

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

May 22, 2014

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-8510094, issued to EQT PRODUCTION COMPANY, 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.

lames Martin

Chief

Operator's Well No: 515276

Farm Name: BRITTON, DEWAYNE ET UX

API Well Number: 47-8510094

Permit Type: Horizontal 6A Well

Date Issued: 05/22/2014

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. The Office of Oil and Gas has approved your permit application, which includes your addendum. Please be advised that the addendum is part of the terms of the well work permit, and will be enforced as such. The Office of Oil and Gas must receive a copy of all data collected, and submitted in a timely fashion, but no later than the WR35 submittal.
- 2. 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.
- 3. 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.
- 4. 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.
- 5. 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.
- 6. 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.
- 7. 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.

4708510094

PERMIT CONDITIONS

- 8. 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.
- 9. 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.

1) Well Operator: EQT Production Company

4708510094

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

085

2) Operator's Well Number:			Operator ID	County	District	Quadrangle
		515276		Well Pad Nam	18:	PEN15
3) Farm Name/Surface Owner : _	Dew	vayne Britton	et ux	Public Road A	ccess:	WV-74
Elevation, current ground:	1,119.0	Elevati	on, proposed	post-construction	:1,11	9.0
i) Well Type: (a) Gas	Oil	Unc	lerground Stor	rage		
Other						
(b) If Gas:	Shallow	1	Deep			
H	Horizontal	W				
s) Existing Pad? Yes or No:	yes					
3) Proposed Total Vertical Depth:				6,395		
) Formation at Total Vertical Dept				Marcellus		
O) Proposed Total Measured Dep				13,998		
 Proposed Horizontal Leg Leng 				5,010		
Approximate Fresh Water Stra			8	3, 163, 242, 394,		
Method to Determine Fresh W.				By offset we	lls	
 Approximate Saltwater Depths 				52, 1943, 2521		
5) Approximate Coal Seam Depth				14, 273, 379, 744		
6) Approximate Depth to Possible 17)Does proposed well location adjacent to an active mine?	contain coal s	ne, karst, oth eams directly	er): overlying or	_	None re	ропеа
	Name:					
(a) If Yes, provide Mine Info:						
(a) If Yes, provide Mine Info:						
(a) If Yes, provide Mine info:						
(a) If Yes, provide Mine Info:	Seam:					

REGEIV.ED Office of Oil and Gas APR 0 8 2014 WV Department of Environmental Protection WW - 6B (3/13)

CASING AND TUBING PROGRAM

18)							
TYPE	<u>Size</u>	<u>New</u> or Used	Grade	<u>Weight per</u> <u>ft.</u>	FOOTAGE: for Drilling	INTERVALS; Left in Well	CEMENT: Fill- up (Cu.Ft.)
Conductor	20	New	MC-50	81	40	40	38 C.T.S.
Fresh Water	13 3/8	New	MC-50	54	973	973	846 C.T.S.
Coal							
Intermediate	9 5/8	New	MC-50	40	5,330	5,330	2,095 C.T.S.
Production	5 1/2	New	P-110	20	13,998	13,998	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							

TYPE	<u>Size</u>	Wellbore Diameter	<u>Wall</u> <u>Thickness</u>	<u>Burst</u> <u>Pressure</u>	Cement Type	Cement Yiel
Conductor	20	24	0.375	-	Construction	1.18
Fresh Water	13 3/8	17 1/2	0.38	2,480	1	1.21
Coal						
Intermediate	9 5/8	12 3/8	0.395	3,590	1	1.21
Production	5 1/2	8 1/2	0.361	12,640	-	1.27/1.86
Tubing	·-				<u> </u>	
Liners		1				

<u>Packers</u>

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.

Page 2 of 3

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(3/13)

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 3956'.
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:
Hydrautic 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, blockle, and scale inhibitor), referred to in the industry as a "stickwater" completion. Maximum
anticipated treating pressures are 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): no additional disturbance
22) Area to be disturbed for well pad only, less access road (acres): ±.3 ac
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
CA) Describe all compart additions according with each compart time.
24) Describe all cement additives associated with each cement type. Used to speed the setting of cement slurries. Surface (Type 1 Cement): 0-3% Calcium Chloride
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:
Lead (Type 1 Cement): 0.2-0.7% Lignosulfonate (Retarder). Lengthens thickening time.
0.3% CFR (dispersant). Makes cement easier to mix.
Tall (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. <u>Surface</u> : 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.

*Note: Attach additional sheets as needed.

Well 515276 (PEN15H7)

EQT Production Pennsboro

Ritchie West Virgina

Azimuth 335 Vertical Section 5880

TVD Depth Formation Casing (feet) Tops (TVD) Hole Size Size Wt (ppf)/Grade Type (inches) (inches) 24 Conductor 20 250 500 750 Base Fresh Water 873 1,000 17 1/2 54#/MC-50 Base Red Rock 1040 (1000) Surface 13 3/8 1,250 1,500 1,750 Maden 1748 - 1700 Blg Lime 1967 - 2036 2,000 Blg Injury 2079 - 2147 (2000) 2,250 Weir 2375 - 2473 2,500 -Gantz 2580 - 2649 Fifty foot 2719 - 2768 2,750 -Thirty foot 2201 - 2634 -Gordon 2844 - 2890 3,000 -Forth Sand 2925 + 2910 (3000') -Bayard 3114 - 3464 3,250 -Watten 3464 - 2521 3,500 -Speechley 3545 - 3607 3,750 4,000 (4000) -Balliown A 4195 - 4248 4,250 4,500 Riley 4580 - 4621 4,750 4951 - 4974 -Benson (5000') 5,000 -Alexander 5211 - 5239 5,250 Int, eng pt 5330 12 3/8 Intermediate 9 5/8 40#/MC-50 5,500 6105 - 6130 Sonyea -Middlesex 6210 - 6275 5,750 6275 - 6326 6326 - 6353 -Genesee -Genesea KOP @ 3,956' (60000) 6,000 -Tully 6353 - 6368 -Hamilton 6368 - 6374 6,250 Marcellus top 6374 Target Inside Marcellus 8 1/2 Production Casing 5 1/2 20#/P-110 6395 THE PARTY OF THE PROPERTY OF THE PARTY OF TH 6,500 Marcellus Bottom 0424 Est. TD @ 6,395' ft TVD Land curve @ 6,395' It TVD Proposed Well Work: 8,488' ft MD 13,498' It MD Drill and complete a new horizontal well in the Marcellus formation. The vertical drill to go down to an approximate depth of 3956'.

Then kick off the horizontal leg into the Marcellus using a slick water frac. 5,010' ft Lateral

Well Name 515276 (PEN15H7) Elevation KB: County Ritchie West Virgina Target Prospect Azimuth Vertical Section 7 4 Hole Size 24" - 20" Conductor at 40" Bit Size 17.5" - 500' 500' TOC @ Surface 873' Fresh Water Base 13 3/8", MC-50, 54.5# @ 973' ft MD Δ Bit Size 12,375* 1,000' - 1,040' Base Red Rock - 1,000 1,500' -- 1.500 1.748' Maxton 2,000' — 1,967' Big Lime 2,079' Big Injun - 2.000 2,375' Weir 2,500' — 2,580' -Gantz - 2.500 2,719' -Fifty foot 2,801' -Thirty foot 3,000' - 2,844' -Gordon - 3,000 2,926' -Forth Sand 3,114' -Bayard 3,500' — 3,464' -Warren -Speechley - 3,500 - 4,000 4,000' -4.195' -Balltown A 4,500' — 4,580' -Riley - 4.500 5,000' — 4,951' -Benson - 5.000 TOC @ Surface 9 5/8", MC-50, 40# ut 5,330" ft MD 5,211' -Alexander Bit Size 8.5* 5,330' Int. csg pt Δ 7 5,500' -- 5,500 6,105' -Sonyea 6,218' -Middlesex KOP = 3,956' ft MD 10 Deg DLS 6,000' — 6,275' -Genesee - 6,000' 8,488" ft MD Land @ 6.326' -Geneseo 6,353 -Tully 6,368' -Hamilton 6,374' -Marcellus 5 1/2", P-110, 20# 13,498' ft MD 6,500' — 6,424' Onondaga 6.395' ft TVD - 6,500 - 7,000 7,000' -- 7.500 7,500' -8,000' -

- 8,000

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API No. 47 085 0 Operator's Well No. 515276

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

Fluids/Cuttings Disposal & Reclamation Plan

Operator Name	EQT F	roduction Compan	у	OP Code			
Watershed (HUC10)_	Long Run of	North Fork Hughes Rive	er Quadr	angle	Pen	nsboro	
Elevation	1119.0	County	Ritchie	_ Distric	ct	Clay	
Do you anticipate usin	g more than 5,	000 bbls of water to	complete the pre	oposed we	ell work?	Yes x	No
	s:No scribe anticipate cliner be used in	ed pit waste:	No	X	If so, what	ml.?	60
Proposed Dis	Land A Underg Reuse Off Site	For Treated Pit Wa pplication round Injection (at API Number_ Disposal (Sup (Explain	stes: (UIC Permit Nu ply form WW-9 fo			62, 4037)
Will closed loop syster fluid. The drill cuttings a	n be used ?	Yes, The closed loc			ngs from the	drilling	
Drilling medium antic	ipated for this	well? Air, freshwate	er, oil based, etc.		drill the top-hole s		
					mediate, and Pilot o drill the curve an		vater based
If oil based	what type? S	nthetic, petroleum	etc	maa id dada ii	ann and darroun	a natural	
Additives to be used in			scosifer, Alkalinity Cor	ntrol Lime C	hloride Salts F	Rate Filtratio	n Control.
Deflocculant, Lubricant, De		The second secon			BORD OF BUILDING	The state of the s	., 00,,,,,,,,
generally used when drilling		X1			Total Annual State of the Control of	The state of the state of	
riscosifer, alkalinity control,			man on the extended to				_
x-cide, SOLTEX terra	iirie, criioride sait	s, rate intration control,	denoccolari, idoncari	ii, detergent,	deloaming, v	valitor strell,	
Drill cuttings disposal	method? Leav	e in nit landfill ren	noved offsite etc		Land	dfill	
		what medium will be us			Luii	n/a	
	ffsite name/pern			See Attach	ed List	Tires	
- Landill of o	nsite name/pem	int marrider)		Joo / Illiadi	ou Liot		
on August 1, 2005, by the C provisions of the permit are or regulation can lead to en	office of Oil and Ga enforceable by law forcement action. y of law that I have chments thereto a at the information in , including the pos	w. Violations of any term e personally examined a nd that, based on my ir s true, accurate, and co	Department of Environ or condition of the grand am familiar with the equity of those individual omplete. I am aware to pament.	nmental Prote eneral permi ne information uals immedia hat there are J. Roark	ection. I under t and/or other n submitted or tely responsit	rstand that the applicable land in this ble for obtain	aw
Subscribed and sworn	before me this	20	day of	rich	Nota	_, 20 <u>/</u>	y
Tan	re Ala	-	2		REC NOW		VE 10015
My commission expire		8	.24.73	Oille	Salchie)5/23/2
					MARZS	X2114-	
						1 0	1



Proposed Revegetation	Treatment: Acres Disturbed	±.3 ac	Prevegetation	n pH6.0
Lime	3 Tons/acre or to c	correct to pH	6.5	
Fertilize type				
Fertilizer Amo	untlbs/ac	re (500 lbs minimum)		
Mulch	2	Tons/acre		
	S	eed Mixtures		
Te Seed Type KY-31	emporary Ibs/acre 40	Seed Type Orchard Grass	Permanent	lbs/acre 15
Alsike Clover	5	Alsike Clover		5
Annual Rye	15			
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4708510094

EQT Production Water plan Offsite disposals for Marcellus wells

CWS TRUCKING INC.

P.O. Box 391 Williamstown, WV 26187 740-516-3586 Noble County/Noble Township Permit # 3390

LAD LIQUID ASSETS DISPOSAL INC.

226 Rankin Road Washington, PA 15301 724-350-2760 724-222-6080 724-229-7034 fax Ohio County/Wheeling Permit # USEPA WV 0014

TRI COUNTY WASTE WATER MANAGEMENT, INC.

1487 Toms Run Road Holbrook, PA 15341 724-627-7178 Plant 724-499-5647 Office Greene County/Waynesburg Permit # TC-1009

Waste Management - Meadowfill Landfill

Rt. 2, Box 68 Dawson Drive Bridgeport, WV 26330 304-326-6027 Permit #SWF-1032-98 Approval #100785WV

Waste Management - Northwestern Landfill

512 E. Dry Road Parkersburg, WV 26104 304-428-0602 Permit #SWF-1025 WV-0109400 Approval #100833WV

BROAD STREET ENERGY LLC

37 West Broad Street Suite 1100 Columbus, Ohio 43215 740-516-5381 Washington County/Belpre Twp. Permit # 8462

TRIAD ENERGY

P.O. Box 430 Reno, OH 45773 740-516-6021 Well 740-374-2940 Reno Office Jennifer Nobel County/Jackson Township Permit # 4037

KING EXCAVATING CO.

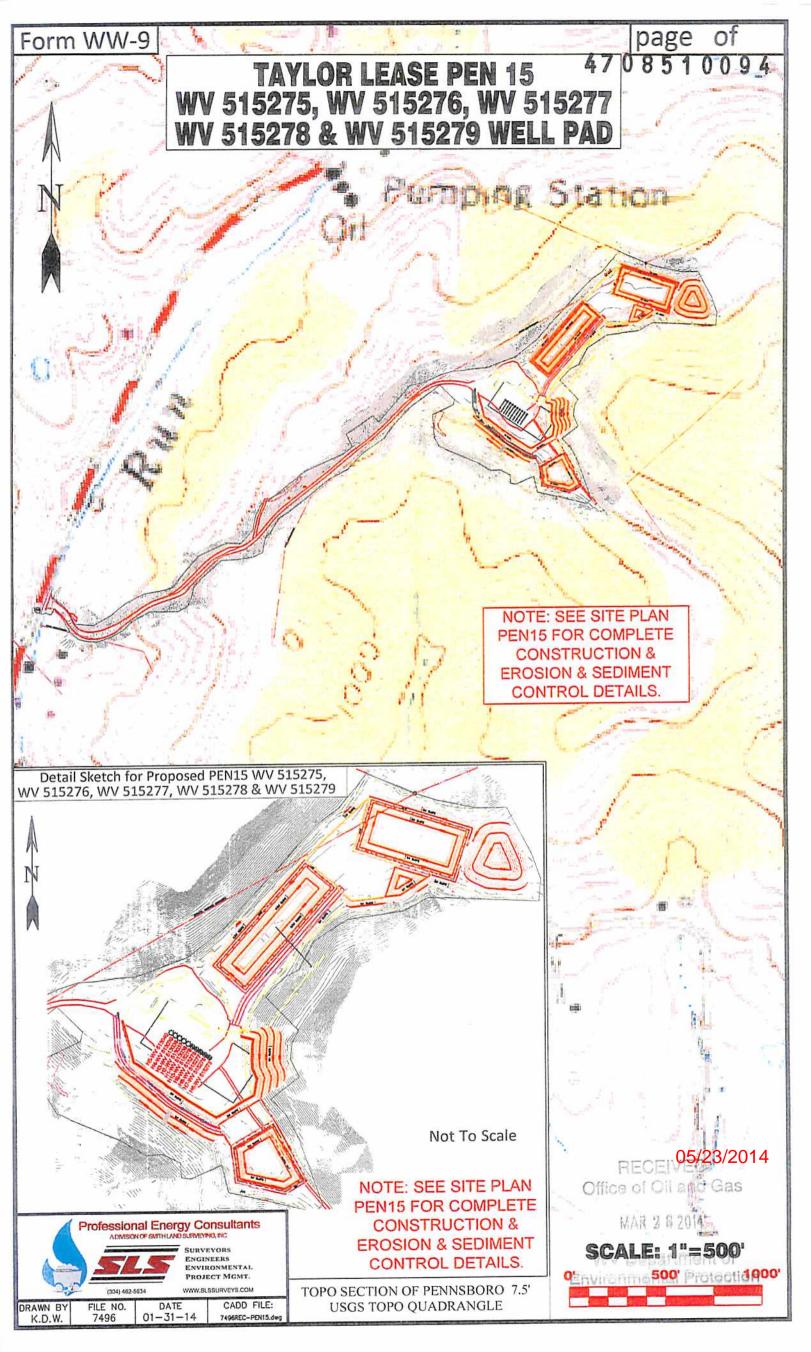
Advanced Waste Services 101 River Park Drive New Castle, Pa. 16101 Facility Permit# PAR000029132

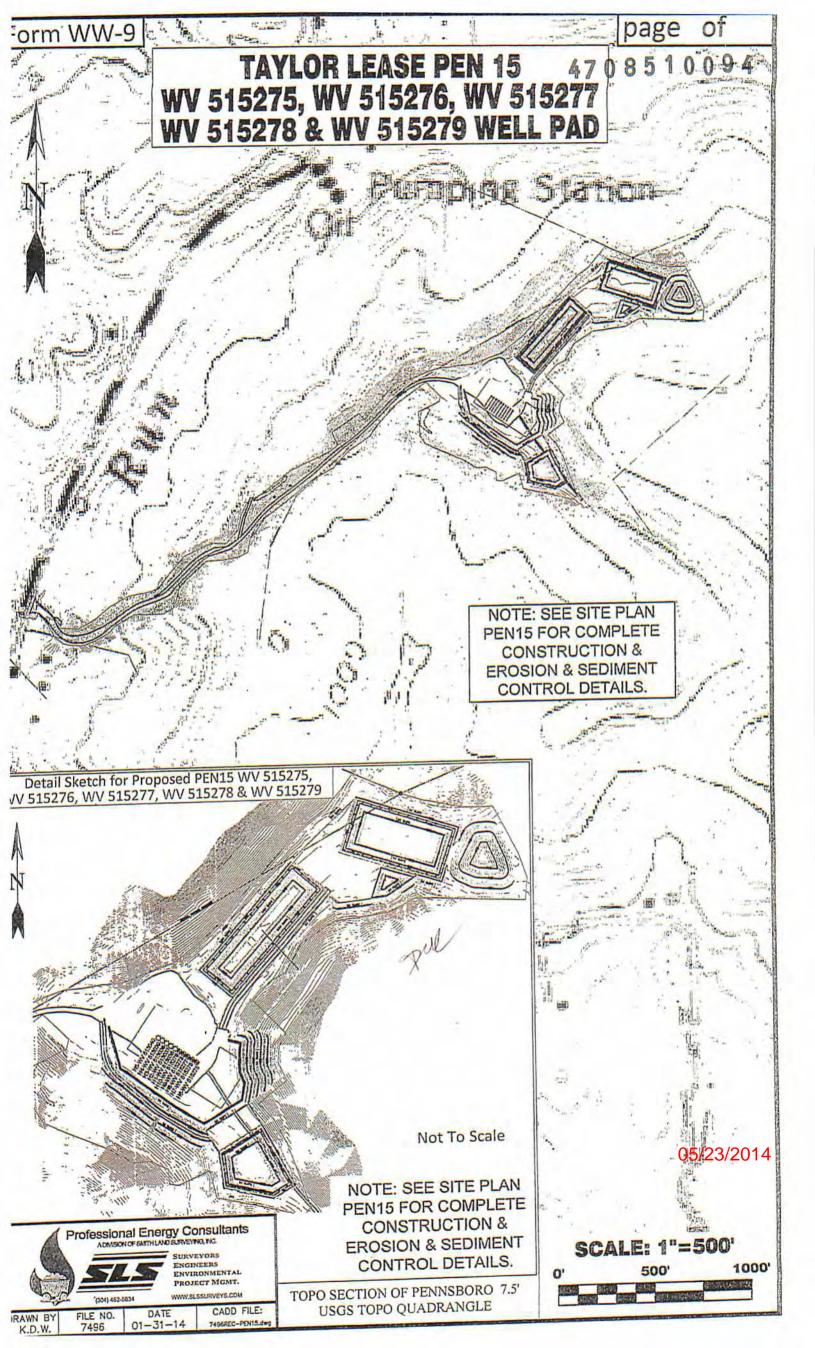
05/23/2014

RECEIVED
Office of CO and Gas

NAR 3 8 2014

TAN Trapartition of Environmental Protection







Site Specific Safety Plan

EQT PEN 15 Pad

Pennsboro

Ritchie County, WV

_515275515276515277	For Wells: 515278515279	
Date Pre	repared: March 17, 2014 Day Deed Cur	
Deem. Leng Spercusor Date	Title 4-2-14 Date	

