



UNDERGROUND INJECTION CONTROL (UIC) PERMIT APPLICATION RENEWAL

GILBERT-PLUMLEY A-55 (LASHER)

4191 PAD FORK ROAD

HANOVER, WV 24839

API NO. 47-109-02032

UIC NO. 2D1092032

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Environmental Protection

Prepared for:

ARP Mountaineer Production, LLC

2615 Steelsburg Highway

Cedarbluff, Virginia 24609

Prepared by:

Envirocheck of Virginia, Inc.

120 Lovelane Street

Bluefield, Virginia 24605



Envirocheck of Virginia, Inc.

"Energy, Environmental Consulting"

CHECKLIST FOR FILING A UIC PERMIT APPLICATION

Please utilize this checklist to ensure you have prepared, completed, and enclosed all required documentation and payment to ensure a timely review of your submittal.

Operator	ARP Mountaineer Production, LLC		
Existing UIC Permit ID Number	2D1092032	UIC Well API Number	47-109-02032

Office of Oil and Gas Office Use Only	
Permit Reviewer	
Date Received	12/11/17
Administratively Complete Date	
Approved Date	
Permit Issued	

Please check the fees and payment included.

Fees	Payment Type
UIC Permit Fee: \$500	Check <input type="checkbox"/>
Groundwater Protection Plan (GPP) Fee: \$50.00	Electronic <input type="checkbox"/>
	Other <input type="checkbox"/>

Please check the items completed and enclosed.

- Checklist
- UIC-1
 - Section 1 – Facility Information
 - Section 2 – Operator Information
 - Section 3 – Application Information
 - Section 4 – Applicant/Activity Request and Type
 - Section 5 – Brief description of the Nature of the Business
 - CERTIFICATION
- Section 6 – Construction
 - Appendix A Injection Well Form
 - Appendix B Storage Tank Inventory
- Section 7 – Area of Review
 - Appendix C Wells Within the Area of Review

*ATLAS RESOURCE PARTNERS
 CK NO. 066932
 11/30/17
 \$ 550.00*

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Appendix D Public Service District Affidavit

Appendix E Water Sources

Appendix F Area Permit Wells

Section 8 – Geological Data on Injection and Confining Zones

Section 9 – Operating Requirements / Data

Appendix G Wells Serviced by Injection Well

Section 10 – Monitoring

Section 11 – Groundwater Protection Plan (GPP)

Appendix H Groundwater Protection Plan (GPP)

Section 12 – Plugging and Abandonment

Section 13 – Additional Bonding

Section 14 – Financial Responsibility

Appendix I Financial Responsibility

Section 15 – Site Security Plan


Appendix J Site Security for Commercial Wells

Section 16 – Additional Information

Appendix K Other Permit Approvals

***NOTE: For all 2D wells an additional bond in the amount of \$5,000 is required.**

Reviewed by (Print Name): Rocky Stilwell


Reviewed by (Sign): 

Date Reviewed: 11-29-2019

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 <p>WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF OIL AND GAS 601 57th Street, SE Charleston, WV 25304 (304) 926-0450 www.dep.wv.gov/oil-and-gas</p>	UNDERGROUND INJECTION CONTROL (UIC) PERMIT APPLICATION	
	UIC PERMIT ID # <u>UIC2D10902032</u>	API # <u>47-109-02032</u>

Section 1. Facility Information

Facility Name: Gilbert-Plumley A-55 (Lasher)		
Address: 4191 Pad Fork Road		
City: Hanover	State: WV	Zip: 24839
County: Wyoming	District: Huff Creek	Quad: Baileysville
Location description: Pad Fork of Little Huff Creek, near Hanover, WV.		
Location of well(s) or approximate center of field/project in UTM NAD 83 (meters):		Lat. 37.50914
Northing: 4151587.3	Easting: 437892.4	Long. -81.702735
Environmental Contact Information:		
Name: Rocky Stilwell	Title: HSE Specialist Senior	
Phone: 276-455-1773	Email: rstilwell@atlasenergy.com	

Section 2. Operator Information

Operator Name: ARP Mountaineer Production, LLC	RECEIVED Office of Oil and Gas DEC 11 2017 WV Department of Environmental Protection	
Operator ID: 494509804		
Address: 2615 Steelsburg Highway		
City: Cedar Bluff	State: VA	Zip: 24609
County: Tazewell		
Contact Name: Rocky Stilwell	Contact Title: HSE Specialist Senior	
Contact Phone: 276-963-2979, X 241	Contact Email: rstilwell@atlasenergy.com	

Section 3. Applicant Information

Ownership Status: PRIVATE PUBLIC FEDERAL STATE
 OTHER (explain):

SIC code: 1311 (2D, 2H, 2R) 1479 (3S) OTHER (explain):

Section 4. Applicant / Activity Request and Type:

- A. Apply for a new UIC Permit: 2D 2H 2R 3S
B. Reissue existing UIC Permit: 2D 2H 2R 3S
C. Modify existing UIC Permit: 2D 2H 2R 3S
(Submit only documentation pertaining to the modification request)
2D COMMERCIAL FACILITY: YES NO

Section 5. Briefly describe the nature of business and the activities to be conducted:

ARP Mountaineer Production, LLC is an oil and natural gas facility that produces natural gas and coal bed methane from wells owned and operated by ARP Mountaineer Production, LLC in Virginia and West Virginia. The Gilbert-Plumley A-55 well been a UIC well for the injection of Class II fluids since 2003. Class II fluids are trucked to the facility in 80 bbl trucks and are unloaded into a 250 bbl AST along with 6 additional 210 bbl ASTS for settling and filtration. All ASTs are registered with the WVDEP AST Program and are located in a concrete secondary containment system capable of holding >110% of the facility capacity. After settling, the Class II liquids are filtered through cartridge and 0.50 micron bag filters prior to being injected to disposal well API 47-109-02032. The facility and injection pressures are monitored continuously through ARP Mountaineer Production, LLC security and SCADA system.

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Section 6

Construction

Section 6 – Construction

The Gilbert-Plumley A-55 UIC well is located at 4191 Pad Fork Road, Hanover, West Virginia. A facility map is provided as an attachment. Access to the facility is only via Pad Fork Road. The operating facility is located inside a 24 x 30 steel metal building with seven ASTs located a concrete dike capable of maintaining 110% of the facility capacity in the event of a tank failure. The concrete dike is 30' x 100' x 3.5' tall. The facility consists of a pump building, truck unloading bay, AST storage facility. A facility map is provided as an attachment. Basically, Class II fluids are trucked to the facility via 80 bbl trucks. The fluids are unloaded (with the operator present at all times) into the 250 bbl AST or one of the 210 bbl ASTs. After settling, the fluids are pumped through a series of cartridge and bag filters prior to being injected into the disposal well. All pumps, filtration units are located inside the building with sumps to catch any accidental spillage, filter change, etc. Security cameras are employed for site security and the facility is only operated in manual mode.

Any spills associated with the operation of these ASTs and UIC well will be reported within 24 hours to the OOG. Additionally, ARP Mountaineer Production, LLC maintains an approved Spill Prevention Response Plan (SPRP) for these ASTs.

Preventative maintenance of the ASTs, valves, and piping will be conducted as needed. Any sludge that accumulates in the ASTs will be cleaned out and properly disposed through ARP Mountaineer Production, LLC two year permit with the Raleigh County Landfill.

If any tank repairs are needed, those repairs will be made by the manufacturer and in accordance with applicable standards.

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Envirocheck of Virginia, Inc.
120 Lovelane Street
Bluefield, VA 24605
"Energy, Environmental Consulting"



SCALE 1" : 50'

ARP MOUNTAINEER PRODUCTIONS, LLC
WYOMING COUNTY, WEST VIRGINIA
WELL NO. UIC2D1092032

SITE MAP
TANK BATTERY & CONTROL BUILDING

Certification

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CERTIFICATION

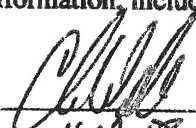
All permit applications must be signed by a responsible corporate officer for a corporation, by a general partner for a partnership, by the proprietor of a sole proprietorship, or by a principal executive or ranking elected official for a public agency, or a ¹duly authorized representative in accordance with 47CSR13-13.11.b.

A. Name and title of person applying for permit:

Print Name: Christopher Walker
Print Title: Chief Operating Officer

B. Signature and Date.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments 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 and imprisonment.

Signature: 
Date: 4-19-18

¹ A person is a duly authorized representative if:

The authorization is made in writing by a person described in subdivision 47CSR13-13.11.a.

The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of the plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility.

The written authorization is submitted to the Director.

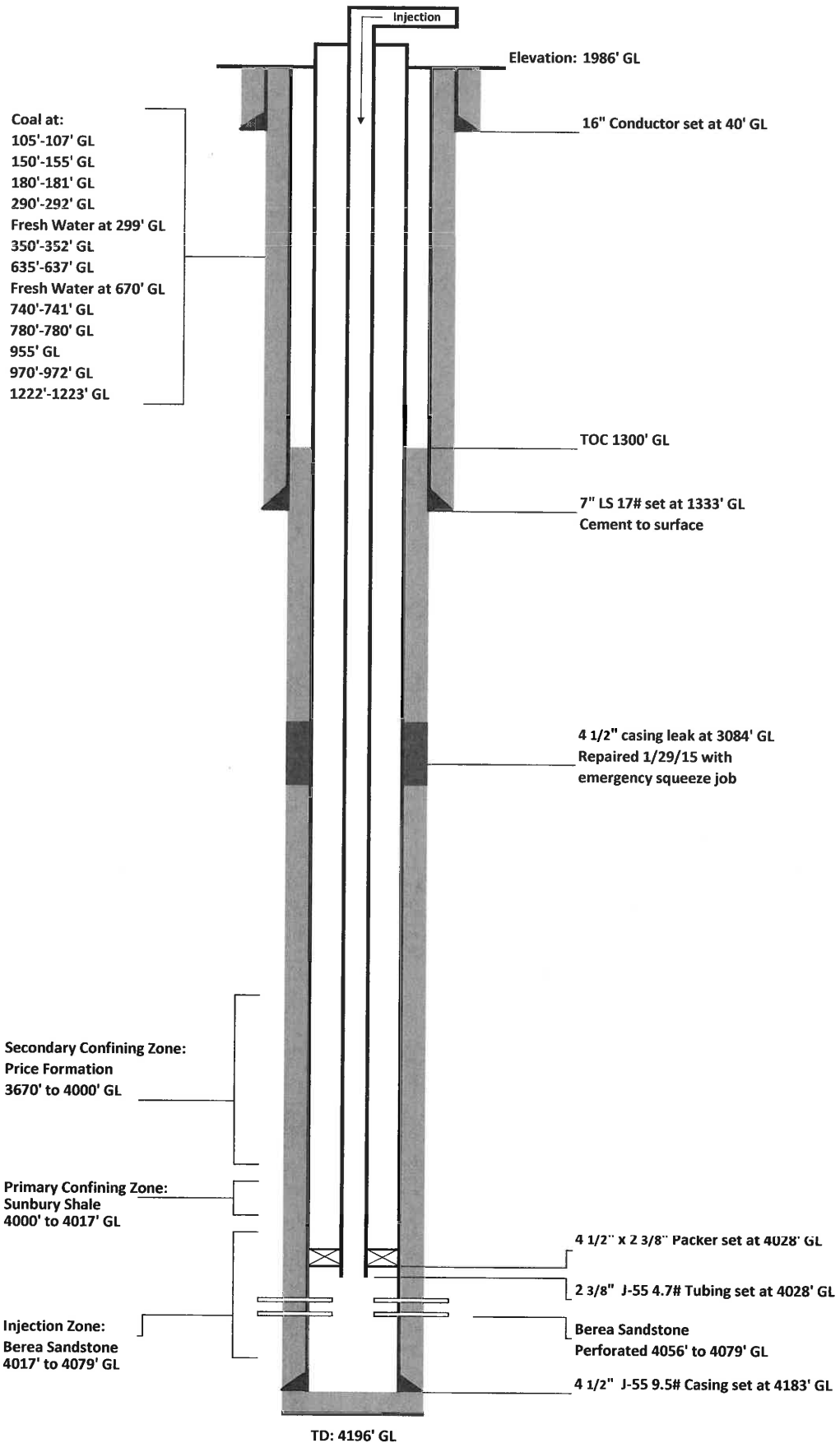
Appendix A
Injection Well Form

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ARP Mountaineer Production, LLC
 Gilbert-Plumley A-55
 API 47-109-02032



APPENDIX A Injection Well Form

1) GEOLOGIC TARGET FORMATION <u>Berea</u>	
Depth <u>4017</u>	Feet (top) <u>4079</u> Feet (bottom)
2) Estimated Depth of Completed Well, (or actual depth of existing well): <u>4196</u> Feet	
3) Approximate water strata depths: Fresh <u>299, 670</u> Feet Salt <u>unk</u> Feet	
4) Approximate coal seam depths: <small>105-107', 150-155', 180-181', 290-292', 350-352', 635-637', 740-741', 780-781', 955-955', 970-972', 1222-1223'</small>	
5) Is coal being mined in the area? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
6) Virgin reservoir pressure in target formation <u>900</u> psig Source <u>Data from wells in the field</u>	
7) Estimated reservoir fracture pressure <u>3256</u> psig (BHFP)	
8) MAXIMUM PROPOSED INJECTION OPERATIONS:	
Injection rate (bbl/hour)	<u>85</u>
Injection volume (bbl/day)	<u>2040</u>
Injection pressure (psig)	<u>1100</u>
Bottom hole pressure (psig)	<u>3245</u>
9) DETAILED IDENTIFICATION OF MATERIALS TO BE INJECTED, INCLUDING ADDITIVES:	
<u>Class II liquids.</u>	
Temperature of injected fluid: (°F) <u>Varies with season</u>	
10) FILTERS (IF ANY)	
<u>Use combination of bag filters and cartridge filtration units in series.</u>	
11) SPECIFICATIONS FOR CATHODIC PROTECTION AND OTHER CORROSION CONTROL	
<u>Coated Tubing Used, Nalco EC611BA (Biocide) and Clearwater international (scale inhibitor)</u>	
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APPENDIX A (cont.)

12. Casing and Tubing Program

TYPE	<u>Size</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling</u>	<u>INTERVALS: Left in Well</u>	<u>CEMENT: Fill-up (Cu. Ft.)</u>
Conductor	16"	New	LS	65.5	40'	40'	To Surface
Fresh Water							
Coal	7"	New	LS	17		1333'	
Intermediate 1							
Intermediate 2							
Production	4 1/2"	New	J-55	9.5		4182.7	1300'
Tubing	2 3/8"	New	J-55	4.7			
Liners							

TYPE	<u>Wellbore Diameter</u>	<u>Casing Size</u>	<u>Wall Thickness</u>	<u>Burst Pressure</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./sk)</u>	<u>Cement to Surface ? (Y or N)</u>
Conductor	16"	16"	0.876"	unk	Class A	1.18	Y
Fresh Water							Y
Coal							
Intermediate 1							
Intermediate 2							
Production		4 1/2"	0.634"	5,180	Class A w/ additives	1.82	N
Tubing		2 3/8"	0.41"	unk	class A w additives	1.82	N
Liners							

PACKERS	Packer #1	Packer #2	Packer #3	Packer #4
Kind:	Injection			
Sizes:	4 1/2" x 2 3/8"			
Depths Set:	4028			

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State of West Virginia
Division of Environmental Protection
Section of Oil and Gas
Well Operator's Report of Well Work

AP

Farm name: North American Timber Operator Well No.: Gilbert & Plumley A-55

LOCATION: Elevation: 1686' Quadrangle: Baileysville
District: Huff Creek County:
Latitude: 11,890 Feet South of 37 DEG. 32 MIN. 30 SEC.
Longitude: 10,520 Feet West of 81 DEG. 40 MIN. 0 SEC.

Company: Cabot Oil & Gas Corporation
900 Lee Street East, Suite 500
Charleston, WV 25301

Agent: John Abshire
Inspector: Ofie Helmick
Permit Issued: 4/30/01
Well Work Commenced: 5/19/01
Well Work Completed: 5/25/01
Verbal Plugging
Permission granted on:
Rotary X Cable
Total Depth (feet) 4194'
Fresh Water Depths (ft)
Salt Water Depths (ft)
Is coal being mined in area (Y / N)? Y
Coal Depths (ft) 105'-107', 150'-151', 180'-181', 290'-292', 350'-352', 635'-637', 740'-741', 780'-781',
955'-957', 970'-972', 1222'-1223'

Casing & Tubing Size	Used in Drilling	Left in Well	Cement Fill up Cu. Ft.
16"		40'	
7"		1333'	260 sks

OPEN FLOW DATA

Producing formation _____ Pay zone depth (ft) _____
Gas: Initial open flow _____ MCF/d Oil: Initial open flow _____ Bbl/d
Final open flow _____ MCF/d Final open flow _____ Bbl/d
Time of open flow between initial and final tests _____ Hours
Static rock pressure _____ psig (surface pressure after _____ Hours

Second producing formation _____ Pay zone depth (ft) _____
Gas: Initial open flow _____ MCF/d Oil: Initial open flow _____ Bbl/d
Final open flow _____ MCF/d Final open flow _____ Bbl/d
Time of open flow between initial and final tests _____ Hours
Static rock pressure _____ psig (surface pressure after _____ Hours

NOTE: ON BACK OF THIS FORM PUT THE FOLLOWING: 1). DETAILS OF PERFORATED INTERVALS, FRACTURING OR STIMULATING, PHYSICAL CHANGE, ETC. 2). THE WELL LOG WHICH IS A SYSTEMATIC DETAILED GEOLOGICAL RECORD OF ALL FORMATIONS, INCLUDING COAL ENCOUNTERED BY THE WELLBORE.

For: CABOT OIL & GAS CORPORATION MAR 22 2002

By: *Ray Rudnick* Operations Manager
Date: 3-18-02

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Permitting
MAR 22 2002
WV Department of
Environmental Protection

WYO 2032

WELL IS BEING EVALUATED FOR SALT WATER DISPOSAL.

FORMATION	TOP	BOTTOM	REMARKS
SILT/SHALE	0	1095	
SANDSTONE	1095	1700	
PRIDE SHALE	1700	1840	
SILT/SHALE	1840	1920	
RAVENCLIFF	1920	1960	
SHALE	1960	1990	
AVIS	1990	2035	
SILT/SHALE	2035	2403	
MAXTON	2403	2500	
SILT/SHALE	2500	2715	
MAXTON	2715	2758	
SHALE	2758	2815	
LITTLE LIME	2815	3020	
BIG LIME	3020	3385	
POCONO	3385	3670	
SHALE	3670	4017	
BEREA	4017	4080	
SHALE	4080	4194' TD	





1) Date: 03/29/2013
 2) Operator's Well No. Gilbert & Plumley A-55
 3) API Well No.: 47 - 109 - 02032
 State County Permit
 4) UIC Permit No. UIC2D1092032

**STATE OF WEST VIRGINIA
 NOTICE OF LIQUID INJECTION OR WASTE DISPOSAL WELL WORK PERMIT APPLICATION
 FOR THE DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS**

5) WELL TYPE: Liquid Injection / Gas Injection (not storage) / Waste Disposal
 6) LOCATION: Elevation: 1686 Watershed: Pea Fork of Little Huff Creek
 District: Huff Creek County Wyoming Quadrangle Baileysville
 7) WELL OPERATOR: GeoMet Operating Company, Inc. 8) DESIGNATED AGENT GT Corporation Systems
 Address: 5336 Stadium Trace Pkwy Ste. 205 Address: 707 Virginia Street East
Birmingham, Alabama 35244 Charleston, WV 25301
 9) OIL & GAS INSPECTOR TO BE NOTIFIED 10) DRILLING CONTRACTOR
 Name: Bary Stollings Name: Gasco Drilling
 Address: P. O. Box 1228 Address: Raffin Drive
Chapmansville, WV 25608 Ph. 304-562-4134 Richlands, Va 24641

11) PROPOSED WELL WORK Drill / Drill deeper / Redrill / Stimulate
 Plug off old formation / Perforate new formation Convert
 Other physical change in well (specify) _____

12) GEOLOGIC TARGET FORMATION Berea Depth 4017 Feet (top) to 4080 Feet (bottom)
 13) Estimated Depth of Completed Well, (or actual depth of existing well): 4196 Feet
 14) Approximate water strata depths: Fresh 299-670 Feet Salt Unknown Feet
 15) Approximate coal seam depths: 105-107, 150-155, 180-191, 290-292, 350-352, 635-637, 740-741, 780-781, 965-967, 970-972, 1222-1223
 16) Is coal being mined in the area? Yes No
 17) Virgin reservoir pressure in target formation 850 psig Source Estimated from nearby wells
 18) Estimated reservoir fracture pressure 825 psig (BHFP)
 19) MAXIMUM PROPOSED INJECTION OPERATIONS: Volume per hour _____ Bottom hole pressure 2930
 20) DETAILED IDENTIFICATION OF MATERIALS TO BE INJECTED, INCLUDING ADDITIVES No change from original permit application

21) FILTERS (IF ANY) 25 um and 10 um
 22) SPECIFICATIONS FOR CATHODIC PROTECTION AND OTHER CORROSION CONTROL
No cathodic protection, coated tubing has been installed.
 23) CASING AND TUBING PROGRAM

CASING OR TUBING TYPE	SPECIFICATIONS					FOOTAGE INTERVALS		CEMENT FILL -UP OR SACKS (CU. FT.)	PACKERS
	Size	Grade	Weight per ft	New	Used	For Drilling	Left In Well		
Conductor	16"	LS	85.6	X					Kinds
Fresh Water									
Coal	7"	LS	17	X			1300	Surface	Sizes 2 3/8" & 4-1/2"
Intermediate									
Production	4-1/2"	J-55	9.5	X			4162.7	1300	Depths set 4316.7
Tubing	2-3/8"	J-55	4.7	X					
Liners									Perforations Top Bottom 4055 4078

24) APPLICANT'S OPERATING RIGHTS were acquired from _____ by deed _____ / lease _____ / other contract _____ dated _____ of record in the _____ County Clerk's office in _____ Book _____ Page _____
Please refer to original application.

MECHANICAL INTEGRITY TEST

Test Method: 1/29/15 Rigged the pressure washer truck up to test the 4-1/2" casing annulus including the 2-3/8" tubing and packer. Pressured casing up to 1675 psig. The casing started losing pressure at an estimated rate of 45 psig a minute (did not communicate with tubing). Pressured the annulus back up and retorted three main lines. All three lines had about the same level of fluid. (Emergency Cement Squeeze) shut the well down and logged up to remove rig and closed the bottom hole valve and disconnected the tubing from the packer and valve. Pulled the tubing out of the hole and went back in with a retrievable plug and packer combination. Moved the packer down to 3194' and set it and pressured tested from 3194' to the original injection packer at 4020'. Pressured up to 1700 psig with no leak. Set the retrievable plug at 3220' and then set the packer at 2966' and tested from 2966'-3220'. Would not hold pressure. Tested above the packer from 2966' surface and it held. Removed packer and spotted 20' of sand on the retrievable plug and ran the tubing back in the hole to 2085' spotted 7.8 lbs of white matrix cement. Pulled tubing out of casing and removed. Pressured then pulled six more tests. Set another packer near surface to anchor the tubing. Pressured the casing up above the packer to 1975 psig. Flow lines with little leak off or movement and held at 1975 psig (squeeze pressure). let the cement set for 3 days. Pulled out of hole with tubing and anchor packer. Rm with bit and scraper. Shifted the cement out of the casing ran tubing back in the hole and released the tubing casing packer and piping to the injection pump to 1775 psig on 1/29/15 seal pressure with no bleed off.

The undersigned certifies that the test was performed on 1/29/15, 20 and demonstrated mechanical integrity of the well. The test was witnessed by Danny Mullins representing the Office of Oil and Gas.

ARP Mountaineer Production, LLC.
Well Operator

1/29/15
Date

THIS WELL IS AUTHORIZED FOR INJECTION.

Signed _____ UIC PROGRAM DIRECTOR

Date _____

[NOTE: That the mechanical integrity of this well must be demonstrated again within ninety (90) days of five years from this date in order for injection to continue. Please notify the state inspector 24 hours in advance of the test].

ARP Mountaineer Production, LLC
Well Operator
By: Rocky Sitwell
Its Regulatory Compliance Specialist

WR37

MECHANICAL INTEGRITY TEST

Test Method: 1/29/15 Rigged the pressure washer truck up to test the 4-1/2" casing annulus including the 2-3/8" tubing and packer, pressured casing up to 1675 psig.

The casing started leaking pressure at an estimated rate of 45 psig a minute (did not communicate with tubing), pressured the annulus back up and repeated three more times.

When the operator had about the same level of rate (Emergency Control Station) shut the well down and rigged up a service rig and aimed the bottom hole valve and disconnected the tubing from the packer and valve.

Removed the tubing out of the hole and went back in with a retrievable plug and packer combination, moved the packer down to 3180' and set it and pressured tested from 3180'

to the original injection packer at 4026'. Pressured up to 1700 psig with no leak; set the retrievable plug at 3220' and then set the packer at 2985' and tested from 2985'-3220'.

would not hold pressure; tested above the packer from 2985'-surface and it held; removed packer and spotted 20' of sand on the retrievable plug and ran the tubing back in the hole to 3085'

tested 7-8 bars of micro emulsion cement, pulled tubing out of cement and reversed circulated with cement ex. more joints, set another packer near surface to anchor the tubing, accessed the casing up below the packer to 1675 psig

three times with little leak after movement and test at 1675 psig (equivalent pressure), let the cement set for 3 days, pulled out of hole with tubing and anchor packer, RHT with bit and scraper,

disconnected out of the casing ran tubing back in the hole and released the tubing using packer and piping to the injection pump to 1710 psig on 1/29/15 and passed with no bleed off

The undersigned certifies that the test was performed on 1/29/15, 20 and demonstrated mechanical integrity of the well. The test was witnessed by Danny Mullins representing the Office of Oil and Gas.

ARP Mountaineer Production, LLC.

1/29/15

Well Operator

Date

THIS WELL IS AUTHORIZED FOR INJECTION.

Appendix B
Storage Tank Inventory

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Section 7

Area of Review

Section 7 – Area of Review

The area of review for this well is a fixed ¼ mile radius around the well head (see attached maps). One producing gas well is located within a ¼ mile radius of this well referenced to as Lasher #1. API 47-109 and updated by ARP Mountaineer Production, LLC. Two springs are located within this ¼ mile radius of the UIC well, see attached map and have been sampled since 2003. Lab results for these surface water sources are provided as an attachment.

The Lasher #1 well does not penetrate the injection zone and is a CBM well with a depth of 1768 feet. A copy of that permit is provided as an attachment.

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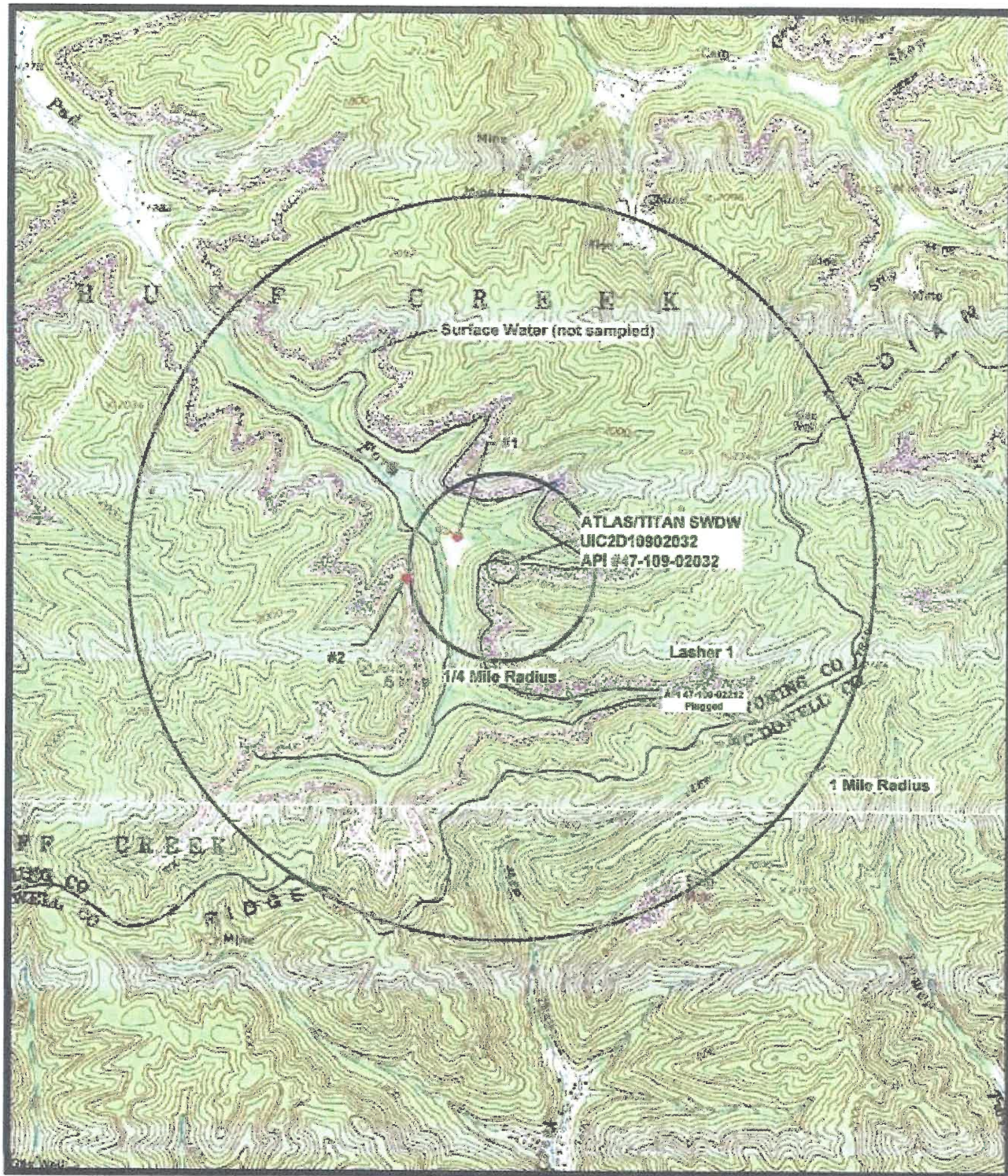
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Appendix C
Wells Within the Area of Review

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ARP MOUNTAINEER PRODUCTION, LLC - WYOMING COUNTY, WEST VIRGINIA
 PORTION OF USGS 7.5' BAILEYSVILLE, WV QUADRANGLE

2,000' 0 2,000'



SCALE 1:2,000

LOCATION MAP

WELL NO. UIC2D10902032



Envirocheck of Virginia, Inc.
 120 Lovelane Street
 Bluefield, VA 24605



WEST VIRGINIA
 QUADRANGLE
 LOCATION

**Work records for 47-109-02212 Lasher #1
(only well within 1 mile radius)**



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

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

Monday, October 17, 2016
WELL WORK PERMIT
Coal Bed Methane Well / Plugging - 2

ARP MOUNTAINEER PRODUCTION, LLC
PARK PLACE CORPORATE CENTER ONE
1000 COMMERCE DRIVE 4TH FLOOR
PITTSBURGH, PA 15275

Re: Permit approval for 120-141-001
47-109-02212-00-00

This well work permit 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 any additional specific 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 of 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.

Per 35 CSR 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- 0450.

James A. Martin
Chief

Operator's Well Number: 120-141-001
Farm Name: PLUM CRK. TIMBERLANDS
U.S. WELL NUMBER: 47-109-02212-00-00
Coal Bed Methane Well / Plugging - 2
Date Issued: 10/17/2016

Promoting a healthy environment.

1) Date April 26th, 2016
2) Operator's
Well No. Lasher 120-141-001
3) API Well No. 47-00 - 030

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 /
(If "Gas, Production or Underground storage) Deep / Shallow

5) Location: Elevation 1,788.25 Watershed Marsh Fork
District Huff Creek County Wyoming Quadrangle Baileysville

6) Well Operator ARP Mountaineer Production, LLC 7) Designated Agent CT Corporation System
Address Park Place Corporate Centre One Address 5400 D Big Tyler Road
1050 Commerce Drive 4th Floor, Pitsburg, PA 15275 Charleston, West Virginia 25313

8) Oil and Gas Inspector to be notified
BKF Name Brian Ferguson
Address 708 Manor Drive Beckley, WV 25801

9) Plugging Contractor
Name C&J Energy Services
Address 580 Hawthorne Drive
Norton, VA 24273

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

Move in rig up work-over rig, Lower tubing and tag bottom, TD 1,710'

If fill is encountered, clean to as deep as reasonably achievable below lowermost coal. *Clean to PBD. 900'*

RIH with 2-3/8" tubing set off of bottom + or - two feet. Spot balanced plug using 25% excess in cement, totaling 67cu.ft of expanding cement.

CEMENT SLURRY BLEND : 50% 50 C3010 7% C3920 + 10% C3111 (BLOWN) + 2% C3020 + 5% 10/50 C3011.

TOOH w/tubing to be above cement plug, WOC for 4hrs minimum

RIH w/tubing, tag cement at or near 1310', finish circulating cement to the surface, using 25% excess totaling 216cu.ft of expanding cement

Install permanent marker and reclaim location to WVDEP specifications

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Environmental Protection

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

Work order approved by inspector *Brian Ferguson* Date 6/23/16

McLaughlin, Jeffrey W

From: McLaughlin, Jeffrey W
Sent: Monday, October 17, 2016 7:45 AM
To: 'Cooper, Jeffrey S'
Subject: RE: message

Jeff,

I talked with Larry Vanhoorebeke from C & J Energy Services last week and also took a look at the expansion test results that indicate a 0.134% circumferential expansion for a specific blend of slurry. The blend is defined as 50:50 CJ010-74:CJ920 +10% CJ111 (BWOW) + 2% CJ020 + 5 LB/SK CJ611. It is my opinion that this blend meets the definition of an expanding cement as the term is used in the WV State Code.

Jeff, the permit in question should be approved and issued today.

Regards,

Jeff McLaughlin, B. S. Petroleum Eng.
Technical Analyst, Office of Oil & Gas
WV Dept. of Environmental Protection
Phone: 304-926-0499 ext. 1614

From: Cooper, Jeffrey S [mailto:JSCooper@atlasenergy.com]
Sent: Friday, October 14, 2016 4:20 PM
To: McLaughlin, Jeffrey W <Jeffrey.W.McLaughlin@wv.gov>
Subject: message

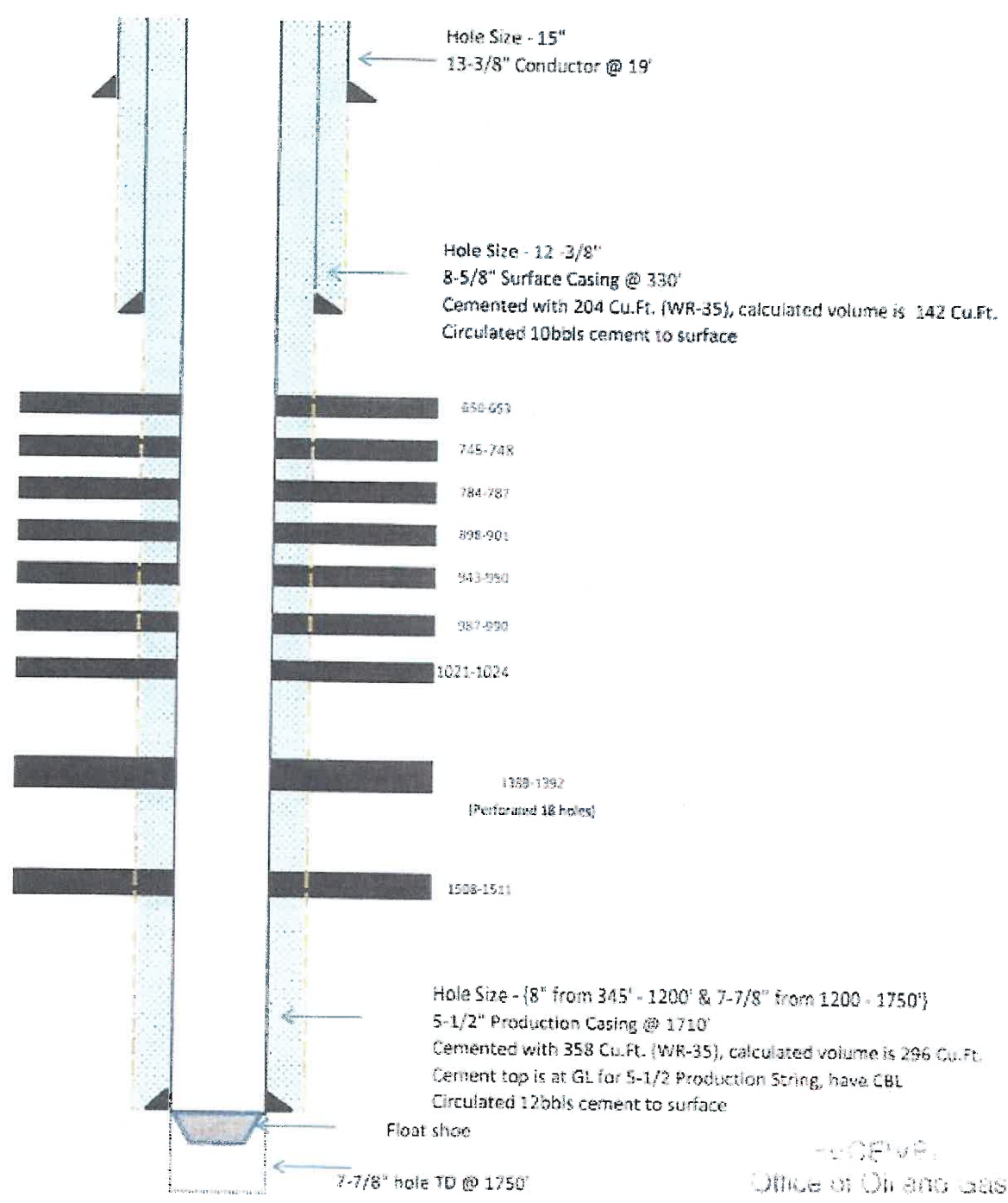
Hi Jeff,

I got your voice message. We are using an expanding cement. I will specify on the WR38 when finished. Are you getting close to releasing the Lasher 1 permit API 02212?

Thanks!

Jeff Cooper
Production Foreman
Atlas | Titan
2615 Steelsburg Highway
Cedar Bluff, VA 24609
Office 276-963-2979 x 243
Cell 276-971-3268

Lasher 001
Plug and Abandon Schematic
API # 47-109-02212



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State of West Virginia
Department of Environmental Protection
Office of Oil and Gas

Well Operator's Report of Well Work

FARM NAME: Fann Creek Timberlands, L.P. OPERATOR WELL NO.: LASHER 001

LOCATION:

Elevation: 1,788.25' Quadrangle: Baileysville

District: Huff Creek County: Wyoming
Latitude: 7,488 Feet South of 37 Deg. 32 Min. 30 Sec.
Longitude: 13,455 Feet West of 81 Deg. 40 Min. 00 Sec.

Company: <u>GeoMet Operating Company</u>	Casing & Tubing	Used in Drilling	Left in Well	Cement fill up Cn. Ft.
Address: <u>5336 Stadium Trace Parkway, Suite 206 Birmingham, Alabama 35244</u>	<u>13-3/8"</u>	<u>18.65'</u>	<u>18.65'</u>	
Agent: <u>Gregg Cleary</u>				
Inspector: <u>Ronnie Scott</u>	<u>8-5/8"</u>	<u>331'</u>	<u>331'</u>	<u>137/Pumped 204</u>
Date Permit Issued: <u>December 12, 2002</u>				
Date Well Work Commenced: <u>December 30, 2002</u>	<u>5-1/2"</u>	<u>1709.45'</u>	<u>1709.45'</u>	<u>296/Pumped 358</u>
Date Well Work Completed: <u>April 17, 2003</u>				
Verbal Plugging:				
Date Permission granted on:				
Rotary <u>XXXX</u> Cable <u> </u> Rig <u> </u>				
Total Depth (feet): <u>1710'</u>				
Fresh Water Depth (feet): <u>Unknown</u>				
Salt Water Depth (feet): <u>Unknown</u>				
Is coal being mined in area (N/Y)? <u>No</u>				

Coal Depths (feet): 326, 327, 328, 530, 331, 348, 361, 363, 650, 651, 746, 747, 785, 786, 899, 948, 986, 989, 1013, 1294, 1389, 1396, 1393, 1395, 1443, 1444, 1508, 1509

OPEN FLOW DATA

Producing formation All Zones Commingled Pay zone depth (ft) _____
Gas: Initial Open Flow N/A MCF/d Oil: Initial Open Flow _____ Bbl/d
Final Open Flow N/A MCF/d Final Open Flow _____ Bbl/d
Time of Open Flow between initial and final tests N/A Hours
Static Rock Pressure 18 psig (surface pressure) after 96 Hours

NOTE: ON BACK OF THIS FORM PUT THE FOLLOWING: 1). DETAILS OF PERFORATED INTERVALS, FRACTURING OR STIMULATING, PHYSICAL CHANGE, ETC. 2). THE WELL LOG WHICH IS A SYSTEMATIC DETAILED GEOLOGICAL RECORD OF ALL FORMATIONS, INCLUDING COAL ENCOUNTERED BY THE WELLBORE.

SIGNED:

BY:

DATE:

Quandrea Smith
Sept. 2, 2003

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**GeoMet Operating Company, Inc.
Perforation and Frac Volume Specification**

Well Name LASHER 001 PBTD 1710'

Zone and Perforation Table

Frac			Ball Out	Bridge Plug Set @	Est Sand Weight	Actual Sand Weight
Stage 1 Interval	1508	1511				
N2 Scf	315,000					
Acid	250	15%				18,000
Gel Volume	10,800	GAL				
ISIP	1833					
ATP	3775					
AIR	3955	BPM				
Stage 2 Interval	1388	1392			30,000	32,000
N2 Scf	370,000					
Acid	200	15%		1430'		
Gel Volume	10500	GAL		Before Frac		
ISIP	1402			Frac Balls on Plug		
ATP	3560			1150'		
AIR	18	BPM				
Stage 3 Interval	1021	1024			20,000	18,000
N2 Scf	184,000					
Acid	200	15%				
Gel Volume	6500	GAL		No Plug		
ISIP	2422					
ATP	2650					
AIR	22	BPM				
Stage 4 Interval	987	990			22,000	13,000
N2 Scf	224,000					
Acid	200	15%				
Gel Volume	7,000			No Plug		
ISIP	2240					
ATP	3480					
AIR	20	BPM				
Stage 5 Interval	898	901			18,000	20,000
N2 Scf	231,000					
Acid	450	15%				
Gel Volume	6,500	GAL		947' - 950'		
ISIP	1290			Ball Out		
ATP	2920			30 Balls On Plug		
AIR	20	BPM		840'		

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Well Name LASHER 001

PBTD

1710'

Zone and Perforation Table

Stage Interval	745	748	Ball Out yes	Bridge Plug Set @	Est Sand Weight	Actual Sand Weight
Stage 6 Interval						
N2 Scf	211,000		784' - 787' Ball Out	700'	18,000	20,000
Acid	450	15%				
Gel Volume	6,300	GAL				
ISIP	1028					
ATP	2690					
AIR	25	BPM				
Stage 7 Interval	650	653			24,000	26,000
N2 Scf	144,000		No Plug			
Acid	200	15%				
Gel Volume	6,800	GAL				
ISIP	839					
ATP	1820					
AIR	25	BPM				
Stage 8 Interval						
N2 Scf						
Acid						
Gel Volume						
ISIP						
ATP						
AIR						
Stage 9 Interval						
N2 Scf						
Acid						
Gel Volume						
ISIP						
ATP						
AIR						
Stage 10 Interval						
N2 Scf						
Acid						
Gel Volume						
ISIP						
ATP						
AIR						

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10902212P

DRILL DATA HOLE - NOAH HORN WELL DRILLING, INC.

COMPANY: GEOMET OPERATING CO. HOLE NO.: LASHER 001

LOCATION: PAD FORK DRILL: RIG # 23

DATE STARTED: 12-30-2002 DATE COMPLETED: 01-09-2003

DEPTH		THICKNESS	STRATA	REMARKS
FROM	TO	FT.	DESCRIPTION	VOIDS, ETC
0.00	5.00	5.00	OVERBURDEN	
5.00	19.00	14.00	SANDY SHALE / SAND	
19.00	30.00	11.00	SANDSTONE	18.65' W/ 13 3/8" CASING
30.00	61.00	31.00	SAND / COAL STR / SANDY SHALE	
61.00	92.00	31.00	SANDY SHALE / SAND / COAL STR	
92.00	123.00	31.00	SAND / SANDY SHALE / SAND	
123.00	154.00	31.00	SANDSTONE	
154.00	185.00	31.00	SAND / SANDY SHALE / SAND	
185.00	215.00	30.00	SAND / COAL STR / SANDY SHALE	
215.00	245.00	30.00	SANDY SHALE / SAND	
245.00	275.00	30.00	SAND / SANDY SHALE	
275.00	305.00	30.00	SANDY SHALE	
305.00	335.00	30.00	SANDY SHALE / SAND	
335.00	345.00	10.00	SANDSTONE	331' W/ 8 5/8" CASING
345.00	365.00	20.00	SAND / SANDY SHALE / COAL STR	
365.00	395.00	30.00	SAND / SANDY SHALE	
395.00	425.00	30.00	SANDY SHALE / SAND STR	
425.00	455.00	30.00	SAND / SANDY SHALE	
455.00	485.00	30.00	SAND / COAL STR / SANDY SHALE	
485.00	515.00	30.00	SANDY SHALE	
515.00	545.00	30.00	SANDY SHALE / SAND / SANDY SHALE	
545.00	575.00	30.00	SANDY SHALE / SAND STR	
575.00	605.00	30.00	SANDY SHALE / SAND	
605.00	635.00	30.00	SAND / SANDY SHALE	
635.00	665.00	30.00	SANDY SHALE / COAL / SAND	
665.00	695.00	30.00	SAND / SANDY SHALE STR	
695.00	725.00	30.00	SAND / SANDY SHALE / SAND	
725.00	755.00	30.00	SAND / COAL STR / SANDY SHALE	
755.00	785.00	30.00	SANDY SHALE / SAND	
785.00	815.00	30.00	SAND / SANDY SHALE STR	
815.00	875.00	60.00	SANDY SHALE	
875.00	905.00	30.00	SANDY SHALE / COAL STR / SANDY SHALE	
905.00	935.00	30.00	SANDY SHALE / SAND	
935.00	965.00	30.00	SAND STR / COAL STR / SANDY SHALE	
965.00	995.00	30.00	SANDY SHALE / COAL STR / SANDY SHALE	
995.00	1025.00	30.00	SAND STR / SANDY SHALE / COAL	
1025.00	1055.00	30.00	SANDY SHALE / SAND STR / SANDY SHALE	RECEIVED
1055.00	1145.00	90.00	SAND / SANDY SHALE / SAND	
1145.00	1170.00	25.00	SAND / SANDY SHALE	
1170.00	1200.00	30.00	HARD SAND	
1200.00	1230.00	30.00	HARD SANDSTONE	

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WV Department of
Mines, Safety and Health

PAGE 2
 GEOMET OPERATING CO
 LASHER 001

FROM	TO	FT.	DESCRIPTION
1230.00	1290.00	60.00	SAND / SANDY SHALE / COAL
1290.00	1320.00	30.00	SAND / SANDY SHALE / SAND
1320.00	1350.00	30.00	SANDY SHALE / SAND / SANDY SHALE
1350.00	1380.00	30.00	SAND / SANDY SHALE STR
1380.00	1410.00	30.00	COAL / SAND / SANDY SHALE / SAND
1410.00	1440.00	30.00	SAND / SANDY SHALE / COAL
1440.00	1470.00	30.00	SANDY SHALE / SAND
1470.00	1500.00	30.00	HARD SAND / SHALE STR
1500.00	1530.00	30.00	SANDY SHALE / SHALE
1530.00	1560.00	30.00	SHALE / HARD SAND / SHALE STR
1560.00	1590.00	30.00	SAND / SHALE STR
1590.00	1620.00	30.00	SAND / SANDY SHALE
1620.00	1650.00	30.00	SAND STR / SANDY SHALE / SHALE
1650.00	1680.00	30.00	SHALE / SANDY SHALE / SAND STR
1680.00	1710.00	30.00	SAND / SANDY SHALE / SHALE / SAND
1710.00	1740.00	30.00	1709.45' W / 5 1/2" CASING
1740.00	1750.00	10.00	SAND / SANDY SHALE / POSS. SHALE SHALE OR SANDY SHALE

1750.00 FT. TOTAL DEPTH
 18.65 FT. OF 13 3/8" CASING
 331.00 FT. OF 8 5/8" CASING
 1709.45 FT. OF 5 1/2" CASING

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10902212P

WELL PROFILE



Well Number Lasher #1

Date of Job 12-11-07 Reason for Job (e.g. completion, stuck pump) work-over

Conditions Found (e.g. coal fines on standing valve)

Rig Number and Operator L10 Rig #4 Anthony Thomas

CASING DETAIL

Surface Casing	Jts.	OD	#ft.	Grade - Set @
Intermediate Casing	Jts.	OU	#ft.	Grade - Set @
Production Casing	Jts. <u>5 1/2</u>	OD	#ft.	Grade - Set @
Fiberglass Jt.				
Balls @				

PERFORATION DETAIL (From Bottom Up)

Open Hole Section			
SPF	TUBING DETAIL	Size <u>2 3/8</u>	Thread <u>8rd</u>
SPF	Subs		
SPF	Joints <u>50</u>	<u>1573.90</u>	
SPF	Barrel <u>SV</u>	<u>.85</u>	
SPF	Tail Joint <u>1</u>	<u>31.80</u>	
SPF	Total		

SPF	EOT	@ <u>1606.55</u>	
SPF	Pump Intake	@	
SPF	PUMP DESCRIPTION	<input type="checkbox"/> 30 Ring	<input checked="" type="checkbox"/> 1 1/2" insert
SPF		<input type="checkbox"/> 60 Ring	<input type="checkbox"/> 1 25/32"
SPF		<input type="checkbox"/> Stainless Steel	<input type="checkbox"/> Carbon Steel
SPF			<input type="checkbox"/> Split Ring
SPF			<input type="checkbox"/> Flanged Ring
SPF			<input type="checkbox"/> Pressure Activated (P.A.P.)

SPF	RODS	Size <u>5/8</u>	Comments
SPF	RODS	Size	#Rods <u>62</u> Poles <u>6'-4"-2'-2'-2'</u>

SPF	MATERIAL DISPOSITION	
SPF	Jts. Tubing left on location	
SPF	Rods left on location	

REMARKS very thin scale on bottom 6 joints long.

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SPF	P3 Seam	@	
SPF	Squire Jim	Yes	No
SPF	TD	@	<u>1708</u>
SPF	PBTD	@	<u>1708</u>
SPF	FIH	@	<u>0</u>
SPF	Bottom Perf	@	<u>?</u>

Signature

10902212 A

WW-4A
Revised 6-07

1) Date: April 26, 2016
2) Operator's Well Number
Lasher 120-141-001
3) API Well No.: 47 - 109 - 02712

STATE OF WEST VIRGINIA
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:	5) (a) Coal Operator
(a) Name <u>Huntington Forestland Fund IV L.P.</u>	Name <u>Riverside Energy Company, LLC</u> ✓
Address <u>The Forestland Group, LLC</u>	Address <u>208 Business Street, Beckley, WV 25801</u>
<u>19045 Stone Mountain Road, Abingdon VA 24210</u>	
(b) Name _____	(b) Coal Owner(s) with Declaration
Address _____	Name <u>Lasher LLC c/o Carl M. Geupel</u> ✓
	Address <u>Four Crescent Street Northampton, MA 01060</u>
(c) Name _____	Name _____
Address _____	Address _____
6) Inspector <u>Brian Ferguson</u>	(c) Coal Lessee with Declaration
Address <u>708 Manor Drive Beckley WV 25801</u>	Name <u>Riverside Energy Company, LLC</u> ✓
Telephone <u>304-560-9205</u>	Address <u>208 Business Street, Beckley, WV 25801</u>

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 reverse 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 this 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 this 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 ARP Mountaineer Production, LLC
 By: Douglas S Byers
 Its: Manager Environmental & Regulatory Affairs
 Address Atlas Resource Partners, LP Park Plaza Corporate Center One
1000 Commerce Drive 4th Floor Pittsburgh, PA 15275
 Telephone 412-489-0311

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Office of Oil and Gas

Subscribed and sworn before me this 16 day of May 2016
Jaimen A. H. Notary Public
My Commission Expires October 2, 2017

JUN 27 2016

WV Department of
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Oil and Gas Privacy Notice

The Office of Oil and Gas processes your personal information, such as name, address and phone number, as a 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 of your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

COMMONWEALTH OF PENNSYLVANIA
 Notarial Seal
 Lauren A. Skiba, Notary Public
 Findlay Twp., Allegheny County
 My Commission Expires Oct. 2, 2017
 PENNSYLVANIA ASSOCIATION OF NOTARIES

WW-9
(2/13)

API Number 47 - 109 - 02212

Operator's Well No. Leslie 125-141-001

109 02212A
BSE

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name ARP Mountaineer Production, LLC OP Code _____
Watershed (HUC 10) Pad Fork Quadrangle Baldysville

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

Will a pit be used? Yes No L.S.

If so, please describe anticipated pit waste: Water and Cement to be collected into a skidded 80 bbl open top tank

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

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 _____)

Will closed loop system be used? If so, describe: _____

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. _____

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

Additives to be used in drilling medium? _____

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

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

-Landfill or offsite name/permit number? _____

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Permittee shall provide written notice to the Office of Oil and Gas of any load of drill cuttings or associated waste rejected at any West Virginia solid waste facility. The notice shall be provided within 24 hours of rejection and the permittee shall also disclose where it was properly disposed.

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 Douglas S. Byers

Company Official (Typed Name) DOUGLAS S. BYERS

Company Official Title MANAGER, Environmental & Regulatory Affairs

Subscribed and sworn before me this 16 day of May, 2016

Lauren A. Skiba Notary Public

My commission expires October 2, 2017

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Lauren A. Skiba, Notary Public
Findlay Twp., Allegheny County
My Commission Expires Oct. 2, 2017
STATE OF PENNSYLVANIA DEPARTMENT OF REVENUE

Operator's Well No. Lasher 120-141-001

ARP Mountaineer Production, LLC

Proposed Revegetation Treatment: Acres Disturbed 0.5 Prevegetation pH 5-6.5

Lime 2 Tons/acre or to correct to pH 6

Fertilizer type 10-20-20 or equivalent

Fertilizer amount 500 lbs/acre

Mulch Hay/Straw Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Tall Fescue or Orchard Grass	40		
Annual Rye Grass	5		

Attach:

Drawing(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided)

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: [Signature]

Comments: _____

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Title: 006 INSPECTION

Date: 6/23/16

Field Reviewed? () Yes (X) No



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Office of Oil and Gas
1356 Hansford Street
Charleston, WV 25301
Phone: (304) 558-6075
Fax: (304) 558-6047

West Virginia Department of Environmental Protection

Bob Wise,
Governor

December 02, 2002

Michael O. Callaghan,
Cabinet Secretary

WELL WORK PERMIT

Coalbed Methane


This permit, API Well Number: 47-10902212, issued to GEOMET OPERATING COMPANY, INC., is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-654-3312 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 of completion of drilling, 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.

This permit will expire in two (2) years from the issue date.

If there are any questions, please feel free to contact me or Mr. Al Blankenship at 304-558-6342.


JAMES MARTIN
Chief,
Office of Oil and Gas

Operator's Well No: 120-141-001

Farm Name: PLUM CRK. TIMBERLANDS

API Well Number: 47-10902212

Permit Type: Coalbed Methane

Date Issued: 12/02/2002

"Promoting A Healthy Environment."



West Virginia
Department of
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Coalbed Methane Review Board
1356 Hansford Street
Charleston, WV 25301
Telephone: 304-558-6076
Fax: 304-558-6047

West Virginia Department of Environmental Protection

Barry K. Lay, Chairman

Bob Wise, Governor

November 7, 2002

Mr. Jeff Keim
Cabot Oil and Gas Corporation
900 Lee Street, East - Suite 1500
Charleston, West Virginia 25301

RE: Coalbed Methane Permit Applications
GeoMet Operating Company, Inc.
Lasher 120-141-001 & 122-145-002

Dear Mr. Keim:

In regards to your letter dated November 1, 2002, the Coalbed Methane Review Board does not have authority to deny issuance of the above referenced permit applications. The Board does however, have jurisdiction over pooling matters as provided in §22-21-15. If you wish to request a hearing for the establishment of a drilling unit, you must submit your request prior to November 15, 2002.

Sincerely,

Barry K. Lay
Chairman

cc: Al Blankenship, OOG/Permitting
Gene Smith, OOG/Permitting
✓Richard Gottlieb

"To use all available resources to protect and restore West Virginia's environment in concert with the needs of present and future generations."



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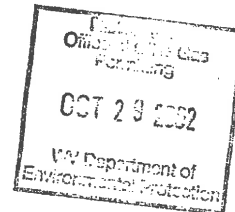
Attachment (a)
Form WW-5A
120-141-001

COALBED METHANE OWNERS

* Lasher LLC 98.5%

* Erik A. Geupel Irrevocable Trust 0.75%
c/o Erik A. Geupel
38 Cornmill Lane
Tutbury Burgon upon Trent
Staffordshire DE 1398A
Untied Kingdom, England

* John S. Geupel 0.75%
8101 E. Paint Pony Drive
Carefree, AZ 85377



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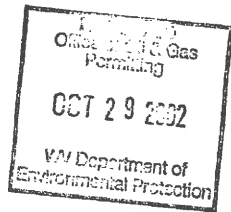
WV Department of
Environmental Protection

109-022120

Attachment (d)
Form WW-5A
120-141-001

NATURAL GAS OWNERS

- * John A. Jenkins ✓
10692 East Honey Mesquite Drive
Scottsdale, AZ 85262
- * Thomas A. Kemp ✓
220 Refugee Road
Columbus, OH 43207
- * Donald A. Davies ✓
1349 Clubview Blvd. North
Columbus, OH 43235
- * Richard A. Roloff ✓
c/o Roloff Development Company
7520 Forsyth Blvd.
Clayton, MO 63105
- * Ann M. Geupel, Carl M. Geupel II, and Brian Fields ✓
Trustees of The John C. Geupel Trust
c/o Ann M. Geupel
385 Beacon Street
Boston, MA 02116
- * John S. Geupel ✓
8101 E. Paint Pony Drive
Carefree, AZ 85377
- * Carl M. Geupel ✓
4 Crescent Street
North Hampton, MA 01060-2115
- * Geoffrey R. Geupel ✓
580 Evergreen Road
P.O. Box 207
Bolanis, CA 94924



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Cont.

- * David F. Williams ✓
The W.W Williams Co.
835 West Goodale Blvd.
Columbus, OH 43212

- * Samuel V. King, Trustee for ✓
Cynthia Carol King, Connie Lea King
and Christine Camyel King
2621 Kanawha Terrace
St. Albans, WV 25177

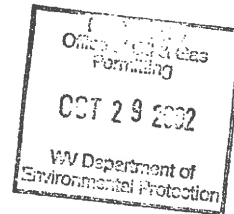
- * Samuel V. King, Trustee of ✓
Carney Clemon King Jr.
2621 Kanawha Terrace
St. Albans, WV 25177

- * Gay Nell King ✓
P.O. Box 4253
Ormond Beach, FL 32175-4253

- * Cynthia Carol King ✓
P.O. Box 4253
Ormond Beach, FL 32175-4253

- * Rosslyn Carol Brown ✓
c/o Carol R. Brown
6 Birchtree Lane
Charleston, WV 25314

- * James V. Brown II ✓
c/o Carol R. Brown
6 Birchtree Lane
Charleston, WV 25314



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Cont.

- * Carrie Laurel Brown ✓
c/o Carol R. Brown
6 Birchtree Lane
Charleston, WV 25314

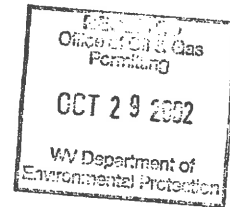
- * J.C. & Jane McCorkle ✓
c/o McCorkle Properties, Inc.
1343 10th Avenue
P.O. 1103
Huntington, WV 25713

- * Pat Kelly ✓
1 Ocean West Blvd.
Daytona Beach, FL 32118

- * Victoria B. Hunt ✓
2874 Granny Grump Circle
Loris, SC 29569

- * Erik A. Geupel Irrevocable Trust
c/o Erik A. Geupel ✓
38 Tutbury Burgon upon Trent
Staffordshire DE 1398A
United Kingdom, England

- * Patrica Jenkins ✓
1188 Kenbrooke Hills Drive
Columbus, OH 43220



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1) Date: September 30, 2002
2) Operator's well number:
Lasher 120-141-001
3) API Well No: 47-~~047~~-109-022120
State County Permit

STATE OF WEST VIRGINIA - BUREAU OF ENVIRONMENT
DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

NOTICE AND APPLICATION FOR A COALBED METHANE WELL PERMIT

4) Surface Owner(s):
(a) Name Plum Creek Timberlands, L.P. ✓
Address 100 Peachtree Street, NW
Suite 2650, Atlanta, GA 30303

(b) Name _____
Address _____

(c) Name _____
Address _____

5) Other Parties Noticed:
(a) Coal Owner(s): CWE
Name Lasher LLC c/o John A. Jenkins W
Address 10696 East Honey Mesquite Dr
Scottsdale, AZ 85262

Name Lasher LLC c/o Carl M. Geupel W
Address Four Crescent Street W
North Hampton, MA 01060

* See Attachment
(b) Coal Lessee(s):
Name National Mines ✓
Address P.O. Box 12022
Lexington, KY 40579

Name Dayton Resources Company ✓
Address P.O. Box 1392
Pineville, WV 24874

(c) Coal Operator(s):
Name _____
Address _____

Name _____
Address _____

(d) Natural Gas Owner(s):
Name ** See Attachment
Address _____

Name _____
Address _____

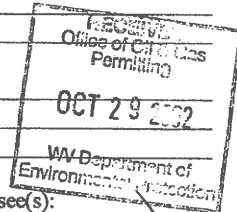
(e) Natural Gas Lessee(s):
Name Cabot Oil and Gas Corp. ✓
Address 900 Lee Street East
Suite 1500, Charleston, WV 25301

Name _____
Address _____

(f) Natural Gas Operator(s):
Name Cabot Oil and Gas Corp. ✓
Address 900 Lee Street East
Suite 1500, Charleston, WV 25301

Name _____
Address _____

6) Inspector Ronald Scott
Address 150 Prospect Street
Spencer, WV 25276
Telephone 304-389-7581



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STATE OF WEST VIRGINIA
DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
COALBED METHANE PERMIT APPLICATION

109-022120

5 228

- 1) Well Operator: GeoMet Operating Company Inc. 2) Well Name Lasher 120-141-001
- 3) Operator's Well Number Lasher 120-141-001 4) Elevation 1788'
- 5) Well Type: (a) Oil _____ / or Gas _____ /
 (b) If Gas: Production _____ / Underground Storage _____ / CBM X /
 Deep _____ / Shallow _____ /
- 6) Proposed Target Formation(s): New River and Pocahontas Coals (Beckley, Firecreek and Pocahontas Coal Zones)
- 7) Proposed Total Depth: 1748 Feet
- 8) Approximate Fresh Water Strata Depths: Unknown
- 9) Approximate Salt Water Depths: Unknown
- 10) Approximate Coal Seam Depths: *
 * Exact depths and correlation of target coals will be established by geophysical logging.
- 11) Does Land Contain Coal Seams Tributary to Active Mines? Yes _____ / No X /
- 12) (a) Proposed Well Work: Drill, Stimulate and Complete
 (b) If Stimulation Proposed, Describe Means to be Used to Stimulate Well: Nitrogen foam frac and sand
- 13) (a) Does the proposed operation plan to convert an existing well (as defined in W. Va. Code § 22-6-1) or a vertical ventilation hole to a coalbed methane well? Yes _____ / No X /
 (b) If yes, please attach to this Application a list of all formations from which production is anticipated and a description of any plans to plug any portion of the well.
- 14) (a) Will the proposed coalbed methane well be completed in some but not all coal seams for production (except for a gob well or vent hole proposed to be converted to a well)? Yes X / No _____ /
 (b) If yes, please attach to this Application a plan and design for the well which will protect all workable coal seams which will be penetrated by the well. (See casing plan)
- 15) (a) Does the proposed operation include horizontal drilling of a well commenced on the surface? Yes _____ / No X /
 (b) If yes, please attach to this Application a description of such operations, including both the vertical and horizontal alignment and extent of the well from the surface to total depth.

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CASING AND TUBING PROGRAM

TYPE	SPECIFICATIONS		FOOTAGE INTERVALS			CEMENT
	Size	Grade	Weight per ft.	For Drilling	Left in Well	Fill-up (sks)
Conductor	13 3/8			30	30	
Fresh Water	8 5/8	J-55	23	310	310	* 108
Coal						
Intermediate						
Production	5 1/2	J-55	15.5	1748	1748	* 335
Tubing	2 3/8	J-55	6.5	1648	1648	
Liners						

DS
11-4-02

PACKERS:

* Cement to surface

Office of Oil & Gas Permitting
NOV 18 2002
WV Department of Environmental Protection

For Office of Oil and Gas Use Only

- Fee(s) paid
 Well Work Permit
 Reclamation Fund
 WPCP
 Plat
 WW-9
 WW-5B
 Bond _____
 Agent
 (Type)

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OPERATOR WE NO. Lasher 120-141-001
PERMIT NO. 109-02220

LEGEND

Well Site	*
Straw Bales	□
Silt Fence	—□—□—
Brush Barrier	⊖⊖⊖⊖⊖⊖⊖⊖
Ground Slope	~
Tree Line	~
Cross Drain	↘
Proposed Culvert	▨
Drilling Pit	▭
Pit Waste Application Area	⊖⊖⊖⊖⊖
Utility Pole	∅

Road Ditch	---
Stream	---
Natural Drain Way	---
Proposed Road	====
Existing Road	====
Ridge Line or Point
Rock Outcrop	⌒
House or Other Structure	■
Water Well	⊙
Spring	⊖
Wet Spot	⊕

Proposed Revegetation Treatment: Acres Disturbed 0.70 Prevegetation pH Approx. 5.0-6.5
 Lime 3-4 ~~20~~ Tons/acre or to correct to pH 6.5
 Fertilizer (10-20-20 or equivalent) 500 lbs/acre (500lbs minimum)
 Mulch Paper Hydrossed Mulch @ 1000 lb./acre. Hay/Straw @ 2 Tons/acre
 Hydroseeding Paper Mulch _____

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Marketing
NOV 18 2002
Tons/acre
WV Department of
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Seed Mixtures		New Access Road	
Location	Seed Type	Seed Type	lbs/acre
	Tall Fescue	Tall Fescue	40
	Alsike or White Dutch Clover	Alsike or White Dutch Clover	5
	Tonga Perennial Ryegrass	Tonga Perennial Ryegrass	24
	Annual Ryegrass	Annual Ryegrass	14
	Redclover-Alta Swede	Redclover-Alta Swede	10

Attach:
Drawing(s) of road, location, pit and proposed area for land application.
Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: Ronald Scott
 Title: inspector Date: 11-4-02
 Field Reviewed? () Yes () No

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State of West Virginia
Department of Environmental Protection
Office of Oil and Gas

Well Operator's Report of Well Work

FARM NAME: Plum Creek Timberlands, L.P. OPERATOR WELL NO.: LASHER 001

LOCATION:

Elevation: 1,788.25' Quadrangle: Baileysville

District: Huff Creek County: Wyoming
Latitude: 7.488 Feet South of 37 Deg. 32 Min. 30 Sec.
Longitude: 13,455 Feet West of 81 Deg. 40 Min. 00 Sec.

Company: <u>GeoMet Operating Company</u>	Casing & Tubing	Used in Drilling	Left in Well	Cement fill up Cu. Ft.
Address: <u>5336 Stadium Trace Parkway, Suite 206 Birmingham, Alabama 35244</u>	<u>13-3/8"</u>	<u>18.65'</u>	<u>18.65'</u>	
Agent: <u>Gregg Cleary</u>				
Inspector: <u>Ronnie Scott</u>	<u>8-5/8"</u>	<u>331'</u>	<u>331'</u>	<u>137/Pumped 204</u>
Date Permit Issued: <u>December 12, 2002</u>				
Date Well Work Commenced: <u>December 30, 2002</u>	<u>5-1/2"</u>	<u>1709.45'</u>	<u>1709.45'</u>	<u>296/Pumped 358</u>
Date Well Work Completed: <u>April 17, 2003</u>				
Verbal Plugging:				
Date Permission granted on:				
Rotary <u>XXXX</u> Cable <u> </u> Rig <u> </u>				
Total Depth (feet): <u>1710'</u>				
Fresh Water Depth (feet): <u>Unknown</u>				
Salt Water Depth (feet): <u>Unknown</u>				
Is coal being mined in area (N/Y)? <u>No</u>				

Coal Depths (feet): 326, 327, 328, 330, 331, 348, 361, 363, 650, 651, 746, 747, 785, 786, 899, 948, 988, 989, 1023, 1294, 1389, 1390, 1393, 1395, 1443, 1444, 1508, 1509

OPEN FLOW DATA

Producing formation All Zones Commingled Pay zone depth (ft) _____
Gas: Initial Open Flow N/A MCF/d Oil: Initial Open Flow _____ Bbl/d
Final Open Flow N/A MCF/d Final Open Flow _____ Bbl/d
Time of Open Flow between initial and final tests N/A Hours
Static Rock Pressure 18 psig (surface pressure) after 96 Hours

NOTE: ON BACK OF THIS FORM PUT THE FOLLOWING: 1). DETAILS OF PERFORATED INTERVALS, FRACTURING OR STIMULATING, PHYSICAL CHANGE, ETC. 2). THE WELL LOG WHICH IS A SYSTEMATIC DETAILED GEOLOGICAL RECORD OF ALL FORMATIONS, INCLUDING COAL ENCOUNTERED BY THE WELLBORE.

SIGNED: _____

BY: Aundrea Smith

DATE: Sept. 2, 2003

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**GeoMet Operating Company, Inc.
Perforation and Frac Volume Specification**

Well Name LASHER 001 PBTB 1710'

Zone and Perforation Table

Frac			Ball Out	Bridge Plug Set @	Est Sand Weight	Actual Sand Weight
Stage 1 Interval	1508	1511				
N2 Scf	315,000					18,000
Acid	250	15%				
Gel Volume	10,800	GAL				
ISIP	1833					
ATP	3775					
AIR	3955	BPM				
Stage 2 Interval	1388	1392			30,000	32,000
N2 Scf	370,000					
Acid	200	15%		1430'		
Gel Volume	10500	GAL		Before Frac		
ISIP	1402			Frac Balls on Plug		
ATP	3560			1150'		
AIR	18	BPM				
Stage 3 Interval	1021	1024			20,000	18,000
N2 Scf	184,000					
Acid	200	15%				
Gel Volume	6500	GAL		No Plug		
ISIP	2422					
ATP	2650					
AIR	22	BPM				
Stage 4 Interval	987	990			22,000	13,000
N2 Scf	224,000					
Acid	200	15%				
Gel Volume	7,000			No Plug		
ISIP	2240					
ATP	3480					
AIR	20	BPM				
Stage 5 Interval	898	901			18,000	20,000
N2 Scf	231,000					
Acid	450	15%				
Gel Volume	6,500	GAL		947' - 950'		
ISIP	1290			Ball Out		
ATP	2920			30 Balls On Plug		
AIR	20	BPM		840'		

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Well Name LASHER 001

PBTD 1710'

Zone and Perforation Table

Stage Interval	745	748	Ball Out yes	Bridge Plug Set @	Est Sand Weight	Actual Sand Weight
Stage 6 Interval						
N2 Scf	211,000		784' - 787' Ball Out	700'	18,000	20,000
Acid	450	15%				
Gel Volume	6,300	GAL				
ISIP	1028					
ATP	2690					
AIR	25	BPM				
Stage 7 Interval	650	653			24,000	26,000
N2 Scf	144,000		No Plug			
Acid	200	15%				
Gel Volume	6,800	GAL				
ISIP	839					
ATP	1820					
AIR	25 BPM					
Stage 8 Interval						
N2 Scf						
Acid						
Gel Volume						
ISIP						
ATP						
AIR						
Stage 9 Interval						
N2 Scf						
Acid						
Gel Volume						
ISIP						
ATP						
AIR						
Stage 10 Interval						
N2 Scf						
Acid						
Gel Volume						
ISIP						
ATP						
AIR						

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DRILL DATA HOLE - NOAH HORN WELL DRILLING, INC.

COMPANY: GEOMET OPERATING CO. HOLE NO.: LASHER 001

LOCATION: PAD FORK DRILL: RIG # 23

DATE STARTED: 12-30-2002 DATE COMPLETED: 01-09-2003

DEPTH		THICKNESS	STRATA	REMARKS
FROM	TO	FT.	DESCRIPTION	VOIDS, ETC
0.00	5.00	5.00	OVERBURDEN	
5.00	19.00	14.00	SANDY SHALE / SAND	
19.00	30.00	11.00	SANDSTONE	18.65' W/ 13 3/8" CASING
30.00	61.00	31.00	SAND / COAL STR / SANDY SHALE	
61.00	92.00	31.00	SANDY SHALE / SAND / COAL STR	
92.00	123.00	31.00	SAND / SANDY SHALE / SAND	
123.00	154.00	31.00	SANDSTONE	
154.00	185.00	31.00	SAND / SANDY SHALE / SAND	
185.00	215.00	30.00	SAND / COAL STR / SANDY SHALE	
215.00	245.00	30.00	SANDY SHALE / SAND	
245.00	275.00	30.00	SAND / SANDY SHALE	
275.00	305.00	30.00	SANDY SHALE	
305.00	335.00	30.00	SANDY SHALE / SAND	
335.00	345.00	10.00	SANDSTONE	331' W/ 8 5/8" CASING
345.00	365.00	20.00	SAND / SANDY SHALE / COAL STR	
365.00	395.00	30.00	SAND / SANDY SHALE	
395.00	425.00	30.00	SANDY SHALE / SAND STR	
425.00	455.00	30.00	SAND / SANDY SHALE	
455.00	485.00	30.00	SAND / COAL STR / SANDY SHALE	
485.00	515.00	30.00	SANDY SHALE	
515.00	545.00	30.00	SANDY SHALE / SAND / SANDY SHALE	
545.00	575.00	30.00	SANDY SHALE / SAND STR	
575.00	605.00	30.00	SANDY SHALE / SAND	
605.00	635.00	30.00	SAND / SANDY SHALE	
635.00	665.00	30.00	SANDY SHALE / COAL / SAND	
665.00	695.00	30.00	SAND / SANDY SHALE STR	
695.00	725.00	30.00	SAND / SANDY SHALE / SAND	
725.00	755.00	30.00	SAND / COAL STR / SANDY SHALE	
755.00	785.00	30.00	SANDY SHALE / SAND	
785.00	815.00	30.00	SAND / SANDY SHALE STR	
815.00	875.00	60.00	SANDY SHALE	
875.00	905.00	30.00	SANDY SHALE / COAL STR / SANDY SHALE	
905.00	935.00	30.00	SANDY SHALE / SAND	
935.00	965.00	30.00	SAND STR / COAL STR / SANDY SHALE	
965.00	995.00	30.00	SANDY SHALE / COAL STR / SANDY SHALE	
995.00	1025.00	30.00	SAND STR / SANDY SHALE / COAL	
1025.00	1055.00	30.00	SANDY SHALE / SAND STR / SANDY SHALE	
1055.00	1145.00	90.00	SAND / SANDY SHALE / SAND	
1145.00	1170.00	25.00	SAND / SANDY SHALE	
1170.00	1200.00	30.00	HARD SAND	
1200.00	1230.00	30.00	HARD SANDSTONE	

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PAGE 2
 GEOMET OPERATING CO
 LASHER 001

FROM	TO	FT.	DESCRIPTION
1230.00	1290.00	60.00	SAND / SANDY SHALE / COAL
1290.00	1320.00	30.00	SAND / SANDY SHALE / SAND
1320.00	1350.00	30.00	SANDY SHALE / SAND / SANDY SHALE
1350.00	1380.00	30.00	SAND / SANDY SHALE STR
1380.00	1410.00	30.00	COAL / SAND / SANDY SHALE / SAND
1410.00	1440.00	30.00	SAND / SANDY SHALE / COAL
1440.00	1470.00	30.00	SANDY SHALE / SAND
1470.00	1500.00	30.00	HARD SAND / SHALE STR
1500.00	1530.00	30.00	SANDY SHALE / SHALE
1530.00	1560.00	30.00	SHALE / HARD SAND / SHALE STR
1560.00	1590.00	30.00	SAND / SHALE STR
1590.00	1620.00	30.00	SAND / SANDY SHALE
1620.00	1650.00	30.00	SAND STR / SANDY SHALE / SHALE
1650.00	1680.00	30.00	SHALE / SANDY SHALE / SAND STR
1680.00	1710.00	30.00	SAND / SANDY SHALE / SHALE / SAND
1710.00	1740.00	30.00	1709.45' W/ 5 1/2" CASING
1740.00	1750.00	10.00	SAND / SANDY SHALE / POSS. SHALE SHALE OR SANDY SHALE

1750.00 FT. TOTAL DEPTH
 18.65 FT. OF 13 3/8" CASING
 331.00 FT. OF 8 5/8" CASING
 1709.45 FT. OF 5 1/2" CASING

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WELL PROFILE



Well Number Lasher #1

Date of Job 12-11-07 Reason for Job (e.g. completion, stuck pump) Work-over

Conditions Found (e.g. coal fines on standing valve)

Rig Number and Operator L+D Rig #4 Anthony Thomas

CASING DETAIL

Surface Casing Jts. OD #ft Grade - Set @
Intermediate Casing Jts. OD #ft Grade - Set @
Production Casing Jts. 5 1/2 OD #ft Grade - Set @
Fiberglass Jt.
Baffles @

PERFORATION DETAIL (From Bottom Up)

Open Hole Section
@ SPF TUBING DETAIL Size 2 3/8 Thread 8rd
@ SPF Subs
@ SPF 50 Joints 1573.90
@ SPF 1 Barrel SV .85
@ SPF 1 Tail Joint 31.80
@ SPF Total

@ SPF EOT @ 1606.55
@ SPF Pump Intake @

@ SPF PUMP DESCRIPTION
@ SPF 30 Ring 1 1/2" insert Split Ring
@ SPF 60 Ring 1 25/32" Flanged Ring
@ SPF Stainless Steel Carbon Steel Pressure Activated (P.A.P.)

@ SPF RODS Size 5/8 #Rods 62 Ponies 6'-4"-2'-2'-2'
@ SPF RODS Size #Rods Ponies

@ SPF MATERIAL DISPOSITION
@ SPF Jts. Tubing left on location
@ SPF Rods left on location

@ SPF REMARKS very thin scale on bottom 6 joints long.
@ SPF
@ SPF
@ SPF
@ SPF
@ SPF
@ SPF
@ SPF

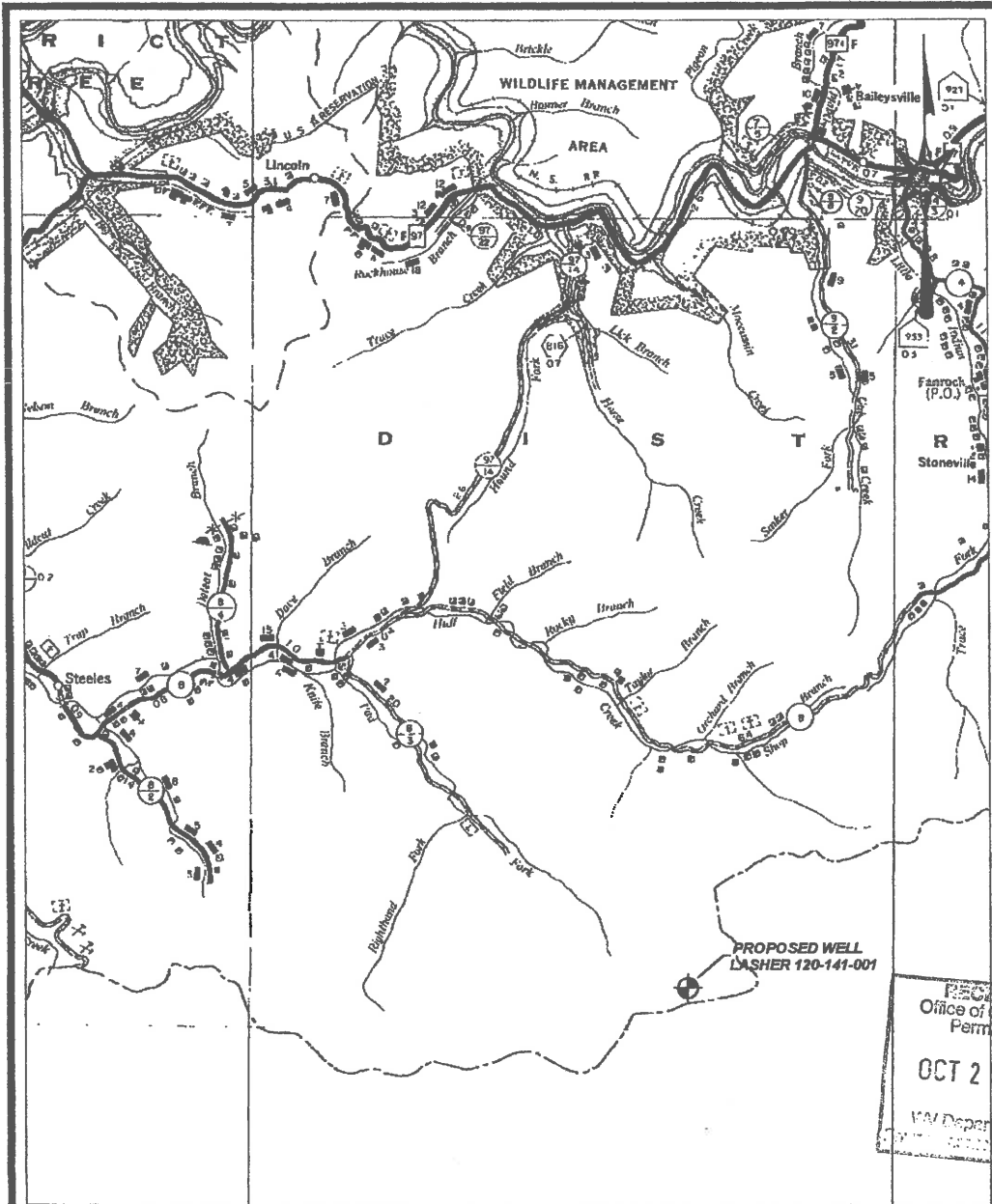
@ SPF P3 Seam @
@ SPF Squire Jim Yes No
@ SPF TD @ 1708
@ SPF PBTD @ 1708
@ SPF Fill @ 0'
@ SPF Bottom Perf @ ? 1508' - 1511' Signature

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TEE Engineering Company, Inc.

320 Cutters Hill Court
 Lexington, KY 40509
 (859) 263-5350
 Fax (859) 263-5345



P.O. Box 219
 Starville, KY 41659
 (606) 478-9024
 Fax (606) 478-9019

GeoMet Operating Company, Inc.
 Well No. Lasher 120-141-001

LOCATION MAP

WYOMING COUNTY HIGHWAY MAP
 LASHER/120-141-001

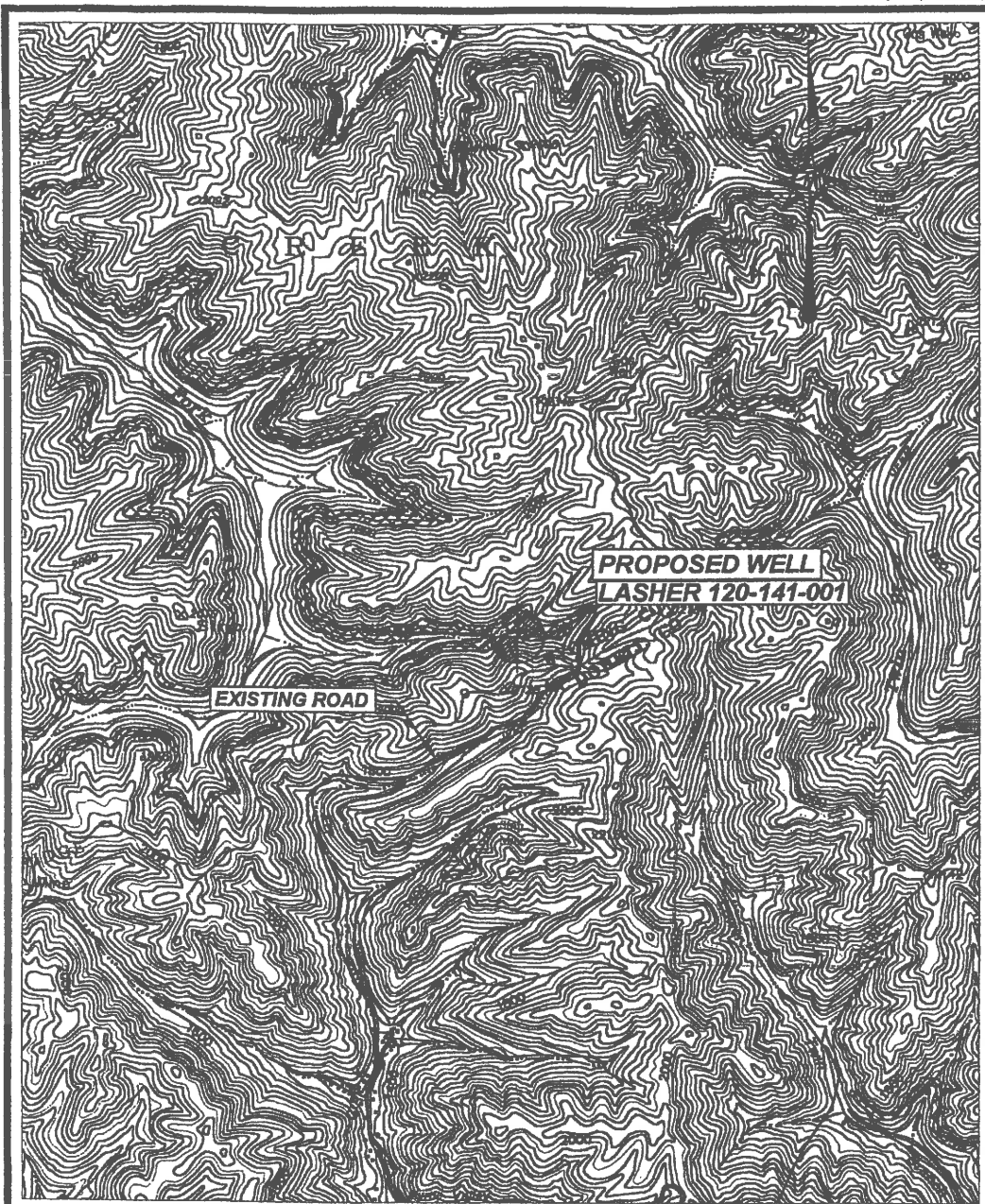
SCALE: 1" = 1 MILE
 DRAWN BY: RDF

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109-02220



TEE Engineering Company, Inc.

320 Cutters Hill Court
Lexington, KY 40509
(859) 263-5350
Fax (859) 263-5345



P.O. Box 219
Staeville, KY 41659
(606) 478-9024
Fax (606) 478-9019

GeoMet Operating Company, Inc.

Well No. Lasher 120-141-001

LOCATION MAP

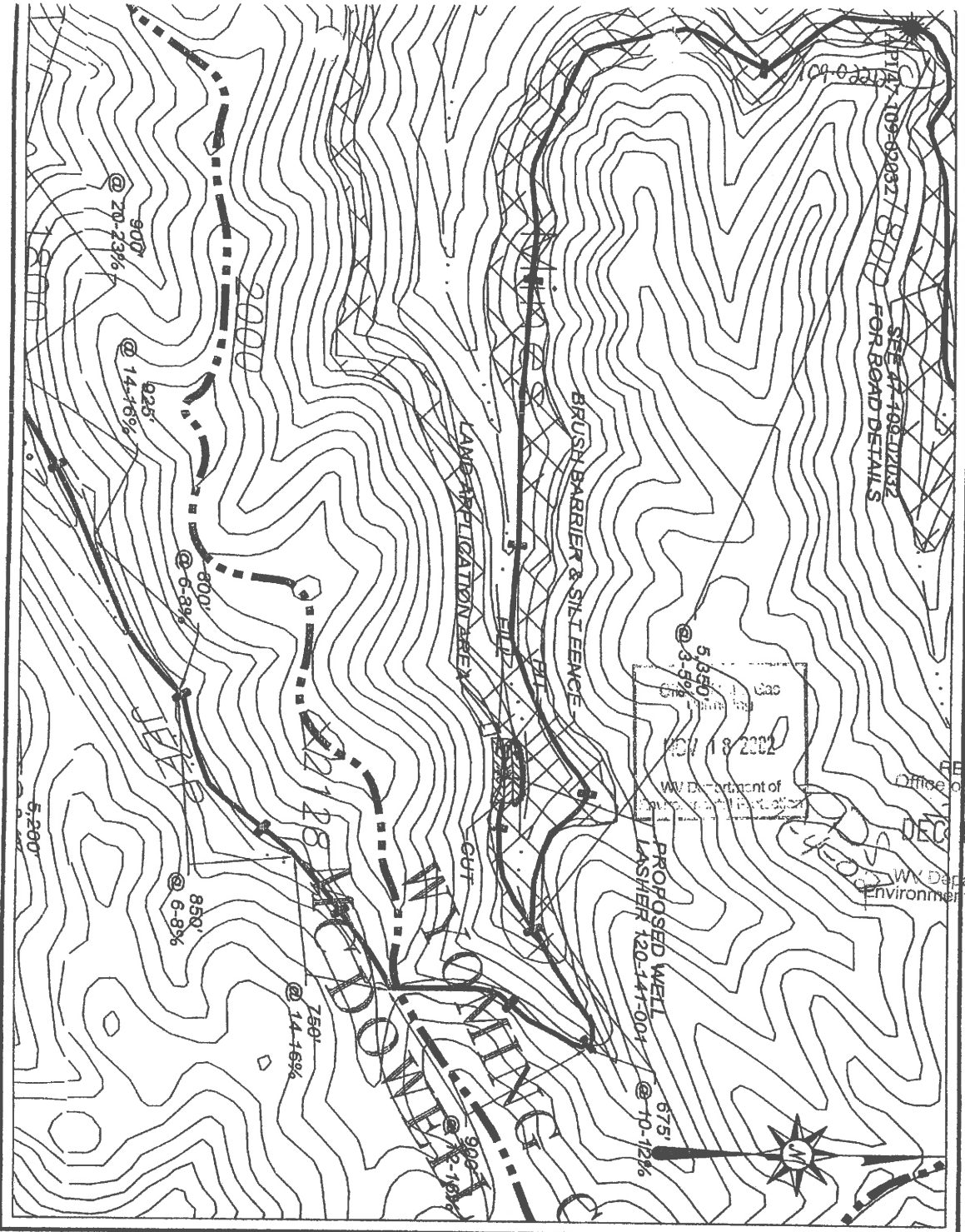
BAILEYSVILLE QUADRANGLE
LASHER/8001 TOPO LOC

SCALE: 1" = 200'
DRAWN BY: RDP

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DRAWING LEGEND

- STRAW BALS
- SILT FENCE
- BRUSH BARRIER
- TREE LINE
- CROSS DRAIN
- PROPOSED CULVERT
- DRILLING PIT
- PIT WASTE AREA
- WELL SPOT
- WELL SITE
- HOUSE OR OTHER STRUCTURE
- ROAD DITCH
- STREAM
- NATURAL DRAINWAY
- EXISTING ROAD
- ROCK OUTCROP
- SPRING
- WATER WELL
- UTILITY POLE

GENERAL NOTES

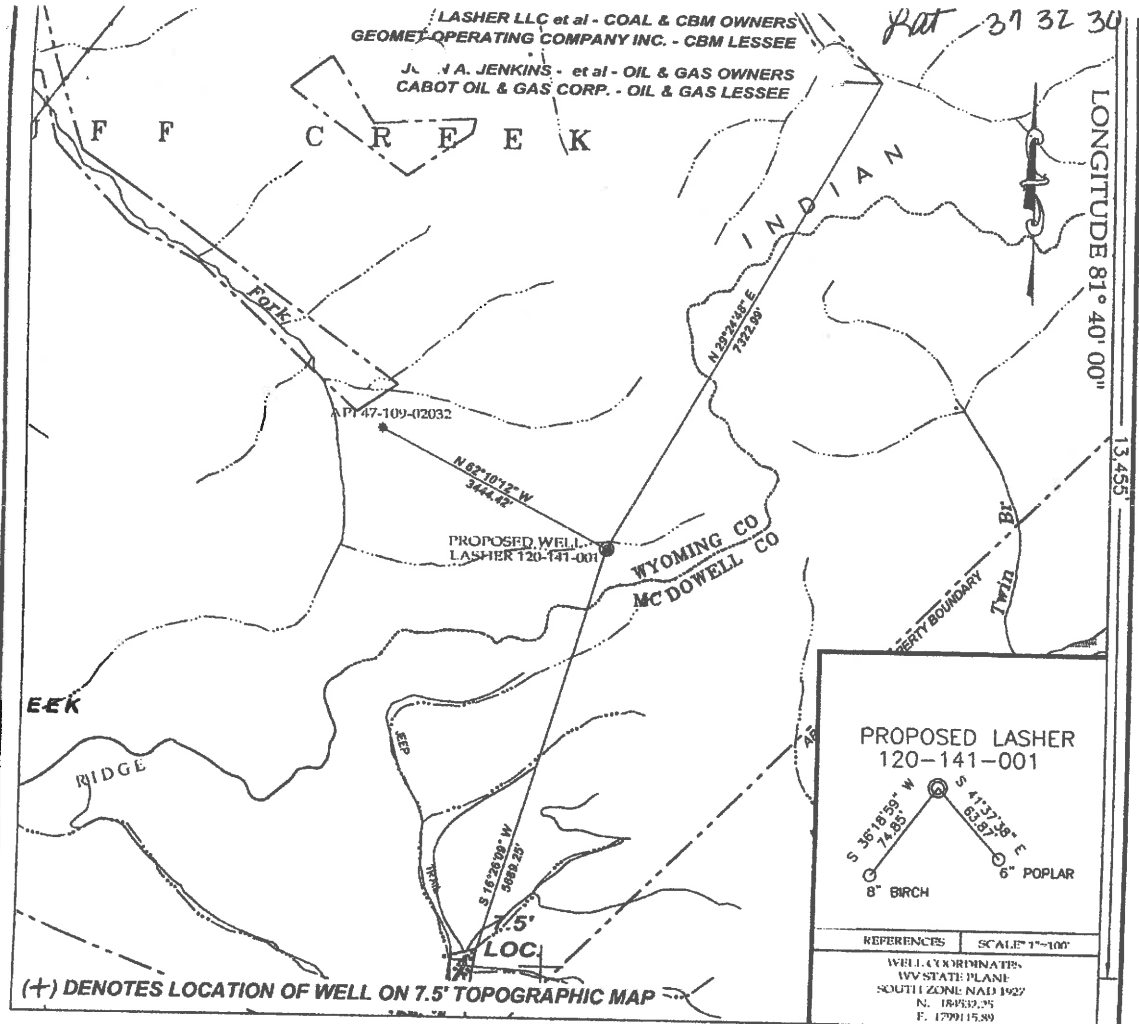
1. This drawing is a schematic representation of the proposed well site and access road. Structures such as the drilling pit, roadways, culverts, sediment barriers, etc., are shown in their approximate programming of these structures may vary slightly from the location shown on this drawing.
2. All culverts shown on this plan are proposed and will be a minimum of 18" in diameter unless otherwise designated.
3. Brush and/or timber removed by clearing and grubbing activities will be cut up and whittowed below the envelope of construction areas.
4. Ditch lines and culverts will be installed whenever practical, however portions of the existing/proposed roads, which are located in soil rock conditions, shall not require ditches or cross drains, unless warranted by field conditions.
5. Supplemental debris and/or sediment control measures in addition to those shown on this plan will be installed as deemed necessary and as necessary. The additional measures may consist of straw bales, silt fences, or other measures as outlined in the Erosion & Sediment Control Field Manual.
6. A sediment barrier of either brush, straw, bales or filter fence will be maintained below the outfall of all proposed culverts and at all other storm water discharge points from either the roadway or the location.
7. A stabilized construction entrance consisting of 8" of crushed stone will be installed for a distance of 50' from the ingress and egress points from all public highways.
8. Cross drains or waterbars will be installed as an integral part of the road construction process and shall be graded consistent with the Erosion & Sediment Control Field Manual.
9. Existing gas lines or other utility lines, within construction area, will be accurately located and identified prior to construction of construction.
10. Temporary road and mulch all cuts & slopes upon construction.

THE Engineering Company, Inc.

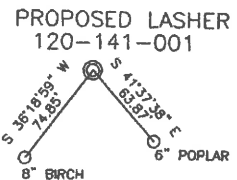
1200 Center Hill Road
PO Box 40000
Salt Lake City, UT 84140
(801) 263-3300
Fax: (801) 263-3340

GHEOMET OPERATING COMPANY, INC.
WELL NO. LASHER 120-141-001

CONSTRUCTION & RECLAMATION SITE PLAN
SITUATED ON PAD FORK
IN HUFF CREEK DISTRICT OF
WYOMING COUNTY, W. VA.
BAILEYVILLE - QUADRANGLE
SCALE 1" = 500'
LASHER/001 188C
DRAWN BY: RDB



(+) DENOTES LOCATION OF WELL ON 7.5' TOPOGRAPHIC MAP



REFERENCES SCALE: 1"=100'

WELL COORDINATES
WV STATE PLANE
SOUTH ZONE NAD 1927
N. 18453.35
E. 179115.89

TEE Engineering Company, Inc.

1301 Coopers Hill Court
Lexington, KY 40509
502.261.5160
Fax: 502.261.5345



P.O. Box 299
Savannah, KY 40369
606.478.9124
Fax: 606.478.9019

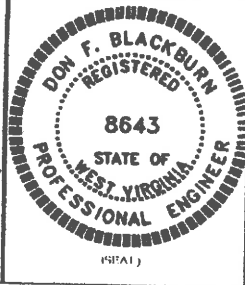
GeoMet Operating Company, Inc.
Well No. Lasher 120-141-001

FILE NO. _____
DRAWING NO. WELL 001 PLAT
SCALE: 1" = 2,000'
MIN. DEGREE OF ACCURACY 1:2,500
PROVEN SOURCE OF ELEVATION
GPS STATION AC-69 (ELEV. 1,083.36')

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 MINES.

Don F. Blackburn
(SIGNATURE)

R.P.E. 8643 R.P.S. _____



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

DATE OCTOBER 1, 2002
OPERATOR'S WELL NO. LASHER 120-141-001
API WELL NO. 47 - 109 - 02212
STAT. COUNTY PERMIT

WELL TYPE: OIL _____ GAS CBM _____ LIQUID INJECTION _____ WASTE DISPOSAL _____
(IF "GAS") PRODUCTION STORAGE _____ DEEP _____ SHALLOW _____
LOCATION: ELEVATION 1,788.25' WATERSHED PAD FORK OF LITTLE HUFF CREEK
DISTRICT HUFF CREEK COUNTY WYOMING
QUADRANGLE: BAILEYSVILLE

SURFACE OWNER PLUM CREEK TIMBERLANDS LP ACREAGE: _____
CBM ROYALTY OWNER LASHER, LLC et al LEASE ACREAGE 16,548.2
LEASE NO. RECORDING IN PROGRESS

PROPOSED WORK: DRILL CONVERT _____ DRILL DEEPER _____ REFRILL _____ FRACTURE OR
STIMULATE PLUG OFF OLD FORMATION _____ REPERATE NEW
FORMATION _____ OTHER PHYSICAL CHANGE IN WELL (SPECIFY) _____

PLUG AND ABANDON _____ CLEAN OUT AND REPLUG _____

TARGET FORMATION NEW RIVER & POCAHONTAS COALS ESTIMATED DEPTH 1,748'
WELL OPERATOR GEOMET OPERATING COMPANY, INC. DESIGNATED AGENT GREGG CLEARY
ADDRESS 5336 STADIUM TRACE PARKWAY SUITE 3206 BIRMINGHAM, ALABAMA 35244
ADDRESS 1105 HEATHERWOOD ROAD BLUEFIELD, WV 24701

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Appendix D
Public Service District Affidavit

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APPENDIX D

Public Service District Affidavit

Underground Injection Control Permit applicants must identify all publically recorded drinking water sources within a one (1) mile radius of the proposed injection well facility. If no drinking water sources are present within this radius a written affidavit shall be supplied by the local Public Service District (PSD) as ample verification.

"I certify under penalty of law that (state name of business)

ARP Mountaineer Production, LLC

has verified with the public service district (state name of PSD)

Wyoming County PSD

that there are no such publically recorded sources.

[Handwritten Signature]

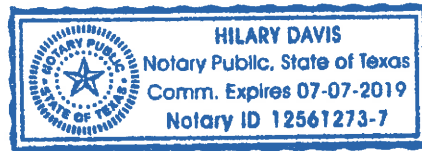
(Signature of Authorized Representative)

Sworn and subscribed to before me this 19th day of April, 2018.

Hilary Davis, my commission expires 7/2/19

(Notary Signature)

Hilary Davis



Jacob Rhudy

From: Cox, Fred W <Fred.W.Cox@wv.gov>
Sent: Monday, November 27, 2017 3:43 PM
To: Jacob Rhudy
Subject: RE: Atlas/Titan Energy Disposal well near Davy, WV

Mr. Rhudy,

A review of the Wyoming County Health Department's water well logs for the period 2014-2017 does not show any new wells drilled in that area of the County. I hope this information will be helpful. Thank you

W. Fred Cox, RS,REHS
Administrator
Wyoming County Health Department
P.O. Box 1679
Pineville, WV 24874
(304) 732-7941 telephone
(304) 732-6709 fax
fred.w.cox@wv.gov

From: Jacob Rhudy [mailto:jl@e2cofvirginia.com]
Sent: Monday, November 27, 2017 7:20 AM
To: Cox, Fred W
Subject: Atlas/Titan Energy Disposal well near Davy, WV

Hello Mr. Cox,

We are working on renewing a UIC permit for Atlas/Titan Energy and I need some assistance regarding any records you may have regarding waterwells within a mile of this disposal well. The disposal well has been permitted since 2003 and is being renewed. No water wells have been historically identified and it appears that no new residences have been added but I need to confirm this is still correct or at least no new water well permits have been added. I have attached a map that show the location of this well.

The well is northeast of Roderfield and Davy—not too far from the McDowell County line in Wyoming County. Your help is much appreciated!!!

Kind regards,
JL Rhudy
Envirocheck of Va, Inc
276-322-1323 office
276-701-3093 cell

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Appendix E
Water Sources

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APPENDIX E

Water Sources

Operator: ARP Mountaineer Production, LLC Year 2017 UIC Permit # UIC2D1092032

Water Source Name	Source # 1	Source # 2	Source #	Source #
Nothing	Spring 4151769.28	Spring 4151593.02		
Easting	437737.73	437520.35		
Parameter	Units			
TPH - GRO	mg/L ND	ND		
TPH - DRO	mg/L ND	ND		
TPH - ORO	mg/L ND	ND		
BTEX	mg/L ND	ND		
Chloride	mg/L 18.04	6.68		
Sodium	mg/L NA	NA		
Total Dissolved Solids (TDS)	mg/L 328	188		
Aluminum	mg/L ND	ND		
Arsenic	mg/L ND	ND		
Barium	mg/L 0.0831	0.0632		
Iron	mg/L ND	0.319		
Manganese	mg/L 0.0131	0.0338		
pH	SU 6.82	7.25		
Calcium	mg/L NA	NA		
Sulfate	mg/L NA	NA		
MBAS	mg/L ND	ND		
Dissolved Methane	mg/L NA	NA		
Dissolved Ethane	mg/L NA	NA		
Dissolved Butane	mg/L NA	NA		
Dissolved Propane	mg/L NA	NA		
Bacteria (Total Coliform)	c/100m L 1550	2420		

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Laboratory Results

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October 17, 2017

EnviroCheck of Va., Inc

Sample Delivery Group: L941689
Samples Received: 10/06/2017
Project Number:
Description: ARP Titan
Site: BECKLEY, WV
Report To: Mr. J. L. Rhudy
375 Mountain Lane
Tazewell, VA 24651

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Entire Report Reviewed By:



Pam Langford
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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SAMPLE SUMMARY

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
INJECTATE L941689-01 GW					
			Collected by JL Rhudy	Collected date/time 10/05/17 09:44	Received date/time 10/06/17 08:45
Microbiology by Method 9223B-2004	WG1028745	1	10/06/17 14:00	10/06/17 14:00	CM
Gravimetric Analysis by Method 2540 C-2011	WG1030079	1	10/12/17 12:54	10/12/17 13:32	MMF
Gravimetric Analysis by Method 2540 D-2011	WG1030095	1	10/11/17 17:53	10/11/17 18:03	BS
Wet Chemistry by Method 5540 C-2011	WG1028582	1	10/06/17 12:09	10/06/17 14:01	ER
Wet Chemistry by Method 9040C	WG1028579	1	10/06/17 14:47	10/06/17 14:47	GB
Wet Chemistry by Method 9056A	WG1031207	20	10/13/17 12:31	10/13/17 12:31	KCF
Wet Chemistry by Method 9056A	WG1031671	500	10/16/17 08:32	10/16/17 08:32	KCF
Wet Chemistry by Method 9060A	WG1029208	1	10/09/17 21:43	10/09/17 21:43	SJM
Metals (ICP) by Method 6010B	WG1029573	10	10/11/17 10:03	10/14/17 09:30	TRB
Metals (ICP) by Method 6010B	WG1029573	5	10/11/17 10:03	10/13/17 17:11	TRB
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1029053	1	10/08/17 05:27	10/08/17 05:27	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1028850	1	10/07/17 17:49	10/07/17 17:49	ACE
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1029867	1	10/09/17 10:37	10/16/17 02:55	SHG

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
#1 L941689-02 GW					
			Collected by JL Rhudy	Collected date/time 10/05/17 10:29	Received date/time 10/06/17 08:45
Microbiology by Method 9223B-2004	WG1028745	1	10/06/17 14:00	10/06/17 14:00	CM
Gravimetric Analysis by Method 2540 C-2011	WG1030079	1	10/12/17 12:54	10/12/17 13:32	MMF
Gravimetric Analysis by Method 2540 D-2011	WG1030095	1	10/11/17 17:53	10/11/17 18:03	BS
Wet Chemistry by Method 5540 C-2011	WG1028582	1	10/06/17 12:09	10/06/17 14:02	ER
Wet Chemistry by Method 9040C	WG1028579	1	10/06/17 14:47	10/06/17 14:47	GB
Wet Chemistry by Method 9056A	WG1030037	1	10/12/17 13:14	10/12/17 13:14	KCF
et Chemistry by Method 9056A	WG1031207	5	10/13/17 13:01	10/13/17 13:01	KCF
Wet Chemistry by Method 9060A	WG1029208	1	10/09/17 22:04	10/09/17 22:04	SJM
Metals (ICP) by Method 6010B	WG1029573	1	10/11/17 10:03	10/13/17 13:42	CCE
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1029053	1	10/08/17 05:52	10/08/17 05:52	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1028850	1	10/07/17 18:05	10/07/17 18:05	ACE
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1029867	1	10/09/17 10:37	10/16/17 03:11	SHG

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
#2 L941689-03 GW					
			Collected by JL Rhudy	Collected date/time 10/05/17 10:49	Received date/time 10/06/17 08:45
Microbiology by Method 9223B-2004	WG1028745	1	10/06/17 14:00	10/06/17 14:00	CM
Gravimetric Analysis by Method 2540 C-2011	WG1030079	1	10/12/17 12:54	10/12/17 13:32	MMF
Gravimetric Analysis by Method 2540 D-2011	WG1030095	1	10/11/17 17:53	10/11/17 18:03	BS
Wet Chemistry by Method 5540 C-2011	WG1028582	1	10/06/17 12:09	10/06/17 14:03	ER
Wet Chemistry by Method 9040C	WG1028579	1	10/06/17 14:47	10/06/17 14:47	GB
Wet Chemistry by Method 9056A	WG1030037	1	10/12/17 13:24	10/12/17 13:24	KCF
Wet Chemistry by Method 9060A	WG1029208	1	10/09/17 22:20	10/09/17 22:20	SJM
Metals (ICP) by Method 6010B	WG1029573	1	10/11/17 10:03	10/13/17 13:45	CCE
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1029053	1	10/08/17 06:16	10/08/17 06:16	ACG
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1028850	1	10/07/17 18:22	10/07/17 18:22	ACE
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1029867	1	10/09/17 10:37	10/16/17 03:28	SHG

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All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Pam Langford
Technical Service Representative

Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

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Collected date/time: 10/05/17 09:44

L941689

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
...Coli	2.00	J3 T8	1	10/06/2017 14:00	WG1028745
Coliform, Total	159	Te	1	10/06/2017 14:00	WG1028745

Injectate



Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	31200		10.0	1	10/12/2017 13:32	WG1030079



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	263		2.50	1	10/11/2017 18:03	WG1030095



Wet Chemistry by Method 5540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
MBAS	ND		0.100	1	10/06/2017 14:01	WG1028582



Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
pH	6.36	T8		1	10/06/2017 14:47	WG1028579

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Sample Narrative:

L941689-01 WG1028579: 6.36 at 18.9c

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Chloride	15500		500	500	10/16/2017 08:32	WG1031671
Sulfate	ND		100	20	10/13/2017 12:31	WG1031207

Wet Chemistry by Method 9060A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	1.63		1.00	1	10/09/2017 21:43	WG1029208

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Aluminum	ND		1.00	5	10/13/2017 17:11	WG1029573
Arsenic	ND		0.0500	5	10/13/2017 17:11	WG1029573
Barium	243		0.0500	10	10/14/2017 09:30	WG1029573
Calcium	1620		5.00	5	10/13/2017 17:11	WG1029573
Iron	203		0.500	5	10/13/2017 17:11	WG1029573
Manganese	2.72		0.0500	5	10/13/2017 17:11	WG1029573

Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	10/08/2017 05:27	WG1029053
(S) a, a, a-Trifluorotoluene(FID)	94.9		77.0-122		10/08/2017 05:27	WG1029053

INJECTATE

SAMPLE RESULTS - 01

ONE LAB. NATIONWIDE.



Collected date/time: 10/05/17 09:44

L941689

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	10/07/2017 17:49	WG1028850
Toluene	ND		0.00100	1	10/07/2017 17:49	WG1028850
Ethylbenzene	ND		0.00100	1	10/07/2017 17:49	WG1028850
Total Xylenes	ND	J4	0.00300	1	10/07/2017 17:49	WG1028850
(S) Toluene-d8	115		80.0-120		10/07/2017 17:49	WG1028850
(S) Dibromofluoromethane	82.2		76.0-123		10/07/2017 17:49	WG1028850
(S) a,a,a-Trifluorotoluene	115		80.0-120		10/07/2017 17:49	WG1028850
(S) 4-Bromofluorobenzene	100		80.0-120		10/07/2017 17:49	WG1028850

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	0.272		0.100	1	10/16/2017 02:55	WG1029867
C28-C40 Oil Range	0.723		0.100	1	10/16/2017 02:55	WG1029867
(S) o-Terphenyl	100		31.0-160		10/16/2017 02:55	WG1029867

6 Qc

7 GI

8 AI

9 Sc

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Microbiology by Method 9223B-2004

Spring #1

Analyte	Result MPN/100ml	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	14.5	T8	1	10/06/2017 14:00	WG1028745
Coliform, Total	1550	T8	1	10/06/2017 14:00	WG1028745



Gravimetric Analysis by Method 2540 C-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Dissolved Solids	328		10.0	1	10/12/2017 13:32	WG1030079



Gravimetric Analysis by Method 2540 D-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Suspended Solids	ND		2.50	1	10/11/2017 18:03	WG1030095



Wet Chemistry by Method 5540 C-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
MBAS	ND		0.100	1	10/06/2017 14:02	WG1028582



Wet Chemistry by Method 9040C

Analyte	Result su	Qualifier	RDL	Dilution	Analysis date / time	Batch
pH	6.92	T8		1	10/06/2017 14:47	WG1028579

Sample Narrative:

L941689-02 WG1028579: 6.92 at 17.3c

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chloride	18.4		1.00	1	10/12/2017 13:14	WG1030037
Sulfate	192		25.0	5	10/13/2017 13:01	WG1031207

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Wet Chemistry by Method 9060A

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Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	ND		1.00	1	10/09/2017 22:04	WG1029208

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Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Aluminum	ND		0.200	1	10/13/2017 13:42	WG1029573
Arsenic	ND		0.0100	1	10/13/2017 13:42	WG1029573
Barium	0.0831		0.00500	1	10/13/2017 13:42	WG1029573
Calcium	43.1		1.00	1	10/13/2017 13:42	WG1029573
Iron	ND		0.100	1	10/13/2017 13:42	WG1029573
Manganese	0.0131		0.0100	1	10/13/2017 13:42	WG1029573

Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	10/08/2017 05:52	WG1029053
(S) a, a, a-Trifluorotoluene(FID)	96.8		77.0-122		10/08/2017 05:52	WG1029053

#1

SAMPLE RESULTS - 02

ONE LAB. NATIONWIDE.



Collected date/time: 10/05/17 10:29

L941689

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
nzene	ND		0.00100	1	10/07/2017 18:05	WG1028850
Toluene	ND		0.00100	1	10/07/2017 18:05	WG1028850
Ethylbenzene	ND		0.00100	1	10/07/2017 18:05	WG1028850
Total Xylenes	ND	<u>J4</u>	0.00300	1	10/07/2017 18:05	WG1028850
(S) Toluene-d8	112		80.0-120		10/07/2017 18:05	WG1028850
(S) Dibromofluoromethane	84.2		76.0-123		10/07/2017 18:05	WG1028850
(S) a,a-Trifluorotoluene	114		80.0-120		10/07/2017 18:05	WG1028850
(S) 4-Bromofluorobenzene	102		80.0-120		10/07/2017 18:05	WG1028850

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		0.100	1	10/16/2017 03:11	WG1029867
C28-C40 Oil Range	ND		0.100	1	10/16/2017 03:11	WG1029867
(S) o-Terphenyl	97.4		31.0-160		10/16/2017 03:11	WG1029867

6 Qc

7 Gl

8 Al

9 Sc

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Collected date/time: 10/05/17 10:49

L941689

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Coli	49.6	T8	1	10/06/2017 14:00	WG1028745
Coliform, Total	2420	T8	1	10/06/2017 14:00	WG1028745

Spring #2

Cp

Tc

Ss

Cn

Sr

Qc

Gl

Al

Sc

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	188		10.0	1	10/12/2017 13:32	WG1030079

Gravimetric Analysis by Method 2540 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	2.84		2.50	1	10/11/2017 18:03	WG1030095

Wet Chemistry by Method 5540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
MBAS	ND		0.100	1	10/06/2017 14:03	WG1028582

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
pH	7.25	T8		1	10/06/2017 14:47	WG1028579

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Sample Narrative:

L941689-03 WG1028579: 7.25 at 17.4c

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Chloride	6.68		1.00	1	10/12/2017 13:24	WG1030037
Sulfate	77.7		5.00	1	10/12/2017 13:24	WG1030037

Wet Chemistry by Method 9060A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	11.8		1.00	1	10/09/2017 22:20	WG1029208

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Aluminum	ND		0.200	1	10/13/2017 13:45	WG1029573
Arsenic	ND		0.0100	1	10/13/2017 13:45	WG1029573
Barium	0.0632		0.00500	1	10/13/2017 13:45	WG1029573
Calcium	28.9		1.00	1	10/13/2017 13:45	WG1029573
Iron	0.319		0.100	1	10/13/2017 13:45	WG1029573
Manganese	0.0338		0.0100	1	10/13/2017 13:45	WG1029573

Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	10/08/2017 06:16	WG1029053
(S) a, a, a-Trifluorotoluene (FID)	97.0		77.0-122		10/08/2017 06:16	WG1029053



Collected date/time: 10/05/17 10:49

L941689

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	10/07/2017 18:22	WG1028850
Toluene	ND		0.00100	1	10/07/2017 18:22	WG1028850
Ethylbenzene	ND		0.00100	1	10/07/2017 18:22	WG1028850
Total Xylenes	ND	J4	0.00300	1	10/07/2017 18:22	WG1028850
(S) Toluene-d8	113		80.0-120		10/07/2017 18:22	WG1028850
(S) Dibromofluoromethane	84.5		76.0-123		10/07/2017 18:22	WG1028850
(S) a,a,a-Trifluorotoluene	116		80.0-120		10/07/2017 18:22	WG1028850
(S) 4-Bromofluorobenzene	100		80.0-120		10/07/2017 18:22	WG1028850

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		0.100	1	10/16/2017 03:28	WG1029867
C28-C40 Oil Range	ND		0.100	1	10/16/2017 03:28	WG1029867
(S) o-Terphenyl	96.4		31.0-160		10/16/2017 03:28	WG1029867

6 Qc

7 Gl

8 Al

9 Sc

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Method Blank (MB)

(MB) R3257339-1 10/12/17 13:32

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Dissolved Solids	U		2.82	10.0

L941670-01 Original Sample (OS) • Duplicate (DUP)

(OS) L941670-01 10/12/17 13:32 • (DUP) R3257339-4 10/12/17 13:32

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Dissolved Solids	137	138	1	0.727		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3257339-2 10/12/17 13:32 • (LCSD) R3257339-3 10/12/17 13:32

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Dissolved Solids	8800	8530	8520	96.9	96.8	85.0-115			0.117	5

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CP Tc Ss Cn Sr Oc Gl Al Sc



Method Blank (MB)

(MB) R3257247-1 10/11/17 18:03

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Suspended Solids	U		0.350	2.50

L941689-01 Original Sample (OS) • Duplicate (DUP)

(OS) L941689-01 10/11/17 18:03 • (DUP) R3257247-4 10/11/17 18:03

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Suspended Solids	263	251	1	4.67		5

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3257247-2 10/11/17 18:03 • (LCSD) R3257247-3 10/11/17 18:03

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	LCSD Result mg/l	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Suspended Solids	773	732	94.7	740	95.7	85.0-115		1.09	5	

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Method Blank (MB)

(MB) R3255418-1 10/06/17 13:58

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
MBAS	U	0.019	0.100	0.100

L941689-02 Original Sample (OS) • Duplicate (DUP)

(OS) L941689-02 10/06/17 14:02 • (DUP) R3255418-4 10/06/17 14:03

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
MBAS	ND	0.000	1	0		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3255418-2 10/06/17 13:59 • (LCSD) R3255418-3 10/06/17 13:59

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
MBAS	1.00	1.06	0.960	106	96	90-110			10	20

L941689-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L941689-03 10/06/17 14:03 • (MS) R3255418-5 10/06/17 14:04 • (MSD) R3255418-6 10/06/17 14:04

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
MBAS	1.00	ND	0.912	0.907	91	91	1	90-110			1	20

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Legend: 1 CP, 2 Tc, 3 Ss, 4 Cn, 5 Sr, 6 Oc, 7 Gl, 8 Al, 9 Sc



L940710-01 Original Sample (OS) • Duplicate (DUP)

(OS) L940710-01 10/06/17 14:47 • (DUP) WG1028579-3 10/06/17 14:47

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	SU	SU		%		%
pH	7.76	7.78	1	0.257	IS	1

Sample Narrative:

OS: 7.76 at 21.0c
DUP: 7.78 at 21.5c

L941739-01 Original Sample (OS) • Duplicate (DUP)

(OS) L941739-01 10/06/17 14:47 • (DUP) WG1028579-4 10/06/17 14:47

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	SU	SU		%		%
pH	6.48	6.54	1	0.922	IS	1

Sample Narrative:

OS: 6.48 at 20.4c
DUP: 6.54 at 20.7c

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) WG1028579-1 10/06/17 14:47 • (LCSD) WG1028579-2 10/06/17 14:47

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	SU	SU	SU	%	%	%			%	%
pH	10.0	9.92	9.92	99.2	99.2	98.3-102			0.000	1

Sample Narrative:

LCS: 9.92 at 22.4c
LCSD: 9.92 at 22.6c

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Method Blank (MB)

(MB) R3257105-1 10/12/17 10:11

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Chloride	U	0.0519	1.00	
Sulfate	U	0.0774	5.00	

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3257105-2 10/12/17 10:21 • (LCSD) R3257105-3 10/12/17 10:31

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Chloride	40.0	38.8	38.8	97	97	80-120			0	15
Sulfate	40.0	38.9	38.8	97	97	80-120			0	15

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CP Tc Ss Cn Sr Oc Gl Al Sc



Method Blank (MB)

(MB) R3257473-1 10/13/17 06:54

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l	mg/l	mg/l	mg/l
Sulfate	U	0.0774	5.00	5.00

L942140-09 Original Sample (OS) • Duplicate (DUP)

(OS) L942140-09 10/13/17 16:00 • (DUP) R3257473-4 10/13/17 16:15

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l	%	%		%
Sulfate	ND	0.000	1	0		15

L942140-11 Original Sample (OS) • Duplicate (DUP)

(OS) L942140-11 10/13/17 17:29 • (DUP) R3257473-7 10/13/17 17:44

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l	%	%		%
Sulfate	ND	0.000	1	200	P1	15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3257473-2 10/13/17 07:09 • (LCSD) R3257473-3 10/13/17 07:24

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD Limits
	mg/l	mg/l	mg/l	%	%	%	%	%	%
Sulfate	40.0	38.7	38.7	97	97	80-120		0	15

L942140-09 Original Sample (OS) • Matrix Spike (MS)

(OS) L942140-09 10/13/17 16:00 • (MS) R3257473-5 10/13/17 16:30

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
	mg/l	mg/l	mg/l	%		%	
Sulfate	50.0	ND	49.4	99	1	80-120	

L942140-09 Original Sample (OS) • Matrix Spike (MS)

(OS) L942140-09 10/13/17 16:00 • (MS) R3257473-6 10/13/17 16:44

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
	mg/l	mg/l	mg/l	%		%	
Sulfate	50.0	ND	48.7	97	1	80-120	

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L942140-11 Original Sample (OS) • Matrix Spike (MS)

(OS) L942140-11 10/13/17 17:29 • (MS) R3257473-8 10/13/17 18:29

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Sulfate	50.0	ND	49.1	98	1	80-120	

1 Cp 2 Tc 3 Ss 4 Cr 5 Sr 6 Qc 7 Gl 8 Al 9 Sc

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Method Blank (MB)

(MB) R3257817-1 10/16/17 07:13

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Chloride	0.0758	J	0.0519	1.00

L941520-35 Original Sample (OS) • Duplicate (DUP)

(OS) L941520-35 10/16/17 09:36 • (DUP) R3257817-4 10/16/17 12:50

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	0.0642	0.0978	1	41	JP1	15

L941834-01 Original Sample (OS) • Duplicate (DUP)

(OS) L941834-01 10/16/17 17:36 • (DUP) R3257817-6 10/16/17 17:49

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	4.55	4.57	1	0		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3257817-2 10/16/17 07:26 • (LCSD) R3257817-3 10/16/17 07:39

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Chloride	40.0	39.6	39.8	99	100	80-120			0	15

L941520-35 Original Sample (OS) • Matrix Spike (MS)

(OS) L941520-35 10/16/17 09:36 • (MS) R3257817-5 10/16/17 13:02

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50.0	0.0642	49.3	98	1	80-120	

L941834-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L941834-01 10/16/17 17:36 • (MS) R3257817-7 10/16/17 18:02 • (MSD) R3257817-8 10/16/17 18:15

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	RPD %	RPD Limits %
Chloride	50.0	4.55	55.3	56.0	101	103	1	80-120		1	15

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Method Blank (MB)

(MB) R3256002-1 10/09/17 09:59

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TOC (Total Organic Carbon)	U	0.102	0.102	1.00

L941514-01 Original Sample (OS) • Duplicate (DUP)

(OS) L941514-01 10/09/17 13:31 • (DUP) R3256002-3 10/09/17 13:48

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
TOC	3.83	3.61	1	6		20

L941689-03 Original Sample (OS) • Duplicate (DUP)

(OS) L941689-03 10/09/17 22:20 • (DUP) R3256002-7 10/09/17 22:33

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
TOC	11.8	11.6	1	2		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3256002-2 10/09/17 12:54 • (LCSD) R3256002-4 10/09/17 15:45

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TOC	75.0	74.2	75.8	99	101	85-115			2	20

L941640-13 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L941640-13 10/09/17 20:52 • (MS) R3256002-5 10/09/17 21:09 • (MSD) R3256002-6 10/09/17 21:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TOC	50.0	4.66	46.9	47.3	1	80-120			1	20

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Method Blank (MB)

(MB) R3257273-2 10/13/17 12:16

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Aluminum	U		0.035	0.200
Arsenic	U		0.0065	0.0100
Barium	U		0.0017	0.00500
Calcium	U		0.0463	1.00
Iron	U		0.0141	0.100
Manganese	U		0.0012	0.0100

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Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3257273-3 10/13/17 12:19 • (LCSD) R3257273-4 10/13/17 12:22

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	10.0	10.3	10.2	103	102	80-120	1	1	20	20
Arsenic	1.00	0.997	0.982	100	98	80-120	2	2	20	20
Barium	1.00	1.05	1.04	105	104	80-120	1	1	20	20
Calcium	10.0	9.68	9.65	97	96	80-120	0	0	20	20
Iron	10.0	10.1	10.1	101	101	80-120	0	0	20	20
Manganese	1.00	0.955	0.946	95	95	80-120	1	1	20	20

L941644-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L941644-06 10/13/17 12:25 • (MS) R3257273-6 10/13/17 12:31 • (MSD) R3257273-7 10/13/17 12:34

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	10.0	U	10.0	10.3	100	103	1	75-125	3	3	20	20
Arsenic	1.00	U	0.971	0.995	97	99	1	75-125	2	2	20	20
Barium	1.00	0.00234	1.02	1.05	102	105	1	75-125	2	2	20	20
Calcium	10.0	0.176	9.64	9.86	95	97	1	75-125	2	2	20	20
Iron	10.0	U	9.93	10.1	99	101	1	75-125	2	2	20	20
Manganese	1.00	U	0.931	0.955	93	96	1	75-125	3	3	20	20



Method Blank (MB)

(MB) R3256284-3 10/08/17 04:18

Analyte	MB Result mg/l	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) Low Fraction	U	0.0314	0.100
(S) a,a,α-Trifluorotoluene(FID)	97.5	77.0-122	

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3256284-1 10/08/17 03:06 • (LCSD) R3256284-2 10/08/17 03:30

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	6.75	6.21	123	113	71.0-136			8.26	20
(S) a,a,α-Trifluorotoluene(FID)				116	113	77.0-122				

L941959-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L941959-02 10/08/17 11:56 • (MS) R3256284-4 10/08/17 12:21 • (MSD) R3256284-5 10/08/17 12:45

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	2.53	6.08	6.17	64.6	66.1	1	18.0-160		1.34		20
(S) a,a,α-Trifluorotoluene(FID)					107	106		77.0-122				

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Method Blank (MB)

(MB) R3256329-2 10/07/17 15:25

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U	U	0.000331	0.00100
Ethylbenzene	U	U	0.000384	0.00100
Toluene	U	U	0.000412	0.00100
Xylenes, Total	U	U	0.00106	0.00300
(S) Toluene-d8	112			80.0-120
(S) Dibromofluoromethane	109			76.0-123
(S) a,a,-Trifluorotoluene	116			80.0-120
(S) 4-Bromofluorobenzene	101			80.0-120

Laboratory Control Sample (LCS)

(LCS) R3256329-1 10/07/17 14:52

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.0250	0.0199	79.6	69.0-123	
Ethylbenzene	0.0250	0.0267	107	77.0-120	
Toluene	0.0250	0.0231	92.4	77.0-120	
Xylenes, Total	0.0750	0.0860	115	77.0-120	J4
(S) Toluene-d8			107	80.0-120	
(S) Dibromofluoromethane			86.6	76.0-123	
(S) a,a,-Trifluorotoluene			95.6	80.0-120	
(S) 4-Bromofluorobenzene			107	80.0-120	

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CP Tc Ss Cn Sr Qc Gl Al Sc



Method Blank (MB)

(MB) R3257701-1 10/16/17 02:05

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
C10-C28 Diesel Range	U	0.0222	0.100	0.100
C28-C40 Oil Range	U	0.0118	0.100	0.100
(S) o-Terphenyl	93.3		31.0-160	

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3257701-2 10/16/17 02:22 • (LCSD) R3257701-3 10/16/17 02:38

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
C10-C28 Diesel Range	1.50	1.33	1.29	88.6	85.8	50.0-150			3.18	20
(S) o-Terphenyl				96.1	96.5	31.0-160				

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CP Tc Ss Cn Sr Qc Gl Al Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

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Cp

Tc

Ss

Cn

Sr

Qc

Gl

Al

Sc

Envirocheck of Va., Inc

375 Mountain Lane
Tazewell, VA 24651

Mr. J. L. Rhudy
375 Mountain Lane
Tazewell, VA 24651

Report to:
MR. J. L. Rhudy

Email To: jlr@envirocheckva.com

Project Description: ARP Titan
Phone: 276-322-1323
Fax: 276-472-2425

City/State Collected: *Daly, WV*

Lab Project #
ENVCHTVA-ARPTITAN

Collected by (print): *J.L. Rhudy*

Site/Facility ID #
BECKLEY, WV

Collected by (signature): *J.L. Rhudy*

Rush? (Lab MUST Be Notified)
 Same Day
 Next Day
 Two Day
 Three Day
 Five Day
 5 Day (Rad Only)
 10 Day (Rad Only)

Sample ID

Comp/Grab

Matrix *

Depth

Date

Time

No. of Cntrs

Analysis / Container / Preservative

Pres Chk

Remarks

Sample # (lab only)

Shipped Via: FedEx Ground

INJECTATE
ADD #1
#2

6.66
11
11

IGN
WW
GW

-
-
-

10/5/17
10/5/17
10/5/17

9:44
10:29
10:11

15
15
15
15
15

COLLERT Microbiological
DRORLA 100ml Amb-HCl
GRO 40ml Amb HCl
MBAS 500mlHDPE-NOPres
Metals 250mlHDPE-HNO3
TDS 250mlHDPE-NOPres
TDC 250mlAmb-HCl
TSS 1L-HDPE NOPres
V82608BTEX 40mlAmb-HCl
Wetchem 125mlHDPE-NOPres

12
12
12

01
02
03

Account: ENVCHTVA
Template: T128320
Prelogin: P620114
TSR: 633 - Pam Langford
PB: 9126177Mg

H125
941689



32065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-3859

Chain of Custody Page 1 of 1

Sample Residual: *0.1*
COG Seal Present/Intact: *Y*
COG Signed/Accurate: *Y*
Bottles active/Intact: *Y*
Correct bottles used: *Y*
Sufficient volume sent: *Y*
VQA Zero headspace: *Y*
Preservation Container/Checked: *Y*

Sample Residual	COG Seal Present/Intact	COG Signed/Accurate	Bottles active/Intact	Correct bottles used	Sufficient volume sent	VQA Zero headspace	Preservation Container/Checked
0.1	Y	Y	Y	Y	Y	Y	Y
0.2	Y	Y	Y	Y	Y	Y	Y
0.3	Y	Y	Y	Y	Y	Y	Y

PH _____ Temp _____
Flow _____ Other _____

Trip Blank Received: *7079*
Temp: *2.9°C* Bottles Received: *45*
Date: *10-6-17* Time: *8:45*

Received for lab by: *Signature*
Received by: *Signature*
Received by: *Signature*

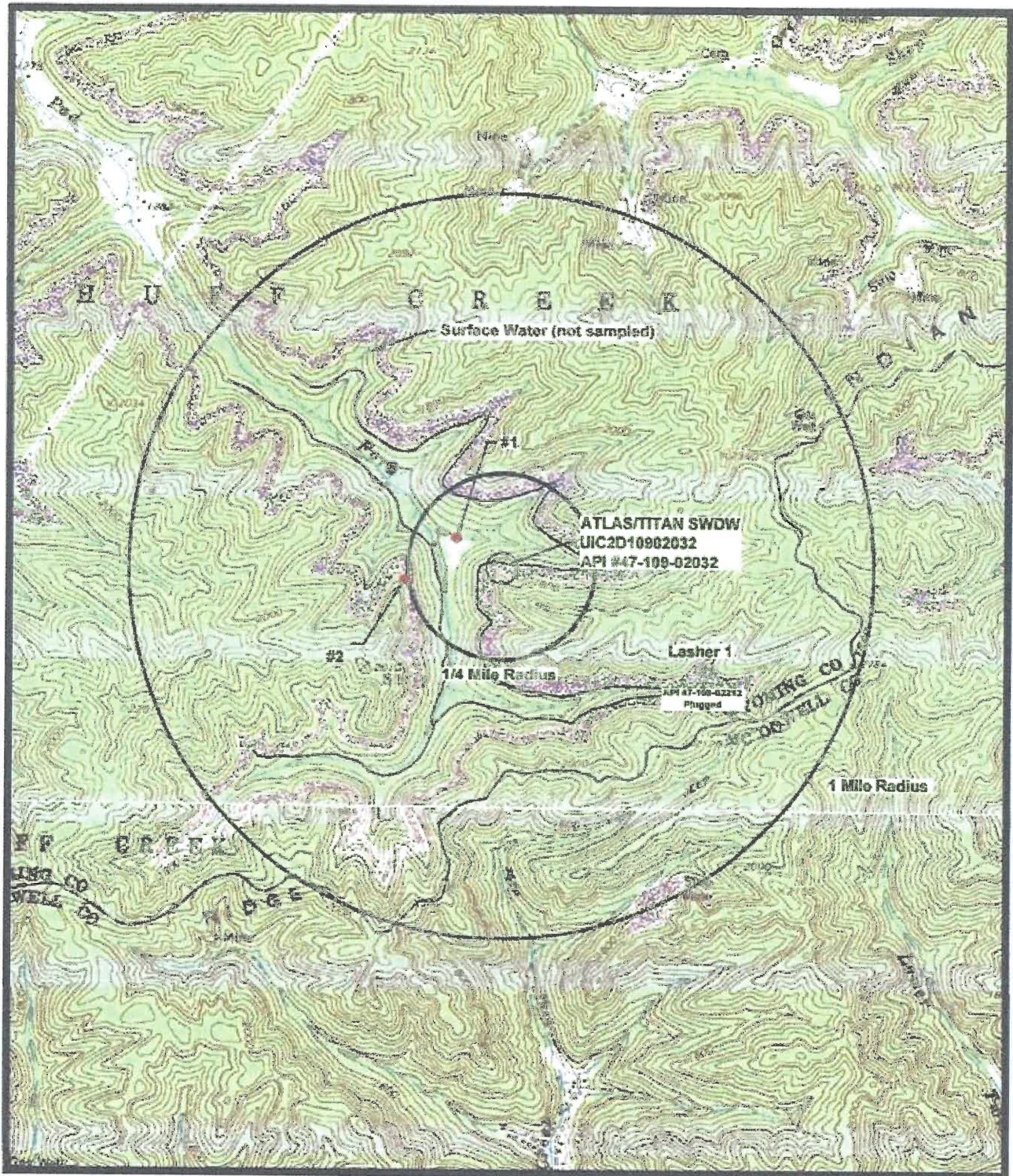
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Appendix F
Area Permit Wells

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ARP MOUNTAINEER PRODUCTION, LLC – WYOMING COUNTY, WEST VIRGINIA
 PORTION OF USGS 7.5' BAILEYSVILLE, WV QUADRANGLE



SCALE 1:2,000

LOCATION MAP

WELL NO. UIC2D10902032



Envirocheck of Virginia, Inc.
 120 Lovelace Street
 Bluefield, VA 26005



WEST VIRGINIA
 QUADRANGLE
 LOCATION