust FW and INT. Casing

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,

Gene Smith
Assistant Chief of Permitting
Office of Oil and Gas

October 23, 2015

Mr. Gene Smith
West Virginia Department of Environmental Protection
Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304

4709502279 MOD

Re: Modification of 095-02278, 02279, 02280, 02281

Dear Mr. Smith,

Enclosed are modifications of the above API numbers located on the WEU4 pad. EQT would like to adjust the casing on the Fresh water and Intermediate casing to match the others in for permit currently. Everything else remains the same.

If you have any questions, please do not hesitate to contact me at (304) 848-0076.

Sincerely,

Vicki Roark
Permitting Supervisor-WV

Enc.

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WW - 6B
(4/15)

4709502279 MOD

API NO. 47 - 095 - 02279
OPERATOR WELL NO. 512891
Well Pad Name: WEU4

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

1) Well Operator:	EQT Production Company	306686	095	1	671
		Operator ID	County	District	Quadrangle

2) Operator's Well Number: 512891 Well Pad Name WEU4

3) Farm Name/Surface Owner : Donna J. Peter Public Road Access: WV-18

4) Elevation, current ground: 1,092.0 Elevation, proposed post-construction: 1,079.0

5) Well Type: (a) Gas • Oil _____ Underground Storage _____

Other _____

(b) If Gas: Shallow • Deep _____

Horizontal •

DmH
11-17-15

6) Existing Pad? Yes or No: No

7) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):

Target formation is Marcellus at a depth of 6680 with the anticipated thickness to be 54 feet and anticipated target pressure of 2747 PSI

Top of Marcellus 6649

8) Proposed Total Vertical Depth: 6680
9) Formation at Total Vertical Depth: Marcellus
10) Proposed Total Measured Depth: 12256
11) Proposed Horizontal Leg Length 4,609
12) Approximate Fresh Water Strata Depths: 132, 175, 186, 204
13) Method to Determine Fresh Water Depth: By offset wells
14) Approximate Saltwater Depths: 1128, 1219, 1222
15) Approximate Coal Seam Depths: 230, 281, 696
16) Approximate Depth to Possible Void (coal mine, karst, other): None reported
17) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes _____ No x

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

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WW - 6B
(4/15)

4709502279 Mod

API NO. 47 - 095 - 02279
OPERATOR WELL NO. 512891
Well Pad Name: WEU4

CASING AND TUBING PROGRAM

18)

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill- up (Cu.Ft.)
Conductor	20	New	MC-50	81	40	40	38 C.T.S.
Fresh Water	13 3/8	New	J-55	54.5	750	750	660 C.T.S.
Coal	–	–	–	–	–	–	–
Intermediate	9 5/8	New	A-500	40	2,865	2,865	1,126 C.T.S.
Production	5 1/2	New	P-110	20	12,256	12,256	See Note 1
Tubing	2 3/8		J-55	4.6			May not be run, if run will be set 100' less than TD
Liners							

DMH 11-13-15

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20	24	0.375	-	18	Construction	1.18
Fresh Water	13 3/8	17 1/2	0.38	2,730	2184	* See Note 2	1.21
Coal							
Intermediate	9 5/8	12 3/8	0.395	3,950	3160	* See Note 2	1.21
Production	5 1/2	8 1/2	0.361	12,640	10112	-	1.27/1.86
Tubing							
Liners							

Packers

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

Note 1: EQT plans to bring the TOC on the production casing cement job 1,000' above kick off point, which is at least 500' above the shallowest production zone, to avoid communication.
Note 2: Reference Variance 2014-17. (Attached)

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4709502279 MSD

API NO. 47 - 095 - 02279
OPERATOR WELL NO. 512891
Well Pad Name: WEU4

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill and complete a new horizontal well in the Marcellus formation. The vertical drill to go down to an approximate depth of 4104'.

Then kick off the horizontal leg into the Marcellus using a slick water frac.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Hydraulic fracturing is completed in accordance with state regulations using water recycled from previously fractured wells and obtained from freshwater sources. This water is mixed with sand and a small percentage (less than 0.3%) of chemicals (including 15% Hydrochloric acid, gelling agent, gel breaker, friction reducer, biocide, and scale inhibitor), referred to in the industry as a "slickwater" completion. Maximum anticipated internal casing pressures is expected to average approximately 8500 psi, maximum anticipated treating rates are expected to average approximately 100 bpm. Stage lengths vary from 150 to 300 feet. Average approximately 200,000 barrels of water per stage. Sand sizes vary from 100 mesh to 20/40 mesh. Average approximately 200,000 pounds of sand per stage.

21) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 19.18

22) Area to be disturbed for well pad only, less access road (acres): 13.17

23) Describe centralizer placement for each casing string.

- Surface: Bow spring centralizers – One at the shoe and one spaced every 500'.
- Intermediate: Bow spring centralizers– One cent at the shoe and one spaced every 500'.
- Production: One spaced every 1000' from KOP to Int csg shoe

24) Describe all cement additives associated with each cement type.

Surface (Type 1 Cement): 0-3% Calcium Chloride Used to speed the setting of cement slurries. 0.4% flake. Loss Circulation Material (LCM) is used to combat the loss of the cement slurry to a thief zone.

Intermediate (Type 1 Cement): 0-3% Calcium Chloride. Salt is used in shallow, low temperature formations to speed the setting of cement slurries. 0.4% flake. Loss Circulation Material (LCM) is used to combat the loss of whole drilling fluid or cement slurry (not filtrate) to a thief zone.

Production:

DMH 11-18-15

Lead (Type 1 Cement): 0.2-0.7% Lignosulfonate (Retarder). Lengthens thickening time.

0.3% CFR (dispersant). Makes cement easier to mix.

Tail (Type H Cement): 0.25-0.40% Lignosulfonate (Retarder). Lengthens thickening time.

0.2-0.3% CFR (dispersant). This is to make the cement easier to mix.

60 % Calcuim Carbonate. Acid solubility.

0.4-0.6% Halad (fluid loss). Reduces amount of water lost to formation.

25) Proposed borehole conditioning procedures.

Surface: Circulate hole clean (Approximately 30-45 minutes) rotating & reciprocating one full joint until cuttings diminish at surface. When cuttings returning to surface diminish, continue to circulate an additional 5 minutes. To ensure that there is no fill, short trip two stands with no circulation. If there is fill, bring compressors back on and circulate hole clean. A constant rate of higher than expected cuttings volume likely indicates washouts that will not clean up.

Intermediate: Circulate hole clean (Approximately 30-45 minutes) rotating & reciprocating one full joint until cuttings diminish at surface. When cuttings returning to surface diminish, continue to circulate an additional 5 minutes. If foam drilling, to enhance hole cleaning use a soap sweep or increase injection rate & foam concentration.

Production: Pump marker sweep with nut plug to determine actual hole washout. Calculate a gauge holes bottoms up volume. Perform a cleanup cycle by pumping 3-5 bottoms up or until the shakers are clean. Check volume of cuttings coming across the shakers every 15 minutes.

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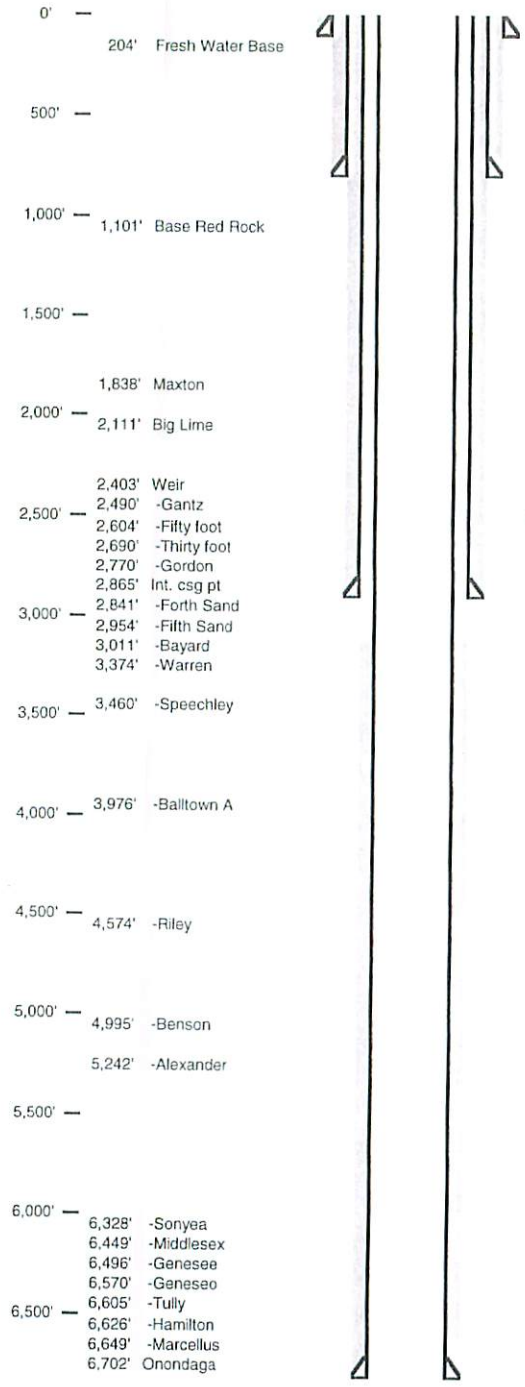
*Note: Attach additional sheets as needed.

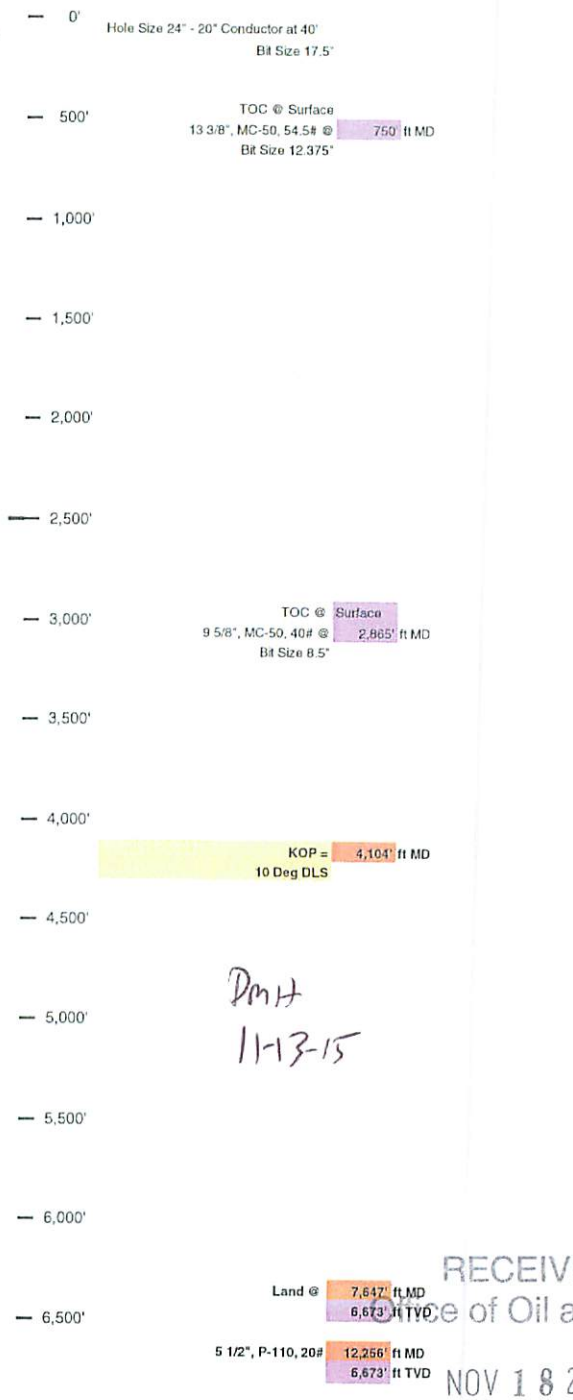
4709502279 MOD

Well Schematic
EQT Production

Well Name	512891(WEU4H2)
County	Tyler
State	West Virgina

Elevation KB:	1092
Target	Marcellus
Prospect	
Azimuth	335
Vertical Section	4294





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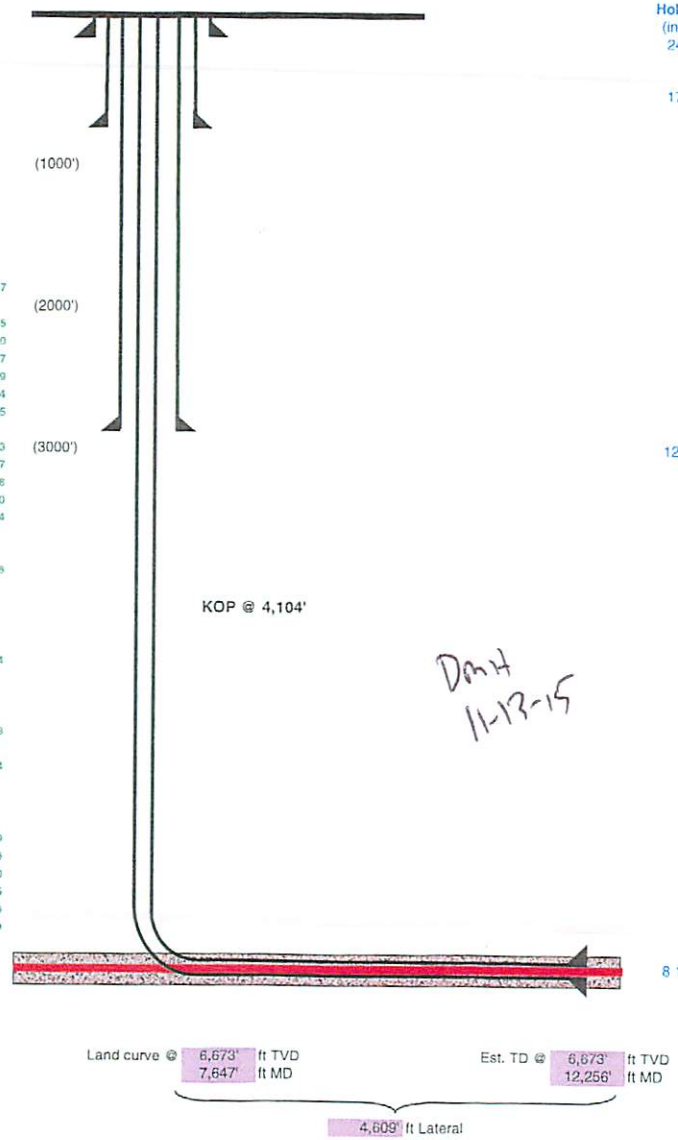
Well 512891(WEU4H2)
EQT Production
West Union
Tyler West Virgina

Azimuth 335
Vertical Section 4284



TVD Depth (feet)	Formation Tops (TVD)	
0'		
	Base Fresh Water	204
250'		
500'		
750'		
1,000'		
	Base Red Rock	1101
1,250'		
1,500'		
1,750'		
	Maxton	1838 - 2037
2,000'		
	Big Lime	2111 - 2395
2,250'	Weir	2403 - 2450
	-Gantz	2490 - 2507
2,500'	-Fifty foot	2604 - 2659
	-Thirty foot	2690 - 2744
2,750'	-Gordon	2770 - 2815
	Int. csg pt	2865
3,000'	-Forth Sand	2841 - 2903
	-Fifth Sand	2954 - 2967
3,250'	-Bayard	3011 - 3148
	-Warren	3374 - 3440
3,500'	-Speechley	3460 - 3574
3,750'		
	-Balltown A	3976 - 4088
4,000'		
4,250'		
4,500'	-Riley	4574 - 4864
4,750'		
5,000'	-Benson	4995 - 5058
5,250'	-Alexander	5242 - 5324
5,500'		
5,750'	-Sonyea	6328 - 6449
	-Middlesex	6449 - 6498
6,000'	-Genesee	6498 - 6570
	-Geneseo	6570 - 6605
6,250'	-Tully	6605 - 6626
	-Hamilton	6626 - 6649
6,500'	Marcellus top	6649
	Target Inside Marcellus	6673
6,750'	Marcellus Bottom	6702
7,000'		
7,250'		
7,500'		
7,750'		

Hole Size (inches)	Casing Type	Size (inches)	Wt (ppf)/Grade
24	Conductor	20	61#/MC-50
17 1/2	Surface	13 3/8	54.5#/J-55
12 3/8	Intermediate	9 5/8	40#/A-500
8 1/2	Production Casing	5 1/2	20#/P-110

Proposed Well Work:
Drill and complete a new horizontal well in the formation.
The vertical drill to go down to an approximate depth of 4104'.
Then kick off the horizontal leg into the using a slick water frac.

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11-13-15

4709502279 MOD

4709502279 MOD

October 1, 2015

Mr. Gene Smith
West Virginia Department of Environmental Protection
Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304

Re: Casing change on WEU4 (512890, 512891, 512892, 512893)

Dear Mr. Smith,

EQT is requesting the 13 3/8" surface casing to be set at 750' KB, 50' below the coal at 696-700' KB. We will set the 9-5/8" intermediate string at 2865' KB, 50' below the base of the Gordon.

If you have any questions, please do not hesitate to contact me at (304) 848-0076.

Sincerely,

Vicki Roark
Permitting Supervisor-WV

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11-13-15

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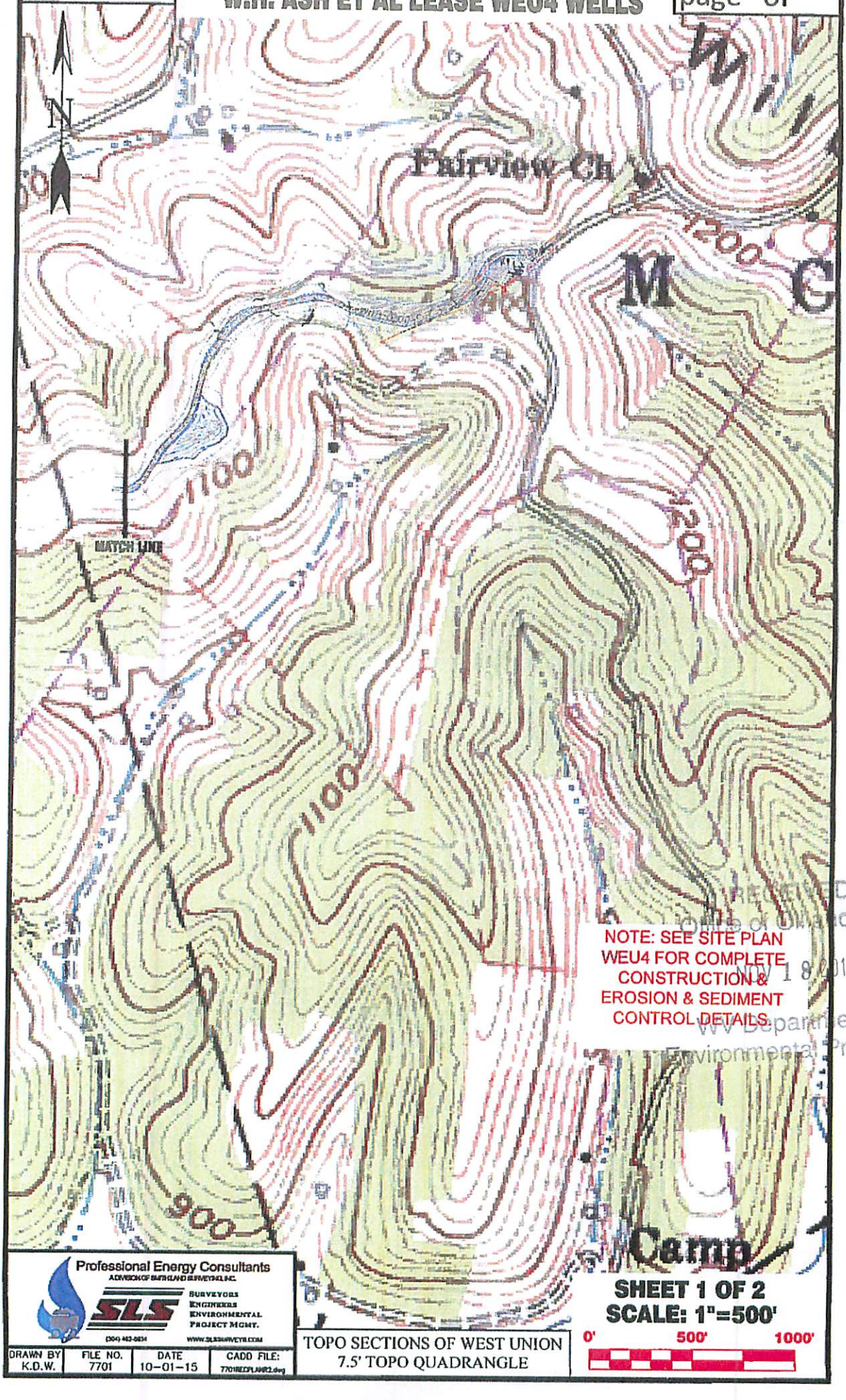
Form WW-9

W.H. ASH ET AL LEASE WEU4 WELLS

page of



NOTE: SEE SITE PLAN WEU4 FOR COMPLETE CONSTRUCTION & EROSION & SEDIMENT CONTROL DETAILS.

SHEET 1 OF 2
SCALE: 1"=500'

0' 500' 1000'

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A DIVISION OF SMITHLAND SURVEYING, INC.
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ENGINEERS
ENVIRONMENTAL
PROJECT MGMT.
(304) 462-0834
WWW.SLSSURVEYS.COM

DRAWN BY	FILE NO.	DATE	CADD FILE:
K.D.W.	7701	10-01-15	7701REDPLANR2.dwg

TOPO SECTIONS OF WEST UNION
7.5' TOPO QUADRANGLE

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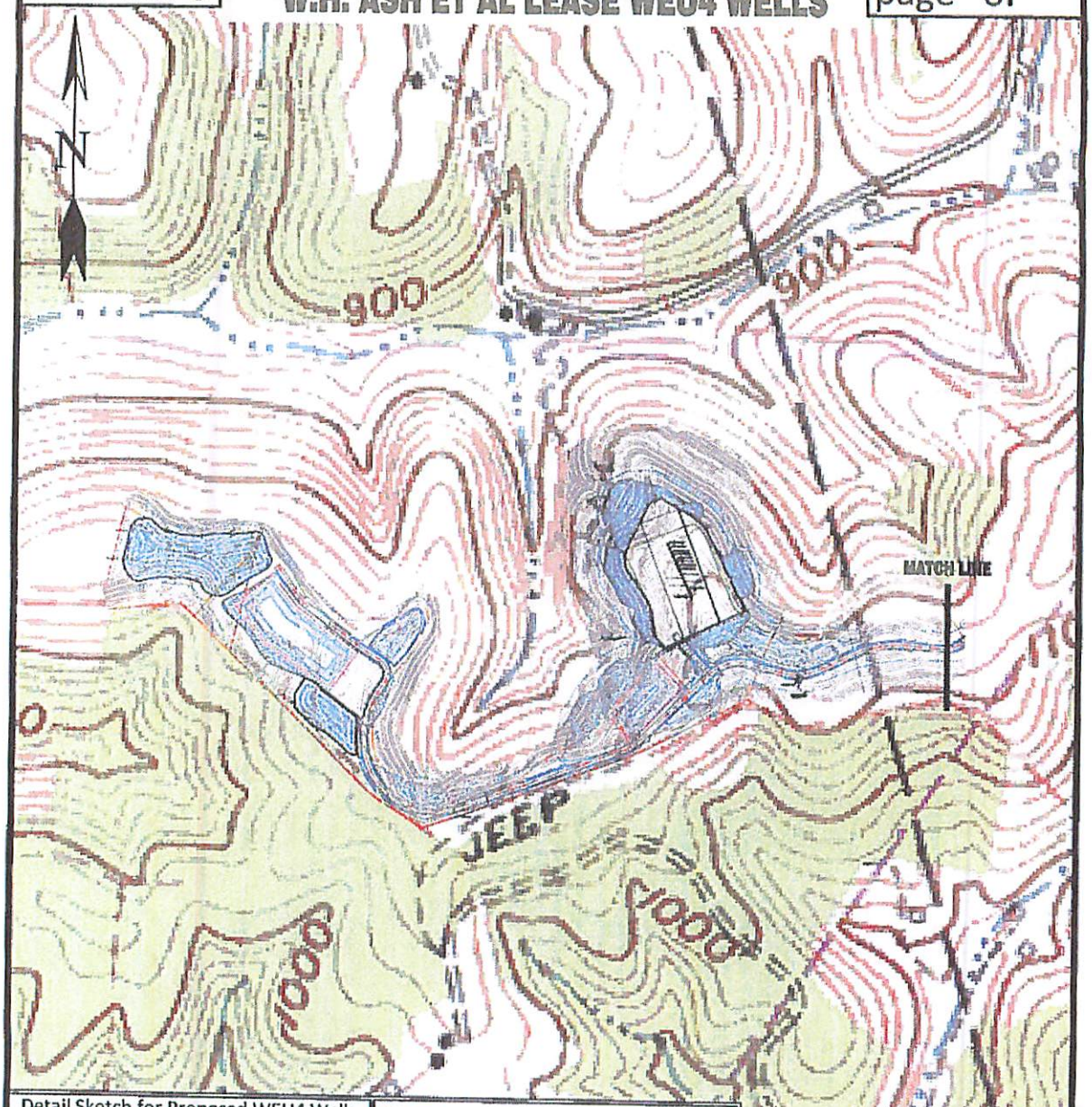
WV Department of
Environmental Protection

4709502279 MoD

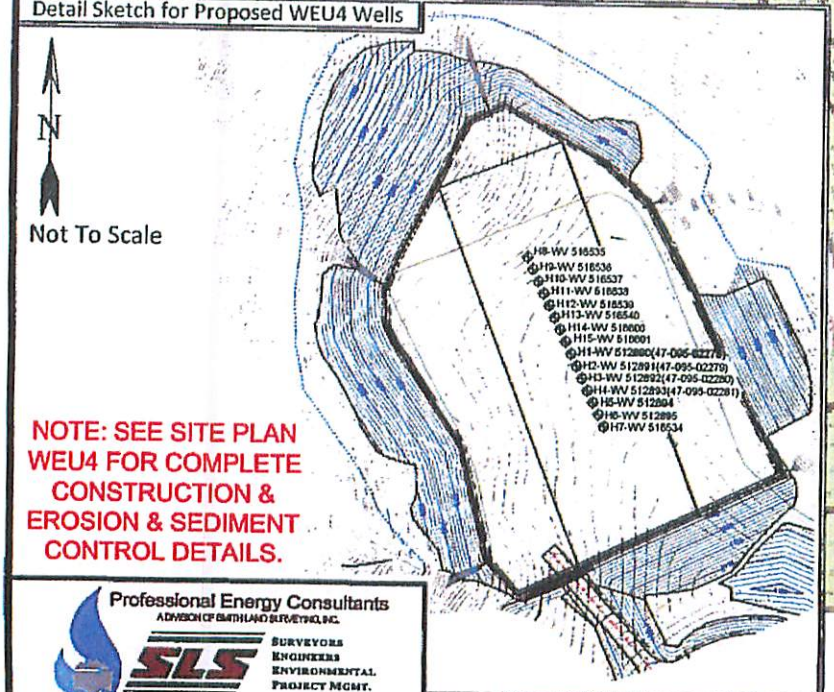
Form WW-9

W.H. ASH ET AL LEASE WEU4 WELLS

page of

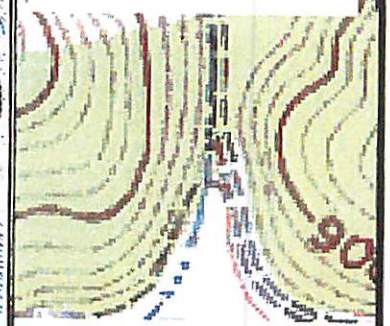


Detail Sketch for Proposed WEU4 Wells



NOTE: SEE SITE PLAN WEU4 FOR COMPLETE CONSTRUCTION & EROSION & SEDIMENT CONTROL DETAILS.

NOTE: SEE SITE PLAN WEU4 FOR COMPLETE CONSTRUCTION & EROSION & SEDIMENT CONTROL DETAILS.



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DRAWN BY	FILE NO.	DATE	CADD FILE:
K.D.W.	7701	10-01-15	7701WEEPLAN2.dwg

TOPO SECTIONS OF WEST UNION
7.5' TOPO QUADRANGLE

SHEET 2 OF 2
SCALE: 1"=500'

0' 500' 1000'

4709502279 Mod

Brewer, Charles T

From: Brewer, Charles T
Sent: Tuesday, December 01, 2015 9:46 AM
To: 'Roark, Vicki'
Subject: WEU 4 Mods

Hey Vicki,

I just took a look at the mods you have in for WEU 4, in which you have asked to change the FW and intermediate casing strings to match the apps that recently came in. This will be fine, but you will need to re-notify the coal folks because a different string will now be covering the coal seams that you have (all covered by 13 3/8's now). Originally one seam was covered by your intermediate which is now being shortened as well. Anyways, you know the routine, I will need the certified mail receipts and either the waivers from them or we can wait the 30 days.

Thanks,

Taylor

Taylor Brewer, B.S., M.S.
Environmental Resource Specialist 3
Permit Review
WVDEP Office of Oil and Gas
601 57th Street, SE
Charleston, WV 25304
304-926-0499 ext. 1547

4709502276 Mod

THE ITEMS REQUESTED IN THIS EMAIL WILL NEED TO BE RECEIVED BY THE OFFICE OF OIL AND GAS WITHIN **20 DAYS** TO AVOID THE PERMIT APPLICATION BEING RETURNED. IF AN OPERATOR WISHES TO RESUBMIT AN APPLICATION THAT HAS BEEN RETURNED, THE OPERATOR IS REQUIRED TO COMPLETE AND SUBMIT NEW FORMS, MYLAR PLAT AND ASSOCIATED FEES.

WW-6A
(9-13)

API NO. 47 - 095 - 02279
OPERATOR WELL NO. 512891
Well Pad Name: WEU4

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF APPLICATION

Notice Time Requirement: notice shall be provided no later than the filing date of permit application.
Date of Notice: 6/24/15 Date Permit Application Filed: 6/24/15

Notice of:

☑ PERMIT FOR ANY WELL WORK ☐ CERTIFICATE OF APPROVAL FOR THE CONSTRUCTION OF AN IMPOUNDMENT OR PIT

Delivery method pursuant to West Virginia Code § 22-6A-10(b)

☐ PERSONAL SERVICE ☐ REGISTERED MAIL ☑ METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to W. Va. Code § 22-6A-10(b) no later than the filing date of the application, the applicant for a permit for any well work or for a for the construction of an impoundment or pit as required by this article shall deliver, by personal service or by registered mail or by any requires a receipt or signature confirmation, copies of the application, the erosion and sediment control plan required by section seven of plat to each of the following persons: (1) The owners of record of the surface of the tract on which the well is or is proposed to be located; the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used disturbance as described in the erosion and sediment control plan submitted pursuant to subsection (c), section seven of this article; (3) The lessee, in the event the tract of land on which the well proposed to be drilled is located [sic] is known to be underlain by one or more coal record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to construction, enlargement, alteration, repair, removal or abandonment of any impoundment or pit as described in section nine of this water purveyor who is known to the applicant to have a water well, spring or water supply source located within one thousand five which is used to provide water for consumption by humans or domestic animals; and (6) The operator of any natural gas storage field work activity is to take place. (c)(1) If more than three tenants in common or other co-owners of interests described in subsection (b) of in the lands, the applicant may serve the documents required upon the person described in the records of the sheriff required to be article one, chapter eleven-a of this code. (2) Notwithstanding any provision of this article to the contrary, notice to a lien holder is not unless the lien holder is the landowner. W. Va. Code R. § 35-8-5.7.a requires, in part, that the operator shall also provide the Well Site the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

☑ Application Notice ☑ WSSP Notice ☑ E&S Plan Notice ☑ Well Plat Notice is hereby provided to:

☑ SURFACE OWNER(s)
Name: Donna J Peter
Address: 733 Ridge Rd
Wilbur WV 26320

Name:
Address:

☑ SURFACE OWNERS(s) (Road and/or Other Disturbance)
Name: Donna J Peter
Address: 733 Ridge Rd
Wilbur WV 26320

Name: L. Bruce and Sandra Jean Stoneking
Address: RR1 Box 304-BB
Elkins WV 26241
See attached for additional surface (road/ disturbance)

☑ SURFACE OWNER(s) (Impoundments/Pits)
Name: Donna J Peter
Address: 733 Ridge Rd
Wilbur WV 26320
0

☑ COAL OWNER OR LESSEE
Name: see attached
Address:

☐ COAL OPERATOR
Name:
Address:

4709502279 MOD

☑ SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)
Name: Donna J Peter
Address: 733 Ridge Rd
Wilbur WV 26320
See Attached for additional water.

☐ OPERATOR OF ANY NATURAL GAS STORAGE FIELD
Name:
Address:

*Please attach additional forms if necessary

095-02279

WW6-A
Additional Coal Owners

Rosemary Brandon
3013 Delaware Avenue
Kenner, LA 70065

Surface Owners(road or other disturbance):

James B. and Brenda J. Stoneking
2 Deerhaven Drive
Wheeling WV 26241

Diane L. Morgan and Glenn W. Morgan
590 Isner Creek Road
Elkins WV 26241

Richard and Yvonne Metcalf
128 Village Drive
Bridgeport WV 26330

Surface Owners(Pits or impoundments):

Richard and Yvonne Metcalf
128 Village Drive
Bridgeport WV 26330

Additional Water Purveyors

Bruce Stoneking
R.D. 1 Box BB
Elkins WV 26241

Frank and Elizabeth Abruzzino
91 Springhill Chapel Road
Clarksburg, WV 26301

4709502279 MOD

WW-6AW
(1-12)

API NO. 47 – 095 – 02279
OPERATOR WELL NO. 512891
Well Pad Name: WEU4

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
VOLUNTARY STATEMENT OF NO OBJECTION

Instructions to Persons Named on Page WW-6A
The well operator named on page WW-6A is applying for a permit from the State of West Virginia to conduct oil or gas well work. Well work permits are valid for twenty-four (24) months. Please contact the listed well operator and the Office of Oil and Gas if you do not own any interest in the listed surface tract.

Comment and Waiver Provisions
Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section ten of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary.

Pursuant to West Virginia Code § 22-6A-8(b) No permit may be issued less than thirty days after the filing date of the application for any well work except plugging or replugging; and no permit for plugging or replugging may be issued less than five days after the filing date of the application except a permit for plugging or replugging a dry hole: Provided, That if the applicant certifies that all persons entitled to notice of the application under the provisions of subsection (b), section ten of this article have been served in person or by certified mail, return receipt requested, with a copy of the well work application, including the erosion and sediment control plan, if required, and the well plat, and further files written statements of no objection by all such persons, the secretary may issue the well work permit at any time.

VOLUNTARY STATEMENT OF NO OBJECTION

I, Rosemary Brandon, hereby state that I have read the Instructions to Persons Named on Page WW-6A and the associated provisions listed above, and that I have received copies of a Notice of Application, an Application for a Well Work Permit on Form WW-6A and attachments consisting of pages one (1) through _____, including the erosion and sediment control plan, if required, and the well plat, all for proposed well work on the tract of land as follows:

State:	WV	UTM NAD 83 Easting:	515,449.91
County:	Tyler	UTM NAD 83 Northing:	4,357,475.69
District:	Centerville	Public Road Access:	WV-18
Quadrangle:	West Union 7.5'	Generally used farm name:	Donna J. Peter
Watershed:	Tributary of Camp Mistake Run		

I further state that I have no objection to the planned work described in these materials, and I have no objection to a permit being issued on those materials.

*Please check the box that applies	FOR EXECUTION BY A NATURAL PERSON
☐ SURFACE OWNER	Signature: Rosemary Brandon
☐ SURFACE OWNER (Road and/or Other Disturbance)	Print Name: ROSEMARY BRANDON
☐ SURFACE OWNER (IMPOUNDMENTS/PITS)	Date: 12-13-2015
☐ COAL OWNER OR LESSEE	FOR EXECUTION BY A CORPORATION, ETC.
☐ COAL OPERATOR	Company:
☐ WATER PURVEYOR	By:
☐ OPERATOR OF ANY NATURAL GAS STORAGE FIELD	Its:
	Signature:
	Date:

4709502279 MOD

Oil and Gas Privacy Notice:
The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov