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**west virginia** department of environmental protection

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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 20, 2014

**WELL WORK PERMIT**

**Horizontal 6A Well**

This permit, API Well Number: 47-1706574, 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.



James Martin  
Chief

Operator's Well No: 515642

Farm Name: HOLLAND, MARY H. EST. C/O HL

**API Well Number: 47-1706574**

**Permit Type: Horizontal 6A Well**

Date Issued: 10/20/2014

**Promoting a healthy environment.**

**10/24/2014**

## 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

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

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

1) Well Operator: EQT Production Company Operator ID 017 County 8 District 671 Quadrangle

2) Operator's Well Number: 515642 Well Pad Name: WEU51

3) Farm Name/Surface Owner: Mary Holland Estate Public Road Access: Rt 13

4) Elevation, current ground: 1,224.0 Elevation, proposed post-construction: 1,208.0

5) Well Type: (a) Gas  Oil  Underground Storage   
Other \_\_\_\_\_

(b) If Gas: Shallow  Deep   
Horizontal

6) Existing Pad? Yes or No: Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):  
Target formation is Marcellus at a depth of 6683' with the anticipated thickness to be 57 feet and anticipated target pressure of 4502 PSI

8) Proposed Total Vertical Depth: 6,683  
9) Formation at Total Vertical Depth: Marcellus  
10) Proposed Total Measured Depth: 11,899  
11) Proposed Horizontal Leg Length: 3,500  
12) Approximate Fresh Water Strata Depths: 171, 176, 207, 334  
13) Method to Determine Fresh Water Depth: By offset wells  
14) Approximate Saltwater Depths: n/a  
15) Approximate Coal Seam Depths: 101, 170, 294, 314, 486, 555  
16) Approximate Depth to Possible Void (coal mine, karst, other): None reported

*DLN  
8-14-2014*

17) Does proposed well location contain coal seams directly overlying or adjacent to an active mine?

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



**CASING AND TUBING PROGRAM**

18)

TYPE	Size	New or Used	Grade	Weight per ft.	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	1,171	1,171	1,011 C.T.S.
Coal							
Intermediate	9 5/8	New	MC-50	40	5,293	5,293	2,074 C.T.S.
Production	5 1/2	New	P-110	20	11,899	11,899	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	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20	24	0.375	-	Construction	1.18
Fresh Water	13 3/8	17 1/2	0.38	2,480	* See Note 2	1.21
Coal						
Intermediate	9 5/8	12 3/8	0.395	3,590	* See Note 2	1.21
Production	5 1/2	8 1/2	0.361	12,640	-	1.27/1.86
Tubing						
Liners						

*DCN  
8-14-2014*

**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.

10/24/2014

RECEIVED  
Office of Oil and Gas

AUG 19 2014

WV Department of  
Environmental Protection



August 6, 2014

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

Re: WEU51 (515642, 515730)

Dear Mr. Smith,

EQT is requesting the 13 3/8" surface casing to be set at approximately 1171' KB (7' below the anticipated red rock show). The proposed casing set depth is above ground elevation. The reason for this is the red rock swells during drilling of the intermediate section causing many drilling problems such as, but not limited to, lost drilling assemblies and casing running issues. 9 5/8" intermediate casing will be set 50' below the Alexander formation at 5293' KB to cover offset production within close proximity to the pad.

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

Sincerely,

A handwritten signature in blue ink, appearing to read 'Vicki Roark', is written over a light blue horizontal line.

Vicki Roark  
Permitting Supervisor-WV

Enc.

Received

AUG - 4 2014

10/24/2014

Office of Oil and Gas  
WV Dept. of Environmental Protection

(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 2715' 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 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): no additional disturbance

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:

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 % Calcium 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.

\*Note: Attach additional sheets as needed.

Received  
 10/24/2014  
 Office of Oil and Gas  
 WV Dept. of Environmental Protection

4701706574



west virginia department of environmental protection

Office of Oil and Gas  
601 57<sup>th</sup> Street, SE  
Charleston, WV 25304  
(304) 926-0450  
(304) 926-0452 fax

Earl Ray Tomblin, Governor  
Randy C. Huffman, Cabinet Secretary  
dep.wv.gov

March 18, 2014

Nabors Completion & Production Services Company  
1380 Route 286 Hwy E #121  
Indiana PA 15701


Re: Cement Variance Request

Dear Sir or Madam,

This agency is approving a variance request for the cement blend listed below to be used on surface and coal protection strings for the drilling of oil and gas wells in the state of West Virginia. The variance cannot be used without requesting its use on a permit application and approval by this agency:

- Type 1 (2% Calcium Chloride-Accelerator, 0.25% Super Flake-Lost Circulation, 5.2% Water, 94% Type "1" Cement)

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

Sincerely,  
  
James Peterson  
Environmental Resources Specialist / Permitting

Promoting a healthy environment.

Received 10/24/2014  
RCS - 8 2014  
Office of Oil and Gas  
West Virginia Department of Environmental Protection



west virginia department of environmental protection

Office of Oil and Gas  
601 57<sup>th</sup> Street, SE  
Charleston, WV 25304  
(304) 826-0450  
(304) 026-0452 fax

Earl Ray Tomblin, Governor  
Randy C. Huffman, Cabinet Secretary  
dep.wv.gov

**BEFORE THE OFFICE OF OIL AND GAS  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
STATE OF WEST VIRGINIA**

**IN THE MATTER OF A VARIANCE FROM ) ORDER NO. 2014 - 17**  
**REGULATION 35 CSR § 4-11.4/11.5/14.1 )**  
**AND 35 CSR § 8-9.2.h. 4/5/6/8 OF THE )**  
**THE OPERATIONAL )**  
**REGULATIONS OF CEMENTING OIL )**  
**AND GAS WELLS )**

**REPORT OF THE OFFICE**

Nabors Completion & Production Services Co. requests approval of a different cement blend for use in cementing surface and coal protection casing of oil and gas wells.

**FINDINGS OF FACT**

1.) Nabors Completion & Production Services Co. proposes the following cement blend:

- 2% Calcium Chloride (Accelerator)
- 0.25 % Super Flake (Lost Circulation)
- 94% Type "I" Cement
- 5.20 % Water

2.) Laboratory testing results indicate that the blend listed in Fact No.1 will achieve a 500 psi compressive strength within 6 hours and a 2,435 psi compressive strength within 24 hours.

Promoting a healthy environment.

Received 10/24/2014  
Office of Oil and Gas  
WV Dept. of Environmental Protection



4701706574

**CONCLUSIONS OF LAW**

Pursuant to Articles 6 and 6A, Chapter 22 of the Code of West Virginia, the Office of Oil and Gas has jurisdiction over the subject matter embraced in said notice, and the persons interested therein, and jurisdiction to promulgate the hereinafter prescribed Order.

Pursuant to 35 CSR § 4-11.5 and 35 CSR § 8-9.2.h.8 the Chief of the Office of Oil and Gas may approve different cement blends upon the well operator providing satisfactory proof that different cement types are adequate.

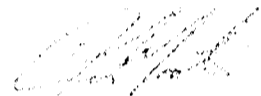
**ORDER**

It is ordered that Nabors Completion & Production Services Co. may use the cement blend listed in Findings of Fact No.1 for the cementing of surface and coal protection casing of oil and gas wells in the State as may be requested by oil and gas operators. The waiting time on the cement blend shall be 8 hours. The cement blend shall be mixed in strict accordance with the specifications for each blend and weight measurements made on-site to assure the cement slurries meet the minimum weight specifications. A sample shall be collected and, if after 8 hours the cement is not set up, additional time will be required. Nabors Completion & Production Services Co. shall keep a record of cement blend jobs in which the cement blend approved under this order is to be used and made available to the Office of Oil and Gas upon request.

Dated this, the 18th day of March, 2014.

IN THE NAME OF THE STATE OF WEST VIRGINIA

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

  
James Martin, Chief  
Office of Oil and Gas

Received 10/24/2014

Office of Oil and Gas  
West Virginia Department of Environmental Protection

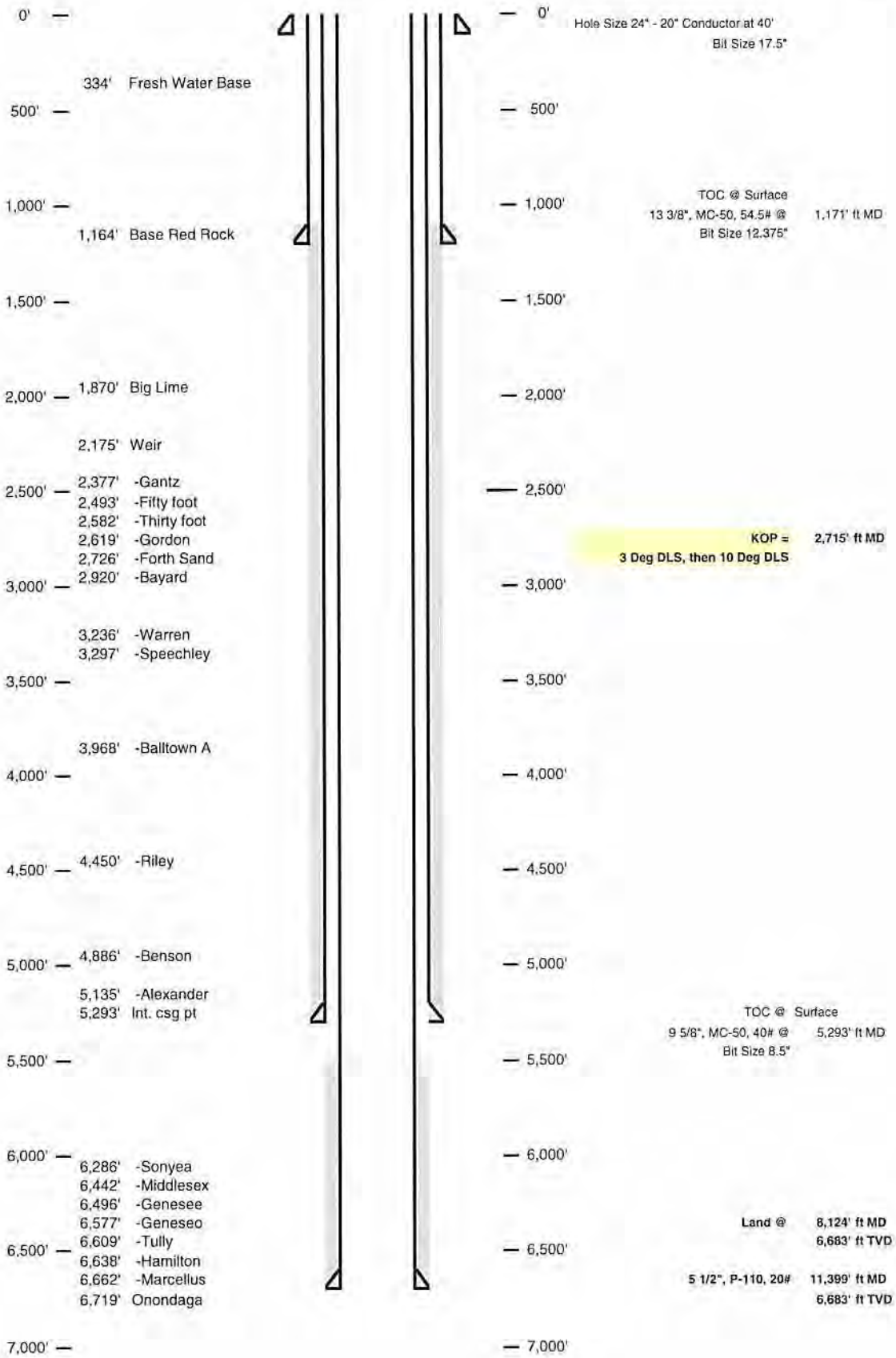
Well Schematic  
EQT Production

4701706574

Well Name 515542 (WEU51H6)  
County Doddridge  
State West Virginia

Elevation KB:  
Target  
Prospect  
Azimuth  
Vertical Section

1221
Marcellus
155
4986.8



Received 10/24/2014

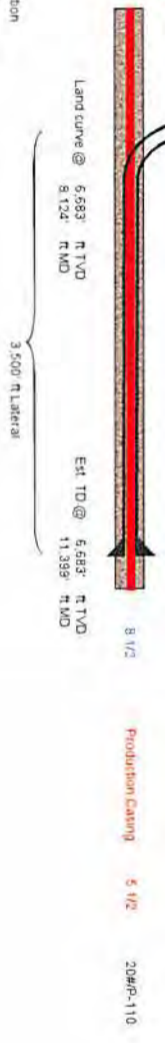
4701706574

Well 515642 (WEU51H6)  
 EOT Production  
 West Union  
 Doddridge  
 West Virginia

Armedh 155  
 Vertical Section 494A

TVD Depth (feet)	Formation Tops (TVD)	Armedh	Vertical Section	Hole Size (Inches)	Casing Type	Size (Inches)	WT (ppH) Grade
0				24	Conductor	20	
250'	Blue Fresh Water	328		17 1/2	Surface	13 3/8	54#MC-50
500'							
750'							
1,000'	Blue Reef Rock	418	(1000')				
1,250'							
1,500'							
1,750'							
2,000'	Big Limestone	418	(2000')				
2,250'	Waverly	215					
2,500'	Gantz	217					
2,715'	27th Foot	285					
2,819'	28th Foot	282					
2,819'	Gordon	289					
2,726'	27th Sand	278					
2,715'	Board	292					
3,000'			(3000')				
3,290'	Warren	328					
3,500'	Speedway	327					
3,750'							
4,000'	Baltimore A	382					
4,250'							
4,500'	Blory	468					
4,750'							
5,000'	Benson	484					
5,250'	Academy	513					
5,500'	Mc Evers	529					
5,750'	George	528					
6,000'	Madison	542					
6,250'	Greene	588					
6,500'	Greene	577					
6,583'	Marcellus Top	609					
6,583'	Marcellus Bottom	607					
6,750'		643					
7,000'		819					

Proposed Well Work  
 Drill and complete a new horizontal well in the Marcellus formation  
 The vertical drill to go down to an approximate depth of 2715'  
 Then kick off the horizontal leg into the Marcellus using a slick water frac.



Received 10/24/2014  
 West Virginia Department of Environmental Protection  
 Division of Oil and Gas

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

Fluids/Cuttings Disposal & Reclamation Plan

Operator Name EQT Production Co. OP Code \_\_\_\_\_

Watershed (HUC10) Bluestone Creek Quadrangle West Union

Elevation 1208.0 County Doddridge District West Union

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? Yes: X No: \_\_\_\_\_

If so please describe anticipated pit waste: Flowback water and residual solids

Will a synthetic liner be used in the pit? Yes X No \_\_\_\_\_ If so, what ml.? 60

Proposed Disposal Method For Treated Pit Wastes:

- \_\_\_\_\_ Land Application
- X Underground Injection ( UIC Permit Number 0014, 8462, 4037 )
- X Reuse (at API Number \_\_\_\_\_)
- X Off Site Disposal (Supply form WW-9 for disposal location)
- \_\_\_\_\_ Other (Explain \_\_\_\_\_)

Will closed loop system be used? Yes, The closed loop system will remove drill cuttings from the drilling fluid. The drill cuttings are then prepared for transportation to an off-site disposal facility.

Drilling medium anticipated for this well? Air, freshwater, oil based, etc. Air is used to drill the top-hole sections of the wellbore. Surface, intermediate, and Pilot hole sections, water based mud is used to drill the curve and lateral.

If oil based, what type? Synthetic, petroleum, etc \_\_\_\_\_

Additives to be used in drilling medium? MILBAR, Viscosifer, Alkalinity Control, Lime, Chloride Salts, Rate Filtration Control, Deflocculant, Lubricant, Detergent, Defoaming, Walnut Shell, X-Cide, SOLTEX Terra. Of the listed chemicals the following are generally used when drilling on air: lubricant, detergent, defoaming. Water based fluids use the following chemicals: MILBAR, viscosifer, alkalinity control, lime, chloride salts, rate filtration control, deflocculant, lubricant, detergent, defoaming, walnut shell, x-cide, SOLTEX terra

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Landfill  
- If left in pit and plan to solidify what medium will be used? (Cement, Lime, sawdust) n/a  
- Landfill or offsite name/permit number? 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 [Signature]  
Company Official (Typed Name) Victoria J. Bealk  
Company Official Title Permitting Supervisor

Subscribed and sworn before me this 16 day of October, 20 14

My commission expires 8-24-22

Notary Public



OFFICIAL SEAL  
STATE OF WEST VIRGINIA  
NOTARY PUBLIC  
Pamela Sykes  
EQT Production  
PO Box 280  
Bridgeport, WV 26330  
My Commission Expires Aug. 24, 2022



Proposed Revegetation Treatment: Acres Disturbed no additional disturbance Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilize type \_\_\_\_\_

Fertilizer Amount 13 lbs/acre (500 lbs minimum)

Mulch 2 Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
KY-31	<u>40</u>	Orchard Grass	<u>15</u>
Alsike Clover	<u>5</u>	Alsike Clover	<u>5</u>
Annual Rye	<u>15</u>		

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: Donald Newlan

Comments: Maintain ERS to WQ Dept regulations

Title: Dirt bas inspector

Date: 9-14-2014

Field Reviewed? (   /   ) Yes (        ) No

<b>EQT Production Water plan</b> <b>Offsite disposals for Marcellus wells</b>
--

**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.**

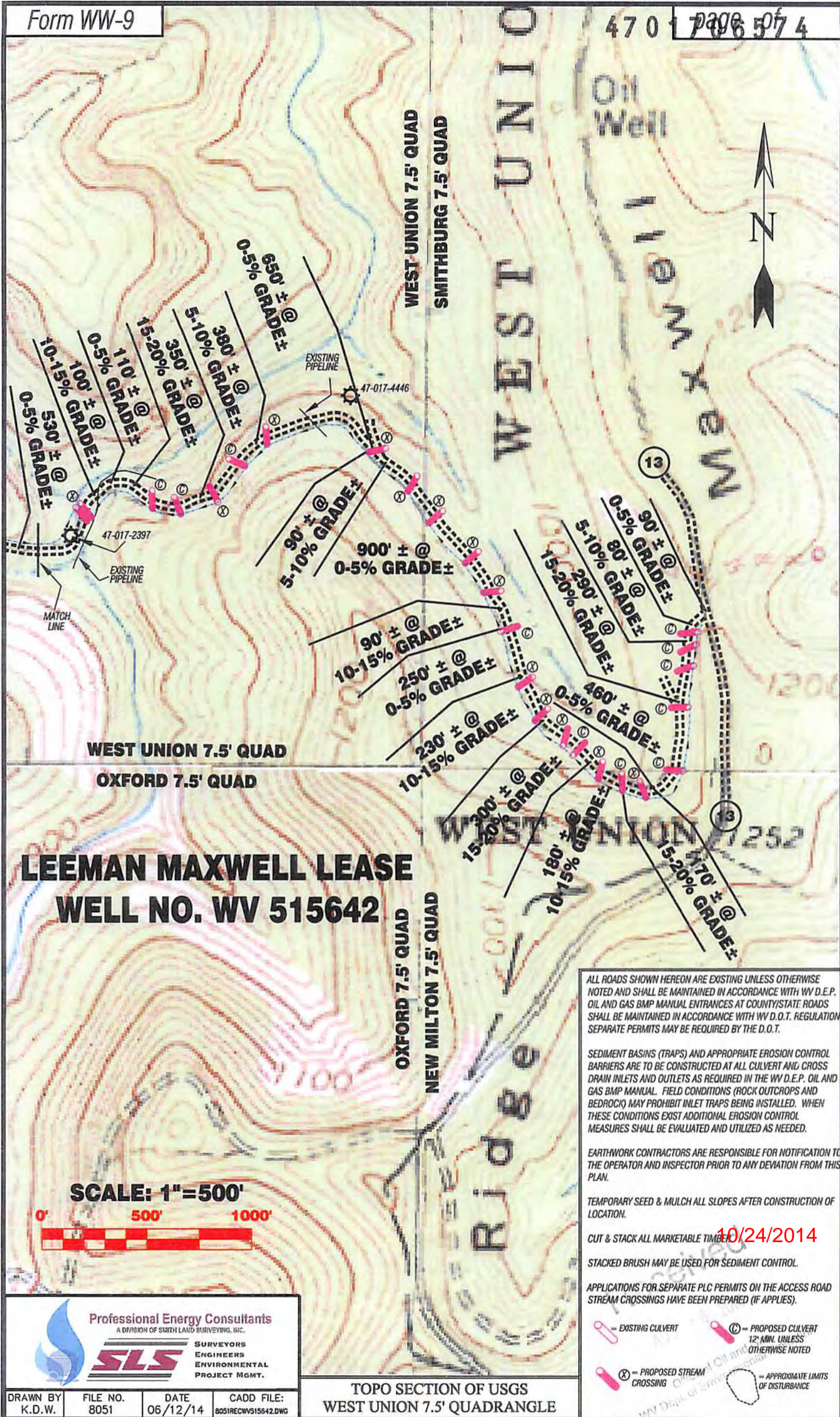
Advanced Waste Services  
 101 River Park Drive  
 New Castle, Pa. 16101  
 Facility Permit# PAR000029132

Received

10/24/2014

Office of Oil and Gas  
 WV Dept. of Environmental Protection





**LEEMAN MAXWELL LEASE  
WELL NO. WV 515642**

**SCALE: 1" = 500'**



ALL ROADS SHOWN HEREON ARE EXISTING UNLESS OTHERWISE NOTED AND SHALL BE MAINTAINED IN ACCORDANCE WITH WV D.E.P. OIL AND GAS BMP MANUAL ENTRANCES AT COUNTY/STATE ROADS SHALL BE MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATION SEPARATE PERMITS MAY BE REQUIRED BY THE D.O.T.

SEDIMENT BASINS (TRAPS) AND APPROPRIATE EROSION CONTROL BARRIERS ARE TO BE CONSTRUCTED AT ALL CULVERT AND CROSS DRAIN INLETS AND OUTLETS AS REQUIRED IN THE WV D.E.P. OIL AND GAS BMP MANUAL. FIELD CONDITIONS (ROCK OUTCROPS AND BEDROCK) MAY PROHIBIT INLET TRAPS BEING INSTALLED. WHEN THESE CONDITIONS EXIST ADDITIONAL EROSION CONTROL MEASURES SHALL BE EVALUATED AND UTILIZED AS NEEDED.

EARTHWORK CONTRACTORS ARE RESPONSIBLE FOR NOTIFICATION TO THE OPERATOR AND INSPECTOR PRIOR TO ANY DEVIATION FROM THIS PLAN.

TEMPORARY SEED & MULCH ALL SLOPES AFTER CONSTRUCTION OF LOCATION.

CUT & STACK ALL MARKETABLE TIMBER

10/24/2014

STACKED BRUSH MAY BE USED FOR SEDIMENT CONTROL.

APPLICATIONS FOR SEPARATE PLC PERMITS ON THE ACCESS ROAD STREAM CROSSINGS HAVE BEEN PREPARED (IF APPLIES).

- EXISTING CULVERT
- PROPOSED CULVERT 12" MIN. UNLESS OTHERWISE NOTED
- PROPOSED STREAM CROSSING
- APPROXIMATE LIMITS OF DISTURBANCE

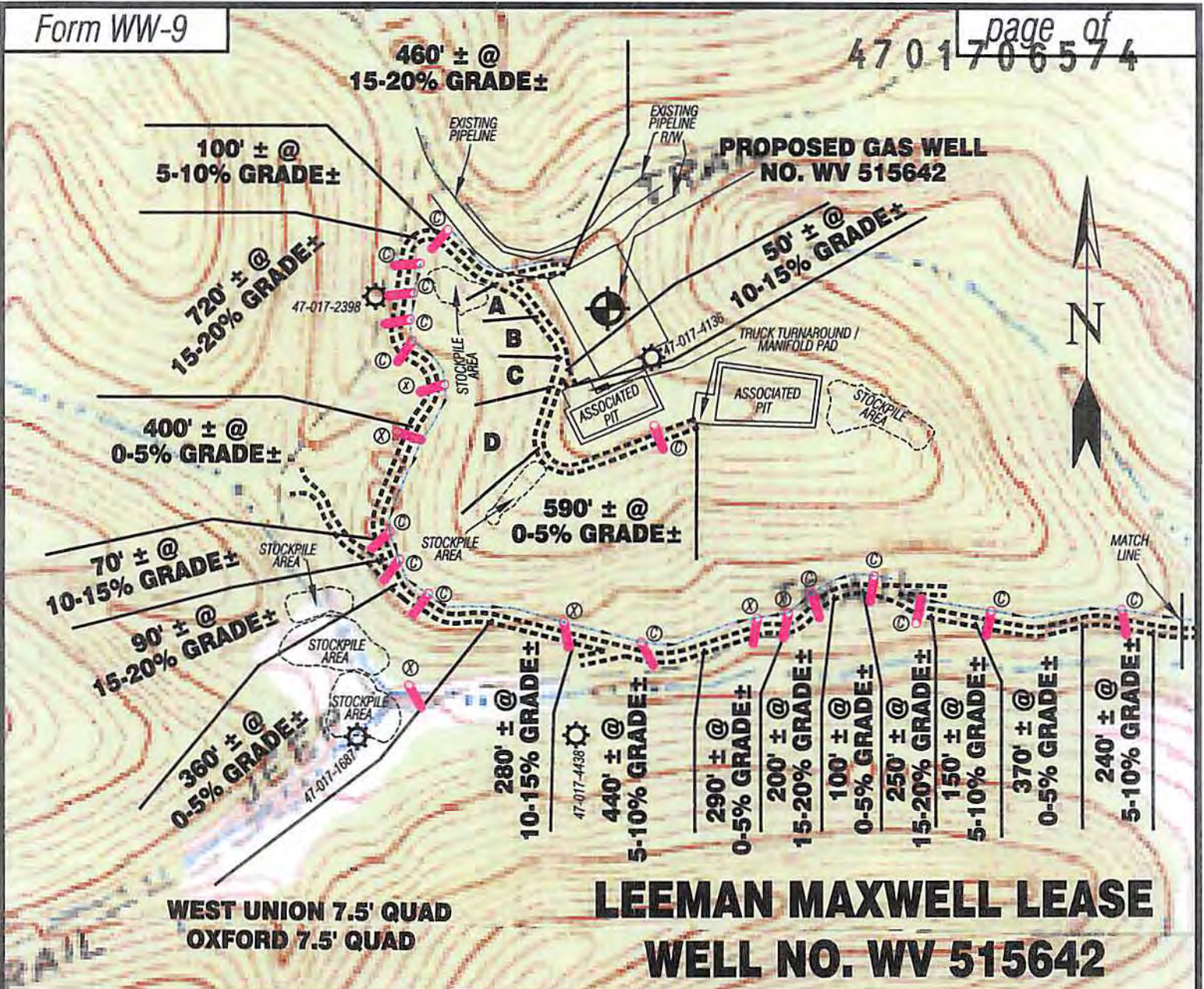
**TOPO SECTION OF USGS  
WEST UNION 7.5' QUADRANGLE**

**Professional Energy Consultants**  
A DIVISION OF SMITH LAND SURVEYING, INC.

**SLS**  
SURVEYORS  
ENGINEERS  
ENVIRONMENTAL  
PROJECT MGMT.

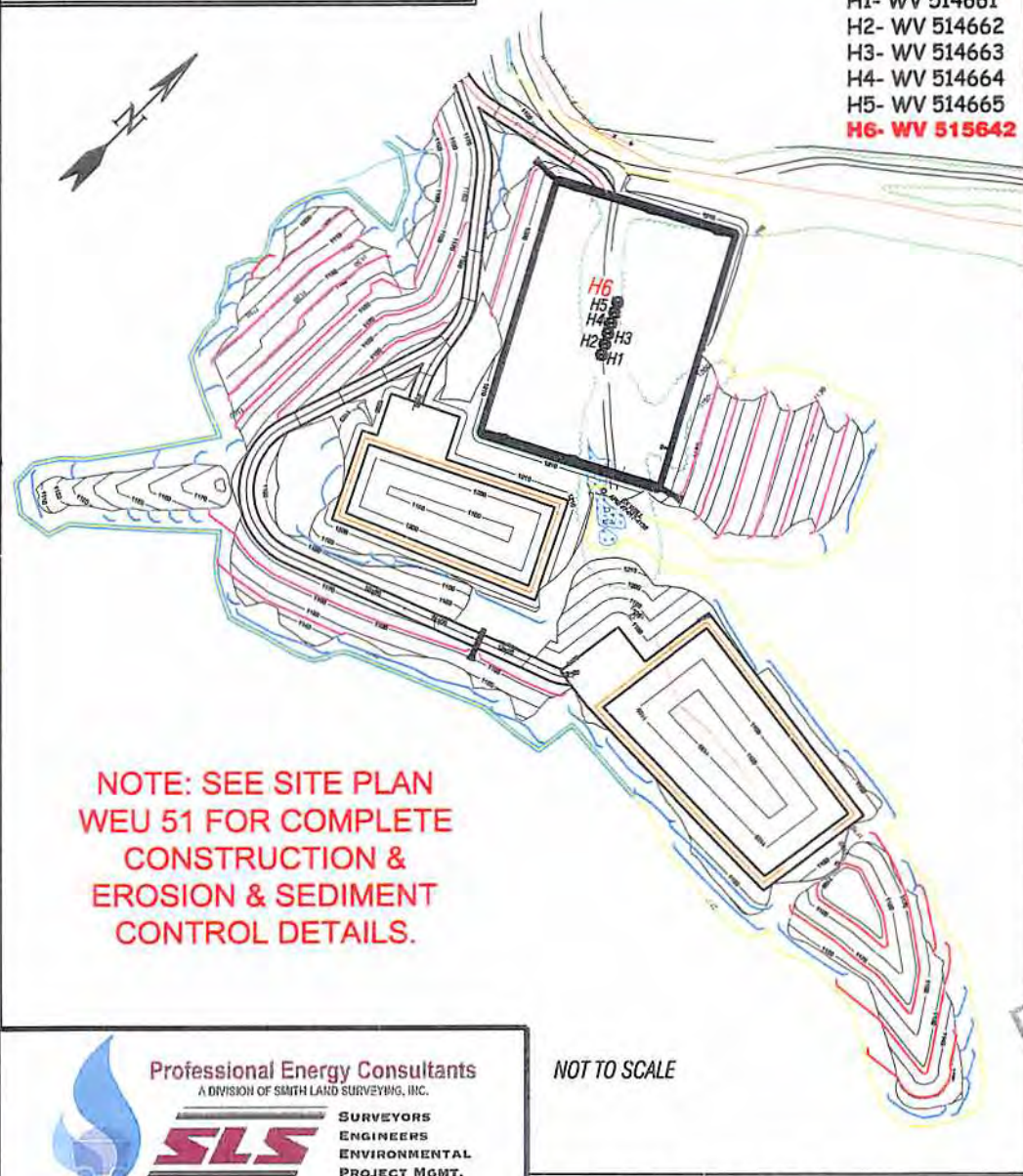
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# LEEMAN MAXWELL LEASE WELL NO. WV 515642

Detail Sketch for Proposed Well WV 515642



- WEU51 WELLS**  
 H1- WV 514661  
 H2- WV 514662  
 H3- WV 514663  
 H4- WV 514664  
 H5- WV 514665  
**H6- WV 515642**

	DISTANCE	GRADE ±
<b>A</b>	170' ±	0-5%
<b>B</b>	160' ±	15-20%
<b>C</b>	100' ±	0-5%
<b>D</b>	210' ±	15-20%

**SCALE: 1"=500'**



**NOTE: SEE SITE PLAN WEU 51 FOR COMPLETE CONSTRUCTION & EROSION & SEDIMENT CONTROL DETAILS.**

ALL ROADS SHOWN HEREON ARE EXISTING UNLESS OTHERWISE NOTED AND SHALL BE MAINTAINED IN ACCORDANCE WITH WV D.E.P. OIL AND GAS BMP MANUAL ENTRANCES AT COUNTY/STATE ROADS SHALL BE MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATION SEPARATE PERMITS MAY BE REQUIRED BY THE D.O.T.

SEDIMENT BASINS (TRAPS) AND APPROPRIATE EROSION CONTROL BARRIERS ARE TO BE CONSTRUCTED AT ALL CULVERT AND CROSS DRAIN INLETS AND OUTLETS AS REQUIRED IN THE WV D.E.P. OIL AND GAS BMP MANUAL. FIELD CONDITIONS (ROCK OUTCROPS AND BEDROCK) MAY PROHIBIT INLET TRAPS BEING INSTALLED. WHEN THESE CONDITIONS EXIST ADDITIONAL EROSION CONTROL MEASURES SHALL BE EVALUATED AND UTILIZED AS NEEDED.

EARTHWORK CONTRACTORS ARE RESPONSIBLE FOR NOTIFICATION TO THE OPERATOR AND INSPECTOR PRIOR TO ANY DEVIATION FROM THIS PLAN.

TEMPORARY SEED & MULCH ALL SLOPES AFTER CONSTRUCTION OF LOCATION.

CUT & STACK ALL MARKETABLE TIMBER. **10/24/2014**

STACKED BRUSH MAY BE USED FOR SEDIMENT CONTROL.

APPLICATIONS FOR SEPARATE PLC PERMITS ON THE ACCESS ROAD STREAM CROSSINGS HAVE BEEN PREPARED (IF APPLIES).

EXISTING CULVERT  
 PROPOSED CULVERT 12" MIN. UNLESS OTHERWISE NOTED  
 PROPOSED STREAM CROSSING  
 APPROXIMATE LIMITS OF DISTURBANCE

NOT TO SCALE

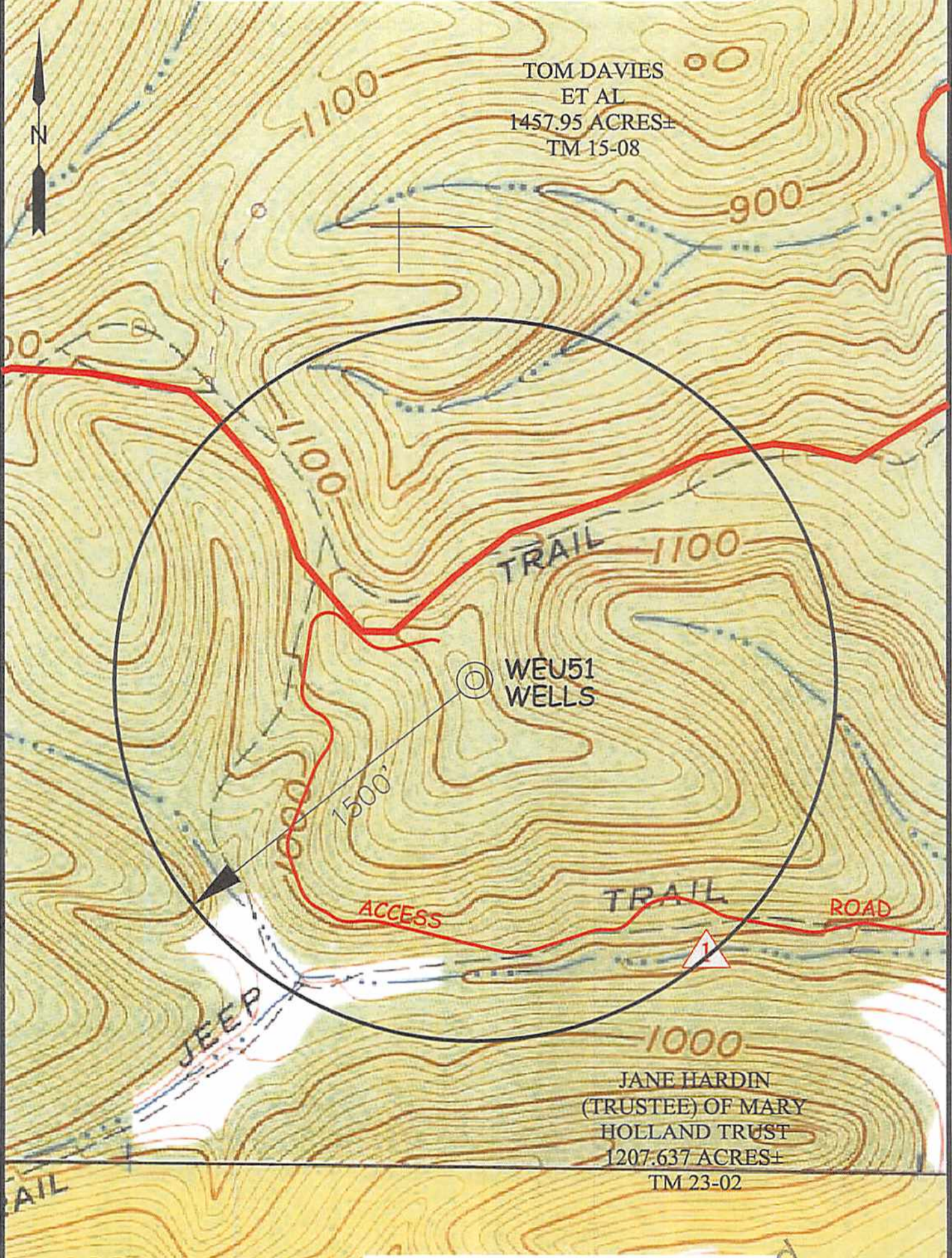
TOPO SECTION OF USGS WEST UNION 7.5' QUADRANGLE

**Professional Energy Consultants**  
 A DIVISION OF SMITH LAND SURVEYING, INC.  
**SLS**  
 SURVEYORS  
 ENGINEERS  
 ENVIRONMENTAL  
 PROJECT MGMT.

DRAWN BY: K.D.W.  
 FILE NO.: 8051  
 DATE: 06/12/14  
 CADD FILE: 8051RECWW515642.DWG



# LEEMAN MAXWELL LEASE 4701706574 WEU51 WELLS



⚠ NAD'83  
LAT: 39.252628  
LONG: 80.759636

SCALE: 1-INCH=1000-FEET



10/24/2014

Professional Energy Consultants  
A DIVISION OF SMITH LAND SURVEYING, INC.

**SLS**  
SURVEYORS  
ENGINEERS  
ENVIRONMENTAL  
PROJECT MGMT.

DRAWN BY K.D.W.	FILE NO. 8051	DATE 08/01/14	CADD FILE: 8051WSWEU51
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TOPO SECTION OF:  
WEST UNION, WV 7.5' QUAD.

DISTRICT	COUNTY	TAX MAP-PARCEL NO.
WEST UNION	DODDRIDGE	23-02

OPERATOR:  
EQT PRODUCTION COMPANY  
115 PROFESSIONAL PLACE  
P.O. BOX 280  
BRIDGEPORT, WV 26330





Where energy meets innovation.™

# Site Specific Safety Plan

EQT WEU 51 Pad


West Union  
Doddridge County, WV

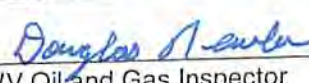
For Wells:

515642 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date Prepared:

June 30, 2014

  
EQT Production

  
WV Oil and Gas Inspector

Permitting Supervisor  
Title

Title

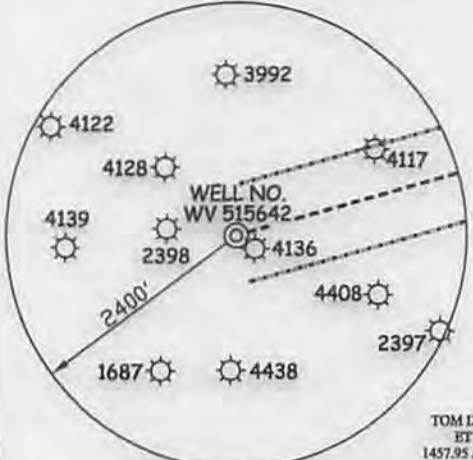
8-6-14  
Date

9-14-2014  
Date

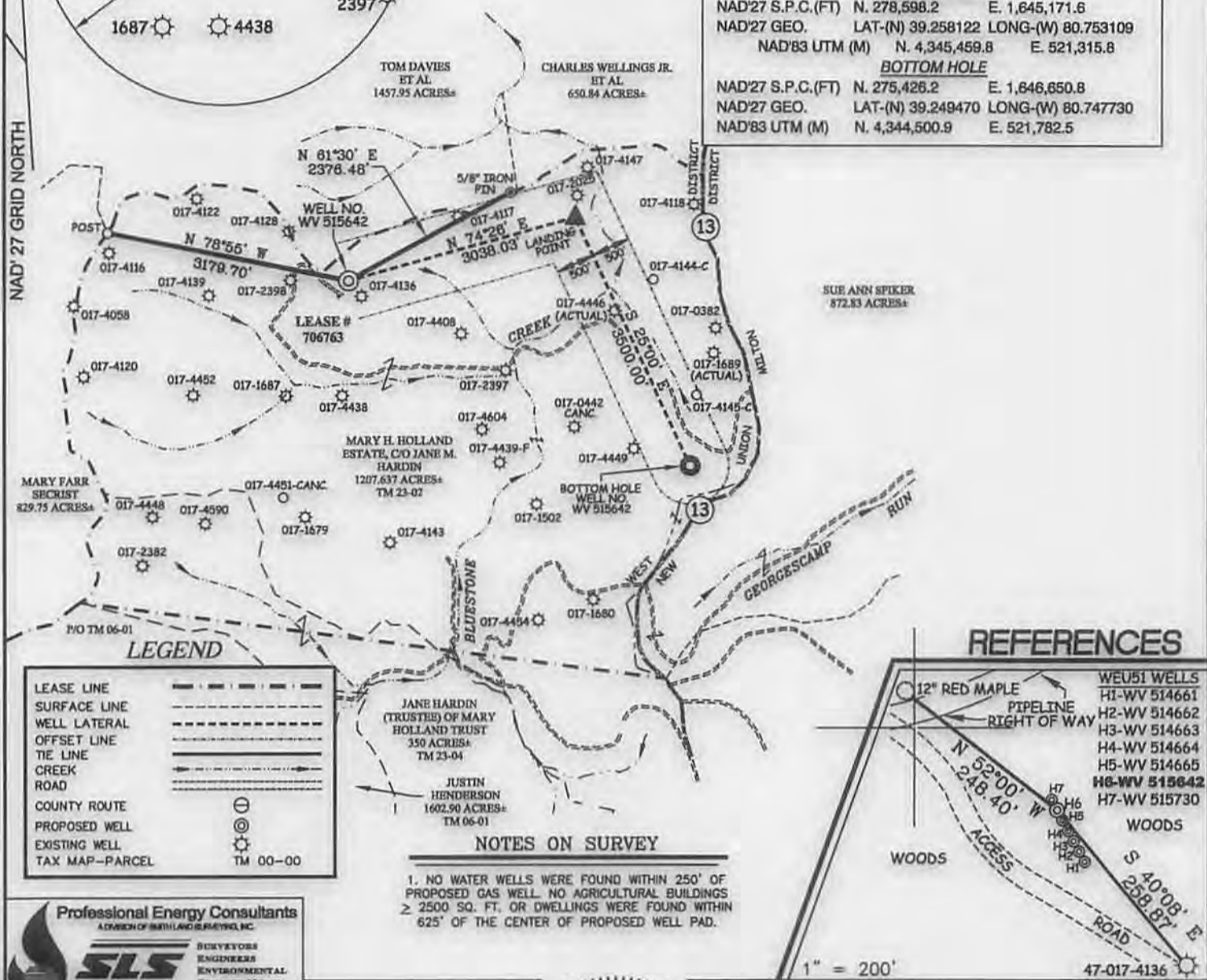


**EQT PRODUCTION COMPANY  
LEEMAN MAXWELL LEASE  
1000 ACRES±  
WELL NO. WV 515642**

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)  
 NAD'27 S.P.C.(FT) N. 277,783.2 E. 1,842,245.0  
 NAD'27 GEO. LAT-(N) 39.255772 LONG-(W) 80.763403  
 NAD'83 UTM (M) N. 4,345,196.6 E. 520,428.3  
**LANDING POINT**  
 NAD'27 S.P.C.(FT) N. 275,598.2 E. 1,845,171.6  
 NAD'27 GEO. LAT-(N) 39.258122 LONG-(W) 80.753109  
 NAD'83 UTM (M) N. 4,345,459.8 E. 521,315.8  
**BOTTOM HOLE**  
 NAD'27 S.P.C.(FT) N. 275,426.2 E. 1,846,650.8  
 NAD'27 GEO. LAT-(N) 39.249470 LONG-(W) 80.747730  
 NAD'83 UTM (M) N. 4,344,500.9 E. 521,782.5



NAD'27 GRID NORTH



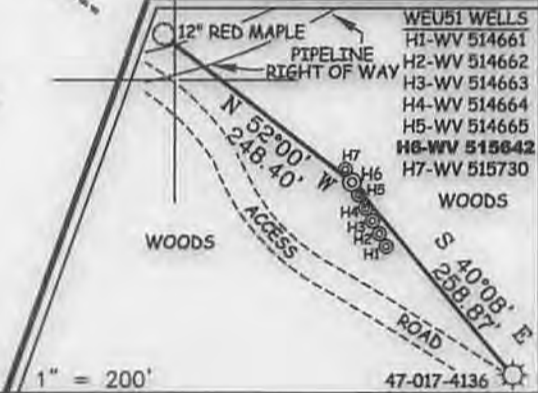
**LEGEND**

LEASE LINE	---
SURFACE LINE	----
WELL LATERAL	-----
OFFSET LINE	- - - - -
TIE LINE	=====
CREEK	~~~~~
ROAD	=====
COUNTY ROUTE	⊙
PROPOSED WELL	⊙
EXISTING WELL	⊙
TAX MAP--PARCEL	TM 00-00

**NOTES ON SURVEY**

- NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.

**REFERENCES**



**Professional Energy Consultants**  
 A DIVISION OF SUELLI AND BROWN, INC.  
  
 SURVEYORS  
 ENGINEERS  
 ENVIRONMENTAL  
 PROJECT MGMT.  
 (304) 483-8854 www.slsurveys.com

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 DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. 849 *C. Victor Moyers*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
 DATE MAY 30 , 20 14  
 REVISED AUGUST 06 , 20 14  
 OPERATORS WELL NO. WV 515642  
 API WELL NO. 47 - 17 - 06574 H6A  
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 8051P515642R2  
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

**STATE OF WEST VIRGINIA**  
 DIVISION OF ENVIRONMENTAL PROTECTION  
 OFFICE OF OIL AND GAS

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  IF "GAS" PRODUCTION  STORAGE  DEEP  SHALLOW

LOCATION:  
 ELEVATION 1,224'(GROUND) 1,208'(PROPOSED) WATERSHED BLUESTONE CREEK  
 DISTRICT WEST UNION COUNTY DODDRIDGE QUADRANGLE WEST UNION 7.5'  
 SURFACE OWNER MARY H. HOLLAND ESTATE, C/O JANE M. HARDIN ACREAGE 1207.637±  
 ROYALTY OWNER LEEMAN MAXWELL HEIRS ACREAGE 1,000±  
 PROPOSED WORK:  
 DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION   
 PERFORATE NEW FORMATION  PLUG AND ABANDON  CLEAN OUT AND REPLUG  OTHER   
 PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ TARGET FORMATION MARCELLUS  
 ESTIMATED DEPTH TVD 6661'

WELL OPERATOR EQT PRODUCTION COMPANY DESIGNATED AGENT REX C. RAY  
 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

COUNTY NAME PERMIT

10/24/2014