CK# 1002 550.00

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	Mountain V Oil & Gas, Inc. Lewis Camden, LLC		
Existing UIC Permit ID Number	2D0413175 2D0410317500	UIC Well API Number	47-041-03175

Office of Oil and Gas Office Use Only	
Permit Reviewer	JEN
Date Received	10/20/16
Administratively Complete Date	
Approved Date	
Permit Issued	

Please check the fees and payment included.

Fees		Payment Type	
UIC Permit Fee: $500	X	Check	X
Groundwater Protection Plan (GPP) Fee: $50.00	X	Electronic	
		Other	

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

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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

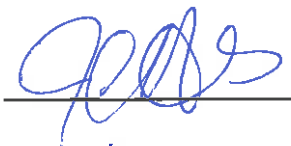
___✓___ Appendix J Site Security for Commercial Wells

___✓___ 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): Jamie Andrews

Reviewed by (Sign): 

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Date Reviewed: 9/28/16

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UNDERGROUND INJECTION CONTROL (UIC)
PERMIT APPLICATION

UIC-1
SECTION 1-5
CERTIFICATION

UIC #: 2D0413175
FACILITY NAME: Law SWS SWD 1
OPERATOR: Lewis Camden, LLC

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UIC-1
(4/25)

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

UNDERGROUND INJECTION CONTROL (UIC)
PERMIT APPLICATION

UIC PERMIT ID # 2D0413175 API # 47-041-03175 WELL # LAW LWS SWD 1 911141

Section I. Facility Information

Facility Name: LAW SWS SWD 1

Address: Freemans Creek

City: Camden State: WV Zip:

County: Lewis

Location description: Existing Well Site. Directions to Site: From exit 99 of I-79 proceed West on U.S. Route 33-W & 119-S for approx. 2.54 miles; Turn left on Main Ave. / US 119-S / US 33-W, and follow for approx. 0.12 miles; Turn right on E 2nd Street / US 33-W / US 119-S and follow for approx. 6.9 miles; Turn right onto existing well road for approximately 0.25 miles to site.

Location of well(s) or approximate center of field/project in UTM NAD 83 (meters):

Northing: 4,322,755 Easting: 536,172

Environmental Contact Information:

Name: Jamie Andrews Title: Land & Business Development

Phone: 304-203-7555 Email: jandrews@mountainvoilandgas.com

Section 2. Operator Information

Operator Name: Lewis Camden LLC

Operator ID:

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Address: PO Box 470

City: Bridgeport State: WV Zip: 26330

County: Harrison

Contact Name: Jamie Andrews Contact Title: Land & Business Development Contact

Phone: 304-203-7555 Contact Email: jandrews@mountainvoilandgas.com

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MOUNTAIN V
OIL & GAS, INC.

P. O. Box 470
Bridgeport, WV 26330

Office: 304-842-6320
Fax: 304-842-0016

September 28, 2016

Justin Nottinham
WVDEP
601 57th Street SE
Charleston, WV 25304

RE: UIC 2D0413175

Mr. Nottingham,

Please see enclosed with this letter the following:

1. OP-77 – Transferring the well from SWN to Lewis Camden LLC.
2. Check in the amount of $550.00 for the permit fee.
3. Check in the amount of $5,000.00 for the bond of the class 2D UIC well.
4. Permit renewal for UIC 2D0413175.

Should you have any questions comments or concerns please contact me.

Best

Jamie Andrews
Mountain V Oil & Gas, Inc.

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UNDERGROUND INJECTION CONTROL (UIC) PERMIT APPLICATION PACKAGE CLASS 2 & 3

Office of Oil and Gas
601 57th Street, SE
Charleston, WV 25304
Phone: (304) 926-0450

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INSTRUCTIONS/GUIDANCE TO COMPLETE A CLASS 2 and CLASS 3 UNDERGROUND INJECTION CONTROL (UIC) PERMIT APPLICATION

A. GENERAL INSTRUCTIONS

The Office of Oil and Gas (OOG) has developed a comprehensive permit package and instruction/guidance document to assist in the preparation of a UIC permit application. Where possible, standardized forms have been created and identified as Appendices to the UIC application package. **NOTE** the instruction/guidance document identifies additional requirements to be submitted with the application.

B. FEES

The application fee for a UIC permit is $500.00. There will be an additional $50.00 fee for a groundwater protection plan (GPP).

C. SUBMITTAL

Please submit an original and a complete copy of the UIC permit application package along with the application fee of $550.00 to:

West Virginia Department of Environmental Protection
Office of Oil and Gas
Underground Injection Control (UIC)
601 57th Street, SE
Charleston, WV 25304

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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:

Lewis Camden LLC is a private owned LLC, who utilizes this UIC well to dispose of produced and/or brine water from wells operated by third party oil & gas producers.

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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 [1]duly authorized representative in accordance with 47CSR13-13.11.b.

A. Name and title of person applying for permit:

Print Name: Mike Shaver

Print Title: Manager

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:

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[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.

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UNDERGROUND INJECTION CONTROL (UIC)
PERMIT APPLICATION

SECTION 6

UIC #: 2D0413175
FACILITY NAME: Law SWS SWD 1
OPERATOR: Lewis Camden, LLC

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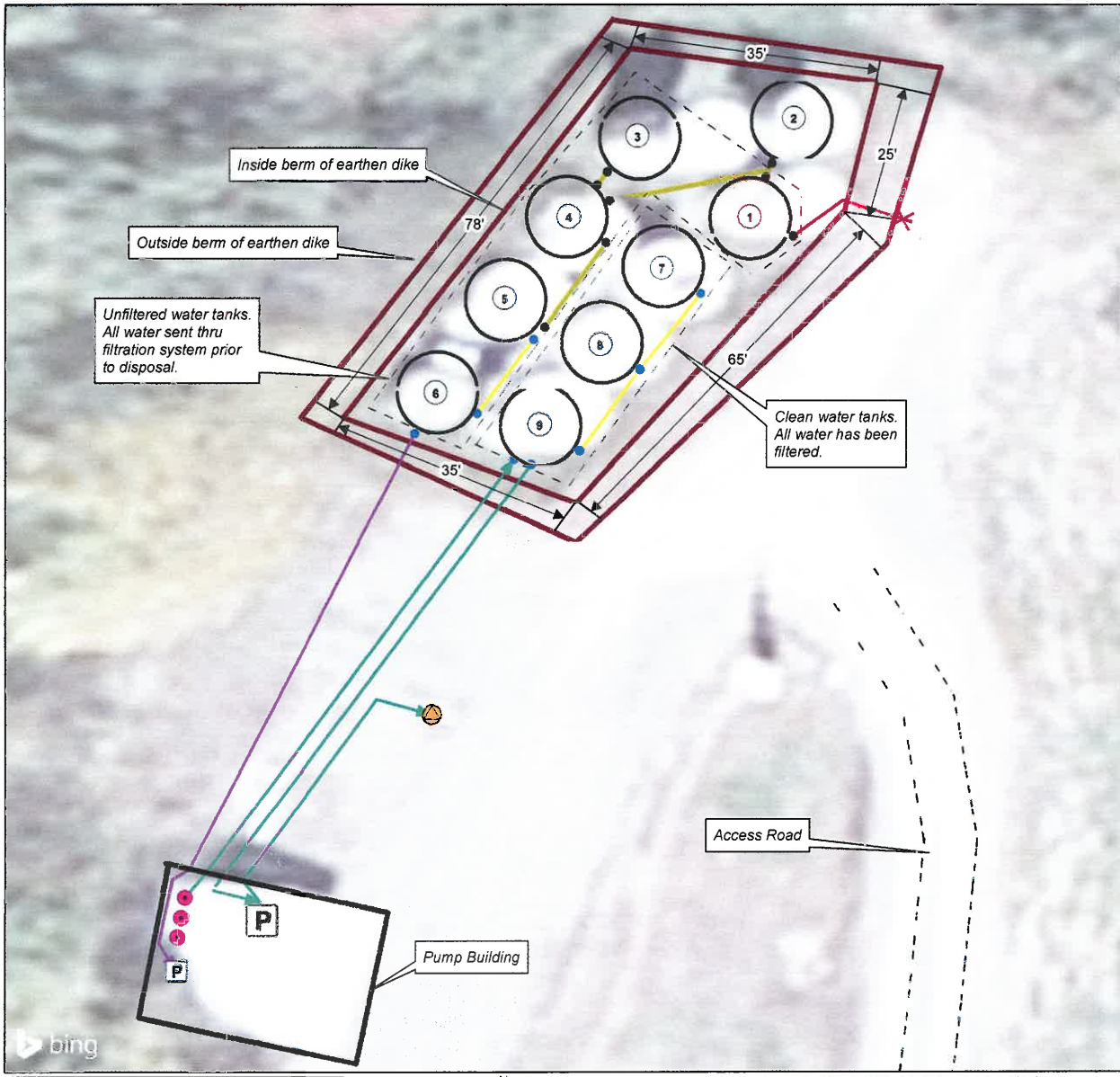


Inside Berm Capacity

Berm Height:	3.5 ft.
Berm dimensions (irregular shaped):	78 ft. + 35 ft. + 25 ft. + 65 ft. + 35 ft. (perimeter dimensions) = 2,877 ft^2
Tak Footprint:	9 Tanks @ 10 ft. dia = 9 X (π 5^2) = 707 $ft.^2$
Net Volume:	(3.5 ft. X (2,877 ft^2 - 707 ft^2)) = 7,595 ft^3 7,595 ft^3 X 7.48 gallons/ft^3 = 56,810.6 gallons
Ratio to largest tank:	56,810.6 gallons / 10,500 gallons > 500%

Corresponding Amount of Freeboard

100% of tank volume:	10,500 gallons = 1,404 ft^3
Net area	2,877 ft^2 - 707 ft^2 = 2,170 ft^2
Minimum berm & dike height for 100% of tank volume	1,404 ft^3 / 2,170 ft^2 = 0.65 ft.
Freeboard	3.5 ft. - 0.65 ft. = 2.85 ft. **(approximately 34 - 1/4 inches)**

Tank ID	Tank Contents	Tank Size	AST No.
1	Unfiltered Water	210 BBL	021-00002242
2	Oil	210 BBL	021-00002243
3	Unfiltered Water	250 BBL	021-00002241
4	Unfiltered Water	160 BBL	021-00002244
5	Unfiltered Water	160 BBL	021-00002245
6	Unfiltered Water	50 BBL	021-00002736
7	Filtered Water	160 BBL	021-00002246
8	Filtered Water	160 BBL	021-00002239
9	Filtered Water	160 BBL	021-00002240

Legend

Status
- UIC2D0413175
- Tanks
- Building
- 2" Valve
- 3" Valve (reduced 2")
- 3" Valve
- P Filter Pump
- P Triplex Down Hole Pump
- Sock Filter
- Cartrige Filter
- Spin Out Filter

Plumbing
- <all other values>
- 2" Filtered Water Flow Line
- 3" Inlet Valve (drop off point)
- 2" Interconnect Between Tanks
- 3" Interconnect Betweek Tanks
- Tank Area
- 2" Unfiltered Water Flow Line

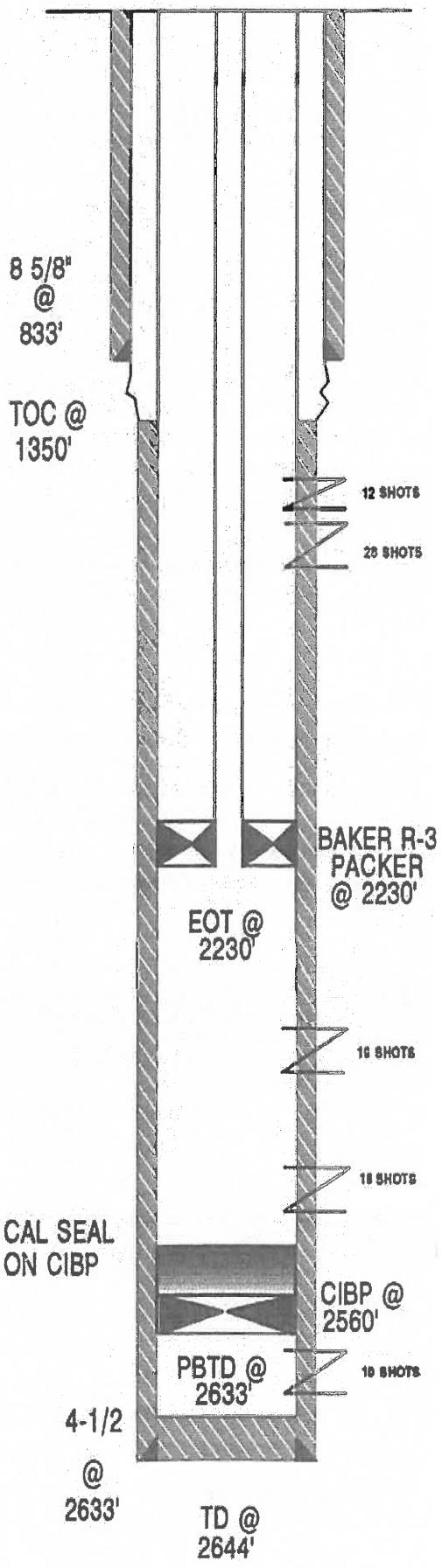
Dike
- <all other values>
- Bermed Welded Plastic Containment
- Raised Area Within Dike
- Earthen Dike Containment

Unfiltered water is unloaded into Tank 1, which feeds into tank 2, where this tank has a heater treater that seperates the brine from oil products, water is then pumped thru dirty water tanks into the pump house thru a series of cartridge filters, which filters the water, then into the clean tanks. The water in the clean tanks are then pumped down hole and disposed of.

N

1 inch = 20 feet

Law SWS SWD UIC2D0413175
Facility Map
Freemans Creek District, Lewis County, WV
Camden 7.5' Quad



WELL NAME: LAW SWS SWD 1 911141

API NO: 47-041-03175

LOCATION: CAMDEN 7.5' QUADRANGLE

DOWNHOLE INFORMATION
(BY DEPTH)

ELEV:

KB 1208'
GL 1198'

CASING:

8-5/8" @ 833'
CEMENT TO SURFACE
4-1/2" @2633'
W/ 260 SKS CEMENT TO 1350'

PERFORATIONS: (DIL DEPTHS)

BAYARD: 2566'-2572' (10)
FIFTH: 2489'-2504' (16)
GORDON: 2326'-2336' (16)
WEIR: 1787'-1849' (28)
BIG INJUN: 1753'-1759' (12)

TUBING:

2-7/8" @ 2230'
BAKER R-3 PACKER @ 2230'

LOGS: GR/CD/CAL/TEMP

APPENDIX A
Injection Well Form

1) GEOLOGIC TARGET FORMATION Gordon and Fifth Sand

Depth 2,326 Feet (top) 2,504 Feet (bottom)

2) Estimated Depth of Completed Well, (or actual depth of existing well): 2,633 Feet

3) Approximate water strata depths: Fresh N/A Feet Salt N/A Feet

4) Approximate coal seam depths: 32'-35', 105'-200'

5) Is coal being mined in the area? Yes _____ No X

6) Virgin reservoir pressure in target formation 1,100 psig Source Field Estimates

7) Estimated reservoir fracture pressure 3,100 psig (BHFP)

8) MAXIMUM PROPOSED INJECTION OPERATIONS:

Injection rate (bbl/hour) 30

Injection volume (bbl/day) 720

Injection pressure (psig) 3100

Bottom hole pressure (psig) 2500

9) DETAILED IDENTIFICATION OF MATERIALS TO BE INJECTED, INCLUDING ADDITIVES

Production water and/or brine

Temperature of injected fluid: (°F) Ambient temperature

10) FILTERS (IF ANY)

50 micron sock, 25 micron and 10 micron cartridge

11) SPECIFICATIONS FOR CATHODIC PROTECTION AND OTHER CORROSION CONTROL

None

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APPENDIX A (cont.)

12. Casing and Tubing Program

TYPE	Size	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
Conductor	11-3/4"	Used	LS	42	29'	29'	None
Fresh Water	8-5/8"	New	J-55	23	833'	833'	CTS
Coal							
Intermediate 1							
Intermediate 2							
Production	4-1/2"	New	J-55	10.5	2633'	2633'	To 1350'
Tubing	2-3/8"	New	J-55	6.4	2230'	2230'	N/A
Liners	sealtite						

TYPE	Wellbore Diameter	Casing Size	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./sk)	Cement to Surface ? (Y or N)
Conductor	15"	11-3/4"	0.333	1980 PSI			
Fresh Water	12 ¼"	8-5/8"	0.312	2270 PSI			Y
Coal							
Intermediate 1							
Intermediate 2							
Production	6 ¼"	4 ½"	0.224	4790 PSI			
Tubing	N/A	2 3/8"	0.190	7700 PSI	N/A	N/A	N/A
Liners							

PACKERS	Packer #1	Packer #2	Packer #3	Packer #4
Kind:	Haliburton			
Sizes:	2-3/8" x 4-1/2"			
Depths Set:	2406			

APPENDIX B
Storage Tank Inventory

API #	Tank ID	Tank Location (UTM NAD 83 Meters)		Installation Date	Tank Age (Months)	Construction Material (Steel, plastic, etc.)	Capacity (gallons)	Type of Fluid Stored	Volume of Fluid Stored (gallons)	Tank Type Single/Double Wall
		Northing	Easting							
47-041-03175	2	4,322,755	536,172	6/1/1995	245	Fiberglass	8,820	Oil	Varies	S
47-041-03175	1	4,322,755	536,172	6/1/1995	245	Fiberglass	8,820	Brine	Varies	S
47-041-03175	8	4,322,755	536,172	6/1/1995	245	Steel	6,720	Brine	Varies	S
47-041-03175	7	4,322,755	536,172	6/1/1995	245	Steel	6,720	Brine	Varies	S
47-041-03175	6	4,322,755	536,172	6/1/1995	245	Poly	2,100	Brine	Varies	S
47-041-03175	5	4,322,755	536,172	6/1/1995	245	Fiberglass	6,720	Brine	Varies	S
47-041-03175	4	4,322,755	536,172	6/1/1995	245	Fiberglass	6,720	Brine	Varies	S
47-041-03175	3	4,322,755	536,172	6/1/1995	245	Fiberglass	10,500	Brine	Varies	S
47-041-03175	9	4,322,755	536,172	6/1/1995	245	Fiberglass	6,720	Brine	Varies	S

UNDERGROUND INJECTION CONTROL (UIC)
PERMIT APPLICATION

SECTION 7

UIC #: 2D0413175
FACILITY NAME: Law SWS SWD 1
OPERATOR: Lewis Camden, LLC

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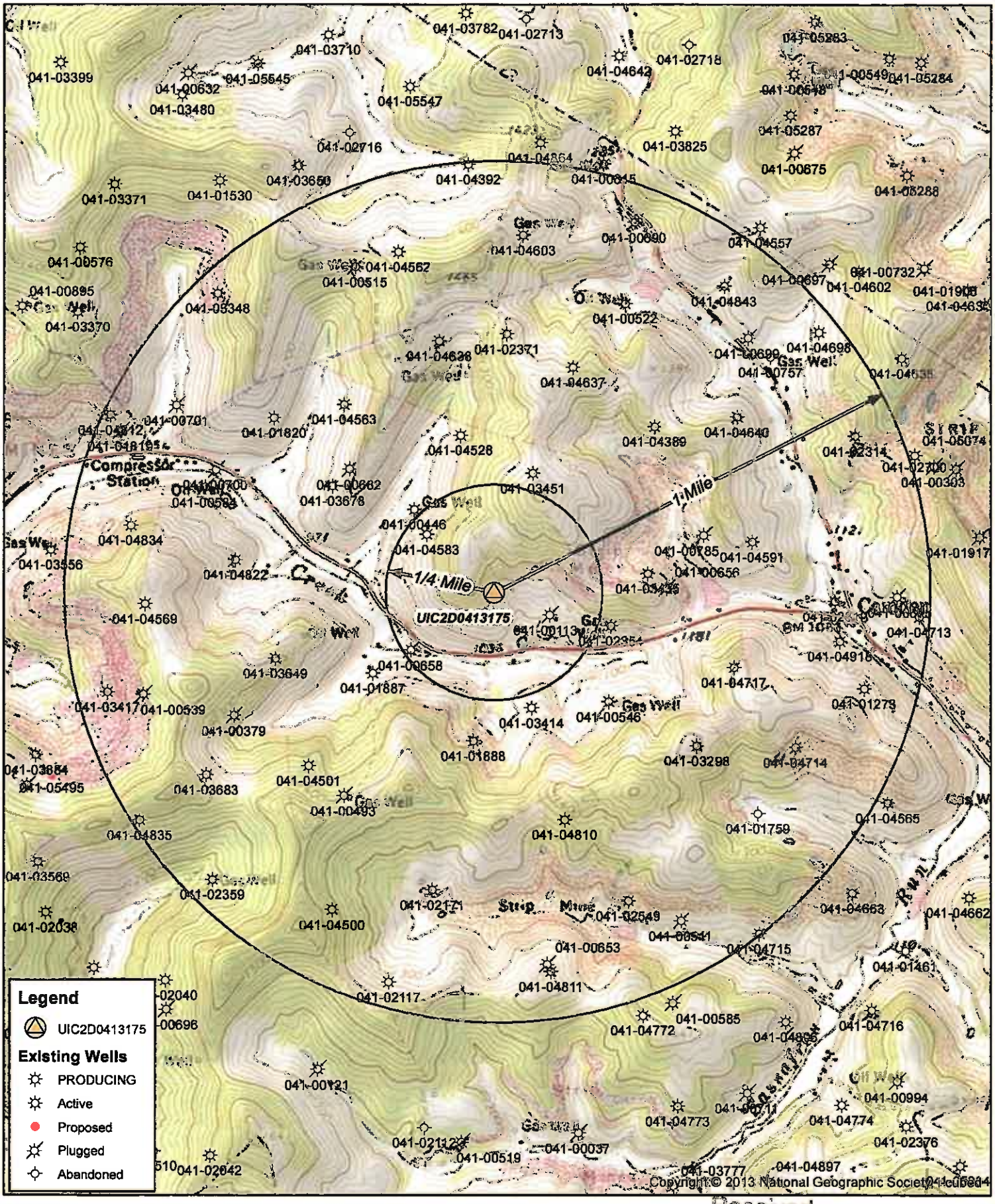

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1 inch = 1,500 feet

LAW SWS SWD UIC2D0413175

Freemans Creek District, Lewis County, WV

Camden 7.5' Quad

APPENDIX C

Wells within the Area of Review

API #	Well Type	Well Status (Active, Abandoned, Shut-in, Plugged)	Northing (UTM NAD 83 Meters)	Easting (UTM NAD 83 Meters)	Penetrate Injection Zone (Y or N)	Penetrate Confining Zone (Y or N)	Total Vertical Depth	Surface Elevation
47-041-30313	Production	Plugged	4,322,903	536,390	Y	Y	2474	1187
47-041-30658	Production	Plugged	4,322,772	535,872	Y	Y	2353	1018
47-041-04583	Production	Active	4,323,201	535,935	Y	Y	3509	1180

Make as many copies as necessary and include page numbers as appropriate.

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GG-10

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION

WELL RECORD

Permit No. Lew-113-D

Oil or Gas Well _____ (KIND)

Company Hope Natural Gas Company
Address 445 West Main St. Clarksburg, W.Va.
Farm John Hanigan Acres 60
Location (waters) _____
Well No. 8296 Elev. 1295
District Freemans Creek County Lewis
The surface of tract is owned in fee by _____
Address _____
Mineral rights are owned by _____
Address _____
Drilling commenced May 23, 1910
Drilling completed June 25, 1910
Date Shot _____ From _____ To _____
With _____
Open Flow _____ /10ths Water in _____ Inch
_____ /10ths Merc. in _____ Inch
Volume _____ Cu. Ft.
Rock Pressure _____ lbs. _____ hrs.
Oil _____ bbls., 1st 24 hrs.
Fresh water None recorded feet _____ feet
Salt water None recorded feet _____ feet

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer
13			
10	172	Pulled	Size of
8¼	780	Pulled	
6⅝	1918	1818	Depth set
5 3/16	2511	2511	
3			Perf. top
2			Perf. bottom
Liners Used			Perf. top
			Perf. bottom

CASING CEMENTED Not cemented SIZE No. Ft. Date

COAL WAS ENCOUNTERED AT 295 FEET 60 INCHES
680 FEET 60 INCHES FEET INCHES
FEET INCHES FEET INCHES

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth Found	Remarks
	Pittsburgh Coal		295	300			
	Little Dunkard		535	570			
	Big Dunkard		735	790	Coal 680 685		
	Gas sand		850	890			
	First Salt		1093	1153			
	Second Salt		1415	1560	show gas	1500	
	Maxon		1790	1800			
	Little Lime		1807	1822			
	Pencil cave		1822	1852			
	Big Lime		1857	1902			
	Big Injun		1907	2115	gas	1930	
	Squaw		2120	2142			
	Gordon Stray		2487	2494			
	Gordon		2503	2524	gas	2505	
	Total depth			2526			

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OG-16

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION

WELL RECORD

Permit No. LEW-115 — Oil or Gas Well (KIND)

Company Hope Natural Gas Company.
Address 445 West Main St. Clarksburg, W.Va.
Farm John Hanigan Acres 60
Location (waters)
Well No. 8296 Elev. 1295
District Freemans Creek County Lewis
The surface of tract is owned in fee by
Address
Mineral rights are owned by
Address
Deeper
Drilling commenced October 18, 1945
Drilling completed November 23, 1945
Date Shot 11-14-45 From 2724 To 2734
With 20qts
Open Flow 45 /10ths Water in 1" Inch
/10ths Merc. in Inch
Volume Cu. Ft.
Rock Pressure lbs. hrs.
Oil bbls., 1st 24 hrs.
Fresh water none feet feet
Salt water none feet feet

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer
13			
10	172	Pulled	Size of
8¼	760	Pulled	
6⅝	1918	1918	Depth set
5 3/16	2511	2511	
3			Perf. top
2			Perf. bottom
Liners Used			Perf. top
			Perf. bottom

CASING CEMENTED No SIZE No. Ft. Date

COAL WAS ENCOUNTERED AT No FEET INCHES
FEET INCHES FEET INCHES
FEET INCHES FEET INCHES

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth Found	Remarks
		RECORD OF DEEPER DRILLING					
	Commenced drilling			2526			
	Fifth sand		2719	2736	gas	2724 2734	
	Total depth			2770			

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STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
Oil and Gas Division
WELL RECORD

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DEPT. OF MINES

Rotary____ Oil____
Cable xx Gas xx
Recycling____ Comb.____
Water Flood____ Storage____
Disposal____ ____(Kind)

Quadrangle VADIS

Permit No. LEW-113-D-Frac

Company Consolidated Gas Supply Corporation
Address Clarksburg, W. Va.
Farm John Hanigan Acres 60
Location (waters) ____
Well No. 8296 Elev. 1295'
District Freemans Creek County Lewis
The surface of tract is owned in fee by ____
____
Address ____
Mineral rights are owned by ____
____ Address ____
Drilling Commenced 3-15-10
Drilling Completed 6-25-10
Initial open flow Exhausted cu. ft. ____ bbls.
Final production 32 M cu. ft. per day ____ bbls.
Well open 14 days hrs. before test 250# RP.

Casing and Tubing	Used in Drilling	Left in Well	Cement fill up Cu. ft. (Sks.)
Size 20-16 Cond.			
xx13x10"	172	None	
9 5/8			
8 5/8	780	None	
7	1918	1918	
5 1/2	2511	None	
4 1/2			
3 1/2"	2082	2082	35 bags
2			
Liners Used			

Well treatment details:
Attach copy of cementing record.

Well fractured 2-7-73 with 25,000# sand, 466 bbl water, 500 gal 15% acid
Perforations: 2010-2018' with 16 holes

Coal was encountered at 295' Feet 60" Inches
Fresh water None Feet ____ Salt Water None Feet ____
Producing Sand Injun Depth 2010-2018'

Formation	Color	Hard or Soft	Top Feet	Bottom Feet	Oil, Gas or Water	* Remarks
Pittsburgh Coal			295	300		
Dunkard Sand			535	790		
Salt Sand			1093	1560	Gas 1500'	
Maxton			1790	1800		
Injun Sand			1907	2115	Gas 1930'	
Total Depth				2115'		

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Consolidated Gas Supply Corporation
445 West Main Street
Clarksburg, W. Va.

(over)

* Indicates Electric Log tops in the remarks section.

Form OG-10

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION 3

WELL RECORD

Quadrangle VADIS

Permit No. Lew 658

Oil or Gas Well Dry (KIND)

Company Angotti & Lydon
Address Weston, West Virginia
Farm Nell McBride Acres 150
Location (waters) Middle Run
Well No. 3 Elev. 1121
District Court House County Lewis
The surface of tract is owned in fee by Nell McBride et al
Weston, W. Va Address
Mineral rights are owned by Same
Address
Drilling commenced Feb. 1, 1961
Drilling completed Mar. 2nd, 1961
Date Shot From To
With
Open Flow /10ths Water in Inch
/10ths Merc. in Inch
Volume none Cu. Ft.
Rock Pressure none lbs. hrs.
Oil bbls., 1st 24 hrs.
WELL ACIDIZED no

WELL FRACTURED no

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer
13			
10	20 ft	20	Size of
8¼	490	490	
6⅝			Depth set
5 3/16			
3			Perf. top
2			Perf. bottom
Liners Used			Perf. top
			Perf. bottom

CASING CEMENTED SIZE No. Ft. Date
none
COAL WAS ENCOUNTERED AT FEET INCHES
FEET INCHES FEET INCHES
FEET INCHES FEET INCHES

RESULT AFTER TREATMENT Injun sand all broken up.
ROCK PRESSURE AFTER TREATMENT
Fresh Water 16 Feet Salt Water none Feet

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth	Remarks
Red Clay			0	20			
Sand			20	40			
Sandy Shale			40	85			
Red Clay			85	105			
Shale			105	198			
Lime			198	210			
Shale			210	300			
Red Rock			300	430			
Gray Shale			430	500			
Lime			500	510			
Red Rock			510	525			
Shale			525	615			
Red Rock			615	635			
Sand			635	670			
Shale			670	700			
Lime			700	720			
Shale			720	830			
Sand			830	1050			
Shale			1050	1140			
Sand			1140	1190			
Shale			1190	1240			
Sand			1240	1287			
Shale			1287	1335			
Sand			1335	1478			
Shale			1478	1610			
Red Rock			1610	1745			
Shale			1745	1765			

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(over)

Formation	Color	Hard or Soft	Top 3	Bottom	Oil, Gas or Water	Depth Found	Remarks
Sand			1765	1780			
Shale			1780	1800			
Lime			1800	1830			
Shale			1830	1845			
Little Lime			1845	1870			
Pencil Cave			1870	1872			
Big Lime			1872	1922			
Injun Sand			1922	2055 Total Depth			

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Form OG-10

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION

Quadrangle Vadis

Permit No. LEW-658-D

WELL RECORD

Oil or Gas Well Gas (KIND)

Company PACE BOWER CONSTRUCTION CO.
Address PINEVILLE, WEST VIRGINIA
Farm NELL McBRIDE Acres 150
Location (waters)
Well No. 3 Elev. 1121
District Court House County Lewis
The surface of tract is owned in fee by
Address
Mineral rights are owned by
Address
Drilling commenced Oct. 18, 1961
Drilling completed Oct. 30, 1961
Date Shot From To
With
Open Flow /10ths Water in Inch
/10ths Merc. in Inch
Volume Cu. Ft.
Rock Pressure lbs. hrs.
Oil bbls., 1st 24 hrs.
WELL ACIDIZED 4/18/62 - 500 Gal 15% Acid; 500 Gal 15% Mud Acid; 500 gal conv. T XR-1; 31,500 Gal Water; 48000# Sand
WELL FRACTURED

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer
13			
10	19	19	Size of
8¼	480	480	
6⅝			Depth set
5 3/16			
4½"	2726	2726	Perf. top
2			Perf. bottom
Liners Used			Perf. top
8" & 10" left in by Angotti & Lydon			Perf. bottom

CASING CEMENTED 4½" SIZE 6 No. Ft 11-1-61 Date
4½" Casing cemented approx. 1200' outside
COAL WAS ENCOUNTERED AT FEET INCHES
FEET INCHES FEET INCHES
FEET INCHES FEET INCHES

RESULT AFTER TREATMENT 22/10 M 2"; 800,000 24 Hour Test
ROCK PRESSURE AFTER TREATMENT 820# - 15 Hours
Fresh Water Feet Salt Water Feet

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth	Remarks
WELL DRILLED TO DEPTH OF 2052 FEET BY ANGOTTI & LYDON:							
SAND			2052	2103			
SLATE			2103	2117			
SAND, BROKEN			2117	2144			
SAND			2144	2261			
SLATE & SHELLS			2261	2374			
SAND			2374	2433			
SLATE & SHELLS			2433	2455			
SAND			2455	2556			
SLATE			2556	2592			
SAND (FIFTH)			2592	2709	Gas	2692-2696	
TOTAL DEPTH				2709			

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(over)

WR-35 API #: 47-041-04583

State of West Virginia
Division of Environmental Protection
Section of Oil and Gas

Well Operator's Report of Well Work

Farm Name: POPE, ROBERT & ARLE Operator Well No.: DEBRULAR LOHAN # 3
B-234

LOCATION: Elevation: 1180 Quadrangle: CAMDEN

District: Freemans Creek County: LEWIS
Latitude: 9400 Feet South of 39 Deg. 5 Min. 0 Sec.
Longitude: 300 Feet West of 80 Deg. 35 Min. 0 Sec.

Company: BOWIE, INC.
PO DRAWER 1430
CLARKSBURG, WV 26302-1430
Agent: William H. Bowie
Inspector: Tim Bennett
Permit Issued: 06/18/2002
Well Work Commenced: 9/18/2003
Well Work Completed: 9/22/2003
Verbal Plugging
Permission granted on:
Rotary: ☑ Cable: ☐ Rig
Total Depth (feet): 3509
Fresh Water Dept 42

Salt Water Depth NA

Is Coal Being Mined in the Area? (Y/N) N
Coal Depths (ft): NA

Casing & Tubing	Used in Drilling	Left in Well	Cement Fill Up in SKS
9 5/8	40	40	CTS
7	1153	1153	205 sks
4 1/2	3384	3384	120 sks

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Office of Chief
OCT 2 2 2003
WV Department of
Environmental Protection

OPEN FLOW DATA

Producing formation Baltown, Speechley Elizabeth Pay zone depth (ft) 3178-3345, 2914-2916
Gas: Initial open flow: 189 MCF/day Oil: Initial open flow: NA BBL/day
Final open flow: 200 MCF/day Final open flow: NA BBL/day
Time of open flow between initial and final tests: after frac Hours
Static Rock Pressure: 250 psig (surface pressure) after 12 Hours

Producing formation 5th Sand, Bayard 30', Gordon Pay zone depth (ft) 2464-2442, 2246-2312
Gas: Initial open flow: comingled MCF/day Oil: Initial open flow: NA BBL/day
Final open flow: comingled MCF/day Final open flow: NA BBL/day
Time of open flow between initial and final tests: NA Hours
Static Rock Pressure: comingled psig (surface pressure) after NA 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 WELBORE.

For: Bowie, Inc.
By: William C. Bowie
Date: 10/9/2003

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OCT 20 2016
WV Department of Environmental Protection

LEW 4583

API: 47-041-04583 BOWIE #: 234 DEBRULAR LOHAN 3

Fracture Record: Elizabeth, Speechley, Balltown (2914-3345) 20 holes, 750 gal 15% HCl, 208 sks sand, 359 bbl X-Link H2O, 25bpm@2654#, 2-4-6ppg

Bayard, 5th Sand (2464-2442) 15 holes, 500 gal 15% HCl, 159 sks sand, 272 bbl X-Link H2O, 29bpm@1862#, 1,2.5,4,6ppg

30', Gordon (2246-2312) 16 holes, 500 gal 15% HCl, 180 sks sand, 340 bbl X-Link H2O, 26bpm@2062#, 1,2,3,4ppg

FORMATION	COMMENT
Maxton, 1400-1415	-H2O: 1/4"@42'
Little Lime, 1520-1540	-Gas: 1839' 133k, 2586' 60k, 2521' 103k, 3105' 198k, 3250' 189k, 3448' 189k, TD 189k
Big Lime, 1570-1675	
Keener, 1675-1680	
Big Injun, 1680-1730	
30', 2235-2290	
Gordon, 2300-2320	
5th Sand, 2450-2500	
Bayard, 2520-2550	
Elizabeth, 2910-2920	
Warren, 3080-3090	
Speechley, 3160-3190	
Balltown, 3340-3350	

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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)

_____

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

_____

that there are no such publically recorded sources.

_____

(Signature of Authorized Representative)

Sworn and subscribed to before me this _____day of _____, 20_____.

_____, my commission expires _____

(Notary Signature)

_____.

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Section 7 – Area of Review:

Section 7.3 Depth to the bottom of all USDWs:

- There are ninety three (93) water supply wells within the AOR. These wells are reported to be less than 100 feet deep and believed to be drawing water from Conemaugh group. The topographic map showing a one mile radius around the proposed SWD well is attached. The location of the proposed facility and the sites of all surface bodies of water, including drinking water wells, ponds, springs, and creeks are noted in the Water Supply Exhibit in Section 7 of this permit application.

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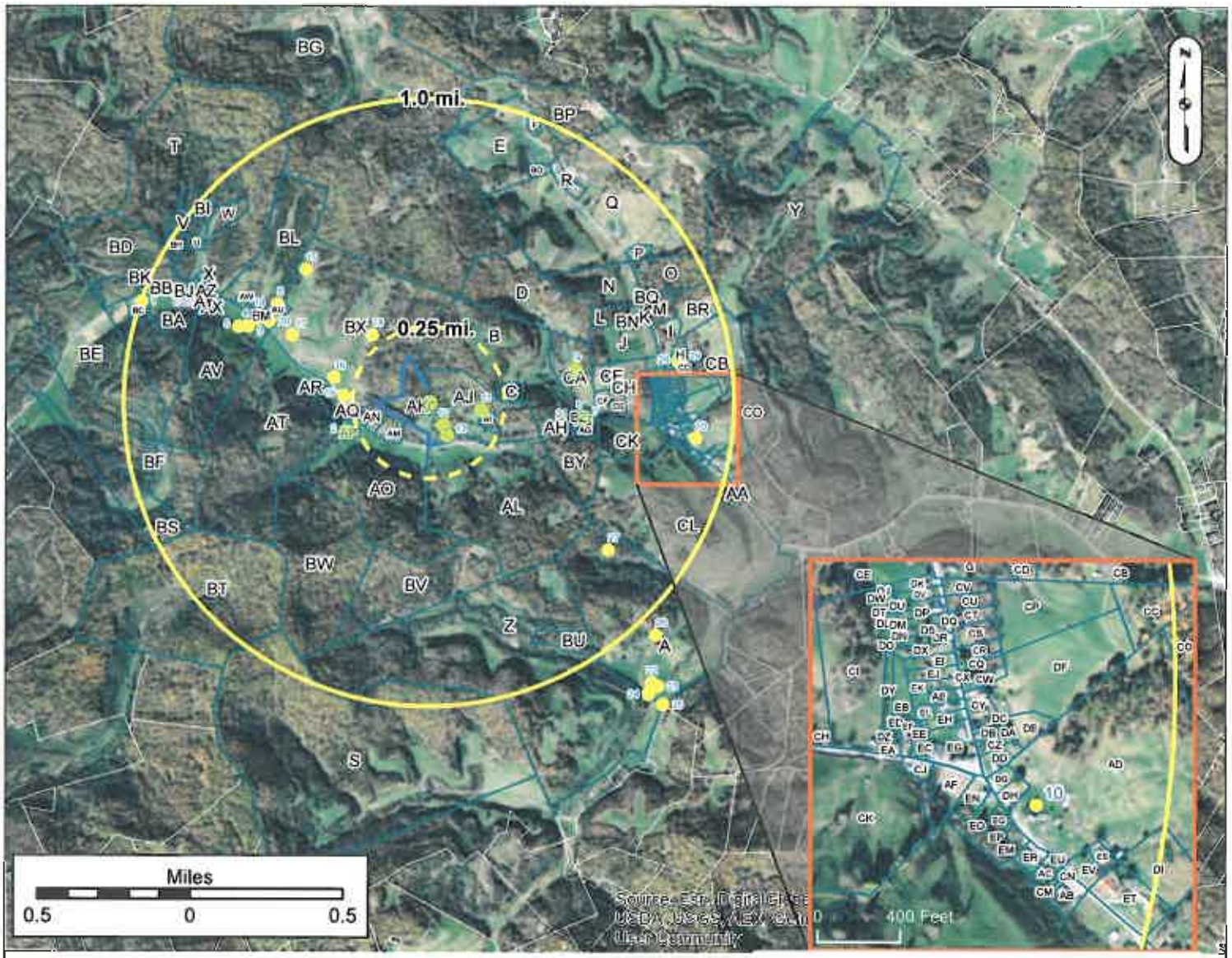
WATER SUPPLY EXHIBIT
A-1141 INJECTION WELL



LOT OWNERS

LABEL	OWNER	TM
A	PRATT WILLIAM D	09 4F0039000000000
B	SARGENT SEAN P & CRAIG S	09 4F0025000100000
C	SWIGER DONALD L & BARBARA	09 4F0025000200000
D	SARGENT SEAN P & CRAIG B	09 4E0031400000000
E	WOOFTER LARETTA DIANNE ET AL	09 4E0028000000000
F	WALKER LORETTA DIANE WOOFTER	09 4E0028000100000
G	MALLION SYLVIA E	09 4F0028000000000
H	WIANT KENNETH J	09 4F0027000300000
I		09 4F0027000100000
J	GROAH EUGENE C & ANNA I	03 4F0026000000000
K	VILLERS EVELYN M	09 4E0031500010000
L	GROSE TIMOTHY W & PAMELA JANE	03 4E0031500000000
M	MONTGOMERY BETTY GAE	03 4E0026000000000
N	CONKLING DANIEL C & NANCY E	09 4E0031600000000
O	MONTGOMERY JAMES J & WILMA J	09 4E0025000000000
P	MICK MARJORIE ANNE B & JAMES M	09 4E0024000010000
Q	COLE JOHN ANDREW JR & LEE ANN	09 4E0024000000000
R	COLE JOHN ANDREW	09 4E0024000100000
S	CUMMINGS PROPERTIES LLC	09 4E0000200004000
T	STOUT KENNETH E & IONA C	09 4E0026000000000
U	HAMON SHARON GROAH	09 4E0026000050000
V	MCCARTNEY BETTY L	03 4E0026000300000
W	LAMB WANDA J	03 4E0026000400000
X	PRATT ROBERT	03 4E0026000600000
Y	WHITE BURL L & JANE B	03 5E0004000100000
Z	RENZELLI PHILIP JR	03 4F0009000000000
AA	GARRETT SAMUEL L	03 4F0036000100000
AB	DAVIS BETTY	03 4F0036000100000
AC	TALBOTT CAROL	03 4F0036000200000
AD	KEMPER JAMES HUGH &CAROLYN LEE	03 4F0035000000000
AE		03 7SERT0000000000
AF	SUTTON JEREMY	03 4F0034000000000
AG	WHITE MARK E & KATHERINE S	09 4F0022000100000
AH	HITT RUSSELL J & DEBRA J	03 4F0023000000000
AI	LAW JOHN E & MELINDA A	03 4F0020000100000
AJ	LAW JOHN TROXELL & BERNADETTE H	09 4F0020000000000
AK	LAW JOHN TROXELL & BERNADETTE H	03 4F0019000000000
AL	LAW JOHN TROXELL & BERNADETTE H	09 4F0021PP00000
AM	CROSS JAMES C & LETHA MAE	03 4F0017000100000
AN	WALKER JAMES L & MARY J	03 4F0017000200000
AO	CROSS LETHA	03 4F0017000000000
AP	CROSS CASEY L & DORIS A	03 4F0017000300000
AQ	POPE ROBERT L	03 4F0018000200000
AR	STALNAKER KEITH	03 4F0022000100000
AS	GUM DANNIE J	03 4F0024000000000
AT	STALNAKER EDSEL	03 4F0022000000000
AU	POPE ROBERT C & ARLENE A	03 4F0018000100000
AV	GUM BARBARA J	03 4E0012000300000
AW	GUM JAMES GROVER II & DEBRA	03 4E0012000400000
AX	TITUS PAUL D	03 4E0012000200000
AY	TITUS PAUL D	03 4E0012000100000
AZ	SOLESKY ROBERT GARY & SANDRA L	09 4E0007000100000
BA	CONSOLIDATED GAS TRANSMISSION CORPORATION	03 4E0011000000000
BB	HELMICK CLIFFORD C & LINDA K	09 4E0009000100000
BC	AMAN JAMES R	09 4E0010000000000
BD	MERTZ GREGORY R	03 4F0009000000000
BE	MERTZ GREGORY R	03 4F0001000000000
BF	MERTZ MICHAEL F JR	09 4F0008000000000
BG	YIBBY LINDA	03 4E0005000100000
BH	STOUT KENNETH E & IONA CAVELL	09 4E0006000100000
BI	CONRAD RICHARD L	03 4E0006000200000
BJ	STOUT KENNETH E & IONA C	03 4E0007000000000
BK	HELMICK CLIFFORD C & LINDA K	09 4E0008000000000
BL	GUM BARBARA JEAN	03 4E0012000000000
BM	MCDOUGAL STEPHEN & VICKIE CHARLENE	03 4E0012000500000
BN	VILLERS EVELYN M	03 4E0015000200000
BO	WALKER LARETTA DIANNE ET AL	09 4E0017000000000
BP	WALKER LARETTA DIANNE ET AL	03 4E0023000000000
BQ	MONTGOMERY BETTY GAE	03 4E0025000100000
BR	TALBOTT DARRELL & RUTH	03 4E0027000000000
BS	MERTZ MICHAEL F JR	03 4F0004000000000
BT	HARRISON KIMBERLY ANN	03 4F0006000000000
BU	BUTCHER BURKE	03 4F0012000000000
BV		09 4F0014000000000
BW	CROSS LETHA	03 4F0016000000000
BX	POPE ROBERT C & ARLENE	09 4F0018000000000
BY	COOK DEBBIE & DON	09 4F0023000000000
BZ	GUM DANNIE J	03 4F0024000100000
CA	GUM DANNIE J	09 4F0025000000000
CB	TALBOTT DARRELL & RUTH	03 4F0027000000000
CC	KEMPER JAMES HUGH & CAROLYN LEE	09 4F0027000200000
CD	AMAN ADA ALFRED DARRELL & DANNIE TALBOTT	09 4F0028000100000
CE	POPE ROBERT C & ARLENE A	09 4F0028000000000
CF	POPE ROBERT C & ARLENE A	09 4F0028000000000
CG	POPE ROBERT C & ARLENE A	09 4F0031000000000
CH	POPE ROBERT C & ARLENE A	09 4F0032000000000
CI	POPE ROBERT C & ARLENE A	03 4F0033000000000
CJ	CARDER JAMES F	09 4F0034000100000
CK	POPE ROBERT C & ARLENE A	03 4F0034000200000
CL	GARRETT SAMUEL L	03 4F0036000000000
CM	TALBOTT CAROL	03 4F0036000300000
CN	TALBOTT CAROL	03 4F0035000050000
CO	KEMPER JAMES HUGH &CAROLYN LEE	03 5F0001000000000
CP - EV	UNKNOWN	

Surface Owner: JOHN AND BERNADETTE LAW

Oil/Gas Owner: JOHN AND BERNADETTE LAW

Well Operator: LEWIS CAMDEN LLC

Address: PO BOX 470

BRIDGEPORT, WV 26330

Phone: (304) 842-6320

County: LEWIS

Township: FREEMANS CREEK DISTRICT

Surveyor: GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

Address: 301 COMMERCE PARK DR

CRANBERRY TOWNSHIP, PA 16066

Phone: 800-267-2549

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NOTICE: THE INTENT OF THIS EXHIBIT IS TO IDENTIFY EXISTING WATER SUPPLIES IN THE VICINITY OF AN INJECTION WELL, AND IS NOT A COMPLETE BOUNDARY SURVEY. PROPERTY LINES AND OWNER INFORMATION WERE OBTAINED FROM DEEDS, TAX RECORDS, AERIAL PHOTOGRAPHY, GIS, AND FIELD SURVEYED EVIDENCE.

L:\Projects\Southwestern Energy\GESVA-1141_Injection_Well\A-1141_Injection_Well_Aerial_Water_Supply_Exhibit_rev1.mxd - Scale 1:9,797 - 11/12/2015 4:48:48 PM - jbautista - NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet

MOUNTAIN V OIL & GAS, INC.

WATER SUPPLY EXHIBIT
A-1141 INJECTION WELL

No.	WATER PURVEYOR	SUPPLY	ELEV.	ADDRESS	PHONE #
1	AMAN JAMES R	WELL	958*	6299 US HWY 33 W CAMDEN, WV 26338	304-269-5485
2	CROSS CASEY L & DORIS A	WELL	1011*	5427 US HWY 33 W CAMDEN, WV 26338	304-517-9958
3	GUM BARBARA J	UNUSED WELL	965*	185 CHURCHVILLE RD CAMDEN, WV 26338	304-269-3612
4	GUM BARBARA J	STREAM	964*	185 CHURCHVILLE RD CAMDEN, WV 26338	304-269-3612
5	GUM BARBARA J	POND	961*	185 CHURCHVILLE RD CAMDEN, WV 26338	304-269-3612
6	GUM BARBARA J	STREAM	996*	185 CHURCHVILLE RD CAMDEN, WV 26338	304-269-3612
7	GUM DANNIE J	WELL	1147*	4652 US HWY 33 W CAMDEN, WV 26338	304-269-1331
8	GUM DANNIE J	POND	1146*	4652 US HWY 33 W CAMDEN, WV 26338	304-269-1331
9	GUM DANNIE J	SPRING	1207*	4652 US HWY 33 W CAMDEN, WV 26338	304-269-1331
10	KEMPER JAMES HUGH & CAROLYN LEE	WELL	1123*	P.O. BOX 534 CAMDEN, WV 26338	304-269-3491
11	LAW JOHN E & MELINDA A	WELL	1213*	4884 US HWY 33 W CAMDEN, WV 26338	304-269-7244
12	LAW JOHN TROXELL & BERNADETTE H	WELL	1109*	5096 US HWY 33 W CAMDEN, WV 26338	304-269-3681
13	LAW JOHN TROXELL & BERNADETTE H	POND	1068*	5096 US HWY 33 W CAMDEN, WV 26338	304-269-3681
14	MCDOUGAL STEPHEN & VICKIE	WELL	983*	5096 US HWY 33 W CAMDEN, WV 26338	304-269-3226
15	POPE ROBERT C & ARLENE A	STREAM	1028*	5872 US HWY 33 W CAMDEN, WV 26338	304-269-2160

No.	SUPPLY COORDINATES	DISTANCE FROM INJECTION WELL	DISTANCE FROM INJECTION WELL	DISTANCE FROM INJECTION WELL
1	39° 03' 34"N 80° 35' 57"W	5300		
2	39° 03' 13"N 80° 35' 12"W	1536		
3	39° 03' 32"N 80° 35' 32"W	3299		
4	39° 03' 30"N 80° 35' 34"W	3392		
5	39° 03' 30"N 80° 35' 36"W	3549		
6	39° 03' 34"N 80° 35' 27"W	3123		
7	39° 03' 16"N 80° 34' 19"W	2763		
8	39° 03' 17"N 80° 34' 20"W	2655		
9	39° 03' 25"N 80° 34' 22"W	2607		
10	39° 03' 14"N 80° 33' 55"W	4668		
11	39° 03' 17"N 80° 34' 42"W	922		
12	39° 03' 15"N 80° 34' 50"W	468		
13	39° 03' 13"N 80° 34' 49"W	628		
14	39° 03' 32"N 80° 35' 31"W	3294		
15	39° 03' 40"N 80° 35' 21"W	3133		

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*ELEVATIONS SHOWN ARE INTERPOLATED FROM LIDAR TOPO AND SUPPLY COORDINATES ARE FROM OTHERS.

MOUNTAIN V OIL & GAS, INC.

WATER SUPPLY EXHIBIT
A-1141 INJECTION WELL

GES

No.	WATER PURVEYOR	SUPPLY	ELEV.	ADDRESS	PHONE #
16	POPE ROBERT C & ARLENE A	STREAM	995*	5872 US HWY 33 W CAMDEN, WV 26338	304-269-2160
17	POPE ROBERT C & ARLENE A	CATCH POND	1005*	5872 US HWY 33 W CAMDEN, WV 26338	304-269-2160
18	POPE ROBERT C & ARLENE A	CATCH POND	1041*	5872 US HWY 33 W CAMDEN, WV 26338	304-269-2160
19	POPE ROBERT C & ARLENE A	CATCH POND	1002*	5872 US HWY 33 W CAMDEN, WV 26338	304-269-2160
20	POPE ROBERT C & ARLENE A	WELL	971*	5872 US HWY 33 W CAMDEN, WV 26338	304-269-2160
21	POTTER ANDREW E & DORIS J	WELL	1204*	28 MAPLEWOOD DR WESTON, WV 26452	304-517-0548
22	PRATT WILLIAM D	WELL	1101*	829 GEE LICK RD WESTON, WV 26452	304-269-7431
23	PRATT WILLIAM D	DUG WELL	1098*	829 GEE LICK RD WESTON, WV 26452	304-269-7431
24	PRATT WILLIAM D	STREAM	1090*	829 GEE LICK RD WESTON, WV 26452	304-269-7431
25	PRATT WILLIAM D	STREAM	1085*	829 GEE LICK RD WESTON, WV 26452	304-269-7431
26	PRATT WILLIAM D	POND	1211*	829 GEE LICK RD WESTON, WV 26452	304-269-7431
27	PRATT WILLIAM D	SPRING	1181*	829 GEE LICK RD WESTON, WV 26452	304-269-7431
28	WIANT KENNETH J	WELL	1140*	220 CHURCHVILLE RD CAMDEN, WV 26338	
29	WIANT KENNETH J	STREAM	1146*	CAMDEN, WV 26338	

No.	SUPPLY COORDINATES	DISTANCE FROM INJECTION WELL	DISTANCE FROM INJECTION WELL	DISTANCE FROM INJECTION WELL
16	39° 03' 22"N 80° 35' 15"W	1706		
17	39° 03' 29"N 80° 35' 24"W	2636		
18	39° 03' 30"N 80° 35' 06"W	1567		
19	39° 03' 19"N 80° 35' 12"W	1464		
20	39° 03' 31"N 80° 35' 29"W	3104		
21	39° 03' 15"N 80° 34' 25"W	6303		
22	39° 02' 31"N 80° 34' 03"W	6168		
23	39° 02' 31"N 80° 34' 01"W	6330		
24	39° 02' 30"N 80° 34' 03"W	6319		
25	39° 02' 28"N 80° 34' 00"W	6603		
26	39° 02' 40"N 80° 34' 02"W	5599		
27	39° 02' 54"N 80° 34' 13"W	4039		
28	39° 03' 27"N 80° 33' 59"W	4363		
29	39° 03' 27"N 80° 33' 59"W	4430		

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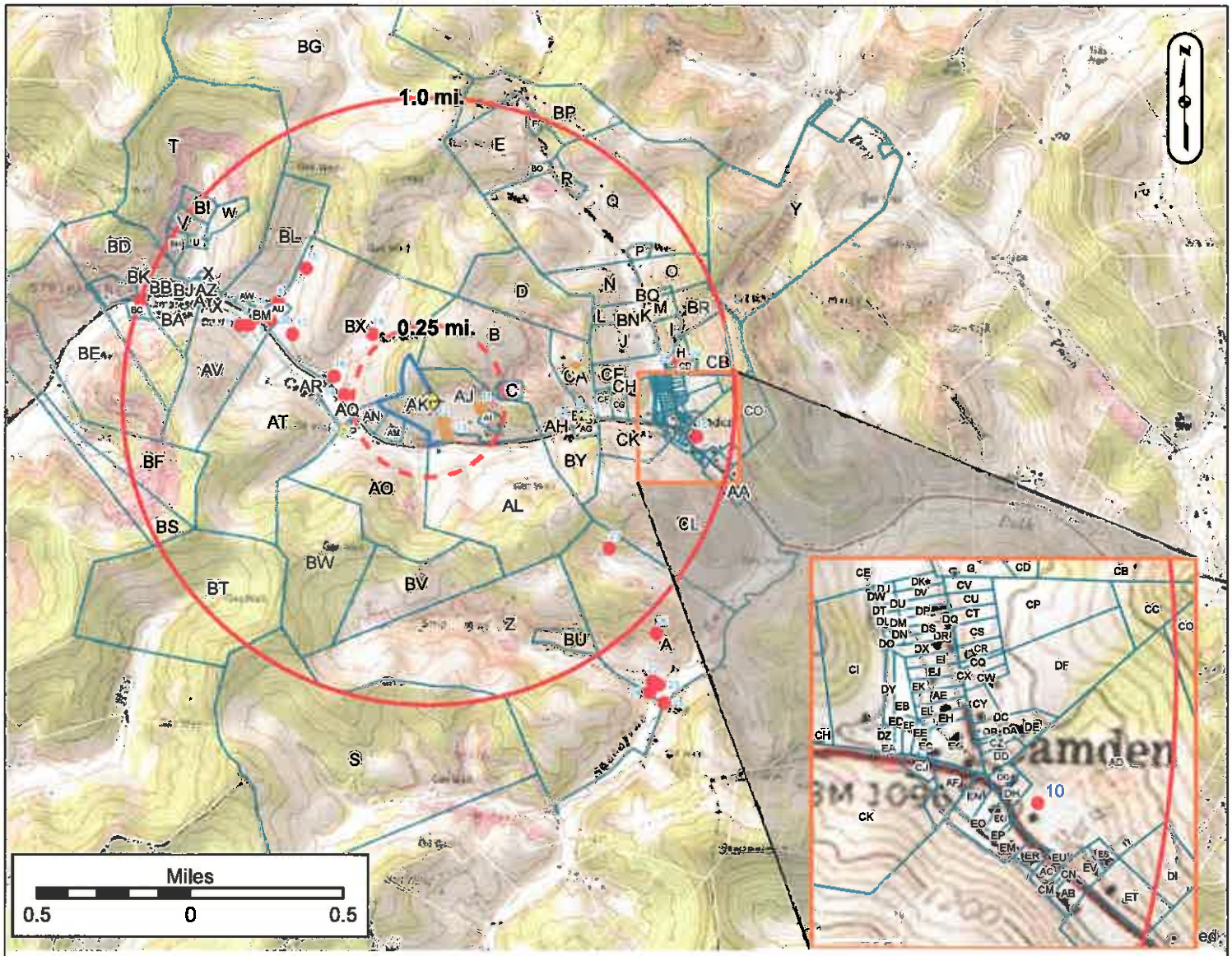
*ELEVATIONS SHOWN ARE INTERPOLATED FROM LIDAR TOPO AND SUPPLY COORDINATES ARE FROM OTHERS.

WATER SUPPLY EXHIBIT
A-1141 INJECTION WELL



LOT OWNERS

LABEL	OWNER	TM
A	PRATT WILLIAM D	03 4F0057000000
B	SARGENT SEAN P & CRAIG S	03 4F0025000100
C	SWIGER DONALD L & BARBARA	03 4F0025000200
D	SARGENT SEAN P & CRAIG B	03 4E0014000000
E	WOOFTER LARETTA DIANNE ET AL	03 4E0018000000
F	WALKER LORETTA DIANE WOOFTER	03 4E0018000100
G	MALLION SYLVIA E	03 4F0028000000
H	WIANT KENNETH J	03 4F0027000000
I		03 4F0027000100
J	GROAH EUGENE C & ANNA I	03 4F0026000000
K	VILLERS EVELYN M	03 4E0015000000
L	GROSE TIMOTHY W & PAMELA JANE	03 4E0015000000
M	MONTGOMERY BETTY GAE	03 4E0026000000
N	CONKLING DANIEL C & NANCY E	03 4E0016000000
O	MONTGOMERY JAMES J & WILMA J	03 4E0025000000
P	MICK MARJORIE ANNE & JAMES M	03 4E0024000100
Q	COLE JOHN ANDREW JR & LEE ANN	03 4E0024000700
R	COLE JOHN ANDREW	03 4E0024000200
S	CUMMINGS PROPERTIES LLC	03 4E0022000000
T	STOUT KENNETH E & IONA C	03 4E0006000000
U	HAMON SHARON GROAH	03 4E0006000500
V	MCCARTNEY BETTY L	03 4E0006000300
W	LAMB WANDA J	03 4E0006000400
X	PRATT ROBERT	03 4E0006000600
Y	WHITE BURL L & JANE B	03 5E0004000100
Z	RENZELLI PHILIP JR	03 4F0009000000
AA	GARRETT SAMUEL L	03 4F0035000400
AB	DAVIS BETTY	03 4F0016000100
AC	TALBOTT CAROL	03 4F0036000200
AD	KEMPER JAMES HUGH &CAROLYN LEE	03 4F0035000000
AE		03 7SERT0000000
AF	SUTTON JEREMY	03 4F0034000000
AG	WHITE MARK E & KATHERINE S	03 4F0022000100
AH	HITT RUSSELL J & DEBRA J	03 4F0023000000
AI	LAW JOHN E & MELINDA A	03 4F0022000100
AJ	LAW JOHN TROXELL & BERNADETTE H	03 4F0023000000
AK	LAW JOHN TROXELL & BERNADETTE H	03 4F0019000000
AL	LAW JOHN TROXELL & BERNADETTE H	03 4F0021000000
AM	CROW JAMES C & LETHA MAE	03 4F0017000100
AN	WALKER JAMES L & MARY J	03 4F0017000200
AO	CROSS LETHA	03 4F0017000000
AP	CROSS CASEY L & DORIS A	03 4F0017000300
AQ	POPE ROBERT L	03 4F0018000200
AR	STALNAKER KEITH	03 4F0028000100
AS	GUM DANNIE J	03 4F0024000000
AT	STALNAKER EDSEL	03 4F0028000000
AU	POPE ROBERT C & ARLENE A	03 4F0018000100
AV	GUM BARBARA J	03 4E0012000000
AW	GUM JAMES GROVER II & DEBRA	03 4E0012000100
AX	TITUS PAUL D	03 4E0012000000
AY	TITUS PAUL D	03 4E0012000100
AZ	SOLESKY ROBERT GARY & SANDRA L	03 4E0007000100
BA	CONSOLIDATED GAS TRANSMISSION CORPORATION	03 4E0011000000
BB	HELMICK CLIFFORD C & LINDA K	03 4E0009000100
BC	AMAN JAMES R	03 4E0010000000
BD	MERTZ GREGORY R	03 4E0009000000
BE	MERTZ GREGORY R	03 4F0031000000
BF	MERTZ MICHAEL F JR	03 4F0033000000
BG	KIRBY LINDA	03 4E0005000000
BH	STOUT KENNETH E & IONA CAVELL	03 4E0005000100
BI	CONRAD RICHARD L	03 4E0005000200
BJ	STOUT KENNETH E & IONA C	03 4E0007000000
BK	HELMICK CLIFFORD C & LINDA K	03 4E0008000000
BL	GUM BARBARA JEAN	03 4E0012000000
BM	MCDOUGAL STEPHEN & VICKIE CHARLENE	03 4E0012000500
BN	VILLERS EVELYN M	03 4E0015000000
BO	WALKER LARETTA DIANNE ET AL	03 4E0012000000
BP	WALKER LARETTA DIANN E ET AL	03 4E0023000000
BQ	MONTGOMERY BETTY GAE	03 4E0026000000
BR	TALBOTT DARRELL & RUTH	03 4E0027000000
BS	MERTZ MICHAEL F JR	03 4F0004000000
BT	HARRISON KIMBERLY ANN	03 4F0008000000
BU	GUTCHER BURKE	03 4F0012000000
BV		03 4F0014000000
BW	CROSS LETHA	03 4F0016000000
BX	POPE ROBERT C & ARLENE	03 4F0016000000
BY	COOK DEBBIE & DON	03 4F0022000000
BZ	GUM DANNIE J	03 4F0024000100
CA	GUM DANNIE J	03 4F0025000000
CB	TALBOTT DARRELL & RUTH	03 4F0027000000
CC	KEMPER JAMES HUGH & CAROLYN LEE	03 4F0027009N000
CD	AMAN ADA ALFRED DARRELL & DANNIE TALBOTT	03 4F0028000000
CE	POPE ROBERT C & ARLENE A	03 4F0029000000
CF	POPE ROBERT C & ARLENE A	03 4F0030000000
CG	POPE ROBERT C & ARLENE A	03 4F0031000000
CH	POPE ROBERT C & ARLENE A	03 4F0032000000
CI	POPE ROBERT C & ARLENE A	03 4F0033000000
CJ	CARDER JAMES F	03 4F0034001000
CK	POPE ROBERT C & ARLENE A	03 4F0034002000
CL	GARRETT SAMUEL L	03 4F0036000000
CM	TALBOTT CAROL	03 4F0036000400
CN	TALBOTT CAROL	03 4F0036000500
CO	KEMPER JAMES HUGH &CAROLYN LEE	03 5F0031000000
CP - EV	UNKNOWN	

Surface Owner: JOHN AND BERNADETTE LAW

Oil/Gas Owner: JOHN AND BERNADETTE LAW

Well Operator: LEWIS CAMDEN LLC

Address: PO BOX 470

BRIDGEPORT, WV 26330

Phone: (304) 842-6320

County: LEWIS

Township: FREEMANS CREEK DISTRICT

Surveyor: GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

Address: 301 COMMERCE PARK DR

CRANBERRY TOWNSHIP, PA 16066

Phone: 800-267-2549

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NOTICE: THE INTENT OF THIS EXHIBIT IS TO IDENTIFY EXISTING WATER SUPPLIES IN THE VICINITY OF AN INJECTION WELL, AND IS NOT A COMPLETE BOUNDARY SURVEY. PROPERTY LINES AND OWNER INFORMATION WERE OBTAINED FROM DEEDS, TAX RECORDS, AERIAL PHOTOGRAPHY, GIS, AND FIELD SURVEYED EVIDENCE.

L:\Projects\Southwestern Energy\A1914-1141_Injection_Well\A-1141_Injection_Well_Topo_Water_Supply_Exhibit.mxd - Scale: 1:8,797 - 11/13/2015 4:49:38 PM - jfaulerio - NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet

(4/25)

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APPENDIX E
Water Sources

Operator: Lewis Camden LLC Year 2016 UIC Permit # 2D0413175

		033-WV-009-112315-1220-1-602	033-WV-009-110615-1235-1-602	033-WV-009-110615-1330-1-602	033-WV-009-110615-1150-1-602
Water Source Name		Cross	Gum Pond	Gum Spring	Gum Well
Northing		4,322,815			
Easting		535,764			
Parameter	Units				
TPH - GRO	mg/L	310	N.D.	N.D.	N.D.
TPH - DRO	mg/L	0.062	N.D.	N.D.	N.D.
TPH - ORO	mg/L	N.D.	N.D.	N.D.	N.D.
BTEX	mg/L	15, N.D., N.D., 2	N.D.	N.D.	N.D.
Chloride	mg/L	4	10.4	3.0	24.7
Sodium	mg/L	86.7	6.91	2.52	106
Total Dissolved Solids (TDS)	mg/L	214	240	224	329
Aluminum	mg/L	N.D.	0.123	N.D.	N.D.
Arsenic	mg/L	0.00088	0.0013	0.0060	0.0018
Barium	mg/L	0.236	0.0394	0.0698	0.0999
Iron	mg/L	N.D.	0.540	0.294	0.0373
Manganese	mg/L	0.0218	0.654	0.0310	0.0128
pH	SU	8.3	8.2	7.7	8.3
Calcium	mg/L	6.32	44.1	57.7	9.99
Sulfate	mg/L	N.D.	50.9	36.4	20
MBAS	mg/L	N.D.	0.056	N.D.	0.041
Dissolved Methane	mg/L	33,000	8.2	N.D.	N.D.
Dissolved Ethane	mg/L	4,400	N.D.	N.D.	N.D.
Dissolved Butane	mg/L	330	N.D.	N.D.	N.D.
Dissolved Propane	mg/L	1,800	N.D.	N.D.	N.D.
Bacteria (Total Coliform)	c/100mL	118.4	>200.5	>200.5	<1.0

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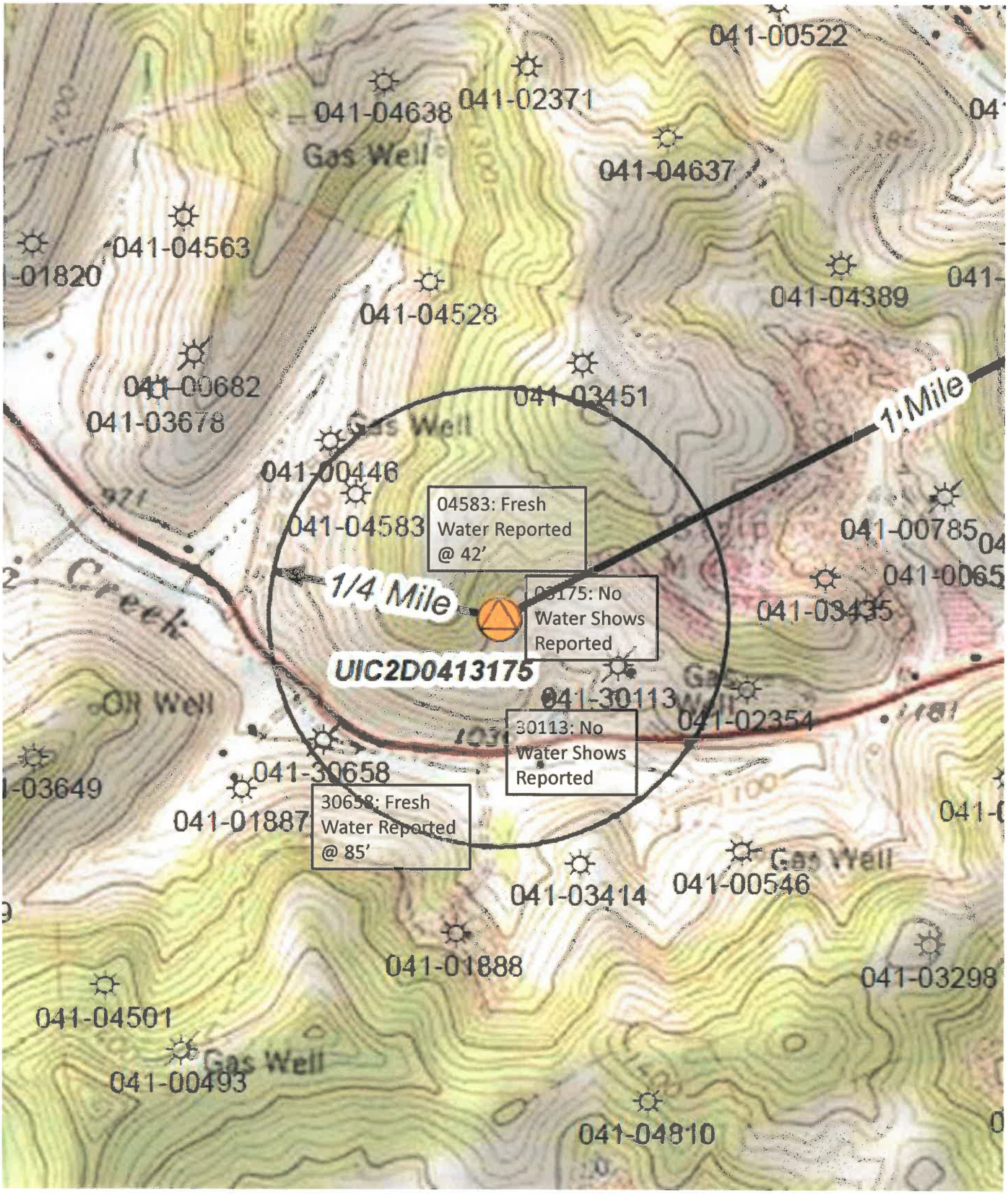
APPENDIX E
Water Sources

Operator: Lewis Camden LLC Year 2016 UIC Permit # 2D0413175

		033-WV-009-110915-1420-1-602	033-WV-009-110915-1150-1-602	033-WV-009-110915-1230-1-602	
Water Source Name		John & Melinda Law	Law Well	Law Pond	
Northing					
Easting					
Parameter	Units				
TPH - GRO	mg/L	N.D.	N.D.	N.D.	
TPH - DRO	mg/L	N.D.	N.D.	0.10	
TPH - ORO	mg/L	N.D.	N.D.	0.11	
BTEX	mg/L	N.D.	N.D.	N.D.	
Chloride	mg/L	7.2	10.3	6.5	
Sodium	mg/L	120	31.8	5.07	
Total Dissolved Solids (TDS)	mg/L	654	167	95.5	
Aluminum	mg/L	N.D.	N.D.	N.D.	
Arsenic	mg/L	N.D.	0.0027	0.00062	
Barium	mg/L	0.0415	0.281	0.0460	
Iron	mg/L	0.0470	0.239	0.211	
Manganese	mg/L	0.0526	0.168	0.0888	
pH	SU	7.9	7.9	8	
Calcium	mg/L	98.6	29	22.3	
Sulfate	mg/L	291	24	16	
MBAS	mg/L	N.D.	N.D.	N.D.	
Dissolved Methane	mg/L	N.D.	27	24	
Dissolved Ethane	mg/L	N.D.	N.D.	N.D.	
Dissolved Butane	mg/L	N.D.	N.D.	N.D.	
Dissolved Propane	mg/L	N.D.	N.D.	N.D.	
Bacteria (Total Coliform)	c/100mL	40.6	3.1	>200.5	

Promoting a healthy environment.


041-00522
041-02371
041-04638
Gas Well
041-04637
041-04563
-01820
041-04528
041-04389
041-00682
041-03678
041-03451
Gas Well
041-00446
1 Mile
041-04583
04583: Fresh Water Reported @ 42'
041-00785
041-0065
1/4 Mile
03175: No Water Shows Reported
041-03435
UIC2D0413175
Oil Well
041-30113
041-02354
30113: No Water Shows Reported
-03649
041-30658
041-01887
30658: Fresh Water Reported @ 85'
Gas Well
041-00546
041-03414
041-01888
041-03298
041-04501
Gas Well
041-00493
041-04810

SWN
Southwestern Energy
PO Box 1300
Jane Lew, WV 26378
PHONE: (304) 884-1610

December 28, 2015

Greg Cross
P.O. Box 44
Friendly, WV 26146

Certified Mail Receipt: 7014 2120 0000 7176 1335

RE: Water Supply Testing Analytical Results

Dear Mr. Cross:

SWN Production Company, LLC has recently sampled your water source(s) in conjunction with renewing an injection well permit with the WV DEP.

Enclosed please find the results of that sample(s) as prepared by Eurofins Lancaster Laboratories Environmental and GeoMark, in addition to the Field Data Packet collected by a GES representative during the interview.

Should you need assistance interpreting the analytical data as presented in the report, you may refer to the following websites or other guidance documents from the West Virginia Department of Environmental Protection or other regulatory agencies. Additionally, EPA Water Systems Council Well Care Hotline can be contacted 888-395-1033.

- www.dep.wv.gov/
- https://wvdhhr.org/phs/water/index.asp
- http://water.epa.gov/drink/contaminants/

Should you have any additional questions, please contact me at (304)-884-1681.

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Thank you, we appreciate your cooperation.

Sincerely,

Tyler Spear
Engineering Regulatory Technician

The Right People doing the Right Things, wisely Investing the cash flow from our underlying Assets, will create Value+

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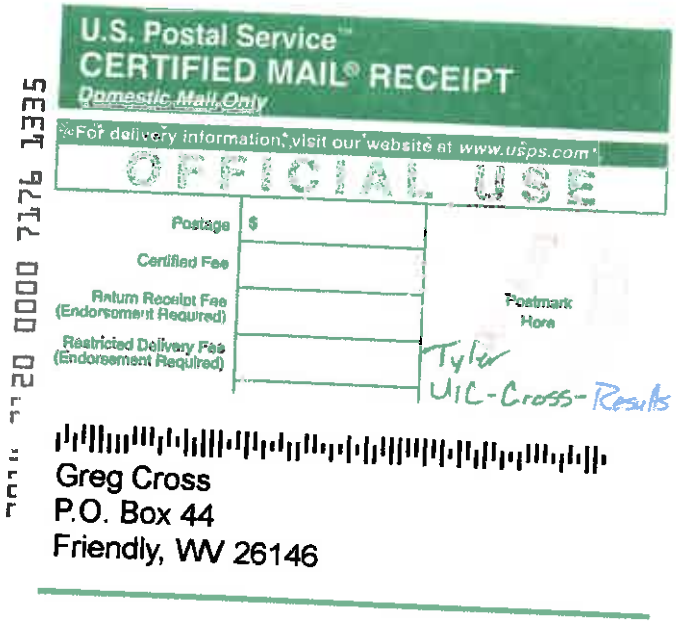
Law Hall (UIC)-Cross-Results



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Restricted Delivery Fee (Endorsement Required)
Postmark Here

Tyler UIC-Cross-Results

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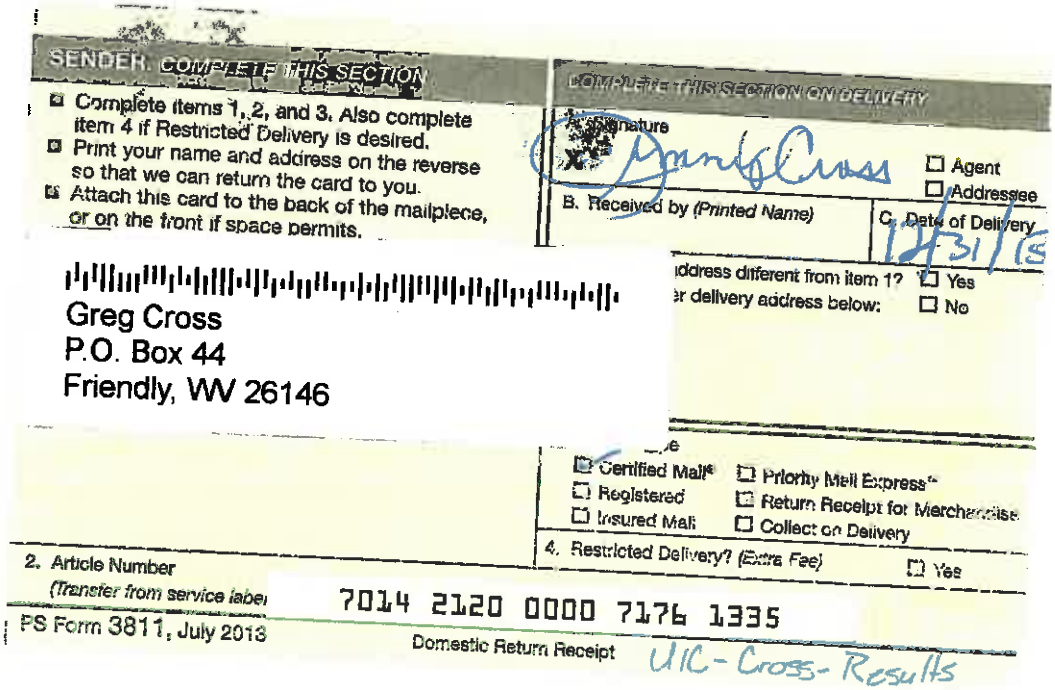
Greg Cross
P.O. Box 44
Friendly, WV 26146



SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

COMPLETE THIS SECTION ON DELIVERY

Signature
X Greg Cross
☐ Agent
☐ Addressee

B. Received by (Printed Name)
C. Date of Delivery
12/31/15

Address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

Greg Cross
P.O. Box 44
Friendly, WV 26146

☑ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ Collect on Delivery

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7014 2120 0000 7176 1335

PS Form 3811, July 2013 Domestic Return Receipt

UIC-Cross-Results

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Southwestern Energy®
PO Box 1300
Jane Lew, WV 26378
PHONE: (304) 884-1610

December 28, 2015

Greg Cross
P.O. Box 44
Friendly, WV 26146

Certified Mail Receipt: 7014 2120 0000 7176 1335

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- www.dep.wv.gov/
- https://wvdhhr.org/phs/water/index.asp
- http://water.epa.gov/drink/contaminants/

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Sincerely,

Tyler Spear
Engineering Regulatory Technician

The Right People doing the Right Things, wisely Investing the cash flow from our underlying Assets, will create Value+

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USGS science for a changing world

WEST VIRGINIA Department of Health Human Resources

dep west virginia department of environmental protection

In cooperation with the West Virginia Department of Health and Human Resources, Bureau for Public Health, Office of Environmental Health Services, Environmental Engineering Division, and the West Virginia Department of Environmental Protection, Division of Water and Waste Management

Methane in West Virginia Ground Water

Introduction

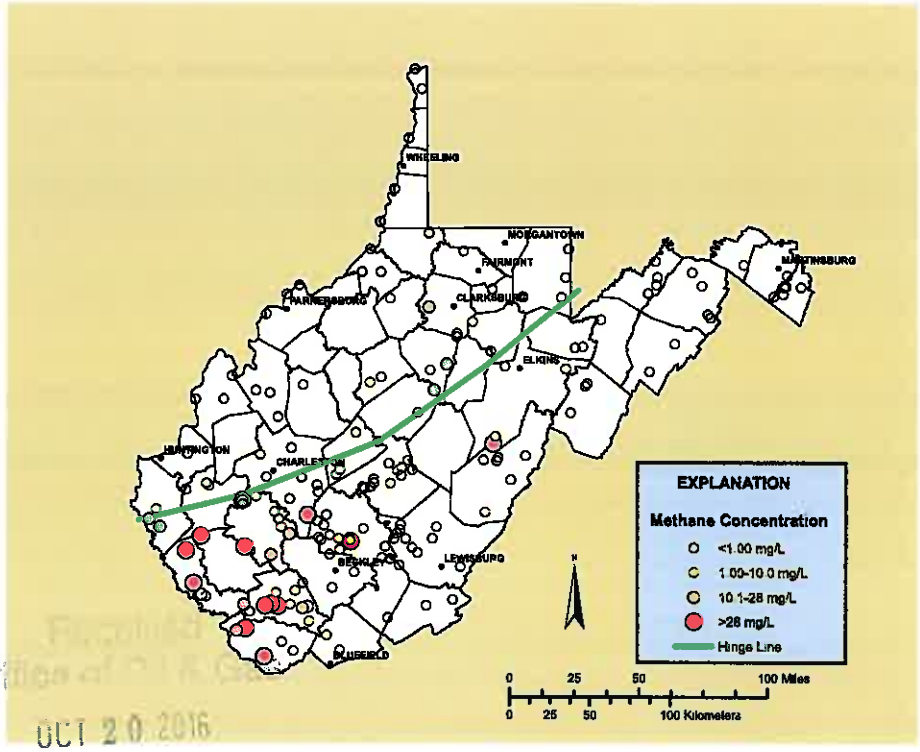
Methane has been found as a dissolved gas in numerous ground-water samples from water wells in West Virginia. Methane (CH_4) is a colorless, odorless, tasteless gas that can cause oxygen-deficient atmospheres, flammable situations, or explosive environments. Methane can ignite at atmospheric concentrations between 5 and 15 percent, and higher concentrations of methane can quickly dilute to flammable levels. Thus, the accumulation of methane gas in an enclosed area may cause an explosive environment in which an ignition source such as an electrical outlet, pilot light, match, or even a well pump could trigger a violent explosion. In addition to the obvious hazards associated with explosions, the breathing of methane in high concentrations can lead to asphyxiation, and the burning of methane produces toxic gases (Eltschlager and others, 2001).

Potential sources of methane gas, also referred to as natural gas, firedamp, and marsh gas, include active and abandoned coal mines, improperly constructed gas wells, decaying organic matter, landfills, and swamps. Methane is often generated and stored in sedimentary rocks associated with coal beds and with oil and gas fields. Coal-bed methane is a result of the microbial or thermal alteration of organic matter during coal formation. The methane originates in the coal units or often in carbonaceous shales, but it may migrate to other geologic units conducive to storage, such as overlying, permeable sandstones (Eltschlager and others, 2001).

Methane gas can be transported by ground water in dissolved or pure gaseous states. Methane in ground water is not explosive; but when water containing dissolved methane comes into contact with air, the methane quickly escapes from the ground water into the atmosphere. If this process occurs in a confined space, then the methane could ignite; or if it is allowed to accumulate, it could explode. Because the solubility of methane in water is between 28 and 30 mg/L (milligrams per liter), well water samples with concentrations of dissolved methane greater than 28 mg/L could liberate potentially explosive or flammable quantities of gas inside the well or in confined spaces in well houses or structures containing wells. Concentrations of methane greater than 10 mg/L but less than 28 mg/L are a possible indication that methane concentrations may be increasing to dangerous levels in ground water (Eltschlager and others, 2001).

Occurrence and Distribution of Methane in West Virginia Ground Water

From 1997 to 2005, the USGS sampled ground water using standard sampling protocols (Koterba and others, 1995) from 170 wells in West Virginia for dissolved gases, including methane. Replicate dissolved-gas samples were collected for each well; the averaged dissolved-gas concentrations for each well are reported in White and Mathes (2006), and averaged methane concentrations are described herein. Methane concentrations in ground water for the 170 wells ranged from not detected to 68.5 mg/L. Methane was detected in 131 of 170 of these wells and was present in concentrations greater than 28 mg/L in 13 of these wells. Another 13 wells had methane concentra-



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OCT 20 2016

tions ranging from 11.9 to 24.3 mg/L, 32 wells had concentrations ranging from 1.00 to 10.0 mg/L, and 73 wells had detectable methane concentrations less than 1.00 mg/L. Methane was detected in wells in 43 of the 47 counties sampled, but methane concentrations exceeding 10 mg/L were found in wells in only 11 counties, with 22 of 26 of these samples from eight counties located in the southern coal fields of West Virginia. All but three of these samples were south of the "hinge line" (Arkle, 1969) that separates the lower-sulfur coal deposits of southern West Virginia from the higher-sulfur coal deposits of northern West Virginia. Most (23 of 26) of the samples with methane concentrations greater than 10 mg/L were from wells with water-bearing zones in rocks of Pennsylvanian age, with one sample from Permian age rocks, one sample from Mississippian age rocks, and one sample from Devonian age rocks. No samples with methane concentrations greater than 10 mg/L were found in Quaternary alluvium or in rocks older than Devonian age (table 1). Methane concentrations exceeding 10 mg/L were found in wells located in valleys and on hillsides but not in wells located on hilltops.

Action Levels

The U.S. Department of the Interior, Office of Surface Mining (Eltschlager and others, 2001), advises owners of wells with dissolved methane concentrations greater than 28 mg/L to immediately contact their local county health department to obtain assistance and guidance in venting the wellhead and for other possible remediation alternatives. Methane will not accumulate in the wellbore if the well is properly vented to the air. Owners of wells with methane concentrations greater than 10 mg/L but less than 28 mg/L might also wish to contact their local county health department for further assistance and might consider removing ignition sources from the immediate area. Methane concentrations less than 10 mg/L require no action, other than periodic monitoring to see if methane concentrations are changing. The West Virginia Bureau for Public Health advises that private well owners requiring additional information about methane contact their local county health department. Public water supply systems in West Virginia are advised by the West Virginia Bureau for Public Health to contact one of the following West Virginia Department of Health and Human Resources, BPH-EED District Offices:

Beckley	(304) 256-6666
Kearneysville	(304) 725-9453
Philippi	(304) 457-2296
St. Albans	(304) 722-0611
Wheeling	(304) 238-1145

or the central Charleston BPH-EED office at (304) 558-2981.

Table 1. Distribution of methane with respect to geologic age.

Geologic age of water-bearing rocks	Number of samples with the indicated methane concentrations (in milligrams per liter)				
	>28	10.1–28	1.00–10.0	<1.00[1]	Not detected
Quaternary alluvium	0	0	0	9	2
Permian	0	1	1	4	3
Pennsylvanian	11	12	26	35	13
Mississippian	1	0	1	15	6
Devonian	1	0	3	9	8
Silurian	No wells sampled				
Ordovician	0	0	0	0	7
Cambrian	0	0	1	1	0
Total samples	13	13	32	73	39

[1]All detections of methane with concentrations less than 1.00 milligram per liter.

References Cited

Arkle, Thomas, Jr., 1969, The configuration of the Pennsylvanian and Dunkard (Permian?) strata in West Virginia; a challenge to classical concepts, *in* Donaldson, A.C., ed., Some Appalachian coals and carbonates—Models of shallow water deposition, Preconvention Geological Society of America Field Trip, November 1969: West Virginia Geological and Economic Survey, p. 55–88.

Eltschlager, K.K., Hawkins, J.W., Ehler, W.C., and Baldassare, Fred, 2001, Technical measures for the investigation and mitigation of fugitive methane hazards in areas of coal mining: Office of Surface Mining Reclamation and Enforcement, 125 p.

Koterba, M.T., Wilde, F.D., and Lapham, W.W., 1995, Ground-water data-collection protocols and procedures for the National Water-Quality Assessment Program–Collection and documentation of water-quality samples and related data: U.S. Geological Survey Open-File Report 95–399, 133 p.

White, J.S., and Mathes, M.V., 2006, Dissolved-gas concentrations in ground water in West Virginia: U.S. Geological Survey Data Series 156, 8 p., available online at *http://pubs.water.usgs.gov/ds156/*

—M.V. Mathes and J.S. White

For Additional Information

For information on USGS products and services, call 1-888-ASK-USGS or visit the *ask.usgs.gov* Web site or the USGS home page at *http://www.usgs.gov/.*

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Groundwater & Environmental Services, Inc.

WESTERN PENNSYLVANIA OFFICE

Sampling Field Data Package
A-1141 INJECTION WELL
LEWIS COUNTY, WV

Cross
034F001700030000
033-WV-009-112315-1220-1-602
November 23, 2015

Prepared For:

Southwestern Energy
Jane Lew, WV

Prepared By:

Groundwater & Environmental Services, Inc.
301 Commerce Park Drive
Cranberry Township, PA 16066

November 25, 2015

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FIELD DOCUMENTATION

Site Visit Form, Calibration Logs, Logbook, Site Sketch, COCs, Checklist

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Part A: GENERAL INFORMATION

Water Source ID*:	WL-11232015-602-01	O & G Well Name*:	A-1141 INJECTION WELL
Pad Name*:	A-1141 INJECTION WELL	Parcel Number*:	03 4F0017000300000
Tax ID:	03 4F0017000300000		
Operator ID*:	033	State Code*:	
County Code*:	009		
Sampled By*:	MATT CROWNOVER	Company Name*:	DES
Water Sampler Identifier*:	602	Date/Time Sampled*:	11/23/2015 12:20 (24hr)
Sample Frequency*:	1	N/A: No Sample Details:	
Person Interviewed*:	Other	Please specify:	GREG CROSS (OWNER'S BROTHER)

PROPERTY OWNER		RESIDENT OR OTHER ☑ Same as owner	
Name*:	CASEY & DORIS CROSS	Name*:	CASEY & DORIS CROSS
Address*:	5427 US HWY 33 W	Address*:	5427 US HWY 33 W
City*:	CAMDEN	City*:	CAMDEN
State*:	WV	State*:	WV
Postal Code*:	26338	Postal Code*:	26338
Phone No*:	304-517-9958	Phone No*:	304-517-9958

Part B: WATER QUALITY

	Reported Quality			Observed Quality		
	Yes	No	N/A	Yes	No	N/A
Staining	○	◉	○	○	◉	○
Odor	○	◉	○	◉	○	○
Cloudiness	○	◉	○	○	◉	○
Sheen	○	◉	○	○	◉	○
Effervescence	○	◉	○	◉	○	○
Taste	○	◉	○			

Treatment*

- ☑ None
- ☐ Charcoal Filter
- ☐ Softening
- ☐ UV light
- ☐ Chlorination
- ☐ pH Adjustment
- ☐ Iron Removal
- ☐ In-line Sediment Filter

Other:

Functioning Properly*: ○ Yes ○ No ○ Unknown

Pump Type

- ○ None
- ○ Gas Piston
- ◉ Submersible
- ○ Windmill
- ○ Jet
- ○ Other:

Capacity (GPM):

Comments:

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Part C: WATER SOURCE INFORMATION

Does this source supply any other properties? ○ Yes ◉ No

Identify properties:

Is the water source(s) located on the property? ◉ Yes ○ No Please explain:

Number of people using this water source: 1 Gallons/day:

Pressure Tank? (•) Yes ( ) No Size (gallons): 20 Estimated

Water Use: [✓] Domestic [ ] Husbandry [ ] Irrigation Other

Coordinates: (NAD83 decimal, 5 places) Lat 39.053729 Long -80.586707 Ground Surface Elevation 995 ft

Does the water source ever go dry? ( ) Yes (•) No

Water Source Type*: WATER WELL

(•) Drilled Well ( ) Dug Well ( ) Other Missing/damaged pit-less adaptor ( ) Yes ( ) No (•) Unknown

Reported total well depth (FT): Reported depth of water level (FT): Reported pump depth (FT):

Date Drilled: Drillers Name: Driller log available ( ) Yes (•) No

Well location: ( ) Inside ( ) Inside and Vented Outside (•) Outside Unvented ( ) Outside Vented

Part D: DESCRIPTION OF WATER SOURCE

Check all that apply

[✓] Loose, missing, or damaged cover [ ] Evidence of insects, spiders, animals [ ] Open to surface water

[ ] Any cracked or damaged well casing/spring vault [ ] Additional storage or holding tank/coyote system

[ ] Evidence of erosion [ ] Water source secured [ ] Source buried [ ] Location unknown [ ] Cover flush with ground

Other:

Part E: DESCRIPTION OF AREA SURROUNDING WATER SOURCE

Check all that apply

[✓] Ground sloping towards water source [ ] Water source downgradient of septic system

Signs of:

[ ] Failing septic [ ] Soggy ground [ ] Foul odor

Close proximity to (tick all that apply):

[ ] Garden [ ] Orchard [ ] Greenhouse [ ] Equipment storage areas

[ ] Junkyard [ ] Dumping area [ ] Landfill [ ] Salt storage area/Salted roadway

[ ] Garage [ ] Fuel storage tanks

Located in field with:

[ ] Livestock [ ] Inside Barn [ ] Barnyard [ ] Other out buildings

Additional remarks and comments:

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Part F: SAMPLING

Sample ID 033-WV-009-112315-1220-1-602

Sampled	Sampling Point Location
( ) Before Treatment ( ) After Treatment	( ) Inside Faucet (•) Outside Faucet ( ) Overflow/Discharge Pipe
(•) No Treatment ( ) Not Sure	( ) Seep ( ) Pressure Tank ( ) Bailed
	( ) Wellhead ( ) Other:

Was the water source purged before sampling (•) Yes ( ) No Volume (gal) 40 Time (min) 20

Is it possible to run water for 30 minutes? (•) Yes ( ) No **If No, please explain**

Average water usage within the last 24 hours Chain of custody attached? (•) Yes ( ) No

Field Analyses:

Field Analyses:

Turbidity (ntu):	1.51	pH (ph units):	8.06
Conductivity (umhos/cm):	394	Temperature (deg c):	12.60

Gas Readings:

Type	PPM	% LEL	% GAS
Wellhead	24440 (Peak)	(Peak)	(Peak)
Cold Tap	40 (Peak)	(Peak)	(Peak)
Cold Headspace	8480 (Peak)	(Peak)	(Peak)
	(Peak)	(Peak)	(Peak)
	(Peak)	(Peak)	(Peak)
	(Peak)	(Peak)	(Peak)

Part G: SITE SKETCH and PHOTOGRAPHS

Add Images | 12 pictures attached to the from

SAMPLER

Please sign in the box below acknowledging that I have supplied the correct information to the best of my knowledge.

Accept | Clear

INTERVIEWEE

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OCT 20 2016

Accept | Clear

Form #: NA
(Reference Form # in Log Book)

Truck #: NA

Gas Explorer Calibration Log

GES Equipment Name: GES-GE-029

Equipment Serial #: 1202-302846

9-28-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dasler 489
↓	↓	H_2S	0	100ppm		↓	↓
10-30-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dasler 489
↓	↓	H_2S	0	100ppm		↓	↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓

Gas

20 2016

NOTE: Gas Explorers must be calibrated on the first day of every month. If the instrument is recalibrated at anytime the calibration information must be recorded on this sheet.

3-Gas= 2.5%(50%LEL) Methane, 100ppm CO, Balance Air

GES - Ver. 1

Southwestern Energy Predrill Sampling

Gas Detector Equipment Calibration

Equipment Serial Number:	1202-302896
GES Equipment Code:	GES-GE-029
Equipment Type:	Gas Explorer
Date of Calibration:	10-30-2015
Include Gas Detector Calibration Log with Field Documentation	

GPS Equipment

Equipment Serial Number:	RBC1510226
GES Equipment Code:	—
Equipment Type:	Trimble Yuma

Water Quality Multi-Parameter Calibration

Equipment Serial Number:		09E100453	08325700
GES Equipment Code:		NA	NA
Equipment Type:		YSI	Hanna HI
Calibration Method:		3pt pH / 1pt Sp. Cond.	4pt.
Date of Calibration:		11-23-15	11-23-15
Calibration Parameter	Time	Pre-Value/Reading	Person Performing Calibration
pH-4	0730	3.95	Matt Conover 602
pH-7	0732	6.81	
pH-10	0734	10.44	
Specific Conductivity (µS/cm)	0736	1406	
Turbidity (<0.1 NTU)	0736	0.15	
Turbidity (15 NTU)	0739	15.0	
Turbidity (100 NTU)	0740	99.8	
Turbidity (750 NTU)	0741	757	
Calibration Parameter	Time	Post-Value/Reading	Person Performing Calibration
pH-4	0731	3.99	
pH-7	0733	6.98	
pH-10	0735	10.01	
Specific Conductivity (µS/cm)	0737	1413	
Turbidity (<0.1 NTU)	0742	0.14	
Turbidity (15 NTU)	0743	15.0	
Turbidity (100 NTU)	0744	100	
Turbidity (750 NTU)	0745	750	

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Decon Procedures

Reference GES Baseline Water Well Sampling SOP

Initials of Person Completing Form and Date: MD 11-23-15 SWN Location Name: A-114 Taj Well

Southwestern Energy Predrill Sampling

Log Book # 106

Parcel #: 03 4F001700030000

Site Arrival Time: 1050 Site Departure Time: 1300

Samplers (Full Names and Sampler #s): Patrick Daisley 489
Matt Crownover 602

Weather Condition Observations Recorded at: 1055

Weather Conditions: Sunny Air Temp (Degrees Fahrenheit): 32°f

Estimate Wind Speed(mph): 4 mph Approximate Wind Direction: SE

Note: Remember to document any changes in weather conditions (include Times).

Equipment Bump Test Verification (include GES Equipment Number and Time): 1100

GE(GES-GE-029) → 100 ppm, Bump = 100 ppm

YSI → 7.00 pH, Bump: 7.02 pH / 1413 µs/cm², Bump = 1413 µs/cm²

Turbidity → 15.0 NTU, Bump = 15.1 NTU

Refer to page 4 for 11-23-15 (insert date) for full calibration information.

Does the parcel have a septic system?: X Y ___ N

If Yes, describe the location of the septic area below and provide an approximate location on the site map. * Septic area is located 20ft NW of the house

0715- Arrived at office.

0815 - Departed office.

1050- Arrived on site, no one present.

1110- N. Lohr called contact, Greg Cross, and left a message.

1130- Greg returned the call asking the team to meet him at his parents house.

1150- Met Greg and proceeded to the property. There is (1) well to be sampled

1155- Began purge @ 2gpm

1215- Ended purge, 40 gal purged.

1220- Collected sample 033-WV-009-112315-1220-I-603 from WL-112320 at 60 PSI

* Elevated methane detected, isotopic sample collected. (See elevated methane form)

1300- Departed site.

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Ohio Dept. of Nat. Res. Gas
DEC 20 2016

Fed Ex Tracking #: 801301831302

Initials of Person Completing Form and Date: PD 11-23-15 SWN Location Name: A-1141 Inj Well

Southwestern Energy Predrill Sampling

Log Book # 106

Parcel #: 03 4F001700030000

PD 11-23-15

Interviewee Signature:

for Carey L. Cross

Fields intentionally left blank in EDGE because they are unknown or do not apply:
(Check all that apply)

For All Sources:

- ☐ Pump Type
- ☑ Pump Capacity
- ☐ Number of People Using the Water Source
- ☑ Gallons/Day Used
- ☑ Average Water Usage Within the Last 24 Hours

For Wells:

- ☑ Reported Well Depth
- ☑ Reported Depth to Water Level
- ☑ Reported Pump Depth
- ☑ Date Drilled
- ☑ Drillers Name
- ☐ Well Location

For Cisterns:

- ☐ Source of Water

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Initials of Person Completing Form and Date PD 11-23-15 SWN Location Name A-Hall Tap Well

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Southwestern Energy Predrill Sampling Log Book # 106

WELL PURGING: FIELD WATER QUALITY MEASUREMENTS FORM

Parcel #: 03 4F0017 00030000 Turbidity (NTU): 1.51 Time (Military): 1221

Time (Military)	Temperature (Degrees Celsius)	Specific Conductance (µS/cm)	pH (Standard Units)	Comments
1200	11.18	393	8.14	Clear, Colorless
1202	12.32	393	7.79	
1204	12.54	393	7.80	
1206	12.57	393	7.84	
1208	12.58	394	7.91	
1210	12.53	394	7.92	
1212	12.57	394	8.02	
1214	12.58	394	8.04	
1216	12.55	394	8.05	
1218	12.52	394	8.06	
1220	12.50	394	8.06	

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Stabilization Criteria: ±10% ±10% ±0.1

Stabilization is considered to be achieved when three consecutive readings are within the specified stabilization criteria.

Initials of Person Completing Form and Date PD 11-23-15 SWN Location Name A-1191 Tioga WPD

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Elevated Combustible Gas Level Observation

To be completed in addition to baseline sampling log book

Date: 11-23-15 Log Book Number: 106

Pad Name: A-1141 Inj. Well Pad Number: N/A

Parcel ID: 03 4F0017000 30000 Subfacility Code: N/A

Samplers: P. Daisley 489, M. Crawmer 602 Location Code: WL- 11232015-602-01

Equipment Name: GES-GE- 029 Serial Number: 1202-302846

Calibration Date: 10-30-15 Calibration Form #: N/A

Initial Combustible Gas Screening: (copied from baseline sampling log book)

Time	Location	Gas Explorer (ppm)	Gas Explorer (%LEL)	Sampler
1220	Cold Tap	40	0.08%	M. Crawmer 602
~~—~~	~~Hot Tap~~			
1222	Well Head/S.W.	24940	49%	
1235	Cold Headspace	8480	17%	
~~—~~	~~Hot Headspace~~			
1236	Ambient	0	0 %	

Bump Test? [X] Yes [ ] No

Bump Test Value: 100ppm, Bump 100ppm

Recalibration Necessary? [ ] Yes [X] No

Equipment Recalibration: (if applicable)

GES-GE-		
Time	O Reading	Span Check

Confirmation Combustible Gas Screening:

Time	Location	Gas Explorer (ppm)	Gas Explorer (%LEL)	Sampler
1240	Cold Tap	20	0.04%	M. Crawmer 602
~~—~~	~~Hot Tap~~			
1243	Well Head/S.W.	150,000 (15% gas)	300%	
1255	Cold Headspace	3180	6.3%	
~~—~~	~~Hot Headspace~~			
1256	Ambient	0	0 %	

Water Quality Observations:

Clear

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Does livestock use the water source? [ ] Yes [X] No

Is water effervescent? [X] Yes [ ] No

Does water have an odor? [X] Yes [ ] No **If yes, describe:** Unknown

Location of Ambient Reading: Outside, near spigot

Report observations to Project Manager before leaving site.

Southwestern Energy
A-1141 Injection Well
Parcel: 03 4F001700030000
Property Owner: Casey & Doris Cross
Date: 11-23-15
Time: 1220

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OCT 20 2016

Environmental Chain of Custody (COC)

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Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC
Lab PM Contact Name: Wendy Kozma
Lab Address: 2425 New Holland Pike
City, State ZIP: Lancaster, PA 17601
Phone: 717-556-7257 **Fax:** 717-656-6766
Email: WendyKozma@eurofinsus.com

Client: Southwestern Energy Company
Client Contact Name: Tyler Spear
Client Address: 179 Innovation Drive
City, State ZIP: Jane Lew, WV 26378
Phone: 304-884-1681
Email: Tyler_Spear@SWN.com

Consultant Name: GES, Inc.
Consultant PM Contact Name: Nicholas Lohr
Phone: 800-267-2549, Ext. 3634 **Fax:** 866-902-2187
Email: Nlohr@gesonline.com

*WELL PAD NAME: A-1141 Injection Well

*Please circle which type of site this is: IMPOUNDMENT (WELL PAD) SPECIAL PROJECT

*PROPERTY # (AFE# if applicable): 4001161668

*MAJOR/MINOR CODE: 52695/007

*STATE SAMPLED: WV

*OWNER NAME: Casey & Doris Cross

*Analysis Turnaround Time (working days)

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

*SAMPLER(s): Matt Crownover 602

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present)

☐ *Sample Collected - POST-Treatment System

☐ *Pre-drill Sample

☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.		Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-112315-1220-1-602	11-23-15	1220	grab	GW	22	Y	X	X	X	X	X	X	X	X	X	X	X	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____							1,6	1,2	1	1,4	1	1	1, 2	1	1,2	1	1,6	

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ■ Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

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OCT 20 2016

*PARCEL ID #: 03 4F001700030000

*FEDEX TRACKING #: 8013 0183 1302

*SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION: Well / Outside Spigot

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
[signature]	GES	11-23-15/1615	Fed Ex		11-23-15/1615
Relinquished by:	Company:	Date/Time:	Received by:		Date/Time:

PHOTOGRAPHS

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Source: Well

Sample Location

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OCT 20 2016

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F001700030000
Cross
033-WV-009-112315-1220-1-602
November 23, 2015

Sample

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OCT 20 2016

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F001700030000
Cross
033-WV-009-112315-1220-1-602
November 23, 2015

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2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

December 11, 2015

Project: A-1141 INJECTION WELL

Submittal Date: 11/24/2015
Group Number: 1611848
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
033-WV-009-112315-1220-1-602 Grab	8147970
033-WV-009-112315-1220-1-602 Filtered Grab	8147971

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/.

Respectfully Submitted,

Received
Office of Oil & Gas
OCT 20 2016

Stephen J. Gordon
Project Manager

(724) 597-2027

Sample Description: 033-WV-009-112315-1220-1-602 Grab
Groundwater Casey & Doris Cross
A-1141 Injection Well

LL Sample # WW 8147970
LL Group # 1611848
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/23/2015 12:20 by MC

Submitted: 11/24/2015 09:35
Reported: 12/11/2015 10:56

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CROSS

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	**Benzene**	15		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Carbon Tetrachloride	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Chlorobenzene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,2-Dichlorobenzene	N.D.		1	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,4-Dichlorobenzene	N.D.		1	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,1-Dichloroethane	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,2-Dichloroethane	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,1-Dichloroethene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	cis-1,2-Dichloroethene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	trans-1,2-Dichloroethene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,2-Dichloropropane	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Ethylbenzene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Methyl Tertiary Butyl Ether	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Methylene Chloride	N.D.		2	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Styrene	N.D.		1	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Tetrachloroethene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Toluene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,2,4-Trichlorobenzene	N.D.		1	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,1,1-Trichloroethane	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,1,2-Trichloroethane	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Trichloroethene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Vinyl Chloride	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	**m+p-Xylene**	2		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	o-Xylene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	**Xylene (Total)**	2		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	**TPH-GRO water C6-C10**	310		20	ug/l		12/01/15 20:12	12/01/15 20:12	7172
GC Miscellaneous									
RSKSOP-175 modified									
07105	**n-butane**	330		1.0	ug/l			12/01/15 14:27	9051
07105	**Ethane**	4,400		100	ug/l			12/02/15 09:31	9051
07105	**Methane**	33,000		300	ug/l			12/02/15 09:31	9051
07105	**Propane**	1,800		100	ug/l			12/02/15 09:31	9051
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	**C10-C28**	0.062 J		0.047	mg/l		11/29/15 16:40	12/02/15 23:10	2027

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OCT 20 2016

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Analysis Report

Sample Description: 033-WV-009-112315-1220-1-602 Grab
Groundwater Casey & Doris Cross
A-1141 Injection Well

LL Sample # WW 8147970
LL Group # 1611848
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/23/2015 12:20 by MC

Submitted: 11/24/2015 09:35
Reported: 12/11/2015 10:56

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CROSS

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	C24-C40	N.D.		0.047	mg/l		11/29/15 16:40	12/02/15 23:10	2027
02740	**Total TPH (C10-C40)**	**0.067 J**		0.047	mg/l		11/29/15 16:40	12/02/15 23:10	2027
Metals									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		12/02/15 09:17	12/04/15 04:54	2106
01750	**Calcium**	**6.32**		0.0333	mg/l		12/02/15 09:17	12/04/15 04:54	2106
01754	Iron	N.D.	.3	0.0333	mg/l		12/02/15 09:17	12/04/15 04:54	2106
07058	**Manganese**	**0.0218**	.05	0.00080	mg/l		12/02/15 09:17	12/04/15 04:54	2106
01767	**Sodium**	**86.7**		0.167	mg/l		12/02/15 09:17	12/04/15 04:54	2106
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.00088 J**	.01	0.00040	mg/l		12/02/15 09:55	12/11/15 03:52	2106
06026	**Barium**	**0.236**	2	0.00092	mg/l		12/02/15 09:55	12/11/15 03:52	2106
Wet Chemistry									
EPA 300.0									
00224	**Chloride**	**4.0**	250	1.0	mg/l			11/28/15 17:52	6676
00228	Sulfate	N.D.	250	1.5	mg/l			11/28/15 17:52	6676
EPA 415.1									
00273	**Total Organic Carbon**	**1.2**		0.50	mg/l			12/08/15 07:32	495
EPA 170.1									
12151	**Temperature of pH**	**21.8**		0.010	Degrees C			11/26/15 03:37	1198
SM 2540 C-1997									
00212	**Total Dissolved Solids**	**214**	500	19.4	mg/l			11/25/15 06:31	8743
SM 2540 D-1997									
10457	Total Suspended Solids	N.D.		1.00	mg/l			11/30/15 21:47	2350
SM 4500-H+ B-2000									
12152	**pH**	**8.3**		0.010	Std. Units			11/26/15 03:37	1198
	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
SM 5540 C-2000									
00225	M. B. A. S.	N.D.	.5	0.040	mg/l LAS MW 320			11/25/15 00:05	237
Microbiology									
SM 9223 B-1997									

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Analysis Report

Sample Description: 033-WV-009-112315-1220-1-602 Grab
Groundwater Casey & Doris Cross
A-1141 Injection Well

LL Sample # WW 8147970
LL Group # 1611848
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/23/2015 12:20 by MC

Submitted: 11/24/2015 09:35
Reported: 12/11/2015 10:56

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CROSS

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Microbiology									
SM 9223 B-1997									
08161	**Tot Coli/E. coli (Quanti-tray)**	See Below			MPN/100mL			11/25/15 12:44	2213
	Total Coliform	118.4		/100ml					
	E. coli	< 1.0		/100ml					

General Sample Comments

DEFINITIONS:
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Analysis Report

Sample Description: 033-WV-009-112315-1220-1-602 Filtered Grab
Groundwater Casey & Doris Cross
A-1141 Injection Well

LL Sample # WW 8147971
LL Group # 1611848
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/23/2015 12:20 by MC

Submitted: 11/24/2015 09:35
Reported: 12/11/2015 10:56

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		12/02/15 09:17	12/04/15 05:27	2106
01750	**Calcium**	**6.32**		0.0333	mg/l		12/02/15 09:17	12/04/15 05:27	2106
01754	Iron	N.D.	.3	0.0333	mg/l		12/02/15 09:17	12/04/15 05:27	2106
07058	**Manganese**	**0.0223**	.05	0.00080	mg/l		12/02/15 09:17	12/04/15 05:27	2106
01767	**Sodium**	**85.5**		0.167	mg/l		12/02/15 09:17	12/04/15 05:27	2106
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.00088 J**	.01	0.00040	mg/l		12/02/15 09:55	12/11/15 03:54	2106
06026	**Barium**	**0.246**	2	0.00092	mg/l		12/02/15 09:55	12/11/15 03:54	2106

General Sample Comments

This sample was field filtered for dissolved metals.

DEFINITIONS:
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC Lab PM Contact Name: Wendy Kozma Lab Address: 2425 New Holland Pike City, State ZIP: Lancaster, PA 17601 Phone: 717-556-7257 Fax: 717-656-6766 Email: WendyKozma@eurofinsus.com	Client: Southwestern Energy Company Client Contact Name: Tyler Spear Client Address: 179 Innovation Drive City, State ZIP: Jane Lew, WV 26378 Phone: 304-884-1681 Email: Tyler_Spear@SWN.com	**Environmental Chain of Custody (COC)** Consultant Name: GES, Inc. Consultant PM Contact Name: Nicholas Lohr Phone: 800-267-2549, Ext. 3634 Fax: 866-902-2187 Email: Nlohr@gesonline.com	eurofins | Lancaster Laboratories

*WELL PAD NAME: A-1141 Injection Well	*Analysis Turnaround Time (working days)	*SAMPLER(s): Matt Crownover 602
*Please circle which type of site this is: IMPOUNDMENT (WELL PAD) SPECIAL PROJECT	Standard TAT = 10 working days (unless otherwise noted below)	20810 1611848 8147970-72
*PROPERTY # (AFE# if applicable): 4001161668	☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only	
*MAJOR/MINOR CODE: 52695/007	☐ Rush TAT = _____ working days	
*STATE SAMPLED: WV		
*OWNER NAME: Casey & Doris Cross		
☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present)	☐ *Sample Collected - POST-Treatment System	
☒ *Pre-drill Sample	☐ *Post-drill Sample	

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-112315-1220-1-602	11-23-15	1220	grab	GW	22	Y	X	X	X	X	X	X	X	X	X	X	X	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ☒ Disposal By Lab after two (2) months of final report date

COC Page 1 of 1

Lab SDG Label

Special Instructions/QC Requirements & Comments:

OCT 20 2016

*PARCEL ID #: 03 4F001700030000

*FEDEX TRACKING #: 8013 0183 1302

*SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION: Well / Outside Spigot

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
[signature]	GES	11-23-15/1615	Fed Ex		11-23-15/1615
Relinquished by:	Company:	Date/Time:	Received by:	ELLE	Date/Time: 11-24-15 / 935

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

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GeoMark
Petroleum Services Division

Water Headspace Gas Isotope and Compositional Analyses

033-WV-009-112315-1220-1-602

Southwestern Energy

December 18, 2015

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115 Zonolite Street
Lafayette, LA 70508
337.261.4002

GeoMark Research, Ltd.

9748 Whithorn Drive
Houston, TX 77095
281.856.9333

GEOMARK

PRODUCED GAS ISOTOPE ANALYSIS

Southwestern Energy **033-WV-009-112315-1220-1-502,**

Cylinder ID Number	Sample Depth (ft)	Sampling Date	Sampling Time	Tubing Pressure (psig)	Casing Pressure (psig)	$\delta^{13}C$ Methane (‰)	$\delta^{13}C$ Ethane (‰)	$\delta^{13}C$ Propane (‰)	$\delta^{13}C$ i-Butane (‰)	$\delta^{13}C$ n-Butane (‰)	$\delta^{13}C$ i-Pentane (‰)	$\delta^{13}C$ n-Pentane (‰)	δD Methane (‰)	$\delta^{13}C$ CO_2 (‰)
033-WV-009-112315-1220-1-502		11/23/2015				-47.3								

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GEOMARK PRODUCED GAS ISOTOPE ANALYSIS

Southwestern Energy — **033-WV-009-112315-1220-1-602**

Cylinder ID Number	Sample Depth (ft)	Sampling Date	Sampling Time	Tubing Pressure (psig)	Casing Pressure (psig)	He Conc. (ppm)	H2 Conc. (ppm)	O2+Ar Conc. (ppm)	N2 Conc. (ppm)	CO2 Conc. (ppm)	H2S Conc. (ppm)	CO Conc. (ppm)	C1 Conc. (ppm)	C2 Conc. (ppm)	C2H4 Conc. (ppm)	C3 Conc. (ppm)	C3H6 Conc. (ppm)	IC4 Conc. (ppm)	nC4 Conc. (ppm)	IC5 Conc. (ppm)	nC5 Conc. (ppm)	C6+ Conc. (ppm)	Specific Gravity (Air = 1.0)
033-WV-009-112315-1220-1-602		11/23/2015				0	14	88,245	419,604	579	0	0	449,339	22,826	0	9,419	0	727	954	169	73	37	0.603

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GEOMARK PRODUCED GAS ISOTOPE ANALYSIS

Southwestern Energy **033-WV-009-112315-1220-1-602,**

Cylinder ID Number	Sample Depth (ft)	Sampling Date	Sampling Time	Tubing Pressure (psig)	Casing Pressure (psig)	C1 Conc. (mole %)	C2 Conc. (mole %)	C3 Conc. (mole %)	iC4 Conc. (mole %)	nC4 Conc. (mole %)	iC5 Conc. (mole %)	nC5 Conc. (mole %)	C6+ Conc. (mole %)
033-WV-009-112315-1220-1-602		11/23/2015				93.52	4.79	1.34	0.15	0.18	0.03	0.02	0.01

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PRODUCED GAS ISOTOPE ANALYSIS

Southwestern Energy	033-WV-009-112315-1220-1-602,

Cylinder ID Number	Sample Depth (ft)	Sampling Date	Sampling Time	Tubing Pressure (psig)	Casing Pressure (psig)	Total Gas (BTU/ft3)	Hydrocar. Gas (BTU/ft3)	Total HC Gas (ppm by mole)	Wetness (C2 - nC5) / (C1 - nC5)	C1/C2 Ratio (mole/mole)	iC4/nC4 Ratio (mole/mole)
033-WV-009-112315-1220-1-602		11/23/2015				517	1,073	480,465	6.47	20	0.95

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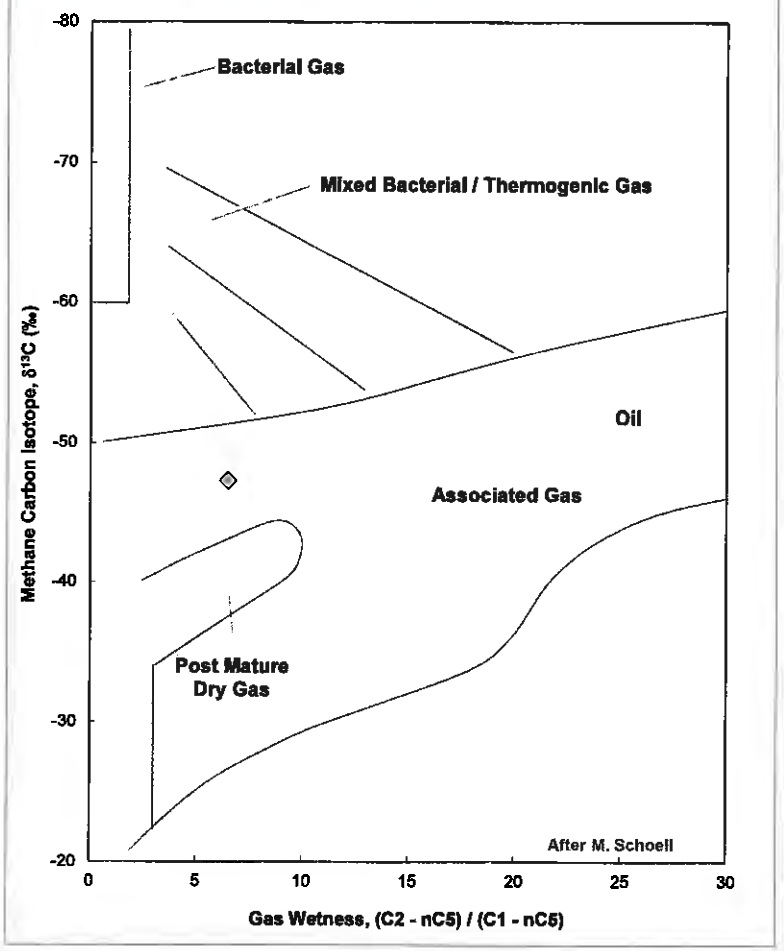
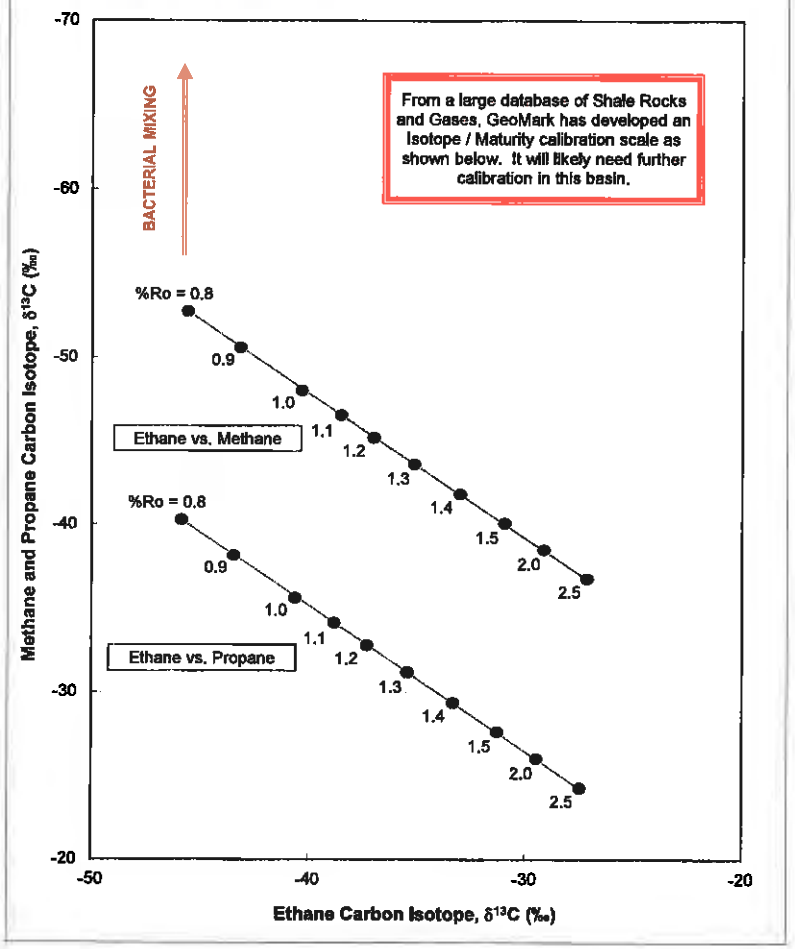
PRODUCED GAS ISOTOPE ANALYSIS

Southwestern Energy **033-WV-009-112315-1220-1-602,**

Genetic Gas Classifications



Maturity and Mixing Plot



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GeoMark Petroleum Fluid Services
115 Zonolite Street
Lafayette, LA 70508

(337) 261.4002
info@geomarkresearch.com
December 18, 2015

Groundwater & Environmental Services, Inc.

WESTERN PENNSYLVANIA OFFICE

Sampling Field Data Package
A-1141 INJECTION WELL
LEWIS COUNTY, WV

Cross
034F001700030000
033-WV-009-112315-1220-1-602
November 23, 2015

Prepared For:

Southwestern Energy
Jane Lew, WV

Prepared By:

Groundwater & Environmental Services, Inc.
301 Commerce Park Drive
Cranberry Township, PA 16066

November 25, 2015

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FIELD DOCUMENTATION

Site Visit Form, Calibration Logs, Logbook, Site Sketch, COCs, Checklist

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Part A: GENERAL INFORMATION

Water Source ID*:	WL-11232015-602-01	O & G Well Name*:	A-1141 INJECTION WELL
Pad Name*:	A-1141 INJECTION WELL	Parcel Number*:	03 4F0017000300000
Tax ID:	03 4F0017000300000		
Operator ID*:	033	State Code*:	
County Code*:	009		
Sampled By*:	MATT CROWNOVER	Company Name*:	GES
Water Sampler Identifier*:	602	Date/Time Sampled*:	11/23/2015 12:20 (24hr)
Sample Frequency*:	1	☐ N/A: No Sample	Details:
Person Interviewed*:	Other	Please specify:	GREG CROSS (OWNER'S BROTHER)

PROPERTY OWNER		RESIDENT OR OTHER ☑ Same as owner	
Name*:	CASEY & DORIS CROSS	Name*:	CASEY & DORIS CROSS
Address*:	5427 US HWY 33 W	Address*:	5427 US HWY 33 W
City*:	CAMDEN	City*:	CAMDEN
State*:	WV	State*:	WV
Postal Code*:	26338	Postal Code*:	26338
Phone No*:	304-517-9958	Phone No*:	304-517-9958

Part B: WATER QUALITY

	Reported Quality			Observed Quality		
	Yes	No	N/A	Yes	No	N/A
Staining	○	◉	○	○	◉	○
Odor	○	◉	○	◉	○	○
Cloudiness	○	◉	○	○	◉	○
Sheen	○	◉	○	○	◉	○
Effervescence	○	◉	○	◉	○	○
Taste	○	◉	○			

Treatment*

- ☑ None
- ☐ Charcoal Filter
- ☐ Softening
- ☐ UV light
- ☐ Chlorination
- ☐ pH Adjustment
- ☐ Iron Removal
- ☐ In-line Sediment Filter

Other:

Functioning Properly*: ○ Yes ○ No ○ Unknown

Pump Type

- ○ None
- ○ Gas Piston
- ◉ Submersible
- ○ Windmill
- ○ Jet
- ○ Other:

Capacity (GPM):

Comments:

EFFERVESCENCE AND AN UNKNOWN ODOR OBSERVED

Part C: WATER SOURCE INFORMATION

Does this source supply any other properties? ○ Yes ◉ No

Identify properties:

Is the water source(s) located on the property? ◉ Yes ○ No Please explain:

Number of people using this water source: 1 Gallons/day:

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Pressure Tank? (•) Yes ( ) No Size (gallons): 20 Estimated

Water Use: [x] Domestic [ ] Husbandry [ ] Irrigation Other

Coordinates: (NAD83 decimal, 5 places) Lat 39.053729 Long -80.686707 Ground Surface Elevation 985 ft

Does the water source ever go dry? ( ) Yes (•) No

Water Source Type*: WATER WELL

(•) Drilled Well ( ) Dug Well ( ) Other Missing/damaged pit-less adaptor ( ) Yes ( ) No (•) Unknown

Reported total well depth (FT): Reported depth of water level (FT): Reported pump depth (FT):

Date Drilled: **Drillers Name:** Driller log available ( ) Yes (•) No

Well location: ( ) Inside ( ) Inside and Vented Outside (•) Outside Unvented ( ) Outside Vented

Part D: DESCRIPTION OF WATER SOURCE

Check all that apply

[x] Loose, missing, or damaged cover [ ] Evidence of insects, spiders, animals [ ] Open to surface water

[ ] Any cracked or damaged well casing/spring vault [ ] Additional storage or holding tank/coyote system

[ ] Evidence of erosion [ ] Water source secured [ ] Source buried [ ] Location unknown [ ] Cover flush with ground

Other:

Part E: DESCRIPTION OF AREA SURROUNDING WATER SOURCE

Check all that apply

[x] Ground sloping towards water source [ ] Water source downgradient of septic system

Signs of:

[ ] Failing septic [ ] Soggy ground [ ] Foul odor

Close proximity to (tick all that apply):

[ ] Garden [ ] Orchard [ ] Greenhouse [ ] Equipment storage areas

[ ] Junkyard [ ] Dumping area [ ] Landfill [ ] Salt storage area/Salted roadway

[ ] Garage [ ] **Fuel storage tanks**

Located in field with:

[ ] **Livestock** [ ] **Inside Barn** [ ] Barnyard [ ] Other out buildings

Additional remarks and comments:

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Part F: SAMPLING

Sample ID 033-WV-009-112315-1220-1-602

Sampled	Sampling Point Location
( ) Before Treatment ( ) After Treatment	( ) Inside Faucet (•) Outside Faucet ( ) Overflow/Discharge Pipe
(•) No Treatment ( ) Not Sure	( ) Spigot ( ) Pressure Tank ( ) **Bailed**
	( ) Wellhead ( ) Other:

Was the water source purged before sampling (•) Yes ( ) No Volume (gal) 40 Time (min) 20

Is it possible to run water for 30 minutes? (•) Yes ( ) No If No, please explain

Average water usage within the last 24 hours Chain of custody attached? (•) Yes ( ) No

Field Readings:

Field Analyses:

Turbidity (ntu):	1.51	pH (ph units):	8.06
Conductivity (umhos/cm):	394	Temperature (deg c):	12.50

Gas Readings:

Type	PPM	% LEL	% GAS
Wellhead	24440 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
Cold Tap	40 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
Cold Headspace	8480 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)

Part G: SITE SKETCH and PHOTOGRAPHS

Add Images | 12 pictures attached to the from

SAMPLER

Please sign in the box below acknowledging that I have supplied the correct information to the best of my knowledge.

Accept | Clear

INTERVIEWEE

Accept | Clear

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OCT 20 2016

Form #: NA
(Reference Form # in Log Book)

Truck #: NA

Gas Explorer Calibration Log

GES Equipment Name: GES-GE-029

Equipment Serial #: 1202-302846

9-28-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dasley 489
↓	↓	H_2S	0	100ppm		↓	↓
10-30-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dasley 489
↓	↓	H_2S	0	100ppm		↓	↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓

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NOTE: Gas Explorers must be calibrated on the first day of every month. If the instrument is recalibrated at anytime the calibration information must be recorded on this sheet.

3-Gas= 2.5%(50%LEL) Methane, 100ppm CO, Balance Air

GES - Ver. 1

Southwestern Energy Predrill Sampling

Gas Detector Equipment Calibration

Equipment Serial Number:	1202-302846
GES Equipment Code:	GES-GE-029
Equipment Type:	Gas Explorer
Date of Calibration:	10-30-2015
Include Gas Detector Calibration Log with Field Documentation	

GPS Equipment

Equipment Serial Number:	RBC15U0226
GES Equipment Code:	–
Equipment Type:	Trimble Yuma

Water Quality Meter Parameter Calibration

Equipment Serial Number:		09E100453	08325700
GES Equipment Code:		NA	NA
Equipment Type:		YSI	Hanna HI
Calibration Method:		3pt pH/1pt Sp. cond.	4pt.
Date of Calibration:		11-23-15	11-23-15
Calibration Parameter	Time	Pre-Value/Reading	Person Performing Calibration
pH-4	0730	3.95	Matt Conover 602
pH-7	0732	6.81	
pH-10	0734	10.44	
Specific Conductivity (µS/cm)	0736	1406	
Turbidity (<0.1 NTU)	0738	0.15	
Turbidity (15 NTU)	0739	15.0	
Turbidity (100 NTU)	0740	99.8	
Turbidity (750 NTU)	0741	757	
Calibration Parameter	Time	Post-Value/Reading	Person Performing Calibration
pH-4	0731	3.99	
pH-7	0733	6.98	
pH-10	0735	10.01	
Specific Conductivity (µS/cm)	0737	1413	
Turbidity (<0.1 NTU)	0742	0.14	
Turbidity (15 NTU)	0743	15.0	
Turbidity (100 NTU)	0744	100	
Turbidity (750 NTU)	0745	750	

Decon Procedures

Reference GES Baseline Water Well Sampling SOP

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Initials of Person Completing Form and Date: PD 11-23-15 SWN Location Name: Arnold Inj. well #4

Southwestern Energy Predrill Sampling

Log Book # 106

Parcel #: 03 4F001700030000

Site Arrival Time: 1050 Site Departure Time: 1300

Samplers (Full Names and Sampler #s): Patrick Daisley 489
Matt Crownover 602

Weather Condition Observations Recorded at: 1055

Weather Conditions: Sunny Air Temp (Degrees Fahrenheit): 32°f

Estimate Wind Speed(mph): 4 mph Approximate Wind Direction: SE

Note: Remember to document any changes in weather conditions (include Times).

Equipment Bump Test Verification (Include GES Equipment Number and Time): 1100

GE(GES-GE-029) → 100 ppm, Bump = 100 ppm

YSI → 7.00 pH, Bump = 7.02 pH / 1413 $\mu s/cm^2$, Bump = 1413 $\mu s/cm^2$

Turbidity → 15.0 NTU, Bump = 15.1 NTU

Refer to page 4 for 11-23-15 (insert date) for full calibration information.

Does the parcel have a septic system?: X Y ___ N

If Yes, describe the location of the septic area below and provide an approximate location on the site map. * Septic area is located 20ft NW of the house

0715 - Arrived at office.
0815 - Departed office.
1050 - Arrived on site, no one present.
1110 - N. Lohr called contact, Greg Cross, and left a message.
1130 - Greg returned the call asking the team to meet him at his parents house.
1150 - Met Greg and proceeded to the property. There is (1) well to be sampled
1155 - Began purge @ 2 gpm
1215 - Ended purge, 40 gal purged.
1220 - Collected sample 033-WV-009-112315-1220-I-602 from WL-11232015-602-01
* Elevated methane detected, isotopic sample collected. (See elevated methane form)
1300 - Departed site.

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Fed Ex Tracking #: 801301831302

Initials of Person Completing Form and Date: PD 11-23-15 SWN Location Name: A-1141 Taj Well

Southwestern Energy Predrill Sampling

Log Book # 106

Parcel #: 03 4F001700030000

PD 11-23-15

Interviewee Signature: for Carey L. Cross

Fields intentionally left blank in EDGE because they are unknown or do not apply:
(Check all that apply)

For All Sources:
- ☐ Pump Type
- ☑ Pump Capacity
- ☐ Number of People Using the Water Source
- ☑ Gallons/Day Used
- ☑ Average Water Usage Within the Last 24 Hours

For Wells:
- ☑ Reported Well Depth
- ☑ Reported Depth to Water Level
- ☑ Reported Pump Depth
- ☑ Date Drilled
- ☑ Drillers Name
- ☐ Well Location

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For Cisterns:
- ☐ Source of Water

Initials of Person Completing Form and Date: PD 11-23-15 SWN Location Name: A-1 Ist Inj. Well 36

Southwestern Energy Predrill Sampling Log Book # 106

WELL PURGING: FIELD WATER QUALITY MEASUREMENTS FORM

Parcel #: 03 4F0017 00030000 Turbidity (NTU): 1.51 Time (Military): 1221

Time (Military)	Temperature (Degrees Celsius)	Specific Conductance (µS/cm)	pH (Standard Units)	Comments
1200	11.18	393	8.14	Clear, Colorless
1202	12.32	393	7.79	
1204	12.54	393	7.80	
1206	12.57	393	7.84	
1208	12.58	394	7.91	
1210	12.53	394	7.92	
1212	12.57	394	8.02	
1214	12.58	394	8.04	
1216	12.55	394	8.05	
1218	12.52	394	8.06	
1220	12.50	394	8.06	

Elevated Combustible Gas Level Observation

To be completed in addition to baseline sampling log book

Date: 11-23-15 Log Book Number: 106

Pad Name: A-1141 Inj. Well Pad Number: N/A

Parcel ID: 03 4F0017 00030000 Subfacility Code: N/A

Samplers: P. Daisley 489, M. Crowmore 602 Location Code: WL- 11232015-602-01

Equipment Name: GES-GE- 029 Serial Number: 1202-302846

Calibration Date: 10-30-15 Calibration Form #: N/A

Initial Combustible Gas Screening: (copied from baseline sampling log book)

Time	Location	Gas Explorer (ppm)	Gas Explorer (%LEL)	Sampler
1220	Cold Tap	40	0.08%	M. Crowmore 602
	~~Hot Tap~~			
1222	Well Head/S.W.	24940	49%	
1235	Cold Headspace	8480	17%	
	~~Hot Headspace~~			
1236	Ambient	0	0 %	

Bump Test? [X] Yes [ ] No

Bump Test Value: 100ppm, Bump 100ppm

Recalibration Necessary? [ ] Yes [X] No

Equipment Recalibration: (if applicable)

GES-GE-		
Time	O Reading	Span Check

Confirmation Combustible Gas Screening:

Time	Location	Gas Explorer (ppm)	Gas Explorer (%LEL)	Sampler
1240	Cold Tap	20	0.04%	M. Crowmore 602
	~~Hot Tap~~			
1243	Well Head/S.W.	150,000 (15% gas)	300%	
1255	Cold Headspace	3180	6.3%	
	~~Hot Headspace~~			
1256	Ambient	0	0 %	

Water Quality Observations:

Clear

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Does livestock use the water source? [ ] Yes [X] No

Is water effervescent? [X] Yes [ ] No

Does water have an odor? [X] Yes [ ] No **If yes, describe:** Unknown

Location of Ambient Reading: Outside, near spigot

Report observations to Project Manager before leaving site.

Southwestern Energy
A-1141 Injection Well
Parcel: 03 4F001700030000
Property Owner: Casey & Doris Cross
Date: 11-23-15
Time: 1220

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Environmental Chain of Custody (COC)

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC
Lab PM Contact Name: Wendy Kozma
Lab Address: 2425 New Holland Pike
City, State ZIP: Lancaster, PA 17601
Phone: 717-556-7257 **Fax:** 717-656-6766
Email: WendyKozma@eurofinsus.com

Client: Southwestern Energy Company
Client Contact Name: Tyler Spear
Client Address: 179 Innovation Drive
City, State ZIP: Jane Lew, WV 26378
Phone: 304-884-1681
Email: Tyler_Spear@SWN.com

Consultant Name: GES, Inc.
Consultant PM Contact Name: Nicholas Lohr
Phone: 800-267-2549, Ext. 3634 **Fax:** 866-902-2187
Email: Nlohr@gesonline.com

eurofins | Lancaster Laboratories

*WELL PAD NAME: A-1141 Injection Well

*Please circle which type of site this is: IMPOUNDMENT (WELL PAD) SPECIAL PROJECT

*PROPERTY # (AFE# if applicable): 4001161668

*MAJOR/MINOR CODE: 52695/007

*STATE SAMPLED: WV

*OWNER NAME: Casey & Doris Cross

*Analysis Turnaround Time (working days)

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

*SAMPLER(s): Matt Crownover 602

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present) ☐ *Sample Collected - POST-Treatment System

☐ *Pre-drill Sample ☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-112315-1220-1-602	11-23-15	1220	grab	GW	22	Y	X	X	X	X	X	X	X	X	X	X	X	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

1,6 | 1,2 | 1 | 1,4 | 1 | 1 | 1,2 | 1 | 1,2 | 1 | 1,6

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ☐ Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

*PARCEL ID #: 03 4F001700030000

*FEDEX TRACKING #: 8013 0183 1302

*SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION: Well / Outside Spigot

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*Relinquished by:	*Company Name:	*Date/Time:	Received by:	Date/Time:
	GES	11-23-15/1615	Fed Ex	11-23-15/1615
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

GES Field Documentation Review Sheet

Client and Well Pad Name: SWN/A-1191 Inj. Well Date: 11-23-15

Parcel #: 03 9F 00170003 0009

Review Prior to Leaving Parcel:

☑ Field equipment calibration records (GE/CG/PID/FID/LEL, conductivity, pH, turbidity, etc.).

☑ Check coolers for bottleware, chain-of-custody, and other paperwork (Predrill parameters and Isotopic).

☑ Sample Matrix confirmed?

☑ Bottle labels filled out with analysis, time, date, sample ID, and sampler?

☑ Chain-of-custody bottle count matches as-is or edited to reflect bottle count in cooler?

☑ Site Visit Form and Supplemental Log Book reviewed and all applicable spaces completed and information is correct?

☑ Full names of both team members (including sampler ID #s) conducting sampling, arrival and departure times noted in Supplemental Log Book.

☑ Purge information and all water quality readings documented on Site Visit Form and Supplemental Log Book, respectfully?

☑ Photographs with accurate time and date stamps and white board taken of treatment system, sample point, source, and filled bottleware (at a minimum)?

☑ White board in photographs contains correct client name, name of well pad, sample identification, parcel number, and date?

N/A ☐ Notes on unusual conditions, such as interference by landowner or third party during sampling, hazardous/unsanitary conditions, dead animals, etc? Photo-documented, if applicable?

N/A ☐ Verbal decline documented and any unusual conditions communicated to Project Manager and/or client representative immediately?

☑ **Both field team members have reviewed all field notes, chains, and forms?**

Review Prior to End of Day:

☑ Upload completed and final PDF. PDF opened to confirm complete upload. PDF includes Site Visit Form, Site Sketch, calibration information, chain-of-custodies, completed Supplemental Log Book pages?

☑ Photo-documentation and GPS files uploaded?

☑ Isotopic sample placed in secure, climate controlled area with chain-of-custody?

Must Sign Below and Scan with End of Day PDF Package

Team Member 1: _____

Team Member 2: _____

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PHOTOGRAPHS

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Source: Well

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Sample Location

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F001700030000
Cross
033-WV-009-112315-1220-1-602
November 23, 2015

Sample

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A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F001700030000
Cross
033-WV-009-112315-1220-1-602
November 23, 2015

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Job Safety Analysis (JSA)

JSA Title: **Baseline Water Sampling (All Sources)**

JSA Control #:

Date Developed: 4/13/2015	
Latest Revised Date: 4/13/2015 / **JSA Retention 1 year from Latest Revision Date.**	
Developed by: Patrick Daisley	
Work Team Leader: Patrick Daisley	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.	
Revision #: 3	**Work Location / Permit #: A-1141 Injection Well**
This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.	

SPECIFIC PPE: Gloves: (base on hazard and identified in column 4 e.g. - nitrile, Kevlar, leather). Hard Hat (required by activity or site requirements). Hearing Protection: if site activities raise the noise level to 85 db. PPE Clothing: highly visible clothing such as orange coveralls & reflective safety vest, Fire Retardant clothing (FRC) is required for well pad operations. Safety Glasses. Safety Shoes: steel-toed. Winter weather: Yaktrax and FRC hard hat liner.

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Gas Explorer, YUMA, YSI, Turbidity Meter, Water Interface Probe, Sampling Kit, Hand Tools, extendable rod with attached cup

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply by using "Hazard Identification" tool)*		**Potential Hazards**	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Arrive Onsite 1. Driving on site and parking 2. Attempt to make contact with home owner or resident. 3. Complete JSA/HASP/safety checklist/tailgate meeting *Note: Please remember to complete client required checklist prior to performing on site activities*	X Motion _ Chemical X Electrical X Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Workers being injured and work vehicles/ property damage being caused by hazardous conditions 1b. Workers being struck/ injured and work vehicles/ property damage being caused by traffic 1c. Injury due to contact with overhead hazards (falling objects and electrocution from lighting)	1a. Conduct a visual inspection of the driveway for hazards before attempting to pull onto the property. Reconsider entering a driveway that is covered in ice or muddy. ➢ Obey no trespassing signs if you have not previously contacted the property owner. ➢ Rain, ice, and snow may worsen driveways that have a steep incline/decline. 1b. Park in a designated area only (*first move forward*) and ensure vehicle is out of traffic pattern so that tailgate safety meeting can be performed safely. ➢ Be extra cautious when parked near active roadways due to vehicles flinging debris. 1c. Inspect work area for any overhead hazards including overhead utilities and overhead trees and vegetation. ➢ A visual inspection of overhead obstacles (e.g. tree branches, vegetation, low structures...) should be conducted prior to starting a job task. ➢ Work conducted in a wooded area, during high winds and/or lighting storm, should be avoided and conditions re-evaluated after a storm has passed. (*See part B, section 4d.*)
On-site edits:				No Edits

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JSA Control #: GES

B. Weather Hazards Exposure	_ Motion _ Chemical X Electrical _ Biological _ Mechanical	_ Gravity X Radiation X Temperature _ Pressure _ Sound	1a. Adverse health effects due to exposure to weather related issues	1a. Staff should understand and be able to recognize the signs and/or symptoms of cold and hot weather related illnesses. ➢ Personnel should dress appropriately for ambient temperatures which would include but not be limited to dry layered clothing. ➢ Applying sunscreen to exposed skin is strongly recommended during sunny weather conditions (all seasons) to mitigate sun exposure.
			2a. Adverse health effects due to cold stress related injury	2a. For cold weather, work schedules should be adjusted to provide sufficient break periods in a heated area. Remember that dehydration is still a risk when working in the cold.
			3a. Adverse health effects due heat stress related injury	3a. ~~For hot~~ weather, work schedules may need to be adjusted to provide time ~~intervals for~~ replenishing fluids and ~~which is free of~~ contamination. For hot weather that ~~exceeds 90oF~~, a 10 to 15 minute break must be taken following every ~~45 minutes to one hour of work~~. Each individual must drink at 16 ounces of water prior to ~~beginning work and~~ 8 to 12 ounces ~~of water or other~~ proper liquid such as Gatorade every 20 to ~~30~~ minutes. ~~Caffeinated drinks must not be consumed at any time.~~
			4a. Adverse health effects or injury due to exposure to severe weather	4a. Avoid exposure to severe weather. ➢ Ensure a plan is in place and discussed to mitigate all potential severe weather concerns (rain, wind, thunderstorms, ice storms, snow fall, tornadoes, hurricanes...) ➢ In case severe weather (e.g. tornadoes, hailstorms, or strong winds) have a place to shelter and make every effort to protect life. ➢ Pay attention to severe weather alerts. ➢ Take precautions with approaching thunderstorms and lighting. Discontinue all work until 30 minutes after severe weather has passed.
			5a. Adverse health effects that can result from Chemical/dust exposure	5a. Be aware of possible chemical exposure from well pad activities. (drilling, fracking, production activities) ➢ Discuss possible sources of exposure with local HSO or PIC. ➢ Avoid inhalation/absorption of dust, exhaust and fumes from well pad activities. ➢ Stay upwind of such activities whenever possible.
On-site edits:				
C. Locate Water Source 1. Traverse to water source location (either by foot or vehicle) 2. GPS and photograph water source 3. Traverse to vehicle location	X Motion _ Chemical X Electrical X Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Personal injury due to slips, trips, falls, lacerations, cuts, burns, and electrocution.	1a. Before traversing the property, perform a general scan of your planned walking path for any obstructions, debris, slip, trip, and fall hazards. Communicate conditions with sampling partner (if applicable). ➢ Scan your walking path. Identify any soil conditions which demonstrate significantly eroded areas from any possible recent rainfall. ➢ Look for changes in elevation (steep slopes) and grade when walking on uneven terrain. ➢ Be aware of loose gravel, wet grass, snow covered rocks and ice, roots and limbs, and slopes ➢ Stay within visual contact of your canvassing partner to ensure that you can be seen. ➢ For fences, complete an inspection to find the best point of entry and ask the owner to shut off any electrified fences. If a gate or opening cannot be located and electric power cannot be shut off, drape a thick blanket up and over the barbed wire rungs or electrified wire before attempting to step over.
			1b. Injury and/or damage to personnel, property or pets/livestock.	1b. When backing out of an area near the water source location, use a spotter to avoid damage or injury to the work vehicle, property, residents, and pets/livestock. If maneuvering vehicle in an area of uneven terrain and unsure of potential locations of slopes, holes, debris, etc. walk the projected vehicle path first. Use a spotter ahead of the vehicle to direct the driver away from potential hazards.
			1c. Injury / illness due to contact with animal and insects (bites, stings, cuts, lacerations, puncture wounds, venom,	1c. Observe signs of biological hazards that may be present (e.g., webs, bees flying in and out, buzzing sounds). ➢ Use repellant if ticks or mosquitoes may be present. ➢ Wear leather gloves when opening cellar, well vault or spring house door. ➢ Do not place your hands or feet anywhere you cannot see them.

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JSA Control #: GES

			etc.)	➢ Stay alert for webs, nests, or other signs of inhabitation. ➢ Scan for "Beware of Dog" signs. Ask to have aggressive animals secured.
On-site edits:				No Edits
D. Purge Water Source (Well) 1. Connect hose to spigot attachment 2. Turn on/off spigot or tap 3. Disconnect and drain hose Note: Be aware of exposed wiring around pressure tanks. Use SWA if purge cannot be completed safely	X Motion _ Chemical X Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature X Pressure _ Sound	1a. Cut or abrasion injury to hand from contact with rusty spigot. 1b. Eye injury resulting from water spray due to faulty hose connection.	1a. Be aware of sharp edges or very rusty areas of spigot openings. ➢ If excessive rust could cause a breakage of the spigot or handle, call the PM to discuss alternative sampling method. ➢ Wear leather gloves when attaching or removing garden hose from the spigot, as well as when turning the spigot on or off. 1b. Turn on the spigot slowly to ensure secure connection from hose to spigot before increasing the water pressure. ➢ Inspect the hose for leaks and be sure hose is in the preferred location to drain the water and not pointed at anyone.
On-site edits:				No Edits
E. Sampling 1. Set up of equipment and sample cooler 2. Fill bottleware using spigot, bailer, transfer vessel, or extendable rod with attached cup. 3. Take field readings with YSI, Gas Explorer, and Turbidity meter	X Motion X Chemical _ Electrical _ Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury (strains) to back / shoulders while moving equipment. 1b. Injury due to slip, trip, fall on cords/piping 1c. injury due to slip or fall on steep embankment. 1d. Eye or bodily injury from splashing of preservatives. 1e. Hand or bodily injury from contact with broken glassware.	1a. Utilize proper lifting procedure when handling equipment and cooler. ➢ Bend down at the knees and lift/lower with your legs and do not lift anything > 50lbs. ➢ Share carrying duties to eliminate balance issues when traversing rough terrain. 1b. Set up the work area so that all equipment is out of the walking path of both personnel and landowner. 1c. Use the extendable rod with the attached cup to reach surface water sources when near a steep embankment or where water level is deep enough for sampling, but is out of reach by hand. 1d. Fill bottleware slowly to avoid splashing of preservatives. 1e. Close lids of glass bottle ware finger tight. Do not over tighten, which could result in broken glassware. ➢ Kevlar and nitrile surgical gloves must be worn when opening a cooler and retrieving sample collection containers ➢ Wear Kevlar (cut resistant) gloves beneath nitrile sampling gloves to help prevent exposure to sharp edges, broken glass, and/or preservatives.
On-site edits:				No Edits
F. Decontamination 1. Soak/spray durable equipment to prevent cross-contamination between multiple sample locations and dispose of all waste	_ Motion X Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Illness due to exposure decontamination chemicals	1a. When spraying equipment with Alconox, spray away from the face and body. ➢ Be sure to account for wind direction and strength before spraying Alconox solution. ➢ Wear nitrile gloves over Kevlar and wear a new pair nitrile gloves for each sample. ➢ Avoid touching your face and body, or any surface you may come into contact with after spraying Alconox
On-site edits:				No Edits

JSA Control #: GES

G. Demobilization 1. Replace all equipment in cases or duffle bag 2. Ice and close sample cooler 3. Traverse to next source	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury (strains) to back / shoulders while moving equipment 1b. Personal injury due to slips, trips, and falls	1a. Utilize proper lifting procedure when handling equipment and cooler. ➢ Bend down at the knees and lift/lower with your legs and do not lift anything > 50lbs. ➢ Place cooler on the bed of the truck before adding ice to avoid making coolers dangerously heavy. Perform a team lift if cooler weight exceeds 35lbs. 1b. Perform a general scan of your planned walking path to truck or next location for any obstructions, debris, slip, trip, and fall hazards. Communicate conditions with sampling partner.
On-site edits:				No Edits
H. Departing the site 1. Exiting the property	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury and/or damage to personnel, property, and pets.	1a. When backing out of a site location, use a spotter to avoid damage or injury to the work vehicle, property, residents, and pets/livestock. ➢ If possible, avoid backing out, and exit moving forward.
On-site edits:				No Edits

Core Safety Expectations

1. ***Always follow Fall Protection standards when working at elevated heights.***
2. ***Always follow Written Permit procedures.***
3. ***Always follow Lock Out/Tag Out (LOTO) procedures.***
4. ***Always follow Critical Device Defeat procedures.***
5. ***Always follow written PPE Requirements for the work being performed.***

PM 11-23-15

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Job Safety Analysis (JSA)

JSA Title: **Motor Vehicle Driving**

JSA Control #:

Date Developed: 4/15/2015	
Latest Revised Date: 4/15/2015- **JSA Retention 1 year from Latest Revision Date.**	
Developed by: Patrick Daisley	
Work Team Leader: Patrick Daisley	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.

Revision #: 1	**Work Location: A-1141 Injection Well** **Permit #:**

This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.

SPECIFIC PPE: Gloves: (base on hazard and identified in column 4 e.g. - leather). PPE Clothing: highly visible clothing such as orange coveralls & reflective safety vest. Fire Retardant clothing (FRC) is required for well pad operations. Safety Glasses. Safety Shoes: steel-toed. Winter weather: Yack Tracks and FRC hard hat liner

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Fire extinguisher; First aid kit; Yellow flashing light; Roadside emergency kit; Spill containment kit

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply by using "Hazard Identification" tool)*		**Potential Hazards**	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Pre-mobilization 1. Always conduct a pre-trip or pre-use inspection of the vehicle prior to driving	X Motion _ Chemical _ Electrical _ Biological X Mechanical	_ Gravity _ Radiation X Temperature _ Pressure _ Sound	**1a.** Injuries caused by faulty or misadjusted equipment **1b.** Accident or injuries caused by environmental conditions (inclement weather)	**1a.** Inspect exterior and interior of vehicle. Don hi-visible clothing, steel-toe boots, safety glasses and leather gloves. ➢ Exterior ▪ Check condition of windshield wipers (wear and cracking). ▪ Check tires for manufacture inflation rate and tread condition. ▪ Check for body damage/overall condition. ▪ Check under vehicle for fluid leaks (e.g., oil, brakes, transmission, etc.). ▪ Check all lights (e.g., hi/low beams, turn signals, emergency flashers). ▪ Don high visible clothing and/or vest, include FRC if on well pad site, while inspecting exterior of vehicle. ➢ Interior ▪ Adjust seat to your height and visibility. ▪ Adjust mirrors to eliminate blind spots. ▪ Fasten safety belt (passengers too). ▪ Secure all lose items in container (e.g. glove box, cargo nets, cargo box). ▪ Verifying critical equipment is working (e.g., defogger, wipers, air bags, lights, turn signals). **1b.** Prepare vehicle for weather conditions prior to departure. ➢ Snow/Ice ▪ Scrape snow/ice from entire vehicle (e.g., hood, roof, windows, etc.). ▪ Add extra weight to back of trucks to increase traction. ▪ Maintain speed for conditions. ➢ Fog ▪ Turn on fog lights. ➢ Rain ▪ Ensure windows are defogged prior to mobilization. ▪ Utilize windshield wipers in all rainy conditions. ▪ Consider alternative routes based on flooding potential of roadway.

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			1c.3rd party injuries or accidents caused by unsecure equipment in truck bed	• Maintain speed for conditions. 1c. Inspect truck bed load. ➢ Check coolers, drums, and toolboxes to make sure all lids, caps, and tops are latched and tightened. ➢ Use ratchet-straps or cargo nets to secure load from shifting or falling from truck bed. ➢ Close and lock tailgate before mobilizing to site. ➢ Place light objects that could be blown out of truck bed in secured location of cab.
On-site edits:				No Edits
B. Driving 1. Driving to and from the site or while driving onsite. ***Note:*** ➢ *Comply with all Smith Systems Five (5) Keys®* ➢ *Cell phone / texting is not permitted at any time while operating vehicle.* ➢ *Three-point seat belts must be worn by all occupants at all times while driving to and from the site and while driving onsite.* ➢ *Drive with low beams on at all times.* ➢ *Smoking is not permitted in GES vehicles.*	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Accident or injuries caused by traffic congestion or other vehicles (struck by, contact with) 1b. Accident or injuries caused by road surface condition (i.e., struck by, contact with)	1a. Mitigate potential for an accident by practicing the following techniques: ➢ Look ahead a minimum of 15 seconds to identify potential oncoming hazards. ➢ Maintain 4-second minimum following distance (increase distance due to weather conditions). ➢ Avoid focusing on any one object for more than 2 seconds. ➢ Scan the road, area around vehicle, and mirrors every 5-8 seconds. ➢ Stay out of other vehicles blind spots. ➢ Do not drive in clusters of traffic (i.e., adjust speed to give cushion between your vehicle & others). ➢ Utilize turn signals as required by law at all times 1b. Mitigate the potential for an accident by practicing the following techniques: ➢ Maintain speed; slower depending on road surface (e.g., dirt, concrete, asphalt, gravel). ➢ Drive posted speed limits (e.g., city, country roads, and highway). ➢ Do not tailgate vehicles in front of you. ➢ Pay attention for pedestrians. ➢ Place two hands on steering wheel at 9 and 3 position. ➢ Check for and yield to emergency vehicles. ➢ Obey traffic signals. ➢ Use particular caution in construction zones. ➢ Look ahead a minimum of 15 seconds. ➢ Scan the road, area around vehicle, and mirrors every 5-8 seconds. ➢ When backing, use a spotter at all times and ensure that the pre-determined hand signals have been discussed during the tailgate meeting and implemented. ➢ Stay out of other vehicles blind spots. Make eye contact with other drivers and ensure they see you.
On-site edits:					No Edits
C. Preparing to Park 1. Parking	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury/vehicle impairment caused by contact with other vehicles	1a. Mitigate the potential for an accident by practicing the following techniques: ➢ ***First move forward*** - Back into space (required on terminal sites). ➢ Maneuver vehicle slowly within parking lot. ➢ Ensure vehicle is legally parked. ➢ Ensure nothing is located at rear of vehicle prior to mobilization. ➢ Get out and inspect space and vehicle if unsure of potential or unseen hazards. When parked, vehicles that have automatic transmissions, the vehicle must be placed into park and the emergency (parking brake applied). For manual transmissions, the emergency brake must be applied and wheel chocks used to prevent the vehicle from rolling ➢ Wheel chocks must be used for large vehicles when parked/positioned on uneven surfaces; front & back of each rear tire. ➢ Wheel chocks must be used (front & back of each rear tire) on all vehicles working at the site/ vehicles with manual transmission parked on sloping surfaces ➢ When parked and unhooked from a vehicle, trailers must have a wheel chock placed in front of and

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				behind each rear wheel.
On-site edits:				No Edits

PD 11-23-15

Core Safety Expectations

1. ***Always follow Fall Protection standards when working at elevated heights.***
2. ***Always follow Written Permit procedures.***
3. ***Always follow Lock Out/Tag Out (LOTO) procedures.***
4. ***Always follow Critical Device Defeat procedures.***
5. ***Always follow written PPE Requirements for the work being performed.***

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Analysis Report

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

December 11, 2015

Project: A-1141 INJECTION WELL

Submittal Date: 11/24/2015
Group Number: 1611848
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
033-WV-009-112315-1220-1-602 Grab	8147970
033-WV-009-112315-1220-1-602 Filtered Grab	8147971

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/.

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Respectfully Submitted,

Stephen J. Gordon
Project Manager

(724) 597-2027

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Analysis Report

Sample Description: 033-WV-009-112315-1220-1-602 Grab
Groundwater Casey & Doris Cross
A-1141 Injection Well

LL Sample # WW 8147970
LL Group # 1611848
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/23/2015 12:20 by MC

Submitted: 11/24/2015 09:35
Reported: 12/11/2015 10:56

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CROSS

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	**Benzene**	**15**		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Carbon Tetrachloride	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Chlorobenzene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,2-Dichlorobenzene	N.D.		1	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,4-Dichlorobenzene	N.D.		1	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,1-Dichloroethane	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,2-Dichloroethane	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,1-Dichloroethene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	cis-1,2-Dichloroethene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	trans-1,2-Dichloroethene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,2-Dichloropropane	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Ethylbenzene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Methyl Tertiary Butyl Ether	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Methylene Chloride	N.D.		2	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Styrene	N.D.		1	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Tetrachloroethene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Toluene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,2,4-Trichlorobenzene	N.D.		1	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,1,1-Trichloroethane	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	1,1,2-Trichloroethane	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Trichloroethene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	Vinyl Chloride	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	**m+p-Xylene**	**2**		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	o-Xylene	N.D.		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
10335	**Xylene (Total)**	**2**		0.5	ug/l		12/03/15 06:22	12/03/15 06:22	2648
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	**TPH-GRO water C6-C10**	**310**		20	ug/l		12/01/15 20:12	12/01/15 20:12	7172
GC Miscellaneous									
RSKSOP-175 modified									
07105	**n-butane**	**330**		1.0	ug/l			12/01/15 14:27	9051
07105	**Ethane**	**4,400**		100	ug/l			12/02/15 09:31	9051
07105	**Methane**	**33,000**		300	ug/l			12/02/15 09:31	9051
07105	**Propane**	**1,800**		100	ug/l			12/02/15 09:31	9051
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	**C10-C28**	**0.062**	*J*	0.047	mg/l		11/29/15 16:40	12/02/15 23:10	2027

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Analysis Report

Sample Description: 033-WV-009-112315-1220-1-602 Grab
Groundwater Casey & Doris Cross
A-1141 Injection Well

LL Sample # WW 8147970
LL Group # 1611848
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/23/2015 12:20 by MC

Submitted: 11/24/2015 09:35
Reported: 12/11/2015 10:56

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CROSS

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	C24-C40	N.D.		0.047	mg/l		11/29/15 16:40	12/02/15 23:10	2027
02740	**Total TPH (C10-C40)**	**0.067 J**		0.047	mg/l		11/29/15 16:40	12/02/15 23:10	2027
Metals									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		12/02/15 09:17	12/04/15 04:54	2106
01750	**Calcium**	**6.32**		0.0333	mg/l		12/02/15 09:17	12/04/15 04:54	2106
01754	Iron	N.D.	.3	0.0333	mg/l		12/02/15 09:17	12/04/15 04:54	2106
07058	**Manganese**	**0.0218**	.05	0.00080	mg/l		12/02/15 09:17	12/04/15 04:54	2106
01767	**Sodium**	**86.7**		0.167	mg/l		12/02/15 09:17	12/04/15 04:54	2106
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.00088 J**	.01	0.00040	mg/l		12/02/15 09:55	12/11/15 03:52	2106
06026	**Barium**	**0.236**	2	0.00092	mg/l		12/02/15 09:55	12/11/15 03:52	2106
Wet Chemistry									
EPA 300.0									
00224	**Chloride**	**4.0**	250	1.0	mg/l			11/28/15 17:52	6676
00228	Sulfate	N.D.	250	1.5	mg/l			11/28/15 17:52	6676
EPA 415.1									
00273	**Total Organic Carbon**	**1.2**		0.50	mg/l			12/08/15 07:32	495
EPA 170.1									
12151	**Temperature of pH**	**21.8**		0.010	Degrees C			11/26/15 03:37	1198
SM 2540 C-1997									
00212	**Total Dissolved Solids**	**214**	500	19.4	mg/l			11/25/15 06:31	8743
SM 2540 D-1997									
10457	Total Suspended Solids	N.D.		1.00	mg/l			11/30/15 21:47	2350
SM 4500-H+ B-2000									
12152	**pH**	**8.3**		0.010	Std. Units			11/26/15 03:37	1198
	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
SM 5540 C-2000									
00225	M. B. A. S.	N.D.	.5	0.040	mg/l LAS MW 320			11/25/15 00:05	237
Microbiology									
SM 9223 B-1997									

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Analysis Report

Sample Description: 033-WV-009-112315-1220-1-602 Grab
Groundwater Casey & Doris Cross
A-1141 Injection Well

LL Sample # WW 8147970
LL Group # 1611848
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/23/2015 12:20 by MC

Submitted: 11/24/2015 09:35
Reported: 12/11/2015 10:56

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CROSS

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Microbiology									
SM 9223 B-1997									
08161	**Tot Coli/E. coli (Quanti-tray)**	See Below			MPN/100mL			11/25/15 12:44	2213
	Total Coliform	118.4		/100ml					
	E. coli	< 1.0		/100ml					

General Sample Comments

DEFINITIONS:
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Analysis Report

Sample Description: 033-WV-009-112315-1220-1-602 Filtered Grab
Groundwater Casey & Doris Cross
A-1141 Injection Well

LL Sample # WW 8147971
LL Group # 1611848
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/23/2015 12:20 by MC

Submitted: 11/24/2015 09:35
Reported: 12/11/2015 10:56

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		12/02/15 09:17	12/04/15 05:27	2106
01750	**Calcium**	**6.32**		0.0333	mg/l		12/02/15 09:17	12/04/15 05:27	2106
01754	Iron	N.D.	.3	0.0333	mg/l		12/02/15 09:17	12/04/15 05:27	2106
07058	**Manganese**	**0.0223**	.05	0.00080	mg/l		12/02/15 09:17	12/04/15 05:27	2106
01767	**Sodium**	**85.5**		0.167	mg/l		12/02/15 09:17	12/04/15 05:27	2106
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.00088 J**	.01	0.00040	mg/l		12/02/15 09:55	12/11/15 03:54	2106
06026	**Barium**	**0.246**	2	0.00092	mg/l		12/02/15 09:55	12/11/15 03:54	2106

General Sample Comments

This sample was field filtered for dissolved metals.

DEFINITIONS:
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC Lab PM Contact Name: Wendy Kozma Lab Address: 2425 New Holland Pike City, State ZIP: Lancaster, PA 17601 Phone: 717-556-7257 Fax: 717-656-6766 Email: WendyKozma@eurofinsus.com	Client: Southwestern Energy Company Client Contact Name: Tyler Spear Client Address: 179 Innovation Drive City, State ZIP: Jane Lew, WV 26378 Phone: 304-884-1681 Email: Tyler_Spear@SWN.com	**Environmental Chain of Custody (COC)** Consultant Name: GES, Inc. Consultant PM Contact Name: Nicholas Lohr Phone: 800-267-2549, Ext. 3634 Fax: 866-902-2187 Email: Nlohr@gesonline.com	eurofins | Lancaster Laboratories

*WELL PAD NAME: A-1141 Injection Well	*Analysis Turnaround Time (working days)	*SAMPLER(s): Matt Crownover 602	20810 1611848 8147970-72
*Please circle which type of site this is: IMPOUNDMENT (WELL PAD) SPECIAL PROJECT	Standard TAT = 10 working days (unless otherwise noted below)		
*PROPERTY # (AFE# if applicable): 4001161668	☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only		COC Page 1 of 1
*MAJOR/MINOR CODE: 52695/007			
*STATE SAMPLED: WV	☐ Rush TAT = _____ working days		Lab SDG Label
*OWNER NAME: Casey & Doris Cross			
☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present)	☐ *Sample Collected - POST-Treatment System		
☒ *Pre-drill Sample	☐ *Post-drill Sample		

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-112315-1220-1-602	11-23-15	1220	grab	GW	22	Y	x	x	x	x	x	x	x	x	x	x	x	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client *Disposal By Lab after two (2) months of final report date*

Special Instructions/QC Requirements & Comments:

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*PARCEL ID #: 03 4F001700030000

*FEDEX TRACKING #: 8013 0183 1302

*SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION: Well / Outside Spigot

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
[signature]	GES	11-23-15/1615	Fed Ex		11-23-15/1615
Relinquished by:	Company:	Date/Time:	Received by:	ELLE	Date/Time: 11-24-15 / 935

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611848

Environmental Sample Administration Receipt Documentation Log

Client/Project: GES

Date of Receipt: 11-24-15

Time of Receipt: 935

Source Code: F1

Shipping Container Sealed: (YES) NO

Custody Seal Present * : (YES) NO

* Custody seal was intact unless otherwise noted in the discrepancy section

Package: (Chilled) Not Chilled

Temperature of Shipping Containers							
Cooler #	Thermometer ID	Temperature (°C)	Temp Bottle (TB) or Surface Temp (ST)	Wet Ice (WI) or Dry Ice (DI) or Ice Packs (IP)	Ice Present? Y/N	Loose (L) Bagged Ice (B) or NA	Comments
1	DT121	1.4	TB	WI	Y	B	—
2							
3							
4							
5							
6							

Number of Trip Blanks received NOT listed on chain of custody: 0

Paperwork Discrepancy/Unpacking Problems:

West Virginia temp: 0.2 – 0.7 (Correction ~~temp~~ factor is +0.2 and not factored in) ① TC 11-24-15

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Unpacker Signature/Emp#: 6520 **Date/Time:** 11-24-15 / 1000

Issued by Dept. 6042 Management

2174.06

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

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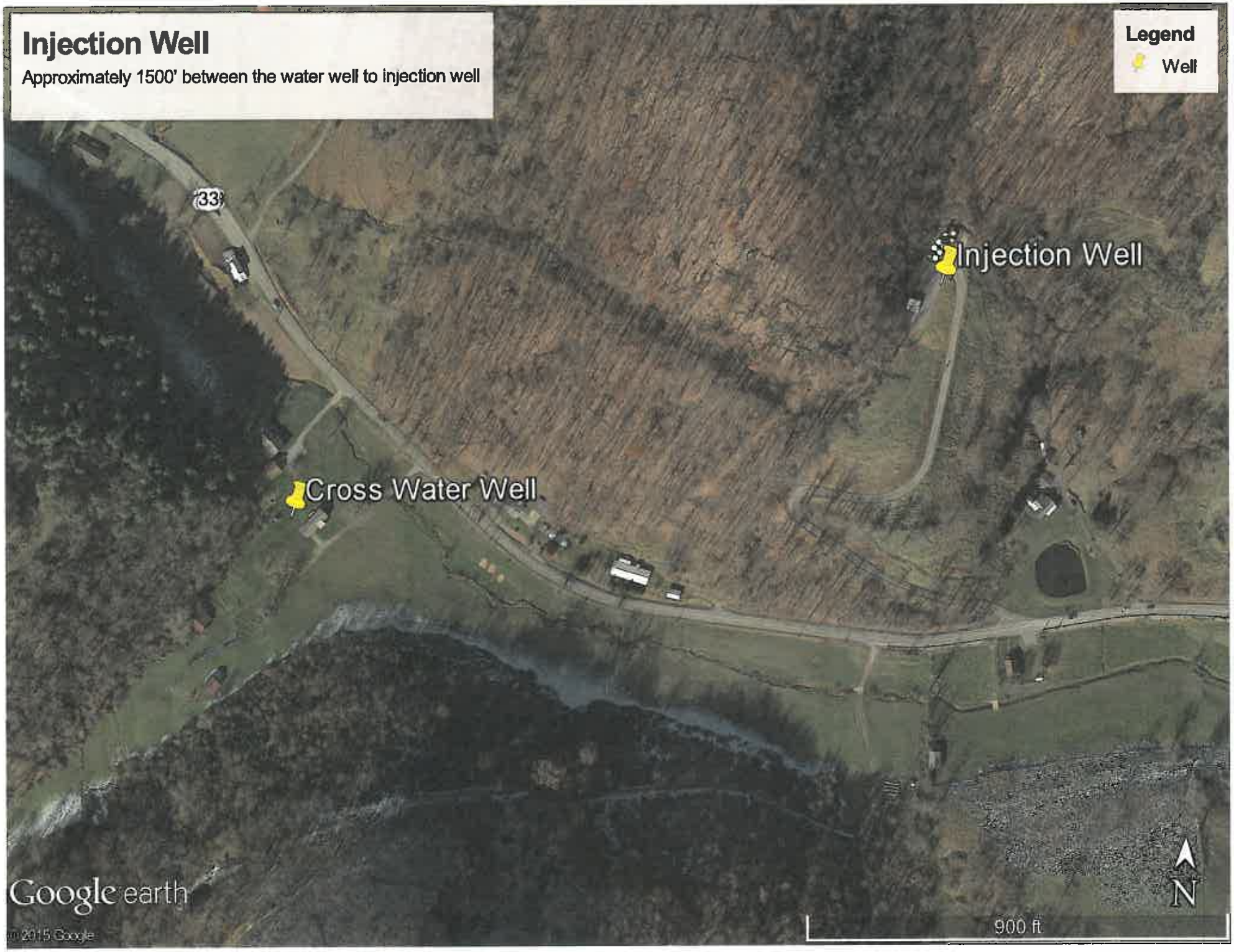
WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.


Injection Well
Approximately 1500' between the water well to injection well
Legend
Well
33
Injection Well
Cross Water Well
Google earth
© 2015 Google
N
900 ft

SWN
Southwestern Energy®
PO Box 1300
Jane Lew, WV 26378
PHONE: (304) 884-1610

December 3, 2015

Dannie Gum
4652 US HWY 33 W
Camden, WV 26338

Certified Mail Receipt: 7014 0150 0001 8784 2482

RE: Water Supply Testing Analytical Results

Dear Mr. Gum:

SWN Production Company, LLC has recently sampled your water source(s) in conjunction with renewing an injection well permit with the WV DEP.

Enclosed please find the results of that sample(s) as prepared by Eurofins Lancaster Laboratories Environmental in addition to the Field Data Packet collected by a GES representative during the interview.

Should you need assistance interpreting the analytical data as presented in the report, you may refer to the following websites or other guidance documents from the West Virginia Department of Environmental Protection or other regulatory agencies. Additionally, EPA Water Systems Council Well Care Hotline can be contacted 888-395-1033.

- www.dep.wv.gov/
- https://wvdhhr.org/phs/water/index.asp
- http://water.epa.gov/drink/contaminants/

Should you have any additional questions, please contact me at (304)-884-1681.

Received
Office of Oil & Gas
OCT 20 2016

Thank you, we appreciate your cooperation.

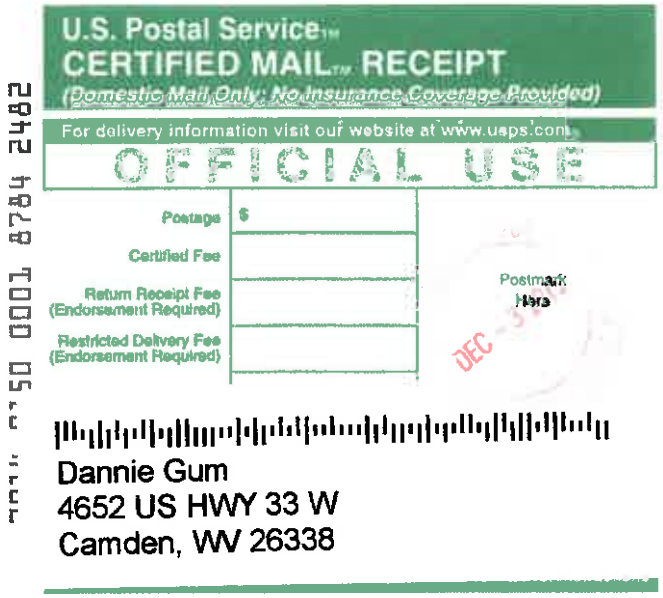
Sincerely,

Tyler Spear
Engineering Regulatory Technician

The Right People doing the Right Things,
wisely Investing the cash flow from
our underlying Assets, will create Value+

Received
Office of Oil & Gas
OCT 20 2016

UIC - Gum- Results



U.S. Postal Service™
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For delivery information visit our website at www.usps.com

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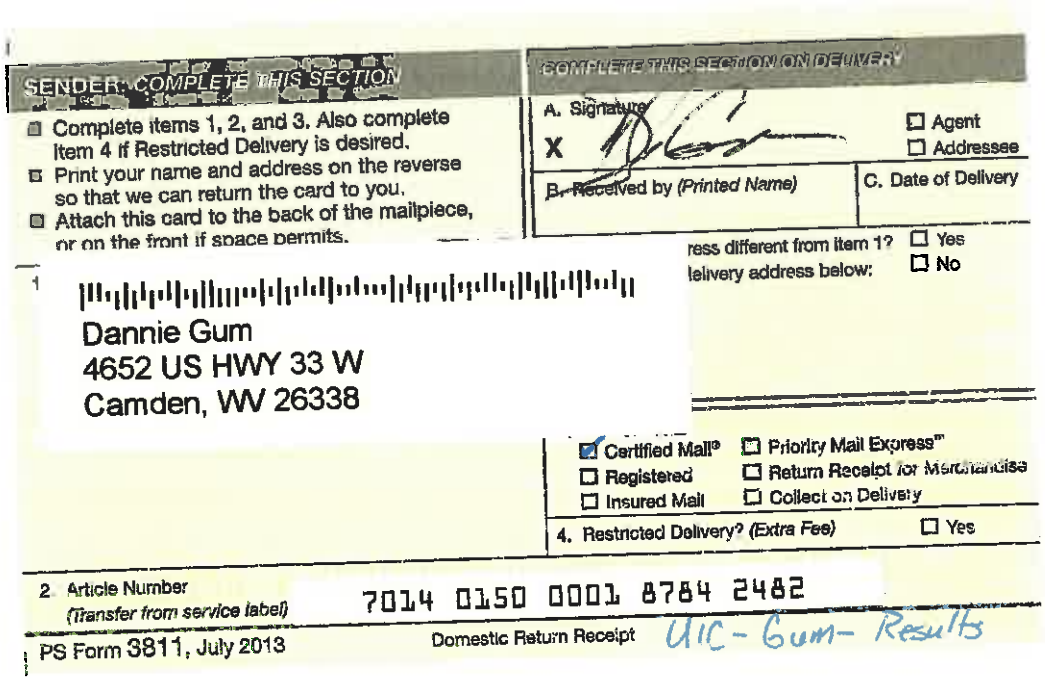
Postage $
Certified Fee
Return Receipt Fee (Endorsement Required)
Restricted Delivery Fee (Endorsement Required)

Postmark Here

DEC

7014 0150 0001 8784 2482

Dannie Gum
4652 US HWY 33 W
Camden, WV 26338



SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by (Printed Name)
C. Date of Delivery

ress different from item 1? ☐ Yes
elivery address below: ☐ No

1

Dannie Gum
4652 US HWY 33 W
Camden, WV 26338

☑ Certified Mail®
☐ Registered
☐ Insured Mail
☐ Priority Mail Express™
☐ Return Receipt for Merchandise
☐ Collect on Delivery

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7014 0150 0001 8784 2482

PS Form 3811, July 2013 Domestic Return Receipt UIC - Gum- Results

Office of Civil Cas

OCT 20 2016

Southwestern Energy®
PO Box 1300
Jane Lew, WV 26378
PHONE: (304) 884-1610

December 3, 2015

Dannie Gum
4652 US HWY 33 W
Camden, WV 26338

Certified Mail Receipt: 7014 0150 0001 8784 2482

RE: Water Supply Testing Analytical Results

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- www.dep.wv.gov/
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Office
OCT 20 2016

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Engineering Regulatory Technician

The Right People doing the Right Things, wisely Investing the cash flow from our underlying Assets, will create Value+

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OCT 20 2016

Groundwater & Environmental Services, Inc.

WESTERN PENNSYLVANIA OFFICE

Sampling Field Data Package
A-1141 INJECTION WELL
LEWIS COUNTY, WV

Gum
034F002400000000
033-WV-009-110615-1235-1-602
November 6, 2015

Prepared For:

Southwestern Energy
Jane Lew, WV

Prepared By:

Groundwater & Environmental Services, Inc.
301 Commerce Park Drive
Cranberry Township, PA 16066

November 16, 2015

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OCT 20 2016

FIELD DOCUMENTATION

Site Visit Form, Calibration Logs, Logbook, Site Sketch, COCs, Checklist

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Office of Oil & Gas
OCT 20 2016

Part A: GENERAL INFORMATION

Water Source ID*:	PD-11062015-602-02	O & G Well Name*:	A-1141 INJECTION WELL
Pad Name*:	A-1141 INJECTION WELL	Parcel Number*:	03 4F002400000000
Tax ID:	03 4F002400000000		
Operator ID*:	033	State Code*:	
County Code*:	009		
Sampled By*:	MATT CROWNOVER	Company Name*:	GES
Water Sampler Identifier*:	602	Date/Time Sampled*:	11/06/2015 12:35 (24hr)
Sample Frequency*:	1	N/A: No Sample	Details:
Person Interviewed*:	Owner	Please specify:	

PROPERTY OWNER		RESIDENT OR OTHER	☑ Same as owner
Name*:	DANNIE GUM	Name*:	DANNIE GUM
Address*:	4652 US HWY 33 W	Address*:	4652 US HWY 33 W
City*:	CAMDEN	City*:	CAMDEN
State*:	WV	State*:	WV
Postal Code*:	26338	Postal Code*:	26338
Phone No*:	304-269-1331	Phone No*:	304-269-1331

Part B: WATER QUALITY

	Reported Quality			Observed Quality		
	Yes	No	N/A	Yes	No	N/A
Staining	○	◉	○	○	◉	○
Odor	○	◉	○	○	◉	○
Cloudiness	○	◉	○	○	◉	○
Sheen	○	◉	○	○	◉	○
Effervescence	○	◉	○	○	◉	○
Taste	○	◉	○			

Treatment*

- ☑ None
- ☐ Charcoal Filter
- ☐ Softening
- ☐ UV light
- ☐ Chlorination
- ☐ pH Adjustment
- ☐ Iron Removal
- ☐ In-line Sediment Filter

Other:

Functioning Properly*: ○ Yes ○ No ○ Unknown

Pump Type

- ◉ None
- ○ Gas Piston
- ○ Submersible
- ○ Windmill
- ○ Jet
- ○ Other:

Capacity (GPM):

Comments:

Part C: WATER SOURCE INFORMATION

Does this source supply any other properties? ◉ Yes ○ No

Identify properties:

Is the water source(s) located on the property? ◉ Yes ○ No Please explain:

Number of people using this water source: 0 Gallons/day:

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OCT 20 2016

Pressure Tank? ○ Yes ◉ No Size (gallons):

Water Use: ☐ Domestic ☐ Husbandry ☐ Irrigation Other: UNUSED

Coordinates: (NAD83 decimal, 5 places) Lat: 39.054800 Long: -80.572322 Ground Surface Elevation: 1069 ft

Does the water source ever go dry? ○ Yes ◉ No

Water Source Type*: POND

Part D: DESCRIPTION OF WATER SOURCE

Check all that apply

☐ Loose, missing, or damaged cover ☑ Evidence of insects, spiders, animals ☑ Open to surface water

☐ Any cracked or damaged well casing/spring vault ☐ Additional storage or holding tank/coyote system

☐ Evidence of erosion ☐ Water source secured ☐ Source buried ☐ Location unknown ☐ Cover flush with ground

Other:

Part E: DESCRIPTION OF AREA SURROUNDING WATER SOURCE

Check all that apply

☑ Ground sloping towards water source ☑ Water source downgradient of septic system

Signs of:

☐ Failing septic ☐ Soggy ground ☐ Foul odor

Close proximity to (tick all that apply):

☐ Garden ☐ Orchard ☐ Greenhouse ☐ Equipment storage areas

☐ Junkyard ☐ Dumping area ☐ Landfill ☐ Salt storage area/Salted roadway

☐ Garage ☐ Fuel storage tanks

Located in field with:

☐ Livestock ☐ Inside Barn ☐ Barnyard ☐ Other out buildings

Additional remarks and comments:

Part F: SAMPLING

Sample ID: 033-WV-C09-110615-1235-1-602

Sampled	Sampling Point Location
○ Before Treatment ○ After Treatment	○ Inside Faucet ○ Outside Faucet ○ Overflow/Discharge Pipe
◉ No Treatment ○ Not Sure	○ Seep ○ Pressure Tank ○ Bailed
	○ Wellhead ◉ Other:

Was the water source purged before sampling ○ Yes ◉ No Volume (gal): Time (min):

Is it possible to run water for 30 minutes? ○ Yes ◉ No **If No, please explain:**

Average water usage within the last 24 hours: Chain of custody attached? ◉ Yes ○ No

Field Analyses:

Turbidity (ntu): 3.39 pH (ph units): 8.07

Conductivity (umhos/cm): 343 Temperature (deg c): 16.22

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Gas Readings:

Type	PPM	% LEL	% GAS

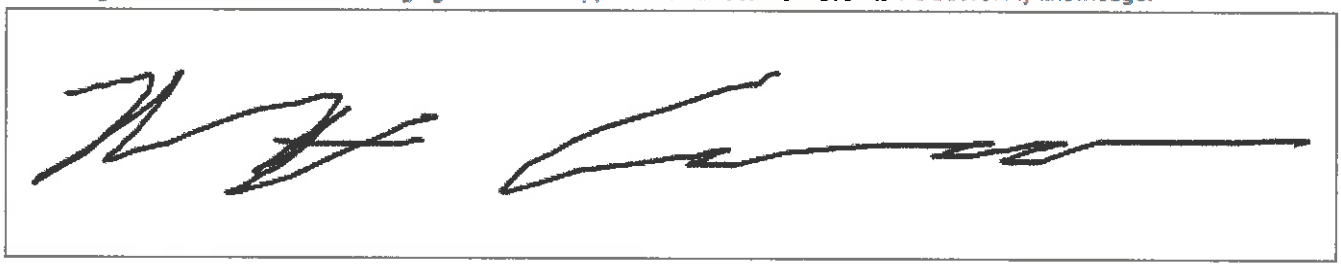
Wellhead		Peak / Sustained		Peak / Sustained		Peak / Sustained
Cold Headspace	0	Peak / Sustained		Peak / Sustained		Peak / Sustained
SW Vicinity	0	Peak / Sustained		Peak / Sustained		Peak / Sustained
		Peak / Sustained		Peak / Sustained		Peak / Sustained
		Peak / Sustained		Peak / Sustained		Peak / Sustained
		Peak / Sustained		Peak / Sustained		Peak / Sustained

Part G: SITE SKETCH and PHOTOGRAPHS

Add Images | 6 pictures attached to the from

SAMPLER

Please sign in the box below acknowledging that I have supplied the correct information to the best of my knowledge.



Accept | Clear

INTERVIEWEE

Accept | Clear

Received
Office of Oil & Gas
OCT 20 2016

Form #: NA
(Reference Form # in Log Book)

Truck #: NA

Gas Explorer Calibration Log

GES Equipment Name: GES-GE-029

Equipment Serial #: 1202-302846

9-28-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dasler 489
↓	↓	H_2S	0	100ppm		↓	↓
10-30-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dasler 489
↓	↓	H_2S	0	100ppm		↓	↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓

Gas

OCT 20 2016

NOTE: Gas Explorers must be calibrated on the first day of every month. If the instrument is recalibrated at anytime the calibration information must be recorded on this sheet.

3-Gas= 2.5%(50%LEL) Methane, 100ppm CO, Balance Air

GES - Ver. 1

Southwestern Energy Predrill Sampling

Gas Detector Equipment Calibration

Equipment Serial Number:	1202-302846
GES Equipment Code:	GES-GE-029
Equipment Type:	Gas Explorer
Date of Calibration:	10-30-15
Include Gas Detector Calibration Log with Field Documentation	

GPS Equipment

Equipment Serial Number:	RBC15V07226
GES Equipment Code:	N/A
Equipment Type:	Trimble YUMA

Water Quality Multi-Parameter Calibration

Equipment Serial Number:		09E100453	08325700
GES Equipment Code:		N/A	N/A
Equipment Type:		YSI	Hanna HI
Calibration Method:		3pt pH/ 1pt. Sp cond.	4pt.
Date of Calibration:		11-6-15	11-6-15
Calibration Parameter	Time	Pre-Value/Reading	Person Performing Calibration
pH-4	0720	4.11	Matt Crowmer 602
pH-7	0722	6.73	
pH-10	0724	10.20	
Specific Conductivity (µS/cm)	0726	1407	
Turbidity (<0.1 NTU)	0727	0.17	
Turbidity (15 NTU)	0728	15.3	
Turbidity (100 NTU)	0729	100	
Turbidity (750 NTU)	0730	752	
Calibration Parameter	Time	Post-Value/Reading	Person Performing Calibration
pH-4	0721	3.99	
pH-7	0723	7.00	
pH-10	0725	10.05	
Specific Conductivity (µS/cm)	0727	1412	
Turbidity (<0.1 NTU)	0731	0.15	
Turbidity (15 NTU)	0752	15.0	
Turbidity (100 NTU)	0753	100	
Turbidity (750 NTU)	0734	749	

Deep Procedures

Reference GES Baseline Water Well Sampling SOP

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OCT 20 2016

Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-114(Inj. Well

11

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4P 00249000 0000

Site Arrival Time: 1100 Site Departure Time: 1415

Samplers (Full Names and Sampler #s): Patrick Darley 489
Matt Crownover 602

Weather Condition Observations Recorded at: 1230

Weather Conditions: Cloudy Air Temp (Degrees Fahrenheit): 75°F

Estimate Wind Speed(mph): 14 mph Approximate Wind Direction: NW

Note: Remember to document any changes in weather conditions (Include Times).

Equipment Bump Test Verification (Include GES Equipment Number and Time):

N/A

Refer to page 11 for 11-6-15 (insert date) for full calibration information.

Does the parcel have a septic system?: X Y ___ N

If Yes, describe the location of the septic area below and provide an approximate location on the site map. * See pg. 68 for septic location.

1225 - Moved to the pond

1235 - Collected sample 033-WV-009-110615-1235-1-602 from the pond

1310 - Moved to the Spring.

Fed Ex Tracking #: 801301831324

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PD 11-6-15

Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-1141 Tj. Well

Southwestern Energy Predrill Sampling

Log Book #105

Parcel #: 03 4F00240000000

PD 11-6-15

Interviewee Signature:

Fields intentionally left blank in EDGE because they are unknown or do not apply:
(Check all that apply)

For All Sources:
- ☐ Pump Type
- ☑ Pump Capacity
- ☐ Number of People Using the Water Source
- ☑ Gallons/Day Used
- ☑ Average Water Usage Within the Last 24 Hours

For Wells:
- ☐ Reported Well Depth
- ☐ Reported Depth to Water Level
- ☐ Reported Pump Depth
- ☐ Date Drilled
- ☐ Drillers Name
- ☐ Well Location

For Cisterns:
- ☐ Source of Water

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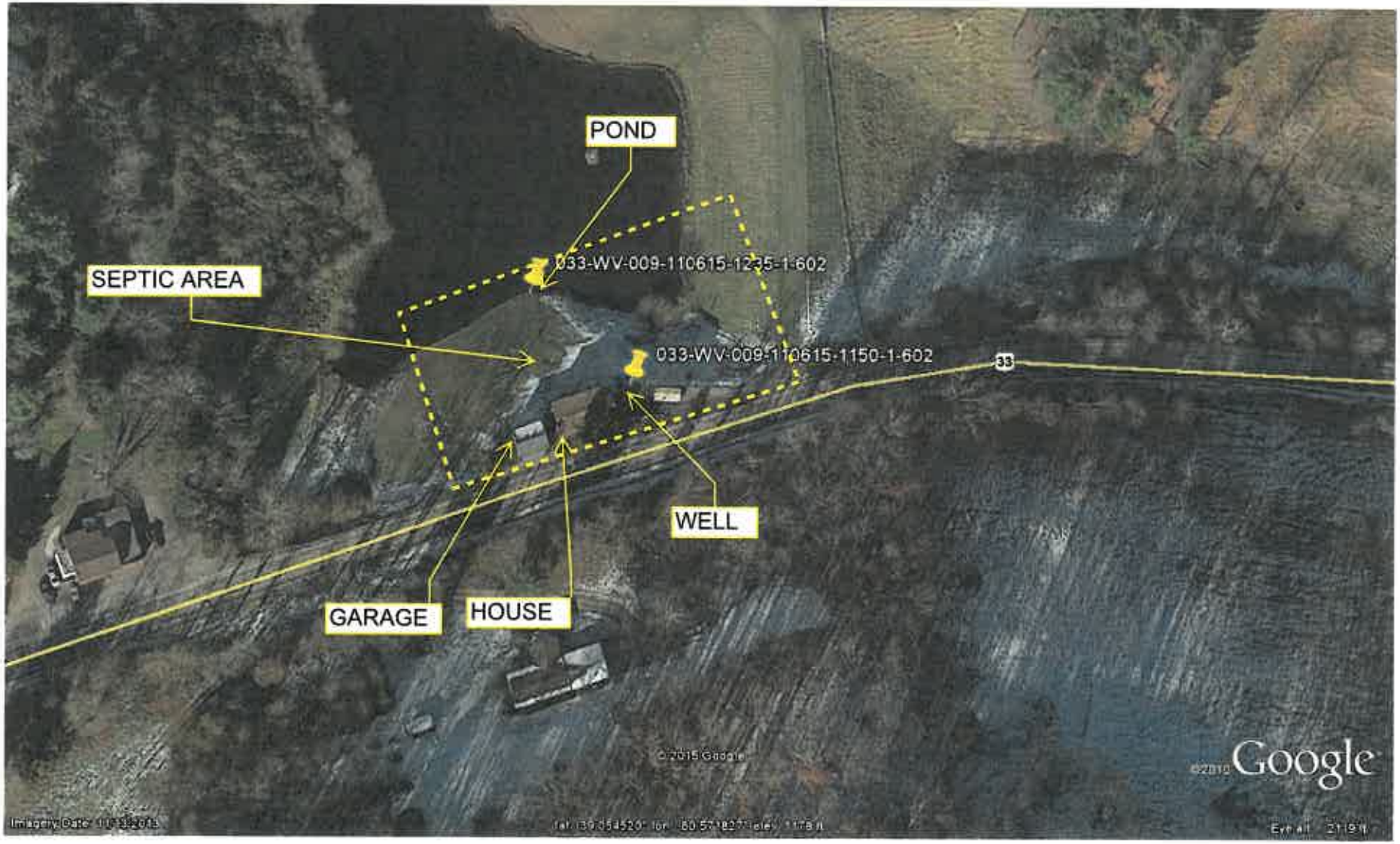
OCT 20 2016

Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-1141 Inj. Well



Southwestern Energy
A-1141 Injection Well
Property Owner: Dannie Gum
Parcel: 03 4F002400000000
Date: 11-06-15
Times: 1150 & 1235

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OCT 20 2016

PHOTOGRAPHS

Received
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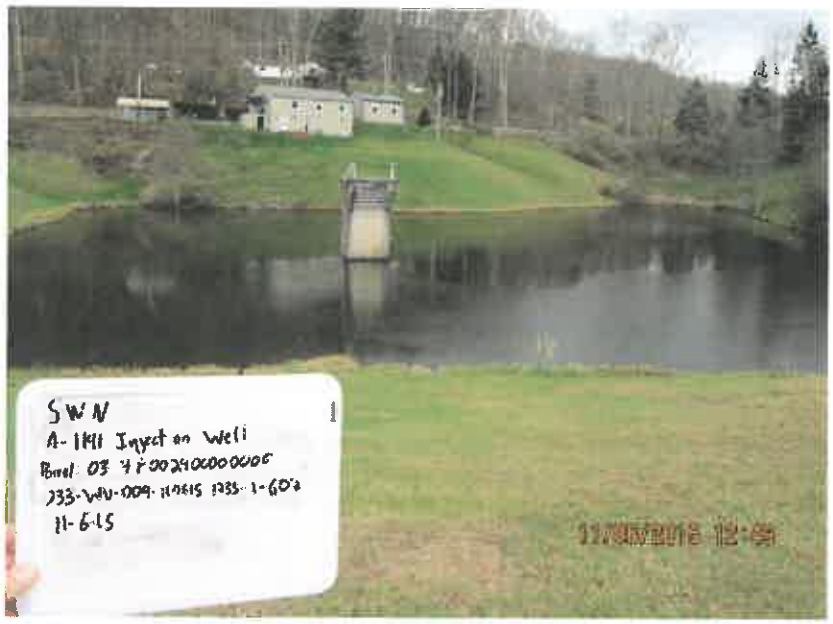
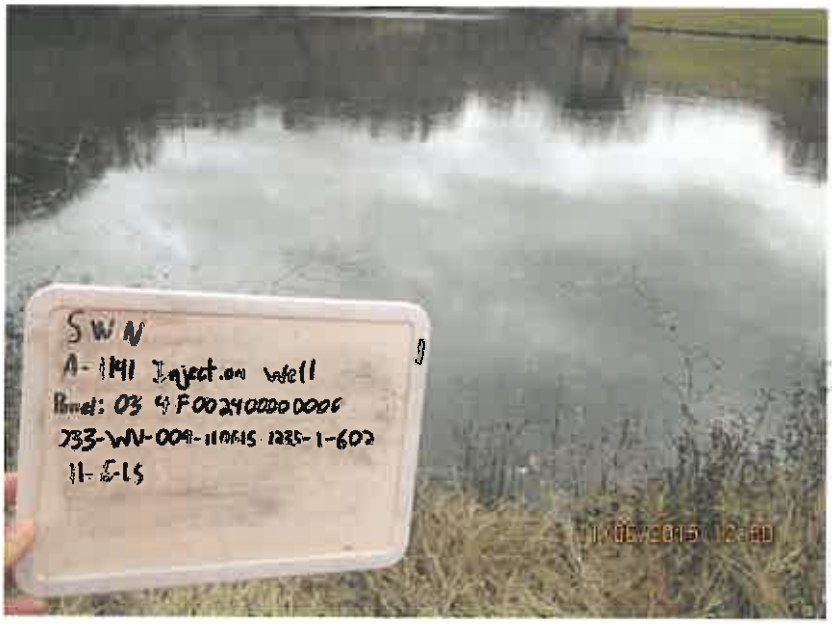
OCT 20 2016



Source: Pond



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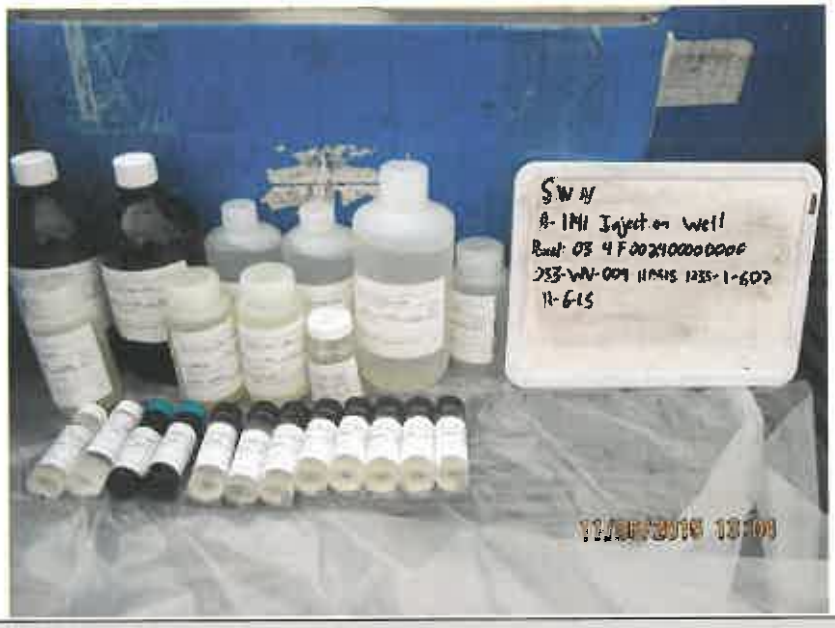
Sample Location

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002400000000
Gum
033-WV-009-110615-1235-1-602
November 6, 2015



Sample

Received
Office of Oil & Gas
OCT 20 2016

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002400000000
Gum
033-WV-009-110615-1235-1-602
November 6, 2015

eurofins | Lancaster Laboratories Environmental

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

REVISED

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

December 01, 2015

Project: A-1141 INJECTION WELL

Submittal Date: 11/07/2015
Group Number: 1607523
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
033-WV-009-110615-1235-1-602 Grab	8124473
033-WV-009-110615-1235-1-602 Filtered Grab	8124474

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

Respectfully Submitted,

Stephen J. Gordon
Project Manager

(724) 597-2027

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Office of Oil & Gas
OCT 20 2016

eurofins | Lancaster Laboratories Environmental

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

REVISED

Sample Description: 033-WV-009-110615-1235-1-602 Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124473
LL Group # 1607523
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 12:35 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG3--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	Benzene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Carbon Tetrachloride	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Chlorobenzene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,2-Dichlorobenzene	N.D.		1	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,4-Dichlorobenzene	N.D.		1	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,1-Dichloroethane	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,2-Dichloroethane	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,1-Dichloroethene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	cis-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	trans-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,2-Dichloropropane	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Ethylbenzene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Methyl Tertiary Butyl Ether	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Methylene Chloride	N.D.		2	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Styrene	N.D.		1	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Tetrachloroethene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Toluene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,2,4-Trichlorobenzene	N.D.		1	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,1,1-Trichloroethane	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,1,2-Trichloroethane	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Trichloroethene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Vinyl Chloride	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	m+p-Xylene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	o-Xylene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Xylene (Total)	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	TPH-GRO water C6-C10	N.D.		20	ug/l		11/11/15 21:33	11/11/15 21:33	2001
GC Miscellaneous									
RSKSOP-175 modified									
07105	n-butane	N.D.		1.0	ug/l			11/11/15 16:23	719
07105	Ethane	N.D.		1.0	ug/l			11/11/15 16:23	719
07105	**Methane**	**8.2**		3.0	ug/l			11/11/15 16:23	719
07105	Propane	N.D.		1.0	ug/l			11/11/15 16:23	719
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	C10-C28	N.D.		0.049	mg/l		11/12/15 19:00	11/17/15 01:59	2027
02740	C24-C40	N.D.		0.049	mg/l		11/12/15 19:00	11/17/15 01:59	2027

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REVISED

Sample Description: 033-WV-009-110615-1235-1-602 Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124473
LL Group # 1607523
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 12:35 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG3--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	Total TPH (C10-C40)	N.D.		0.049	mg/l		11/12/15 19:00	11/17/15 01:59	2027
Metals									
EPA 200.7 rev 4.4									
01743	**Aluminum**	**0.123 J**	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:06	2992
01750	**Calcium**	**44.1**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:06	2992
01754	**Iron**	**0.540**	.3	0.0333	mg/l	X	11/17/15 09:53	11/18/15 19:06	2992
07058	**Manganese**	**0.654**	.05	0.00080	mg/l	X	11/17/15 09:53	11/18/15 19:06	2992
01767	**Sodium**	**6.91**		0.167	mg/l		11/17/15 09:53	11/18/15 19:06	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.0013 J**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:26	1242
06026	**Barium**	**0.0394**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:26	1242
Wet Chemistry									
EPA 300.0									
00224	**Chloride**	**10.4**	250	1.0	mg/l			11/14/15 16:49	6676
00228	**Sulfate**	**50.9**	250	1.5	mg/l			11/14/15 16:49	6676
EPA 415.1									
00273	**Total Organic Carbon**	**5.1**		0.50	mg/l			11/18/15 06:12	495
EPA 170.1									
12151	**Temperature of pH**	**21.9**		0.010	Degrees C			11/10/15 20:24	1124
SM 2540 C-1997									
00212	**Total Dissolved Solids**	**240**	500	19.4	mg/l			11/11/15 08:20	1198
SM 2540 D-1997									
10457	**Total Suspended Solids**	**4.40**		1.00	mg/l			11/11/15 08:40	8743
SM 4500-H+ B-2000									
12152	**pH**	**8.2**		0.010	Std. Units			11/10/15 20:24	1124
	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
SM 5540 C-2000									
00225	**M. B. A. S.**	**0.056 J**	.5	0.040	mg/l LAS MW 320			11/07/15 11:10	237
Microbiology									
SM 9223 B-1997									

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Analysis Report

REVISED

Sample Description: 033-WV-009-110615-1235-1-602 Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124473
LL Group # 1607523
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 12:35 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG3--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Microbiology									
SM 9223 B-1997									
08161	**Tot Coli/E. coli (Quanti-tray)**	See Below			MPN/100mL			11/08/15 11:39	1281
	Total Coliform	> 200.5		/100ml					
	E. coli	16.4		/100ml					

General Sample Comments

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Analysis Report

REVISED

Sample Description: 033-WV-009-110615-1235-1-602 Filtered Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124474
LL Group # 1607523
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 12:35 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:15	2992
01750	**Calcium**	**44.0**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:15	2992
01754	Iron	N.D.	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:15	2992
07058	**Manganese**	**0.231**	.05	0.00080	mg/l	X	11/17/15 09:53	11/18/15 19:15	2992
01767	**Sodium**	**6.86**		0.167	mg/l		11/17/15 09:53	11/18/15 19:15	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.00099 J**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:31	1242
06026	**Barium**	**0.0303**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:31	1242

General Sample Comments

This sample was field filtered for dissolved metals.

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Environmental Chain of Custody (COC)

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Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC
Lab PM Contact Name: Wendy Kozma
Lab Address: 2425 New Holland Pike
City, State ZIP: Lancaster, PA 17601
Phone: 717-556-7257 **Fax:** 717-656-6766
Email: WendyKozma@eurofinsus.com

Client: Southwestern Energy Company
Client Contact Name: Tyler Spear
Client Address: 179 Innovation Drive
City, State ZIP: Jane Lew, WV 26378
Phone: 304-884-1681
Email: Tyler_Spear@SWN.com

Consultant Name: GES, Inc.
Consultant PM Contact Name: Nicholas Lohr
Phone: 800-267-2549, Ext. 3634 **Fax:** 866-902-2187
Email: Nlohr@gesonline.com

20810
1607523
8124473-75

*WELL PAD NAME: A-1191 Injection Well

*Please circle which type of site this is: IMPOUNDMENT (WELL PAD) SPECIAL PROJECT

*PROPERTY # (AFE# if applicable): 4001161668

*MAJOR/MINOR CODE: 52695/007

*STATE SAMPLED: WV

*OWNER NAME: Dannie Gum

*Analysis Turnaround Time (working days)

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

*SAMPLER(s): Matt Crowmer 602

COC Page 1 of 1

Lab SDG Label

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present) ☐ *Sample Collected - POST-Treatment System

☒ *Pre-drill Sample ☐ *Post-drill Sample

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
733-WV-009-110615-1235-1-602	11-6-15	1235	grab	SW	22	Y	x	x	x	x	x	x	x	x	x	x	x	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												

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Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

						1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,8

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client *Disposal By Lab after two (2) months of final report date*

Special Instructions/QC Requirements & Comments:

*PARCEL ID #: 03 4F00240000000

*FEDEX TRACKING #: 8013 0183 1324

*SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION: Pond/ Bank of Pond

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:	Date/Time:
	GES	11-6-15/1730		
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
				11/2/15 0945

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

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Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

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Sampling Field Data Package
A-1141 INJECTION WELL
LEWIS COUNTY, WV

Gum
034F002500000000
033-WV-009-110615-1330-1-602
November 6, 2015

Prepared For:

Southwestern Energy
Jane Lew, WV

Prepared By:

Groundwater & Environmental Services, Inc.
301 Commerce Park Drive
Cranberry Township, PA 16066

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November 16, 2015

FIELD DOCUMENTATION

Site Visit Form, Calibration Logs, Logbook, Site Sketch, COCs, Checklist

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Part A: GENERAL INFORMATION

Water Source ID*:	SP-11062015-602-03	O & G Well Name*:	A-1141 INJECTION WELL
Pad Name*:	A-1141 INJECTION WELL	Parcel Number*:	03 4F002500000000
Tax ID:	03 4F002500000000GC		
Operator ID*:	033	State Code*:	
County Code*:	009		
Sampled By*:	MATT CROWNOVER	Company Name*:	CES
Water Sampler Identifier*:	602	Date/Time Sampled*:	11/06/2015 13:30 (24hr)
Sample Frequency*:	1	N/A: No Sample Details:	
Person Interviewed*:	Owner	Please specify:	

PROPERTY OWNER		RESIDENT OR OTHER	☑ Same as owner
Name*:	DANNIE GUM	Name*:	DANNIE GUM
Address*:	4652 US HWY 33 W	Address*:	4652 US HWY 33 W
City*:	CAMDEN	City*:	CAMDEN
State*:	WV	State*:	WV
Postal Code*:	26338	Postal Code*:	26338
Phone No*:	304-269-1331	Phone No*:	304-269-1331

Part B: WATER QUALITY

	Reported Quality			Observed Quality		
	Yes	No	N/A	Yes	No	N/A
Staining	○	◉	○	○	◉	○
Odor	○	◉	○	○	◉	○
Cloudiness	○	◉	○	○	◉	○
Sheen	○	◉	○	◉	○	○
Effervescence	○	◉	○	○	◉	○
Taste	○	◉	○			

Treatment*

- ☑ None
- ☐ Charcoal Filter
- ☐ Softening
- ☐ UV light
- ☐ Chlorination
- ☐ pH Adjustment
- ☐ Iron Removal
- ☐ In-line Sediment Filter

Other:

Functioning Properly*: ○ Yes ○ No ○ Unknown

Pump Type

- ◉ None
- ○ Gas Piston
- ○ Submersible
- ○ Windmill
- ○ Jet
- ○ Other:

Capacity (GPM):

Comments:

SHEEN OBSERVED.

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Part C: WATER SOURCE INFORMATION

Does this source supply any other properties? ○ Yes ◉ No

Identify properties:

Is the water source(s) located on the property? ◉ Yes ○ No Please explain:

Number of people using this water source: 0 Gallons/day:

Pressure Tank? ○ Yes ◉ No Size (gallons):

Water Use: ☐ Domestic ☐ Husbandry ☐ Irrigation Other: UNUSED

Coordinates: (NAD83 decimal, 5 places) Lat: 39.057024 Long: -80.572846 Ground Surface Elevation: 1138 ft

Does the water source ever go dry? ○ Yes ◉ No

Water Source Type*: SPRING

Discharge Pipe ○ Yes ◉ No Seep/Ground Surface Flow ○ Yes ◉ No Spring House ○ Yes ◉ No

Underground Vault ◉ Yes ○ No

Part D: DESCRIPTION OF WATER SOURCE

Check all that apply

☐ Loose, missing, or damaged cover ☑ Evidence of insects, spiders, animals ☐ Open to surface water

☐ Any cracked or damaged well casing/spring vault ☐ Additional storage or holding tank/coyote system

☐ Evidence of erosion ☐ Water source secured ☐ Source buried ☐ Location unknown ☐ Cover flush with ground

Other:

Part E: DESCRIPTION OF AREA SURROUNDING WATER SOURCE

Check all that apply

☑ Ground sloping towards water source ☐ Water source downgradient of septic system

Signs of:

☐ Failing septic ☐ Soggy ground ☐ Foul odor

Close proximity to (tick all that apply):

☐ Garden ☐ Orchard ☐ Greenhouse ☐ Equipment storage areas

☐ Junkyard ☐ Dumping area ☐ Landfill ☐ Salt storage area/Salted roadway

☐ Garage ☐ Fuel storage tanks

Located in field with:

☐ Livestock ☐ Inside Barn ☐ Barnyard ☐ Other out buildings

Additional remarks and comments:

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Part F: SAMPLING

Sample ID 033-WV-008-110615-1330-1-602

Sampled	Sampling Point Location
○ Before Treatment ○ After Treatment	○ Inside Faucet ○ Outside Faucet ○ Overflow/Discharge Pipe
◉ No Treatment ○ Not Sure	○ Seep ○ Pressure Tank ○ Bailed
	○ Wellhead ◉ Other: UNDERGROUND VAULT

Was the water source purged before sampling ○ Yes ◉ No Volume (gal): Time (min):

Is it possible to run water for 30 minutes? ○ Yes ◉ No If No, please explain: SPRING IN A VAULT

Average water usage within the last 24 hours: Chain of custody attached? ○ Yes ◉ No

Field Analyses:

Turbidity (ntu): 2.51 pH (ph units): 7.78

Conductivity (umhos/cm): 374 Temperature (deg c): 15.69

Gas Readings:

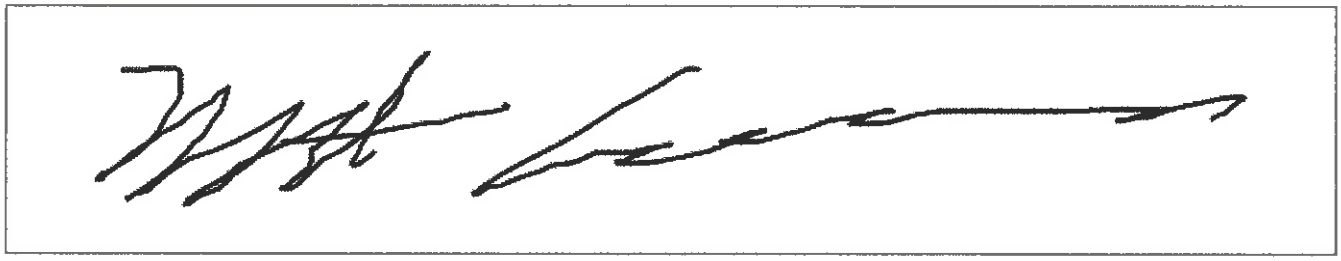
Type	PPM	% LEL	% GAS
Wellhead	Peak / Sustained	Peak / Sustained	Peak / Sustained
Cold Headspace	0 — Sustained	Peak / Sustained	Peak / Sustained
SW Vicinity	0 — Sustained	Peak / Sustained	Peak / Sustained
	Peak / Sustained	Peak / Sustained	Peak / Sustained
	Peak / Sustained	Peak / Sustained	Peak / Sustained
	Peak / Sustained	Peak / Sustained	Peak / Sustained

Part G: SITE SKETCH and PHOTOGRAPHS

Add Images — 10 pictures attached to the from

SAMPLER

Please sign in the box below acknowledging that I have supplied the correct information to the best of my knowledge.



Accept | Clear

INTERVIEWEE

Accept | Clear

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Form #: NA
(Reference Form # in Log Book)

Truck #: N A

Gas Explorer Calibration Log

GES Equipment Name: GES-GE-029

Equipment Serial #: 1202-302846

9-28-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Daisley 489
↓	↓	H_2S	0	100ppm		↓	↓
10-30-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Daisley 489
↓	↓	H_2S	0	100ppm		↓	↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓

OCT 20 2016

NOTE: Gas Explorers must be calibrated on the first day of every month. If the instrument is recalibrated at anytime the calibration information must be recorded on this sheet.

3-Gas= 2.5%(50%LEL) Methane, 100ppm CO, Balance Air

GES - Ver. 1

Southwestern Energy Predrill Sampling

Gas Detector Equipment Calibration

Equipment Serial Number:	1202-302846
GES Equipment Code:	GES-GE-029
Equipment Type:	Gas Explorer
Date of Calibration:	10-30-15
Include Gas Detector Calibration Log with Field Documentation	

GPS Equipment

Equipment Serial Number:	RBC15U0226
GES Equipment Code:	N/A
Equipment Type:	Trimble YUMA

Water Quality Multi-Parameter Calibration

Equipment Serial Number:	09E100453	08325700
GES Equipment Code:	N/A	N/A
Equipment Type:	YSI	Hanna HI
Calibration Method:	3pt pH/ 1pt. Sp. cond.	4pt.
Date of Calibration:	11-6-15	11-6-15

Calibration Parameter	Time	Pre-Value/Reading	Person Performing Calibration
pH-4	0720	4.11	Matt Crowmer 602
pH-7	0722	6.73	
pH-10	0724	10.20	
Specific Conductivity (µS/cm)	0726	1407	
Turbidity (<0.1 NTU)	0727	0.17	
Turbidity (15 NTU)	0728	15.3	
Turbidity (100 NTU)	0729	100	
Turbidity (750 NTU)	0730	752	
Calibration Parameter	**Time**	**Post-Value/Reading**	**Person Performing Calibration**
pH-4	0721	3.99	
pH-7	0723	7.00	
pH-10	0725	10.05	
Specific Conductivity (µS/cm)	0727	1412	
Turbidity (<0.1 NTU)	0731	0.15	
Turbidity (15 NTU)	0732	15.0	
Turbidity (100 NTU)	0733	100	
Turbidity (750 NTU)	0734	749	

Deviations Procedures

Reference GES Baseline Water Well Sampling SOP

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Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-1141 Inj. Well

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F 00250000 0000

Site Arrival Time: 1100 Site Departure Time: 1415

Samplers (Full Names and Sampler #s): Patrick Dasler 489
Matt Crownover 602

Weather Condition Observations Recorded at: 1315

Weather Conditions: light rain Air Temp (Degrees Fahrenheit): 72°F

Estimate Wind Speed(mph): 16 mph Approximate Wind Direction: NW

Note: Remember to document any changes in weather conditions (Include Times).

Equipment Bump Test Verification (Include GES Equipment Number and Time): 1320

GE(GES-GE-029) → 100ppm, Bump= 100ppm

YSI → 7.00 pH, Bump = 7.02pH / 1413 µs/cm, Bump = 1412 µs/cm

Turbidity → 15.0 NTU, Bump = 15.0 NTU

Refer to page 11 for 11-6-15 (insert date) for full calibration information.

Does the parcel have a septic system?: ___ Y _X_ N

If Yes, describe the location of the septic area below and provide an approximate location on the site map.

1310 - Moved to the spring

1330 - Collected sample 033-WH-009-110615-1330-1-602 from the spring.

1415 - Departed site to canvass (see canvassing spreadsheet)

Fed Ex Tracking #: 801301874566

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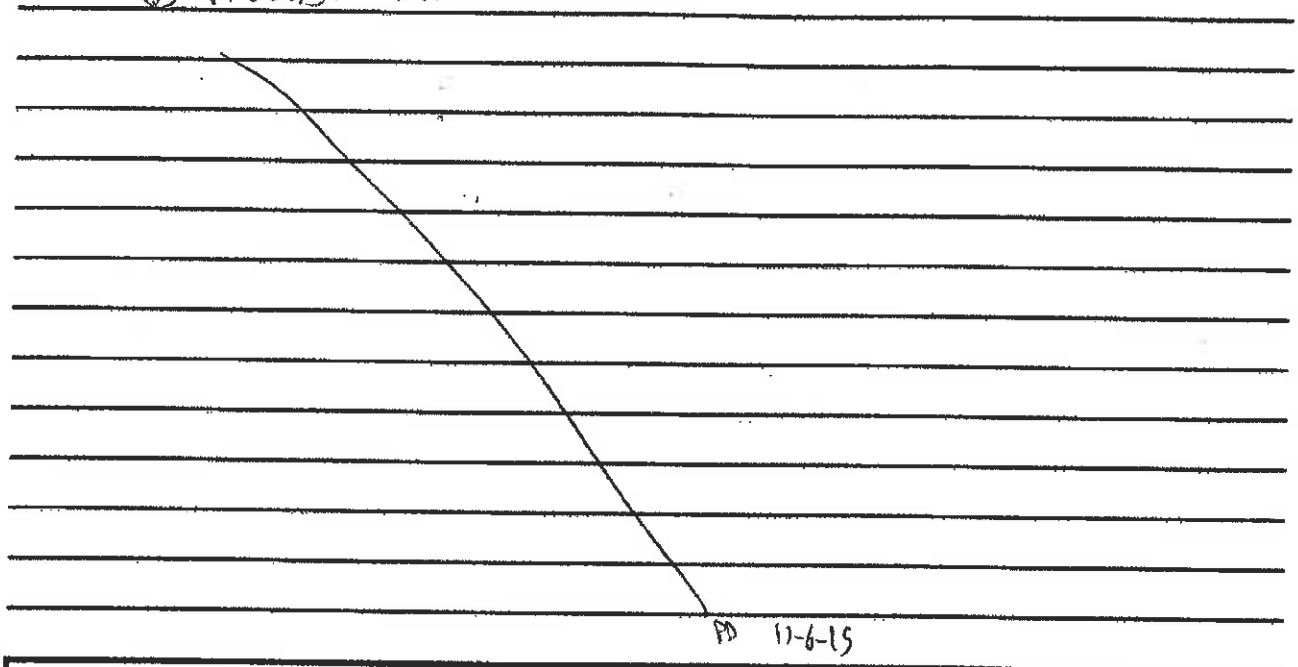
PD 11-6-15

Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-1149 Brig Wx 11

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F00250000 0000



Interviewee Signature:

Fields intentionally left blank in EDGE because they are unknown or do not apply:
(Check all that apply)

For All Sources:
- ☐ Pump Type
- ☑ Pump Capacity
- ☐ Number of People Using the Water Source
- ☑ Gallons/Day Used
- ☑ Average Water Usage Within the Last 24 Hours

For Wells:
- ☐ Reported Well Depth
- ☐ Reported Depth to Water Level
- ☐ Reported Pump Depth
- ☐ Date Drilled
- ☐ Drillers Name
- ☐ Well Location

For Cisterns:
- ☐ Source of Water

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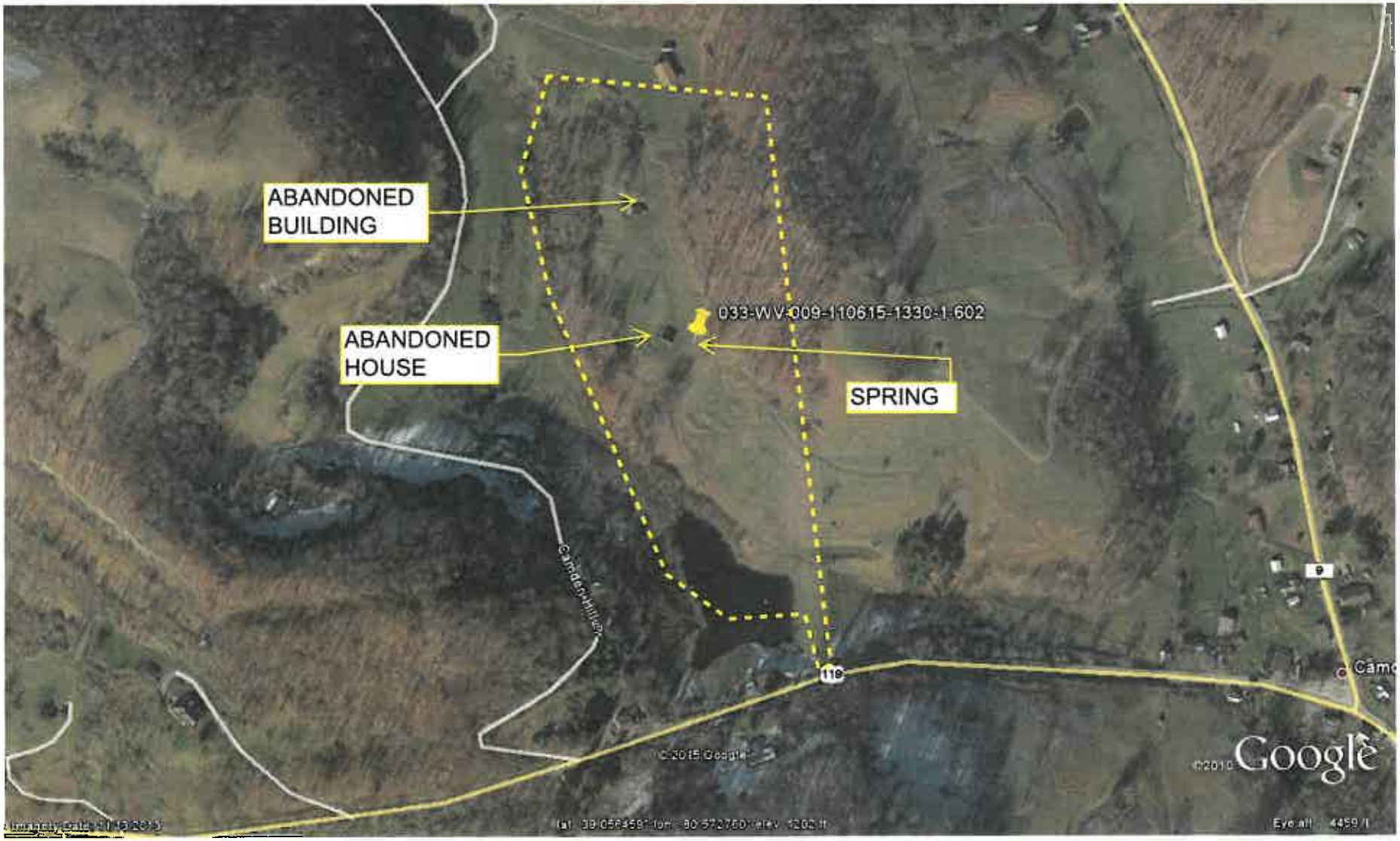
Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-1H Inj. Well



Southwestern Energy
A-1141 Injection Well
Property Owner: Dannie Gum
Parcel: 03 4F002500000000
Date: 11-06-15
Times: 1330

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PHOTOGRAPHS

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Source: Spring

Sample Location

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002500000000
Gum
033-WV-009-110615-1330-1-602
November 6, 2015

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Office of Oil & Gas
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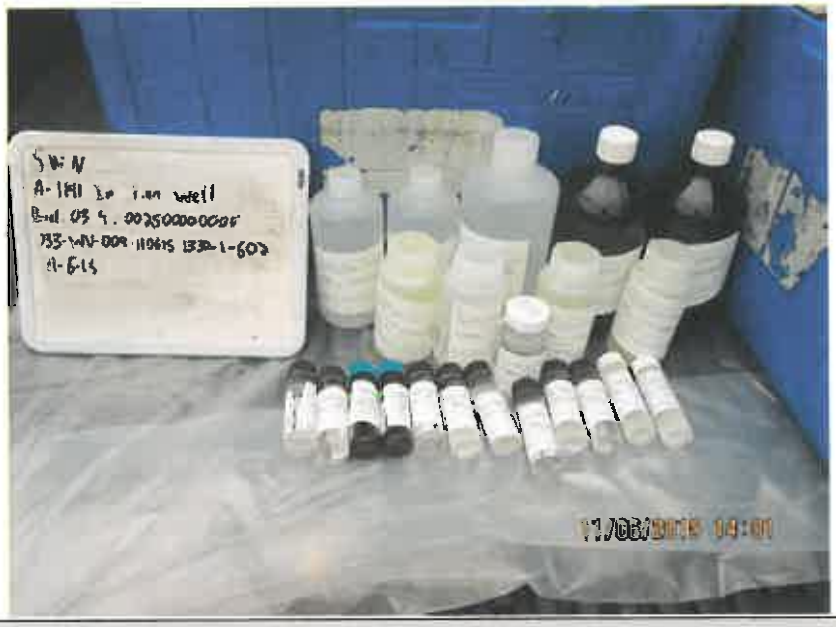

Sample

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002500000000
Gum
033-WV-009-110615-1330-1-602
November 6, 2015

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Analysis Report

REVISED

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

December 01, 2015

Project: A-1141 INJECTION WELL

Submittal Date: 11/07/2015
Group Number: 1607522
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
033-WV-009-110615-1330-1-602 Grab	8124470
033-WV-009-110615-1330-1-602 Filtered Grab	8124471

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

Respectfully Submitted,

Stephen J. Gordon
Project Manager

(724) 597-2027

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Analysis Report

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Sample Description: 033-WV-009-110615-1330-1-602 Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124470
LL Group # 1607522
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 13:30 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG2--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	Benzene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Carbon Tetrachloride	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Chlorobenzene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,2-Dichlorobenzene	N.D.		1	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,4-Dichlorobenzene	N.D.		1	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,1-Dichloroethane	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,2-Dichloroethane	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,1-Dichloroethene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	cis-1,2-Dichloroethene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	trans-1,2-Dichloroethene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,2-Dichloropropane	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Ethylbenzene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Methyl Tertiary Butyl Ether	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Methylene Chloride	N.D.		2	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Styrene	N.D.		1	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Tetrachloroethene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Toluene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,2,4-Trichlorobenzene	N.D.		1	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,1,1-Trichloroethane	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,1,2-Trichloroethane	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Trichloroethene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Vinyl Chloride	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	m+p-Xylene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	o-Xylene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Xylene (Total)	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	TPH-GRO water C6-C10	N.D.		20	ug/l		11/11/15 21:05	11/11/15 21:05	2001
GC Miscellaneous									
RSKSOP-175 modified									
07105	n-butane	N.D.		1.0	ug/l			11/11/15 16:06	719
07105	Ethane	N.D.		1.0	ug/l			11/11/15 16:06	719
07105	Methane	N.D.		3.0	ug/l			11/11/15 16:06	719
07105	Propane	N.D.		1.0	ug/l			11/11/15 16:06	719
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	C10-C28	N.D.		0.048	mg/l		11/12/15 19:00	11/17/15 01:37	2027
02740	C24-C40	N.D.		0.048	mg/l		11/12/15 19:00	11/17/15 01:37	2027

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Analysis Report

REVISED

Sample Description: 033-WV-009-110615-1330-1-602 Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124470
LL Group # 1607522
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 13:30 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG2--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
	SW-846 8015B, SW-846 3510C								
02740	Total TPH (C10-C40)	N.D.		0.048	mg/l		11/12/15 19:00	11/17/15 01:37	2027
Metals									
	EPA 200.7 rev 4.4								
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 18:45	2992
01750	**Calcium**	**57.7**		0.0333	mg/l		11/17/15 09:53	11/18/15 18:45	2992
01754	**Iron**	**0.294**	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 18:45	2992
07058	**Manganese**	**0.0310**	.05	0.00080	mg/l		11/17/15 09:53	11/18/15 18:45	2992
01767	**Sodium**	**2.52**		0.167	mg/l		11/17/15 09:53	11/18/15 18:45	2992
	EPA 200.8 rev 5.4								
06025	**Arsenic**	**0.0060**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:14	1242
06026	**Barium**	**0.0698**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:14	1242
Wet Chemistry									
	EPA 300.0								
00224	**Chloride**	**3.0**	250	1.0	mg/l			11/14/15 16:32	6676
00228	**Sulfate**	**36.4**	250	1.5	mg/l			11/14/15 16:32	6676
	EPA 415.1								
00273	Total Organic Carbon	N.D.		0.50	mg/l			11/18/15 05:57	495
	EPA 170.1								
12151	**Temperature of pH**	**21.4**		0.010	Degrees C			11/10/15 21:08	1124
	SM 2540 C-1997								
00212	**Total Dissolved Solids**	**224**	500	19.4	mg/l			11/11/15 08:20	1198
	SM 2540 D-1997								
10457	**Total Suspended Solids**	**1.80** J		1.00	mg/l			11/11/15 08:40	8743
	SM 4500-H+ B-2000								
12152	**pH**	**7.7**		0.010	Std. Units			11/10/15 21:08	1124
	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
	SM 5540 C-2000								
00225	M. B. A. S.	N.D.	.5	0.040	mg/l LAS MW 320			11/07/15 11:10	237
Microbiology									
	SM 9223 B-1997								

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Analysis Report

REVISED

Sample Description: 033-WV-009-110615-1330-1-602 Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124470
LL Group # 1607522
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 13:30 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG2--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Microbiology									
SM 9223 B-1997									
08161	**Tot Coli/E. coli (Quanti-tray)**	See Below			MPN/100mL			11/08/15 11:39	1281
	Total Coliform	> 200.5		/100ml					
	E. coli	< 1.0		/100ml					

General Sample Comments

DEFINITIONS:
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Analysis Report

REVISED

Sample Description: 033-WV-009-110615-1330-1-602 Filtered Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124471
LL Group # 1607522
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 13:30 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:03	2992
01750	**Calcium**	**57.6**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:03	2992
01754	Iron	N.D.	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:03	2992
07058	**Manganese**	**0.0296**	.05	0.00080	mg/l		11/17/15 09:53	11/18/15 19:03	2992
01767	**Sodium**	**2.50**		0.167	mg/l		11/17/15 09:53	11/18/15 19:03	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.0036**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:25	1242
06026	**Barium**	**0.0735**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:25	1242

General Sample Comments

This sample was field filtered for dissolved metals.

DEFINITIONS:
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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OCT 20 2016

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC **Lab PM Contact Name:** Wendy Kozma **Lab Address:** 2425 New Holland Pike **City, State ZIP:** Lancaster, PA 17601 **Phone:** 717-556-7257 **Fax:** 717-656-6766 **Email:** WendyKozma@eurofinsus.com	**Client:** Southwestern Energy Company **Client Contact Name:** Tyler Spear **Client Address:** 179 Innovation Drive **City, State ZIP:** Jane Lew, WV 26378 **Phone:** 304-884-1681 **Email:** Tyler_Spear@SWN.com	**Environmental Chain of Custody (COC)** **Consultant Name:** GES, Inc. **Consultant PM Contact Name:** Nicholas Lohr **Phone:** 800-267-2549, Ext. 3634 **Fax:** 866-902-2187 **Email:** Nlohr@gesonline.com	eurofins | Lancaster Laboratories

***WELL PAD NAME:** A-1141 Injection Well

***Please circle which type of site this is:** IMPOUNDMENT (WELL PAD) SPECIAL PROJECT

***PROPERTY # (AFE# if applicable):** 4009116668

***MAJOR/MINOR CODE:** 52695/007

***STATE SAMPLED:** WV

***OWNER NAME:** Dannie Gum

***Analysis Turnaround Time (working days)**

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

***SAMPLER(s):** Matt Crowmer 602

20810
1607522
8124470-72

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present) ☐ *Sample Collected - POST-Treatment System

☒ *Pre-drill Sample ☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-110615-1330-1-602	11-6-15	1330	grab	SW	22	Y	X	X	X	X	X	X	X	X	X	X	X	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client *Disposal By Lab after two (2) months of final report date*

Special Instructions/QC Requirements & Comments: Analyze for Chloride and TOC Gas

OCT 20 2016

***PARCEL ID #:** 03 4F002500000000

***FEDEX TRACKING #:** 8013 0187 4566

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Spring/ Underground vault

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
	GES	11-6-15/1730			
Relinquished by:	**Company:**	**Date/Time:**	**Received by:**		**Date/Time:**
			Krista Abel	ELLE	11/7/15 0945.

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

Office of Oil & Gas
OCT 20 2016

Groundwater & Environmental Services, Inc.

WESTERN PENNSYLVANIA OFFICE

Sampling Field Data Package
A-1141 INJECTION WELL
LEWIS COUNTY, WV

Gum
034F002400000000
033-WV-009-110615-1150-1-602
November 6, 2015

Prepared For:

Southwestern Energy
Jane Lew, WV

Prepared By:

Groundwater & Environmental Services, Inc.
301 Commerce Park Drive
Cranberry Township, PA 16066

November 16, 2015

Received
Office of Oil & Gas
OCT 20 2016

FIELD DOCUMENTATION

Site Visit Form, Calibration Logs, Logbook, Site Sketch, COCs, Checklist

Received
Office of Oil & Gas
OCT 20 2016

Part A: GENERAL INFORMATION

Water Source ID*:	WL-11002016-602-01	O & G Well Name*:	A-1141 INJECTION WELL
Pad Name*:	A-1141 INJECTION WELL	Parcel Number*:	03 4F0024000000000
Tax ID:	03 4F0024000000000		
Operator ID*:	033	State Code*:	
County Code*:	009		
Sampled By*:	MATT CROWNOVER	Company Name*:	OES
Water Sample Identifier*:	502	Date/Time Sampled*:	11/08/2016 11:50 (24hr)
Sample Frequency*:	1	☐ N/A: No Sample	Details:
Person Interviewed*:	Owner	Please specify:	

PROPERTY OWNER		RESIDENT OR OTHER ☑ Same as owner	
Name*:	DANNIE GUM	Name*:	DANNIE GUM
Address*:	4652 US HWY 33 W	Address*:	4652 US HWY 33 W
City*:	CAMDEN	City*:	CAMDEN
State*:	WV	State*:	WV
Postal Code*:	26338	Postal Code*:	26338
Phone No*:	304-269-1331	Phone No*:	304-269-1331

Part B: WATER QUALITY

	Reported Quality			Observed Quality		
	Yes	No	N/A	Yes	No	N/A
Staining	○	◉	○	○	◉	○
Odor	○	◉	○	○	◉	○
Cloudiness	○	◉	○	○	◉	○
Sheen	○	◉	○	○	◉	○
Effervescence	○	◉	○	○	◉	○
Taste	○	◉	○			

Treatment*

- ☑ None
- ☐ Charcoal Filter
- ☐ Softening
- ☐ UV light
- ☐ Chlorination
- ☐ pH Adjustment
- ☐ Iron Removal
- ☐ In-line Sediment Filter

Other:

Functioning Properly*: ○ Yes ○ No ○ Unknown

Pump Type

- ○ None
- ○ Gas Piston
- ◉ Submersible
- ○ Windmill
- ○ Jet
- ○ Other:

Capacity (GPM):

Comments:

Part C: WATER SOURCE INFORMATION

Does this source supply any other properties? ○ Yes ◉ No

Identify properties:

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Is the water source(s) located on the property? ◉ Yes ○ No Please explain:

Number of people using this water source: 2 Gallons/day:

Pressure Tank? (•) Yes ( ) No Size (gallons): 20 Estimated

Water Use: [x] Domestic [ ] Husbandry [ ] Irrigation Other

Coordinates: (NAD83 decimal, 5 places) Lat 39.054596 Long -80.572031 Ground Surface Elevation 1065 ft

Does the water source ever go dry? ( ) Yes (•) No

Water Source Type*: WATER WELL

(•) Drilled Well ( ) Dug Well ( ) Other Missing/damaged pit-less adaptor ( ) Yes ( ) No (•) Unknown

Reported total well depth (FT): Reported depth of water level (FT): Reported pump depth (FT):

Date Drilled: Drillers Name: **Driller log available** ( ) Yes (•) No

Well location: ( ) Inside ( ) Inside and Vented Outside (•) Outside Unvented ( ) Outside Vented

Part D: DESCRIPTION OF WATER SOURCE

Check all that apply

[ ] Loose, missing, or damaged cover [ ] Evidence of insects, spiders, animals [ ] Open to surface water

[ ] Any cracked or damaged well casing/spring vault [ ] Additional storage or holding tank/coyote system

[ ] Evidence of erosion [x] Water source secured [ ] Source buried [ ] Location unknown [ ] Cover flush with ground

Other:

Part E: DESCRIPTION OF AREA SURROUNDING WATER SOURCE

Check all that apply

[x] Ground sloping towards water source [ ] Water source downgradient of septic system

Signs of:

[ ] **Failing septic** [ ] Soggy ground [ ] Foul odor

Close proximity to (tick all that apply):

[ ] Garden [ ] Orchard [ ] Greenhouse [ ] Equipment storage areas

[ ] Junkyard [ ] Dumping area [ ] Landfill [ ] Salt storage area/Salted roadway

[ ] Garage [ ] Fuel storage tanks

Located in field with:

[ ] Livestock [ ] Inside Barn [ ] Barnyard [ ] **Other out buildings**

Additional remarks and comments:

Part F: SAMPLING

Sample ID 033-WV-009-110615-1150-1-602

Sampled	Sampling Point Location
( ) Before Treatment ( ) After Treatment	( ) Inside Faucet ( ) Outside Faucet ( ) Overflow/Discharge Pipe
(•) No Treatment ( ) Not Sure	( ) **Seep** (•) Pressure Tank ( ) Bailed
	( ) Wellhead ( ) Other:

Was the water source purged before sampling (•) Yes ( ) No Volume (gal) 40 Time (min) 20

Is it possible to run water for 30 minutes? (•) Yes ( ) No **If No, please explain**

Average water usage within the last 24 hours Chain of custody attached? (•) Yes ( ) No

Field Analyses:

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Field Analyses:

Turbidity (ntu):	0.93	pH (ph units):	7.61
Conductivity (umhos/cm):	519	Temperature (deg c):	14.73

Gas Readings:

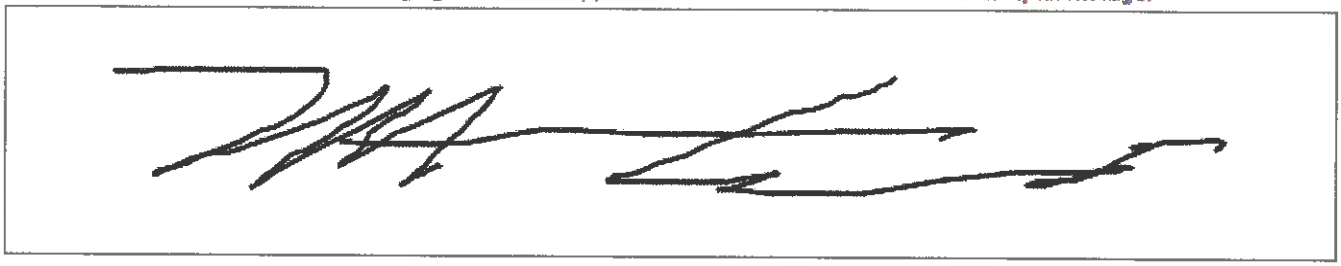
Type	PPM	% LEL	% GAS
Wellhead	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
Cold Tap	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
Cold Headspace	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)

Part G: SITE SKETCH and PHOTOGRAPHS

Add Images | 10 pictures attached to the from

SAMPLER

Please sign in the box below acknowledging that I have supplied the correct information to the best of my knowledge.



Accept | Clear

INTERVIEWEE

Accept | Clear

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Form #: NA
(Reference Form # in Log Book)

Truck #: NA

Gas Explorer Calibration Log

GES Equipment Name: GES-GE-029

Equipment Serial #: 1202-302846

9-28-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dailey 489
↓	↓	H_2S	0	100ppm		↓	↓
10-30-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dailey 489
↓	↓	H_2S	0	100ppm		↓	↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓

NOTE: Gas Explorers must be calibrated on the first day of every month. If the instrument is recalibrated at anytime the calibration information must be recorded on this sheet.

3-Gas= 2.5%(50%LEL) Methane, 100ppm CO, Balance Air

OCT 20 2016

GES - Ver. 1

Southwestern Energy Predrill Sampling

Gas Detector Equipment Calibration	
Equipment Serial Number:	1202-302846
GES Equipment Code:	GES-GE-029
Equipment Type:	Gas Explorer
Date of Calibration:	10-30-15
Include Gas Detector Calibration Log with Field Documentation	

GPS Equipment	
Equipment Serial Number:	RBL15U0226
GES Equipment Code:	N/A
Equipment Type:	Trimble YUMA

Water Quality Multi-Parameter Calibration			
Equipment Serial Number:	09E100453		08325700
GES Equipment Code:	N/A		N/A
Equipment Type:	YSI		Hanna HI
Calibration Method:	3pt pH/ 1pt- Sp cond.		4pt.
Date of Calibration:	11-6-15		11-6-15
Calibration Parameter	Time	Pre-Value/Reading	Person Performing Calibration
pH-4	0720	4.11	Matt Crownover 602
pH-7	0722	6.73	
pH-10	0724	10.20	
Specific Conductivity (µS/cm)	0726	1407	
Turbidity (<0.1 NTU)	0727	0.17	
Turbidity (15 NTU)	0728	15.3	
Turbidity (100 NTU)	0729	100	
Turbidity (750 NTU)	0730	752	
Calibration Parameter	Time	Post-Value/Reading	Person Performing Calibration
pH-4	0721	3.99	
pH-7	0723	7.00	
pH-10	0725	10.05	
Specific Conductivity (µS/cm)	0727	1412	
Turbidity (<0.1 NTU)	0731	0.15	
Turbidity (15 NTU)	0732	15.0	
Turbidity (100 NTU)	0733	100	
Turbidity (750 NTU)	0734	749	

Recon Procedures

Reference GES Baseline Water Well Sampling SOP

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Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-1141 Inj. Well

Southwestern Energy Predrill Sampling

Log Book #105

Parcel #: 03 4F00240000 0000

Site Arrival Time: 1100 Site Departure Time: 1415

Samplers (Full Names and Sampler #s): Patrick Daister 489
Matt Crowmore 602

Weather Condition Observations Recorded at: 1118

Weather Conditions: Cloudy Air Temp (Degrees Fahrenheit): 76° F

Estimate Wind Speed(mph): 15 mph Approximate Wind Direction: NW

Note: Remember to document any changes in weather conditions (Include Times).

Equipment Bump Test Verification (Include GES Equipment Number and Time): 1105

GE(GES-GE-029) → 100 ppm, Bump = 100 ppm
YSI → 7.00 pH, Bump = 7.00 pH / 1413 µs/cm², Bump = 1411 µs/cm²
Turbidity → 15.0 NTU, Bump = 150 NTU

Refer to page 11 for 11-6-15 (insert date) for full calibration information.

Does the parcel have a septic system?: X Y ___ N

If Yes, describe the location of the septic area below and provide an approximate location on the site map.

0715- Met at office.
0820- Departed office.
1100- Arrived on site and confirmed information with Dannie Gun, 1 well, 1 pond, and 1 spring to be sampled
1130- Began purge.
1150- Ended purge. Collected sample 033-WV-009-110615-1150-1-602 from the well.
1225- Moved to the pond

Fed Ex Tracking #'s 801301831313

* Septic located 20 ft N of house.

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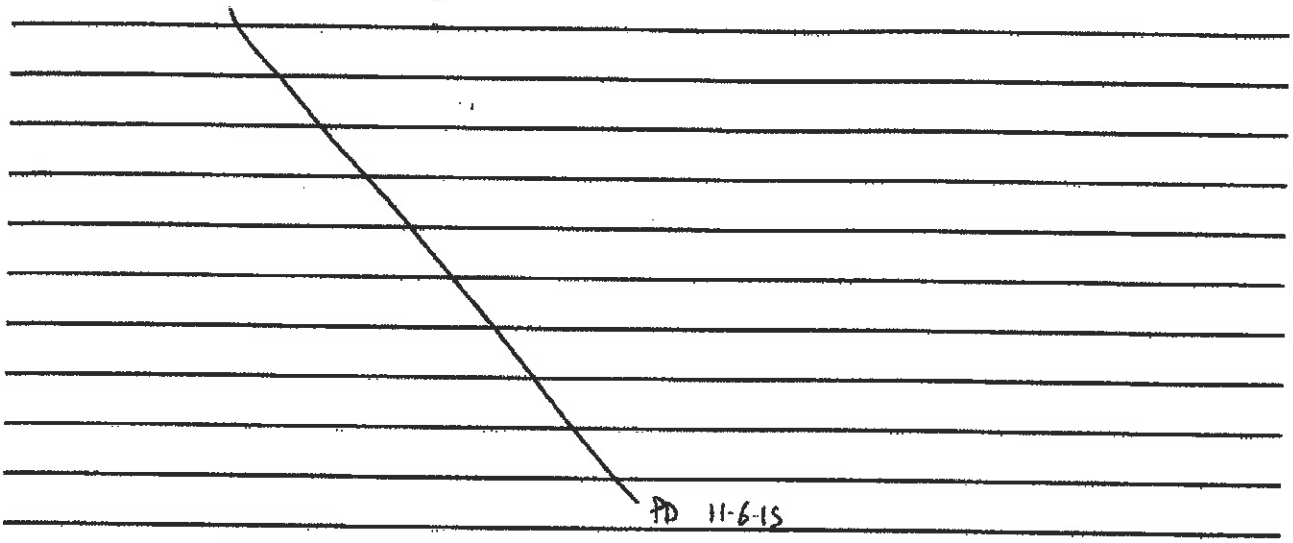
Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-114 Inj. Well 68

Southwestern Energy Predrill Sampling

Log Book #105

Parcel #: 03 4P0024 0000 0000



Interviewee Signature:

Fields intentionally left blank in EDGE because they are unknown or do not apply:
(Check all that apply)

For All Sources:
- ☐ Pump Type
- ☑ Pump Capacity
- ☐ Number of People Using the Water Source
- ☑ Gallons/Day Used
- ☑ Average Water Usage Within the Last 24 Hours

For Wells:
- ☑ Reported Well Depth
- ☑ Reported Depth to Water Level
- ☑ Reported Pump Depth
- ☑ Date Drilled
- ☑ Drillers Name
- ☐ Well Location

For Cisterns:
- ☐ Source of Water

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Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-1141 Inj. Well 69

Southwestern Energy Predrill Sampling Log Book #105

WELL PURGING: FIELD WATER QUALITY MEASUREMENTS FORM

Parcel #: 03 4F00240000.0000 Turbidity (NTU): 0.93 Time (Military): 1150

Time (Military)	Temperature (Degrees Celsius)	Specific Conductance (µS/cm)	pH (Standard Units)	Comments
1130	15.56	520	7.85	Clear, Colorless
1132	15.30	520	7.74	
1134	15.05	519	7.68	
1136	15.00	519	7.65	
1138	15.08	519	7.63	
1140	14.88	519	7.62	
1142	14.95	519	7.61	
1144	14.73	519	7.61	
1146	14.78	519	7.61	
1148	14.81	519	7.60	
1150	14.73	519	7.61	

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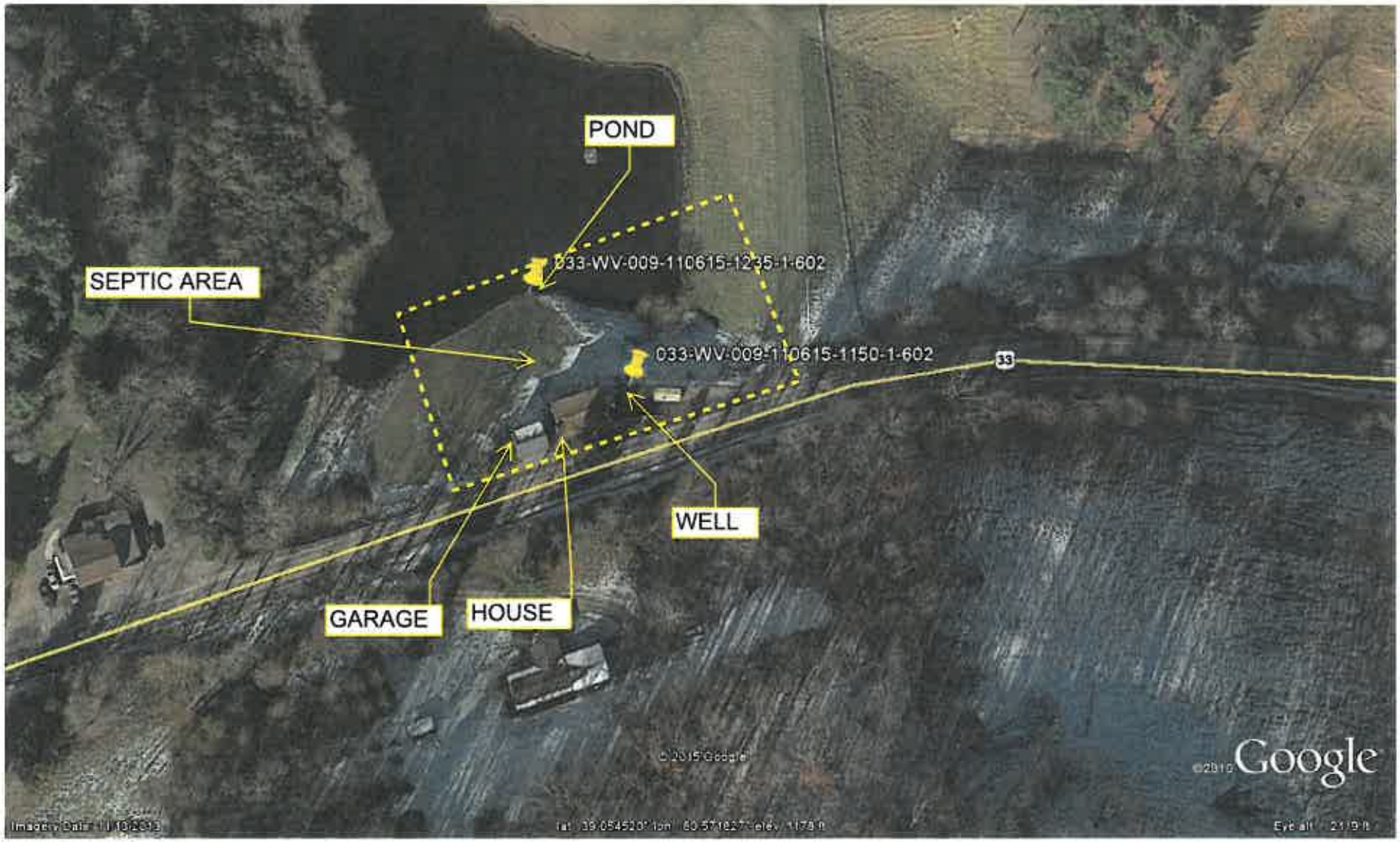
Stabilization Criteria: ±10% ±10% ±0.1

Stabilization is considered to be achieved when three consecutive readings are within the specified stabilization criteria.

Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-1141 Irg. Well



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Southwestern Energy
A-1141 Injection Well
Property Owner: Dannie Gum
Parcel: 03 4F002400000000
Date: 11-06-15
Times: 1150 & 1235

PHOTOGRAPHS

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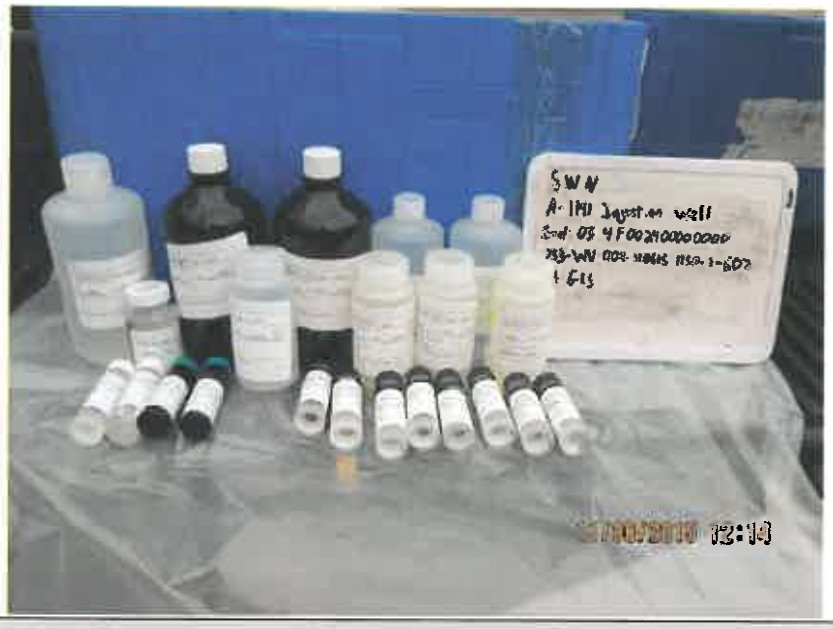
Source: Well

Sample Location

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002400000000
Gum
033-WV-009-110615-1150-1-602
November 6, 2015

Office of Oil & Gas
OCT 20 2016



Sample

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002400000000
Gum
033-WV-009-110615-1150-1-602
November 6, 2015

Office of Oil & Gas
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Analysis Report

REVISED

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

December 01, 2015

Project: A-1141 INJECTION WELL

Submittal Date: 11/07/2015
Group Number: 1607521
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
033-WV-009-110615-1150-1-602 Grab	8124467
033-WV-009-110615-1150-1-602 Filtered Grab	8124468

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

Respectfully Submitted,

Stephen J. Gordon
Project Manager

(724) 597-2027

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Analysis Report

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Sample Description: 033-WV-009-110615-1150-1-602 Grab
Groundwater Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124467
LL Group # 1607521
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 11:50 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:09

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG1--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	Benzene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Carbon Tetrachloride	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Chlorobenzene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,2-Dichlorobenzene	N.D.		1	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,4-Dichlorobenzene	N.D.		1	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,1-Dichloroethane	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,2-Dichloroethane	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,1-Dichloroethene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	cis-1,2-Dichloroethene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	trans-1,2-Dichloroethene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,2-Dichloropropane	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Ethylbenzene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Methyl Tertiary Butyl Ether	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Methylene Chloride	N.D.		2	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Styrene	N.D.		1	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Tetrachloroethene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Toluene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,2,4-Trichlorobenzene	N.D.		1	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,1,1-Trichloroethane	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,1,2-Trichloroethane	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Trichloroethene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Vinyl Chloride	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	m+p-Xylene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	o-Xylene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Xylene (Total)	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	TPH-GRO water C6-C10	N.D.		20	ug/l		11/11/15 20:38	11/11/15 20:38	2001
GC Miscellaneous									
RSKSOP-175 modified									
07105	n-butane	N.D.		1.0	ug/l			11/11/15 14:59	719
07105	Ethane	N.D.		1.0	ug/l			11/11/15 14:59	719
07105	Methane	N.D.		3.0	ug/l			11/11/15 14:59	719
07105	Propane	N.D.		1.0	ug/l			11/11/15 14:59	719
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	C10-C28	N.D.		0.047	mg/l		11/12/15 19:00	11/17/15 01:15	2027
02740	C24-C40	N.D.		0.047	mg/l		11/12/15 19:00	11/17/15 01:15	2027

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Analysis Report

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Sample Description: 033-WV-009-110615-1150-1-602 Grab
Groundwater Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124467
LL Group # 1607521
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 11:50 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:09

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG1--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	Total TPH (C10-C40)	N.D.		0.047	mg/l		11/12/15 19:00	11/17/15 01:15	2027
Metals									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/18/15 09:58	11/25/15 05:25	2106
01750	**Calcium**	**9.99**		0.0333	mg/l		11/18/15 09:58	11/25/15 05:25	2106
01754	**Iron**	**0.0373 J**	.3	0.0333	mg/l		11/18/15 09:58	11/25/15 05:25	2106
07058	**Manganese**	**0.0128**	.05	0.00080	mg/l		11/18/15 09:58	11/25/15 05:25	2106
01767	**Sodium**	**106**		0.167	mg/l		11/18/15 09:58	11/25/15 05:25	2106
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.0018 J**	.01	0.00040	mg/l		11/19/15 09:49	11/20/15 05:07	1242
06026	**Barium**	**0.0999**	2	0.00092	mg/l		11/19/15 09:49	11/20/15 05:07	1242
Wet Chemistry									
EPA 300.0									
00224	**Chloride**	**24.7**	250	1.0	mg/l			11/14/15 15:59	6676
00228	**Sulfate**	**20.0**	250	1.5	mg/l			11/14/15 15:59	6676
EPA 415.1									
00273	Total Organic Carbon	N.D.		0.50	mg/l			11/18/15 05:42	495
EPA 170.1									
12151	**Temperature of pH**	**22.5**		0.010	Degrees C			11/10/15 21:16	1124
SM 2540 C-1997									
00212	**Total Dissolved Solids**	**329**	500	19.4	mg/l			11/11/15 08:20	1198
SM 2540 D-1997									
10457	Total Suspended Solids	N.D.		1.00	mg/l			11/11/15 08:40	8743
SM 4500-H+ B-2000									
12152	**pH**	**8.3**		0.010	Std. Units			11/10/15 21:16	1124
	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
SM 5540 C-2000									
00225	**M. B. A. S.**	**0.041 J**	.5	0.040	mg/l LAS MW 320			11/07/15 11:10	237
Microbiology									
SM 9223 B-1997									

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Analysis Report

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Sample Description: 033-WV-009-110615-1150-1-602 Grab
Groundwater Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124467
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Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 11:50 by MC

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Reported: 12/01/2015 16:09

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG1--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Microbiology									
SM 9223 B-1997									
08161	**Tot Coli/E. coli (Quanti-tray)**	See Below			MPN/100mL			11/08/15 11:39	1281
	Total Coliform	< 1.0		/100ml					
	E. coli	< 1.0		/100ml					

General Sample Comments

DEFINITIONS:
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

REVISED

Sample Description: 033-WV-009-110615-1150-1-602 Filtered Grab
Groundwater Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124468
LL Group # 1607521
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 11:50 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:09

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/19/15 09:49	11/20/15 03:31	2106
01750	**Calcium**	**9.86**		0.0333	mg/l		11/19/15 09:49	11/20/15 03:31	2106
01754	Iron	N.D.	.3	0.0333	mg/l		11/19/15 09:49	11/20/15 03:31	2106
07058	**Manganese**	**0.0035 J**	.05	0.00080	mg/l		11/19/15 09:49	11/20/15 03:31	2106
01767	**Sodium**	**102**		0.167	mg/l		11/19/15 09:49	11/20/15 03:31	2106
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.0017 J**	.01	0.00040	mg/l		11/18/15 10:30	11/19/15 14:01	1242
06026	**Barium**	**0.0976**	2	0.00092	mg/l		11/18/15 10:30	11/19/15 14:01	1242

General Sample Comments

This sample was field filtered for dissolved metals.

DEFINITIONS:
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC **Lab PM Contact Name:** Wendy Kozma **Lab Address:** 2425 New Holland Pike **City, State ZIP:** Lancaster, PA 17601 **Phone:** 717-556-7257 **Fax:** 717-656-6766 **Email:** WendyKozma@eurofinsus.com	**Client:** Southwestern Energy Company **Client Contact Name:** Tyler Spear **Client Address:** 179 Innovation Drive **City, State ZIP:** Jane Lew, WV 26378 **Phone:** 304-884-1681 **Email:** Tyler_Spear@SWN.com	**Environmental Chain of Custody (COC)** **Consultant Name:** GES, Inc. **Consultant PM Contact Name:** Nicholas Lohr **Phone:** 800-267-2549, Ext. 3634 **Fax:** 866-902-2187 **Email:** Nlohr@gesonline.com	eurofins | Lancaster Laboratories

***WELL PAD NAME:** A-1141 Injection Well

***Please circle which type of site this is:** IMPOUNDMENT (WELL PAD) SPECIAL PROJECT

***PROPERTY # (AFE# if applicable):** 4001161668

***MAJOR/MINOR CODE:** 52695/007

***STATE SAMPLED:** WV

***Analysis Turnaround Time (working days)**

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

***SAMPLER(s):** Matt Crownover 602

20810
1607521
8124467-69

***OWNER NAME:** Donnie Gum

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present) ☐ *Sample Collected - POST-Treatment System

☒ *Pre-drill Sample ☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-110615-1150-1-602	11-6-15	1150	grab	GW	22	Y	X	X	X	X	X	X	X	X	X	X	X	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
									OCT 20 2016									
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client *Disposal By Lab after two (2) months of final report date*

Special Instructions/QC Requirements & Comments:

***PARCEL ID #:** 03 4F0024000000000

***FEDEX TRACKING #:** 801301831313

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Well/ Pressure tank spigot

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
	GES	11-6-15/1730			
Relinquished by:	**Company:**	**Date/Time:**	**Received by:**		**Date/Time:**
			Krista Abel	H3 KmA 11/7/15 ELLE	11/7/15 0945

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

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Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

Groundwater & Environmental Services, Inc.

WESTERN PENNSYLVANIA OFFICE

Sampling Field Data Package
A-1141 INJECTION WELL
LEWIS COUNTY, WV

Gum
034F002400000000
033-WV-009-110615-1235-1-602
November 6, 2015

Prepared For:

Southwestern Energy
Jane Lew, WV

Prepared By:

Groundwater & Environmental Services, Inc.
301 Commerce Park Drive
Cranberry Township, PA 16066

November 16, 2015

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FIELD DOCUMENTATION

Site Visit Form, Calibration Logs, Logbook, Site Sketch, COCs, Checklist

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Part A: GENERAL INFORMATION

Water Source ID*:	PD-11062015-602-02	O & G Well Name*:	A-1141 INJECTION WELL
Pad Name*:	A-1141 INJECTION WELL	Parcel Number*:	03 4F002400000000
Tax ID:	03 4F002400000000		
Operator ID*:	033	State Code*:	
County Code*:	009		
Sampled By*:	MATT CROWNOVER	Company Name*:	GES
Water Sampler Identifier*:	602	Date/Time Sampled*:	11/06/2015 12:35 (24hr)
Sample Frequency*:	1	N/A: No Sample Details:	
Person Interviewed*:	Owner	Please specify:	

PROPERTY OWNER		RESIDENT OR OTHER	Same as owner
Name*:	DANNIE GUM	Name*:	DANNIE GUM
Address*:	4652 US HWY 33 W	Address*:	4652 US HWY 33 W
City*:	CAMDEN	City*:	CAMDEN
State*:	WV	State*:	WV
Postal Code*:	26338	Postal Code*:	26338
Phone No*:	304-269-1331	Phone No*:	304-269-1331

Part B: WATER QUALITY

	Reported Quality			Observed Quality		
	Yes	No	N/A	Yes	No	N/A
Staining	○	●	○	○	●	○
Odor	○	●	○	○	●	○
Cloudiness	○	●	○	○	●	○
Sheen	○	●	○	○	●	○
Effervescence	○	●	○	○	●	○
Taste	○	●	○			

Treatment*

- ☑ None
- ☐ Charcoal Filter
- ☐ Softening
- ☐ UV light
- ☐ Chlorination
- ☐ pH Adjustment
- ☐ Iron Removal
- ☐ In-line Sediment Filter

Other:

Functioning Properly*: ○ Yes ○ No ○ Unknown

Pump Type

- ● None
- ○ Gas Piston
- ○ Submersible
- ○ Windmill
- ○ Jet
- ○ Other:

Capacity (GPM):

Comments:

Part C: WATER SOURCE INFORMATION

Does this source supply any other properties? ● Yes ○ No

Identify properties:

Is the water source(s) located on the property? ● Yes ○ No Please explain:

Number of people using this water source: 0 Gallons/day:

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Pressure Tank? ○ Yes ◉ No Size (gallons):

Water Use: ☐ Domestic ☐ Husbandry ☐ Irrigation Other UNUSED

Coordinates: (NAD83 decimal, 5 places) Lat 39.054800 Long -80.572322 Ground Surface Elevation 1069 ft

Does the water source ever go dry? ○ Yes ◉ No

Water Source Type*: POND

Part D: DESCRIPTION OF WATER SOURCE

Check all that apply

☐ Loose, missing, or damaged cover ☑ Evidence of insects, spiders, animals ☑ Open to surface water

☐ Any cracked or damaged well casing/spring vault ☐ Additional storage or holding tank/coyote system

☐ Evidence of erosion ☐ Water source secured ☐ Source buried ☐ Location unknown ☐ Cover flush with ground

Other:

Part E: DESCRIPTION OF AREA SURROUNDING WATER SOURCE

Check all that apply

☑ Ground sloping towards water source ☑ Water source downgradient of septic system

Signs of:

☐ Failing septic ☐ Soggy ground ☐ Foul odor

Close proximity to (tick all that apply):

☐ Garden ☐ Orchard ☐ Greenhouse ☐ Equipment storage areas

☐ Junkyard ☐ Dumping area ☐ Landfill ☐ Salt storage area/Salted roadway

☐ Garage ☐ Fuel storage tanks

Located in field with:

☐ Livestock ☐ Inside Barn ☐ Barnyard ☐ Other out buildings

Additional remarks and comments:

Part F: SAMPLING

Sample ID 033-WV-009-110615-1235-1-602

Sampled	Sampling Point Location
○ Before Treatment ○ After Treatment	○ Inside Faucet ○ Outside Faucet ○ Overflow/Discharge Pipe
◉ No Treatment ○ Not Sure	○ Seep ○ Pressure Tank ○ Bailed
	○ Wellhead ◉ Other:

Was the water source purged before sampling ○ Yes ◉ No Volume (gal) Time (min)

Is it possible to run water for 30 minutes? ○ Yes ◉ No If No, please explain

Average water usage within the last 24 hours Chain of custody attached? ◉ Yes ○ No

Field Analyses:

Turbidity (ntu): 3.39 **pH (ph units):** 8.07

Conductivity (umhos/cm): 343 Temperature (deg c): 16.22

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Gas Readings:

Type	PPM	% LEL	% GAS

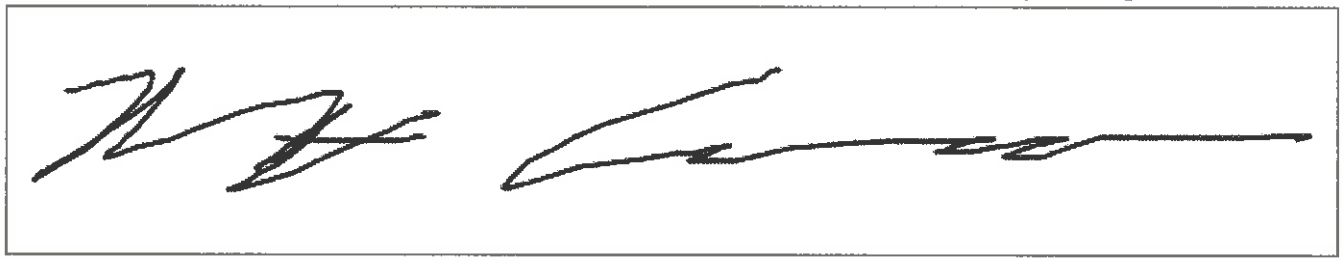
Wellhead		Peak / Sustained		Peak / Sustained		Peak / Sustained
Cold Headspace	0	Peak / Sustained		Peak / Sustained		Peak / Sustained
SW Vicinity	0	Peak / Sustained		Peak / Sustained		Peak / Sustained
		Peak / Sustained		Peak / Sustained		Peak / Sustained
		Peak / Sustained		Peak / Sustained		Peak / Sustained
		Peak / Sustained		Peak / Sustained		Peak / Sustained

Part G: SITE SKETCH and PHOTOGRAPHS

Add Images | 6 pictures attached to the from

SAMPLER

Please sign in the box below acknowledging that I have supplied the correct information to the best of my knowledge.



Accept | Clear

INTERVIEWEE

Accept | Clear

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Form #: NA
(Reference Form # in Log Book)

Truck #: NA

Gas Explorer Calibration Log

GES Equipment Name: GES-GE-029

Equipment Serial #: 1202-302846

9-28-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dailey 489
↓	↓	H_2S	0	100ppm		↓	↓
10-30-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P Dailey 489
↓	↓	H_2S	0	100ppm		↓	↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S			

GES - Ver. 1

Southwestern Energy Predrill Sampling

Gas Detector Equipment Calibration	
Equipment Serial Number:	1202-302846
GES Equipment Code:	GES-GE-029
Equipment Type:	Gas Explorer
Date of Calibration:	10-30-15
Include Gas Detector Calibration Log with Field Documentation	

GPS Equipment	
Equipment Serial Number:	RBC15U0226
GES Equipment Code:	N/A
Equipment Type:	Trimble YUMA

Water Quality Multi-Parameter Calibration			
Equipment Serial Number:		09E100453	08325700
GES Equipment Code:		N/A	N/A
Equipment Type:		YSI	Hanna HI
Calibration Method:		3pt pH/ 1pt. Sp cond.	4pt.
Date of Calibration:		11-6-15	11-6-15
Calibration Parameter	Time	Pre-Value/Reading	Person Performing Calibration
pH-4	0720	4.11	Matt Crownover 602
pH-7	0722	6.73	
pH-10	0724	10.20	
Specific Conductivity (µS/cm)	0726	1407	
Turbidity (<0.1 NTU)	0727	0.17	
Turbidity (15 NTU)	0728	15.3	
Turbidity (100 NTU)	0729	100	
Turbidity (750 NTU)	0730	752	
Calibration Parameter	Time	Post-Value/Reading	Person Performing Calibration
pH-4	0721	3.99	
pH-7	0723	7.00	
pH-10	0725	10.05	
Specific Conductivity (µS/cm)	0727	1412	
Turbidity (<0.1 NTU)	0731	0.15	
Turbidity (15 NTU)	0752	15.0	
Turbidity (100 NTU)	0753	100	
Turbidity (750 NTU)	0734	749	

Decon Procedures

Reference GES Baseline Water Well Sampling SOP

OCT 20 2016

Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-1141 Inj. Well

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F 00249000 0000

Site Arrival Time: 1100 Site Departure Time: 1415

Samplers (Full Names and Sampler #s): Patrick Daisley 489
Matt Crossover 602

Weather Condition Observations Recorded at: 1230

Weather Conditions: Cloudy Air Temp (Degrees Fahrenheit): 75°F

Estimate Wind Speed(mph): 19 mph Approximate Wind Direction: NW

Note: Remember to document any changes in weather conditions (include Times).

Equipment Bump Test Verification (Include GES Equipment Number and Time):

N/A

Refer to page 11 for 11-6-15 (Insert date) for full calibration information.

Does the parcel have a septic system?: X Y ___ N

If Yes, describe the location of the septic area below and provide an approximate location on the site map. * See pg. 68 for septic location.

1225 - Moved to the pond

1235 - Collected sample 033-WV-009-110615-1235-1-602 from the pond

1310 - Moved to the Spring.

Fed Ex Tracking #: 801301831324

PD 11-6-15

OCT 20 2016

Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-1141 Tj. Well

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F002400000000

PD 11-6-15

Interviewee Signature:

Fields intentionally left blank in EDGE because they are unknown or do not apply:
(Check all that apply)

For All Sources:
- ☐ Pump Type
- ☑ Pump Capacity
- ☐ Number of People Using the Water Source
- ☑ Gallons/Day Used
- ☑ Average Water Usage Within the Last 24 Hours

For Wells:
- ☐ Reported Well Depth
- ☐ Reported Depth to Water Level
- ☐ Reported Pump Depth
- ☐ Date Drilled
- ☐ Drillers Name
- ☐ Well Location

For Cisterns:
- ☐ Source of Water

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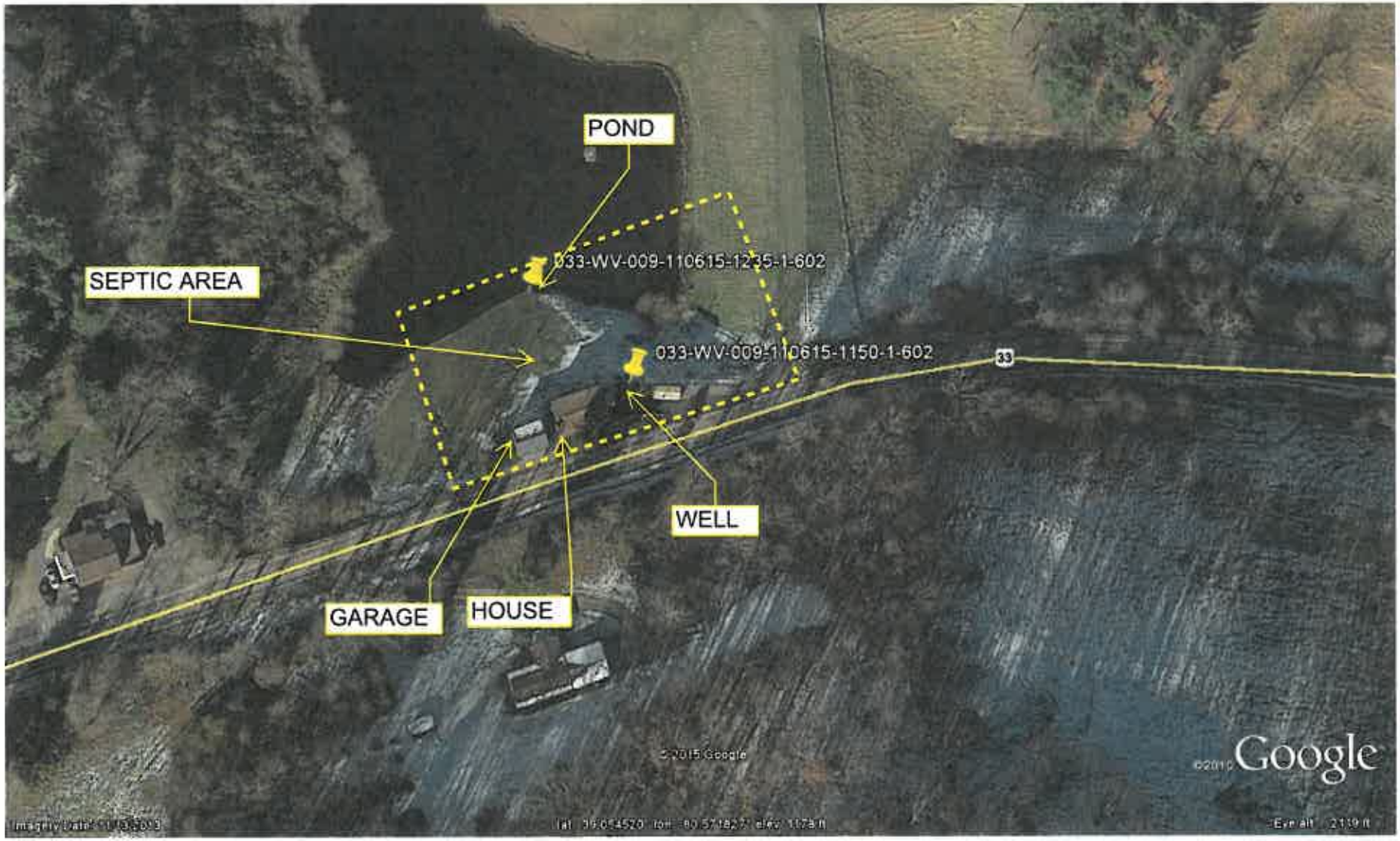
Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-1191 Inj. Well 72



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OCT 20 2016

Southwestern Energy
A-1141 Injection Well
Property Owner: Dannie Gum
Parcel: 03 4F002400000000
Date: 11-06-15
Times: 1150 & 1235

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC
Lab PM Contact Name: Wendy Kozma
Lab Address: 2425 New Holland Pike
City, State ZIP: Lancaster, PA 17601
Phone: 717-556-7257 **Fax:** 717-656-6766
Email: WendyKozma@eurofinsus.com

Client: Southwestern Energy Company
Client Contact Name: Tyler Spear
Client Address: 179 Innovation Drive
City, State ZIP: Jane Lew, WV 26378
Phone: 304-884-1681
Email: Tyler_Spear@SWN.com

Environmental Chain of Custody (COC)

Consultant Name: GES, Inc.
Consultant PM Contact Name: Nicholas Lohr
Phone: 800-267-2549, Ext. 3634 **Fax:** 866-902-2187
Email: Nlohr@gesonline.com

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***WELL PAD NAME:** A-1141 Injection Well

***Please circle which type of site this is:** IMPUNDMENT / (WELL PAD) / SPECIAL PROJECT

***PROPERTY # (AFE# if applicable):** 400116668

***MAJOR/MINOR CODE:** 5269S/007

***STATE SAMPLED:** WV

***OWNER NAME:** Donnie Gum

***Analysis Turnaround Time (working days)**

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only.

☐ Rush TAT = _____ working days

***SAMPLER(s):** Matt Crownover 602

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present)
☐ *Sample Collected - POST-Treatment System
☒ *Pre-drill Sample
☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-110615-1255-1-602	11-6-15	1235	grab	SW	22	Y	X	X	X	X	X	X	X	X	X	X	X	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ☐ Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

OCT 20 2016

***PARCEL ID #:** 03 4f00240000000

***FEDEX TRACKING #:** 8013 0183 1324

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Pond / Bank of Pond

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
	GES	11-6-15/1730			
Relinquished by:	Company:	Date/Time:	Received by:		Date/Time:

GES Field Documentation Review Sheet

Client and Well Pad Name: SWN / A-1191 Date: 11-6-15

Parcel #: 03 4F0024 00000000

Review Prior to Leaving Parcel:

- [x] Field equipment calibration records (GE/CG/PID/FID/LEL, conductivity, pH, turbidity, etc.).
- [x] Check coolers for bottleware, chain-of-custody, and other paperwork (Predrill parameters and Isotopic).
- [x] Sample Matrix confirmed?
- [x] Bottle labels filled out with analysis, time, date, sample ID, and sampler?
- [x] Chain-of-custody bottle count matches as-is or edited to reflect bottle count in cooler?
- [x] Site Visit Form and Supplemental Log Book reviewed and all applicable spaces completed and information is correct?
- [x] Full names of both team members (including sampler ID #s) conducting sampling, arrival and departure times noted in Supplemental Log Book.
- [x] Purge information and all water quality readings documented on Site Visit Form and Supplemental Log Book, respectfully?
- [x] Photographs with accurate time and date stamps and white board taken of treatment system, sample point, source, and filled bottleware (at a minimum)?
- [x] White board in photographs contains correct client name, name of well pad, sample identification, parcel number, and date?
- N/A [ ] Notes on unusual conditions, such as interference by landowner or third party during sampling, hazardous/unsanitary conditions, dead animals, etc? Photo-documented, if applicable?
- N/A [ ] Verbal decline documented and any unusual conditions communicated to Project Manager and/or client representative immediately?
- [x] **Both field team members have reviewed all field notes, chains, and forms?**

Review Prior to End of Day:

- [x] Upload completed and final PDF. PDF opened to confirm complete upload. PDF includes Site Visit Form, Site Sketch, calibration information, chain-of-custodies, completed Supplemental Log Book pages?
- [x] Photo-documentation and GPS files uploaded?
- N/A [ ] Isotopic sample placed in secure, climate controlled area with chain-of-custody?

Must Sign Below and Scan with End of Day PDF Package

Team Member 1: [signature]

Team Member 2: [signature]

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PHOTOGRAPHS

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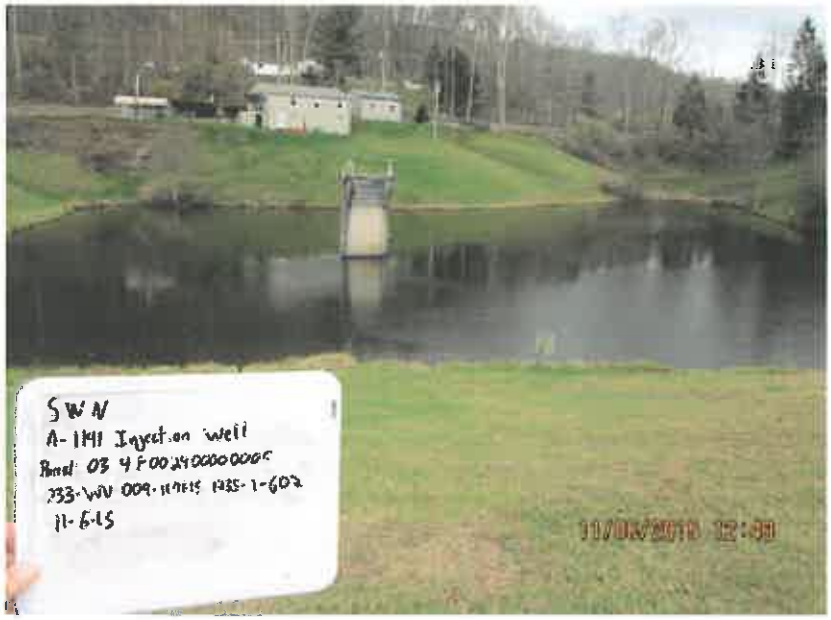
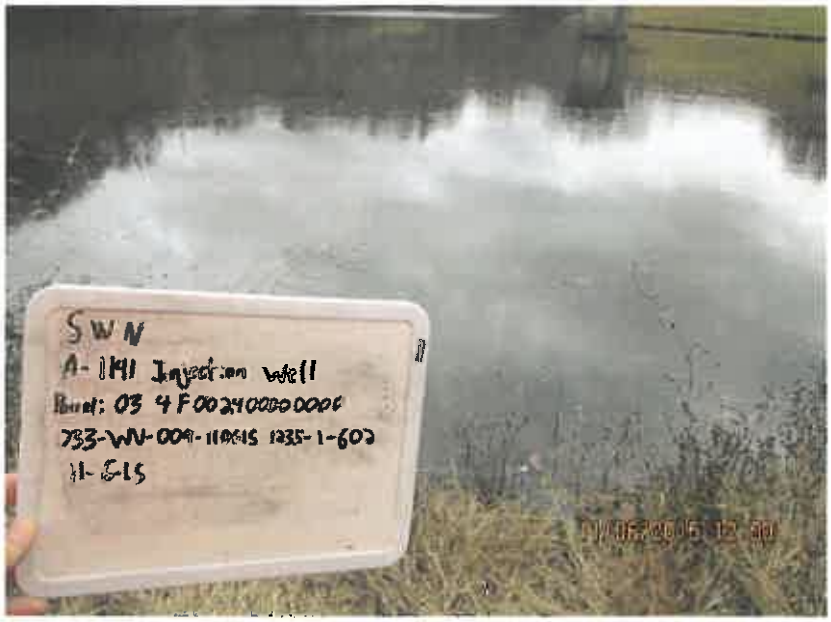


Source: Pond



Sample Location

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002400000000
Gum
033-WV-009-110615-1235-1-602
November 6, 2015

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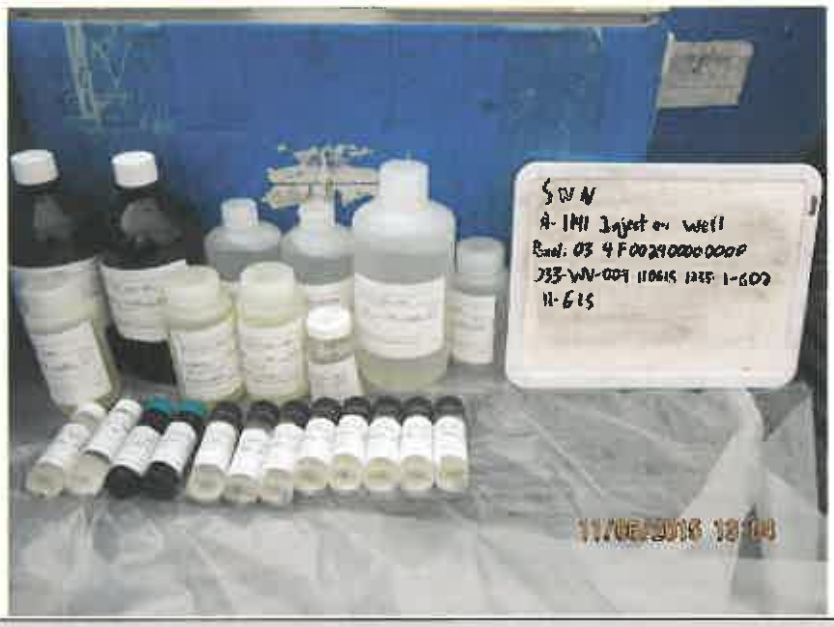

Sample

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002400000000
Gum
033-WV-009-110615-1235-1-602
November 6, 2015

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JSAs

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Job Safety Analysis (JSA)

JSA Title: **Motor Vehicle Driving**

JSA Control #:

Date Developed: 4/15/2015	
Latest Revised Date: 4/15/2015- JSA Retention 1 year from Latest Revision Date.	
Developed by: Patrick Daisley	
Work Team Leader: Patrick Daisley	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.

Revision #: 1	**Work Location:** A-1141 Inj. Well **Permit #:**

This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.

SPECIFIC PPE: Gloves. (base on hazard and identified in column 4 e.g. - leather). PPE Clothing: highly visible clothing such as orange coveralls & reflective safety vest. Fire Retardant clothing (FRC) is required for well pad operations. Safety Glasses. Safety Shoes: steel-toed. Winter weather: Yack Tracks and FRC hard hat liner

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Fire extinguisher; First aid kit; Yellow flashing light; Roadside emergency kit; Spill containment kit

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	Energy or Biological Sources *(Check all that apply by using "Hazard Identification" tool)*		Potential Hazards	Energy/Biological/Waste Management Plan Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Pre-mobilization 1. Always conduct a pre-trip or pre-use inspection of the vehicle prior to driving	X Motion _ Chemical _ Electrical _ Biological X Mechanical	_ Gravity _ Radiation X Temperature _ Pressure _ Sound	1a. Injuries caused by faulty or misadjusted equipment 1b. Accident or injuries caused by environmental conditions (inclement weather)	1a. Inspect exterior and interior of vehicle. Don hi-visible clothing, steel-toe boots, safety glasses and leather gloves. ➢ Exterior ▪ Check condition of windshield wipers (wear and cracking). ▪ Check tires for manufacture inflation rate and tread condition. ▪ Check for body damage/overall condition. ▪ Check under vehicle for fluid leaks (e.g., oil, brakes, transmission, etc.). ▪ Check all lights (e.g., hi/low beams, turn signals, emergency flashers). ▪ Don high visible clothing and/or vest, include FRC if on well pad site, while inspecting exterior of vehicle. ➢ Interior ▪ Adjust seat to your height and visibility. ▪ Adjust mirrors to eliminate blind spots. ▪ Fasten safety belt (passengers too). ▪ Secure all lose items in container (e.g. glove box, cargo nets, cargo box). ▪ Verifying critical equipment is working (e.g., defogger, wipers, air bags, lights, turn signals). 1b. Prepare vehicle for weather conditions prior to departure. ➢ Snow/ice ▪ Scrape snow/ice from entire vehicle (e.g., hood, roof, windows, etc.). ▪ Add extra weight to back of trucks to increase traction. ▪ Maintain speed for conditions. ➢ Fog ▪ Turn on fog lights. ➢ Rain ▪ Ensure windows are defogged prior to mobilization. ▪ Utilize windshield wipers in all rainy conditions. ▪ Consider alternative routes based on flooding potential of roadway.

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			1c.3rd party injuries or accidents caused by unsecure equipment in truck bed	▪ Maintain speed for conditions. 1c. Inspect truck bed load. ➢ Check coolers, drums, and toolboxes to make sure all lids, caps, and tops are latched and tightened. ➢ Use ratchet-straps or cargo nets to secure load from shifting or falling from truck bed. ➢ Close and lock tailgate before mobilizing to site. ➢ Place light objects that could be blown out of truck bed in secured location of cab.
On-site edits:				
B. Driving 1. Driving to and from the site or while driving onsite. ***Note:*** ➢ *Comply with all Smith Systems Five (5) Keys®* ➢ *Cell phone / texting is not permitted at any time while operating vehicle.* ➢ *Three-point seat belts must be worn by all occupants at all times while driving to and from the site and while driving onsite.* ➢ *Drive with low beams on at all times.* ➢ *Smoking is not permitted in GES vehicles.*	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Accident or injuries caused by traffic congestion or other vehicles (struck by, contact with) 1b. Accident or injuries caused by road surface condition (i.e., struck by, contact with)	1a. Mitigate potential for an accident by practicing the following techniques: ➢ Look ahead a minimum of 15 seconds to identify potential oncoming hazards. ➢ Maintain 4-second minimum following distance (increase distance due to weather conditions). ➢ Avoid focusing on any one object for more than 2 seconds. ➢ Scan the road, area around vehicle, and mirrors every 5-8 seconds. ➢ Stay out of other vehicles blind spots. ➢ Do not drive in clusters of traffic (i.e., adjust speed to give cushion between your vehicle & others). ➢ Utilize turn signals as required by law at all times 1b. Mitigate the potential for an accident by practicing the following techniques: ➢ Maintain speed; slower depending on road surface (e.g., dirt, concrete, asphalt, gravel). ➢ Drive posted speed limits (e.g., city, country roads, and highway). ➢ Do not tailgate vehicles in front of you. ➢ Pay attention for pedestrians. ➢ Place two hands on steering wheel at 9 and 3 position. ➢ Check for and yield to emergency vehicles. ➢ Obey traffic signals. ➢ Use particular caution in construction zones. ➢ Look ahead a minimum of 15 seconds. ➢ Scan the road, area around vehicle, and mirrors every 5-8 seconds. ➢ When backing, use a spotter at all times and ensure that the pre-determined hand signals have been discussed during the tailgate meeting and implemented. ➢ Stay out of other vehicles blind spots. Make eye contact with other drivers and ensure they see you.
On-site edits:				No Edits
C. Preparing to Park 1. Parking	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury/vehicle impairment caused by contact with other vehicles	1a. Mitigate the potential for an accident by practicing the following techniques: ➢ ***First move forward*** - Back into space (required on terminal sites). ➢ Maneuver vehicle slowly within parking lot. ➢ Ensure vehicle is legally parked. ➢ Ensure nothing is located at rear of vehicle prior to mobilization. ➢ Get out and inspect space and vehicle if unsure of potential or unseen hazards. When parked, vehicles that have automatic transmissions, the vehicle must be placed into park and the emergency (parking brake applied). For manual transmissions, the emergency brake must be applied and wheel chocks used to prevent the vehicle from rolling ➢ Wheel chocks must be used for large vehicles when parked/positioned on uneven surfaces; front & back of each rear tire. ➢ Wheel chocks must be used (front & back of each rear tire) on all vehicles working at the site/ vehicles with manual transmission parked on sloping surfaces ➢ When parked and unhooked from a vehicle, trailers must have a wheel chock placed in front of and

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				behind each rear wheel.
On-site edits:				No Edits

PD 11-6-15

Core Safety Expectations

1. ***Always follow Fall Protection standards when working at elevated heights.***
2. ***Always follow Written Permit procedures.***
3. ***Always follow Lock Out/Tag Out (LOTO) procedures.***
4. ***Always follow Critical Device Defeat procedures.***
5. ***Always follow written PPE Requirements for the work being performed.***

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Job Safety Analysis (JSA)

JSA Title: **Baseline Water Sampling (All Sources)**

JSA Control #:

Date Developed: 4/13/2015	
Latest Revised Date: 4/13/2015 / JSA Retention 1 year from Latest Revision Date.	
Developed by: Patrick Daisley	
Work Team Leader: Patrick Daisley	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.	
Revision #: 3	**Work Location / Permit #: A-1141 Inj. Well**
This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.	

SPECIFIC PPE: Gloves: (base on hazard and identified in column 4 e.g. - nitrile, Kevlar, leather). Hard Hat (required by activity or site requirements). Hearing Protection: If site activities raise the noise level to 85 db. PPE Clothing: highly visible clothing such as orange coveralls & reflective safety vest, Fire Retardant clothing (FRC) is required for well pad operations. Safety Glasses. Safety Shoes: steel-toed. Winter weather: Yaktrax and FRC hard hat liner.

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Gas Explorer, YUMA, YSI, Turbidity Meter, Water Interface Probe, Sampling Kit, Hand Tools, extendable rod with attached cup

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply by using "Hazard Identification" tool)*		**Potential Hazards**	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Arrive Onsite 1. Driving on site and parking 2. Attempt to make contact with home owner or resident. 3. Complete JSA/HASP/safety checklist/tailgate meeting ***Note:** Please remember to complete client required checklist prior to performing on site activities*	X Motion _ Chemical X Electrical X Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Workers being injured and work vehicles/ property damage being caused by hazardous conditions 1b. Workers being struck/ injured and work vehicles/ property damage being caused by traffic 1c. Injury due to contact with overhead hazards (falling objects and electrocution from lighting)	1a. Conduct a visual inspection of the driveway for hazards before attempting to pull onto the property. Reconsider entering a driveway that is covered in ice or muddy. ➢ Obey no trespassing signs if you have not previously contacted the property owner. ➢ Rain, ice, and snow may worsen driveways that have a steep incline/decline. 1b. Park in a designated area only (*first move forward*) and ensure vehicle is out of traffic pattern so that tailgate safety meeting can be performed safely. ➢ Be extra cautious when parked near active roadways due to vehicles flinging debris. 1c. Inspect work area for any overhead hazards including overhead utilities and overhead trees and vegetation. ➢ A visual inspection of overhead obstacles (e.g. tree branches, vegetation, low structures...) should be conducted prior to starting a job task. ➢ Work conducted in a wooded area, during high winds and/or lighting storm, should be avoided and conditions re-evaluated after a storm has passed. (*See part B, section 4d.*)
On-site edits:				No Edits

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B. Weather Hazards Exposure	_ Motion _ Chemical X Electrical _ Biological _ Mechanical	_ Gravity X Radiation X Temperature _ Pressure _ Sound	1a. Adverse health effects due to exposure to weather related issues	1a. Staff should understand and be able to recognize the signs and/or symptoms of cold and hot weather related illnesses. ➢ Personnel should dress appropriately for ambient temperatures which would include but not be limited to dry layered clothing. ➢ Applying sunscreen to exposed skin is strongly recommended during sunny weather conditions (all seasons) to mitigate sun exposure.
			2a. Adverse health effects due to cold stress related injury	2a. For cold weather, work schedules should be adjusted to provide sufficient break periods in a heated area. Remember that dehydration is still a risk when working in the cold.
			3a. Adverse health effects due heat stress related injury	3a. For hot weather, work schedules may need to be adjusted to provide time intervals for replenishing fluids and which is free of contamination. For hot weather that exceeds 90oF, a 10 to 15 minute break must be taken following every 45 minutes to one hour of work. Each individual must drink at 16 ounces of water prior to beginning work and 8 to 12 ounces of water or other proper liquid such as Gatorade every 20 to 30 minutes. Caffeinated drinks must not be consumed at any time.
			4a. Adverse health effects or injury due to exposure to severe weather	4a. Avoid exposure to severe weather. ➢ Ensure a plan is in place and discussed to mitigate all potential severe weather concerns (rain, wind, thunderstorms, ice storms, snow fall, tornadoes, hurricanes...) ➢ In case severe weather (e.g. tornadoes, hailstorms, or strong winds) have a place to shelter and make every effort to protect life. ➢ Pay attention to severe weather alerts. ➢ Take precautions with approaching thunderstorms and lighting. Discontinue all work until 30 minutes after severe weather has passed.
			5a. Adverse health effects that can result from Chemical/dust exposure	5a. Be aware of possible chemical exposure from well pad activities. (drilling, fracking, production activities) ➢ Discuss possible sources of exposure with local HSO or PIC. ➢ Avoid inhalation/absorption of dust, exhaust and fumes from well pad activities. ➢ Stay upwind of such activities whenever possible.
On-site edits:				
C. Locate Water Source 1. Traverse to water source location (either by foot or vehicle) 2. GPS and photograph water source 3. Traverse to vehicle location	X Motion _ Chemical X Electrical X Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Personal injury due to slips, trips, falls, lacerations, cuts, burns, and electrocution.	1a. Before traversing the property, perform a general scan of your planned walking path for any obstructions, debris, slip, trip, and fall hazards. Communicate conditions with sampling partner (if applicable). ➢ Scan your walking path. Identify any soil conditions which demonstrate significantly eroded areas from any possible recent rainfall. ➢ Look for changes in elevation (steep slopes) and grade when walking on uneven terrain. ➢ Be aware of loose gravel, wet grass, snow covered rocks and ice, roots and limbs, and slopes ➢ Stay within visual contact of your canvassing partner to ensure that you can be seen. ➢ For fences, complete an inspection to find the best point of entry and ask the owner to shut off any electrified fences. If a gate or opening cannot be located and electric power cannot be shut off, drape a thick blanket up and over the barbed wire rungs or electrified wire before attempting to step over.
			1b. Injury and/or damage to personnel, property or pets/livestock.	1b. When backing out of an area near the water source location, use a spotter to avoid damage or injury to the work vehicle, property, residents, and pets/livestock. If maneuvering vehicle in an area of uneven terrain and unsure of potential locations of slopes, holes, debris, etc. walk the projected vehicle path first. Use a spotter ahead of the vehicle to direct the driver away from potential hazards.
			1c. Injury / illness due to contact with animal and insects (bites, stings, cuts, lacerations, puncture wounds, venom,	1c. Observe signs of biological hazards that may be present (e.g., webs, bees flying in and out, buzzing sounds). ➢ Use repellant if ticks or mosquitoes may be present. ➢ Wear leather gloves when opening cellar, well vault or spring house door. ➢ Do not place your hands or feet anywhere you cannot see them.

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			etc.)	➢ Stay alert for webs, nests, or other signs of inhabitation. ➢ Scan for "Beware of Dog" signs. Ask to have aggressive animals secured.
On-site edits:				No Edits
D. Purge Water Source (Well) 1. Connect hose to spigot attachment 2. Turn on/off spigot or tap 3. Disconnect and drain hose Note: Be aware of exposed wiring around pressure tanks. Use SWA if purge cannot be completed safely	X Motion _ Chemical X Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature X Pressure _ Sound	1a. Cut or abrasion injury to hand from contact with rusty spigot. 1b. Eye injury resulting from water spray due to faulty hose connection.	1a. Be aware of sharp edges or very rusty areas of spigot openings. ➢ If excessive rust could cause a breakage of the spigot or handle, call the PM to discuss alternative sampling method. ➢ Wear leather gloves when attaching or removing garden hose from the spigot, as well as when turning the spigot on or off. 1b. Turn on the spigot slowly to ensure secure connection from hose to spigot before increasing the water pressure. ➢ Inspect the hose for leaks and be sure hose is in the preferred location to drain the water and not pointed at anyone.
On-site edits:				No Edits
E. Sampling 1. Set up of equipment and sample cooler 2. Fill bottleware using spigot, bailer, transfer vessel, or extendable rod with attached cup. 3. Take field readings with YSI, Gas Explorer, and Turbidity meter	X Motion X Chemical _ Electrical _ Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury (strains) to back / shoulders while moving equipment. 1b. Injury due to slip, trip, fall on cords/piping 1c. Injury due to slip or fall on steep embankment. 1d. Eye or bodily injury from splashing of preservatives. 1e. Hand or bodily injury from contact with broken glassware.	1a. Utilize proper lifting procedure when handling equipment and cooler. ➢ Bend down at the knees and lift/lower with your legs and do not lift anything > 50lbs. ➢ Share carrying duties to eliminate balance issues when traversing rough terrain. 1b. Set up the work area so that all equipment is out of the walking path of both personnel and landowner. 1c. Use the extendable rod with the attached cup to reach surface water sources when near a steep embankment or where water level is deep enough for sampling, but is out of reach by hand. 1d. Fill bottleware slowly to avoid splashing of preservatives. 1e. Close lids of glass bottle ware finger tight. Do not over tighten, which could result in broken glassware. ➢ Kevlar and nitrile surgical gloves must be worn when opening a cooler and retrieving sample collection containers ➢ Wear Kevlar (cut resistant) gloves beneath nitrile sampling gloves to help prevent exposure to sharp edges, broken glass, and/or preservatives.
On-site edits:				No Edits
F. Decontamination 1. Soak/spray durable equipment to prevent cross-contamination between multiple sample locations and dispose of all waste	_ Motion X Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Illness due to exposure decontamination chemicals	1a. When spraying equipment with Alconox, spray away from the face and body. ➢ Be sure to account for wind direction and strength before spraying Alconox solution. ➢ Wear nitrile gloves over Kevlar and wear a new pair nitrile gloves for each sample. ➢ Avoid touching your face and body, or any surface you may come into contact with after spraying Alconox
On-site edits:				No Edits

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G. Demobilization 1. Replace all equipment in cases or duffle bag 2. Ice and close sample cooler 3. Traverse to next source	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury (strains) to back / shoulders while moving equipment 1b. Personal injury due to slips, trips, and falls	1a. Utilize proper lifting procedure when handling equipment and cooler. ➢ Bend down at the knees and lift/lower with your legs and do not lift anything > 50lbs. ➢ Place cooler on the bed of the truck before adding ice to avoid making coolers dangerously heavy. Perform a team lift if cooler weight exceeds 35lbs. 1b. Perform a general scan of your planned walking path to truck or next location for any obstructions, debris, slip, trip, and fall hazards. Communicate conditions with sampling partner.
On-site edits:				No Edits
H. Departing the site 1. Exiting the property	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury and/or damage to personnel, property, and pets.	1a. When backing out of a site location, use a spotter to avoid damage or injury to the work vehicle, property, residents, and pets/livestock. ➢ If possible, avoid backing out, and exit moving forward.
On-site edits:				No Edits

Core Safety Expectations

AD 11-6-15

1. ***Always follow Fall Protection standards when working at elevated heights.***
2. ***Always follow Written Permit procedures.***
3. ***Always follow Lock Out/Tag Out (LOTO) procedures.***
4. ***Always follow Critical Device Defeat procedures.***
5. ***Always follow written PPE Requirements for the work being performed.***

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Groundwater & Environmental Services, Inc.

WESTERN PENNSYLVANIA OFFICE

Sampling Field Data Package
A-1141 INJECTION WELL
LEWIS COUNTY, WV

Gum
034F002500000000
033-WV-009-110615-1330-1-602
November 6, 2015

Prepared For:

Southwestern Energy
Jane Lew, WV

Prepared By:

Groundwater & Environmental Services, Inc.
301 Commerce Park Drive
Cranberry Township, PA 16066

November 16, 2015

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FIELD DOCUMENTATION

Site Visit Form, Calibration Logs, Logbook, Site Sketch, COCs, Checklist

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Part A: GENERAL INFORMATION

Water Source ID*:	SP-11062015-602-03	O & G Well Name*:	A-1141 INJECTION WELL
Pad Name*:	A-1141 INJECTION WELL	Parcel Number*:	03 4F002500000000
Tax ID:	03 4F002500000000GC		
Operator ID*:	033	State Code*:	
County Code*:	009		
Sampled By*:	MATT CROWNOVER	Company Name*:	OES
Water Sampler Identifier*:	902	Date/Time Sampled*:	11/06/2015 13:30 (24hr)
Sample Frequency*:	1	N/A: No Sample	Details:
Person Interviewed*:	Owner	Please specify:	

PROPERTY OWNER		RESIDENT OR OTHER	Same as owner
Name*:	DANNIE GUM	Name*:	DANNIE GUM
Address*:	4552 US HWY 33 W	Address*:	4552 US HWY 33 W
City*:	CAMDEN	City*:	CAMDEN
State*:	WV	State*:	WV
Postal Code*:	26338	Postal Code*:	26338
Phone No*:	304-269-1331	Phone No*:	304-269-1331

Part B: WATER QUALITY

	Reported Quality			Observed Quality		
	Yes	No	N/A	Yes	No	N/A
Staining	○	●	○	○	●	○
Odor	○	●	○	○	●	○
Cloudiness	○	●	○	○	●	○
Sheen	○	●	○	●	○	○
Effervescence	○	●	○	○	●	○
Taste	○	●	○			

Treatment*

- ☑ None
- ☐ Charcoal Filter
- ☐ Softening
- ☐ UV light
- ☐ Chlorination
- ☐ pH Adjustment
- ☐ Iron Removal
- ☐ In-line Sediment Filter

Other:

Functioning Properly*: ○ Yes ○ No ○ Unknown

Pump Type

- ● None
- ○ Gas Piston
- ○ Submersible
- ○ Windmill
- ○ Jet
- ○ Other:

Capacity (GPM):

Comments:

SHEEN OBSERVED.

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Part C: WATER SOURCE INFORMATION

Does this source supply any other properties? ○ Yes ● No

Identify properties:

Is the water source(s) located on the property? ● Yes ○ No **Please explain:**

Number of people using this water source: 0 **Gallons/day:**

Pressure Tank? ○ Yes ◉ No Size (gallons):

Water Use: ☐ Domestic ☐ Husbandry ☐ Irrigation Other UNUSED

Coordinates: (NAD83 decimal, 5 places) Lat 39.057024 Long -80.572846 Ground Surface Elevation 1138 ft

Does the water source ever go dry? ○ Yes ◉ No

Water Source Type*: SPRING

Discharge Pipe ○ Yes ◉ No **Seep/Ground Surface Flow** ○ Yes ◉ No **Spring House** ○ Yes ◉ No

Underground Vault: ◉ Yes ○ No

Part D: DESCRIPTION OF WATER SOURCE

Check all that apply

☐ Loose, missing, or damaged cover ☑ Evidence of insects, spiders, animals ☐ Open to surface water

☐ Any cracked or damaged well casing/spring vault ☐ Additional storage or holding tank/coyote system

☐ Evidence of erosion ☐ Water source secured ☐ Source buried ☐ Location unknown ☐ Cover flush with ground

Other:

Part E: DESCRIPTION OF AREA SURROUNDING WATER SOURCE

Check all that apply

☑ Ground sloping towards water source ☐ Water source downgradient of septic system

Signs of:

☐ Failing septic ☐ Soggy ground ☐ Foul odor

Close proximity to (tick all that apply):

☐ Garden ☐ Orchard ☐ Greenhouse ☐ Equipment storage areas

☐ Junkyard ☐ Dumping area ☐ Landfill ☐ Salt storage area/Salted roadway

☐ Garage ☐ Fuel storage tanks

Located in field with:

☐ Livestock ☐ Inside Barn ☐ Barnyard ☐ Other out buildings

Additional remarks and comments:

Part F: SAMPLING

Sample ID 033-WV-009-110615-1330-1-602

Sampled	Sampling Point Location
○ Before Treatment ○ After Treatment	○ Inside Faucet ○ Outside Faucet ○ Overflow/Discharge Pipe
◉ No Treatment ○ Not Sure	○ Seep ○ Pressure Tank ○ Bailed
	○ Wellhead ◉ Other: UNDERGROUND VAULT

Was the water source purged before sampling ○ Yes ◉ No Volume (gal) Time (min)

Is it possible to run water for 30 minutes? ○ Yes ◉ No If No, please explain SPRING IN A VAULT

Average water usage within the last 24 hours Chain of custody attached? ○ Yes ◉ No

Field Analyses:

Turbidity (ntu): 2.51 pH (ph units): 7.78

Conductivity (umhos/cm): 374 Temperature (deg c): 15.69

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Gas Readings:

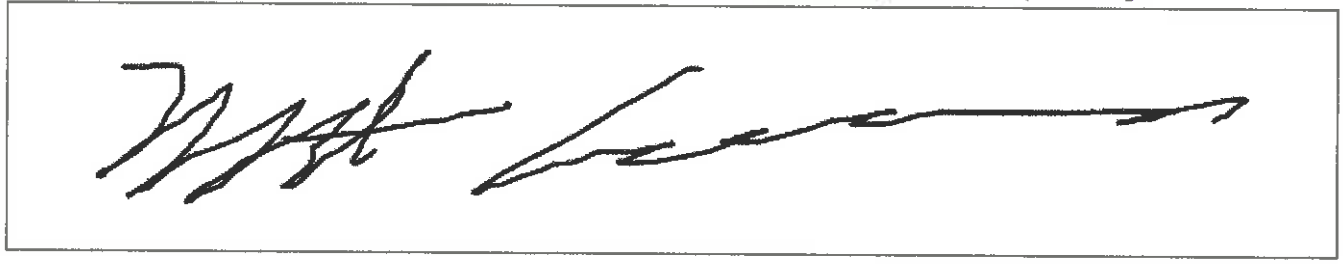
Type	PPM	% LEL	% GAS
Wellhead	Peak / Sustained	Peak / Sustained	Peak / Sustained
Cold Headspace	0 (Sustained)	Peak / Sustained	Peak / Sustained
SW Vicinity	0 (Sustained)	Peak / Sustained	Peak / Sustained
	Peak / Sustained	Peak / Sustained	Peak / Sustained
	Peak / Sustained	Peak / Sustained	Peak / Sustained
	Peak / Sustained	Peak / Sustained	Peak / Sustained

Part G: SITE SKETCH and PHOTOGRAPHS

Add Images | 10 pictures attached to the from

SAMPLER

Please sign in the box below acknowledging that I have supplied the correct information to the best of my knowledge.



Accept | Clear

INTERVIEWEE

Accept | Clear

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Form #: NA
(Reference Form # in Log Book)

Truck #: N A

Gas Explorer Calibration Log

GES Equipment Name: GES-GE-029

Equipment Serial #: 1202-302846

9-28-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dasler 489
↓	↓	H_2S	0	100ppm		↓	↓
10-30-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dasler 489
↓	↓	H_2S	0	100ppm		↓	↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓

NOTE: Gas Explorers must be calibrated on the first day of every month. If the instrument is recalibrated at anytime the calibration information must be recorded on this sheet.

3-Gas= 2.5%(50%LEL) Methane, 100ppm CO, Balance Air

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GES - Ver. 1

Southwestern Energy Predrill Sampling

Gas Detector Equipment Calibration	
Equipment Serial Number:	1202-302846
GES Equipment Code:	GES-GE-029
Equipment Type:	Gas Explorer
Date of Calibration:	10-30-15
Include Gas Detector Calibration Log with Field Documentation	

GPS Equipment	
Equipment Serial Number:	RBC15U0226
GES Equipment Code:	N/A
Equipment Type:	Trimble YUMA

Water Quality Multi-Parameter Calibration			
Equipment Serial Number:		09E100453	08325700
GES Equipment Code:		N/A	N/A
Equipment Type:		YSI	Hanna HI
Calibration Method:		3pt pH/ 1pt. Sp cond.	4pt.
Date of Calibration:		11-6-15	11-6-15
Calibration Parameter	Time	Pre-Value/Reading	Person Performing Calibration
pH-4	0720	4.11	Matt Crowmer 602
pH-7	0722	6.73	
pH-10	0724	10.20	
Specific Conductivity (µS/cm)	0726	1407	
Turbidity (<0.1 NTU)	0727	0.17	
Turbidity (15 NTU)	0728	15.3	
Turbidity (100 NTU)	0729	100	
Turbidity (750 NTU)	0730	752	
Calibration Parameter	Time	Post-Value/Reading	Person Performing Calibration
pH-4	0721	3.99	
pH-7	0723	7.00	
pH-10	0725	10.05	
Specific Conductivity (µS/cm)	0727	1412	
Turbidity (<0.1 NTU)	0731	0.15	
Turbidity (15 NTU)	0752	15.0	
Turbidity (100 NTU)	0753	100	
Turbidity (750 NTU)	0734	749	

Decon Procedures

Reference GES Baseline Water Well Sampling SOP

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Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-114(Inj. Well

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F 00250000 0000

Site Arrival Time: 1100 Site Departure Time: 1415

Samplers (Full Names and Sampler #s): Patrick Dasler 489
Matt Crawmer 602

Weather Condition Observations Recorded at: 1315

Weather Conditions: light rain Air Temp (Degrees Fahrenheit): 72°F

Estimate Wind Speed(mph): 16 mph Approximate Wind Direction: NW

Note: Remember to document any changes in weather conditions (Include Times).

Equipment Bump Test Verification (Include GES Equipment Number and Time): 1320

GE(GES-GE-029) → 100ppm, Bump= 100ppm

YSI → 7.00 pH, Bump = 7.02pH / 1413 µs/cm, Bump = 1412 µs/cm

Turbidity → 15.0 NTU, Bump = 15.0 NTU

Refer to page 11 for 11-6-15 (insert date) for full calibration information.

Does the parcel have a septic system?: ___ Y _X_ N

If Yes, describe the location of the septic area below and provide an approximate location on the site map.

1310 - Moved to the spring

1330 - Collected sample 033-WH-009-110615-1330-1-602 from the spring.

1415 - Departed site to canvass (See canvassing spreadsheet)

Fed Ex Tracking #: 801301874566

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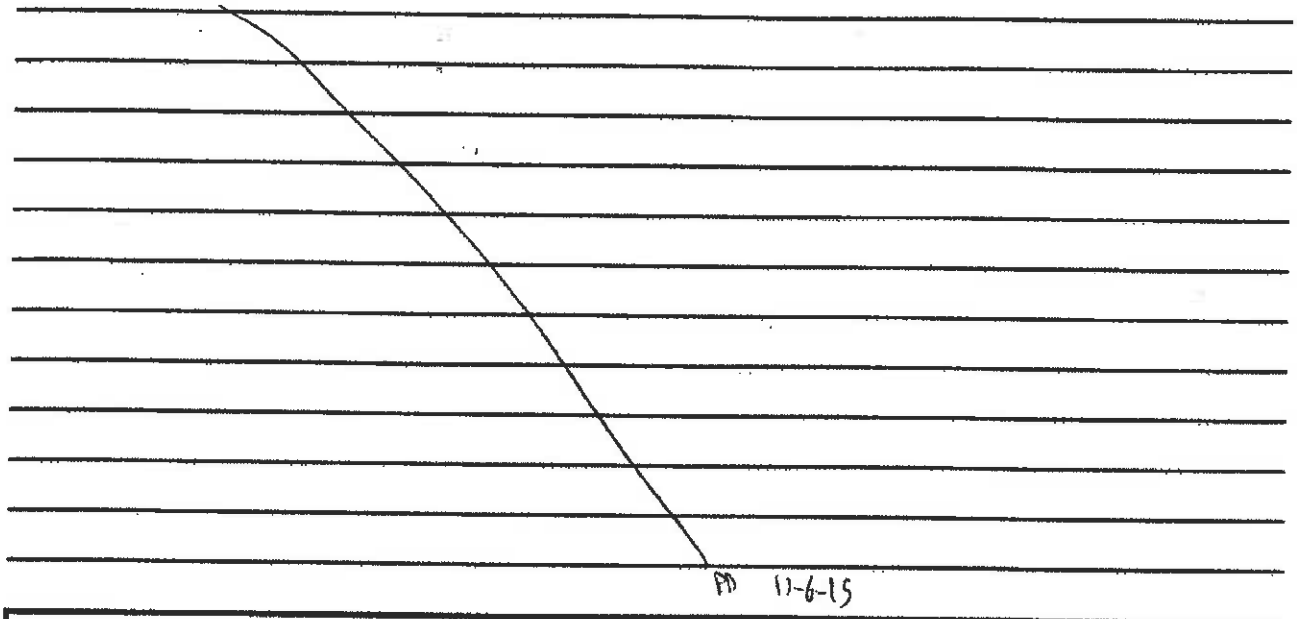
PD 11-6-15

Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-1149 Jay Wy 11

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F00250000 0000



Interviewee Signature:

Fields intentionally left blank in EDGE because they are unknown or do not apply:
(Check all that apply)

For All Sources:
- ☐ Pump Type
- ☑ Pump Capacity
- ☐ Number of People Using the Water Source
- ☑ Gallons/Day Used
- ☑ Average Water Usage Within the Last 24 Hours

For Wells:
- ☐ Reported Well Depth
- ☐ Reported Depth to Water Level
- ☐ Reported Pump Depth
- ☐ Date Drilled
- ☐ Drillers Name
- ☐ Well Location

For Cisterns:
- ☐ Source of Water

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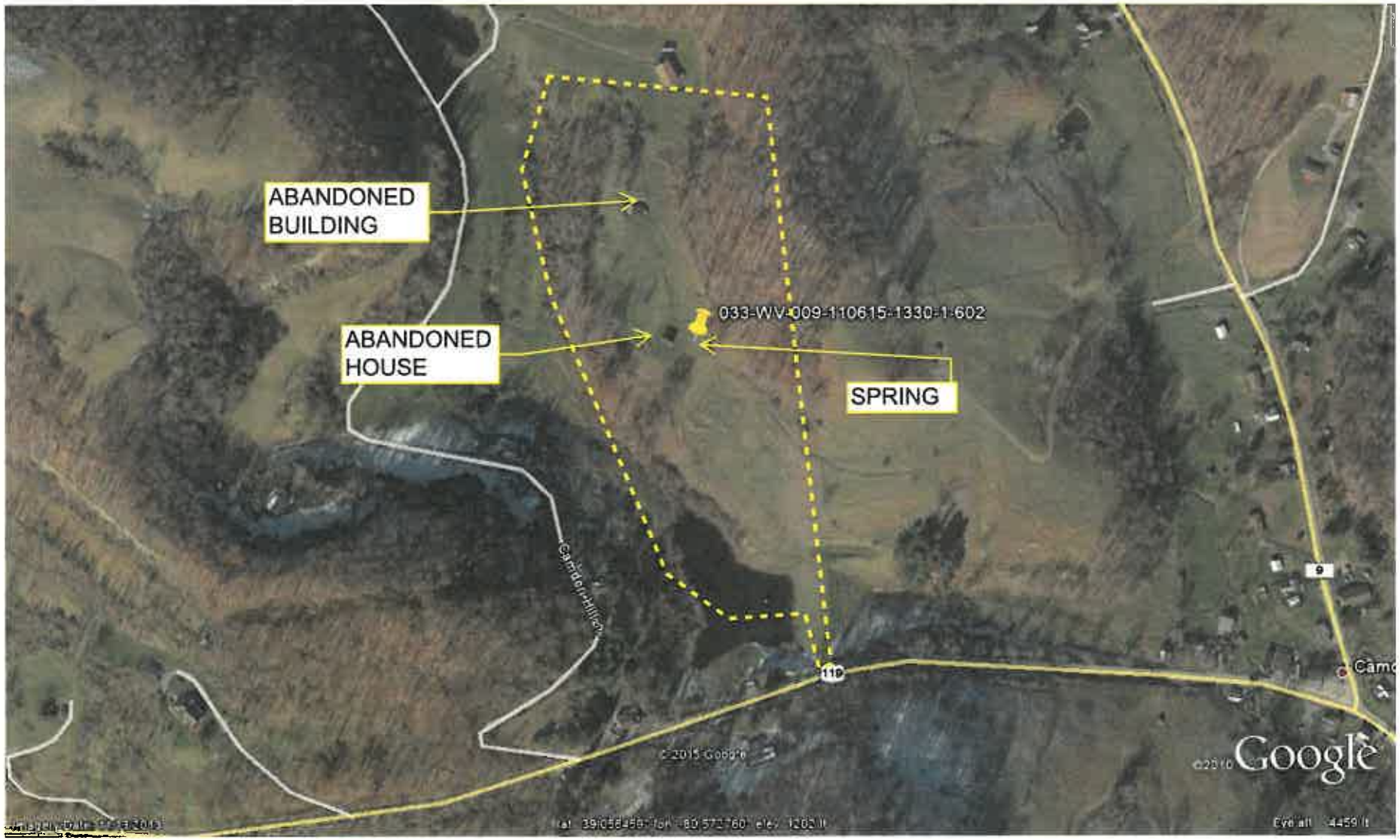
Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-1H Inj. Well



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Southwestern Energy
A-1141 Injection Well
Property Owner: Dannie Gum
Parcel: 03 4F002500000000
Date: 11-06-15
Times: 1330

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC
Lab PM Contact Name: Wendy Kozma
Lab Address: 2425 New Holland Pike
City, State ZIP: Lancaster, PA 17601
Phone: 717-556-7257 **Fax:** 717-656-6766
Email: WendyKozma@eurofinsus.com

Client: Southwestern Energy Company
Client Contact Name: Tyler Spear
Client Address: 179 Innovation Drive
City, State ZIP: Jane Lew, WV 26378
Phone: 304-884-1681
Email: Tyler_Spear@SWN.com

Environmental Chain of Custody (COC)

Consultant Name: GES, Inc.
Consultant PM Contact Name: Nicholas Lohr
Phone: 800-267-2549, Ext. 3634 **Fax:** 866-902-2187
Email: Nlohr@gesonline.com

eurofins | Lancaster Laboratories

***WELL PAD NAME:** A-114J Injection Well

***Please circle which type of site this is:** IMPOUNDMENT (WELL PAD) SPECIAL PROJECT

***PROPERTY # (AFE# if applicable):** 4900161668

***MAJOR/MINOR CODE:** 52695/007

***STATE SAMPLED:** WV

***OWNER NAME:** Dannie Crum

***Analysis Turnaround Time (working days)**

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

***SAMPLER(s):** Matt Crownover 602

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present)
☐ *Sample Collected - POST-Treatment System
☒ *Pre-drill Sample
☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - Sml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-110615-1330-1-602	11-6-15	1330	grab	SW	22	Y	X	X	X	X	X	X	X	X	X	X	X	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ☐ Disposal By Lab after two (2) months of final report date

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Special Instructions/QC Requirements & Comments:

***PARCEL ID #:** 03 4F00250000000

***FEDEX TRACKING #:** 8013 0187 4566

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Spring/Underground vault

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:		Date/Time:
	GES	11-6-15/1730			

GES Field Documentation Review Sheet

Client and Well Pad Name: SWN/ A-1141 Date: 11-6-15

Parcel #: 03 4F 00250000000

Review Prior to Leaving Parcel:

- ☑ Field equipment calibration records (GE/CG/PID/FID/LEL, conductivity, pH, turbidity, etc.).
- ☑ Check coolers for bottleware, chain-of-custody, and other paperwork (Predrill parameters and Isotopic).
- ☑ Sample Matrix confirmed?
- ☑ Bottle labels filled out with analysis, time, date, sample ID, and sampler?
- ☑ Chain-of-custody bottle count matches as-is or edited to reflect bottle count in cooler?
- ☑ Site Visit Form and Supplemental Log Book reviewed and all applicable spaces completed and information is correct?
- ☑ Full names of both team members (including sampler ID #s) conducting sampling, arrival and departure times noted in Supplemental Log Book.
- ☑ Purge information and all water quality readings documented on Site Visit Form and Supplemental Log Book, respectfully?
- ☑ Photographs with accurate time and date stamps and white board taken of treatment system, sample point, source, and filled bottleware (at a minimum)?
- ☑ White board in photographs contains correct client name, name of well pad, sample identification, parcel number, and date?
- N/A ☐ Notes on unusual conditions, such as interference by landowner or third party during sampling, hazardous/unsanitary conditions, dead animals, etc? Photo-documented, if applicable?
- N/A ☐ Verbal decline documented and any unusual conditions communicated to Project Manager and/or client representative immediately?
- ☑ **Both field team members have reviewed all field notes, chains, and forms?**

Review Prior to End of Day:

- ☑ Upload completed and final PDF. PDF opened to confirm complete upload. PDF includes Site Visit Form, Site Sketch, calibration information, chain-of-custodies, completed Supplemental Log Book pages?
- ☑ Photo-documentation and GPS files uploaded?
- N/A ☐ Isotopic sample placed in secure, climate controlled area with chain-of-custody?

Must Sign Below and Scan with End of Day PDF Package

Team Member 1: _____

Team Member 2: _____

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PHOTOGRAPHS

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Source: Spring

Sample Location

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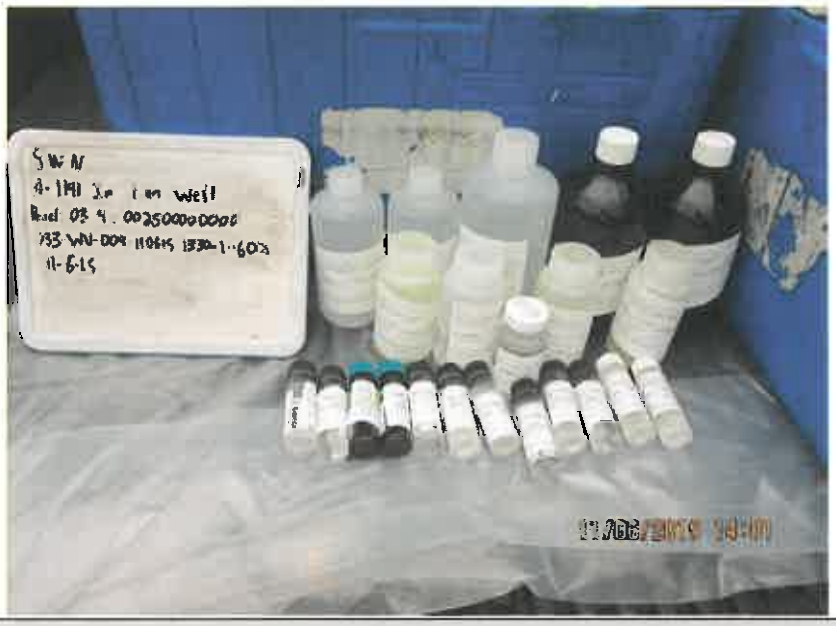
A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002500000000
Gum
033-WV-009-110615-1330-1-602
November 6, 2015



Sample

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002500000000
Gum
033-WV-009-110615-1330-1-602
November 6, 2015

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Job Safety Analysis (JSA)

JSA Title: **Motor Vehicle Driving**

JSA Control #:

Date Developed: 4/15/2015	
Latest Revised Date: 4/15/2015- JSA Retention 1 year from Latest Revision Date.	
Developed by: Patrick Daisley	
Work Team Leader: Patrick Daisley	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.

Revision #: 1	**Work Location:** A-1141 inj. Well **Permit #:**

This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.

SPECIFIC PPE: Gloves. (base on hazard and identified in column 4 e.g. - leather). PPE Clothing: highly visible clothing such as orange coveralls & reflective safety vest, Fire Retardant clothing (FRC) is required for well pad operations. Safety Glasses. Safety Shoes: steel-toed. Winter weather: Yack Tracks and FRC hard hat liner

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Fire extinguisher, First aid kit, Yellow flashing light, Roadside emergency kit, Spill containment kit

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply by using "Hazard Identification" tool)*		**Potential Hazards**	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Pre-mobilization 1. Always conduct a pre-trip or pre-use inspection of the vehicle prior to driving	X Motion _ Chemical _ Electrical _ Biological X Mechanical	_ Gravity _ Radiation X Temperature _ Pressure _ Sound	1a. Injuries caused by faulty or misadjusted equipment	1a. Inspect exterior and interior of vehicle. Don hi-visible clothing, steel-toe boots, safety glasses and leather gloves. ➢ Exterior ▪ Check condition of windshield wipers (wear and cracking). ▪ Check tires for manufacture inflation rate and tread condition. ▪ Check for body damage/overall condition. ▪ Check under vehicle for fluid leaks (e.g., oil, brakes, transmission, etc.). ▪ Check all lights (e.g., hi/low beams, turn signals, emergency flashers). ▪ Don high visible clothing and/or vest, include FRC if on well pad site, while inspecting exterior of vehicle. ➢ Interior ▪ Adjust seat to your height and visibility. ▪ Adjust mirrors to eliminate blind spots. ▪ Fasten safety belt (passengers too). ▪ Secure all lose items in container (e.g. glove box, cargo nets, cargo box). ▪ Verifying critical equipment is working (e.g., defogger, wipers, air bags, lights, turn signals).
			1b. Accident or injuries caused by environmental conditions (inclement weather)	1b. Prepare vehicle for weather conditions prior to departure. ➢ Snow/Ice ▪ Scrape snow/ice from entire vehicle (e.g., hood, roof, windows, etc.). ▪ Add extra weight to back of trucks to increase traction. ▪ Maintain speed for conditions. ➢ Fog ▪ Turn on fog lights. ➢ Rain ▪ Ensure windows are defogged prior to mobilization. ▪ Utilize windshield wipers in all rainy conditions. ▪ Consider alternative routes based on flooding potential of roadway.

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			1c.3rd party injuries or accidents caused by unsecure equipment in truck bed	▪ Maintain speed for conditions. 1c. Inspect truck bed load. ➢ Check coolers, drums, and toolboxes to make sure all lids, caps, and tops are latched and tightened. ➢ Use ratchet-straps or cargo nets to secure load from shifting or falling from truck bed. ➢ Close and lock tailgate before mobilizing to site. ➢ Place light objects that could be blown out of truck bed in secured location of cab.
On-site edits:				
B. Driving 1. Driving to and from the site or while driving onsite. ***Note:*** ➢ *Comply with all Smith Systems Five (5) Keys®* ➢ *Cell phone / texting is not permitted at any time while operating vehicle.* ➢ *Three-point seat belts must be worn by all occupants at all times while driving to and from the site and while driving onsite.* ➢ *Drive with low beams on at all times.* ➢ *Smoking is not permitted in GES vehicles.*	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Accident or injuries caused by traffic congestion or other vehicles (struck by, contact with) 1b. Accident or injuries caused by road surface condition (i.e., struck by, contact with)	1a. Mitigate potential for an accident by practicing the following techniques: ➢ Look ahead a minimum of 15 seconds to identify potential oncoming hazards. ➢ Maintain 4-second minimum following distance (increase distance due to weather conditions). ➢ Avoid focusing on any one object for more than 2 seconds. ➢ Scan the road, area around vehicle, and mirrors every 5-8 seconds. ➢ Stay out of other vehicles blind spots. ➢ Do not drive in clusters of traffic (i.e., adjust speed to give cushion between your vehicle & others). ➢ Utilize turn signals as required by law at all times 1b. Mitigate the potential for an accident by practicing the following techniques: ➢ Maintain speed; slower depending on road surface (e.g., dirt, concrete, asphalt, gravel). ➢ Drive posted speed limits (e.g., city, country roads, and highway). ➢ Do not tailgate vehicles in front of you. ➢ Pay attention for pedestrians. ➢ Place two hands on steering wheel at 9 and 3 position. ➢ Check for and yield to emergency vehicles. ➢ Obey traffic signals. ➢ Use particular caution in construction zones. ➢ Look ahead a minimum of 15 seconds. ➢ Scan the road, area around vehicle, and mirrors every 5-8 seconds. ➢ When backing, use a spotter at all times and ensure that the pre-determined hand signals have been discussed during the tailgate meeting and implemented. ➢ Stay out of other vehicles blind spots. Make eye contact with other drivers and ensure they see you.
On-site edits:				No Edits
C. Preparing to Park 1. Parking	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury/vehicle impairment caused by contact with other vehicles	1a. Mitigate the potential for an accident by practicing the following techniques: ➢ ***First move forward*** - Back into space (required on terminal sites). ➢ Maneuver vehicle slowly within parking lot. ➢ Ensure vehicle is legally parked. ➢ Ensure nothing is located at rear of vehicle prior to mobilization. ➢ Get out and inspect space and vehicle if unsure of potential or unseen hazards. When parked, vehicles that have automatic transmissions, the vehicle must be placed into park and the emergency (parking brake applied). For manual transmissions, the emergency brake must be applied and wheel chocks used to prevent the vehicle from rolling ➢ Wheel chocks must be used for large vehicles when parked/positioned on uneven surfaces; front & back of each rear tire. ➢ Wheel chocks must be used (front & back of each rear tire) on all vehicles working at the site/ vehicles with manual transmission parked on sloping surfaces ➢ When parked and unhooked from a vehicle, trailers must have a wheel chock placed in front of and

Gas

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				behind each rear wheel.
On-site edits:				No Edits

PD 11-6-15

Core Safety Expectations

1. ***Always follow Fall Protection standards when working at elevated heights.***
2. ***Always follow Written Permit procedures.***
3. ***Always follow Lock Out/Tag Out (LOTO) procedures.***
4. ***Always follow Critical Device Defeat procedures.***
5. ***Always follow written PPE Requirements for the work being performed.***

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Job Safety Analysis (JSA)

JSA Title: **Baseline Water Sampling (All Sources)**

JSA Control #:

Date Developed: 4/13/2015	
Latest Revised Date: 4/13/2015 / **JSA Retention 1 year from Latest Revision Date.**	
Developed by: Patrick Daisley	
Work Team Leader: Patrick Daisley	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.	
Revision #: 3	**Work Location / Permit #: A-1141 Inj. Well**
This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.	

SPECIFIC PPE: Gloves: (base on hazard and identified in column 4 e.g. - nitrile, Kevlar, leather). Hard Hat (required by activity or site requirements). Hearing Protection: if site activities raise the noise level to 85 db. PPE Clothing: highly visible clothing such as orange coveralls & reflective safety vest. Fire Retardant clothing (FRC) is required for well pad operations. Safety Glasses. Safety Shoes: steel-toed. Winter weather: Yaktrax and FRC hard hat liner.

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Gas Explorer, YUMA, YSI, Turbidity Meter, Water Interface Probe, Sampling Kit, Hand Tools, extendable rod with attached cup

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply by using "Hazard Identification" tool)*		**Potential Hazards**	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Arrive Onsite 1. Driving on site and parking 2. Attempt to make contact with home owner or resident. 3. Complete JSA/HASP/safety checklist/tailgate meeting ***Note:** Please remember to complete client required checklist prior to performing on site activities*	X Motion _ Chemical X Electrical X Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Workers being injured and work vehicles/ property damage being caused by hazardous conditions 1b. Workers being struck/ injured and work vehicles/ property damage being caused by traffic 1c. Injury due to contact with overhead hazards (falling objects and electrocution from lighting)	1a. Conduct a visual inspection of the driveway for hazards before attempting to pull onto the property. Reconsider entering a driveway that is covered in ice or muddy. ➢ Obey no trespassing signs if you have not previously contacted the property owner. ➢ Rain, ice, and snow may worsen driveways that have a steep incline/decline. 1b. Park in a designated area only (*first move forward*) and ensure vehicle is out of traffic pattern so that tailgate safety meeting can be performed safely. ➢ Be extra cautious when parked near active roadways due to vehicles flinging debris. 1c. Inspect work area for any overhead hazards including overhead utilities and overhead trees and vegetation. ➢ A visual inspection of overhead obstacles (e.g. tree branches, vegetation, low structures...) should be conducted prior to starting a job task. ➢ Work conducted in a wooded area, during high winds and/or lighting storm, should be avoided and conditions re-evaluated after a storm has passed. (*See part B, section 4d.*)
On-site edits:				No Edits

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B. Weather Hazards Exposure	_ Motion _ Chemical X Electrical _ Biological _ Mechanical	_ Gravity X Radiation X Temperature _ Pressure _ Sound	1a. Adverse health effects due to exposure to weather related issues	1a. Staff should understand and be able to recognize the signs and/or symptoms of cold and hot weather related illnesses. ➢ Personnel should dress appropriately for ambient temperatures which would include but not be limited to dry layered clothing. ➢ Applying sunscreen to exposed skin is strongly recommended during sunny weather conditions (all seasons) to mitigate sun exposure.
			2a. Adverse health effects due to cold stress related injury	2a. For cold weather, work schedules should be adjusted to provide sufficient break periods in a heated area. Remember that dehydration is still a risk when working in the cold.
			3a. Adverse health effects due heat stress related injury	3a. For hot weather, work schedules may need to be adjusted to provide time intervals for replenishing fluids and which is free of contamination. For hot weather that exceeds 90oF, a 10 to 15 minute break must be taken following every 45 minutes to one hour of work. Each individual must drink at 16 ounces of water prior to beginning work and 8 to 12 ounces of water or other proper liquid such as Gatorade every 20 to 30 minutes. Caffeinated drinks must not be consumed at any time.
			4a. Adverse health effects or injury due to exposure to severe weather	4a. Avoid exposure to severe weather. ➢ Ensure a plan is in place and discussed to mitigate all potential severe weather concerns (rain, wind, thunderstorms, ice storms, snow fall, tornadoes, hurricanes...) ➢ In case severe weather (e.g. tornadoes, hailstorms, or strong winds) have a place to shelter and make every effort to protect life. ➢ Pay attention to severe weather alerts. ➢ Take precautions with approaching thunderstorms and lighting. Discontinue all work until 30 minutes after severe weather has passed.
			5a. Adverse health effects that can result from Chemical/dust exposure	5a. Be aware of possible chemical exposure from well pad activities. (drilling, fracking, production activities) ➢ Discuss possible sources of exposure with local HSO or PIC. ➢ Avoid inhalation/absorption of dust, exhaust and fumes from well pad activities. ➢ Stay upwind of such activities whenever possible.
On-site edits:				
C. Locate Water Source 1. Traverse to water source location (either by foot or vehicle) 2. GPS and photograph water source 3. Traverse to vehicle location	X Motion _ Chemical X Electrical X Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Personal injury due to slips, trips, falls, lacerations, cuts, burns, and electrocution.	1a. Before traversing the property, perform a general scan of your planned walking path for any obstructions, debris, slip, trip, and fall hazards. Communicate conditions with sampling partner (if applicable). ➢ Scan your walking path. Identify any soil conditions which demonstrate significantly eroded areas from any possible recent rainfall. ➢ Look for changes in elevation (steep slopes) and grade when walking on uneven terrain. ➢ Be aware of loose gravel, wet grass, snow covered rocks and ice, roots and limbs, and slopes ➢ Stay within visual contact of your canvassing partner to ensure that you can be seen. ➢ For fences, complete an inspection to find the best point of entry and ask the owner to shut off any electrified fences. If a gate or opening cannot be located and electric power cannot be shut off, drape a thick blanket up and over the barbed wire rungs or electrified wire before attempting to step over.
			1b. Injury and/or damage to personnel, property or pets/livestock.	1b. When backing out of an area near the water source location, use a spotter to avoid damage or injury to the work vehicle, property, residents, and pets/livestock. If maneuvering vehicle in an area of uneven terrain and unsure of potential locations of slopes, holes, debris, etc. walk the projected vehicle path first. Use a spotter ahead of the vehicle to direct the driver away from potential hazards.
			1c. Injury / illness due to contact with animal and insects (bites, stings, cuts, lacerations, puncture wounds, venom,	1c. Observe signs of biological hazards that may be present (e.g., webs, bees flying in and out, buzzing sounds). ➢ Use repellant if ticks or mosquitoes may be present. ➢ Wear leather gloves when opening cellar, well vault or spring house door. ➢ Do not place your hands or feet anywhere you cannot see them.

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			etc.)	➢ Stay alert for webs, nests, or other signs of inhabitation. ➢ Scan for "Beware of Dog" signs. Ask to have aggressive animals secured.
On-site edits:				No Edits
D. Purge Water Source (Well) 1. Connect hose to spigot attachment 2. Turn on/off spigot or tap 3. Disconnect and drain hose Note: Be aware of exposed wiring around pressure tanks. Use SWA if purge cannot be completed safely	X Motion _ Chemical X Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature X Pressure _ Sound	1a. Cut or abrasion injury to hand from contact with rusty spigot. 1b. Eye injury resulting from water spray due to faulty hose connection.	1a. Be aware of sharp edges or very rusty areas of spigot openings. ➢ If excessive rust could cause a breakage of the spigot or handle, call the PM to discuss alternative sampling method. ➢ Wear leather gloves when attaching or removing garden hose from the spigot, as well as when turning the spigot on or off. 1b. Turn on the spigot slowly to ensure secure connection from hose to spigot before increasing the water pressure. ➢ Inspect the hose for leaks and be sure hose is in the preferred location to drain the water and not pointed at anyone.
On-site edits:				No Edits
E. Sampling 1. Set up of equipment and sample cooler 2. Fill bottleware using spigot, bailer, transfer vessel, or extendable rod with attached cup. 3. Take field readings with YSI, Gas Explorer, and Turbidity meter Oil & Gas OCT 20 2016	X Motion X Chemical _ Electrical _ Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury (strains) to back / shoulders while moving equipment. 1b. Injury due to slip, trip, fall on cords/piping 1c. Injury due to slip or fall on steep embankment. 1d. Eye or bodily injury from splashing of preservatives. 1e. Hand or bodily injury from contact with broken glassware.	1a. Utilize proper lifting procedure when handling equipment and cooler. ➢ Bend down at the knees and lift/lower with your legs and do not lift anything > 50lbs. ➢ Share carrying duties to eliminate balance issues when traversing rough terrain. 1b. Set up the work area so that all equipment is out of the walking path of both personnel and landowner. 1c. Use the extendable rod with the attached cup to reach surface water sources when near a steep embankment or where water level is deep enough for sampling, but is out of reach by hand. 1d. Fill bottleware slowly to avoid splashing of preservatives. 1e. Close lids of glass bottle ware finger tight. Do not over tighten, which could result in broken glassware. ➢ Kevlar and nitrile surgical gloves must be worn when opening a cooler and retrieving sample collection containers ➢ Wear Kevlar (cut resistant) gloves beneath nitrile sampling gloves to help prevent exposure to sharp edges, broken glass, and/or preservatives.
On-site edits:				No Edits
F. Decontamination 1. Soak/spray durable equipment to prevent cross-contamination between multiple sample locations and dispose of all waste	_ Motion X Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Illness due to exposure decontamination chemicals	1a. When spraying equipment with Alconox, spray away from the face and body. ➢ Be sure to account for wind direction and strength before spraying Alconox solution. ➢ Wear nitrile gloves over Kevlar and wear a new pair nitrile gloves for each sample. ➢ Avoid touching your face and body, or any surface you may come into contact with after spraying Alconox
On-site edits:				No Edits

G. Demobilization 1. Replace all equipment in cases or duffle bag 2. Ice and close sample cooler 3. Traverse to next source	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury (strains) to back / shoulders while moving equipment 1b. Personal injury due to slips, trips, and falls	1a. Utilize proper lifting procedure when handling equipment and cooler. ➢ Bend down at the knees and lift/lower with your legs and do not lift anything > 50lbs. ➢ Place cooler on the bed of the truck before adding ice to avoid making coolers dangerously heavy. Perform a team lift if cooler weight exceeds 35lbs. 1b. Perform a general scan of your planned walking path to truck or next location for any obstructions, debris, slip, trip, and fall hazards. Communicate conditions with sampling partner.
On-site edits:				No Edits
H. Departing the site 1. Exiting the property	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury and/or damage to personnel, property, and pets.	1a. When backing out of a site location, use a spotter to avoid damage or injury to the work vehicle, property, residents, and pets/livestock. ➢ If possible, avoid backing out, and exit moving forward.
On-site edits:				No Edits

Core Safety Expectations

AD 11-6-15

1. ***Always follow Fall Protection standards when working at elevated heights.***
2. ***Always follow Written Permit procedures.***
3. ***Always follow Lock Out/Tag Out (LOTO) procedures.***
4. ***Always follow Critical Device Defeat procedures.***
5. ***Always follow written PPE Requirements for the work being performed.***

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Groundwater & Environmental Services, Inc.

WESTERN PENNSYLVANIA OFFICE

Sampling Field Data Package
A-1141 INJECTION WELL
LEWIS COUNTY, WV

Gum
034F002400000000
033-WV-009-110615-1150-1-602
November 6, 2015

Prepared For:

Southwestern Energy
Jane Lew, WV

Prepared By:

Groundwater & Environmental Services, Inc.
301 Commerce Park Drive
Cranberry Township, PA 16066

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November 16, 2015

FIELD DOCUMENTATION

Site Visit Form, Calibration Logs, Logbook, Site Sketch, COCs, Checklist

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Part A: GENERAL INFORMATION

Water Source ID*:	WL-11062015-602-01	O & G Well Name*:	A-1141 INJECTION WELL
Pad Name*:	A-1141 INJECTION WELL	Parcel Number*:	03 4F002400000000
Tax ID:	03 4F002400000000		
Operator ID*:	033	State Code*:	
County Code*:	009		
Sampled By*:	MATT CROWNOVER	Company Name*:	GES
Water Sampler Identifier*:	602	Date/Time Sampled*:	11/06/2015 11:50 (24hr)
Sample Frequency*:	1	N/A: No Sample Details:	
Person Interviewed*:	Owner	Please specify:	

PROPERTY OWNER		RESIDENT OR OTHER	☑ Same as owner
Name*:	DANNIE GUM	Name*:	DANNIE GUM
Address*:	4652 US HWY 33 W	Address*:	4652 US HWY 33 W
City*:	CAMDEN	City*:	CAMDEN
State*:	WV	State*:	WV
Postal Code*:	26338	Postal Code*:	26338
Phone No*:	304-269-1331	Phone No*:	304-269-1331

Part B: WATER QUALITY

	Reported Quality			Observed Quality		
	Yes	No	N/A	Yes	No	N/A
Staining	○	◉	○	○	◉	○
Odor	○	◉	○	○	◉	○
Cloudiness	○	◉	○	○	◉	○
Sheen	○	◉	○	○	◉	○
Effervescence	○	◉	○	○	◉	○
Taste	○	◉	○			

Treatment*

- ☑ None
- ☐ Charcoal Filter
- ☐ Softening
- ☐ UV light
- ☐ Chlorination
- ☐ pH Adjustment
- ☐ Iron Removal
- ☐ In-line Sediment Filter
- Other:

Functioning Properly*: ○ Yes ○ No ○ Unknown

Pump Type

- ○ None
- ○ Gas Piston
- ◉ Submersible
- ○ Windmill
- ○ Jet
- ○ Other:

Capacity (GPM):

Comments:

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Part C: WATER SOURCE INFORMATION

Does this source supply any other properties? ○ Yes ◉ No

Identify properties:

Is the water source(s) located on the property? ◉ Yes ○ No Please explain:

Number of people using this water source: 2 Gallons/day:

Pressure Tank? (•) Yes ( ) No Size (gallons): 20 Estimated

Water Use: [x] Domestic [ ] Husbandry [ ] Irrigation Other

Coordinates: (NAD83 decimal, 5 places) Lat 39.054595 Long -80.572031 Ground Surface Elevation 1066 ft

Does the water source ever go dry? ( ) Yes (•) No

Water Source Type[4]: WATER WELL

(•) Drilled Well ( ) Dug Well ( ) Other Missing/damaged pit-less adaptor ( ) Yes ( ) No (•) Unknown

Reported total well depth (FT): Reported depth of water level (FT): Reported pump depth (FT):

Date Drilled: **Drillers Name:** Driller log available ( ) Yes (•) No

Well location: ( ) Inside ( ) Inside and Vented Outside (•) Outside Unvented ( ) Outside Vented

Part D: DESCRIPTION OF WATER SOURCE

Check all that apply

[ ] Loose, missing, or damaged cover [ ] Evidence of insects, spiders, animals [ ] Open to surface water

[ ] Any cracked or damaged well casing/spring vault [ ] Additional storage or holding tank/coyote system

[ ] Evidence of erosion [x] Water source secured [ ] Source buried [ ] Location unknown [ ] Cover flush with ground

Other:

Part E: DESCRIPTION OF AREA SURROUNDING WATER SOURCE

Check all that apply

[x] Ground sloping towards water source [ ] Water source downgradient of septic system

Signs of:

[ ] Failing septic [ ] Soggy ground [ ] Foul odor

Close proximity to (tick all that apply):

[ ] Garden [ ] Orchard [ ] Greenhouse [ ] Equipment storage areas

[ ] Junkyard [ ] Dumping area [ ] Landfill [ ] Salt storage area/Salted roadway

[ ] Garage [ ] Fuel storage tanks

Located in field with:

[ ] Livestock [ ] Inside Barn [ ] Barnyard [ ] Other out buildings

Additional remarks and comments:

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Part F: SAMPLING

Sample ID 033-WV-009-110615-1150-1-502

Sampled	Sampling Point Location
( ) Before Treatment ( ) After Treatment	( ) Inside Faucet ( ) Outside Faucet ( ) Overflow/Discharge Pipe
(•) No Treatment ( ) Not Sure	( ) Seep (•) Pressure Tank ( ) Bailed
	( ) Wellhead ( ) Other:

Was the water source purged before sampling (•) Yes ( ) No Volume (gal) 40 Time (min) 20

Is it possible to run water for 30 minutes? (•) Yes ( ) No If No, please explain

Average water usage within the last 24 hours Chain of custody attached? (•) Yes ( ) No

Field Analyses:

Field Analyses:

Turbidity (ntu):	0.93	pH (ph units):	7.61
Conductivity (umhos/cm):	519	Temperature (deg c):	14.73

Gas Readings:

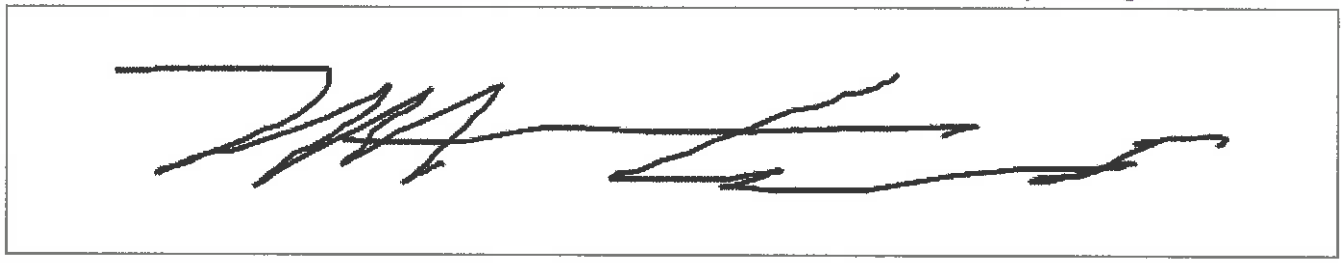
Type	PPM	% LEL	% GAS
Wellhead	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
Cold Tap	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
Cold Headspace	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)

Part G: SITE SKETCH and PHOTOGRAPHS

Add Images — 10 pictures attached to the from

SAMPLER

Please sign in the box below acknowledging that I have supplied the correct information to the best of my knowledge.



Accept | Clear

INTERVIEWEE

Accept | Clear

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Form #: NA
(Reference Form # in Log Book)

Truck #: NA

Gas Explorer Calibration Log

GES Equipment Name: GES-GE-029

Equipment Serial #: 1202-302846

9-28-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Baisley 489
↓	↓	H_2S	0	100ppm		↓	↓
10-30-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Baisley 489
↓	↓	H_2S	0	100ppm		↓	↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓

NOTE: Gas Explorers must be calibrated on the first day of every month. If the instrument is recalibrated at anytime the calibration information must be recorded on this sheet.

3-Gas= 2.5%(50%LEL) Methane, 100ppm CO, Balance Air

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GES - Ver. 1

Southwestern Energy Predrill Sampling

Gas Detector Equipment Calibration

Equipment Serial Number:	1202-302846
GES Equipment Code:	GES-GE-029
Equipment Type:	Gas Explorer
Date of Calibration:	10-30-15
Include Gas Detector Calibration Log with Field Documentation	

GPS Equipment

Equipment Serial Number:	RBC15U0226
GES Equipment Code:	N/A
Equipment Type:	Trimble YUMA

Water Quality Multi-Parameter Calibration

Equipment Serial Number:	09E100453	08325700
GES Equipment Code:	N/A	N/A
Equipment Type:	YSI	Hanna HI
Calibration Method:	3pt pH/ 1pt. Sp cond.	4pt.
Date of Calibration:	11-6-15	11-6-15

Calibration Parameter	Time	Pre-Value/Reading	Person Performing Calibration
pH-4	0720	4.11	Matt Crowmer 602
pH-7	0722	6.73	
pH-10	0724	10.20	
Specific Conductivity (µS/cm)	0726	1407	
Turbidity (<0.1 NTU)	0727	0.17	
Turbidity (15 NTU)	0728	15.3	
Turbidity (100 NTU)	0729	100	
Turbidity (750 NTU)	0730	752	
Calibration Parameter	**Time**	**Post-Value/Reading**	**Person Performing Calibration**
pH-4	0721	3.99	
pH-7	0723	7.00	
pH-10	0725	10.05	
Specific Conductivity (µS/cm)	0727	1412	
Turbidity (<0.1 NTU)	0731	0.15	
Turbidity (15 NTU)	0732	15.0	
Turbidity (100 NTU)	0733	100	
Turbidity (750 NTU)	0734	749	

Decon Procedures

Reference GES Baseline Water Well Sampling SOP

OCT 20 2016

Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-114I Inj. Well

Southwestern Energy Predrill Sampling

Log Book #105

Parcel #: 03 4F00240000 0000

Site Arrival Time: 1100 Site Departure Time: 1415

Samplers (Full Names and Sampler #s): Patrick Daister 489
Matt Cranmer 602

Weather Condition Observations Recorded at: 1118

Weather Conditions: Cloudy Air Temp (Degrees Fahrenheit): 76° F

Estimate Wind Speed(mph): 15 mph Approximate Wind Direction: NW

Note: Remember to document any changes in weather conditions (Include Times).

Equipment Bump Test Verification (Include GES Equipment Number and Time): 1105

GE(GES-GE-029) → 100 ppm, Bump = 100 ppm
YSI → 7.00 pH, Bump = 7.00 pH / 1413 µs/cm^c, Bump = 1411 µs/cm^c
Turbidity → 15.0 NTU, Bump = 15.0 NTU

Refer to page 11 for 11-6-15 (insert date) for full calibration information.

Does the parcel have a septic system?: X Y ___ N

If Yes, describe the location of the septic area below and provide an approximate location on the site map.

0715- Met at office.
0820- Departed office.
1100- Arrived on site and confirmed information with Dannie Gun, 1 well, 1 pond, and 1 spring to be sampled
1130- Began purge.
1150- Ended purge. Collected sample 033-WV-009-110615-1150-1-602 from the well.
1225- Moved to the pond

Fed Ex Tracking #s 801301831313

* Septic located 20 ft N of house.

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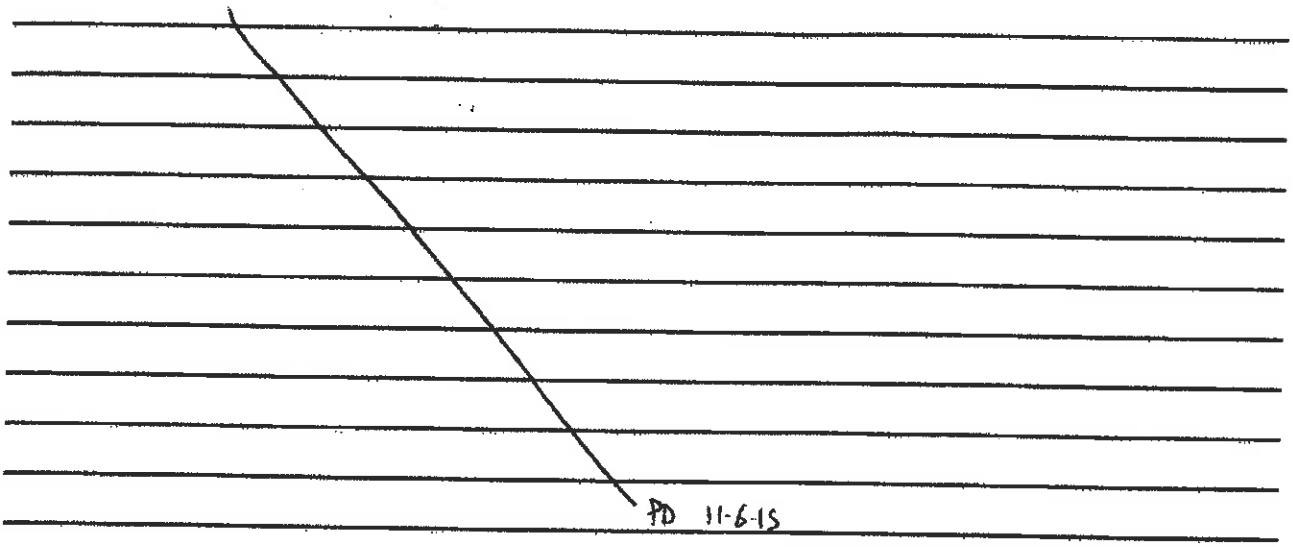
Initials of Person Completing Form and Date: DD 11-6-15 SWN Location Name: A-1141 Inj. Well 68

Southwestern Energy Predrill Sampling

Log Book #105

Parcel #: 03 4P0024 00000000



Interviewee Signature:

Fields intentionally left blank in EDGE because they are unknown or do not apply:
(Check all that apply)

For All Sources:
- ☐ Pump Type
- ☑ Pump Capacity
- ☐ Number of People Using the Water Source
- ☑ Gallons/Day Used
- ☑ Average Water Usage Within the Last 24 Hours

For Wells:
- ☑ Reported Well Depth
- ☑ Reported Depth to Water Level
- ☑ Reported Pump Depth
- ☑ Date Drilled
- ☑ Drillers Name
- ☐ Well Location

For Cisterns:
- ☐ Source of Water

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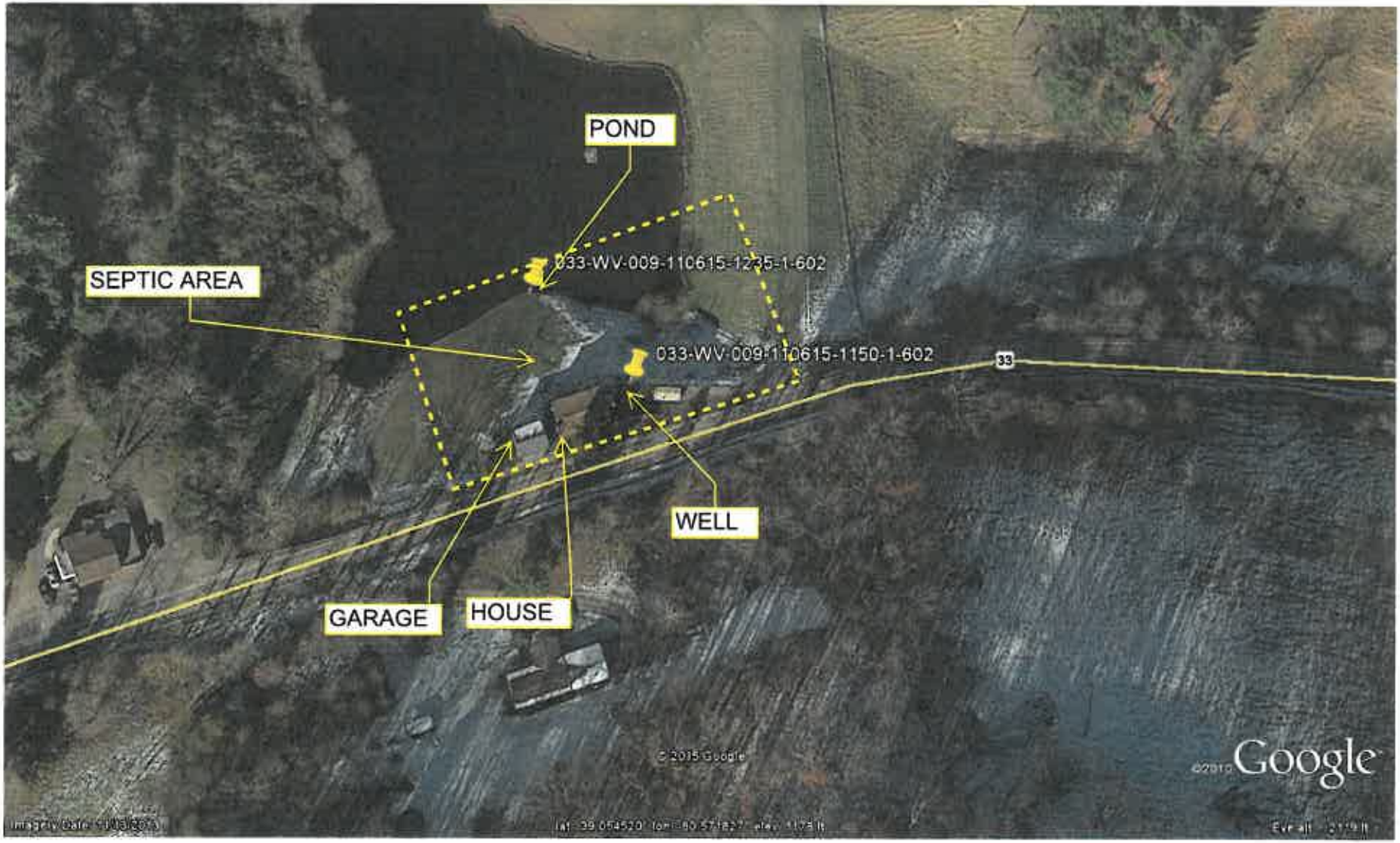
Initials of Person Completing Form and Date: PD 11-6-15 SWN Location Name: A-1141 Inj. Well 69

Southwestern Energy Predrill Sampling Log Book #105

WELL PURGING: FIELD WATER QUALITY MEASUREMENTS FORM

Parcel #: 03 4F00240000 0000 Turbidity (NTU): 0.93 Time (Military): 1150

Time (Military)	Temperature (Degrees Celsius)	Specific Conductance (µS/cm)	pH (Standard Units)	Comments
1130	15.56	520	7.85	Clear, Colorless
1132	15.30	520	7.74	
1134	15.05	519	7.68	
1136	15.00	519	7.65	
1138	15.08	519	7.63	
1140	14.88	519	7.62	
1142	14.95	519	7.61	
1144	14.73	519	7.61	
1146	14.78	519	7.61	
1148	14.81	519	7.60	
1150	14.73	519	7.61	



Southwestern Energy
A-1141 Injection Well
Property Owner: Dannie Gum
Parcel: 03 4F002400000000
Date: 11-06-15
Times: 1150 & 1235

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OCT 20 2016

Environmental Chain of Custody (COC)

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC
Lab PM Contact Name: Wendy Kozma
Lab Address: 2425 New Holland Pike
City, State ZIP: Lancaster, PA 17601
Phone: 717-556-7257 **Fax:** 717-656-6766
Email: WendyKozma@eurofinsus.com

Client: Southwestern Energy Company
Client Contact Name: Tyler Spear
Client Address: 179 Innovation Drive
City, State ZIP: Jane Lew, WV 26378
Phone: 304-884-1681
Email: Tyler_Spear@SWN.com

Consultant Name: GES, Inc.
Consultant PM Contact Name: Nicholas Lohr
Phone: 800-267-2549, Ext. 3634 **Fax:** 866-902-2187
Email: Nlohr@gesonline.com

eurofins | Lancaster Laboratories

***WELL PAD NAME:** A-1141 Injection Well

***Please circle which type of site this is:** IMPOUNDMENT (WELL PAD) SPECIAL PROJECT

***PROPERTY # (AFE# if applicable):** C100.1161.668

***MAJOR/MINOR CODE:** 52695/007

***STATE SAMPLED:** WV

***OWNER NAME:** Dannie Gum

***Analysis Turnaround Time (working days)**

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

***SAMPLER(s):** Matt Crownover 602

☐ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present)

☐ *Sample Collected - POST-Treatment System

☐ *Pre-drill Sample

☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-110615-1150-1-602	11-6-15	1150	grab	GW	22	Y	X	X	X	X	X	X	X	X	X	X	X	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

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Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ☐ Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

***PARCEL ID #:** 03 4F00240000D000

***FEDEX TRACKING #:** 801301831313

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Well/ Pressure tank Spigot

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
	GES	11-6-15/1730			
Relinquished by:	Company:	Date/Time:	Received by:		Date/Time:

GES Field Documentation Review Sheet

Client and Well Pad Name: SWN A-1191 Date: 11-6-15

Parcel #: 03 4F0024 00000000

Review Prior to Leaving Parcel:

- [x] Field equipment calibration records (GE/CG/PID/FID/LEL, conductivity, pH, turbidity, etc.).
- [x] Check coolers for bottleware, chain-of-custody, and other paperwork (Predrill parameters and Isotopic).
- [x] Sample Matrix confirmed?
- [x] Bottle labels filled out with analysis, time, date, sample ID, and sampler?
- [x] Chain-of-custody bottle count matches as-is or edited to reflect bottle count in cooler?
- [x] Site Visit Form and Supplemental Log Book reviewed and all applicable spaces completed and information is correct?
- [x] Full names of both team members (including sampler ID #s) conducting sampling, arrival and departure times noted in Supplemental Log Book.
- [x] Purge information and all water quality readings documented on Site Visit Form and Supplemental Log Book, respectfully?
- [x] Photographs with accurate time and date stamps and white board taken of treatment system, sample point, source, and filled bottleware (at a minimum)?
- [x] White board in photographs contains correct client name, name of well pad, sample identification, parcel number, and date?
- N/A [ ] Notes on unusual conditions, such as interference by landowner or third party during sampling, hazardous/unsanitary conditions, dead animals, etc? Photo-documented, if applicable?
- N/A [ ] Verbal decline documented and any unusual conditions communicated to Project Manager and/or client representative immediately?
- [x] **Both field team members have reviewed all field notes, chains, and forms?**

Review Prior to End of Day:

- [x] Upload completed and final PDF. PDF opened to confirm complete upload. PDF includes Site Visit Form, Site Sketch, calibration information, chain-of-custodies, completed Supplemental Log Book pages?
- [x] Photo-documentation and GPS files uploaded?
- N/A [ ] Isotopic sample placed in secure, climate controlled area with chain-of-custody?

Must Sign Below and Scan with End of Day PDF Package

Team Member 1: [signature]

Team Member 2: [signature]

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PHOTOGRAPHS

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Source: Well

Received
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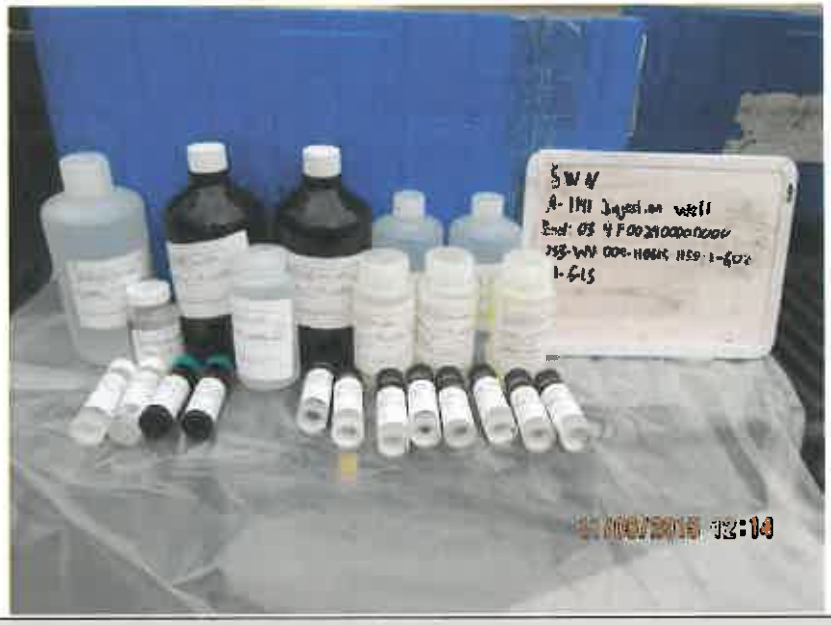
OCT 20 2016

Sample Location

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002400000000
Gum
033-WV-009-110615-1150-1-602
November 6, 2015



Sample

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A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002400000000
Gum
033-WV-009-110615-1150-1-602
November 6, 2015

JSAs

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Job Safety Analysis (JSA)

JSA Title: **Motor Vehicle Driving**

JSA Control #:

Date Developed: 4/15/2015	
Latest Revised Date: 4/15/2015- JSA Retention 1 year from Latest Revision Date.	
Developed by: Patrick Daisley	
Work Team Leader: Patrick Daisley	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.	
Revision #: 1	**Work Location:** A-1141 Inj. Well **Permit #:**
This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.	

SPECIFIC PPE: Gloves. (base on hazard and identified in column 4 e.g. - leather). PPE Clothing: highly visible clothing such as orange coveralls & reflective safety vest. Fire Retardant clothing (FRC) is required for well pad operations. Safety Glasses. Safety Shoes: steel-toed. Winter weather: Yack Tracks and FRC hard hat liner.

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Fire extinguisher, First aid kit, Yellow flashing light, Roadside emergency kit, Spill containment kit

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply by using "Hazard Identification" tool)*		**Potential Hazards**	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Pre-mobilization 1. Always conduct a pre-trip or pre-use inspection of the vehicle prior to driving	X Motion _ Chemical _ Electrical _ Biological X Mechanical	_ Gravity _ Radiation X Temperature _ Pressure _ Sound	1a. Injuries caused by faulty or misadjusted equipment 1b. Accident or injuries caused by environmental conditions (inclement weather)	1a. Inspect exterior and interior of vehicle. Don hi-visible clothing, steel-toe boots, safety glasses and leather gloves. ➢ Exterior ▪ Check condition of windshield wipers (wear and cracking). ▪ Check tires for manufacture inflation rate and tread condition. ▪ Check for body damage/overall condition. ▪ Check under vehicle for fluid leaks (e.g., oil, brakes, transmission, etc.). ▪ Check all lights (e.g., hi/low beams, turn signals, emergency flashers). ▪ Don high visible clothing and/or vest, include FRC if on well pad site, while inspecting exterior of vehicle. ➢ Interior ▪ Adjust seat to your height and visibility. ▪ Adjust mirrors to eliminate blind spots. ▪ Fasten safety belt (passengers too). ▪ Secure all lose items in container (e.g. glove box, cargo nets, cargo box). ▪ Verifying critical equipment is working (e.g., defogger, wipers, air bags, lights, turn signals). 1b. Prepare vehicle for weather conditions prior to departure. ➢ Snow/Ice ▪ Scrape snow/ice from entire vehicle (e.g., hood, roof, windows, etc.). ▪ Add extra weight to back of trucks to increase traction. ▪ Maintain speed for conditions. ➢ Fog ▪ Turn on fog lights. ➢ Rain ▪ Ensure windows are defogged prior to mobilization. ▪ Utilize windshield wipers in all rainy conditions. ▪ Consider alternative routes based on flooding potential of roadway.

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			1c.3rd party injuries or accidents caused by unsecure equipment in truck bed	▪ Maintain speed for conditions. 1c. Inspect truck bed load. ➢ Check coolers, drums, and toolboxes to make sure all lids, caps, and tops are latched and tightened. ➢ Use ratchet-straps or cargo nets to secure load from shifting or falling from truck bed. ➢ Close and lock tailgate before mobilizing to site. ➢ Place light objects that could be blown out of truck bed in secured location of cab.
On-site edits:				
B. Driving 1. Driving to and from the site or while driving onsite. ***Note:*** ➢ *Comply with all Smith Systems Five (5) Keys®* ➢ *Cell phone / texting is not permitted at any time while operating vehicle.* ➢ *Three-point seat belts must be worn by all occupants at all times while driving to and from the site and while driving onsite.* ➢ *Drive with low beams on at all times.* ➢ *Smoking is not permitted in GES vehicles.*	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Accident or injuries caused by traffic congestion or other vehicles (struck by, contact with) 1b. Accident or injuries caused by road surface condition (i.e., struck by, contact with)	1a. Mitigate potential for an accident by practicing the following techniques: ➢ Look ahead a minimum of 15 seconds to identify potential oncoming hazards. ➢ Maintain 4-second minimum following distance (increase distance due to weather conditions). ➢ Avoid focusing on any one object for more than 2 seconds. ➢ Scan the road, area around vehicle, and mirrors every 5-8 seconds. ➢ Stay out of other vehicles blind spots. ➢ Do not drive in clusters of traffic (i.e., adjust speed to give cushion between your vehicle & others). ➢ Utilize turn signals as required by law at all times 1b. Mitigate the potential for an accident by practicing the following techniques: ➢ Maintain speed; slower depending on road surface (e.g., dirt, concrete, asphalt, gravel). ➢ Drive posted speed limits (e.g., city, country roads, and highway). ➢ Do not tailgate vehicles in front of you. ➢ Pay attention for pedestrians. ➢ Place two hands on steering wheel at 9 and 3 position. ➢ Check for and yield to emergency vehicles. ➢ Obey traffic signals. ➢ Use particular caution in construction zones. ➢ Look ahead a minimum of 15 seconds. ➢ Scan the road, area around vehicle, and mirrors every 5-8 seconds. ➢ When backing, use a spotter at all times and ensure that the pre-determined hand signals have been discussed during the tailgate meeting and implemented. ➢ Stay out of other vehicles blind spots. Make eye contact with other drivers and ensure they see you.
On-site edits:				No Edits
C. Preparing to Park 1. Parking	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury/vehicle impairment caused by contact with other vehicles	1a. Mitigate the potential for an accident by practicing the following techniques: ➢ ***First move forward*** - Back into space (required on terminal sites). ➢ Maneuver vehicle slowly within parking lot. ➢ Ensure vehicle is legally parked. ➢ Ensure nothing is located at rear of vehicle prior to mobilization. ➢ Get out and inspect space and vehicle if unsure of potential or unseen hazards. When parked, vehicles that have automatic transmissions, the vehicle must be placed into park and the emergency (parking brake applied). For manual transmissions, the emergency brake must be applied and wheel chocks used to prevent the vehicle from rolling ➢ Wheel chocks must be used for large vehicles when parked/positioned on uneven surfaces; front & back of each rear tire. ➢ Wheel chocks must be used (front & back of each rear tire) on all vehicles working at the site/ vehicles with manual transmission parked on sloping surfaces ➢ When parked and unhooked from a vehicle, trailers must have a wheel chock placed in front of and

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				behind each rear wheel.
On-site edits:				No Edits

PD 11-6-15

Core Safety Expectations

1. ***Always follow Fall Protection standards when working at elevated heights.***
2. ***Always follow Written Permit procedures.***
3. ***Always follow Lock Out/Tag Out (LOTO) procedures.***
4. ***Always follow Critical Device Defeat procedures.***
5. ***Always follow written PPE Requirements for the work being performed.***

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Job Safety Analysis (JSA)

JSA Title: **Baseline Water Sampling (All Sources)**

JSA Control #:

Date Developed: 4/13/2015	
Latest Revised Date: 4/13/2015 / **JSA Retention 1 year from Latest Revision Date.**	
Developed by: Patrick Daisley	
Work Team Leader: Patrick Daisley	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.	
Revision #: 3	**Work Location / Permit #: A-1141 Inj. Well**
This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.	

SPECIFIC PPE: Gloves: (base on hazard and identified in column 4 e.g. - nitrile, Kevlar, leather). Hard Hat (required by activity or site requirements). Hearing Protection: if site activities raise the noise level to 85 db. PPE Clothing: highly visible clothing such as orange coveralls & reflective safety vest. Fire Retardant clothing (FRC) is required for well pad operations. Safety Glasses. Safety Shoes: steel-toed. Winter weather: Yaktrax and FRC hard hat liner.

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Gas Explorer, YUMA, YSI, Turbidity Meter, Water Interface Probe, Sampling Kit, Hand Tools, extendable rod with attached cup

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply by using "Hazard Identification" tool)*		**Potential Hazards**	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Arrive Onsite 1. Driving on site and parking 2. Attempt to make contact with home owner or resident. 3. Complete JSA/HASP/safety checklist/tailgate meeting ***Note: Please remember to complete client required checklist prior to performing on site activities***	X Motion _ Chemical X Electrical X Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Workers being injured and work vehicles/ property damage being caused by hazardous conditions 1b. Workers being struck/ injured and work vehicles/ property damage being caused by traffic 1c. Injury due to contact with overhead hazards (falling objects and electrocution from lighting)	1a. Conduct a visual inspection of the driveway for hazards before attempting to pull onto the property. Reconsider entering a driveway that is covered in ice or muddy. ➢ Obey no trespassing signs if you have not previously contacted the property owner. ➢ Rain, ice, and snow may worsen driveways that have a steep incline/decline. 1b. Park in a designated area only (*first move forward*) and ensure vehicle is out of traffic pattern so that tailgate safety meeting can be performed safely. ➢ Be extra cautious when parked near active roadways due to vehicles flinging debris. 1c. Inspect work area for any overhead hazards including overhead utilities and overhead trees and vegetation. ➢ A visual inspection of overhead obstacles (e.g. tree branches, vegetation, low structures...) should be conducted prior to starting a job task. ➢ Work conducted in a wooded area, during high winds and/or lighting storm, should be avoided and conditions re-evaluated after a storm has passed. (*See part B, section 4d.*)
On-site edits:				No Edits

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B. Weather Hazards Exposure	_ Motion _ Chemical X Electrical _ Biological _ Mechanical	_ Gravity X Radiation X Temperature _ Pressure _ Sound	1a. Adverse health effects due to exposure to weather related issues	1a. Staff should understand and be able to recognize the signs and/or symptoms of cold and hot weather related illnesses. ➢ Personnel should dress appropriately for ambient temperatures which would include but not be limited to dry layered clothing. ➢ Applying sunscreen to exposed skin is strongly recommended during sunny weather conditions (all seasons) to mitigate sun exposure.
			2a. Adverse health effects due to cold stress related injury	2a. For cold weather, work schedules should be adjusted to provide sufficient break periods in a heated area. Remember that dehydration is still a risk when working in the cold.
			3a. Adverse health effects due heat stress related injury	3a. For hot weather, work schedules may need to be adjusted to provide time intervals for replenishing fluids and which is free of contamination. For hot weather that exceeds 90oF, a 10 to 15 minute break must be taken following every 45 minutes to one hour of work. Each individual must drink at 16 ounces of water prior to beginning work and 8 to 12 ounces of water or other proper liquid such as Gatorade every 20 to 30 minutes. Caffeinated drinks must not be consumed at any time.
			4a. Adverse health effects or injury due to exposure to severe weather	4a. Avoid exposure to severe weather. ➢ Ensure a plan is in place and discussed to mitigate all potential severe weather concerns (rain, wind, thunderstorms, ice storms, snow fall, tornadoes, hurricanes...) ➢ In case severe weather (e.g. tornadoes, hailstorms, or strong winds) have a place to shelter and make every effort to protect life. ➢ Pay attention to severe weather alerts. ➢ Take precautions with approaching thunderstorms and lighting. Discontinue all work until 30 minutes after severe weather has passed.
			5a. Adverse health effects that can result from Chemical/dust exposure	5a. Be aware of possible chemical exposure from well pad activities. (drilling, fracking, production activities) ➢ Discuss possible sources of exposure with local HSO or PIC. ➢ Avoid inhalation/absorption of dust, exhaust and fumes from well pad activities. ➢ Stay upwind of such activities whenever possible.
On-site edits:				
C. Locate Water Source 1. Traverse to water source location (either by foot or vehicle) 2. GPS and photograph water source 3. Traverse to vehicle location	X Motion _ Chemical X Electrical X Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Personal injury due to slips, trips, falls, lacerations, cuts, burns, and electrocution.	1a. Before traversing the property, perform a general scan of your planned walking path for any obstructions, debris, slip, trip, and fall hazards. Communicate conditions with sampling partner (if applicable). ➢ Scan your walking path. Identify any soil conditions which demonstrate significantly eroded areas from any possible recent rainfall. ➢ Look for changes in elevation (steep slopes) and grade when walking on uneven terrain. ➢ Be aware of loose gravel, wet grass, snow covered rocks and ice, roots and limbs, and slopes ➢ Stay within visual contact of your canvassing partner to ensure that you can be seen. ➢ For fences, complete an inspection to find the best point of entry and ask the owner to shut off any electrified fences. If a gate or opening cannot be located and electric power cannot be shut off, drape a thick blanket up and over the barbed wire rungs or electrified wire before attempting to step over.
			1b. Injury and/or damage to personnel, property or pets/livestock.	1b. When backing out of an area near the water source location, use a spotter to avoid damage or injury to the work vehicle, property, residents, and pets/livestock. If maneuvering vehicle in an area of uneven terrain and unsure of potential locations of slopes, holes, debris, etc. walk the projected vehicle path first. Use a spotter ahead of the vehicle to direct the driver away from potential hazards.
			1c. Injury / illness due to contact with animal and insects (bites, stings, cuts, lacerations, puncture wounds, venom,	1c. Observe signs of biological hazards that may be present (e.g., webs, bees flying in and out, buzzing sounds). ➢ Use repellant if ticks or mosquitoes may be present. ➢ Wear leather gloves when opening cellar, well vault or spring house door. ➢ Do not place your hands or feet anywhere you cannot see them.

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			etc.)	➢ Stay alert for webs, nests, or other signs of inhabitation. ➢ Scan for "Beware of Dog" signs. Ask to have aggressive animals secured.
On-site edits:				No Edits
D. Purge Water Source (Well) 1. Connect hose to spigot attachment 2. Turn on/off spigot or tap 3. Disconnect and drain hose Note: Be aware of exposed wiring around pressure tanks. Use SWA if purge cannot be completed safely	X Motion _ Chemical X Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature X Pressure _ Sound	1a. Cut or abrasion injury to hand from contact with rusty spigot. 1b. Eye injury resulting from water spray due to faulty hose connection.	1a. Be aware of sharp edges or very rusty areas of spigot openings. ➢ If excessive rust could cause a breakage of the spigot or handle, call the PM to discuss alternative sampling method. ➢ Wear leather gloves when attaching or removing garden hose from the spigot, as well as when turning the spigot on or off. 1b. Turn on the spigot slowly to ensure secure connection from hose to spigot before increasing the water pressure. ➢ Inspect the hose for leaks and be sure hose is in the preferred location to drain the water and not pointed at anyone.
On-site edits:				No Edits
E. Sampling 1. Set up of equipment and sample cooler 2. Fill bottleware using spigot, bailer, transfer vessel, or extendable rod with attached cup. 3. Take field readings with YSI, Gas Explorer, and Turbidity meter	X Motion X Chemical _ Electrical _ Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury (strains) to back / shoulders while moving equipment. 1b. Injury due to slip, trip, fall on cords/piping 1c. Injury due to slip or fall on steep embankment. 1d. Eye or bodily injury from splashing of preservatives. 1e. Hand or bodily injury from contact with broken glassware.	1a. Utilize proper lifting procedure when handling equipment and cooler. ➢ Bend down at the knees and lift/lower with your legs and do not lift anything > 50lbs. ➢ Share carrying duties to eliminate balance issues when traversing rough terrain. 1b. Set up the work area so that all equipment is out of the walking path of both personnel and landowner. 1c. Use the extendable rod with the attached cup to reach surface water sources when near a steep embankment or where water level is deep enough for sampling, but is out of reach by hand. 1d. Fill bottleware slowly to avoid splashing of preservatives. 1e. Close lids of glass bottle ware finger tight. Do not over tighten, which could result in broken glassware. ➢ Kevlar and nitrile surgical gloves must be worn when opening a cooler and retrieving sample collection containers ➢ Wear Kevlar (cut resistant) gloves beneath nitrile sampling gloves to help prevent exposure to sharp edges, broken glass, and/or preservatives.
On-site edits:				No Edits
F. Decontamination 1. Soak/spray durable equipment to prevent cross-contamination between multiple sample locations and dispose of all waste	_ Motion X Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Illness due to exposure decontamination chemicals	1a. When spraying equipment with Alconox, spray away from the face and body. ➢ Be sure to account for wind direction and strength before spraying Alconox solution. ➢ Wear nitrile gloves over Kevlar and wear a new pair nitrile gloves for each sample. ➢ Avoid touching your face and body, or any surface you may come into contact with after spraying Alconox
On-site edits:				No Edits

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G. Demobilization 1. Replace all equipment in cases or duffle bag 2. Ice and close sample cooler 3. Traverse to next source	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury (strains) to back / shoulders while moving equipment 1b. Personal injury due to slips, trips, and falls	1a. Utilize proper lifting procedure when handling equipment and cooler. ➢ Bend down at the knees and lift/lower with your legs and do not lift anything > 50lbs. ➢ Place cooler on the bed of the truck before adding ice to avoid making coolers dangerously heavy. Perform a team lift if cooler weight exceeds 35lbs. 1b. Perform a general scan of your planned walking path to truck or next location for any obstructions, debris, slip, trip, and fall hazards. Communicate conditions with sampling partner.
On-site edits:				No Edits
H. Departing the site 1. Exiting the property	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury and/or damage to personnel, property, and pets.	1a. When backing out of a site location, use a spotter to avoid damage or injury to the work vehicle, property, residents, and pets/livestock. ➢ If possible, avoid backing out, and exit moving forward.
On-site edits:				No Edits

Core Safety Expectations

AD 11-6-15

1. ***Always follow Fall Protection standards when working at elevated heights.***
2. ***Always follow Written Permit procedures.***
3. ***Always follow Lock Out/Tag Out (LOTO) procedures.***
4. ***Always follow Critical Device Defeat procedures.***
5. ***Always follow written PPE Requirements for the work being performed.***

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Analysis Report

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ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

December 01, 2015

Project: A-1141 INJECTION WELL

Submittal Date: 11/07/2015
Group Number: 1607523
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
033-WV-009-110615-1235-1-602 Grab	8124473
033-WV-009-110615-1235-1-602 Filtered Grab	8124474

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

Respectfully Submitted,

Stephen J. Gordon
Project Manager

(724) 597-2027

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Analysis Report

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Sample Description: 033-WV-009-110615-1235-1-602 Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124473
LL Group # 1607523
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 12:35 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG3--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	Benzene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Carbon Tetrachloride	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Chlorobenzene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,2-Dichlorobenzene	N.D.		1	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,4-Dichlorobenzene	N.D.		1	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,1-Dichloroethane	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,2-Dichloroethane	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,1-Dichloroethene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	cis-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	trans-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,2-Dichloropropane	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Ethylbenzene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Methyl Tertiary Butyl Ether	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Methylene Chloride	N.D.		2	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Styrene	N.D.		1	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Tetrachloroethene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Toluene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,2,4-Trichlorobenzene	N.D.		1	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,1,1-Trichloroethane	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	1,1,2-Trichloroethane	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Trichloroethene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Vinyl Chloride	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	m+p-Xylene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	o-Xylene	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
10335	Xylene (Total)	N.D.		0.5	ug/l		11/20/15 04:54	11/20/15 04:54	3258
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	TPH-GRO water C6-C10	N.D.		20	ug/l		11/11/15 21:33	11/11/15 21:33	2001
GC Miscellaneous									
RSKSOP-175 modified									
07105	n-butane	N.D.		1.0	ug/l			11/11/15 16:23	719
07105	Ethane	N.D.		1.0	ug/l			11/11/15 16:23	719
07105	**Methane**	**8.2**		3.0	ug/l			11/11/15 16:23	719
07105	Propane	N.D.		1.0	ug/l			11/11/15 16:23	719
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	C10-C28	N.D.		0.049	mg/l		11/12/15 19:00	11/17/15 01:59	2027
02740	C24-C40	N.D.		0.049	mg/l		11/12/15 19:00	11/17/15 01:59	2027

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Sample Description: 033-WV-009-110615-1235-1-602 Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124473
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Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG3--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	Total TPH (C10-C40)	N.D.		0.049	mg/l		11/12/15 19:00	11/17/15 01:59	2027
Metals									
EPA 200.7 rev 4.4									
01743	**Aluminum**	**0.123 J**	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:06	2992
01750	**Calcium**	**44.1**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:06	2992
01754	**Iron**	**0.540**	.3	0.0333	mg/l	X	11/17/15 09:53	11/18/15 19:06	2992
07058	**Manganese**	**0.654**	.05	0.00080	mg/l	X	11/17/15 09:53	11/18/15 19:06	2992
01767	**Sodium**	**6.91**		0.167	mg/l		11/17/15 09:53	11/18/15 19:06	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.0013 J**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:26	1242
06026	**Barium**	**0.0394**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:26	1242
Wet Chemistry									
EPA 300.0									
00224	**Chloride**	**10.4**	250	1.0	mg/l			11/14/15 16:49	6676
00228	**Sulfate**	**50.9**	250	1.5	mg/l			11/14/15 16:49	6676
EPA 415.1									
00273	**Total Organic Carbon**	5.1		0.50	mg/l			11/18/15 06:12	495
EPA 170.1									
12151	**Temperature of pH**	**21.9**		0.010	Degrees C			11/10/15 20:24	1124
SM 2540 C-1997									
00212	**Total Dissolved Solids**	**240**	500	19.4	mg/l			11/11/15 08:20	1198
SM 2540 D-1997									
10457	**Total Suspended Solids**	**4.40**		1.00	mg/l			11/11/15 08:40	8743
SM 4500-H+ B-2000									
12152	**pH**	**8.2**		0.010	Std. Units			11/10/15 20:24	1124
	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
SM 5540 C-2000									
00225	**M. B. A. S.**	**0.056 J**	.5	0.040	mg/l LAS MW 320			11/07/15 11:10	237
Microbiology									
SM 9223 B-1997									

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Analysis Report

REVISED

Sample Description: 033-WV-009-110615-1235-1-602 Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124473
LL Group # 1607523
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 12:35 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG3--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Microbiology									
SM 9223 B-1997									
08161	**Tot Coli/E. coli (Quanti-tray)**	See Below			MPN/100mL			11/08/15 11:39	1281
	Total Coliform	> 200.5		/100ml					
	E. coli	16.4		/100ml					

General Sample Comments

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Analysis Report

REVISED

Sample Description: 033-WV-009-110615-1235-1-602 Filtered Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124474
LL Group # 1607523
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 12:35 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:15	2992
01750	**Calcium**	**44.0**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:15	2992
01754	Iron	N.D.	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:15	2992
07058	**Manganese**	**0.231**	.05	0.00080	mg/l	X	11/17/15 09:53	11/18/15 19:15	2992
01767	**Sodium**	**6.86**		0.167	mg/l		11/17/15 09:53	11/18/15 19:15	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.00099 J**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:31	1242
06026	**Barium**	**0.0303**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:31	1242

General Sample Comments

This sample was field filtered for dissolved metals.

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC	Client: Southwestern Energy Company	**Environmental Chain of Custody (COC)**	eurofins | Lancaster Laboratories
Lab PM Contact Name: Wendy Kozma	Client Contact Name: Tyler Spear	Consultant Name: GES, Inc.	
Lab Address: 2425 New Holland Pike	Client Address: 179 Innovation Drive	Consultant PM Contact Name: Nicholas Lohr	
City, State ZIP: Lancaster, PA 17601	City, State ZIP: Jane Lew, WV 26378	Phone: 800-267-2549, Ext. 3634 Fax: 866-902-2187	
Phone: 717-556-7257 Fax: 717-656-6766	Phone: 304-884-1681	Email: Nlohr@gesonline.com	
Email: WendyKozma@eurofinsus.com	Email: Tyler_Spear@SWN.com		

20810
1607523
8124473-75

*WELL PAD NAME: A-1141 Injection Well

*Please circle which type of site this is: IMPOUNDMENT (WELL PAD) SPECIAL PROJECT

*PROPERTY # (AFE# if applicable): 4001161668

*MAJOR/MINOR CODE: 52695/007

*STATE SAMPLED: WV

*OWNER NAME: Donnie Gum

*Analysis Turnaround Time (working days)

Standard TAT = 10 working days (unless noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

*SAMPLER(s): Matt Crowmer 602

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present) ☐ *Sample Collected - POST-Treatment System

☒ *Pre-drill Sample ☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-110615-1235-1-602	11-6-15	1235	grab	SW	22	Y	x	x	x	x	x	x	x	x	x	x	x	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

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Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ☒ Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

*PARCEL ID #: 03 4F00240000000

*FEDEX TRACKING #: 8013 0183 1324

*SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION: Pond / Bank of Pond

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
	GES	11-6-15/1739			
Relinquished by:	Company:	Date/Time:	Received by:		Date/Time:
					11/7/15 0945

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Sample Administration Receipt Documentation Log

Doc Log ID: 122286

Group Number(s): 1607523

Client: Southwestern Energy Company

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	11/07/2015 9:45
Number of Packages:	1	Number of Projects:	1

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	No
Samples Chilled:	Yes	Total Trip Blank Qty:	2
Paperwork Enclosed:	Yes	Trip Blank Type:	HCL
Samples Intact:	Yes	Air Quality Samples Present:	No
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Krista Abel (3058) at 10:21 on 11/07/2015

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT146	0.4	DT	Wet	Y	Bagged	N

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

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Analysis Report

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ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

December 01, 2015

Project: A-1141 INJECTION WELL

Submittal Date: 11/07/2015
Group Number: 1607522
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
033-WV-009-110615-1330-1-602 Grab	8124470
033-WV-009-110615-1330-1-602 Filtered Grab	8124471

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

Respectfully Submitted,

Stephen J. Gordon
Project Manager

(724) 597-2027

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Sample Description: 033-WV-009-110615-1330-1-602 Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124470
LL Group # 1607522
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 13:30 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG2--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	Benzene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Carbon Tetrachloride	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Chlorobenzene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,2-Dichlorobenzene	N.D.		1	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,4-Dichlorobenzene	N.D.		1	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,1-Dichloroethane	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,2-Dichloroethane	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,1-Dichloroethene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	cis-1,2-Dichloroethene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	trans-1,2-Dichloroethene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,2-Dichloropropane	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Ethylbenzene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Methyl Tertiary Butyl Ether	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Methylene Chloride	N.D.		2	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Styrene	N.D.		1	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Tetrachloroethene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Toluene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,2,4-Trichlorobenzene	N.D.		1	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,1,1-Trichloroethane	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	1,1,2-Trichloroethane	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Trichloroethene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Vinyl Chloride	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	m+p-Xylene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	o-Xylene	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
10335	Xylene (Total)	N.D.		0.5	ug/l		11/19/15 19:47	11/19/15 19:47	1731
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	TPH-GRO water C6-C10	N.D.		20	ug/l		11/11/15 21:05	11/11/15 21:05	2001
GC Miscellaneous									
RSKSOP-175 modified									
07105	n-butane	N.D.		1.0	ug/l			11/11/15 16:06	719
07105	Ethane	N.D.		1.0	ug/l			11/11/15 16:06	719
07105	Methane	N.D.		3.0	ug/l			11/11/15 16:06	719
07105	Propane	N.D.		1.0	ug/l			11/11/15 16:06	719
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	C10-C28	N.D.		0.048	mg/l		11/12/15 19:00	11/17/15 01:37	2027
02740	C24-C40	N.D.		0.048	mg/l		11/12/15 19:00	11/17/15 01:37	2027

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Analysis Report

REVISED

Sample Description: 033-WV-009-110615-1330-1-602 Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124470
LL Group # 1607522
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 13:30 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG2--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	Total TPH (C10-C40)	N.D.		0.048	mg/l		11/12/15 19:00	11/17/15 01:37	2027
Metals									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 18:45	2992
01750	**Calcium**	**57.7**		0.0333	mg/l		11/17/15 09:53	11/18/15 18:45	2992
01754	**Iron**	**0.294**	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 18:45	2992
07058	**Manganese**	**0.0310**	.05	0.00080	mg/l		11/17/15 09:53	11/18/15 18:45	2992
01767	**Sodium**	**2.52**		0.167	mg/l		11/17/15 09:53	11/18/15 18:45	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.0060**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:14	1242
06026	**Barium**	**0.0698**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:14	1242
Wet Chemistry									
EPA 300.0									
00224	**Chloride**	**3.0**	250	1.0	mg/l			11/14/15 16:32	6676
00228	**Sulfate**	**36.4**	250	1.5	mg/l			11/14/15 16:32	6676
EPA 415.1									
00273	Total Organic Carbon	N.D.		0.50	mg/l			11/18/15 05:57	495
EPA 170.1									
12151	**Temperature of pH**	**21.4**		0.010	Degrees C			11/10/15 21:08	1124
SM 2540 C-1997									
00212	**Total Dissolved Solids**	**224**	500	19.4	mg/l			11/11/15 08:20	1198
SM 2540 D-1997									
10457	**Total Suspended Solids**	**1.80** J		1.00	mg/l			11/11/15 08:40	8743
SM 4500-H+ B-2000									
12152	**pH**	**7.7**		0.010	Std. Units			11/10/15 21:08	1124
	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
SM 5540 C-2000									
00225	M. B. A. S.	N.D.	.5	0.040	mg/l LAS MW 320			11/07/15 11:10	237
Microbiology									
SM 9223 B-1997									

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Analysis Report

REVISED

Sample Description: 033-WV-009-110615-1330-1-602 Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124470
LL Group # 1607522
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 13:30 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG2--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Microbiology									
SM 9223 B-1997									
08161	**Tot Coli/E. coli (Quanti-tray)**	See Below			MPN/100mL			11/08/15 11:39	1281
	Total Coliform	> 200.5		/100ml					
	E. coli	< 1.0		/100ml					

General Sample Comments

DEFINITIONS:
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Analysis Report

REVISED

Sample Description: 033-WV-009-110615-1330-1-602 Filtered Grab
Surface Water Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124471
LL Group # 1607522
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 13:30 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:03	2992
01750	**Calcium**	**57.6**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:03	2992
01754	Iron	N.D.	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:03	2992
07058	**Manganese**	**0.0296**	.05	0.00080	mg/l		11/17/15 09:53	11/18/15 19:03	2992
01767	**Sodium**	**2.50**		0.167	mg/l		11/17/15 09:53	11/18/15 19:03	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.0036**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:25	1242
06026	**Barium**	**0.0735**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:25	1242

General Sample Comments

This sample was field filtered for dissolved metals.

DEFINITIONS:
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

Received
Office of Oil & Gas
OCT 20 2016

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC **Lab PM Contact Name:** Wendy Kozma **Lab Address:** 2425 New Holland Pike **City, State ZIP:** Lancaster, PA 17601 **Phone:** 717-556-7257 **Fax:** 717-656-6766 **Email:** WendyKozma@eurofinsus.com	**Client:** Southwestern Energy Company **Client Contact Name:** Tyler Spear **Client Address:** 179 Innovation Drive **City, State ZIP:** Jane Lew, WV 26378 **Phone:** 304-884-1681 **Email:** Tyler_Spear@SWN.com	**Environmental Chain of Custody (COC)** **Consultant Name:** GES, Inc. **Consultant PM Contact Name:** Nicholas Lohr **Phone:** 800-267-2549, Ext. 3634 **Fax:** 866-902-2187 **Email:** Nlohr@gesonline.com	eurofins | Lancaster Laboratories

***WELL PAD NAME:** A-1141 Injection Well

***Please circle which type of site this is:** IMPOUNDMENT (WELL PAD) SPECIAL PROJECT

***PROPERTY # (AFE# if applicable):** 4009161668

***MAJOR/MINOR CODE:** 52695/007

***STATE SAMPLED:** WV

***Analysis Turnaround Time (working days)**

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

***SAMPLER(s):** Matt Crawmer 602

20810
1607522
8124470-72

***OWNER NAME:** Dannie Gum

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present) ☐ *Sample Collected - POST-Treatment System

☒ *Pre-drill Sample ☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-110615-1330-1-602	11-6-15	1330	grab	SW	22	Y	x	x	x	x	x	x	x	x	x	x	x	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

OCT 20 2016

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ☒ Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

***PARCEL ID #:** 03 4F00250000000

***FEDEX TRACKING #:** 8013 0187 4566

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Spring/Underground vault

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
Matt Crawmer	GES	11-6-15/1730			
Relinquished by:	Company:	Date/Time:	Received by:		Date/Time:
			Krista Abel	ELLE	11/7/15 0945

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Sample Administration Receipt Documentation Log

Doc Log ID: 122281

Group Number(s): 1607522

Client: Southwestern Energy Company

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	11/07/2015 9:45
Number of Packages:	1	Number of Projects:	1

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	No
Samples Chilled:	Yes	Total Trip Blank Qty:	2
Paperwork Enclosed:	Yes	Trip Blank Type:	HCL
Samples Intact:	Yes	Air Quality Samples Present:	No
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Krista Abel (3058) at 10:03 on 11/07/2015

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT146	0.9	DT	Wet	Y	Bagged	N

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2425 New Holland Pike
Lancaster, PA 17605-2425

T | 717-656-2300
F | 717-656-2681
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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

Office of Oil & Gas
OCT 20 2016

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Analysis Report

REVISED

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

December 01, 2015

Project: A-1141 INJECTION WELL

Submittal Date: 11/07/2015
Group Number: 1607521
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
033-WV-009-110615-1150-1-602 Grab	8124467
033-WV-009-110615-1150-1-602 Filtered Grab	8124468

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

Respectfully Submitted,

Stephen J. Gordon
Project Manager

(724) 597-2027

Received
Office of Oil & Gas
OCT 20 2016

REVISED

Sample Description: 033-WV-009-110615-1150-1-602 Grab
Groundwater Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124467
LL Group # 1607521
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 11:50 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:09

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG1--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	Benzene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Carbon Tetrachloride	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Chlorobenzene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,2-Dichlorobenzene	N.D.		1	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,4-Dichlorobenzene	N.D.		1	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,1-Dichloroethane	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,2-Dichloroethane	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,1-Dichloroethene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	cis-1,2-Dichloroethene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	trans-1,2-Dichloroethene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,2-Dichloropropane	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Ethylbenzene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Methyl Tertiary Butyl Ether	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Methylene Chloride	N.D.		2	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Styrene	N.D.		1	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Tetrachloroethene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Toluene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,2,4-Trichlorobenzene	N.D.		1	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,1,1-Trichloroethane	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	1,1,2-Trichloroethane	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Trichloroethene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Vinyl Chloride	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	m+p-Xylene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	o-Xylene	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
10335	Xylene (Total)	N.D.		0.5	ug/l		11/19/15 19:23	11/19/15 19:23	1731
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	TPH-GRO water C6-C10	N.D.		20	ug/l		11/11/15 20:38	11/11/15 20:38	2001
GC Miscellaneous									
RSKSOP-175 modified									
07105	n-butane	N.D.		1.0	ug/l			11/11/15 14:59	719
07105	Ethane	N.D.		1.0	ug/l			11/11/15 14:59	719
07105	Methane	N.D.		3.0	ug/l			11/11/15 14:59	719
07105	Propane	N.D.		1.0	ug/l			11/11/15 14:59	719
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	C10-C28	N.D.		0.047	mg/l		11/12/15 19:00	11/17/15 01:15	2027
02740	C24-C40	N.D.		0.047	mg/l		11/12/15 19:00	11/17/15 01:15	2027

Received
Office of Oil & Gas
OCT 20 2016

REVISED

Sample Description: 033-WV-009-110615-1150-1-602 Grab
Groundwater Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124467
LL Group # 1607521
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 11:50 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:09

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG1--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	Total TPH (C10-C40)	N.D.		0.047	mg/l		11/12/15 19:00	11/17/15 01:15	2027
Metals									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/18/15 09:58	11/25/15 05:25	2106
01750	**Calcium**	**9.99**		0.0333	mg/l		11/18/15 09:58	11/25/15 05:25	2106
01754	**Iron**	**0.0373 J**	.3	0.0333	mg/l		11/18/15 09:58	11/25/15 05:25	2106
07058	**Manganese**	**0.0128**	.05	0.00080	mg/l		11/18/15 09:58	11/25/15 05:25	2106
01767	**Sodium**	**106**		0.167	mg/l		11/18/15 09:58	11/25/15 05:25	2106
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.0018 J**	.01	0.00040	mg/l		11/19/15 09:49	11/20/15 05:07	1242
06026	**Barium**	**0.0999**	2	0.00092	mg/l		11/19/15 09:49	11/20/15 05:07	1242
Wet Chemistry									
EPA 300.0									
00224	**Chloride**	**24.7**	250	1.0	mg/l			11/14/15 15:59	6676
00228	**Sulfate**	**20.0**	250	1.5	mg/l			11/14/15 15:59	6676
EPA 415.1									
00273	Total Organic Carbon	N.D.		0.50	mg/l			11/18/15 05:42	495
EPA 170.1									
12151	**Temperature of pH**	**22.5**		0.010	Degrees C			11/10/15 21:16	1124
SM 2540 C-1997									
00212	**Total Dissolved Solids**	**329**	500	19.4	mg/l			11/11/15 08:20	1198
SM 2540 D-1997									
10457	Total Suspended Solids	N.D.		1.00	mg/l			11/11/15 08:40	8743
SM 4500-H+ B-2000									
12152	**pH**	**8.3**		0.010	Std. Units			11/10/15 21:16	1124
	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
SM 5540 C-2000									
00225	**M. B. A. S.**	**0.041 J**	.5	0.040	mg/l LAS MW 320			11/07/15 11:10	237
Microbiology									
SM 9223 B-1997									

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Analysis Report

REVISED

Sample Description: 033-WV-009-110615-1150-1-602 Grab
Groundwater Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124467
LL Group # 1607521
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 11:50 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:09

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

DG1--

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Microbiology									
SM 9223 B-1997									
08161	**Tot Coli/E. coli (Quanti-tray)**	See Below			MPN/100mL			11/08/15 11:39	1281
	Total Coliform	< 1.0		/100ml					
	E. coli	< 1.0		/100ml					

General Sample Comments

DEFINITIONS:
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Analysis Report

REVISED

Sample Description: 033-WV-009-110615-1150-1-602 Filtered Grab
Groundwater Dannie Gum
A-1141 INJECTION WELL

LL Sample # WW 8124468
LL Group # 1607521
Account # 20810

Project Name: A-1141 INJECTION WELL

Collected: 11/06/2015 11:50 by MC

Submitted: 11/07/2015 09:45
Reported: 12/01/2015 16:09

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/19/15 09:49	11/20/15 03:31	2106
01750	**Calcium**	**9.86**		0.0333	mg/l		11/19/15 09:49	11/20/15 03:31	2106
01754	Iron	N.D.	.3	0.0333	mg/l		11/19/15 09:49	11/20/15 03:31	2106
07058	**Manganese**	**0.0035 J**	.05	0.00080	mg/l		11/19/15 09:49	11/20/15 03:31	2106
01767	**Sodium**	**102**		0.167	mg/l		11/19/15 09:49	11/20/15 03:31	2106
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.0017 J**	.01	0.00040	mg/l		11/18/15 10:30	11/19/15 14:01	1242
06026	**Barium**	**0.0976**	2	0.00092	mg/l		11/18/15 10:30	11/19/15 14:01	1242

General Sample Comments

This sample was field filtered for dissolved metals.

DEFINITIONS:
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

Received
Office of Oil & Gas
OCT 20 2016

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC **Lab PM Contact Name:** Wendy Kozma **Lab Address:** 2425 New Holland Pike **City, State ZIP:** Lancaster, PA 17601 **Phone:** 717-556-7257 **Fax:** 717-656-6766 **Email:** WendyKozma@eurofinsus.com	**Client:** Southwestern Energy Company **Client Contact Name:** Tyler Spear **Client Address:** 179 Innovation Drive **City, State ZIP:** Jane Lew, WV 26378 **Phone:** 304-884-1681 **Email:** Tyler_Spear@SWN.com	**Environmental Chain of Custody (COC)** **Consultant Name:** GES, Inc. **Consultant PM Contact Name:** Nicholas Lohr **Phone:** 800-267-2549, Ext. 3634 **Fax:** 866-902-2187 **Email:** Nlohr@gesonline.com	eurofins | Lancaster Laboratories

***WELL PAD NAME:** A-1141 Injection Well

*Please circle which type of site this is: IMPOUNDMENT (WELL PAD) SPECIAL PROJECT

***PROPERTY # (AFE# if applicable):** 400 1161668

***MAJOR/MINOR CODE:** 52695/007

***STATE SAMPLED:** WV

***OWNER NAME:** Donnie Gum

***Analysis Turnaround Time (working days)**

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

***SAMPLER(s):** Matt Crownover 602

20810
160721
8124467-69

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present) ☐ *Sample Collected - POST-Treatment System

☒ *Pre-drill Sample ☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-110615-1150-1-602	11-6-15	1150	grab	GW	22	Y	X	X	X	X	X	X	X	X	X	X	X	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
Received by GES OCT 20 2016																		
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ☐ Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

***PARCEL ID #:** 03 4F00240000000

***FEDEX TRACKING #:** 801301831313

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Well / Pressure tank spigot

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
	GES	11-6-15/1730			
Relinquished by:	**Company:**	**Date/Time:**	**Received by:**		**Date/Time:**
			Abel	H@ KmA 11/7/15 ELLE	11/7/15 0945

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Sample Administration Receipt Documentation Log

Doc Log ID: 122284

Group Number(s): 1607521

Client: Southwestern Energy Company

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	11/07/2015 9:45
Number of Packages:	1	Number of Projects:	1

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	No
Samples Chilled:	Yes	Total Trip Blank Qty:	2
Paperwork Enclosed:	Yes	Trip Blank Type:	HCL
Samples Intact:	Yes	Air Quality Samples Present:	No
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Krista Abel (3058) at 10:12 on 11/07/2015

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT146	0.3	DT	Wet	Y	Bagged	N

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2425 New Holland Pike
Lancaster, PA 17605-2425

T : 717-656-2300
F : 717-656-2681
www.LancasterLabs.com

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT. SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

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OCT 20 2016

SWN
Southwestern Energy®
PO Box 1300
Jane Lew, WV 26378
PHONE: (304) 884-1610

December 3, 2015

John & Melinda Law
4884 US HWY 33 W
Camden, WV 26338

Certified Mail Receipt: 7014 0150 0001 8784 2499

RE: Water Supply Testing Analytical Results

Dear Mr. and Ms. Law:

SWN Production Company, LLC has recently sampled your water source(s) in conjunction with renewing an injection well permit with the WV DEP.

Enclosed please find the results of that sample(s) as prepared by Eurofins Lancaster Laboratories Environmental in addition to the Field Data Packet collected by a GES representative during the interview.

Should you need assistance interpreting the analytical data as presented in the report, you may refer to the following websites or other guidance documents from the West Virginia Department of Environmental Protection or other regulatory agencies. Additionally, EPA Water Systems Council Well Care Hotline can be contacted 888-395-1033.

- www.dep.wv.gov/
- https://wvdhhr.org/phs/water/index.asp
- http://water.epa.gov/drink/contaminants/

Should you have any additional questions, please contact me at (304)-884-1681.

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Thank you, we appreciate your cooperation.

Sincerely,

Tyler Spear
Engineering Regulatory Technician

The Right People doing the Right Things, wisely Investing the cash flow from our underlying Assets, will create Value+

Office of Oil & Gas
OCT 20 2016

UIC - John & Melinda Law - Results

7014 0150 0001 8784 2499

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at www.usps.com

OFFICIAL USE

Postage $
Certified Fee
Return Receipt Fee (Endorsement Required)
Restricted Delivery Fee (Endorsement Required)

Postmark Here
DEC - 9 2015

John & Melinda Law
4884 US HWY 33 W
Camden, WV 26338

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by (Printed Name) John Law
C. Date of Delivery 12/07/15

ddress different from item 1? ☐ Yes
r delivery address below: ☐ No

John & Melinda Law
4884 US HWY 33 W
Camden, WV 26338

☑ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ Collect on Delivery

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service lab) 7014 0150 0001 8784 2499

PS Form 3811, July 2013 Domestic Return Receipt

UIC - Law - Results

Received
Office of Oil & Gas
OCT 20 2016

SWN
Southwestern Energy®
PO Box 1300
Jane Lew, WV 26378
PHONE: (304) 884-1610

December 3, 2015

John & Melinda Law
4884 US HWY 33 W
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- www.dep.wv.gov/
- https://wvdhhr.org/phs/water/index.asp
- http://water.epa.gov/drink/contaminants/

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Sampling Field Data Package
A-1141 INJECTION WELL
LEWIS COUNTY, WV

Law
034F002000010000
033-WV-009-110915-1420-1-602
November 9, 2015

Prepared For:

Southwestern Energy
Jane Lew, WV

Prepared By:

Groundwater & Environmental Services, Inc.
301 Commerce Park Drive
Cranberry Township, PA 16066

November 16, 2015

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FIELD DOCUMENTATION

Site Visit Form, Calibration Logs, Logbook, Site Sketch, COCs, Checklist

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Part A: GENERAL INFORMATION

Water Source ID*:	WL-11092015-602-03	O & G Well Name*:	A-1141 INJECTION WELL
Pad Name*:	A-1141 INJECTION WELL	Parcel Number*:	03 4F002000010000
Tax ID:	03 4F002000010000		
Operator ID*:	033	State Code*:	
County Code*:	009		
Sampled By*:	MATT CROWNOVER	Company Name*:	GES
Water Sampler Identifier*:	502	Date/Time Sampled*:	11/09/2015 14:20 (24hr)
Sample Frequency*:	1	N/A: No Sample Details:	
Person Interviewed*:	Other	Please specify:	

PROPERTY OWNER		RESIDENT OR OTHER	☑ Same as owner
Name*:	JOHN & MELINDA LAW	Name*:	JOHN & MELINDA LAW
Address*:	4884 US HWY 33 W	Address*:	4884 US HWY 33 W
City*:	CAMDEN	City*:	CAMDEN
State*:	WV	State*:	WV
Postal Code*:	26338	Postal Code*:	26338
Phone No*:	304-269-7244	Phone No*:	304-269-7244

Part B: WATER QUALITY

	Reported Quality			Observed Quality		
	Yes	No	N/A	Yes	No	N/A
Staining	○	◉	○	○	◉	○
Odor	○	◉	○	○	◉	○
Cloudiness	○	◉	○	○	◉	○
Sheen	○	◉	○	○	◉	○
Effervescence	○	◉	○	○	◉	○
Taste	○	◉	○			

Treatment*

- ☑ None
- ☐ Charcoal Filter
- ☐ Softening
- ☐ UV light
- ☐ Chlorination
- ☐ pH Adjustment
- ☐ Iron Removal
- ☐ In-line Sediment Filter

Other:

Functioning Properly*: ○ Yes ○ No ○ Unknown

Pump Type

- ○ None
- ○ Gas Piston
- ◉ Submersible
- ○ Windmill
- ○ Jet
- ○ Other:

Capacity (GPM):

Comments:

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Part C: WATER SOURCE INFORMATION

Does this source supply any other properties? ○ Yes ◉ No

Identify properties:

Is the water source(s) located on the property? ◉ Yes ○ No Please explain:

Number of people using this water source: 0 Gallons/day:

Pressure Tank? (•) Yes ( ) No Size (gallons): Unknown

Water Use: [ ] Domestic [ ] Husbandry [ ] Irrigation Other WATERING GARDEN, WASHING CARS

Coordinates: (NAD83 decimal, 6 places) Lat 39.054936 Long -80.678476 Ground Surface Elevation 1225 ft

Does the water source ever go dry? ( ) Yes (•) No

Water Source Type*: WATER WELL

(•) Drilled Well ( ) Dug Well ( ) Other Missing/damaged pit-less adaptor ( ) Yes ( ) No (•) Unknown

Reported total well depth (FT): Reported depth of water level (FT): Reported pump depth (FT):

Date Drilled: Drillers Name: Driller log available ( ) Yes (•) No

Well location: ( ) Inside ( ) Inside and Vented Outside (•) Outside Unvented ( ) Outside Vented

Part D: DESCRIPTION OF WATER SOURCE

Check all that apply

[ ] Loose, missing, or damaged cover [ ] Evidence of insects, spiders, animals [ ] Open to surface water

[ ] Any cracked or damaged well casing/spring vault [ ] Additional storage or holding tank/coyote system

[ ] Evidence of erosion [ ] Water source secured [ ] Source buried [ ] Location unknown [ ] Cover flush with ground

Other:

Part E: DESCRIPTION OF AREA SURROUNDING WATER SOURCE

Check all that apply

[✓] Ground sloping towards water source [ ] Water source downgradient of septic system

Signs of:

[ ] Failing septic [ ] Soggy ground [ ] Foul odor

Close proximity to (tick all that apply):

[ ] Garden [ ] Orchard [ ] Greenhouse [ ] Equipment storage areas

[ ] Junkyard [ ] Dumping area [ ] Landfill [ ] Salt storage area/Salted roadway

[ ] Garage [ ] Fuel storage tanks

Located in field with:

[ ] Livestock [ ] Inside Barn [ ] Barnyard [ ] Other out buildings

Additional remarks and comments:

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Part F: SAMPLING

Sample ID: 033-WV-009-110915-1420-1-602

Sampled	Sampling Point Location
( ) Before Treatment ( ) After Treatment	( ) Inside Faucet (•) Outside Faucet ( ) Overflow/Discharge Pipe
(•) No Treatment ( ) Not Sure	( ) Spring ( ) Pressure Tank ( ) Bailed
	( ) Wellhead ( ) Other:

Was the water source purged before sampling (•) Yes ( ) No Volume (gal) 54 Time (min) 10

Is it possible to run water for 30 minutes? (•) Yes ( ) No If No, please explain

Average water usage within the last 24 hours Chain of custody attached? (•) Yes ( ) No

Field Analyses:

Field Analyses:

Turbidity (ntu):	3.22	pH (ph units):	7.16
Conductivity (umhos/cm):	1144	Temperature (deg c):	13.69

Gas Readings

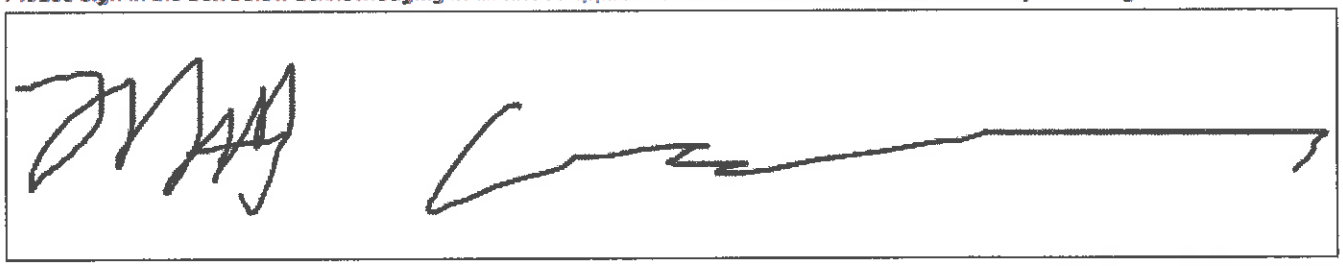
Type	PPM	% LEL	% GAS
Wellhead	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
Cold Tap	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
Cold Headspace	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)

Part G: SITE SKETCH and PHOTOGRAPHS

Add Images | 12 pictures attached to the from

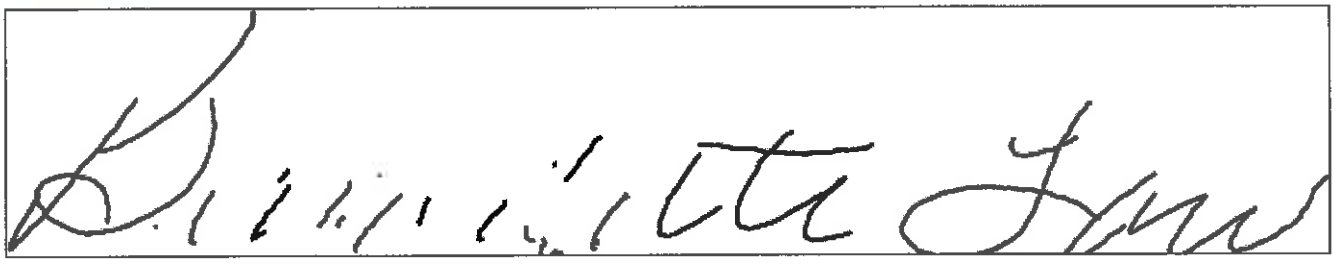
SAMPLER

Please sign in the box below acknowledging that I have supplied the correct information to the best of my knowledge.



Accept | Clear

INTERVIEWEE



Accept | Clear

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Form #: NA
(Reference Form # in Log Book)

Truck #: NA

Gas Explorer Calibration Log

GES Equipment Name: GES-GE-029

Equipment Serial #: 1202-302846

9-28-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dasler 489
↓	↓	H_2S	0	100ppm		↓	↓
10-30-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dasler 489
↓	↓	H_2S	0	100ppm		↓	↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓

NOTE: Gas Explorers must be calibrated on the first day of every month. If the instrument is recalibrated at anytime the calibration information must be recorded on this sheet.

3-Gas= 2.5%(50%LEL) Methane, 100ppm CO, Balance Air

OCT 20 2016

GES - Ver. 1

Southwestern Energy Predrill Sampling

Gas Detector Equipment Calibration

Equipment Serial Number:	1202 - 302846
GES Equipment Code:	GES - GE - 029
Equipment Type:	Gas Explorer
Date of Calibration:	10-30-2015
Include Gas Detector Calibration Log with Field Documentation	

GPS Equipment

Equipment Serial Number:	RBC15N0226
GES Equipment Code:	NA
Equipment Type:	Trimble Yuma

Water Quality Multi-Parameter Calibration

Equipment Serial Number:	09E100453		08325700
GES Equipment Code:	NA		NA
Equipment Type:	YSI		Hanna H1
Calibration Method:	3pt pH / 1pt sp cond.		4pt.
Date of Calibration:	11-9-2015		11-9-15
Calibration Parameter	Time	Pre-Value/Reading	Person Performing Calibration
pH-4	0724	4.34	Matthew Crownover 602
pH-7	0725	6.61	
pH-10	0727	10.36	
Specific Conductivity (µS/cm)	0730	1420	
Turbidity (<0.1 NTU)	0735	0.12	
Turbidity (15 NTU)	0736	14.9	
Turbidity (100 NTU)	0738	100	
Turbidity (750 NTU)	0739	758	
Calibration Parameter	Time	Post-Value/Reading	Person Performing Calibration
pH-4	0724	3.98	Matthew Crownover 602
pH-7	0726	7.00	
pH-10	0728	10.06	
Specific Conductivity (µS/cm)	0731	1413	
Turbidity (<0.1 NTU)	0735	0.18	
Turbidity (15 NTU)	0737	15.1	
Turbidity (100 NTU)	0738	99.9	
Turbidity (750 NTU)	0740	751	

Decon Procedures

Reference GES Baseline Water Well Sampling SOP

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Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Inj. Well

12

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F002000010000

Site Arrival Time: 1315 Site Departure Time: 1500

Samplers (Full Names and Sampler #s): Misty Kittell 555
Matthew Crownover 602

Weather Condition Observations Recorded at: 1320

Weather Conditions: Cloudy, raining Air Temp (Degrees Fahrenheit): 49

Estimate Wind Speed(mph): 3 Approximate Wind Direction: SW

Note: Remember to document any changes in weather conditions (Include Times).

Equipment Bump Test Verification (Include GES Equipment Number and Time): 1318

GE (GES-GE-029) → 100 ppm, Bump = 100 ppm
YSI → 7.00 pH, Bump = 7.04 pH / 1413 µS/cm, Bump = 1414 µS/cm
Turbidity → 15.0 NTU, Bump = 15.1 NTU

Refer to page 12 for 11-9-15 (insert date) for full calibration information.

Does the parcel have a septic system?: X Y ___ N

If Yes, describe the location of the septic area below and provide an approximate location on the site map. Septic area unknown.

1315: Arrived onsite with Bernadette Law (mother of John). Bernadette directed team to the well location.
1322: Began purge for well.
Temperature readings increased drastically.
Sp. Conductivity readings decreased.
With this, team knew something was wrong.
1356 - Switched batteries in the YSI and restarted purge
Purged 54 gallons on second attempt.
* Bernadette does not know pressure tank size.
1420: Began sampling WL-110915-602-03, Sample ID 033-WV-009-110915-1-602 - Sample collected from a hand pump hydrant located across the driveway from the house. Bernadette said the pressure tank is not accessible.
1500: Offsite to began GPS Collection.

Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: Arthur Ing Well

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Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F 002000010000

Tracking Number: 803301874555

Interviewee Signature:

Bernadette Law

Fields intentionally left blank in EDGE because they are unknown or do not apply:
(Check all that apply)

For All Sources:
- ☐ Pump Type
- ☒ Pump Capacity
- ☐ Number of People Using the Water Source
- ☒ Gallons/Day Used
- ☒ Average Water Usage Within the Last 24 Hours

For Wells:
- ☒ Reported Well Depth
- ☒ Reported Depth to Water Level
- ☒ Reported Pump Depth
- ☒ Date Drilled
- ☒ Drillers Name
- ☐ Well Location

For Cisterns:
- ☐ Source of Water

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Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Ivy Well

Southwestern Energy Predrill Sampling

Log Book # 105

WELL PURGING: FIELD WATER QUALITY MEASUREMENTS FORM

Parcel #: 03 4F00200001 0000 Turbidity (NTU): 3.22 Time (Military): 1414

Time (Military)	Temperature (Degrees Celsius)	Specific Conductance (µS/cm)	pH (Standard Units)	Comments
1322	15.11	1269	7.36	Start purge
1324	14.06	1209	7.30	
1326	14.98	1219	7.34	
1328	15.90	1190	7.29	
1330	18.70	1079	7.25	
1332	21.50	916	7.19	
1334	27.80	747	7.11	
1336	31.51	582	7.01	
1338	39.55	416	6.81	
1340	45.26	231	6.58	
1342	64.34	115	6.78	
~~1344 MK~~				YSI working incorrectly.
~~1346 MK~~				changed batteries - to MK
1356	14.67	1180	7.15	start begin again.
1358	14.62	1170	7.18	
1400	14.38	1173	7.20	
1402	14.48	1155	7.15	
1404	14.27	1126	7.15	
1406	13.74	1117	7.16	
1408	14.58	1155	7.10	
1410	15.03	1149	7.10	
1412	14.04	1143	7.12	
1414	13.69	1144	7.15	

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Stabilization Criteria: ±10% ±10% ±0.1

Stabilization is considered to be achieved when three consecutive readings are within the specified stabilization criteria.

Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Inj Well

Google earth

feet 900
meters 200

N

Southwestern Energy
A-1141 Injection Well
Property Owner: John & Melinda Law
Parcel: 03 4F002000010000
Date: 11-09-2015
Time: 1420

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Office of Oil & Gas
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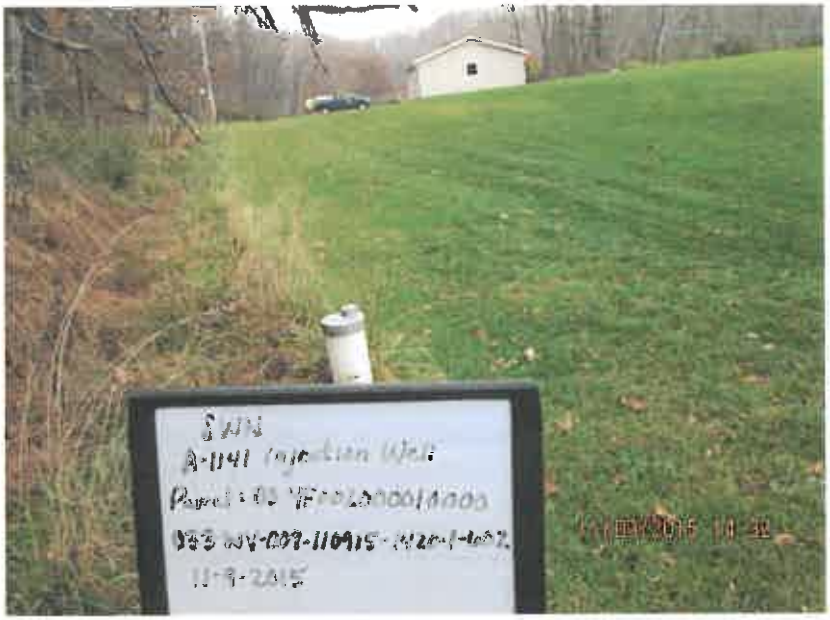
PHOTOGRAPHS

Office of Oil & Gas
OCT 20 2016



Source: Well

Sample Location

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002000010000
Law
033-WV-009-110915-1420-1-602
November 9, 2015

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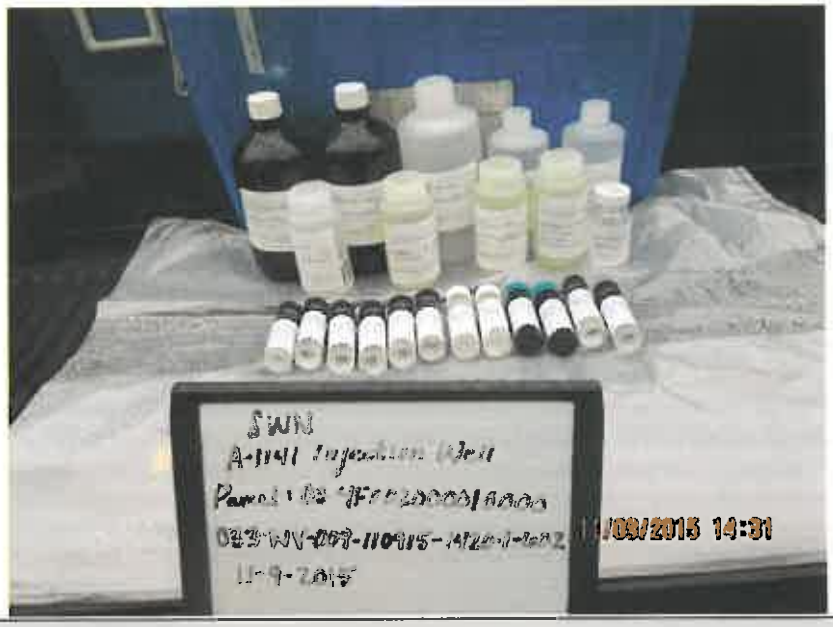

Sample

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002000010000
Law
033-WV-009-110915-1420-1-602
November 9, 2015

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Analysis Report

REVISED

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

December 01, 2015

Project: A-1141 Injection Well

Submittal Date: 11/10/2015
Group Number: 1607915
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
033-WV-009-110915-1420-1-602 Grab	8126439
033-WV-009-110915-1420-1-602 Filtered Grab	8126440

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

Respectfully Submitted,

Stephen J. Gordon
Project Manager

(724) 597-2027

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Analysis Report

REVISED

Sample Description: 033-WV-009-110915-1420-1-602 Grab
Groundwater John & Melinda Law
A-1141 Injection Well

LL Sample # WW 8126439
LL Group # 1607915
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 14:20 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

JLAW-

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	Benzene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Carbon Tetrachloride	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Chlorobenzene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,2-Dichlorobenzene	N.D.		1	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,4-Dichlorobenzene	N.D.		1	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,1-Dichloroethane	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,2-Dichloroethane	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,1-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	cis-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	trans-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,2-Dichloropropane	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Ethylbenzene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Methyl Tertiary Butyl Ether	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Methylene Chloride	N.D.		2	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Styrene	N.D.		1	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Tetrachloroethene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Toluene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,2,4-Trichlorobenzene	N.D.		1	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,1,1-Trichloroethane	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,1,2-Trichloroethane	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Trichloroethene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Vinyl Chloride	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	m+p-Xylene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	o-Xylene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Xylene (Total)	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	TPH-GRO water C6-C10	N.D.		20	ug/l		11/11/15 23:21	11/11/15 23:21	2001
GC Miscellaneous									
RSKSOP-175 modified									
07105	n-butane	N.D.		1.0	ug/l			11/11/15 17:47	719
07105	Ethane	N.D.		1.0	ug/l			11/11/15 17:47	719
07105	Methane	N.D.		3.0	ug/l			11/11/15 17:47	719
07105	Propane	N.D.		1.0	ug/l			11/11/15 17:47	719
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	C10-C28	N.D.		0.047	mg/l		11/12/15 19:00	11/17/15 00:54	2027
02740	C24-C40	N.D.		0.047	mg/l		11/12/15 19:00	11/17/15 00:54	2027

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Analysis Report

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Sample Description: 033-WV-009-110915-1420-1-602 Grab
Groundwater John & Melinda Law
A-1141 Injection Well

LL Sample # WW 8126439
LL Group # 1607915
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 14:20 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

JLAW-

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	Total TPH (C10-C40)	N.D.		0.047	mg/l		11/12/15 19:00	11/17/15 00:54	2027
Metals									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:30	2992
01750	**Calcium**	**98.6**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:30	2992
01754	**Iron**	**0.0470 J**	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:30	2992
07058	**Manganese**	**0.0526**	.05	0.00080	mg/l	X	11/17/15 09:53	11/18/15 19:30	2992
01767	**Sodium**	**120**		0.167	mg/l		11/17/15 09:53	11/18/15 19:30	2992
EPA 200.8 rev 5.4									
06025	Arsenic	N.D.	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:40	1242
06026	**Barium**	**0.0415**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:40	1242
Wet Chemistry									
EPA 300.0									
00224	**Chloride**	**7.2**	250	1.0	mg/l			11/16/15 16:23	2987
00228	**Sulfate**	**291**	250	7.5	mg/l	XX		11/14/15 18:13	6676
EPA 415.1									
00273	Total Organic Carbon	N.D.		0.50	mg/l			11/18/15 11:14	495
EPA 170.1									
12151	**Temperature of pH**	**23.2**		0.010	Degrees C			11/10/15 22:27	1124
SM 2540 C-1997									
00212	**Total Dissolved Solids**	**654**	500	19.4	mg/l	X		11/12/15 08:00	8743
SM 2540 D-1997									
10457	Total Suspended Solids	N.D.		1.00	mg/l			11/12/15 08:02	8743
SM 4500-H+ B-2000									
12152	**pH**	**7.9**		0.010	Std. Units			11/10/15 22:27	1124
	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
SM 5540 C-2000									
00225	M. B. A. S.	N.D.	.5	0.040	mg/l LAS MW 320			11/11/15 00:15	237
Microbiology									
SM 9223 B-1997									

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Analysis Report

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Sample Description: 033-WV-009-110915-1420-1-602 Grab
Groundwater John & Melinda Law
A-1141 Injection Well

LL Sample # WW 8126439
LL Group # 1607915
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 14:20 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

JLAW-

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Microbiology									
SM 9223 B-1997									
08161	**Tot Coli/E. coli (Quanti-tray)**	See Below			MPN/100mL			11/11/15 14:21	2213
	Total Coliform	40.6		/100ml					
	E. coli	< 1.0		/100ml					

General Sample Comments

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Analysis Report

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Sample Description: 033-WV-009-110915-1420-1-602 Filtered Grab
Groundwater John & Melinda Law
A-1141 Injection Well

LL Sample # WW 8126440
LL Group # 1607915
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 14:20 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:33	2992
01750	**Calcium**	**78.8**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:33	2992
01754	Iron	N.D.	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:33	2992
07058	**Manganese**	**0.0456**	.05	0.00080	mg/l		11/17/15 09:53	11/18/15 19:33	2992
01767	**Sodium**	**133**		0.167	mg/l		11/17/15 09:53	11/18/15 19:33	2992
EPA 200.8 rev 5.4									
06025	Arsenic	N.D.	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:42	1242
06026	**Barium**	**0.0377**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:42	1242

General Sample Comments

This sample was field filtered for dissolved metals.

DEFINITIONS:
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC Lab PM Contact Name: Wendy Kozma Lab Address: 2425 New Holland Pike City, State ZIP: Lancaster, PA 17601 Phone: 717-556-7257 Fax: 717-656-6766 Email: WendyKozma@eurofinsus.com	Client: Southwestern Energy Company Client Contact Name: Tyler Spear Client Address: 179 Innovation Drive City, State ZIP: Jane Lew, WV 26378 Phone: 304-884-1681 Email: Tyler_Spear@SWN.com	**Environmental Chain of Custody (COC)** Consultant Name: GES, Inc. Consultant PM Contact Name: Nicholas Lohr Phone: 800-267-2549, Ext. 3634 Fax: 866-902-2187 Email: Nlohr@gesonline.com	eurofins | Lancaster Laboratories

*WELL PAD NAME: A-1141 Injection Well *Please circle which type of site this is: IMPOUNDMENT WELL PAD SPECIAL PROJECT	*Analysis Turnaround Time (working days) Standard TAT = 10 working days (unless otherwise noted below)	*SAMPLER(s): Matthew Crowmaker 602	20810 1607915 8126439-41
*PROPERTY # (AFE# if applicable): 40116/668	☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only		
*MAJOR/MINOR CODE: 52695/007	☐ Rush TAT = _____ working days		
*STATE SAMPLED: WV			
*OWNER NAME: John & Melinda Law			
☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present)	☐ *Sample Collected - POST-Treatment System		
☒ *Pre-drill Sample	☐ *Post-drill Sample		

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - Sml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon										Lab SDG Label / Sample Specific Notes / Additional Parameters:
033-WV-009-110915-1420-1-602	11/9/15	1420	grab	GW	22	Y	x	x	x	x	x	x	x	x	x	x	x										
Trip Blank	use sample collection date above	0:01	grab	W	2	N																					
							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6											

COC Page 1 of 1

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ☐ Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

*PARCEL ID #: 03 4F0020006810000

*FEDEX TRACKING #: 4601 3018 4555

*SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION: Well at hand pump hydrant

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
Matt Crowmaker	GES	11/9/15 1815			
Relinquished by:	Company:	Date/Time:	Received by:		Date/Time:
				ELLE	11-10-15 / 915

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

OCT 20 2016

Groundwater & Environmental Services, Inc.

WESTERN PENNSYLVANIA OFFICE

Sampling Field Data Package
A-1141 INJECTION WELL
LEWIS COUNTY, WV

Law
034F002000010000
033-WV-009-110915-1420-1-602
November 9, 2015

Prepared For:

Southwestern Energy
Jane Lew, WV

Prepared By:

Groundwater & Environmental Services, Inc.
301 Commerce Park Drive
Cranberry Township, PA 16066

November 16, 2015

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FIELD DOCUMENTATION

Site Visit Form, Calibration Logs, Logbook, Site Sketch, COCs, Checklist

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Part A: GENERAL INFORMATION

Water Source ID*:	WL-11092015-602-03	O & G Well Name*:	A-1141 INJECTION WELL
Pad Name*:	A-1141 INJECTION WELL	Parcel Number*:	03 4F002000010000
Tax ID:	03 4F002000010000		
Operator ID*:	033	State Code*:	
County Code*:	009		
Sampled By*:	MATT CROWNOVER	Company Name*:	GES
Water Sampler Identifier*:	602	Date/Time Sampled*:	11/09/2015 14:20 (24hr)
Sample Frequency*:	1	N/A: No Sample	Details:
Person Interviewed*:	Other	Please specify:	

PROPERTY OWNER		RESIDENT OR OTHER	☑ Same as owner
Name*:	JOHN & MELINDA LAW	Name*:	JOHN & MELINDA LAW
Address*:	4884 US HWY 33 W	Address*:	4884 US HWY 33 W
City*:	CAMDEN	City*:	CAMDEN
State*:	WV	State*:	WV
Postal Code*:	26338	Postal Code*:	26338
Phone No*:	304-269-7244	Phone No*:	304-269-7244

Part B: WATER QUALITY

	Reported Quality			Observed Quality		
	Yes	No	N/A	Yes	No	N/A
Staining	○	◉	○	○	◉	○
Odor	○	◉	○	○	◉	○
Cloudiness	○	◉	○	○	◉	○
Sheen	○	◉	○	○	◉	○
Effervescence	○	◉	○	○	◉	○
Taste	○	◉	○			

Treatment*

- ☑ None
- ☐ Charcoal Filter
- ☐ Softening
- ☐ UV light
- ☐ Chlorination
- ☐ pH Adjustment
- ☐ Iron Removal
- ☐ In-line Sediment Filter

Other:

Functioning Properly*: ○ Yes ○ No ○ Unknown

Pump Type

- ○ None
- ○ Gas Piston
- ◉ Submersible
- ○ Windmill
- ○ Jet
- ○ Other:

Capacity (GPM):

Comments:

Part C: WATER SOURCE INFORMATION

Does this source supply any other properties? ○ Yes ◉ No

Identify properties:

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Is the water source(s) located on the property? ◉ Yes ○ No Please explain:

Number of people using this water source: 0 Gallons/day:

Pressure Tank? (•) Yes ( ) No Size (gallons): | Unknown

Water Use: [ ] Domestic [ ] Husbandry [ ] Irrigation Other | WATERING GARDEN, WASHING CARS

Coordinates: (NAD83 decimal, 5 places) Lat | 39.054936 | Long | -80.579476 | Ground Surface Elevation | 1226 | ft

Does the water source ever go dry? ( ) Yes (•) No

Water Source Type*: WATER WELL

(•) Drilled Well ( ) Dug Well ( ) Other | Missing/damaged pit-less adaptor ( ) Yes ( ) No (•) Unknown

Reported total well depth (FT): | Reported depth of water level (FT): | Reported pump depth (FT):

Date Drilled: | **Drillers Name:** | **Driller log available** ( ) Yes (•) No

Well location: ( ) Inside ( ) Inside and Vented Outside (•) Outside Unvented ( ) Outside Vented

Part D: DESCRIPTION OF WATER SOURCE

Check all that apply

[ ] Loose, missing, or damaged cover [ ] Evidence of insects, spiders, animals [ ] Open to surface water

[ ] Any cracked or damaged well casing/spring vault [ ] Additional storage or holding tank/coyote system

[ ] Evidence of erosion [ ] Water source secured [ ] Source buried [ ] Location unknown [ ] Cover flush with ground

Other:

Part E: DESCRIPTION OF AREA SURROUNDING WATER SOURCE

Check all that apply

[✓] Ground sloping towards water source [ ] Water source downgradient of septic system

Signs of:

[ ] Failing septic [ ] Soggy ground [ ] Foul odor

Close proximity to (tick all that apply):

[ ] Garden [ ] Orchard [ ] Greenhouse [ ] Equipment storage areas

[ ] Junkyard [ ] Dumping area [ ] **Landfill** [ ] Salt storage area/Salted roadway

[ ] Garage [ ] Fuel storage tanks

Located in field with:

[ ] **Livestock** [ ] **Inside Barn** [ ] **Barnyard** [ ] Other out buildings

Additional remarks and comments:

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Part F: SAMPLING

Sample ID 033-WV-009-110915-1420-1-602

Sampled	Sampling Point Location
( ) Before Treatment ( ) After Treatment	( ) Inside Faucet (•) Outside Faucet ( ) Overflow/Discharge Pipe
(•) No Treatment ( ) Not Sure	( ) **Seep** ( ) **Pressure Tank** ( ) Bailed
	( ) Wellhead ( ) Other:

Was the water source purged before sampling (•) Yes ( ) No Volume (gal) 54 Time (min) 18

Is it possible to run water for 30 minutes? (•) Yes ( ) No If No, please explain

Average water usage within the last 24 hours | Chain of custody attached? (•) Yes ( ) No

Field Analysis

Field Analyses:

Turbidity (ntu):	3.22	pH (ph units):	7.15
Conductivity (umhos/cm):	1144	Temperature (deg c):	13.69

Gas Readings:

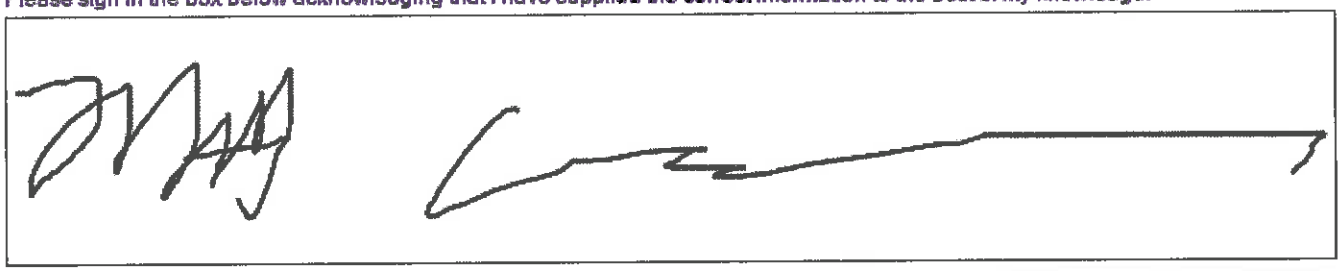
Type	PPM		% LEL		% GAS	
Wellhead	0	○ Peak ◉ Sustained		○ Peak ○ Sustained		○ Peak ○ Sustained
Cold Tap	0	○ Peak ◉ Sustained		○ Peak ○ Sustained		○ Peak ○ Sustained
Cold Headspace	0	○ Peak ◉ Sustained		○ Peak ○ Sustained		○ Peak ○ Sustained
		○ Peak ○ Sustained		○ Peak ○ Sustained		○ Peak ○ Sustained
		○ Peak ○ Sustained		○ Peak ○ Sustained		○ Peak ○ Sustained
		○ Peak ○ Sustained		○ Peak ○ Sustained		○ Peak ○ Sustained

Part G: SITE SKETCH and PHOTOGRAPHS

Add Images | 12 pictures attached to the from

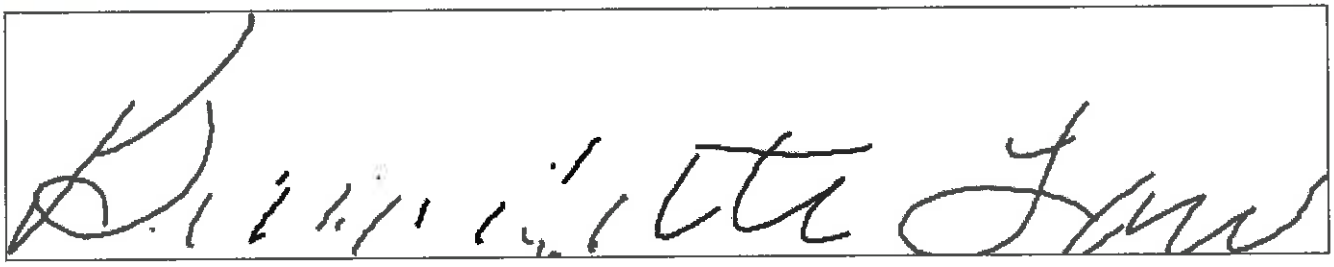
SAMPLER

Please sign in the box below acknowledging that I have supplied the correct information to the best of my knowledge.



Accept | Clear

INTERVIEWEE



Accept | Clear

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Form #: NA
(Reference Form # in Log Book)

Truck #: NA

Gas Explorer Calibration Log

GES Equipment Name: GES-GE-029

Equipment Serial #: 1202-302846

9-28-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dasler 489
↓	↓	H_2S	0	100ppm		↓	↓
10-30-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dasler 489
↓	↓	H_2S	0	100ppm		↓	↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓

NOTE: Gas Explorers must be calibrated on the first day of every month. If the instrument is recalibrated at anytime the calibration information must be recorded on this sheet.

3-Gas= 2.5%(50%LEL) Methane, 100ppm CO, Balance Air

Gas

OCT 20 2016

GES - Ver. 1

Southwestern Energy Predrill Sampling

Gas Detector Equipment Calibration	
Equipment Serial Number:	1202 - 302846
GES Equipment Code:	GES - GE - 029
Equipment Type:	Gas Explorer
Date of Calibration:	10-30-2015
Include Gas Detector Calibration Log with Field Documentation	

GPS Equipment	
Equipment Serial Number:	RBC15N0226
GES Equipment Code:	NA
Equipment Type:	Trimble YuMA

Water Quality Multi-Parameter Calibration			
Equipment Serial Number:	09E100453		08325700
GES Equipment Code:	NA		NA
Equipment Type:	YSI		Hanna HI
Calibration Method:	3pt pH / 1pt sp cond -		4pt.
Date of Calibration:	11-9-2015		11-9-15
Calibration Parameter	Time	Pre-Value/Reading	Person Performing Calibration
pH-4	0724	4.34	Matthew Crownover L002
pH-7	0725	6.61	
pH-10	0727	10.36	
Specific Conductivity (µS/cm)	0730	1420	
Turbidity (<0.1 NTU)	0735	0.12	
Turbidity (15 NTU)	0736	14.9	
Turbidity (100 NTU)	0738	100	
Turbidity (750 NTU)	0739	758	
Calibration Parameter	Time	Post-Value/Reading	Person Performing Calibration
pH-4	0724	3.98	Matthew Crownover L002
pH-7	0726	7.00	
pH-10	0728	10.06	
Specific Conductivity (µS/cm)	0731	1413	
Turbidity (<0.1 NTU)	0735	0.18	
Turbidity (15 NTU)	0737	15.1	
Turbidity (100 NTU)	0738	99.9	
Turbidity (750 NTU)	0740	751	

Deviation Procedures

Reference GES Baseline Water Well Sampling SOP

OCT 20 2016

Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Inj. Well

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F002000010000

Site Arrival Time: 1315 Site Departure Time: 1500

Samplers (Full Names and Sampler #s): Misty Kittell 555
Matthew Crownover 602

Weather Condition Observations Recorded at: 1320

Weather Conditions: Cloudy, raining Air Temp (Degrees Fahrenheit): 49

Estimate Wind Speed(mph): 3 Approximate Wind Direction: SW

Note: Remember to document any changes in weather conditions (Include Times).

Equipment Bump Test Verification (Include GES Equipment Number and Time): 1318

GE (GES-GE-029) → 100 ppm, Bump = 100 ppm
YSI → 7.00 pH, Bump = 7.04 pH / 1413 µS/cm, Bump = 1414 µS/cm
Turbidity → 15.0 NTU, Bump = 15.1 NTU

Refer to page 12 for 11-9-15 (insert date) for full calibration information.

Does the parcel have a septic system?: X Y ___ N

If Yes, describe the location of the septic area below and provide an approximate location on the site map. Septic area unknown.

1315 : Arrived onsite with Bernadette Law (mother of John). Bernadette directed team to the well location.
1322 : Began purge for well.
Temperature readings increased drastically.
Sp. Conductivity readings decreased.
With this, team knew something was wrong.
1356 - Switched batteries in the YSI and restarted purge
Purged 54 gallons on second attempt.
* Bernadette does not know pressure tank size.
1420 : Began sampling WL-110915-602-03, Sample ID 033-WV-009-110915-1-602 - Sample collected from a hand pump hydrant located across the driveway from the house. Bernadette said the pressure tank is not accessible.
1500 : Offsite to began GPS Collection.

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Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: Arthur Inj Well 83

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F 002000010000

Tracking Number: 801301874555

Interviewee Signature:

Bernadette Law

Fields intentionally left blank in EDGE because they are unknown or do not apply:
(Check all that apply)

For All Sources:

- ☐ Pump Type
- ☒ Pump Capacity
- ☐ Number of People Using the Water Source
- ☒ Gallons/Day Used
- ☒ Average Water Usage Within the Last 24 Hours

For Wells:

- ☒ Reported Well Depth
- ☒ Reported Depth to Water Level
- ☒ Reported Pump Depth
- ☒ Date Drilled
- ☒ Drillers Name
- ☐ Well Location

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For Cisterns:

- ☐ Source of Water

Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Inj Well

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Southwestern Energy Predrill Sampling

Log Book # 105

WELL PURGING: FIELD WATER QUALITY MEASUREMENTS FORM

Parcel #: 03 9F00200001 0000 Turbidity (NTU): 3.22 Time (Military): 1414

Time (Military)	Temperature (Degrees Celsius)	Specific Conductance (µS/cm)	pH (Standard Units)	Comments
1322	15.11	1269	7.36	start purge
1324	14.06	1209	7.30	
1326	14.98	1219	7.34	
1328	15.90	1190	7.29	
1330	18.70	1079	7.25	
1332	21.50	916	7.19	
1334	27.80	747	7.11	
1336	31.51	582	7.01	
1338	39.55	416	6.81	
1340	45.26	231	6.58	
1342	64.34	115	6.78	
~~1344 MK~~				YSI working incorrectly.
~~1346 MK~~				changed batteries - to MK
1356	14.67	1180	7.15	start begin again.
1358	14.62	1170	7.18	
1400	14.38	1173	7.20	
1402	14.48	1155	7.15	
1404	14.27	1126	7.15	
1406	13.74	1117	7.16	
1408	14.58	1155	7.10	
1410	15.03	1149	7.10	
1412	14.04	1143	7.12	
1414	13.69	1144	7.15	
Stabilization Criteria:	±10%	±10%	±0.1	

Stabilization is considered to be achieved when three consecutive readings are within the specified stabilization criteria.

OCT 20 2016

Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Inj Well

Google earth

feet 900
meters 200

N

Southwestern Energy
A-1141 Injection Well
Property Owner: John & Melinda Law
Parcel: 03 4F002000010000
Date: 11-09-2015
Time: 1420

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Environmental Chain of Custody (COC)

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC
Lab PM Contact Name: Wendy Kozma
Lab Address: 2425 New Holland Pike
City, State ZIP: Lancaster, PA 17601
Phone: 717-556-7257 **Fax:** 717-656-6766
Email: WendyKozma@eurofinsus.com

Client: Southwestern Energy Company
Client Contact Name: Tyler Spear
Client Address: 179 Innovation Drive
City, State ZIP: Jane Lew, WV 26378
Phone: 304-884-1681
Email: Tyler_Spear@SWN.com

Consultant Name: GES, Inc.
Consultant PM Contact Name: Nicholas Lohr
Phone: 800-267-2549, Ext. 3634 **Fax:** 866-902-2187
Email: Nlohr@gesonline.com

eurofins | Lancaster Laboratories

***WELL PAD NAME:** A-1141 Injection Well

*Please circle which type of site this is: IMPOUNDMENT WELL PAD SPECIAL PROJECT

***PROPERTY # (AFE# if applicable):** 401161668

***MAJOR/MINOR CODE:** 52695/607

***STATE SAMPLED:** WV

***Analysis Turnaround Time (working days)**

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

***SAMPLER(s):** Matthew Crowncover 602

***OWNER NAME:** John & Melinda Law

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present) ☐ *Sample Collected - POST-Treatment System

☒ *Pre-drill Sample ☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-11815-H20-1-602	11/9/15	H20	grab	GW	22	Y	X	X	X	X	X	X	X	X	X	X	X	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

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Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ☐ Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

***PARCEL ID #:** 03 4F0070660010000

***FEDEX TRACKING #:** 8013018 74555

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Wet at hand pump hydrant

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:	Date/Time:
Matt Crowncover	GES	11/9/15 1845		
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

GES Field Documentation Review Sheet

Client and Well Pad Name: DWN/A-1141 Inj Well Date: 11-9-15

Parcel #: 03 4F0020 0001 0000

Review Prior to Leaving Parcel:

- [x] Field equipment calibration records (GE/CG/PID/FID/LEL, conductivity, pH, turbidity, etc.).
- [x] Check coolers for bottleware, chain-of-custody, and other paperwork (Predrill parameters and Isotopic).
- [x] Sample Matrix confirmed?
- [x] Bottle labels filled out with analysis, time, date, sample ID, and sampler?
- [x] Chain-of-custody bottle count matches as-is or edited to reflect bottle count in cooler?
- [x] Site Visit Form and Supplemental Log Book reviewed and all applicable spaces completed and information is correct?
- [x] Full names of both team members (including sampler ID #s) conducting sampling, arrival and departure times noted in Supplemental Log Book.
- [x] Purge information and all water quality readings documented on Site Visit Form and Supplemental Log Book, respectfully?
- [x] Photographs with accurate time and date stamps and white board taken of treatment system, sample point, source, and filled bottleware (at a minimum)?
- [x] White board in photographs contains correct client name, name of well pad, sample identification, parcel number, and date?
- NA [ ] Notes on unusual conditions, such as interference by landowner or third party during sampling, hazardous/unsanitary conditions, dead animals, etc? Photo-documented, if applicable?
- NA [ ] Verbal decline documented and any unusual conditions communicated to Project Manager and/or client representative immediately?
- [x] **Both field team members have reviewed all field notes, chains, and forms?**

Review Prior to End of Day:

- [x] Upload completed and final PDF. PDF opened to confirm complete upload. PDF includes Site Visit Form, Site Sketch, calibration information, chain-of-custodies, completed Supplemental Log Book pages?
- [x] Photo-documentation and GPS files uploaded?
- NA [ ] Isotopic sample placed in secure, climate controlled area with chain-of-custody?

Must Sign Below and Scan with End of Day PDF Package

Team Member 1: Mindy J Kittell

Team Member 2:

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PHOTOGRAPHS

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Source: Well

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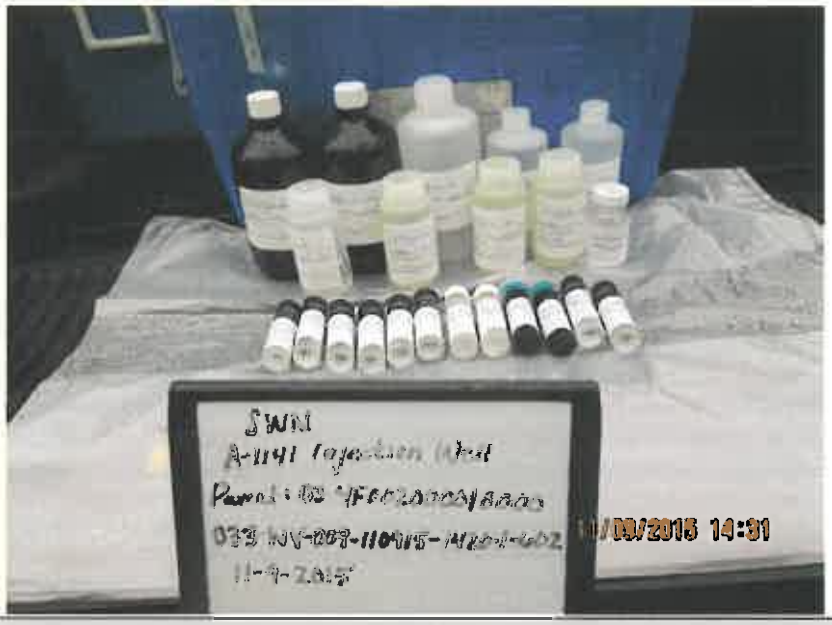
Sample Location

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002000010000
Law
033-WV-009-110915-1420-1-602
November 9, 2015



Sample

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F002000010000
Law
033-WV-009-110915-1420-1-602
November 9, 2015

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JSAs

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Job Safety Analysis (JSA)

JSA Title: **Baseline Water Sampling (All Sources)**

JSA Control #:

Date Developed: 4/13/2015	
Latest Revised Date: 4/13/2015 / **JSA Retention 1 year from Latest Revision Date.**	
Developed by: Misty Kittell	
Work Team Leader: Misty Kittell	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.

Revision #: 3	**Work Location / Permit #:** A-1141 Injection Well

This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.

SPECIFIC PPE: Gloves: (base on hazard and identified in column 4 e.g. - nitrile, Kevlar, leather). Hard Hat (required by activity or site requirements). Hearing Protection: if site activities raise the noise level to 85 db. PPE Clothing: highly visible clothing such as orange coveralls & reflective safety vest, Fire Retardant clothing (FRC) is required for well pad operations. Safety Glasses. Safety Shoes: steel-toed. Winter weather: Yaktrax and FRC hard hat liner.

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Gas Explorer, YUMA, YSI, Turbidity Meter, Water Interface Probe, Sampling Kit, Hand Tools, extendable rod with attached cup

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply by using "Hazard Identification" tool)*		**Potential Hazards**	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Arrive Onsite 1. Driving on site and parking 2. Attempt to make contact with home owner or resident. 3. Complete JSA/HASP/safety checklist/tailgate meeting ***Note:** Please remember to complete client required checklist prior to performing on site activities*	X Motion _ Chemical X Electrical X Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Workers being injured and work vehicles/ property damage being caused by hazardous conditions 1b. Workers being struck/ injured and work vehicles/ property damage being caused by traffic 1c. Injury due to contact with overhead hazards (falling objects and electrocution from lighting)	1a. Conduct a visual inspection of the driveway for hazards before attempting to pull onto the property. Reconsider entering a driveway that is covered in ice or muddy. ➢ Obey no trespassing signs if you have not previously contacted the property owner. ➢ Rain, ice, and snow may worsen driveways that have a steep incline/decline. 1b. Park in a designated area only (*first move forward*) and ensure vehicle is out of traffic pattern so that tailgate safety meeting can be performed safely. ➢ Be extra cautious when parked near active roadways due to vehicles flinging debris. 1c. Inspect work area for any overhead hazards including overhead utilities and overhead trees and vegetation. ➢ A visual inspection of overhead obstacles (e.g. tree branches, vegetation, low structures...) should be conducted prior to starting a job task. ➢ Work conducted in a wooded area, during high winds and/or lighting storm, should be avoided and conditions re-evaluated after a storm has passed. (*See part B, section 4d.*)
On-site edits:				No edits

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B. Weather Hazards Exposure	_ Motion _ Chemical X Electrical _ Biological _ Mechanical	_ Gravity X Radiation X Temperature _ Pressure _ Sound	1a. Adverse health effects due to exposure to weather related issues	1a. Staff should understand and be able to recognize the signs and/or symptoms of cold and hot weather related illnesses. ➢ Personnel should dress appropriately for ambient temperatures which would include but not be limited to dry layered clothing. ➢ Applying sunscreen to exposed skin is strongly recommended during sunny weather conditions (all seasons) to mitigate sun exposure.
			2a. Adverse health effects due to cold stress related injury	2a. For cold weather, work schedules should be adjusted to provide sufficient break periods in a heated area. Remember that dehydration is still a risk when working in the cold.
			3a. Adverse health effects due heat stress related injury	3a. For hot weather, work schedules may need to be adjusted to provide time intervals for replenishing fluids and which is free of contamination. For hot weather that exceeds 90oF, a 10 to 15 minute break must be taken following every 45 minutes to one hour of work. Each individual must drink at 16 ounces of water prior to beginning work and 8 to 12 ounces of water or other proper liquid such as Gatorade every 20 to 30 minutes. Caffeinated drinks must not be consumed at any time.
			4a. Adverse health effects or injury due to exposure to severe weather	4a. Avoid exposure to severe weather. ➢ Ensure a plan is in place and discussed to mitigate all potential severe weather concerns (rain, wind, thunderstorms, ice storms, snow fall, tornadoes, hurricanes...) ➢ In case severe weather (e.g. tornadoes, hailstorms, or strong winds) have a place to shelter and make every effort to protect life. ➢ Pay attention to severe weather alerts. ➢ Take precautions with approaching thunderstorms and lighting. Discontinue all work until 30 minutes after severe weather has passed.
			5a. Adverse health effects that can result from Chemical/dust exposure	5a. Be aware of possible chemical exposure from well pad activities. (drilling, fracking, production activities) ➢ Discuss possible sources of exposure with local HSO or PIC. ➢ Avoid inhalation/absorption of dust, exhaust and fumes from well pad activities. ➢ Stay upwind of such activities whenever possible.
On-site edits:				No edits
C. Locate Water Source 1. Traverse to water source location (either by foot or vehicle) 2. GPS and photograph water source 3. Traverse to vehicle location	X Motion _ Chemical X Electrical X Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Personal injury due to slips, trips, falls, lacerations, cuts, burns, and electrocution.	1a. Before traversing the property, perform a general scan of your planned walking path for any obstructions, debris, slip, trip, and fall hazards. Communicate conditions with sampling partner (if applicable). ➢ Scan your walking path. Identify any soil conditions which demonstrate significantly eroded areas from any possible recent rainfall. ➢ Look for changes in elevation (steep slopes) and grade when walking on uneven terrain. ➢ Be aware of loose gravel, wet grass, snow covered rocks and ice, roots and limbs, and slopes ➢ Stay within visual contact of your canvassing partner to ensure that you can be seen. ➢ For fences, complete an inspection to find the best point of entry and ask the owner to shut off any electrified fences. If a gate or opening cannot be located and electric power cannot be shut off, drape a thick blanket up and over the barbed wire rungs or electrified wire before attempting to step over.
			1b. Injury and/or damage to personnel, property or pets/livestock.	1b. When backing out of an area near the water source location, use a spotter to avoid damage or injury to the work vehicle, property, residents, and pets/livestock. If maneuvering vehicle in an area of uneven terrain and unsure of potential locations of slopes, holes, debris, etc. walk the projected vehicle path first. Use a spotter ahead of the vehicle to direct the driver away from potential hazards.
			1c. Injury / illness due to contact with animal and insects (bites, stings, cuts, lacerations, puncture wounds, venom,	1c. Observe signs of biological hazards that may be present (e.g., webs, bees flying in and out, buzzing sounds). ➢ Use repellant if ticks or mosquitoes may be present. ➢ Wear leather gloves when opening cellar, well vault or spring house door. ➢ Do not place your hands or feet anywhere you cannot see them.

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			etc.)	➢ Stay alert for webs, nests, or other signs of inhabitation. ➢ Scan for "Beware of Dog" signs. Ask to have aggressive animals secured.
On-site edits:				No edits
D. Purge Water Source (Well) 1. Connect hose to spigot attachment 2. Turn on/off spigot or tap 3. Disconnect and drain hose Note: Be aware of exposed wiring around pressure tanks. Use SWA if purge cannot be completed safely	X Motion _ Chemical X Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature X Pressure _ Sound	1a. Cut or abrasion injury to hand from contact with rusty spigot. 1b. Eye injury resulting from water spray due to faulty hose connection.	1a. Be aware of sharp edges or very rusty areas of spigot openings. ➢ If excessive rust could cause a breakage of the spigot or handle, call the PM to discuss alternative sampling method. ➢ Wear leather gloves when attaching or removing garden hose from the spigot, as well as when turning the spigot on or off. 1b. Turn on the spigot slowly to ensure secure connection from hose to spigot before increasing the water pressure. ➢ Inspect the hose for leaks and be sure hose is in the preferred location to drain the water and not pointed at anyone.
On-site edits:				No edits
E. Sampling 1. Set up of equipment and sample cooler 2. Fill bottleware using spigot, bailer, transfer vessel, or extendable rod with attached cup. 3. Take field readings with YSI, Gas Explorer, and Turbidity meter	X Motion X Chemical _ Electrical _ Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury (strains) to back / shoulders while moving equipment. 1b. Injury due to slip, trip, fall on cords/piping 1c. injury due to slip or fall on steep embankment. 1d. Eye or bodily injury from splashing of preservatives. 1e. Hand or bodily injury from contact with broken glassware.	1a. Utilize proper lifting procedure when handling equipment and cooler. ➢ Bend down at the knees and lift/lower with your legs and do not lift anything > 50lbs. ➢ Share carrying duties to eliminate balance issues when traversing rough terrain. 1b. Set up the work area so that all equipment is out of the walking path of both personnel and landowner. 1c. Use the extendable rod with the attached cup to reach surface water sources when near a steep embankment or where water level is deep enough for sampling, but is out of reach by hand. 1d. Fill bottleware slowly to avoid splashing of preservatives. 1e. Close lids of glass bottle ware finger tight. Do not over tighten, which could result in broken glassware. ➢ Kevlar and nitrile surgical gloves must be worn when opening a cooler and retrieving sample collection containers ➢ Wear Kevlar (cut resistant) gloves beneath nitrile sampling gloves to help prevent exposure to sharp edges, broken glass, and/or preservatives.
On-site edits:				No edits
F. Decontamination 1. Soak/spray durable equipment to prevent cross-contamination between multiple sample locations and dispose of all waste	_ Motion X Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Illness due to exposure decontamination chemicals	1a. When spraying equipment with Alconox, spray away from the face and body. ➢ Be sure to account for wind direction and strength before spraying Alconox solution. ➢ Wear nitrile gloves over Kevlar and wear a new pair nitrile gloves for each sample. ➢ Avoid touching your face and body, or any surface you may come into contact with after spraying Alconox
On-site edits:				No edits

Office of Water Programs

OCT 20 2016

JSA Control #: GES

G. Demobilization 1. Replace all equipment in cases or duffle bag 2. Ice and close sample cooler 3. Traverse to next source	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury (strains) to back / shoulders while moving equipment 1b. Personal injury due to slips, trips, and falls	1a. Utilize proper lifting procedure when handling equipment and cooler. ➢ Bend down at the knees and lift/lower with your legs and do not lift anything > 50lbs. ➢ Place cooler on the bed of the truck before adding ice to avoid making coolers dangerously heavy. Perform a team lift if cooler weight exceeds 35lbs. 1b. Perform a general scan of your planned walking path to truck or next location for any obstructions, debris, slip, trip, and fall hazards. Communicate conditions with sampling partner.
On-site edits:				No edits
H. Departing the site 1. Exiting the property	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury and/or damage to personnel, property, and pets.	1a. When backing out of a site location, use a spotter to avoid damage or injury to the work vehicle, property, residents, and pets/livestock. ➢ If possible, avoid backing out, and exit moving forward.
On-site edits:				No edits

Core Safety Expectations

1. ***Always follow Fall Protection standards when working at elevated heights.***
2. ***Always follow Written Permit procedures.***
3. ***Always follow Lock Out/Tag Out (LOTO) procedures.***
4. ***Always follow Critical Device Defeat procedures.***
5. ***Always follow written PPE Requirements for the work being performed.***

Misty J Kettell
11-9-15

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Job Safety Analysis (JSA)

JSA Title: **Motor Vehicle Driving**

JSA Control #:

Date Developed: 4/15/2015	
Latest Revised Date: 4/15/2015- JSA Retention 1 year from Latest Revision Date.	
Developed by: Misty Kuttell	
Work Team Leader: Misty Kuttell	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.

Revision #: 1	**Work Location:** **Permit #:** A-1141 Injection Well

This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.

SPECIFIC PPE: Gloves: (base on hazard and identified in column 4 e.g. - leather). PPE Clothing: highly visible clothing such as orange coveralls & reflective safety vest. Fire Retardant clothing (FRC) is required for well pad operations. Safety Glasses. Safety Shoes: steel-toed. Winter weather: Yack Tracks and FRC hard hat liner

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Fire extinguisher; First aid kit; Yellow flashing light; Roadside emergency kit; Spill containment kit

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply by using "Hazard Identification" tool)*		**Potential Hazards**	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Pre-mobilization 1. Always conduct a pre-trip or pre-use inspection of the vehicle prior to driving	X Motion _ Chemical _ Electrical _ Biological X Mechanical	_ Gravity _ Radiation X Temperature _ Pressure _ Sound	1a. Injuries caused by faulty or misadjusted equipment 1b. Accident or injuries caused by environmental conditions (inclement weather)	1a. Inspect exterior and interior of vehicle. Don hi-visible clothing, steel-toe boots, safety glasses and leather gloves. ➢ Exterior ▪ Check condition of windshield wipers (wear and cracking). ▪ Check tires for manufacture inflation rate and tread condition. ▪ Check for body damage/overall condition. ▪ Check under vehicle for fluid leaks (e.g., oil, brakes, transmission, etc.). ▪ Check all lights (e.g., hi/low beams, turn signals, emergency flashers). ▪ Don high visible clothing and/or vest, include FRC if on well pad site, while inspecting exterior of vehicle. ➢ Interior ▪ Adjust seat to your height and visibility. ▪ Adjust mirrors to eliminate blind spots. ▪ Fasten safety belt (passengers too). ▪ Secure all lose items in container (e.g. glove box, cargo nets, cargo box). ▪ Verifying critical equipment is working (e.g., defogger, wipers, air bags, lights, turn signals). 1b. Prepare vehicle for weather conditions prior to departure. ➢ Snow/Ice ▪ Scrape snow/ice from entire vehicle (e.g., hood, roof, windows, etc.). ▪ Add extra weight to back of trucks to increase traction. ▪ Maintain speed for conditions. ➢ Fog ▪ Turn on fog lights. ➢ Rain ▪ Ensure windows are defogged prior to mobilization. ▪ Utilize windshield wipers in all rainy conditions. ▪ Consider alternative routes based on flooding potential of roadway.

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			1c.3rd party injuries or accidents caused by unsecure equipment in truck bed	▪ Maintain speed for conditions. 1c. Inspect truck bed load. ➢ Check coolers, drums, and toolboxes to make sure all lids, caps, and tops are latched and tightened. ➢ Use ratchet-straps or cargo nets to secure load from shifting or falling from truck bed. ➢ Close and lock tailgate before mobilizing to site. ➢ Place light objects that could be blown out of truck bed in secured location of cab.
On-site edits:				No edits
B. Driving 1. Driving to and from the site or while driving onsite. ***Note:*** ➢ *Comply with all Smith Systems Five (5) Keys®* ➢ *Cell phone / texting is not permitted at any time while operating vehicle.* ➢ *Three-point seat belts must be worn by all occupants at all times while driving to and from the site and while driving onsite.* ➢ *Drive with low beams on at all times.* ➢ *Smoking is not permitted in GES vehicles.*	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Accident or injuries caused by traffic congestion or other vehicles (struck by, contact with) 1b. Accident or injuries caused by road surface condition (i.e., struck by, contact with)	1a. Mitigate potential for an accident by practicing the following techniques: ➢ Look ahead a minimum of 15 seconds to identify potential oncoming hazards. ➢ Maintain 4-second minimum following distance (increase distance due to weather conditions). ➢ Avoid focusing on any one object for more than 2 seconds. ➢ Scan the road, area around vehicle, and mirrors every 5-8 seconds. ➢ Stay out of other vehicles blind spots. ➢ Do not drive in clusters of traffic (i.e., adjust speed to give cushion between your vehicle & others). ➢ Utilize turn signals as required by law at all times 1b. Mitigate the potential for an accident by practicing the following techniques: ➢ Maintain speed; slower depending on road surface (e.g., dirt, concrete, asphalt, gravel). ➢ Drive posted speed limits (e.g., city, country roads, and highway). ➢ Do not tailgate vehicles in front of you. ➢ Pay attention for pedestrians. ➢ Place two hands on steering wheel at 9 and 3 position. ➢ Check for and yield to emergency vehicles. ➢ Obey traffic signals. ➢ Use particular caution in construction zones. ➢ Look ahead a minimum of 15 seconds. ➢ Scan the road, area around vehicle, and mirrors every 5-8 seconds. ➢ When backing, use a spotter at all times and ensure that the pre-determined hand signals have been discussed during the tailgate meeting and implemented. ➢ Stay out of other vehicles blind spots. Make eye contact with other drivers and ensure they see you.
On-site edits:				No edits
C. Preparing to Park 1. Parking	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury/vehicle impairment caused by contact with other vehicles	1a. Mitigate the potential for an accident by practicing the following techniques: ➢ ***First move forward*** - Back into space (required on terminal sites). ➢ Maneuver vehicle slowly within parking lot. ➢ Ensure vehicle is legally parked. ➢ Ensure nothing is located at rear of vehicle prior to mobilization. ➢ Get out and inspect space and vehicle if unsure of potential or unseen hazards. When parked, vehicles that have automatic transmissions, the vehicle must be placed into park and the emergency (parking brake applied). For manual transmissions, the emergency brake must be applied and wheel chocks used to prevent the vehicle from rolling ➢ Wheel chocks must be used for large vehicles when parked/positioned on uneven surfaces; front & back of each rear tire. ➢ Wheel chocks must be used (front & back of each rear tire) on all vehicles working at the site/ vehicles with manual transmission parked on sloping surfaces ➢ When parked and unhooked from a vehicle, trailers must have a wheel chock placed in front of and

Gas

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				behind each rear wheel.
On-site edits:				No edits

Misty J. Kittell
11-9-15

Core Safety Expectations

1. ***Always follow Fall Protection standards when working at elevated heights.***
2. ***Always follow Written Permit procedures.***
3. ***Always follow Lock Out/Tag Out (LOTO) procedures.***
4. ***Always follow Critical Device Defeat procedures.***
5. ***Always follow written PPE Requirements for the work being performed.***

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Analysis Report

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ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

December 01, 2015

Project: A-1141 Injection Well

Submittal Date: 11/10/2015
Group Number: 1607915
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
033-WV-009-110915-1420-1-602 Grab	8126439
033-WV-009-110915-1420-1-602 Filtered Grab	8126440

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

Respectfully Submitted,

Stephen J. Gordon
Project Manager

(724) 597-2027

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Analysis Report

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Sample Description: 033-WV-009-110915-1420-1-602 Grab
Groundwater John & Melinda Law
A-1141 Injection Well

LL Sample # WW 8126439
LL Group # 1607915
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 14:20 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

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CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	Benzene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Carbon Tetrachloride	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Chlorobenzene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,2-Dichlorobenzene	N.D.		1	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,4-Dichlorobenzene	N.D.		1	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,1-Dichloroethane	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,2-Dichloroethane	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,1-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	cis-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	trans-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,2-Dichloropropane	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Ethylbenzene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Methyl Tertiary Butyl Ether	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Methylene Chloride	N.D.		2	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Styrene	N.D.		1	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Tetrachloroethene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Toluene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,2,4-Trichlorobenzene	N.D.		1	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,1,1-Trichloroethane	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	1,1,2-Trichloroethane	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Trichloroethene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Vinyl Chloride	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	m+p-Xylene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	o-Xylene	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
10335	Xylene (Total)	N.D.		0.5	ug/l		11/20/15 00:41	11/20/15 00:41	2002
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	TPH-GRO water C6-C10	N.D.		20	ug/l		11/11/15 23:21	11/11/15 23:21	2001
GC Miscellaneous									
RSKSOP-175 modified									
07105	n-butane	N.D.		1.0	ug/l			11/11/15 17:47	719
07105	Ethane	N.D.		1.0	ug/l			11/11/15 17:47	719
07105	Methane	N.D.		3.0	ug/l			11/11/15 17:47	719
07105	Propane	N.D.		1.0	ug/l			11/11/15 17:47	719
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	C10-C28	N.D.		0.047	mg/l		11/12/15 19:00	11/17/15 00:54	2027
02740	C24-C40	N.D.		0.047	mg/l		11/12/15 19:00	11/17/15 00:54	2027

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Analysis Report

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Sample Description: 033-WV-009-110915-1420-1-602 Grab
Groundwater John & Melinda Law
A-1141 Injection Well

LL Sample # WW 8126439
LL Group # 1607915
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 14:20 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

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CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	Total TPH (C10-C40)	N.D.		0.047	mg/l		11/12/15 19:00	11/17/15 00:54	2027
Metals									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:30	2992
01750	**Calcium**	**98.6**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:30	2992
01754	**Iron**	**0.0470 J**	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:30	2992
07058	**Manganese**	**0.0526**	.05	0.00080	mg/l	X	11/17/15 09:53	11/18/15 19:30	2992
01767	**Sodium**	**120**		0.167	mg/l		11/17/15 09:53	11/18/15 19:30	2992
EPA 200.8 rev 5.4									
06025	Arsenic	N.D.	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:40	1242
06026	**Barium**	**0.0415**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:40	1242
Wet Chemistry									
EPA 300.0									
00224	**Chloride**	**7.2**	250	1.0	mg/l			11/16/15 16:23	2987
00228	**Sulfate**	**291**	250	7.5	mg/l	XX		11/14/15 18:13	6676
EPA 415.1									
00273	Total Organic Carbon	N.D.		0.50	mg/l			11/18/15 11:14	495
EPA 170.1									
12151	**Temperature of pH**	**23.2**		0.010	Degrees C			11/10/15 22:27	1124
SM 2540 C-1997									
00212	**Total Dissolved Solids**	**654**	500	19.4	mg/l	X		11/12/15 08:00	8743
SM 2540 D-1997									
10457	Total Suspended Solids	N.D.		1.00	mg/l			11/12/15 08:02	8743
SM 4500-H+ B-2000									
12152	**pH**	**7.9**		0.010	Std. Units			11/10/15 22:27	1124
	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
SM 5540 C-2000									
00225	M. B. A. S.	N.D.	.5	0.040	mg/l LAS MW 320			11/11/15 00:15	237
Microbiology									
SM 9223 B-1997									

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Analysis Report

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Sample Description: 033-WV-009-110915-1420-1-602 Grab
Groundwater John & Melinda Law
A-1141 Injection Well

LL Sample # WW 8126439
LL Group # 1607915
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 14:20 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

JLAW-

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Microbiology									
SM 9223 B-1997									
08161	**Tot Coli/E. coli (Quanti-tray)**	See Below			MPN/100mL			11/11/15 14:21	2213
	Total Coliform	40.6	/100ml						
	E. coli	< 1.0	/100ml						

General Sample Comments

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Analysis Report

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Sample Description: 033-WV-009-110915-1420-1-602 Filtered Grab
Groundwater John & Melinda Law
A-1141 Injection Well

LL Sample # WW 8126440
LL Group # 1607915
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 14:20 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:33	2992
01750	**Calcium**	**78.8**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:33	2992
01754	Iron	N.D.	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:33	2992
07058	**Manganese**	**0.0456**	.05	0.00080	mg/l		11/17/15 09:53	11/18/15 19:33	2992
01767	**Sodium**	**133**		0.167	mg/l		11/17/15 09:53	11/18/15 19:33	2992
EPA 200.8 rev 5.4									
06025	Arsenic	N.D.	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:42	1242
06026	**Barium**	**0.0377**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:42	1242

General Sample Comments

This sample was field filtered for dissolved metals.

DEFINITIONS:
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC **Lab PM Contact Name:** Wendy Kozma **Lab Address:** 2425 New Holland Pike **City, State ZIP:** Lancaster, PA 17601 **Phone:** 717-556-7257 **Fax:** 717-656-6766 **Email:** WendyKozma@eurofinsus.com	**Client:** Southwestern Energy Company **Client Contact Name:** Tyler Spear **Client Address:** 179 Innovation Drive **City, State ZIP:** Jane Lew, WV 26378 **Phone:** 304-884-1681 **Email:** Tyler_Spear@SWN.com	**Environmental Chain of Custody (COC)** **Consultant Name:** GES, Inc. **Consultant PM Contact Name:** Nicholas Lohr **Phone:** 800-267-2549, Ext. 3634 **Fax:** 866-902-2187 **Email:** Nlohr@gesonline.com	eurofins | Lancaster Laboratories

***WELL PAD NAME:** A-1141 Injection Well

***Please circle which type of site this is:** IMPOUNDMENT WELL PAD SPECIAL PROJECT

***PROPERTY # (AFE# if applicable):** 401161668

***MAJOR/MINOR CODE:** 52695/007

***STATE SAMPLED:** WV

***OWNER NAME:** John & Melinda Law

***Analysis Turnaround Time (working days)**

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

***SAMPLER(s):** Matthew Crownover 602

20810
1607915
8126439-41

COC Page 1 of 1

Lab SDG Label

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present) ☐ *Sample Collected - POST-Treatment System

☒ *Pre-drill Sample ☐ *Post-drill Sample

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-110915-1420-1-602	11/9/15	1420	grab	GW	22	X	x	x	x	x	x	x	x	x	x	x	x	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

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Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

***PARCEL ID #:** 03 4F 0070000 10000

***FEDEX TRACKING #:** 8013018 74555

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Well at hand pump hydrant

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
Matt Crownover	GES	11/9/15 1845			
Relinquished by:	Company:	Date/Time:	Received by:		Date/Time:
				ELLE	11-10-15 / 915

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Sample Administration Receipt Documentation Log

Doc Log ID: 122727

Group Number(s): 1607915

Client: GES

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	11/10/2015 9:15
Number of Packages:	1	Number of Projects:	1
State/Province of Origin:	WV		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	No	Sample Date/Times match COC:	Yes
Samples Chilled:	Yes	VOA Vial Headspace ≥ 6mm:	No
Paperwork Enclosed:	Yes	Total Trip Blank Qty:	2
Samples Intact:	Yes	Trip Blank Type:	HCL
Missing Samples:	No	Air Quality Samples Present:	No
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Timothy Cubberley (6520) at 10:00 on 11/10/2015

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT131	0.4	DT	Wet	Y	Bagged	N

Per-bottle Temperature Details

All Temperatures in °C

Cooler #	Thermometer	Bottle Temperature Range
1	32170023	0.7 - 1.1

Office of Oil & Gas
OCT 20 2016

2425 New Holland Pike
Lancaster, PA 17605-2425

T | 717-656-2300
F | 717-656-2681
www.LancasterLabs.com

eurofins | Lancaster Laboratories Environmental

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

OCT 20 2016

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

Southwestern Energy
PO Box 1300
Jane Lew, WV 26378
PHONE: (304) 884-1610

December 3, 2015

Bernadette Law
5096 US HWY 33 W
Camden, WV 26338

Certified Mail Receipt: 7014 0150 0001 8784 2505

RE: Water Supply Testing Analytical Results

Dear Ms. Law:

SWN Production Company, LLC has recently sampled your water source(s) in conjunction with renewing an injection well permit with the WV DEP.

Enclosed please find the results of that sample(s) as prepared by Eurofins Lancaster Laboratories Environmental in addition to the Field Data Packet collected by a GES representative during the interview.

Should you need assistance interpreting the analytical data as presented in the report, you may refer to the following websites or other guidance documents from the West Virginia Department of Environmental Protection or other regulatory agencies. Additionally, EPA Water Systems Council Well Care Hotline can be contacted 888-395-1033.

- www.dep.wv.gov/
- https://wvdhhr.org/phs/water/index.asp
- http://water.epa.gov/drink/contaminants/

Should you have any additional questions, please contact me at (304)-884-1681.

Received
Office of Oil & Gas
OCT 20 2016

Thank you, we appreciate your cooperation.

Sincerely,

Tyler Spear
Engineering Regulatory Technician

The Right People doing the Right Things, wisely Investing the cash flow from our underlying Assets, will create Value+

Received
Office of Oil & Gas
OCT 20 2016

UIC - Bernadette Law - Results

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)
For delivery information visit our website at www.usps.com®
OFFICIAL USE
Postage $
Certified Fee
Return Receipt Fee (Endorsement Required)
Restricted Delivery Fee (Endorsement Required)
Postmark Here
7014 0150 0001 8784 2505
Bernadette Law
5096 US HWY 33 W
Camden, WV 26338

SENDER: COMPLETE THIS SECTION
- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

COMPLETE THIS SECTION ON DELIVERY
A. Signature
X ☐ Agent ☐ Addressee
B. Received by (Printed Name) C. Date of Delivery
1. ...ss different from item 1? ☐ Yes
...livery address below: ☐ No
Bernadette Law
5096 US HWY 33 W
Camden, WV 26338
☑ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ Collect on Delivery
4. Restricted Delivery? (Extra Fee) ☐ Yes
2. Article Number (Transfer from service label) 7014 0150 0001 8784 2505
PS Form 3811, July 2013 Domestic Return Receipt UIC - Law - Results

Received
Office of the Clerk
OCT 20 2016

SWN
Southwestern Energy
PO Box 1300
Jane Lew, WV 26378
PHONE: (304) 884-1610

December 3, 2015

Bernadette Law
5096 US HWY 33 W
Camden, WV 26338

Certified Mail Receipt: 7014 0150 0001 8784 2505

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Sincerely,

Tyler Spear
Engineering Regulatory Technician

The Right People doing the Right Things,
wisely Investing the cash flow from
our underlying Assets, will create Value+

Received
Office
OCT 20 2016

Sampling Field Data Package
A-1141 INJECTION WELL
LEWIS COUNTY, WV

Law
034F001900000000
033-WV-009-110915-1230-1-602
November 9, 2015

Prepared For:

Southwestern Energy
Jane Lew, WV

Prepared By:

Groundwater & Environmental Services, Inc.
301 Commerce Park Drive
Cranberry Township, PA 16066

November 16, 2015

OCT 20 2016

FIELD DOCUMENTATION

Site Visit Form, Calibration Logs, Logbook, Site Sketch, COCs, Checklist

Received
Office of Oil & Gas
OCT 20 2016

Part A: GENERAL INFORMATION

Water Source ID*:	PD-11092015-602-02	O & G Well Name*:	A-1141 INJECTION WELL
Pad Name*:	A-1141 INJECTION WELL	Parcel Number*:	03 4F001900000000
Tax ID:	03 4F001900000000		
Operator ID*:	033	State Code*:	
County Code*:	009		
Sampled By*:	MATT CROWNOVER	Company Name*:	GES
Water Sampler Identifier*:	602	Date/Time Sampled*:	11/09/2015 12:30 (24hr)
Sample Frequency*:	1	N/A: No Sample Details:	
Person Interviewed*:	Owner	Please specify:	

PROPERTY OWNER		RESIDENT OR OTHER	☑ Same as owner
Name*:	BERNADETTE LAW	Name*:	BERNADETTE LAW
Address*:	5096 US HWY 33 W	Address*:	5096 US HWY 33 W
City*:	CAMDEN	City*:	CAMDEN
State*:	WV	State*:	WV
Postal Code*:	26338	Postal Code*:	26338
Phone No*:	304-359-3561	Phone No*:	304-269-3611

Part B: WATER QUALITY

	Recorded Quality			Observed Quality		
	Yes	No	N/A	Yes	No	N/A
Staining	○	◉	○	○	◉	○
Odor	○	◉	○	○	◉	○
Cloudiness	○	◉	○	○	◉	○
Sheen	○	◉	○	○	◉	○
Effervescence	○	◉	○	○	◉	○
Taste	○	○	◉			

Treatment*

- ☑ None
- ☐ Charcoal Filter
- ☐ Softening
- ☐ UV light
- ☐ Chlorination
- ☐ pH Adjustment
- ☐ Iron Removal
- ☐ In-line Sediment Filter

Other:

Functioning Properly*: ○ Yes ○ No ○ Unknown

Pump Type

- ◉ None
- ○ Gas Piston
- ○ Submersible
- ○ Windmill
- ○ Jet
- ○ Other:

Capacity (GPM):

Comments:

Part C: WATER SOURCE INFORMATION

Does this source supply any other properties? ○ Yes ◉ No

Identify properties:

Is the water source(s) located on the property? ◉ Yes ○ No Please explain:

Number of people using this water source: 0 Gallons/day: 0

OCT 20 2015

Pressure Tank? ○ Yes ◉ No Size (gallons):

Water Use: ☐ Domestic ☐ Husbandry ☐ Irrigation Other: NOT USED

Coordinates: (NAD83 decimal, 5 places) Lat: 39.053710 Long: -80.880522 Ground Surface Elevation: 1075 ft

Does the water source ever go dry? ○ Yes ◉ No

Water Source Type*: POND

Part D: DESCRIPTION OF WATER SOURCE

Check all that apply

☐ Loose, missing, or damaged cover ☑ Evidence of insects, spiders, animals ☑ Open to surface water

☐ Any cracked or damaged well casing/spring vault ☐ Additional storage or holding tank/coyote system

☐ Evidence of erosion ☐ Water source secured ☐ Source buried ☐ Location unknown ☐ Cover flush with ground

Other:

Part E: DESCRIPTION OF AREA SURROUNDING WATER SOURCE

Check all that apply

☑ Ground sloping towards water source ☐ Water source downgradient of septic system

Signs of:

☐ Failing septic ☐ Soggy ground ☐ Foul odor

Close proximity to (tick all that apply):

☐ Garden ☐ Orchard ☐ Greenhouse ☐ Equipment storage areas

☐ Junkyard ☐ Dumping area ☐ Landfill ☐ Salt storage area/Salted roadway

☐ Garage ☐ Fuel storage tanks

Located in field with:

☐ Livestock ☐ Inside Barn ☐ Barnyard ☐ Other out buildings

Additional remarks and comments:

Part F: SAMPLING

Sample ID: 033-WV-009-110915-1230-1-602

Sampled	Sampling Point Location
○ Before Treatment ○ After Treatment	○ Inside Faucet ○ Outside Faucet ○ Overflow/Discharge Pipe
◉ No Treatment ○ Not Sure	○ Seep ○ Pressure Tank ○ Bailed
	○ Wellhead ◉ Other: EDGE OF POND

Was the water source purged before sampling ○ Yes ◉ No Volume (gal): Time (min):

Is it possible to run water for 30 minutes? ○ Yes ◉ No If No, please explain: NO FLOWING WATER

Average water usage within the last 24 hours: 0 Chain of custody attached? ◉ Yes ○ No

Field Analyses:

Turbidity (ntu): 2.96 pH (ph units): 7.75

Conductivity (umhos/cm): 183 Temperature (deg c): 13.06

Gas Readings:

Type	PPM	% LEL	% GAS

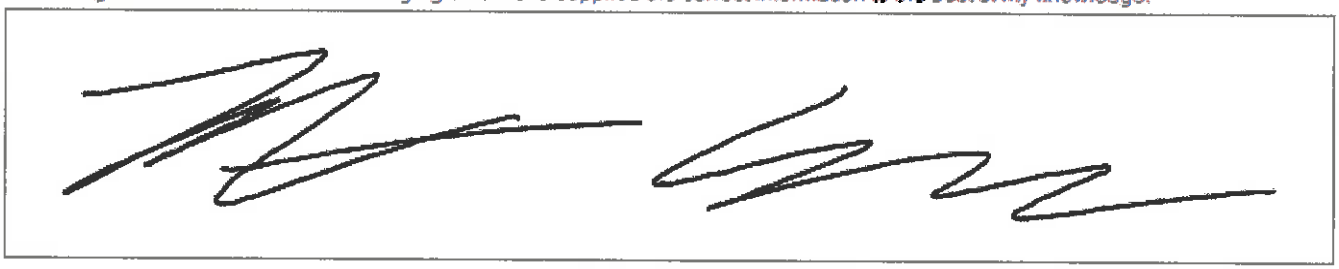
Wellhead		Peak / Sustained		Peak / Sustained		Peak / Sustained		
SW Vicinity	0	Peak / Sustained		Peak / Sustained		Peak / Sustained		
Cold Headspace	0	Peak / Sustained		Peak / Sustained		Peak / Sustained		
		Peak / Sustained		Peak / Sustained		Peak / Sustained		
		Peak / Sustained		Peak / Sustained		Peak / Sustained		
		Peak / Sustained		Peak / Sustained		Peak / Sustained		

Part G: SITE SKETCH and PHOTOGRAPHS

Add Images | 3 pictures attached to the from

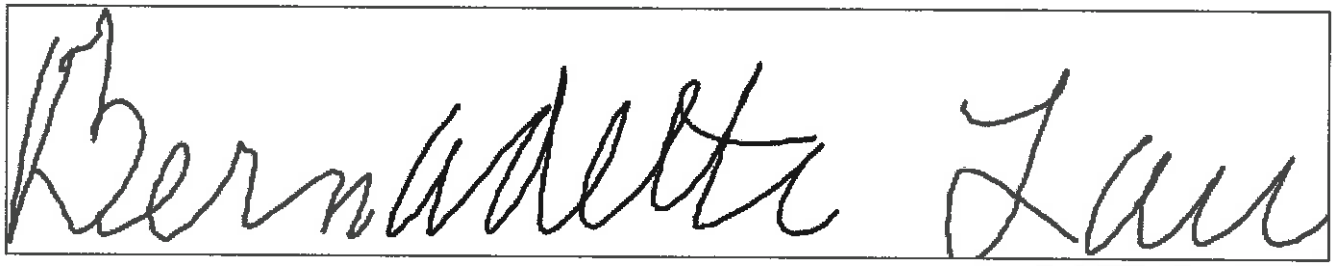
SAMPLER

Please sign in the box below acknowledging that I have supplied the correct information to the best of my knowledge.



Accept | Clear

INTERVIEWEE



Accept | Clear

OCT 20 2016

Form #: NA
(Reference Form # in Log Book)

Truck #: NA

Gas Explorer Calibration Log

GES Equipment Name: GES-GE-029

Equipment Serial #: 1202-302846

Date of Calibration	Time		Pre-Test	Span Gas	Span Gas	Bump Test	Calibrated By
9-28-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Baxley 489
↓	↓	H_2S	0	100ppm		↓	↓
Date of Calibration	Time		Pre-Test	Span Gas	Span Gas	Bump Test	Calibrated By
10-30-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P Baxley 489
↓	↓	H_2S	0	100ppm		↓	↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
Date of Calibration	Time		Pre-Test	Span Gas	Span Gas	Bump Test	Calibrated By
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
Date of Calibration	Time		Pre-Test	Span Gas	Span Gas	Bump Test	Calibrated By
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
Date of Calibration	Time		Pre-Test	Span Gas	Span Gas	Bump Test	Calibrated By
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
Date of Calibration	Time		Pre-Test	Span Gas	Span Gas	Bump Test	Calibrated By
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
Date of Calibration	Time		Pre-Test	Span Gas	Span Gas	Bump Test	Calibrated By
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
Date of Calibration	Time		Pre-Test	Span Gas	Span Gas	Bump Test	Calibrated By
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
Date of Calibration	Time		Pre-Test	Span Gas	Span Gas	Bump Test	Calibrated By
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
Date of Calibration	Time		Pre-Test	Span Gas	Span Gas	Bump Test	Calibrated By
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓

NOTE: Gas Explorers must be calibrated on the first day of every month. If the instrument is recalibrated at anytime the calibration information must be recorded on this sheet.

3-Gas= 2.5%(50%LEL) Methane, 100ppm CO, Balance Air

GES - Ver. 1

Southwestern Energy Predrill Sampling

Gas Detector Bytorch Calibration

Equipment Serial Number:	1202 - 302846
GES Equipment Code:	GES - GE - 029
Equipment Type:	Gas Explorer
Date of Calibration:	10-30-2015
Include Gas Detector Calibration Log with Field Documentation	

GPS Equipment

Equipment Serial Number:	RBC15N0226
GES Equipment Code:	NA
Equipment Type:	Trimble Yuma

Water Quality Multi-Parameter Calibration

Equipment Serial Number:	09E100453		08325700
GES Equipment Code:	NA		NA
Equipment Type:	YSI		Hanna H1
Calibration Method:	3pt pH / 1pt sp cond -		4pt.
Date of Calibration:	11-9-2015		11-9-15
Calibration Parameter	Time	Pre-Value/Reading	Person Performing Calibration
pH-4	0724	4.34	Matthew Crownover 402
pH-7	0725	6.61	
pH-10	0727	10.36	
Specific Conductivity (µS/cm)	0730	1420	
Turbidity (<0.1 NTU)	0735	0.12	
Turbidity (15 NTU)	0736	14.9	
Turbidity (100 NTU)	0738	100	
Turbidity (750 NTU)	0739	758	
Calibration Parameter	Time	Post-Value/Reading	Person Performing Calibration
pH-4	0724	3.98	Matthew Crownover 402
pH-7	0726	7.00	
pH-10	0728	10.06	
Specific Conductivity (µS/cm)	0731	1413	
Turbidity (<0.1 NTU)	0735	0.18	
Turbidity (15 NTU)	0737	15.1	
Turbidity (100 NTU)	0738	99.9	
Turbidity (750 NTU)	0740	751	

Decon Procedures

Reference GES Baseline Water Well Sampling SOP

OCT 20 2016

Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Inj. Well

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F0619000000000

Site Arrival Time: 1100 Site Departure Time: 1315

Samplers (Full Names and Sampler #s): Misty Kettell 556

Mathew Crownover 602

Weather Condition Observations Recorded at: 1228

Weather Conditions: Cloudy Air Temp (Degrees Fahrenheit): 49

Estimate Wind Speed(mph): 3 Approximate Wind Direction: SW

Note: Remember to document any changes in weather conditions (Include Times).

Equipment Bump Test Verification (Include GES Equipment Number and Time):

MK

Refer to page 12 for 11-9-15 (insert date) for full calibration information.

Does the parcel have a septic system?: X Y ___ N

If Yes, describe the location of the septic area below and provide an approximate location on the site map. East of house

1230: Arrived at the pond and began sampling PD-11092015-602-02.
Sample ID 033-WV-009-110915-1230-1-602.
Pond is not used.
Located downhill from the injection well on the same property.
1315: Departed site for next owner + sample.

Tracking Number: 804713270307

MK

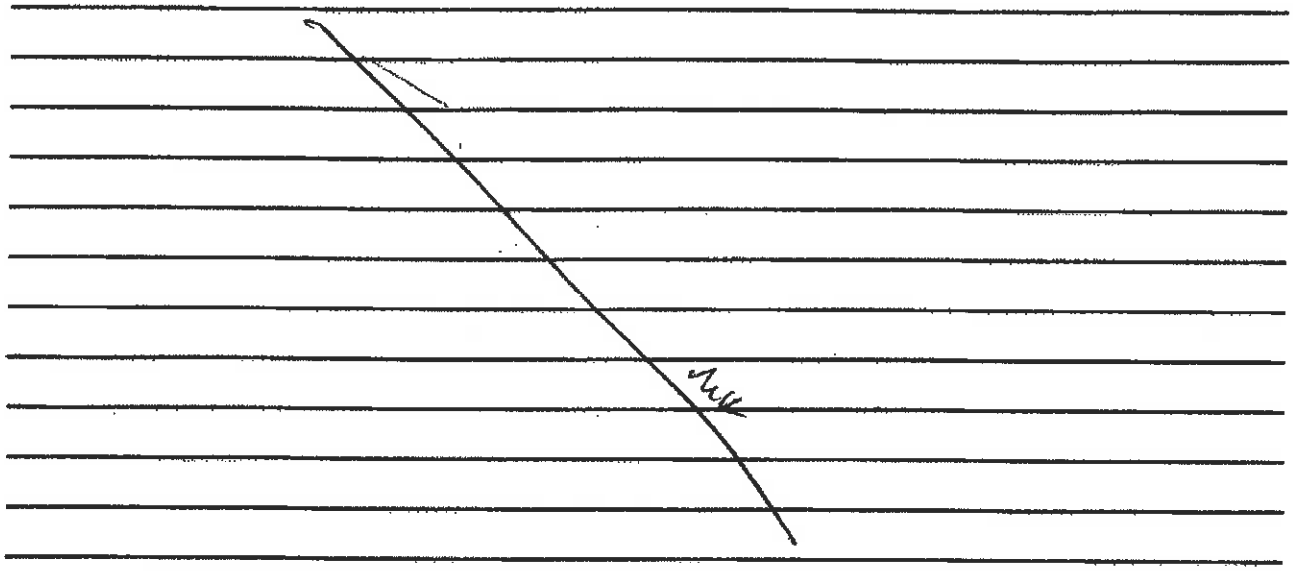
Received
OCT 20 2016

Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Inj Well 80

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F00190000 0000



Interviewee Signature:

Bernadette Law

Fields intentionally left blank in EDGE because they are unknown or do not apply:
(Check all that apply)

For All Sources:

- ☐ Pump Type
- ☐ Pump Capacity
- ☐ Number of People Using the Water Source
- ☐ Gallons/Day Used
- ☐ Average Water Usage Within the Last 24 Hours

For Wells:

- ☐ Reported Well Depth
- ☐ Reported Depth to Water Level
- ☐ Reported Pump Depth
- ☐ Date Drilled
- ☐ Drillers Name
- ☐ Well Location

For Cisterns:

- ☐ Source of Water

Received
Office
OCT 20 2016

Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Inj Well 81

Southwestern Energy Predrill Sampling

Log Book #105

WELL PURGING: FIELD WATER QUALITY MEASUREMENTS FORM

Parcel #: 03 4F00190000000 Turbidity (NTU): Time (Military):

Time (Military)	Temperature (Degrees Celsius)	Specific Conductance (µS/cm)	pH (Standard Units)	Comments

Google earth

feet 1000
meters 400

N

Southwestern Energy
A-1141 Injection Well
Property Owner: Bernadette Law
Parcel: 03 4F001900000000
Date: 11-09-2015
Times: 1150 and 1230

OCT 20 2016

PHOTOGRAPHS

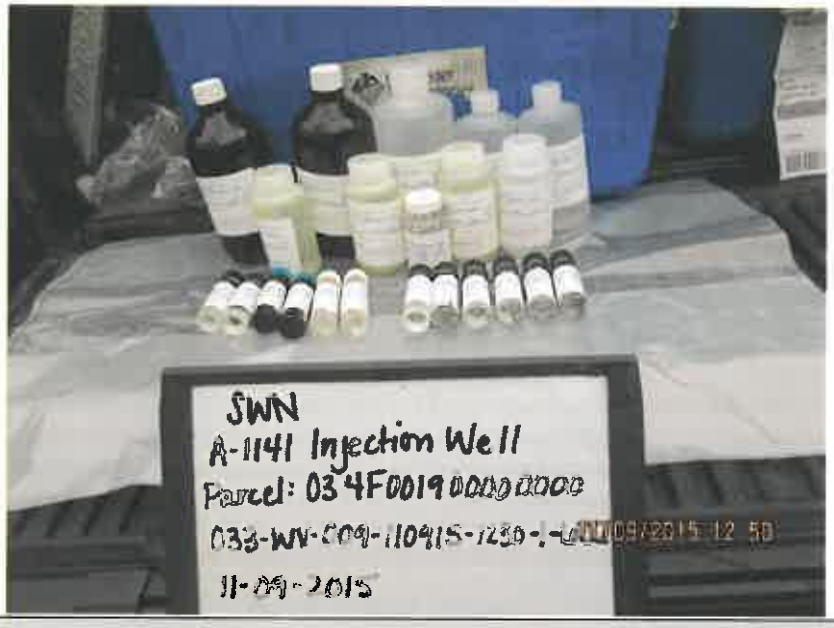
Received
Office of Oil & Gas
OCT 20 2016

Source: Pond

Sample Location

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F001900000000
Law
033-WV-009-110915-1230-1-602
November 9, 2015

OCT 20 2016



Sample

Received
Office of Oil & Gas
OCT 20 2016

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F001900000000
Law
033-WV-009-110915-1230-1-602
November 9, 2015

eurofins | Lancaster Laboratories Environmental

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

REVISED

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

December 01, 2015

Project: A-1141 Injection Well

Submittal Date: 11/10/2015
Group Number: 1607913
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
033-WV-009-110915-1230-1-602 Grab	8126435
033-WV-009-110915-1230-1-602 Filtered Grab	8126436

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

Respectfully Submitted,

Stephen J. Gordon
Project Manager

(724) 597-2027

Received
Office of Oil & Gas
OCT 20 2016

REVISED

Sample Description: 033-WV-009-110915-1230-1-602 Grab
Surface Water Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126435
LL Group # 1607913
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 12:30 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

BLAW2

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	Benzene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Carbon Tetrachloride	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Chlorobenzene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,2-Dichlorobenzene	N.D.		1	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,4-Dichlorobenzene	N.D.		1	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,1-Dichloroethane	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,2-Dichloroethane	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,1-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	cis-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	trans-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,2-Dichloropropane	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Ethylbenzene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Methyl Tertiary Butyl Ether	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Methylene Chloride	N.D.		2	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Styrene	N.D.		1	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Tetrachloroethene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Toluene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,2,4-Trichlorobenzene	N.D.		1	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,1,1-Trichloroethane	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,1,2-Trichloroethane	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Trichloroethene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Vinyl Chloride	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	m+p-Xylene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	o-Xylene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Xylene (Total)	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	TPH-GRO water C6-C10	N.D.		20	ug/l		11/11/15 22:27	11/11/15 22:27	2001
GC Miscellaneous									
RSKSOP-175 modified									
07105	n-butane	N.D.		1.0	ug/l			11/11/15 17:30	719
07105	Ethane	N.D.		1.0	ug/l			11/11/15 17:30	719
07105	**Methane**	**24**		3.0	ug/l			11/11/15 17:30	719
07105	Propane	N.D.		1.0	ug/l			11/11/15 17:30	719
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	**C10-C28**	**0.10**		0.050	mg/l		11/12/15 19:00	11/17/15 02:21	2027

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Analysis Report

REVISED

Sample Description: 033-WV-009-110915-1230-1-602 Grab
Surface Water Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126435
LL Group # 1607913
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 12:30 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

BLAW2

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	**C24-C40**	**0.11**		0.050	mg/l		11/12/15 19:00	11/17/15 02:21	2027
02740	**Total TPH (C10-C40)**	**0.12**		0.050	mg/l		11/12/15 19:00	11/17/15 02:21	2027
Metals									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:24	2992
01750	**Calcium**	**22.3**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:24	2992
01754	**Iron**	**0.211**	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:24	2992
07058	**Manganese**	**0.0888**	.05	0.00080	mg/l	X	11/17/15 09:53	11/18/15 19:24	2992
01767	**Sodium**	**5.07**		0.167	mg/l		11/17/15 09:53	11/18/15 19:24	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.00062 J**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:37	1242
06026	**Barium**	**0.0460**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:37	1242
Wet Chemistry									
EPA 300.0									
00224	**Chloride**	**6.5**	250	1.0	mg/l			11/14/15 17:56	6676
00228	**Sulfate**	**16.0**	250	1.5	mg/l			11/14/15 17:56	6676
EPA 415.1									
00273	**Total Organic Carbon**	**3.9**		0.50	mg/l			11/18/15 10:59	495
EPA 170.1									
12151	**Temperature of pH**	**22.8**		0.010	Degrees C			11/10/15 22:23	1124
SM 2540 C-1997									
00212	**Total Dissolved Solids**	**95.5**	500	9.7	mg/l			11/12/15 08:00	8743
SM 2540 D-1997									
10457	**Total Suspended Solids**	**5.70**		1.00	mg/l			11/12/15 08:02	8743
SM 4500-H+ B-2000									
12152	**pH**	**8.0**		0.010	Std. Units			11/10/15 22:23	1124
	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
SM 5540 C-2000									
00225	M. B. A. S.	N.D.	.5	0.040	mg/l LAS MW 320			11/11/15 00:15	237
Microbiology									

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Analysis Report

REVISED

Sample Description: 033-WV-009-110915-1230-1-602 Grab
Surface Water Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126435
LL Group # 1607913
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 12:30 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

BLAW2

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Microbiology									
SM 9223 B-1997									
08161	**Tot Coli/E. coli (Quanti-tray)**	**See Below**			MPN/100mL			11/11/15 14:21	2213
	Total Coliform	> 200.5		/100ml					
	E. coli	200.5		/100ml					

General Sample Comments

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Analysis Report

REVISED

Sample Description: 033-WV-009-110915-1230-1-602 Filtered Grab
Surface Water Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126436
LL Group # 1607913
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 12:30 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:27	2992
01750	**Calcium**	**22.4**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:27	2992
01754	**Iron**	**0.0833 J**	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:27	2992
07058	**Manganese**	**0.0598**	.05	0.00080	mg/l	X	11/17/15 09:53	11/18/15 19:27	2992
01767	**Sodium**	**5.05**		0.167	mg/l		11/17/15 09:53	11/18/15 19:27	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.00087 J**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:38	1242
06026	**Barium**	**0.0427**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:38	1242

General Sample Comments

This sample was field filtered for dissolved metals.

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

OCT 20 2016

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC **Lab PM Contact Name:** Wendy Kozma **Lab Address:** 2425 New Holland Pike **City, State ZIP:** Lancaster, PA 17601 **Phone:** 717-556-7257 **Fax:** 717-656-6766 **Email:** WendyKozma@eurofinsus.com	**Client:** Southwestern Energy Company **Client Contact Name:** Tyler Spear **Client Address:** 179 Innovation Drive **City, State ZIP:** Jane Lew, WV 26378 **Phone:** 304-884-1681 **Email:** Tyler_Spear@SWN.com	**Environmental Chain of Custody (COC)** **Consultant Name:** GES, Inc. **Consultant PM Contact Name:** Nicholas Lohr **Phone:** 800-267-2549, Ext. 3634 **Fax:** 866-902-2187 **Email:** Nlohr@gesonline.com	eurofins | Lancaster Laboratories

***WELL PAD NAME:** A-1141 Injection Well

***Please circle which type of site this is:** IMPOUNDMENT WELL PAD SPECIAL PROJECT

***PROPERTY # (AFE# if applicable):** 4001161668

***MAJOR/MINOR CODE:** 57695 / 007

***STATE SAMPLED:** WV

***OWNER NAME:** Bernadette Law

***Analysis Turnaround Time (working days)**

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

***SAMPLER(s):** Matthew Cranmer 602

20810
1607913
8126435-37

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present) ☐ *Sample Collected - POST-Treatment System

☒ *Pre-drill Sample ☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-110915-1230-1-602	11/9/15	1230	grab	SW	22	X	x	x	x	x	x	x	x	x	x	x	x	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client *Disposal By Lab after two (2) months of final report date*

Special Instructions/QC Requirements & Comments:

***PARCEL ID #:** 03 4F0081900000000

***FEDEX TRACKING #:** 8071713276307

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Pond

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
	GES	11/9/15 1845			
Relinquished by:	Company:	Date/Time:	Received by:		Date/Time:
				ELLE	11-10-15 / 9:15

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

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Office of Oil & Gas
OCT 20 2016

Sampling Field Data Package
A-1141 INJECTION WELL
LEWIS COUNTY, WV

Law
034F001900000000
033-WV-009-110915-1150-1-602
November 9, 2015

Prepared For:

Southwestern Energy
Jane Lew, WV

Prepared By:

Groundwater & Environmental Services, Inc.
301 Commerce Park Drive
Cranberry Township, PA 16066

November 16, 2015

Received
Office of Oil & Gas
OCT 20 2016

FIELD DOCUMENTATION

Site Visit Form, Calibration Logs, Logbook, Site Sketch, COCs, Checklist

OCT 20 2016

Part A: GENERAL INFORMATION

Water Source ID*:	WL-11092015-602-01	O & G Well Name*:	A-1141 INJECTION WELL
Pad Name*:	A-1141 INJECTION WELL	Parcel Number*:	03 4F001900000000
Tax ID:	03 4F001900000000		
Operator ID*:	033	State Code*:	
County Code*:	009		
Sampled By*:	MATT CROWNOVER	Company Name*:	GES
Water Sampler Identifier*:	602	Date/Time Sampled*:	11/09/2015 11:50 (24hr)
Sample Frequency*:	1	N/A: No Sample	Details:
Person Interviewed*:	Owner	Please specify:	

PROPERTY OWNER		RESIDENT OR OTHER	☑ Same as owner
Name*:	BERNADETTE LAW	Name*:	BERNADETTE LAW
Address*:	5095 US HWY 33 W	Address*:	5096 US HWY 33 W
City*:	CAMDEN	City*:	CAMDEN
State*:	WV	State*:	WV
Postal Code*:	26338	Postal Code*:	26338
Phone No*:	304-269-3681	Phone No*:	304-269-3681

Part B: WATER QUALITY

	Reported Quality			Observed Quality		
	Yes	No	N/A	Yes	No	N/A
Staining	○	◉	○	○	◉	○
Odor	○	◉	○	○	◉	○
Cloudiness	○	◉	○	○	◉	○
Sheen	○	◉	○	○	◉	○
Effervescence	○	◉	○	○	◉	○
Taste	○	◉	○			

Treatment*

- ☑ None
- ☐ Charcoal Filter
- ☐ Softening
- ☐ UV light
- ☐ Chlorination
- ☐ pH Adjustment
- ☐ Iron Removal
- ☐ In-line Sediment Filter

Other:

Functioning Properly*: ○ Yes ○ No ○ Unknown

Pump Type

- ○ None
- ○ Gas Piston
- ◉ Submersible
- ○ Windmill
- ○ Jet
- ○ Other:

Capacity (GPM):

Comments:

Part C: WATER SOURCE INFORMATION

Does this source supply any other properties? ○ Yes ◉ No

Identify properties:

Is the water source(s) located on the property? ◉ Yes ○ No **Please explain:**

Number of people using this water source: 1 Gallons/day:

Office of Oil & Gas
OCT 20 2015

Pressure Tank? (•) Yes ( ) No Size (gallons):

Water Use: [ ] Domestic [ ] Husbandry [ ] Irrigation Other: WATERING PLANTS, WASHING CARS

Coordinates: (NAD83 decimal, 5 places) Lat: 39.054204 Long: -80.530770 Ground Surface Elevation: 1072 ft

Does the water source ever go dry? ( ) Yes (•) No

Water Source Type*: WATER WELL

(•) Drilled Well ( ) Dug Well ( ) Other Missing/damaged pit-less adaptor ( ) Yes ( ) No (•) Unknown

Reported total well depth (FT): Reported depth of water level (FT): Reported pump depth (FT):

Date Drilled: Drillers Name: Driller log available ( ) Yes (•) No

Well location: ( ) Inside ( ) Inside and Vented Outside (•) Outside Unvented ( ) Outside Vented

Part D: DESCRIPTION OF WATER SOURCE

Check all that apply

[ ] Loose, missing, or damaged cover [ ] Evidence of insects, spiders, animals [ ] Open to surface water

[ ] Any cracked or damaged well casing/spring vault [ ] Additional storage or holding tank/coyote system

[ ] Evidence of erosion [ ] Water source secured [ ] Source buried [ ] Location unknown [ ] Cover flush with ground

Other: LEAVES AND DEBRIS COVERING WELLHEAD

Part E: DESCRIPTION OF AREA SURROUNDING WATER SOURCE

Check all that apply

[x] Ground sloping towards water source [ ] Water source downgradient of septic system

Signs of:

[ ] Failing septic [ ] Soggy ground [ ] Foul odor

Close proximity to (tick all that apply):

[ ] Garden [ ] Orchard [ ] Greenhouse [ ] Equipment storage areas

[ ] Junkyard [ ] Dumping area [ ] Landfill [ ] Salt storage area/Salted roadway

[x] Garage [ ] Fuel storage tanks

Located in field with:

[ ] Livestock [ ] Inside Barn [ ] Barnyard [ ] Other out buildings

Additional remarks and comments:

Office of Oil & Gas

OCT 20 2016

Part F: SAMPLING

Sample ID: 033-WV-009-110915-1150-1-602

Sampled	Sampling Point Location
( ) Before Treatment ( ) After Treatment	( ) Inside Faucet (•) Outside Faucet ( ) Overflow/Discharge Pipe
(•) No Treatment ( ) Not Sure	( ) Seep ( ) Pressure Tank ( ) Bailed
	( ) Wellhead ( ) Other:

Was the water source purged before sampling (•) Yes ( ) No Volume (gal): 60 Time (min): 20

Is it possible to run water for 30 minutes? (•) Yes ( ) No If No, please explain:

Average water usage within the last 24 hours: 0 Chain of custody attached? (•) Yes ( ) No

Field Analyses:

Turbidity (ntu): 1.22 | pH (ph units): 7.21

Conductivity (umhos/cm): 361 | Temperature (deg c): 12.89

Gas Readings:

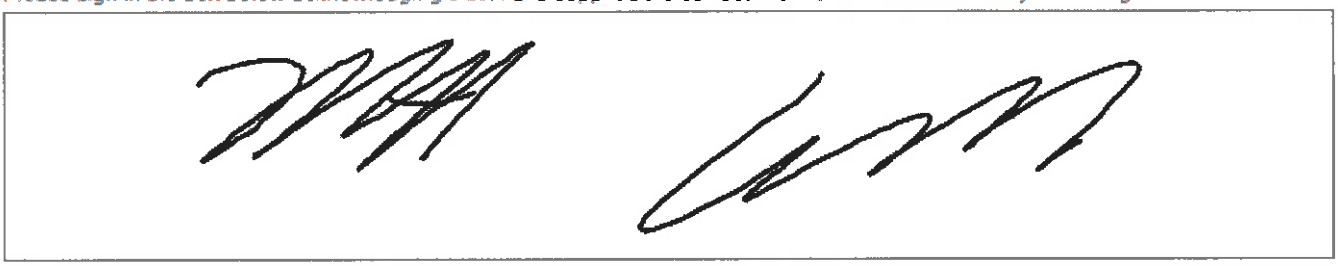
Type	PPM	% LEL	% GAS
Wellhead	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
Cold Tap	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
Cold Headspace	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)

Part G: SITE SKETCH and PHOTOGRAPHS

Add Images | 18 pictures attached to the from

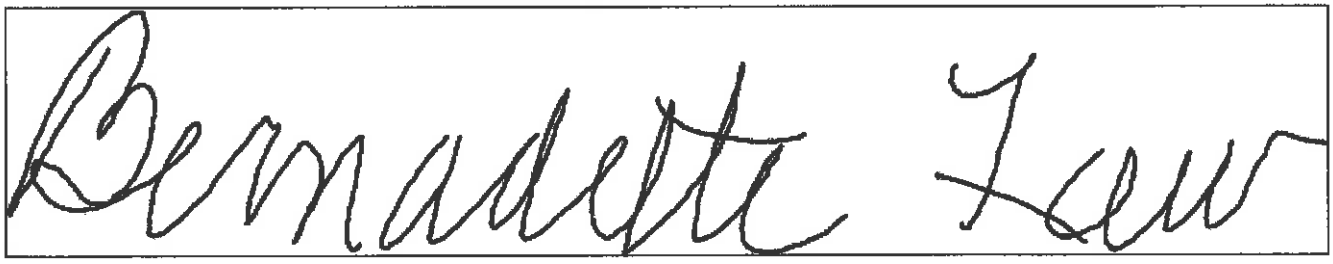
SAMPLER

Please sign in the box below acknowledging that I have supplied the correct information to the best of my knowledge.



Accept | Clear

INTERVIEWEE



Accept | Clear

Received
Office of Oil & Gas
OCT 20 2016

Form #: NA
(Reference Form # in Log Book)

Truck #: NA

Gas Explorer Calibration Log

GES Equipment Name: GES-GE-029

Equipment Serial #: 1202-302846

9-28-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Nasby 489
↓	↓	H_2S	0	100ppm		↓	↓
10-30-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Daisley 489
↓	↓	H_2S	0	100ppm		↓	↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓

NOTE: Gas Explorers must be calibrated on the first day of every month. If the instrument is recalibrated at anytime the calibration information must be recorded on this sheet.

3-Gas= 2.5%(50%LEL) Methane, 100ppm CO, Balance Air

OCT 20 2016

GES - Ver. 1

Southwestern Energy Predrill Sampling

Gas Detector Equipment Calibration

Equipment Serial Number:	1202 - 302846
GES Equipment Code:	GES - GE - 029
Equipment Type:	Gas Explorer
Date of Calibration:	10-30-2015
Include Gas Detector Calibration Log with Field Documentation	

GPS Equipment

Equipment Serial Number:	RBC15N0226
GES Equipment Code:	NA
Equipment Type:	Trimble Yuma

Water Quality Multi-Parameter Calibration

Equipment Serial Number:		09E100453	08325700
GES Equipment Code:		NA	NA
Equipment Type:		YSI	Hanna HI
Calibration Method:		3pt pH / 1pt sp cond.	4pt.
Date of Calibration:		11-9-2015	11-9-15
Calibration Parameter	Time	Pre-Value/Reading	Person Performing Calibration
pH-4	0724	4.34	Matthew Crownover L002
pH-7	0725	6.61	
pH-10	0727	10.36	
Specific Conductivity (µS/cm)	0730	1420	
Turbidity (<0.1 NTU)	0735	0.12	
Turbidity (15 NTU)	0736	14.9	
Turbidity (100 NTU)	0738	100	
Turbidity (750 NTU)	0739	758	
Calibration Parameter	Time	Post-Value/Reading	Person Performing Calibration
pH-4	0724	3.98	Matthew Crownover L002
pH-7	0726	7.00	
pH-10	0728	10.06	
Specific Conductivity (µS/cm)	0731	1413	
Turbidity (<0.1 NTU)	0735	0.18	
Turbidity (15 NTU)	0737	15.1	
Turbidity (100 NTU)	0738	99.9	
Turbidity (750 NTU)	0740	751	

Decon Procedures

Reference GES Baseline Water Well Sampling SOP

Received
Oil & Gas Division
OCT 20 2016

Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Inj. Well

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F001900000000

Site Arrival Time: 1100 Site Departure Time: 1315

Samplers (Full Names and Sampler #s): Misty Kettell 555

602 Matthew Crownover

Weather Condition Observations Recorded at: 1115

Weather Conditions: cloudy Air Temp (Degrees Fahrenheit): 47

Estimate Wind Speed(mph): 3 Approximate Wind Direction: SW

Note: Remember to document any changes in weather conditions (Include Times).

Equipment Bump Test Verification (Include GES Equipment Number and Time): 1120

GE (GES-GE-029) → 100 ppm, Bump = 100 ppm

YSI → 7.00 pH, Bump = 7.02 pH, 1413 µS/cm, Bump = 1414 µS/cm

Turbidity → 15.0 NTU, Bump = 15.0 NTU

Refer to page 12 for 11-09-15 (insert date) for full calibration information.

Does the parcel have a septic system?: X Y ___ N

If Yes, describe the location of the septic area below and provide an approximate location on the site map. Septic area located east of house.

0715: Arrived at the office to begin preparations.

0724: Calibrated equipment.

0830: Departed office for site

11:00: Arrived onsite and spoke with Bernadette Law about source information.

1128: Began purging well from outside garage spigot. The well is used for washing cars watering flowers and garden.

Pressure tank is located inside the garage. There is a pressure tank spigot however it is completely rusted and would not turn Mrs. Law showed team outside spigot instead. No cell service to notify manager.

1150: Sample collected at WL-11092015-602-01. Sample ID 033-WV-009-110915-1150-1-602

1220: Moved to next source on parcel

OCT 20 2016

Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Inj Well 77

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F001900060060

Tracking Number: 801301831298

2nd

Interviewee Signature:

Bernadette Law

Fields intentionally left blank in EDGE because they are unknown or do not apply:
(Check all that apply)

For All Sources:
- ☐ Pump Type
- ☒ Pump Capacity
- ☐ Number of People Using the Water Source
- ☒ Gallons/Day Used
- ☐ Average Water Usage Within the Last 24 Hours

For Wells:
- ☒ Reported Well Depth
- ☒ Reported Depth to Water Level
- ☒ Reported Pump Depth
- ☒ Date Drilled
- ☒ Drillers Name
- ☐ Well Location

For Cisterns:
- ☐ Source of Water

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OCT 20 2016

Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Inj Well 78

Southwestern Energy Predrill Sampling

Log Book # 105

WELL PURGING: FIELD WATER QUALITY MEASUREMENTS FORM

Parcel #: 03 4F 06190000660 Turbidity (NTU): 1.22 Time (Military): 1148

Time (Military)	Temperature (Degrees Celsius)	Specific Conductance (µS/cm)	pH (Standard Units)	Comments
1128	11.89	351	7.28	start purge
1130	12.50	351	7.01	
1132	12.48	352	7.03	
1134	12.62	352	7.03	
1136	12.73	353	7.04	
1138	12.80	353	7.08	
1140	12.79	353	7.09	
1142	12.84	353	7.12	
1144	12.86	352	7.24	
1146	12.87	352	7.25	
1148	12.89	351	7.21	

MK

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Stabilization Criteria: ±10% ±10% ±0.1

Stabilization is considered to be achieved when three consecutive readings are within the specified stabilization criteria.

Initials of Person Completing Form and Date: MK 11-9-15 SWN Location Name: A7141 Inj Well

Google earth

feet 1000
meters 400

N

Southwestern Energy
A-1141 Injection Well
Property Owner: Bernadette Law
Parcel: 03 4F001900000000
Date: 11-09-2015
Times: 1150 and 1230

Received
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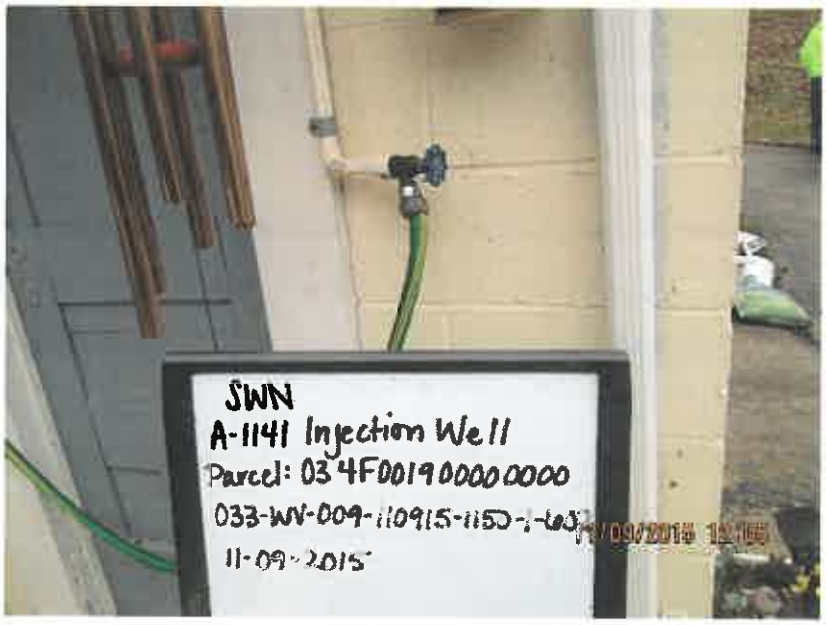
OCT 20 2016

PHOTOGRAPHS

Enclosure 1
Office of Nuclear Reactor
OCT 20 2016

Source: Well

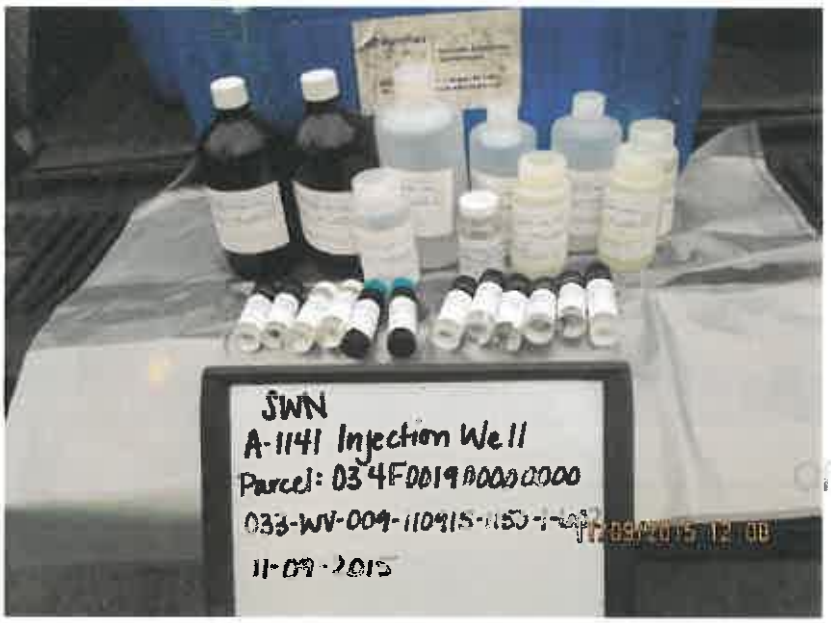


Sample Location

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F001900000000
Law
033-WV-009-110915-1150-1-602
November 9, 2015

OCT 20 2016

Pressure Tank



Office of Oil & Gas
OCT 20 2016

Sample

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F001900000000
Law
033-WV-009-110915-1150-1-602
November 9, 2015

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Analysis Report

REVISED

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

December 01, 2015

Project: A-1141 Injection Well

Submittal Date: 11/10/2015
Group Number: 1607911
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
033-WV-009-110915-1150-1-602 Grab	8126430
033-WV-009-110915-1150-1-602 Filtered Grab	8126431

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

Respectfully Submitted,

Stephen J. Gordon
Project Manager

(724) 597-2027

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OCT 20 2016

REVISED

Sample Description: 033-WV-009-110915-1150-1-602 Grab
Groundwater Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126430
LL Group # 1607911
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 11:50 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

BLAW-

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	Benzene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Carbon Tetrachloride	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Chlorobenzene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,2-Dichlorobenzene	N.D.		1	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,4-Dichlorobenzene	N.D.		1	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,1-Dichloroethane	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,2-Dichloroethane	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,1-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	cis-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	trans-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,2-Dichloropropane	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Ethylbenzene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Methyl Tertiary Butyl Ether	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Methylene Chloride	N.D.		2	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Styrene	N.D.		1	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Tetrachloroethene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Toluene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,2,4-Trichlorobenzene	N.D.		1	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,1,1-Trichloroethane	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,1,2-Trichloroethane	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Trichloroethene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Vinyl Chloride	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	m+p-Xylene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	o-Xylene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Xylene (Total)	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	TPH-GRO water C6-C10	N.D.		20	ug/l		11/11/15 22:00	11/11/15 22:00	2001
GC Miscellaneous									
RSKSOP-175 modified									
07105	n-butane	N.D.		1.0	ug/l			11/11/15 17:13	719
07105	Ethane	N.D.		1.0	ug/l			11/11/15 17:13	719
07105	**Methane**	**27**		3.0	ug/l			11/11/15 17:13	719
07105	Propane	N.D.		1.0	ug/l			11/11/15 17:13	719
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	C10-C28	N.D.		0.050	mg/l		11/12/15 19:00	11/17/15 00:32	2027
02740	C24-C40	N.D.		0.050	mg/l		11/12/15 19:00	11/17/15 00:32	2027

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Analysis Report

REVISED

Sample Description: 033-WV-009-110915-1150-1-602 Grab
Groundwater Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126430
LL Group # 1607911
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 11:50 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

BLAW-

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	Total TPH (C10-C40)	N.D.		0.050	mg/l		11/12/15 19:00	11/17/15 00:32	2027
Metals									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:18	2992
01750	**Calcium**	**29.0**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:18	2992
01754	**Iron**	**0.239**	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:18	2992
07058	**Manganese**	**0.168**	.05	0.00080	mg/l	X	11/17/15 09:53	11/18/15 19:18	2992
01767	**Sodium**	**31.8**		0.167	mg/l		11/17/15 09:53	11/18/15 19:18	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.0027**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:33	1242
06026	**Barium**	**0.281**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:33	1242
Wet Chemistry									
EPA 300.0									
00224	**Chloride**	**10.3**	250	1.0	mg/l			11/14/15 17:06	6676
00228	**Sulfate**	**24.0**	250	1.5	mg/l			11/14/15 17:06	6676
EPA 415.1									
00273	Total Organic Carbon	N.D.		0.50	mg/l			11/18/15 10:44	495
EPA 170.1									
12151	**Temperature of pH**	**21.9**		0.010	Degrees C			11/10/15 22:48	1124
SM 2540 C-1997									
00212	**Total Dissolved Solids**	**167**	500	19.4	mg/l			11/12/15 08:00	8743
SM 2540 D-1997									
10457	Total Suspended Solids	N.D.		1.00	mg/l			11/12/15 08:02	8743
SM 4500-H+ B-2000									
12152	**pH**	**7.9**		0.010	Std. Units			11/10/15 22:48	1124
	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
SM 5540 C-2000									
00225	M. B. A. S.	N.D.	.5	0.040	mg/l LAS MW 320			11/11/15 00:15	237
Microbiology									
SM 9223 B-1997									

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Analysis Report

REVISED

Sample Description: 033-WV-009-110915-1150-1-602 Grab
Groundwater Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126430
LL Group # 1607911
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 11:50 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

BLAW-

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Microbiology									
SM 9223 B-1997									
08161	**Tot Coli/E. coli (Quanti-tray)**	**See Below**			MPN/100mL			11/11/15 14:21	2213
	Total Coliform	3.1		/100ml					
	E. coli	< 1.0		/100ml					

General Sample Comments

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Analysis Report

REVISED

Sample Description: 033-WV-009-110915-1150-1-602 Filtered Grab
Groundwater Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126431
LL Group # 1607911
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 11:50 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:21	2992
01750	**Calcium**	**28.4**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:21	2992
01754	**Iron**	**0.145 J**	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:21	2992
07058	**Manganese**	**0.156**	.05	0.00080	mg/l	X	11/17/15 09:53	11/18/15 19:21	2992
01767	**Sodium**	**32.5**		0.167	mg/l		11/17/15 09:53	11/18/15 19:21	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.0021**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:35	1242
06026	**Barium**	**0.276**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:35	1242

General Sample Comments

This sample was field filtered for dissolved metals.

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

OCT 20 2016

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC Lab PM Contact Name: Wendy Kozma Lab Address: 2425 New Holland Pike City, State ZIP: Lancaster, PA 17601 Phone: 717-556-7257 Fax: 717-656-6766 Email: WendyKozma@eurofinsus.com	Client: Southwestern Energy Company Client Contact Name: Tyler Spear Client Address: 179 Innovation Drive City, State ZIP: Jane Lew, WV 26378 Phone: 304-884-1681 Email: Tyler_Spear@SWN.com	**Environmental Chain of Custody (COC)** Consultant Name: GES, Inc. Consultant PM Contact Name: Nicholas Lohr Phone: 800-267-2549, Ext. 3634 Fax: 866-902-2187 Email: Nlohr@gesonline.com	eurofins | Lancaster Laboratories

***WELL PAD NAME:** A-1141 Injection Well *Please circle which type of site this is: IMPOUNDMENT (WELL PAD) SPECIAL PROJECT	***Analysis Turnaround Time (working days)** Standard TAT = 10 working days (unless otherwise noted below) ☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only ☐ Rush TAT = _____ working days	***SAMPLER(s):** Matthew Cowmeadow 602	20810 1607911 8126430-32
***PROPERTY # (AFE# if applicable):** 400116166 8 ***MAJOR/MINOR CODE:** 52695/007 ***STATE SAMPLED:** WV			COC Page 1 of 1
***OWNER NAME:** Bernadette Law			Lab SDG Label
☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present) ☒ *Pre-drill Sample	☐ *Sample Collected - POST-Treatment System ☐ *Post-drill Sample		

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-COA-11.9.15-1150-1-602	11/9/15	1150	grab	GW	22	X	x	x	x	x	x	x	x	x	x	x	x	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

OCT 20 2015

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ☐ Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

***PARCEL ID #:** 03 4F001900000000

***FEDEX TRACKING #:** 801360831298

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Well at outside garage spigot

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
Matt Cowmeadow	GES	11/9/15 1645pm			
Relinquished by:	Company:	Date/Time:	Received by:		Date/Time:
				ELLE	11-10-15 / 915

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

Office of Oil & Gas

OCT 20 2016

Sampling Field Data Package
A-1141 INJECTION WELL
LEWIS COUNTY, WV

Law
034F001900000000
033-WV-009-110915-1230-1-602
November 9, 2015

Prepared For:

Southwestern Energy
Jane Lew, WV

Prepared By:

Groundwater & Environmental Services, Inc.
301 Commerce Park Drive
Cranberry Township, PA 16066

November 16, 2015

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FIELD DOCUMENTATION

Site Visit Form, Calibration Logs, Logbook, Site Sketch, COCs, Checklist

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Part A: GENERAL INFORMATION

Water Source ID*:	PD-11092015-002-02	O & G Well Name*:	A-1141 INJECTION WELL
Pad Name*:	A-1141 INJECTION WELL	Parcel Number*:	03 4F0019000000000
Tax ID:	03 4F0019000000000		
Operator ID*:	033	State Code*:	
County Code*:	009		
Sampled By*:	MATT CROWNOVER	Company Name*:	GES
Water Sampler Identifier*:	002	Date/Time Sampled*:	11/09/2015 12:30 (24hr)
Sample Frequency*:	1	☐ N/A: No Sample	Details:
Person Interviewed*:	Owner	Please specify:	

PROPERTY OWNER		RESIDENT OR OTHER ☑ Same as owner	
Name*:	BERNADETTE LAW	Name*:	BERNADETTE LAW
Address*:	5096 US HWY 33 W	Address*:	5096 US HWY 33 W
City*:	CAMDEN	City*:	CAMDEN
State*:	WV	State*:	WV
Postal Code*:	26338	Postal Code*:	26338
Phone No*:	304-269-3681	Phone No*:	304-269-3681

Part B: WATER QUALITY

	Reported Quality			Observed Quality		
	Yes	No	N/A	Yes	No	N/A
Staining	○	●	○	○	●	○
Odor	○	●	○	○	●	○
Cloudiness	○	●	○	○	●	○
Sheen	○	●	○	○	●	○
Effervescence	○	●	○	○	●	○
Taste	○	○	●			

Treatment*

- ☑ None
- ☐ Charcoal Filter
- ☐ Softening
- ☐ UV light
- ☐ Chlorination
- ☐ pH Adjustment
- ☐ Iron Removal
- ☐ In-line Sediment Filter

Other:

Functioning Properly*: ○ Yes ○ No ○ Unknown

Pump Type

- ● None
- ○ Gas Piston
- ○ Submersible
- ○ Windmill
- ○ Jet
- ○ Other:

Capacity (GPM):

Comments:

Part C: WATER SOURCE INFORMATION

Does this source supply any other properties? ○ Yes ● No

Identify properties:

Is the water source(s) located on the property? ● Yes ○ No **Please explain:**

Number of people using this water source: 0 Gallons/day: 0

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Pressure Tank? ○ Yes ◉ No Size (gallons):

Water Use: ☐ Domestic ☐ Husbandry ☐ Irrigation Other: NOT USED

Coordinates: (NAD83 decimal, 5 places) Lat: 39.053710 Long: -80.580522 Ground Surface Elevation: 1075 ft

Does the water source ever go dry? ○ Yes ◉ No

Water Source Type*: POND

Part D: DESCRIPTION OF WATER SOURCE

Check all that apply

☐ Loose, missing, or damaged cover ☑ Evidence of insects, spiders, animals ☑ Open to surface water

☐ Any cracked or damaged well casing/spring vault ☐ Additional storage or holding tank/coyote system

☐ Evidence of erosion ☐ Water source secured ☐ Source buried ☐ Location unknown ☐ Cover flush with ground

Other:

Part E: DESCRIPTION OF AREA SURROUNDING WATER SOURCE

Check all that apply

☑ Ground sloping towards water source ☐ Water source downgradient of septic system

Signs of:

☐ Failing septic ☐ Soggy ground ☐ Foul odor

Close proximity to (tick all that apply):

☐ Garden ☐ Orchard ☐ Greenhouse ☐ Equipment storage areas

☐ Junkyard ☐ Dumping area ☐ Landfill ☐ Salt storage area/Salted roadway

☐ Garage ☐ **Fuel storage tanks**

Located in field with:

☐ Livestock ☐ Inside Barn ☐ Barnyard ☐ Other out buildings

Additional remarks and comments:

Part F: SAMPLING

Sample ID: 033-WV-009-110915-1230-1-602

Sampled	Sampling Point Location
○ Before Treatment ○ After Treatment	○ Inside Faucet ○ Outside Faucet ○ Overflow/Discharge Pipe
◉ No Treatment ○ Not Sure	○ Seep ○ Pressure Tank ○ Bailed
	○ Wellhead ◉ Other: EDGE OF POND

Was the water source purged before sampling ○ Yes ◉ No Volume (gal): Time (min):

Is it possible to run water for 30 minutes? ○ Yes ◉ No If No, please explain: NO FLOWING WATER

Average water usage within the last 24 hours: 0 Chain of custody attached? ◉ Yes ○ No

Field Analyses:

Turbidity (ntu): 2.96 pH (ph units): 7.75

Conductivity (umhos/cm): 183 Temperature (deg c): 13.06

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Gas Readings:

Type	PPM	% LEL	% GAS

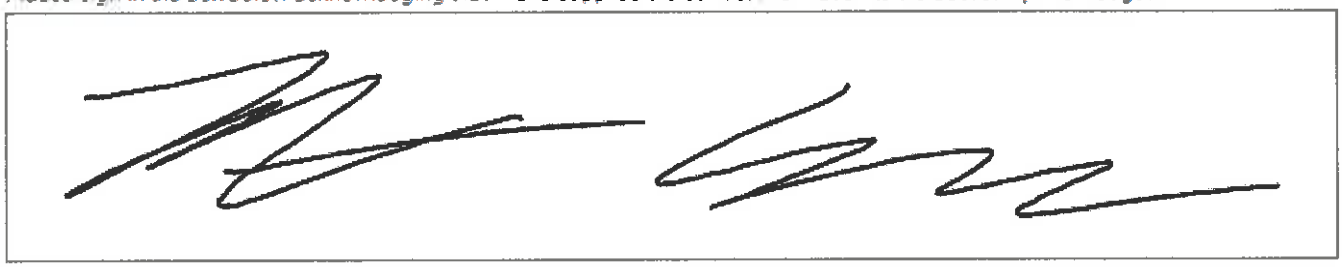
Wellhead		Peak / Sustained		Peak / Sustained		Peak / Sustained
SW Vicinity	0	Peak / Sustained		Peak / Sustained		Peak / Sustained
Cold Headspace	0	Peak / Sustained		Peak / Sustained		Peak / Sustained
		Peak / Sustained		Peak / Sustained		Peak / Sustained
		Peak / Sustained		Peak / Sustained		Peak / Sustained
		Peak / Sustained		Peak / Sustained		Peak / Sustained

Part G: SITE SKETCH and PHOTOGRAPHS

Add Images | 3 pictures attached to the from

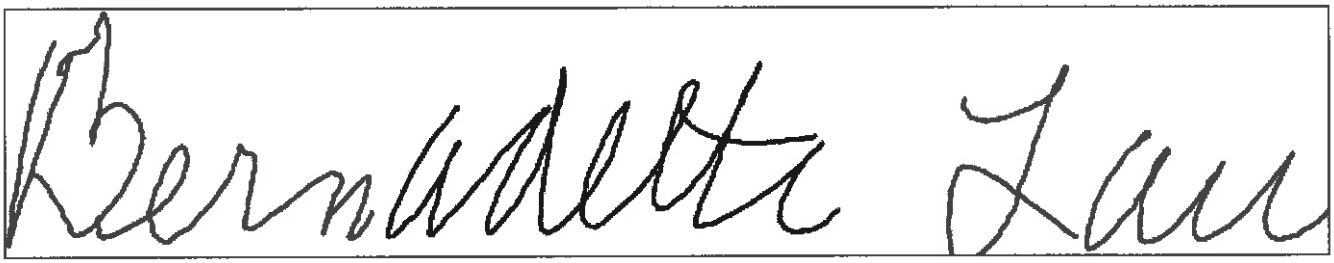
SAMPLER

Please sign in the box below acknowledging that I have supplied the correct information to the best of my knowledge.



Accept | Clear

INTERVIEWEE



Accept | Clear

OCT 20 2016

Form #: NA
(Reference Form # in Log Book)

Truck #: NA

Gas Explorer Calibration Log

GES Equipment Name: GES-GE-029

Equipment Serial #: 1202-302846

9-28-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dasler 489
↓	↓	H_2S	0	100ppm		↓	↓
10-30-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dasler 489
↓	↓	H_2S	0	100ppm		↓	↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓

NOTE: Gas Explorers must be calibrated on the first day of every month. If the instrument is recalibrated at anytime the calibration information must be recorded on this sheet.

3-Gas= 2.5%(50%LEL) Methane, 100ppm CO, Balance Air

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GES - Ver. 1

Southwestern Energy Predrill Sampling

Gas Detector Equipment Calibration

Equipment Serial Number:	1202 - 302846
GES Equipment Code:	GES-GE-029
Equipment Type:	Gas Explorer
Date of Calibration:	10-30-2015
Include Gas Detector Calibration Log with Field Documentation	

GPS Equipment

Equipment Serial Number:	RBC15H0226
GES Equipment Code:	NA
Equipment Type:	Trimble Yuma

Water Quality/Multi-Parameter Calibration

Equipment Serial Number:		09E100453	08325700
GES Equipment Code:		NA	NA
Equipment Type:		YSI	Hanna HI
Calibration Method:		3pt pH / 1pt sp cond	4pt.
Date of Calibration:		11-9-2015	11-9-15
Calibration Parameter	Time	Pre-Value/Reading	Person Performing Calibration
pH-4	0724	4.34	Matthew Crownover GO2
pH-7	0725	6.61	
pH-10	0727	10.36	
Specific Conductivity (µS/cm)	0730	1420	
Turbidity (<0.1 NTU)	0735	0.12	
Turbidity (15 NTU)	0736	14.9	
Turbidity (100 NTU)	0738	100	
Turbidity (750 NTU)	0739	758	
Calibration Parameter	Time	Post-Value/Reading	Person Performing Calibration
pH-4	0724	3.98	Matthew Crownover GO2
pH-7	0726	7.00	
pH-10	0728	10.06	
Specific Conductivity (µS/cm)	0731	1413	
Turbidity (<0.1 NTU)	0735	0.18	
Turbidity (15 NTU)	0737	15.1	
Turbidity (100 NTU)	0738	99.9	
Turbidity (750 NTU)	0740	751	

Decon Procedures

Reference GES Baseline Water Well Sampling SOP

OCT 20 2016

Initials of Person Completing Form and Date: MLH 11-9-15 SWN Location Name: A-1141 Inj. Well

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F00190000000

Site Arrival Time: 1100 Site Departure Time: 1315

Samplers (Full Names and Sampler #s): Misty Kethell 555

Mathew Crownover 602

Weather Condition Observations Recorded at: 1228

Weather Conditions: Cloudy Air Temp (Degrees Fahrenheit): 49

Estimate Wind Speed(mph): 3 Approximate Wind Direction: SW

Note: Remember to document any changes in weather conditions (Include Times).

Equipment Bump Test Verification (Include GES Equipment Number and Time):

MK

Refer to page 12 for 11-9-15 (insert date) for full calibration information.

Does the parcel have a septic system?: X Y ___ N

If Yes, describe the location of the septic area below and provide an approximate location on the site map. East of house

1230: Arrived at the pond and began sampling PD-110915-602-02.
Sample ID 033-WU-009-110915-1230-1-602.
Pond is not used.
Located downhill from the injection well on the same property.
1315: Departed site for next owner + sample

Tracking Number: 804713270307

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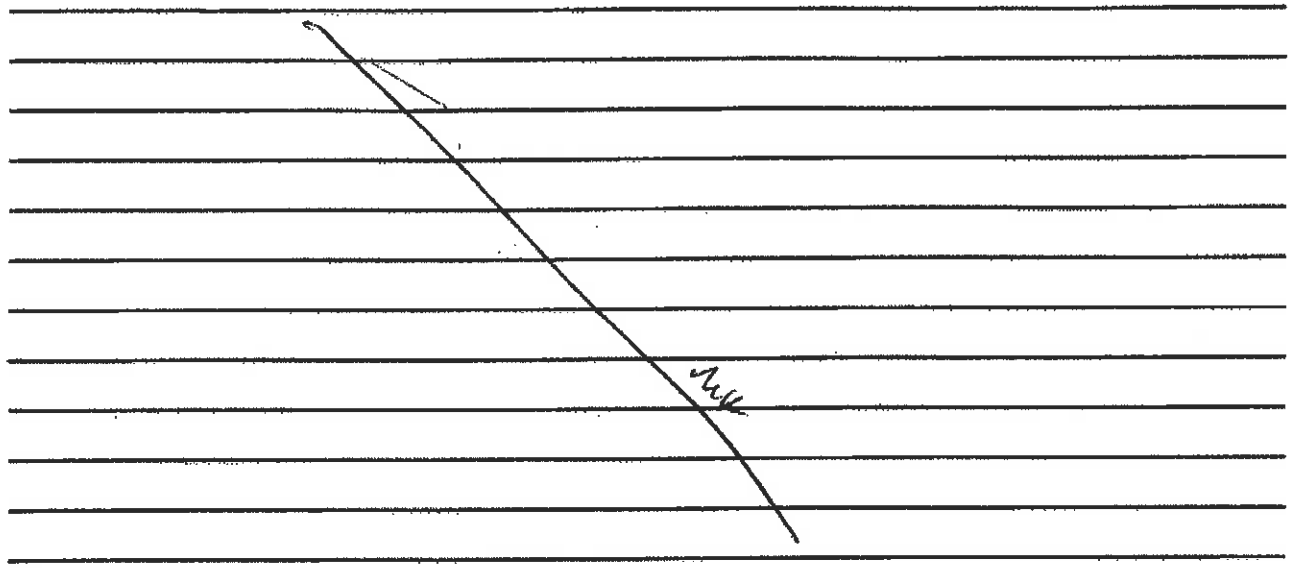
MK

Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Inj Well 80

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F001900000000



Interviewee Signature:

Bernadette Law

Fields intentionally left blank in EDGE because they are unknown or do not apply:
(Check all that apply)

For All Sources:

- ☐ Pump Type
- ☐ Pump Capacity
- ☐ Number of People Using the Water Source
- ☐ Gallons/Day Used
- ☐ Average Water Usage Within the Last 24 Hours

For Wells:

- ☐ Reported Well Depth
- ☐ Reported Depth to Water Level
- ☐ Reported Pump Depth
- ☐ Date Drilled
- ☐ Drillers Name
- ☐ Well Location

For Cisterns:

- ☐ Source of Water

Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Ing Well

Southwestern Energy Predrill Sampling

Log Book #105

WELL PURGING: FIELD WATER QUALITY MEASUREMENTS FORM

Parcel #: 03 4F00190000000 Turbidity (NTU): Time (Military):

Time (Military)	Temperature (Degrees Celsius)	Specific Conductance (µS/cm)	pH (Standard Units)	Comments

Google earth

feet 1000
meters 400

N

Southwestern Energy
A-1141 Injection Well
Property Owner: Bernadette Law
Parcel: 03 4F001900000000
Date: 11-09-2015
Times: 1150 and 1230

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OCT 20 2016

Environmental Chain of Custody (COC)

eurofins | Lancaster Laboratories

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC
Lab PM Contact Name: Wendy Kozma
Lab Address: 2425 New Holland Pike
City, State ZIP: Lancaster, PA 17601
Phone: 717-556-7257 **Fax:** 717-656-6766
Email: WendyKozma@eurofinsus.com

Client: Southwestern Energy Company
Client Contact Name: Tyler Spear
Client Address: 179 Innovation Drive
City, State ZIP: Jane Lew, WV 26378
Phone: 304-884-1681
Email: Tyler_Spear@SWN.com

Consultant Name: GES, Inc.
Consultant PM Contact Name: Nicholas Lohr
Phone: 800-267-2549, Ext. 3634 **Fax:** 866-902-2187
Email: Nlohr@gesonline.com

***WELL PAD NAME:** A-1141 Injection Well

*Please circle which type of site this is: IMPOUNDMENT WELL PAD SPECIAL PROJECT

***PROPERTY # (AFE# if applicable):** 400116168

***MAJOR/MINOR CODE:** 57695/007

***STATE SAMPLED:** WV

***OWNER NAME:** Bernadette Law

***Analysis Turnaround Time (working days)**

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

***SAMPLER(s):** Matthew Cravener GOZ

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present)

☐ *Sample Collected - POST-Treatment System

☒ *Pre-drill Sample

☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-609-110915-1230-1-602	11/9/15	1230	grab	SW	22	X	X	X	X	X	X	X	X	X	X	X	X	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

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Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client *Disposal By Lab after two (2) months of final report date*

Special Instructions/QC Requirements & Comments:

***PARCEL ID #:** 03 4F6619000000000

***FEDEX TRACKING #:** 8071713278367

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Pond

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
Matt Cravener	GES	11/9/15 1945			
Relinquished by:	Company:	Date/Time:	Received by:		Date/Time:

GES Field Documentation Review Sheet

Client and Well Pad Name: SWN/A 1141 Inj Well Date: 11-9-15

Parcel #: 03 4F00140000000

Review Prior to Leaving Parcel:

- [x] Field equipment calibration records (GE/CG/PID/FID/LEL, conductivity, pH, turbidity, etc.).
- [x] Check coolers for bottleware, chain-of-custody, and other paperwork (Predrill parameters and Isotopic).
- [x] Sample Matrix confirmed?
- [x] Bottle labels filled out with analysis, time, date, sample ID, and sampler?
- [x] Chain-of-custody bottle count matches as-is or edited to reflect bottle count in cooler?
- [x] Site Visit Form and Supplemental Log Book reviewed and all applicable spaces completed and information is correct?
- [x] Full names of both team members (including sampler ID #s) conducting sampling, arrival and departure times noted in Supplemental Log Book.
- [x] Purge information and all water quality readings documented on Site Visit Form and Supplemental Log Book, respectfully?
- [x] Photographs with accurate time and date stamps and white board taken of treatment system, sample point, source, and filled bottleware (at a minimum)?
- [x] White board in photographs contains correct client name, name of well pad, sample identification, parcel number, and date?
- NA [ ] Notes on unusual conditions, such as interference by landowner or third party during sampling, hazardous/unsanitary conditions, dead animals, etc? Photo-documented, if applicable?
- NA [ ] Verbal decline documented and any unusual conditions communicated to Project Manager and/or client representative immediately?
- [x] **Both field team members have reviewed all field notes, chains, and forms?**

Review Prior to End of Day:

- [x] Upload completed and final PDF. PDF opened to confirm complete upload. PDF includes Site Visit Form, Site Sketch, calibration information, chain-of-custodies, completed Supplemental Log Book pages?
- [x] Photo-documentation and GPS files uploaded?
- NA [ ] Isotopic sample placed in secure, climate controlled area with chain-of-custody?

Must Sign Below and Scan with End of Day PDF Package

Team Member 1: Misty J Kittell

Team Member 2:

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PHOTOGRAPHS

Received
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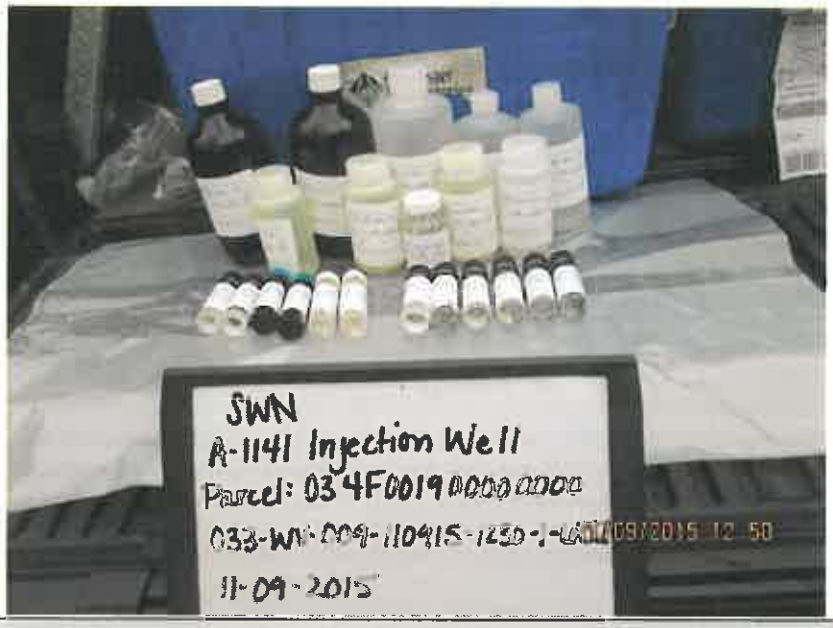
OCT 20 2016

Source: Pond

OCT 20 2016

Sample Location

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F001900000000
Law
033-WV-009-110915-1230-1-602
November 9, 2015



Sample

Received
Office of Oil & Gas
OCT 20 2016

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F001900000000
Law
033-WV-009-110915-1230-1-602
November 9, 2015

OCT 2 3 2015

Job Safety Analysis (JSA)

JSA Title: **Baseline Water Sampling (All Sources)**

JSA Control #:

Date Developed: 4/13/2015	
Latest Revised Date: 4/13/2015 / **JSA Retention 1 year from Latest Revision Date.**	
Developed by: Misty Kittell	
Work Team Leader: Misty Kittell	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.

Revision #: 3	**Work Location / Permit #:** A-1141 Injection Well

This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.

SPECIFIC PPE: Gloves: (base on hazard and identified in column 4 e.g. - nitrile, Kevlar, leather). Hard Hat (required by activity or site requirements). Hearing Protection: if site activities raise the noise level to 85 db. PPE Clothing: highly visible clothing such as orange coveralls & reflective safety vest, Fire Retardant clothing (FRC) is required for well pad operations. Safety Glasses. Safety Shoes: steel-toed. Winter weather: Yaktrax and FRC hard hat liner.

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Gas Explorer, YUMA, YSI, Turbidity Meter, Water Interface Probe, Sampling Kit, Hand Tools, extendable rod with attached cup

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply by using "Hazard Identification" tool)*		**Potential Hazards**	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Arrive Onsite 1. Driving on site and parking 2. Attempt to make contact with home owner or resident. 3. Complete JSA/HASP/safety checklist/tailgate meeting ***Note:** Please remember to complete client required checklist prior to performing on site activities*	X Motion _ Chemical X Electrical X Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Workers being injured and work vehicles/ property damage being caused by hazardous conditions 1b. Workers being struck/ injured and work vehicles/ property damage being caused by traffic 1c. Injury due to contact with overhead hazards (falling objects and electrocution from lighting)	1a. Conduct a visual inspection of the driveway for hazards before attempting to pull onto the property. Reconsider entering a driveway that is covered in ice or muddy. ➢ Obey no trespassing signs if you have not previously contacted the property owner. ➢ Rain, ice, and snow may worsen driveways that have a steep incline/decline. 1b. Park in a designated area only (*first move forward*) and ensure vehicle is out of traffic pattern so that tailgate safety meeting can be performed safely. ➢ Be extra cautious when parked near active roadways due to vehicles flinging debris. 1c. Inspect work area for any overhead hazards including overhead utilities and overhead trees and vegetation. ➢ A visual inspection of overhead obstacles (e.g. tree branches, vegetation, low structures...) should be conducted prior to starting a job task. ➢ Work conducted in a wooded area, during high winds and/or lighting storm, should be avoided and conditions re-evaluated after a storm has passed. (*See part B, section 4d.*)
On-site edits:				No edits

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B. Weather Hazards Exposure	_ Motion _ Chemical X Electrical _ Biological _ Mechanical	_ Gravity X Radiation X Temperature _ Pressure _ Sound	1a. Adverse health effects due to exposure to weather related issues	1a. Staff should understand and be able to recognize the signs and/or symptoms of cold and hot weather related illnesses. ➢ Personnel should dress appropriately for ambient temperatures which would include but not be limited to dry layered clothing. ➢ Applying sunscreen to exposed skin is strongly recommended during sunny weather conditions (all seasons) to mitigate sun exposure.
			2a. Adverse health effects due to cold stress related injury	2a. For cold weather, work schedules should be adjusted to provide sufficient break periods in a heated area. Remember that dehydration is still a risk when working in the cold.
			3a. Adverse health effects due heat stress related injury	3a. For hot weather, work schedules may need to be adjusted to provide time intervals for replenishing fluids and which is free of contamination. For hot weather that exceeds 90oF, a 10 to 15 minute break must be taken following every 45 minutes to one hour of work. Each individual must drink at 16 ounces of water prior to beginning work and 8 to 12 ounces of water or other proper liquid such as Gatorade every 20 to 30 minutes. Caffeinated drinks must not be consumed at any time.
			4a. Adverse health effects or injury due to exposure to severe weather	4a. Avoid exposure to severe weather. ➢ Ensure a plan is in place and discussed to mitigate all potential severe weather concerns (rain, wind, thunderstorms, ice storms, snow fall, tornadoes, hurricanes...) ➢ In case severe weather (e.g. tornadoes, hailstorms, or strong winds) have a place to shelter and make every effort to protect life. ➢ Pay attention to severe weather alerts. ➢ Take precautions with approaching thunderstorms and lighting. Discontinue all work until 30 minutes after severe weather has passed.
			5a. Adverse health effects that can result from Chemical/dust exposure	5a. Be aware of possible chemical exposure from well pad activities. (drilling, fracking, production activities) ➢ Discuss possible sources of exposure with local HSO or PIC. ➢ Avoid inhalation/absorption of dust, exhaust and fumes from well pad activities. ➢ Stay upwind of such activities whenever possible.
On-site edits:				No edits
C. Locate Water Source 1. Traverse to water source location (either by foot or vehicle) 2. GPS and photograph water source 3. Traverse to vehicle location	X Motion _ Chemical X Electrical X Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Personal injury due to slips, trips, falls, lacerations, cuts, burns, and electrocution.	1a. Before traversing the property, perform a general scan of your planned walking path for any obstructions, debris, slip, trip, and fall hazards. Communicate conditions with sampling partner (if applicable). ➢ Scan your walking path. Identify any soil conditions which demonstrate significantly eroded areas from any possible recent rainfall. ➢ Look for changes in elevation (steep slopes) and grade when walking on uneven terrain. ➢ Be aware of loose gravel, wet grass, snow covered rocks and ice, roots and limbs, and slopes ➢ Stay within visual contact of your canvassing partner to ensure that you can be seen. ➢ For fences, complete an inspection to find the best point of entry and ask the owner to shut off any electrified fences. If a gate or opening cannot be located and electric power cannot be shut off, drape a thick blanket up and over the barbed wire rungs or electrified wire before attempting to step over.
			1b. Injury and/or damage to personnel, property or pets/livestock.	1b. When backing out of an area near the water source location, use a spotter to avoid damage or injury to the work vehicle, property, residents, and pets/livestock. If maneuvering vehicle in an area of uneven terrain and unsure of potential locations of slopes, holes, debris, etc. walk the projected vehicle path first. Use a spotter ahead of the vehicle to direct the driver away from potential hazards.
			1c. Injury / illness due to contact with animal and insects (bites, stings, cuts, lacerations, puncture wounds, venom,	1c. Observe signs of biological hazards that may be present (e.g., webs, bees flying in and out, buzzing sounds). ➢ Use repellant if ticks or mosquitoes may be present. ➢ Wear leather gloves when opening cellar, well vault or spring house door. ➢ Do not place your hands or feet anywhere you cannot see them.

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			etc.)	➢ Stay alert for webs, nests, or other signs of inhabitation. ➢ Scan for "Beware of Dog" signs. Ask to have aggressive animals secured.
On-site edits:				No edits
D. Purge Water Source (Well) 1. Connect hose to spigot attachment 2. Turn on/off spigot or tap 3. Disconnect and drain hose Note: Be aware of exposed wiring around pressure tanks. Use SWA if purge cannot be completed safely	X Motion _ Chemical X Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature X Pressure _ Sound	1a. Cut or abrasion injury to hand from contact with rusty spigot. 1b. Eye injury resulting from water spray due to faulty hose connection.	1a. Be aware of sharp edges or very rusty areas of spigot openings. ➢ If excessive rust could cause a breakage of the spigot or handle, call the PM to discuss alternative sampling method. ➢ Wear leather gloves when attaching or removing garden hose from the spigot, as well as when turning the spigot on or off. 1b. Turn on the spigot slowly to ensure secure connection from hose to spigot before increasing the water pressure. ➢ Inspect the hose for leaks and be sure hose is in the preferred location to drain the water and not pointed at anyone.
On-site edits:				No edits
E. Sampling 1. Set up of equipment and sample cooler 2. Fill bottleware using spigot, bailer, transfer vessel, or extendable rod with attached cup. 3. Take field readings with YSI, Gas Explorer, and Turbidity meter OCT 20 2016	X Motion X Chemical _ Electrical _ Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury (strains) to back / shoulders while moving equipment. 1b. Injury due to slip, trip, fall on cords/piping 1c. Injury due to slip or fall on steep embankment. 1d. Eye or bodily injury from splashing of preservatives. 1e. Hand or bodily injury from contact with broken glassware.	1a. Utilize proper lifting procedure when handling equipment and cooler. ➢ Bend down at the knees and lift/lower with your legs and do not lift anything > 50lbs. ➢ Share carrying duties to eliminate balance issues when traversing rough terrain. 1b. Set up the work area so that all equipment is out of the walking path of both personnel and landowner. 1c. Use the extendable rod with the attached cup to reach surface water sources when near a steep embankment or where water level is deep enough for sampling, but is out of reach by hand. 1d. Fill bottleware slowly to avoid splashing of preservatives. 1e. Close lids of glass bottle ware finger tight. Do not over tighten, which could result in broken glassware. ➢ Kevlar and nitrile surgical gloves must be worn when opening a cooler and retrieving sample collection containers ➢ Wear Kevlar (cut resistant) gloves beneath nitrile sampling gloves to help prevent exposure to sharp edges, broken glass, and/or preservatives.
On-site edits:				No edits
F. Decontamination 1. Soak/spray durable equipment to prevent cross-contamination between multiple sample locations and dispose of all waste	_ Motion X Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Illness due to exposure decontamination chemicals	1a. When spraying equipment with Alconox, spray away from the face and body. ➢ Be sure to account for wind direction and strength before spraying Alconox solution. ➢ Wear nitrile gloves over Kevlar and wear a new pair nitrile gloves for each sample. ➢ Avoid touching your face and body, or any surface you may come into contact with after spraying Alconox
On-site edits:				No edits

JSA Control #: GES

G. Demobilization 1. Replace all equipment in cases or duffle bag 2. Ice and close sample cooler 3. Traverse to next source	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury (strains) to back / shoulders while moving equipment 1b. Personal injury due to slips, trips, and falls	1a. Utilize proper lifting procedure when handling equipment and cooler. ➢ Bend down at the knees and lift/lower with your legs and do not lift anything > 50lbs. ➢ Place cooler on the bed of the truck before adding ice to avoid making coolers dangerously heavy. Perform a team lift if cooler weight exceeds 35lbs. 1b. Perform a general scan of your planned walking path to truck or next location for any obstructions, debris, slip, trip, and fall hazards. Communicate conditions with sampling partner.
On-site edits:				No edits
H. Departing the site 1. Exiting the property	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury and/or damage to personnel, property, and pets.	1a. When backing out of a site location, use a spotter to avoid damage or injury to the work vehicle, property, residents, and pets/livestock. ➢ If possible, avoid backing out, and exit moving forward.
On-site edits:				No edits

Core Safety Expectations

1. ***Always follow Fall Protection standards when working at elevated heights.***
2. ***Always follow Written Permit procedures.***
3. ***Always follow Lock Out/Tag Out (LOTO) procedures.***
4. ***Always follow Critical Device Defeat procedures.***
5. ***Always follow written PPE Requirements for the work being performed.***

Misty J Kettell
11-9-15

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Job Safety Analysis (JSA)

JSA Title: **Motor Vehicle Driving**

JSA Control #:

Date Developed: 4/15/2015	
Latest Revised Date: 4/15/2015- JSA Retention 1 year from Latest Revision Date.	
Developed by: Misty Kuttell	
Work Team Leader: Misty Kuttell	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.	
Revision #: 1	**Work Location:** **Permit #:** A-1141 Injection Well
This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.	

SPECIFIC PPE: Gloves: (base on hazard and identified in column 4 e.g. - leather). PPE Clothing: highly visible clothing such as orange coveralls & reflective safety vest. Fire Retardant clothing (FRC) is required for well pad operations. Safety Glasses. Safety Shoes: steel-toed. Winter weather: Yack Tracks and FRC hard hat liner

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Fire extinguisher; First aid kit; Yellow flashing light; Roadside emergency kit; Spill containment kit

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply by using "Hazard Identification" tool)*		**Potential Hazards**	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Pre-mobilization 1. Always conduct a pre-trip or pre-use inspection of the vehicle prior to driving	X Motion _ Chemical _ Electrical _ Biological X Mechanical	_ Gravity _ Radiation X Temperature _ Pressure _ Sound	**1a.** Injuries caused by faulty or misadjusted equipment **1b.** Accident or injuries caused by environmental conditions (inclement weather)	**1a.** Inspect exterior and interior of vehicle. Don hi-visible clothing, steel-toe boots, safety glasses and leather gloves. ➢ Exterior ▪ Check condition of windshield wipers (wear and cracking). ▪ Check tires for manufacture inflation rate and tread condition. ▪ Check for body damage/overall condition. ▪ Check under vehicle for fluid leaks (e.g., oil, brakes, transmission, etc.). ▪ Check all lights (e.g., hi/low beams, turn signals, emergency flashers). ▪ Don high visible clothing and/or vest, include FRC if on well pad site, while inspecting exterior of vehicle. ➢ Interior ▪ Adjust seat to your height and visibility. ▪ Adjust mirrors to eliminate blind spots. ▪ Fasten safety belt (passengers too). ▪ Secure all lose items in container (e.g. glove box, cargo nets, cargo box). ▪ Verifying critical equipment is working (e.g., defogger, wipers, air bags, lights, turn signals). **1b.** Prepare vehicle for weather conditions prior to departure. ➢ Snow/Ice ▪ Scrape snow/ice from entire vehicle (e.g., hood, roof, windows, etc.). ▪ Add extra weight to back of trucks to increase traction. ▪ Maintain speed for conditions. ➢ Fog ▪ Turn on fog lights. ➢ Rain ▪ Ensure windows are defogged prior to mobilization. ▪ Utilize windshield wipers in all rainy conditions. ▪ Consider alternative routes based on flooding potential of roadway.

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			1c.3rd party injuries or accidents caused by unsecure equipment in truck bed	▪ Maintain speed for conditions. 1c. Inspect truck bed load. ➢ Check coolers, drums, and toolboxes to make sure all lids, caps, and tops are latched and tightened. ➢ Use ratchet-straps or cargo nets to secure load from shifting or falling from truck bed. ➢ Close and lock tailgate before mobilizing to site. ➢ Place light objects that could be blown out of truck bed in secured location of cab.
On-site edits:				No edits
B. Driving 1. Driving to and from the site or while driving onsite. ***Note:*** ➢ *Comply with all Smith Systems Five (5) Keys®* ➢ *Cell phone / texting is not permitted at any time while operating vehicle.* ➢ *Three-point seat belts must be worn by all occupants at all times while driving to and from the site and while driving onsite.* ➢ *Drive with low beams on at all times.* ➢ *Smoking is not permitted in GES vehicles.*	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Accident or injuries caused by traffic congestion or other vehicles (struck by, contact with) 1b. Accident or injuries caused by road surface condition (i.e., struck by, contact with)	1a. Mitigate potential for an accident by practicing the following techniques: ➢ Look ahead a minimum of 15 seconds to identify potential oncoming hazards. ➢ Maintain 4-second minimum following distance (increase distance due to weather conditions). ➢ Avoid focusing on any one object for more than 2 seconds. ➢ Scan the road, area around vehicle, and mirrors every 5-8 seconds. ➢ Stay out of other vehicles blind spots. ➢ Do not drive in clusters of traffic (i.e., adjust speed to give cushion between your vehicle & others). ➢ Utilize turn signals as required by law at all times 1b. Mitigate the potential for an accident by practicing the following techniques: ➢ Maintain speed; slower depending on road surface (e.g., dirt, concrete, asphalt, gravel). ➢ Drive posted speed limits (e.g., city, country roads, and highway). ➢ Do not tailgate vehicles in front of you. ➢ Pay attention for pedestrians. ➢ Place two hands on steering wheel at 9 and 3 position. ➢ Check for and yield to emergency vehicles. ➢ Obey traffic signals. ➢ Use particular caution in construction zones. ➢ Look ahead a minimum of 15 seconds. ➢ Scan the road, area around vehicle, and mirrors every 5-8 seconds. ➢ When backing, use a spotter at all times and ensure that the pre-determined hand signals have been discussed during the tailgate meeting and implemented. ➢ Stay out of other vehicles blind spots. Make eye contact with other drivers and ensure they see you.
On-site edits:				No edits
C. Preparing to Park 1. Parking Received Office of Oil & Gas OCT 20 2016	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury/vehicle impairment caused by contact with other vehicles	1a. Mitigate the potential for an accident by practicing the following techniques: ➢ ***First move forward*** - Back into space (required on terminal sites). ➢ Maneuver vehicle slowly within parking lot. ➢ Ensure vehicle is legally parked. ➢ Ensure nothing is located at rear of vehicle prior to mobilization. ➢ Get out and inspect space and vehicle if unsure of potential or unseen hazards. When parked, vehicles that have automatic transmissions, the vehicle must be placed into park and the emergency (parking brake applied). For manual transmissions, the emergency brake must be applied and wheel chocks used to prevent the vehicle from rolling ➢ Wheel chocks must be used for large vehicles when parked/positioned on uneven surfaces; front & back of each rear tire. ➢ Wheel chocks must be used (front & back of each rear tire) on all vehicles working at the site/ vehicles with manual transmission parked on sloping surfaces ➢ When parked and unhooked from a vehicle, trailers must have a wheel chock placed in front of and

				behind each rear wheel.
On-site edits:				No edits

Misty J. Kittell
11-9-15

Core Safety Expectations

1. ***Always follow Fall Protection standards when working at elevated heights.***
2. ***Always follow Written Permit procedures.***
3. ***Always follow Lock Out/Tag Out (LOTO) procedures.***
4. ***Always follow Critical Device Defeat procedures.***
5. ***Always follow written PPE Requirements for the work being performed.***

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Sampling Field Data Package
A-1141 INJECTION WELL
LEWIS COUNTY, WV

Law
034F001900000000
033-WV-009-110915-1150-1-602
November 9, 2015

Prepared For:

Southwestern Energy
Jane Lew, WV

Prepared By:

Groundwater & Environmental Services, Inc.
301 Commerce Park Drive
Cranberry Township, PA 16066

November 16, 2015

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FIELD DOCUMENTATION

Site Visit Form, Calibration Logs, Logbook, Site Sketch, COCs, Checklist

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Part A: GENERAL INFORMATION

Water Source ID*:	WL-11092015-602-01	O & G Well Name*:	A-1141 INJECTION WELL
Pad Name*:	A-1141 INJECTION WELL	Parcel Number*:	03 4F0019000000C0
Tax ID:	03 4F0019000000C0		
Operator ID*:	033	State Code*:	
County Code*:	009		
Sampled By*:	MATT CROWNOVER	Company Name*:	GES
Water Sampler Identifier*:	602	Date/Time Sampled*:	11/09/2015 11:50 (24hr)
Sample Frequency*:	1	☐ N/A: No Sample	Details:
Person Interviewed*:	Owner	Please specify:	

PROPERTY OWNER		RESIDENT OR OTHER ☑ Same as owner	
Name*:	BERNADETTE LAW	Name*:	BERNADETTE LAW
Address*:	5096 US HWY 33 W	Address*:	5096 US HWY 33 W
City*:	CAMDEN	City*:	CAMDEN
State*:	WV	State*:	WV
Postal Code*:	26338	Postal Code*:	26338
Phone No*:	304-269-3681	Phone No*:	304-269-3681

Part B: WATER QUALITY

	Reported Quality			Observed Quality		
	Yes	No	N/A	Yes	No	N/A
Staining	○	○	○	○	◉	○
Odor	○	○	○	○	○	○
Cloudiness	○	◉	○	○	○	○
Sheen	○	○	○	○	○	○
Effervescence	○	○	○	○	◉	○
Tests	○	○	○			

Treatment*

- ☑ None
- ☐ Charcoal Filter
- ☐ Softening
- ☐ UV light
- ☐ Chlorination
- ☐ pH Adjustment
- ☐ Iron Removal
- ☐ In-line Sediment Filter

Other:

Functioning Properly*: ○ Yes ○ No ○ Unknown

Pump Type

- ○ None
- ○ Gas Piston
- ◉ Submersible
- ○ Windmill
- ○ Jet
- ○ Other:

Capacity (GPM):

Comments:

Part C: WATER SOURCE INFORMATION

Does this source supply any other properties? ○ Yes ◉ No

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Identify properties:

Is the water source(s) located on the property? ◉ Yes ○ No Please explain:

Number of people using this water source: 1 Gallons/day:

Pressure Tank? (•) Yes ( ) No Size (gallons):

Water Use: [ ] Domestic [ ] Husbandry [ ] Irrigation Other: WATERING PLANTS, WASHING CARS

Coordinates: (NAD83 decimal, 6 places) Lat: 39.054204 Long: -80.580770 Ground Surface Elevation: 1072 ft

Does the water source ever go dry? ( ) Yes (•) No

Water Source Type*: WATER WELL

(•) Drilled Well ( ) Dug Well ( ) Other Missing/damaged pit-less adaptor: ( ) Yes ( ) No (•) Unknown

Reported total well depth (FT): Reported depth of water level (FT): Reported pump depth (FT):

Date Drilled: Drillers Name: Driller log available ( ) Yes (•) No

Well location: ( ) Inside ( ) Inside and Vented Outside (•) Outside Unvented ( ) Outside Vented

Part D: DESCRIPTION OF WATER SOURCE

Check all that apply

[ ] Loose, missing, or damaged cover [ ] Evidence of insects, spiders, animals [ ] Open to surface water

[ ] Any cracked or damaged well casing/spring vault [ ] Additional storage or holding tank/coyote system

[ ] Evidence of erosion [ ] Water source secured [ ] Source buried [ ] Location unknown [ ] Cover flush with ground

Other: LEAVES AND DEBRIS COVERING WELLHEAD

Part E: DESCRIPTION OF AREA SURROUNDING WATER SOURCE

Check all that apply

[x] Ground sloping towards water source [ ] Water source downgradient of septic system

Signs of:

[ ] Failing septic [ ] Soggy ground [ ] Foul odor

Close proximity to (tick all that apply):

[ ] Garden [ ] Orchard [ ] Greenhouse [ ] Equipment storage areas

[ ] Junkyard [ ] Dumping area [ ] Landfill [ ] Salt storage area/Salted roadway

[x] Garage [ ] Fuel storage tanks

Located in field with:

[ ] Livestock [ ] Inside Barn [ ] Barnyard [ ] Other out buildings

Additional remarks and comments:

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Part F: SAMPLING

Sample ID: 033-WV-009-110915-1150-1-602

Sampled	Sampling Point Location
( ) Before Treatment ( ) After Treatment	( ) Inside Faucet (•) Outside Faucet ( ) Overflow/Discharge Pipe
(•) No Treatment ( ) Not Sure	( ) Spigot ( ) Pressure Tank ( ) Bailed
	( ) Wellhead ( ) Other:

Was the water source purged before sampling (•) Yes ( ) No Volume (gal): 60 Time (min): 20

Is it possible to run water for 30 minutes? (•) Yes ( ) No If No, please explain:

Average water usage within the last 24 hours: 0 Chain of custody attached? (•) Yes ( ) No

Field Analyses:

Field Analyses:

Turbidity (ntu):	1.22	pH (ph units):	7.21
Conductivity (umhos/cm):	351	Temperature (deg c):	12.89

Gas Readings:

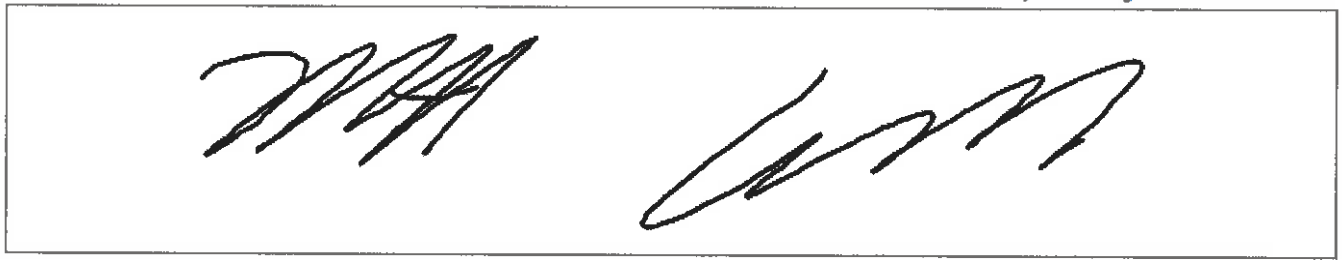
Type	PPM	% LEL	% GAS
Wellhead	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
Cold Tap	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
Cold Headspace	0 (Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)
	(Peak / Sustained)	(Peak / Sustained)	(Peak / Sustained)

Part G: SITE SKETCH and PHOTOGRAPHS

Add Images | 18 pictures attached to the from

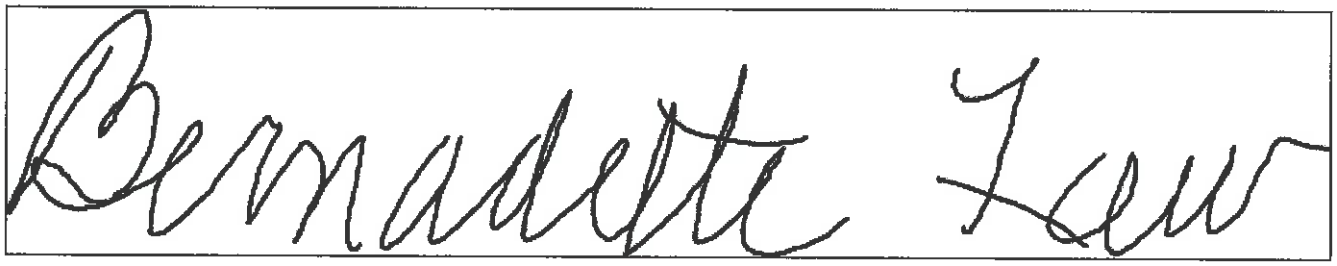
SAMPLER

Please sign in the box below acknowledging that I have supplied the correct information to the best of my knowledge.



Accept | Clear

INTERVIEWEE



Accept | Clear

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Form #: NA
(Reference Form # in Log Book)

Truck #: NA

Gas Explorer Calibration Log

GES Equipment Name: GES-GE-029

Equipment Serial #: 1202-302846

Date of Calibration	Time		Reading	Span Check	Span Gas	Span Gas	Technician Performing Calibration
9-28-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dailey 489
↓	↓	H_2S	0	100ppm		↓	↓
10-30-15	0945	LEL	0 %LEL	50 %LEL	50% LEL	3 gas	P. Dailey 489
↓	↓	H_2S	0	100ppm		↓	↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓
		LEL	%LEL	%LEL	50% LEL		
↓	↓	H_2S					↓

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NOTE: Gas Explorers must be calibrated on the first day of every month. If the instrument is recalibrated at anytime the calibration information must be recorded on this sheet.

3-Gas= 2.5%(50%LEL) Methane, 100ppm CO, Balance Air

GES - Ver. 1

Southwestern Energy Predrill Sampling

Gas Detector Equipment Calibration

Equipment Serial Number:	1202 - 302846
GES Equipment Code:	GES - GE - 029
Equipment Type:	Gas Explorer
Date of Calibration:	10-30-2015
Include Gas Detector Calibration Log with Field Documentation	

GPS Equipment

Equipment Serial Number:	RBC15N0226
GES Equipment Code:	NA
Equipment Type:	Trimble Yuma

Water Quality Multi-Parameter Calibration

Equipment Serial Number:	09E100453	08325700
GES Equipment Code:	NA	NA
Equipment Type:	YSI	Hanna HI
Calibration Method:	3pt pH / 1pt sp cond	4pt.
Date of Calibration:	11-9-2015	11-9-15

Calibration Parameter	Time	Pre-Value/Reading	Person Performing Calibration
pH-4	0724	4.34	Matthew Crownover 1002
pH-7	0725	6.61	
pH-10	0727	10.36	
Specific Conductivity (µS/cm)	0730	1420	
Turbidity (<0.1 NTU)	0735	0.12	
Turbidity (15 NTU)	0736	14.9	
Turbidity (100 NTU)	0738	100	
Turbidity (750 NTU)	0739	758	
Calibration Parameter	**Time**	**Post-Value/Reading**	**Person Performing Calibration**
pH-4	0724	3.98	Matthew Crownover 1002
pH-7	0726	7.00	
pH-10	0728	10.06	
Specific Conductivity (µS/cm)	0731	1413	
Turbidity (<0.1 NTU)	0735	0.18	
Turbidity (15 NTU)	0737	15.1	
Turbidity (100 NTU)	0738	99.9	
Turbidity (750 NTU)	0740	751	

Decon Procedures

Reference GES Baseline Water Well Sampling SOP

OCT 2 0

Initials of Person Completing Form and Date: MW 11-9-15 SWN Location Name: A-1141 Inj. Well

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F001900000000

Site Arrival Time: 1100 Site Departure Time: 1315

Samplers (Full Names and Sampler #s): Misty Kettell 555

602 Matthew Crownover

Weather Condition Observations Recorded at: 1115

Weather Conditions: cloudy Air Temp (Degrees Fahrenheit): 47

Estimate Wind Speed(mph): 3 Approximate Wind Direction: SW

Note: Remember to document any changes in weather conditions (Include Times).

Equipment Bump Test Verification (Include GES Equipment Number and Time): 1120

GE (GES-GE-029) → 100 ppm, Bump = 100 ppm

YSI → 7.00 pH, Bump = 7.02 pH, 1413 µS/cm, Bump = 1414 µS/cm

Turbidity → 15.0 NTU, Bump = 15.0 NTU

Refer to page 12 for 11-09-15 (insert date) for full calibration information.

Does the parcel have a septic system?: X Y ___ N

If Yes, describe the location of the septic area below and provide an approximate location on the site map. Septic area located east of house.

0715: Arrived at the office to begin preparations.
0724: Calibrated equipment.
0830: Departed office for site
11:00: Arrived onsite and spoke with Bernadette Law about source information.
1128: Began purging well from outside garage spigot. The well is used for washing cars watering flowers and garden.
Pressure tank is located inside the garage. There is a pressure tank spigot however, it is completely rusted and would not turn Mrs. Law showed team outside spigot instead. No cell service to notify manager.
1150: Sample collected at WL-11092015-602-01. Sample ID 033-WV-009-110915-1150-1-402
1220: Moved to next source on parcel

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Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Inj Well

Southwestern Energy Predrill Sampling

Log Book # 105

Parcel #: 03 4F001900060000

Tracking Number: 801301831298

Interviewee Signature:

Bernadette Law

Fields intentionally left blank in EDGE because they are unknown or do not apply:
(Check all that apply)

For All Sources:
- ☐ Pump Type
- ☒ Pump Capacity
- ☐ Number of People Using the Water Source
- ☒ Gallons/Day Used
- ☐ Average Water Usage Within the Last 24 Hours

For Wells:
- ☒ Reported Well Depth
- ☒ Reported Depth to Water Level
- ☒ Reported Pump Depth
- ☒ Date Drilled
- ☒ Drillers Name
- ☐ Well Location

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For Cisterns:
- ☐ Source of Water

Initials of Person Completing Form and Date: MLK 11-9-15 SWN Location Name: A-1141 Inj Well 78

Southwestern Energy Predrill Sampling

Log Book # 105

WELL PURGING: FIELD WATER QUALITY MEASUREMENTS FORM

Parcel #: 03 4F 06190000880 Turbidity (NTU): 1.22 Time (Military): 1148

Time (Military)	Temperature (Degrees Celsius)	Specific Conductance (µS/cm)	pH (Standard Units)	Comments
1128	11.89	351	7.28	start purge
1130	12.50	351	7.01	
1132	12.48	352	7.03	
1134	12.62	352	7.03	
1136	12.73	353	7.04	
1138	12.80	353	7.08	
1140	12.79	353	7.09	
1142	12.84	353	7.12	
1144	12.86	352	7.24	
1146	12.87	352	7.25	
1148	12.89	351	7.21	

Google earth

feet 1000
meters 400

N

Southwestern Energy
A-1141 Injection Well
Property Owner: Bernadette Law
Parcel: 03 4F001900000000
Date: 11-09-2015
Times: 1150 and 1230

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OCT 20 2016

Environmental Chain of Custody (COC)

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC
Lab PM Contact Name: Wendy Kozma
Lab Address: 2425 New Holland Pike
City, State ZIP: Lancaster, PA 17601
Phone: 717-556-7257 **Fax:** 717-656-6766
Email: WendyKozma@eurofinsus.com

Client: Southwestern Energy Company
Client Contact Name: Tyler Spear
Client Address: 179 Innovation Drive
City, State ZIP: Jane Lew, WV 26378
Phone: 304-884-1681
Email: Tyler_Spear@SWN.com

Consultant Name: GES, Inc.
Consultant PM Contact Name: Nicholas Lohr
Phone: 800-267-2549, Ext. 3634 **Fax:** 866-902-2187
Email: Nlohr@gesonline.com

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***WELL PAD NAME:** A-1141 Injection Well

***Please circle which type of site this is:** IMPOUNDMENT (WELL PAD) SPECIAL PROJECT

***PROPERTY # (AFE# if applicable):** 400116166B

***MAJOR/MINOR CODE:** 52695/007

***STATE SAMPLED:** WV

***OWNER NAME:** Bernadette Law

***Analysis Turnaround Time (working days)**

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

***SAMPLER(s):** Matthew Cowners GOZ

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present)

☐ *Sample Collected - POST-Treatment System

☒ *Pre-drill Sample

☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	BABAS and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-110915-1150-1-GOZ	11/9/15	1150	grab	GW	22	X	X	X	X	X	X	X	X	X	X	X	X	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

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Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown.

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ■ Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

***PARCEL ID #:** 03 4F0019000600

***FEDEX TRACKING #:** 801361831298

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Well at outside garage spigot

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:	Date/Time:
Matt Cowners	GES	11/9/15 1635pm		
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:

GES Field Documentation Review Sheet

Client and Well Pad Name: SWN/A-1141 Inj Well Date: 11-9-15

Parcel #: 03 4F0019 00000000

Review Prior to Leaving Parcel:

- [x] Field equipment calibration records (GE/CG/PID/FID/LEL, conductivity, pH, turbidity, etc.).
- [x] Check coolers for bottleware, chain-of-custody, and other paperwork (Predrill parameters and Isotopic).
- [x] Sample Matrix confirmed?
- [x] Bottle labels filled out with analysis, time, date, sample ID, and sampler?
- [x] Chain-of-custody bottle count matches as-is or edited to reflect bottle count in cooler?
- [x] Site Visit Form and Supplemental Log Book reviewed and all applicable spaces completed and information is correct?
- [x] Full names of both team members (including sampler ID #s) conducting sampling, arrival and departure times noted in Supplemental Log Book.
- [x] Purge information and all water quality readings documented on Site Visit Form and Supplemental Log Book, respectfully?
- [x] Photographs with accurate time and date stamps and white board taken of treatment system, sample point, source, and filled bottleware (at a minimum)?
- [x] White board in photographs contains correct client name, name of well pad, sample identification, parcel number, and date?
- NA [ ] Notes on unusual conditions, such as interference by landowner or third party during sampling, hazardous/unsanitary conditions, dead animals, etc? Photo-documented, if applicable?
- NA [ ] Verbal decline documented and any unusual conditions communicated to Project Manager and/or client representative immediately?
- [x] **Both field team members have reviewed all field notes, chains, and forms?**

Review Prior to End of Day:

- [x] Upload completed and final PDF. PDF opened to confirm complete upload. PDF includes Site Visit Form, Site Sketch, calibration information, chain-of-custodies, completed Supplemental Log Book pages?
- [x] Photo-documentation and GPS files uploaded?
- NA [ ] Isotopic sample placed in secure, climate controlled area with chain-of-custody?

Must Sign Below and Scan with End of Day PDF Package

Team Member 1: Marty J Kittell

Team Member 2:

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PHOTOGRAPHS

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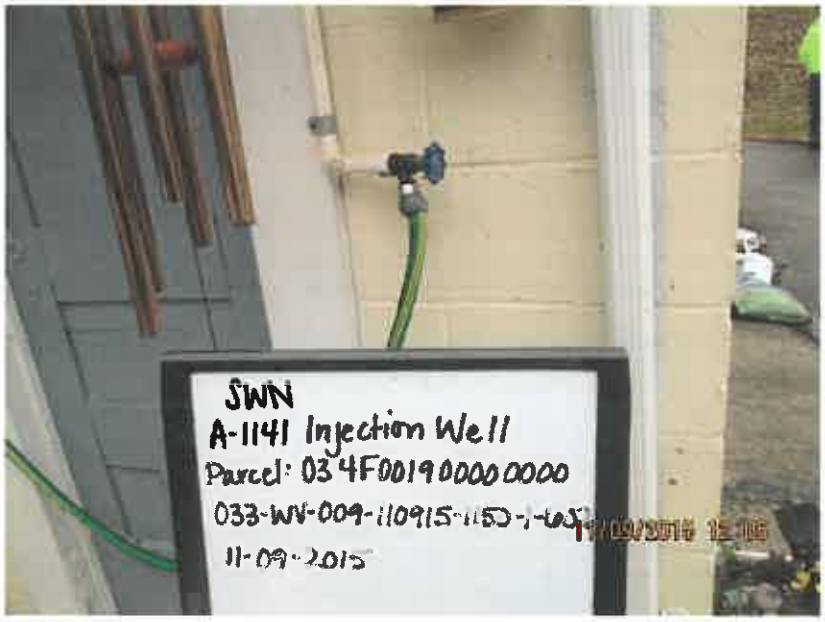
Source: Well

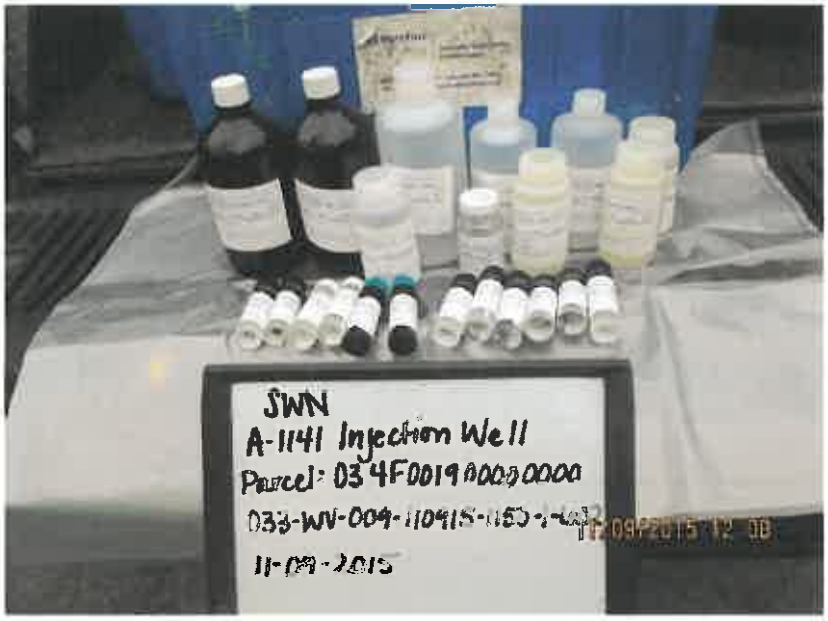


Sample Location

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F001900000000
Law
033-WV-009-110915-1150-1-602
November 9, 2015

OCT 20 2016

Pressure Tank



Sample

A-1141 INJECTION WELL, LEWIS COUNTY, WV
PHOTO LOG
034F001900000000
Law
033-WV-009-110915-1150-1-602
November 9, 2015

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Job Safety Analysis (JSA)

JSA Title: **Baseline Water Sampling (All Sources)**

JSA Control #:

Date Developed: 4/13/2015	
Latest Revised Date: 4/13/2015 / **JSA Retention 1 year from Latest Revision Date.**	
Developed by: Misty Kittell	
Work Team Leader: Misty Kittell	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.

Revision #: 3	**Work Location / Permit #:** A-1141 Injection Well

This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.

SPECIFIC PPE: Gloves: (base on hazard and identified in column 4 e.g. - nitrile, Kevlar, leather). Hard Hat (required by activity or site requirements). Hearing Protection: if site activities raise the noise level to 85 db. PPE Clothing: highly visible clothing such as orange coveralls & reflective safety vest, Fire Retardant clothing (FRC) is required for well pad operations. Safety Glasses. Safety Shoes: steel-toed. Winter weather: Yaktrax and FRC hard hat liner.

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Gas Explorer, YUMA, YSI, Turbidity Meter, Water Interface Probe, Sampling Kit, Hand Tools, extendable rod with attached cup

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply by using "Hazard Identification" tool)*		**Potential Hazards**	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Arrive Onsite 1. Driving on site and parking 2. Attempt to make contact with home owner or resident. 3. Complete JSA/HASP/safety checklist/tailgate meeting ***Note:** Please remember to complete client required checklist prior to performing on site activities*	X Motion _ Chemical X Electrical X Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Workers being injured and work vehicles/ property damage being caused by hazardous conditions 1b. Workers being struck/ injured and work vehicles/ property damage being caused by traffic 1c. Injury due to contact with overhead hazards (falling objects and electrocution from lighting)	1a. Conduct a visual inspection of the driveway for hazards before attempting to pull onto the property. Reconsider entering a driveway that is covered in ice or muddy. ➢ Obey no trespassing signs if you have not previously contacted the property owner. ➢ Rain, Ice, and snow may worsen driveways that have a steep incline/decline. 1b. Park in a designated area only (*first move forward*) and ensure vehicle is out of traffic pattern so that tailgate safety meeting can be performed safely. ➢ Be extra cautious when parked near active roadways due to vehicles flinging debris. 1c. Inspect work area for any overhead hazards including overhead utilities and overhead trees and vegetation. ➢ A visual inspection of overhead obstacles (e.g. tree branches, vegetation, low structures...) should be conducted prior to starting a job task. ➢ Work conducted in a wooded area, during high winds and/or lighting storm, should be avoided and conditions re-evaluated after a storm has passed. (*See part B, section 4d.*)
On-site edits: OCT 20 2016				No edits

B. Weather Hazards Exposure	_ Motion _ Chemical X Electrical _ Biological _ Mechanical	_ Gravity X Radiation X Temperature _ Pressure _ Sound	1a. Adverse health effects due to exposure to weather related issues	1a. Staff should understand and be able to recognize the signs and/or symptoms of cold and hot weather related illnesses. ➢ Personnel should dress appropriately for ambient temperatures which would include but not be limited to dry layered clothing. ➢ Applying sunscreen to exposed skin is strongly recommended during sunny weather conditions (all seasons) to mitigate sun exposure.
			2a. Adverse health effects due to cold stress related injury	2a. For cold weather, work schedules should be adjusted to provide sufficient break periods in a heated area. Remember that dehydration is still a risk when working in the cold.
			3a. Adverse health effects due heat stress related injury	3a. For hot weather, work schedules may need to be adjusted to provide time intervals for replenishing fluids and which is free of contamination. For hot weather that exceeds 90oF, a 10 to 15 minute break must be taken following every 45 minutes to one hour of work. Each individual must drink at 16 ounces of water prior to beginning work and 8 to 12 ounces of water or other proper liquid such as Gatorade every 20 to 30 minutes. Caffeinated drinks must not be consumed at any time.
			4a. Adverse health effects or injury due to exposure to severe weather	4a. Avoid exposure to severe weather. ➢ Ensure a plan is in place and discussed to mitigate all potential severe weather concerns (rain, wind, thunderstorms, ice storms, snow fall, tornadoes, hurricanes...) ➢ In case severe weather (e.g. tornadoes, hailstorms, or strong winds) have a place to shelter and make every effort to protect life. ➢ Pay attention to severe weather alerts. ➢ Take precautions with approaching thunderstorms and lighting. Discontinue all work until 30 minutes after severe weather has passed.
			5a. Adverse health effects that can result from Chemical/dust exposure	5a. Be aware of possible chemical exposure from well pad activities. (drilling, fracking, production activities) ➢ Discuss possible sources of exposure with local HSO or PIC. ➢ Avoid inhalation/absorption of dust, exhaust and fumes from well pad activities. ➢ Stay upwind of such activities whenever possible.
On-site edits:				No edits
C. Locate Water Source 1. Traverse to water source location (either by foot or vehicle) 2. GPS and photograph water source 3. Traverse to vehicle location	X Motion _ Chemical X Electrical X Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Personal injury due to slips, trips, falls, lacerations, cuts, burns, and electrocution.	1a. Before traversing the property, perform a general scan of your planned walking path for any obstructions, debris, slip, trip, and fall hazards. Communicate conditions with sampling partner (if applicable). ➢ Scan your walking path. Identify any soil conditions which demonstrate significantly eroded areas from any possible recent rainfall. ➢ Look for changes in elevation (steep slopes) and grade when walking on uneven terrain. ➢ Be aware of loose gravel, wet grass, snow covered rocks and ice, roots and limbs, and slopes ➢ Stay within visual contact of your canvassing partner to ensure that you can be seen. ➢ For fences, complete an inspection to find the best point of entry and ask the owner to shut off any electrified fences. If a gate or opening cannot be located and electric power cannot be shut off, drape a thick blanket up and over the barbed wire rungs or electrified wire before attempting to step over.
			1b. Injury and/or damage to personnel, property or pets/livestock.	1b. When backing out of an area near the water source location, use a spotter to avoid damage or injury to the work vehicle, property, residents, and pets/livestock. If maneuvering vehicle in an area of uneven terrain and unsure of potential locations of slopes, holes, debris, etc. walk the projected vehicle path first. Use a spotter ahead of the vehicle to direct the driver away from potential hazards.
			1c. Injury / illness due to contact with animal and insects (bites, stings, cuts, lacerations, puncture wounds, venom,	1c. Observe signs of biological hazards that may be present (e.g., webs, bees flying in and out, buzzing sounds). ➢ Use repellant if ticks or mosquitoes may be present. ➢ Wear leather gloves when opening cellar, well vault or spring house door. ➢ Do not place your hands or feet anywhere you cannot see them.

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			etc.)	➢ Stay alert for webs, nests, or other signs of inhabitation. ➢ Scan for "Beware of Dog" signs. Ask to have aggressive animals secured.
On-site edits:				No edits
D. Purge Water Source (Well) 1. Connect hose to spigot attachment 2. Turn on/off spigot or tap 3. Disconnect and drain hose Note: Be aware of exposed wiring around pressure tanks. Use SWA if purge cannot be completed safely	X Motion _ Chemical X Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature X Pressure _ Sound	1a. Cut or abrasion injury to hand from contact with rusty spigot. 1b. Eye injury resulting from water spray due to faulty hose connection.	1a. Be aware of sharp edges or very rusty areas of spigot openings. ➢ If excessive rust could cause a breakage of the spigot or handle, call the PM to discuss alternative sampling method. ➢ Wear leather gloves when attaching or removing garden hose from the spigot, as well as when turning the spigot on or off. 1b. Turn on the spigot slowly to ensure secure connection from hose to spigot before increasing the water pressure. ➢ Inspect the hose for leaks and be sure hose is in the preferred location to drain the water and not pointed at anyone.
On-site edits:				No edits
E. Sampling 1. Set up of equipment and sample cooler 2. Fill bottleware using spigot, bailer, transfer vessel, or extendable rod with attached cup. 3. Take field readings with YSI, Gas Explorer, and Turbidity meter	X Motion X Chemical _ Electrical _ Biological _ Mechanical OCT 20 2016	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury (strains) to back / shoulders while moving equipment. 1b. Injury due to slip, trip, fall on cords/piping 1c. injury due to slip or fall on steep embankment. 1d. Eye or bodily injury from splashing of preservatives. 1e. Hand or bodily injury from contact with broken glassware.	1a. Utilize proper lifting procedure when handling equipment and cooler. ➢ Bend down at the knees and lift/lower with your legs and do not lift anything > 50lbs. ➢ Share carrying duties to eliminate balance issues when traversing rough terrain. 1b. Set up the work area so that all equipment is out of the walking path of both personnel and landowner. 1c. Use the extendable rod with the attached cup to reach surface water sources when near a steep embankment or where water level is deep enough for sampling, but is out of reach by hand. 1d. Fill bottleware slowly to avoid splashing of preservatives. 1e. Close lids of glass bottle ware finger tight. Do not over tighten, which could result in broken glassware. ➢ Kevlar and nitrile surgical gloves must be worn when opening a cooler and retrieving sample collection containers ➢ Wear Kevlar (cut resistant) gloves beneath nitrile sampling gloves to help prevent exposure to sharp edges, broken glass, and/or preservatives.
On-site edits:				No edits
F. Decontamination 1. Soak/spray durable equipment to prevent cross-contamination between multiple sample locations and dispose of all waste	_ Motion X Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Illness due to exposure decontamination chemicals	1a. When spraying equipment with Alconox, spray away from the face and body. ➢ Be sure to account for wind direction and strength before spraying Alconox solution. ➢ Wear nitrile gloves over Kevlar and wear a new pair nitrile gloves for each sample. ➢ Avoid touching your face and body, or any surface you may come into contact with after spraying Alconox
On-site edits:				No edits

JSA Control #: GES

G. Demobilization 1. Replace all equipment in cases or duffle bag 2. Ice and close sample cooler 3. Traverse to next source	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	X Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury (strains) to back / shoulders while moving equipment 1b. Personal injury due to slips, trips, and falls	1a. Utilize proper lifting procedure when handling equipment and cooler. ➢ Bend down at the knees and lift/lower with your legs and do not lift anything > 50lbs. ➢ Place cooler on the bed of the truck before adding ice to avoid making coolers dangerously heavy. Perform a team lift if cooler weight exceeds 35lbs. 1b. Perform a general scan of your planned walking path to truck or next location for any obstructions, debris, slip, trip, and fall hazards. Communicate conditions with sampling partner.
On-site edits:				No edits
H. Departing the site 1. Exiting the property	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury and/or damage to personnel, property, and pets.	1a. When backing out of a site location, use a spotter to avoid damage or injury to the work vehicle, property, residents, and pets/livestock. ➢ If possible, avoid backing out, and exit moving forward.
On-site edits:				No edits

Core Safety Expectations

1. ***Always follow Fall Protection standards when working at elevated heights.***
2. ***Always follow Written Permit procedures.***
3. ***Always follow Lock Out/Tag Out (LOTO) procedures.***
4. ***Always follow Critical Device Defeat procedures.***
5. ***Always follow written PPE Requirements for the work being performed.***

Misty J Kettell
11-9-15

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Job Safety Analysis (JSA)

JSA Title: **Motor Vehicle Driving**

JSA Control #:

Date Developed: 4/15/2015	
Latest Revised Date: 4/15/2015- JSA Retention 1 year from Latest Revision Date.	
Developed by: Misty Kettell	
Work Team Leader: Misty Kettell	

Please complete the below if this JSA is being modified for SITE-SPECIFIC reasons.

Revision #: 1	**Work Location:** A-1141 Injection Well **Permit #:**

This JSA has been fully reviewed with all staff members and all activity job steps, hazards, work practices, and PPE are clearly understood and have been implemented. All necessary revisions have been written on this JSA.

SPECIFIC PPE: Gloves: (base on hazard and identified in column 4 e.g. - leather). PPE Clothing: highly visible clothing such as orange coveralls & reflective safety vest. Fire Retardant clothing (FRC) is required for well pad operations. Safety Glasses. Safety Shoes: steel-toed. Winter weather: Yack Tracks and FRC hard hat liner

REQUIRED AND/OR RECOMMENDED TOOLS AND EQUIPMENT: Fire extinguisher; First aid kit; Yellow flashing light; Roadside emergency kit; Spill containment kit

Activity/Sequence of Job Tasks List all tasks required to perform a job in the sequence they are carried out.	**Energy or Biological Sources** *(Check all that apply by using "Hazard Identification" tool)*		**Potential Hazards**	**Energy/Biological/Waste Management Plan** Eliminate – Control – Protect **Risk Control Measures** List control measures required to eliminate, control or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental impact. Include identification of 'Stop Work' triggers.
Please ensure that all necessary JSAs associated with your work scope have been identified and reviewed.				
A. Pre-mobilization 1. Always conduct a pre-trip or pre-use inspection of the vehicle prior to driving	X Motion _ Chemical _ Electrical _ Biological X Mechanical	_ Gravity _ Radiation X Temperature _ Pressure _ Sound	1a. Injuries caused by faulty or misadjusted equipment 1b. Accident or injuries caused by environmental conditions (inclement weather)	1a. Inspect exterior and interior of vehicle. Don hi-visible clothing, steel-toe boots, safety glasses and leather gloves. ➢ Exterior ▪ Check condition of windshield wipers (wear and cracking). ▪ Check tires for manufacture inflation rate and tread condition. ▪ Check for body damage/overall condition. ▪ Check under vehicle for fluid leaks (e.g., oil, brakes, transmission, etc.). ▪ Check all lights (e.g., hi/low beams, turn signals, emergency flashers). ▪ Don high visible clothing and/or vest, include FRC if on well pad site, while inspecting exterior of vehicle. ➢ Interior ▪ Adjust seat to your height and visibility. ▪ Adjust mirrors to eliminate blind spots. ▪ Fasten safety belt (passengers too). ▪ Secure all lose items in container (e.g. glove box, cargo nets, cargo box). ▪ Verifying critical equipment is working (e.g., defogger, wipers, air bags, lights, turn signals). 1b. Prepare vehicle for weather conditions prior to departure. ➢ Snow/Ice ▪ Scrape snow/ice from entire vehicle (e.g., hood, roof, windows, etc.). ▪ Add extra weight to back of trucks to increase traction. ▪ Maintain speed for conditions. ➢ Fog ▪ Turn on fog lights. ➢ Rain ▪ Ensure windows are defogged prior to mobilization. ▪ Utilize windshield wipers in all rainy conditions. ▪ Consider alternative routes based on flooding potential of roadway.

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			1c.3rd party injuries or accidents caused by unsecure equipment in truck bed	▪ Maintain speed for conditions. 1c. Inspect truck bed load. ➢ Check coolers, drums, and toolboxes to make sure all lids, caps, and tops are latched and tightened. ➢ Use ratchet-straps or cargo nets to secure load from shifting or falling from truck bed. ➢ Close and lock tailgate before mobilizing to site. ➢ Place light objects that could be blown out of truck bed in secured location of cab.
On-site edits:				No edits
B. Driving 1. Driving to and from the site or while driving onsite. ***Note:*** ➢ *Comply with all Smith Systems Five (5) Keys®* ➢ *Cell phone / texting is not permitted at any time while operating vehicle.* ➢ *Three-point seat belts must be worn by all occupants at all times while driving to and from the site and while driving onsite.* ➢ *Drive with low beams on at all times.* ➢ *Smoking is not permitted in GES vehicles.*	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Accident or injuries caused by traffic congestion or other vehicles (struck by, contact with) 1b. Accident or injuries caused by road surface condition (i.e., struck by, contact with)	1a. Mitigate potential for an accident by practicing the following techniques: ➢ Look ahead a minimum of 15 seconds to identify potential oncoming hazards. ➢ Maintain 4-second minimum following distance (increase distance due to weather conditions). ➢ Avoid focusing on any one object for more than 2 seconds. ➢ Scan the road, area around vehicle, and mirrors every 5-8 seconds. ➢ Stay out of other vehicles blind spots. ➢ Do not drive in clusters of traffic (i.e., adjust speed to give cushion between your vehicle & others). ➢ Utilize turn signals as required by law at all times 1b. Mitigate the potential for an accident by practicing the following techniques: ➢ Maintain speed; slower depending on road surface (e.g., dirt, concrete, asphalt, gravel). ➢ Drive posted speed limits (e.g., city, country roads, and highway). ➢ Do not tailgate vehicles in front of you. ➢ Pay attention for pedestrians. ➢ Place two hands on steering wheel at 9 and 3 position. ➢ Check for and yield to emergency vehicles. ➢ Obey traffic signals. ➢ Use particular caution in construction zones. ➢ Look ahead a minimum of 15 seconds. ➢ Scan the road, area around vehicle, and mirrors every 5-8 seconds. ➢ When backing, use a spotter at all times and ensure that the pre-determined hand signals have been discussed during the tailgate meeting and implemented. ➢ Stay out of other vehicles blind spots. Make eye contact with other drivers and ensure they see you.
On-site edits:				No edits
C. Preparing to Park 1. Parking Received Office of Utility Regs OCT 20 2016	X Motion _ Chemical _ Electrical _ Biological _ Mechanical	_ Gravity _ Radiation _ Temperature _ Pressure _ Sound	1a. Injury/vehicle impairment caused by contact with other vehicles	1a. Mitigate the potential for an accident by practicing the following techniques: ➢ ***First move forward*** - Back into space (required on terminal sites). ➢ Maneuver vehicle slowly within parking lot. ➢ Ensure vehicle is legally parked. ➢ Ensure nothing is located at rear of vehicle prior to mobilization. ➢ Get out and inspect space and vehicle if unsure of potential or unseen hazards. When parked, vehicles that have automatic transmissions, the vehicle must be placed into park and the emergency (parking brake applied). For manual transmissions, the emergency brake must be applied and wheel chocks used to prevent the vehicle from rolling ➢ Wheel chocks must be used for large vehicles when parked/positioned on uneven surfaces; front & back of each rear tire. ➢ Wheel chocks must be used (front & back of each rear tire) on all vehicles working at the site/ vehicles with manual transmission parked on sloping surfaces ➢ When parked and unhooked from a vehicle, trailers must have a wheel chock placed in front of and

				behind each rear wheel.
On-site edits:				No edits

Misty J. Kittell
11-9-15

Core Safety Expectations

1. ***Always follow Fall Protection standards when working at elevated heights.***
2. ***Always follow Written Permit procedures.***
3. ***Always follow Lock Out/Tag Out (LOTO) procedures.***
4. ***Always follow Critical Device Defeat procedures.***
5. ***Always follow written PPE Requirements for the work being performed.***

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2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

REVISED

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

December 01, 2015

Project: A-1141 Injection Well

Submittal Date: 11/10/2015
Group Number: 1607913
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
033-WV-009-110915-1230-1-602 Grab	8126435
033-WV-009-110915-1230-1-602 Filtered Grab	8126436

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

Respectfully Submitted,

Stephen J. Gordon
Project Manager

(724) 597-2027

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Analysis Report

REVISED

Sample Description: 033-WV-009-110915-1230-1-602 Grab
Surface Water Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126435
LL Group # 1607913
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 12:30 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

BLAW2

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	Benzene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Carbon Tetrachloride	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Chlorobenzene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,2-Dichlorobenzene	N.D.		1	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,4-Dichlorobenzene	N.D.		1	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,1-Dichloroethane	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,2-Dichloroethane	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,1-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	cis-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	trans-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,2-Dichloropropane	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Ethylbenzene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Methyl Tertiary Butyl Ether	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Methylene Chloride	N.D.		2	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Styrene	N.D.		1	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Tetrachloroethene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Toluene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,2,4-Trichlorobenzene	N.D.		1	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,1,1-Trichloroethane	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	1,1,2-Trichloroethane	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Trichloroethene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Vinyl Chloride	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	m+p-Xylene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	o-Xylene	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
10335	Xylene (Total)	N.D.		0.5	ug/l		11/20/15 00:21	11/20/15 00:21	2002
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	TPH-GRO water C6-C10	N.D.		20	ug/l		11/11/15 22:27	11/11/15 22:27	2001
GC Miscellaneous									
RSKSOP-175 modified									
07105	n-butane	N.D.		1.0	ug/l			11/11/15 17:30	719
07105	Ethane	N.D.		1.0	ug/l			11/11/15 17:30	719
07105	**Methane**	**24**		3.0	ug/l			11/11/15 17:30	719
07105	Propane	N.D.		1.0	ug/l			11/11/15 17:30	719
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	**C10-C28**	**0.10**		0.050	mg/l		11/12/15 19:00	11/17/15 02:21	2027

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Analysis Report

REVISED

Sample Description: 033-WV-009-110915-1230-1-602 Grab
Surface Water Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126435
LL Group # 1607913
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 12:30 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

BLAW2

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	**C24-C40**	**0.11**		0.050	mg/l		11/12/15 19:00	11/17/15 02:21	2027
02740	**Total TPH (C10-C40)**	**0.12**		0.050	mg/l		11/12/15 19:00	11/17/15 02:21	2027
Metals									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:24	2992
01750	**Calcium**	**22.3**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:24	2992
01754	**Iron**	**0.211**	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:24	2992
07058	**Manganese**	**0.0888**	.05	0.00080	mg/l	X	11/17/15 09:53	11/18/15 19:24	2992
01767	**Sodium**	**5.07**		0.167	mg/l		11/17/15 09:53	11/18/15 19:24	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.00062 J**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:37	1242
06026	**Barium**	**0.0460**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:37	1242
Wet Chemistry									
EPA 300.0									
00224	**Chloride**	**6.5**	250	1.0	mg/l			11/14/15 17:56	6676
00228	**Sulfate**	**16.0**	250	1.5	mg/l			11/14/15 17:56	6676
EPA 415.1									
00273	**Total Organic Carbon**	**3.9**		0.50	mg/l			11/18/15 10:59	495
EPA 170.1									
12151	**Temperature of pH**	**22.8**		0.010	Degrees C			11/10/15 22:23	1124
SM 2540 C-1997									
00212	**Total Dissolved Solids**	**95.5**	500	9.7	mg/l			11/12/15 08:00	8743
SM 2540 D-1997									
10457	**Total Suspended Solids**	**5.70**		1.00	mg/l			11/12/15 08:02	8743
SM 4500-H+ B-2000									
12152	**pH**	**8.0**		0.010	Std. Units			11/10/15 22:23	1124
	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
SM 5540 C-2000									
00225	M. B. A. S.	N.D.	.5	0.040	mg/l LAS MW 320			11/11/15 00:15	237
Microbiology									

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Analysis Report

REVISED

Sample Description: 033-WV-009-110915-1230-1-602 Grab
Surface Water Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126435
LL Group # 1607913
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 12:30 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

BLAW2

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Microbiology									
SM 9223 B-1997									
08161	**Tot Coli/E. coli (Quanti-tray)**	See Below			MPN/100mL			11/11/15 14:21	2213
	Total Coliform	> 200.5		/100ml					
	E. coli	200.5		/100ml					

General Sample Comments

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Analysis Report

REVISED

Sample Description: 033-WV-009-110915-1230-1-602 Filtered Grab
Surface Water Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126436
LL Group # 1607913
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 12:30 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:27	2992
01750	**Calcium**	**22.4**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:27	2992
01754	**Iron**	**0.0833 J**	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:27	2992
07058	**Manganese**	**0.0598**	.05	0.00080	mg/l	X	11/17/15 09:53	11/18/15 19:27	2992
01767	**Sodium**	**5.05**		0.167	mg/l		11/17/15 09:53	11/18/15 19:27	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.00087 J**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:38	1242
06026	**Barium**	**0.0427**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:38	1242

General Sample Comments

This sample was field filtered for dissolved metals.

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

OCT 2 0 2016

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC **Lab PM Contact Name:** Wendy Kozma **Lab Address:** 2425 New Holland Pike **City, State ZIP:** Lancaster, PA 17601 **Phone:** 717-556-7257 **Fax:** 717-656-6766 **Email:** WendyKozma@eurofinsus.com	**Client:** Southwestern Energy Company **Client Contact Name:** Tyler Spear **Client Address:** 179 Innovation Drive **City, State ZIP:** Jane Lew, WV 26378 **Phone:** 304-884-1681 **Email:** Tyler_Spear@SWN.com	**Environmental Chain of Custody (COC)** **Consultant Name:** GES, Inc. **Consultant PM Contact Name:** Nicholas Lohr **Phone:** 800-267-2549, Ext. 3634 **Fax:** 866-902-2187 **Email:** Nlohr@gesonline.com	eurofins | Lancaster Laboratories

***WELL PAD NAME:** A-1141 Injection Well

***Please circle which type of site this is:** IMPOUNDMENT WELL PAD SPECIAL PROJECT

***PROPERTY # (AFE# if applicable):** 400116668

***MAJOR/MINOR CODE:** 52695 / 007

***STATE SAMPLED:** WV

***OWNER NAME:** Bernadette Law

***Analysis Turnaround Time (working days)**

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

***SAMPLER(s):** Matthew Conover 602

20810
1607913
8126435-37

COC Page 1 of 1

Lab SDG Label

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present) ☐ *Sample Collected - POST-Treatment System

☒ *Pre-drill Sample ☐ *Post-drill Sample

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-609-11015-1230-1-602	11/1/15	1230	grab	SW	22	X	x	x	x	x	x	x	x	x	x	x	x	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

OCT 20 2016

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ■ Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

***PARCEL ID #:** 03 4F6681900000000

***FEDEX TRACKING #:** 807713276367

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Pond

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
Matt Conover	GES	11/9/15 1945			
Relinquished by:	Company:	Date/Time:	Received by:	ELLE	Date/Time:
					11-10-15 / 915

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Sample Administration Receipt Documentation Log

Doc Log ID: 122724

Group Number(s): 1607913

Client: GES

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	11/10/2015 9:15
Number of Packages:	1	Number of Projects:	1
State/Province of Origin:	WV		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	No	Sample Date/Times match COC:	Yes
Samples Chilled:	Yes	VOA Vial Headspace ≥ 6mm:	No
Paperwork Enclosed:	Yes	Total Trip Blank Qty:	2
Samples Intact:	Yes	Trip Blank Type:	HCL
Missing Samples:	No	Air Quality Samples Present:	No
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Timothy Cubberley (6520) at 09:55 on 11/10/2015

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT131	0.3	DT	Wet	Y	Bagged	N

Per-bottle Temperature Details

All Temperatures in °C

Cooler #	Thermometer	Bottle Temperature Range
1	32170023	0.0 - 1.0

Research
Different Than One
OCT 20 2016

2425 New Holland Pike
Lancaster, PA 17605-2425

T 717-656-2300
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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

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Analysis Report

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ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

December 01, 2015

Project: A-1141 Injection Well

Submittal Date: 11/10/2015
Group Number: 1607911
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
033-WV-009-110915-1150-1-602 Grab	8126430
033-WV-009-110915-1150-1-602 Filtered Grab	8126431

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

Respectfully Submitted,

Stephen J. Gordon
Project Manager

(724) 597-2027

Received
Office of Oil & Gas
OCT 20 2016

REVISED

Sample Description: 033-WV-009-110915-1150-1-602 Grab
Groundwater Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126430
LL Group # 1607911
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 11:50 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

BLAW-

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	Benzene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Carbon Tetrachloride	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Chlorobenzene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,2-Dichlorobenzene	N.D.		1	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,4-Dichlorobenzene	N.D.		1	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,1-Dichloroethane	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,2-Dichloroethane	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,1-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	cis-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	trans-1,2-Dichloroethene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,2-Dichloropropane	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Ethylbenzene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Methyl Tertiary Butyl Ether	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Methylene Chloride	N.D.		2	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Styrene	N.D.		1	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Tetrachloroethene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Toluene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,2,4-Trichlorobenzene	N.D.		1	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,1,1-Trichloroethane	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	1,1,2-Trichloroethane	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Trichloroethene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Vinyl Chloride	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	m+p-Xylene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	o-Xylene	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
10335	Xylene (Total)	N.D.		0.5	ug/l		11/20/15 00:01	11/20/15 00:01	2002
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	TPH-GRO water C6-C10	N.D.		20	ug/l		11/11/15 22:00	11/11/15 22:00	2001
GC Miscellaneous									
RSKSOP-175 modified									
07105	n-butane	N.D.		1.0	ug/l			11/11/15 17:13	719
07105	Ethane	N.D.		1.0	ug/l			11/11/15 17:13	719
07105	**Methane**	**27**		3.0	ug/l			11/11/15 17:13	719
07105	Propane	N.D.		1.0	ug/l			11/11/15 17:13	719
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	C10-C28	N.D.		0.050	mg/l		11/12/15 19:00	11/17/15 00:32	2027
02740	C24-C40	N.D.		0.050	mg/l		11/12/15 19:00	11/17/15 00:32	2027

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Analysis Report

REVISED

Sample Description: 033-WV-009-110915-1150-1-602 Grab
Groundwater Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126430
LL Group # 1607911
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 11:50 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

BLAW-

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	Total TPH (C10-C40)	N.D.		0.050	mg/l		11/12/15 19:00	11/17/15 00:32	2027
Metals									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:18	2992
01750	**Calcium**	**29.0**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:18	2992
01754	**Iron**	**0.239**	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:18	2992
07058	**Manganese**	**0.168**	.05	0.00080	mg/l	X	11/17/15 09:53	11/18/15 19:18	2992
01767	**Sodium**	**31.8**		0.167	mg/l		11/17/15 09:53	11/18/15 19:18	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.0027**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:33	1242
06026	**Barium**	**0.281**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:33	1242
Wet Chemistry									
EPA 300.0									
00224	**Chloride**	**10.3**	250	1.0	mg/l			11/14/15 17:06	6676
00228	**Sulfate**	**24.0**	250	1.5	mg/l			11/14/15 17:06	6676
EPA 415.1									
00273	Total Organic Carbon	N.D.		0.50	mg/l			11/18/15 10:44	495
EPA 170.1									
12151	**Temperature of pH**	**21.9**		0.010	Degrees C			11/10/15 22:48	1124
SM 2540 C-1997									
00212	**Total Dissolved Solids**	**167**	500	19.4	mg/l			11/12/15 08:00	8743
SM 2540 D-1997									
10457	Total Suspended Solids	N.D.		1.00	mg/l			11/12/15 08:02	8743
SM 4500-H+ B-2000									
12152	**pH**	**7.9**		0.010	Std. Units			11/10/15 22:48	1124
	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
SM 5540 C-2000									
00225	M. B. A. S.	N.D.	.5	0.040	mg/l LAS MW 320			11/11/15 00:15	237
Microbiology									
SM 9223 B-1997									

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Analysis Report

REVISED

Sample Description: 033-WV-009-110915-1150-1-602 Grab
Groundwater Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126430
LL Group # 1607911
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 11:50 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

BLAW-

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Microbiology									
SM 9223 B-1997									
08161	**Tot Coli/E. coli (Quanti-tray)**	See Below			MPN/100mL			11/11/15 14:21	2213
	Total Coliform	3.1	/100ml						
	E. coli	< 1.0	/100ml						

General Sample Comments

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Analysis Report

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Sample Description: 033-WV-009-110915-1150-1-602 Filtered Grab
Groundwater Bernadette Law
A-1141 Injection Well

LL Sample # WW 8126431
LL Group # 1607911
Account # 20810

Project Name: A-1141 Injection Well

Collected: 11/09/2015 11:50 by MC

Submitted: 11/10/2015 09:15
Reported: 12/01/2015 16:10

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	0.0841	mg/l		11/17/15 09:53	11/18/15 19:21	2992
01750	**Calcium**	**28.4**		0.0333	mg/l		11/17/15 09:53	11/18/15 19:21	2992
01754	**Iron**	**0.145** J	.3	0.0333	mg/l		11/17/15 09:53	11/18/15 19:21	2992
07058	**Manganese**	**0.156**	.05	0.00080	mg/l	X	11/17/15 09:53	11/18/15 19:21	2992
01767	**Sodium**	**32.5**		0.167	mg/l		11/17/15 09:53	11/18/15 19:21	2992
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.0021**	.01	0.00040	mg/l		11/17/15 09:09	11/19/15 06:35	1242
06026	**Barium**	**0.276**	2	0.00092	mg/l		11/17/15 09:09	11/19/15 06:35	1242

General Sample Comments

This sample was field filtered for dissolved metals.

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

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Environmental Chain of Custody (COC)

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC
Lab PM Contact Name: Wendy Kozma
Lab Address: 2425 New Holland Pike
City, State ZIP: Lancaster, PA 17601
Phone: 717-556-7257 **Fax:** 717-656-6766
Email: WendyKozma@eurofinsus.com

Client: Southwestern Energy Company
Client Contact Name: Tyler Spear
Client Address: 179 Innovation Drive
City, State ZIP: Jane Lew, WV 26378
Phone: 304-884-1681
Email: Tyler_Spear@SWN.com

Consultant Name: GES, Inc.
Consultant PM Contact Name: Nicholas Lohr
Phone: 800-267-2549, Ext. 3634 **Fax:** 866-902-2187
Email: Nlohr@gesonline.com

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***WELL PAD NAME:** A-1141 Injection Well

***Please circle which type of site this is:** IMPOUNDMENT (WELL PAD) SPECIAL PROJECT

***PROPERTY # (AFE# if applicable):** 400116166 68

***MAJOR/MINOR CODE:** 52695/007

***STATE SAMPLED:** WV

***OWNER NAME:** Bernadette Law

***Analysis Turnaround Time (working days)**

Standard TAT = 10 working days (unless otherwise noted below)

☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only

☐ Rush TAT = _____ working days

***SAMPLER(s):** Matthew Cowmeadow 602

20810
1607911
8126430-32

☒ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present) ☐ *Sample Collected - POST-Treatment System

☒ *Pre-drill Sample ☐ *Post-drill Sample

COC Page 1 of 1

Lab SDG Label

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Standard Parameters: Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
033-WV-009-110915-1150-1-602	11/9/15	1150	grab	GW	22	X	X	X	X	X	X	X	X	X	X	X	X	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												

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Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

1,6 | 1,2 | 1 | 1,4 | 1 | 1 | 1,2 | 1 | 1,2 | 1 | 1,6

Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown.

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ■ Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

***PARCEL ID #:** 03 4F00190000000

***FEDEX TRACKING #:** 801301831298

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Well at outside garage spigot

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
Matt Cowmeadow	GES	11/9/15 1615pm			
Relinquished by:	Company:	Date/Time:	Received by:		Date/Time:
				ELLE	11-10-15 / 9:15

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Sample Administration Receipt Documentation Log

Doc Log ID: 122728

Group Number(s): 1607911

Client: GES

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	11/10/2015 9:15
Number of Packages:	1	Number of Projects:	1
State/Province of Origin:	WV		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	No
Samples Chilled:	Yes	Total Trip Blank Qty:	2
Paperwork Enclosed:	Yes	Trip Blank Type:	HCL
Samples Intact:	Yes	Air Quality Samples Present:	No
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Timothy Cubberley (6520) at 10:07 on 11/10/2015

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT131	2.0	DT	Wet	Y	Bagged	N

Per-bottle Temperature Details

All Temperatures in °C

Cooler #	Thermometer	Bottle Temperature Range
1	32170023	1.4 - 2.3

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

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WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

APPENDIX F

Area Permit Wells

API #	Well Type (Injection, Production, Observation, Monitoring)	Well Status (Active, Abandoned, Shut-In, Plugged)	Northing (UTM NAD 83 Meters)	Easting (UTM NAD 83 Meters)
4704100113A		PLUGGED	4,322,903	536,390
4704100379A		PLUGGED	4,322,527	535,217
4704100446		PRODUCING GAS	4,323,295	535,889
4704100493		PLUGGED	4,322,228	535,626
4704100511A		PLUGGED	4,321,762	536,879
4704100515		PLUGGED	4,324,204	535,669
4704100522		PRODUCING OIL	4,324,064	536,673
4704100539A		PLUGGED	4,322,606	534,879
4704100546		PRODUCING GAS	4,322,577	536,610
4704100584		PLUGGED	4,323,380	535,110
4704100653A		PLUGGED	4,321,599	536,380
4704100656A		PLUGGED	4,323,002	536,824
4704100658A		PLUGGED	4,322,772	535,876
4704100675		PLUGGED	4,322,970	537,682
4704100682A		PLUGGED	4,323,447	535,647
4704100690A		PLUGGED	4,324,370	536,703
4704100699A		PLUGGED	4,323,938	537,126
4704100700A		PLUGGED	4,323,445	535,149
4704100701A		PLUGGED	4,323,686	535,003
4704100757		UNKNOWN	4,323,864	537,213
4704100785		PLUGGED	4,323,200	536,962
4704101273		PRODUCING GAS	4,322,626	537,562
4704101759		PRODUCING GAS	4,322,158	537,166
4704101819		PLUGGED	4,323,590	534,797
4704101820		PRODUCING GAS	4,323,636	535,368
4704101887		PRODUCING GAS	4,322,684	535,736
4704101888		PRODUCING GAS	4,322,430	536,109
4704102117		PRODUCING GAS	4,321,530	535,793
4704102171		PRODUCING GAS	4,321,875	535,956
4704102314		PRODUCING GAS	4,323,569	537,528
4704102319		PRODUCING GAS	4,322,951	537,453
4704102354		PRODUCING GAS	4,322,860	536,618
4704102359		PRODUCING GAS	4,321,913	535,139
4704102371		PRODUCING GAS	4,323,951	536,232
4704102549		PRODUCING GAS	4,321,834	536,683
4704103298		PRODUCING GAS	4,322,412	536,940
4704103348		PRODUCING GAS	4,324,102	535,139
4704103414		PRODUCING GAS	4,322,553	536,325
4704103417		PRODUCING GAS	4,322,613	534,750
4704103435		PRODUCING GAS	4,323,055	536,755
4704103451		PRODUCING GAS	4,323,430	536,330
4704103649		PRODUCING GAS	4,322,738	535,372
4704103678		PRODUCING GAS	4,323,382	535,586
4704103683		PRODUCING GAS	4,322,304	535,115
4704104389		PRODUCING GAS	4,323,604	536,781
4704104392		PRODUCING GAS	4,324,584	536,091
4704104500		PRODUCING GAS	4,321,800	535,583
4704104501		PRODUCING GAS	4,322,338	535,496
4704104528		PRODUCING GAS AND OIL	4,323,572	536,062
4704104562		PRODUCING GAS	4,324,257	535,829
4704104563		PRODUCING GAS	4,323,686	535,629
4704104569		PRODUCING GAS	4,322,942	534,888
4704104583		PRODUCING GAS	4,323,201	535,936
4704104591		PRODUCING GAS	4,323,174	537,145
4704104603		PRODUCING GAS	4,324,319	536,295
4704104637		PRODUCING GAS	4,323,825	536,479
4704104638		PRODUCING GAS	4,323,924	535,983
4704104640		PRODUCING GAS	4,323,640	537,088
4704104698		PRODUCING GAS	4,323,956	537,394
4704104713		PRODUCING GAS	4,322,894	537,768
4704104714		PRODUCING GAS	4,322,406	537,307
4704104715		PRODUCING GAS	4,321,711	537,170
4704104717		PRODUCING GAS	4,322,704	537,077
4704104810		PRODUCING GAS	4,322,135	536,446
4704104811		PRODUCING GAS	4,321,569	536,396
4704104812		PRODUCING GAS	4,323,648	534,761
4704104822		PRODUCING GAS	4,323,107	535,223
4704104834		PRODUCING GAS AND OIL	4,323,235	534,836
4704104835		PRODUCING GAS	4,322,135	534,869
4704104843		PRODUCING GAS	4,324,129	537,041
4704104918		PRODUCING GAS	4,322,803	537,471

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Make as many copies as necessary and include page numbers as appropriate.

Promoting a healthy environment

UNDERGROUND INJECTION CONTROL (UIC)
PERMIT APPLICATION

SECTION 8

UIC #: 2D0413175
FACILITY NAME: Law SWS SWD 1
OPERATOR: Lewis Camden, LLC

Received
Office of Oil & Gas
OCT 20 2016

Promoting a healthy environment.

Section 8 – Geological Data on the Injection and Confining Zone:

- Injection Interval: The existing injection interval is from 2260 to 2508 feet measured depth. The injection interval is in the Gordon and Fifth Sand. The injection interval is represented by the Structure Contour Map and Isopach map included in this section.
- Confining Layers: Produced formation water will be injected into the Gordon Sand as defined by the depth 2,250 to 2,339 feet in the proposed well. In this well the Gordon Sand consists of 3 sandstone beds separated by less than 15 feet of siltstone and shale. There is 60' of gross sand with 62' of net pay defined as porosity greater than 7% based on bulk density geophysical log response less than 2.575 g/c. Within an one mile area of the proposed facility, available geophysical logs show the Gordon Sand interval to range from 70 to 80 feet of thickness, 46 to 60 feet of gross sand, 53 to 62 feet of net pay and 10% to 22% in peak porosity. Data on permeability is not available. Produced formation water may also be injected into the Fifth Sand after such time that the Gordon Sand will no longer accept fluids. The Fifth Sand in the proposed facility is defined by the depth 2,488 to 2,507 feet. The Fifth Sand has 19 feet of gross sand and 19 feet of net pay. Within an one mile area of the proposed facility, the Fifth Sand interval ranges from 17 to 19 feet in thickness, 13 to 19 feet of gross sand, 15 to 19 of net pay and 23% to 24% in peak porosity. Data on permeability is not available.

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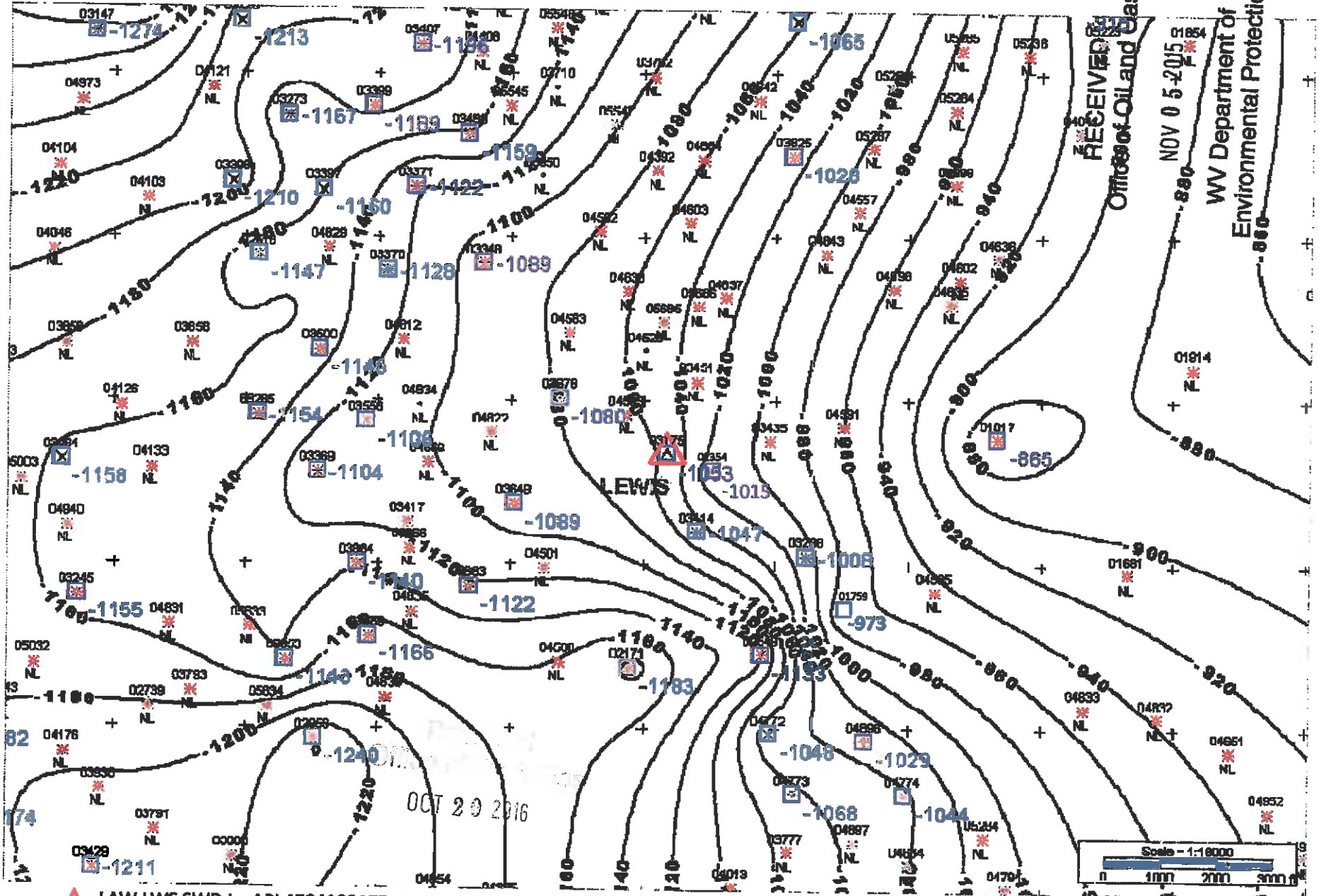
Office of Oil & Gas
OCT 20 2016

Exhibit 8a.)

Structure Map on Upper Gordon Sand C.I. 20 FT



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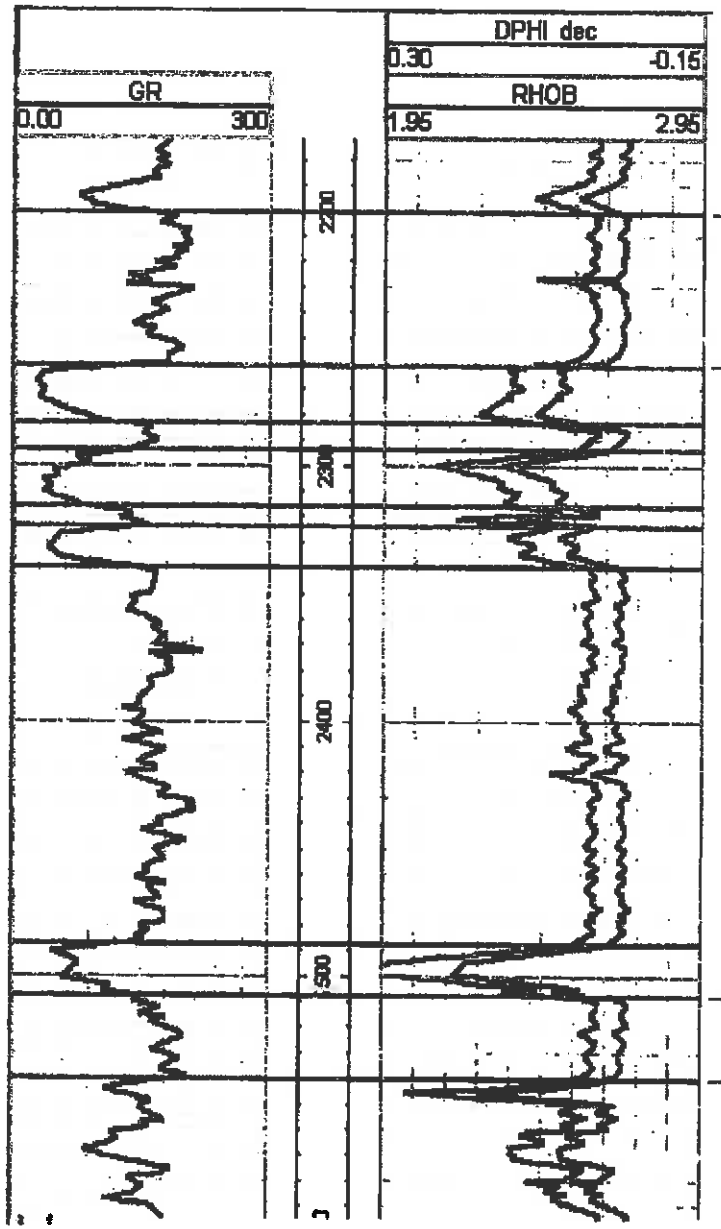
WV Department of
Environmental Protection
OCT 20 2016

Exhibit 8b.)

LAW LSW SWD I
API 4707103175



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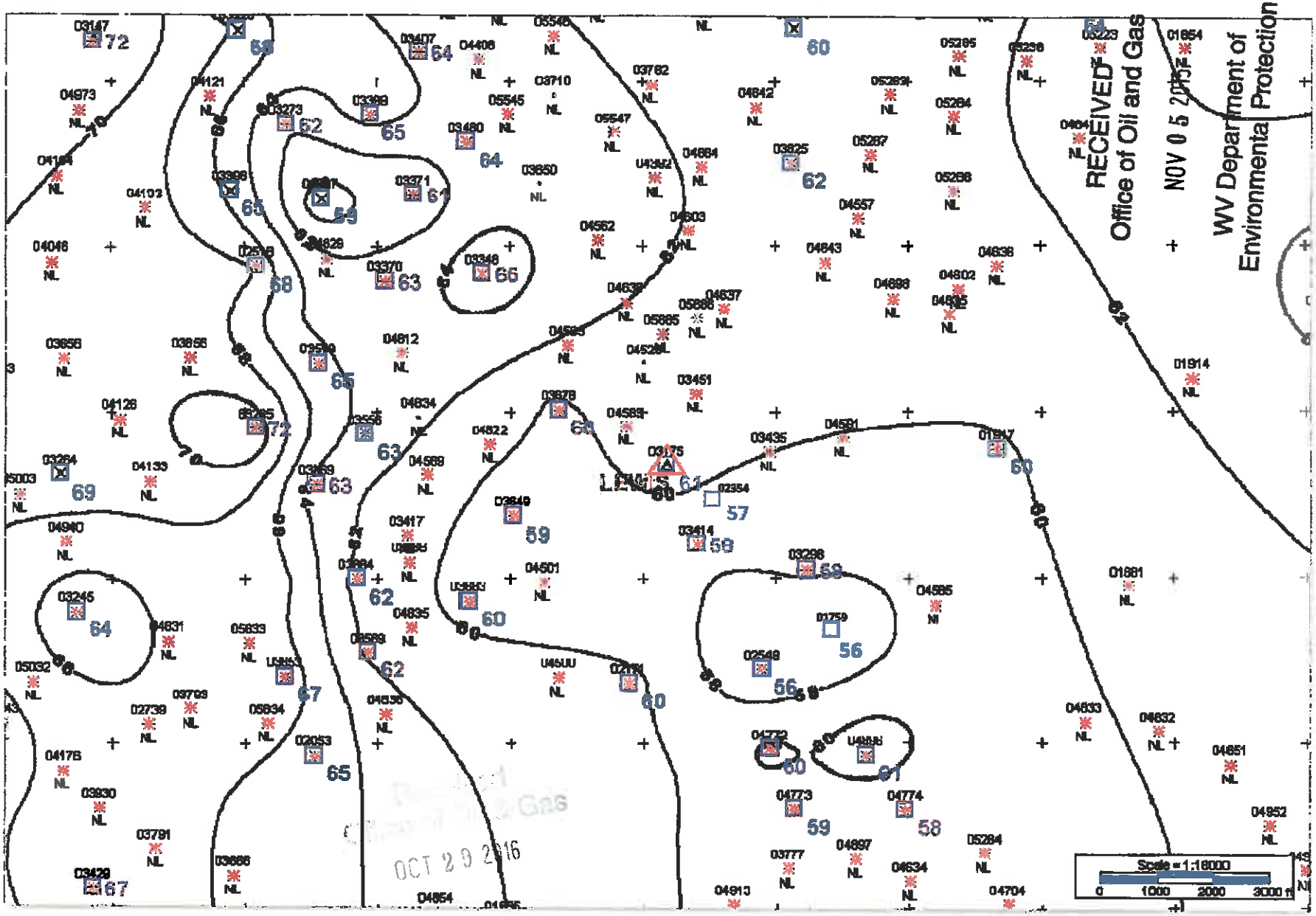
WV Department of
Environmental Protection

Received
Office of Oil & Gas
OCT 20 2016

Exhibit 8c.) Total Thickness of Upper Confining Zone C.I. 2 FT

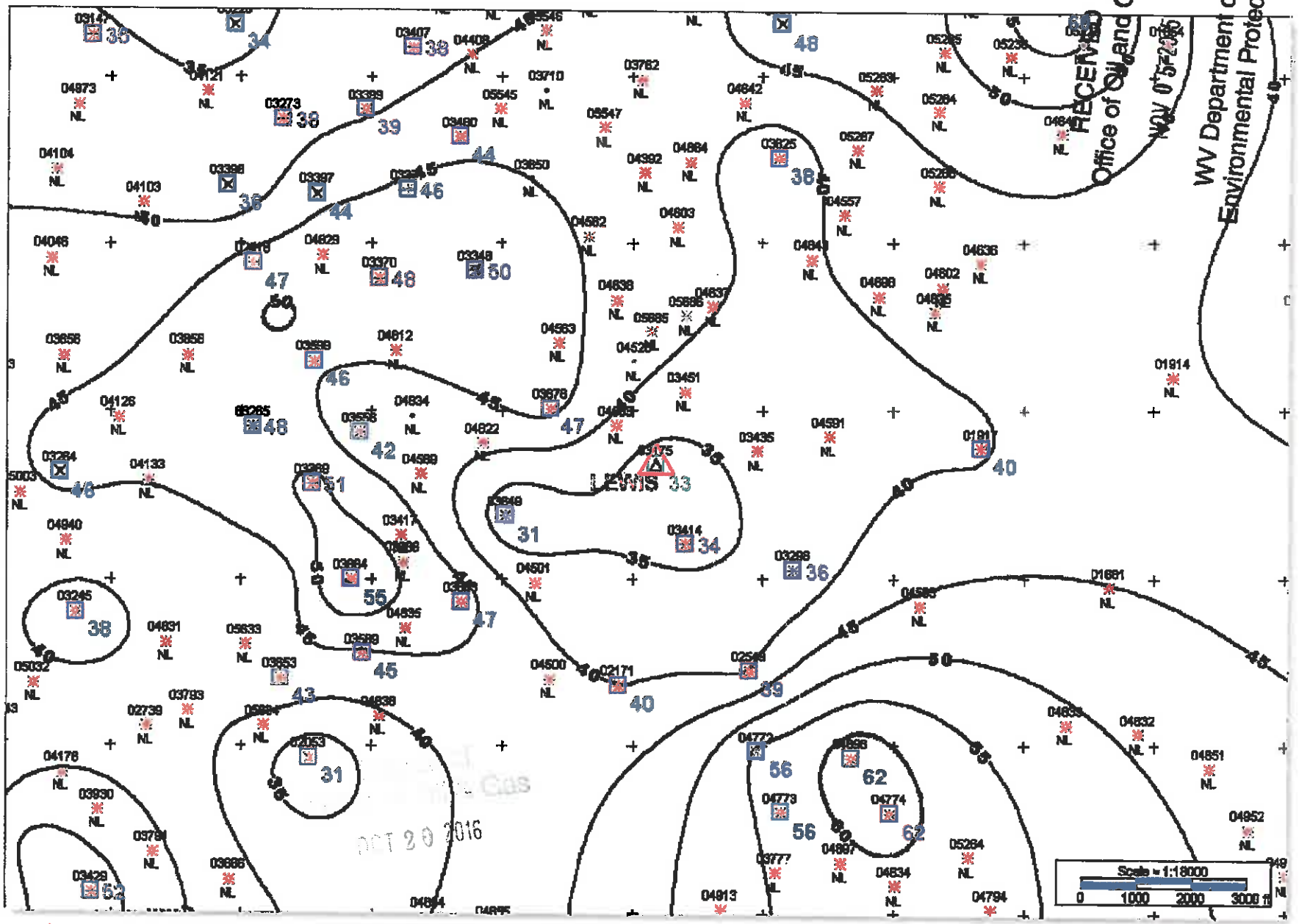


△ LAW LWS SWD I – API 4704103175

NL: No Public Log Available

Exhibit 8d.)

Total Thickness of Lower Confining Zone C.I. 5Ft



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Environmental Protection

OCT 20 2016

△ LAW LWS SWD I – API 4704103175
NL: No Public Log Available

Exhibit 8e.)

Net Sand of Injection Zone C.I. 10 FT

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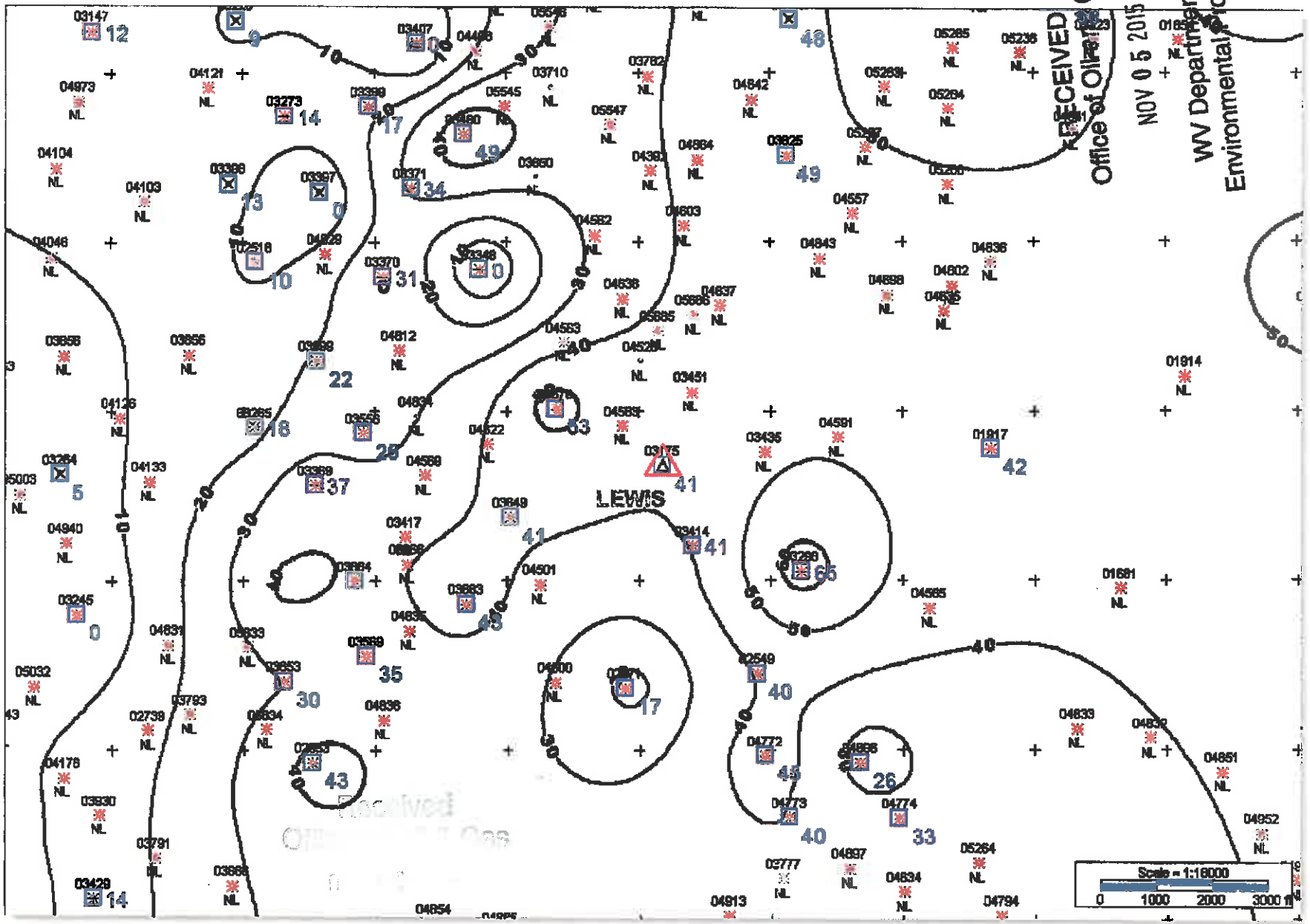
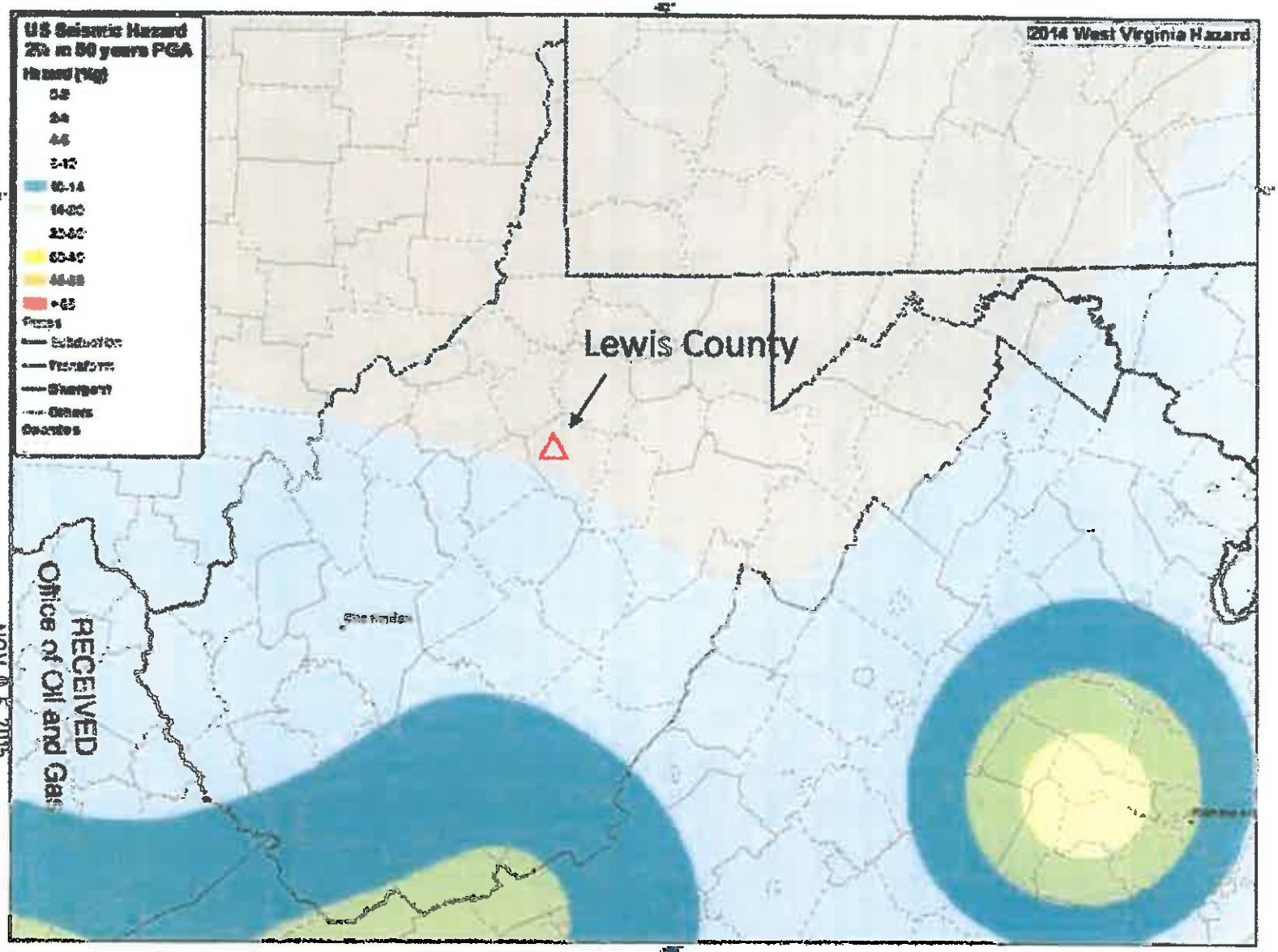


△ LAW LWS SWD I – API 4704103175

NL: No Public Log Available

Exhibit 8f.)

2014 Seismic Hazard Map



http://earthquake.usgs.gov/earthquakes/states/west_virginia/hazards.php

△ LAW LWS SWD I – API 4704103175

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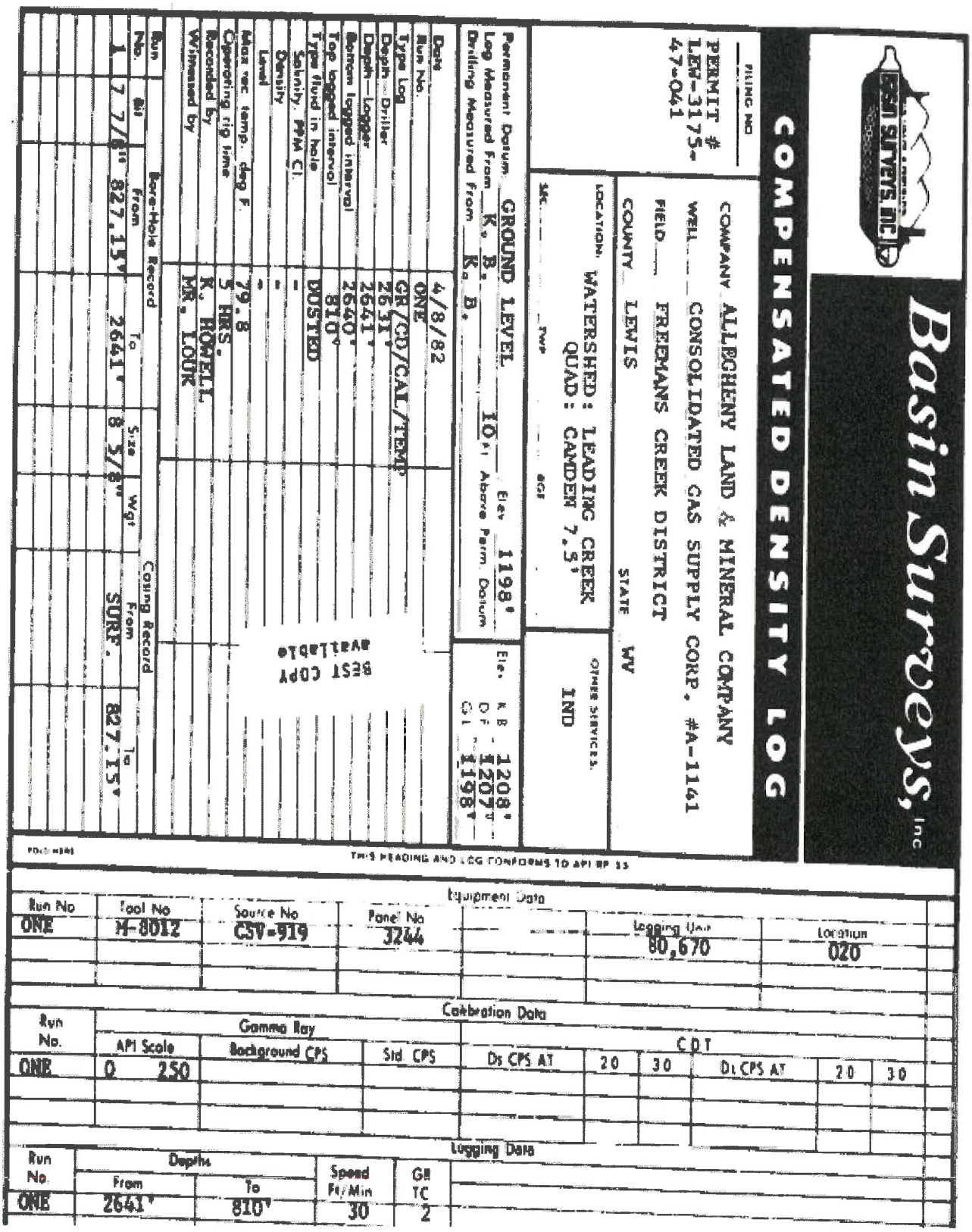
NOV 05 2015
WV Department of
Environmental Protection
OCT 20 2016



Basin Surveys, INC

COMPENSATED DENSITY LOG

COMPANY ALLEGHENY LAND & MINERAL COMPANY
WELL CONSOLIDATED GAS SUPPLY CORP. #A-1141
FIELD FREEMANS CREEK DISTRICT
COUNTY LEWIS STATE WV
LOCATION: WATERSHED : LEADING CREEK
QUAD : CAMDEN 7.5'
OTHER SERVICES: IND

PERMIT # LEW-3175-47-041

Permanent Datum GROUND LEVEL Elev. 1198'
Log Measured From K. B. 10 Ft. Above Perm. Datum
Drilling Measured From K. B.

Date	4/8/82
Run No.	ONE
Type Log	GR/CD/CAL/TEMP
Depth—Driller	2641'
Depth—Logger	2640'
Bottom logged interval	810'
Top logged interval	DUSTED
Type fluid in hole	-
Salinity, PPM Cl	-
Density	-
Level	79.8
Max. rec. temp. deg F	5 HRS.
Operating rig time	K. HOWELL
Recorded by	MR. LOUK
Witnessed by	

Elev. K.B. 1208'
D.F. 1207'
G.L. 1198'

Bore-Hole Record

Run No.	Bit From	To	Size	Wgt
1	7 7/8" 827.15'	2641'	8 5/8"	

Casing Record

From	To
SURF.	827.15'

BEST COPY AVAILABLE

THIS READING AND LOG CONFORMS TO API RP 33

Equipment Data

Run No	Tool No	Source No	Panel No		Logging Unit	Location
ONE	M-8012	CSV-919	3244		80,670	020

Calibration Data

Run No.	Gamma Ray API Scale	Background CPS	Std. CPS	CDT Ds CPS AT	20	30	Dl CPS AT	20	30
ONE	0 250								

Logging Data

Run No.	Depths From	To	Speed Ft/Min	GR TC
ONE	2641'	810'	30	2

Weatherford
PDF processed with CutePDF evaluation edition www.CutePDF.com

Logging Data

Run No.	Depths From	Depths To	Speed Ft./Min.	GR TC
ONE	2641'	810'	30	2

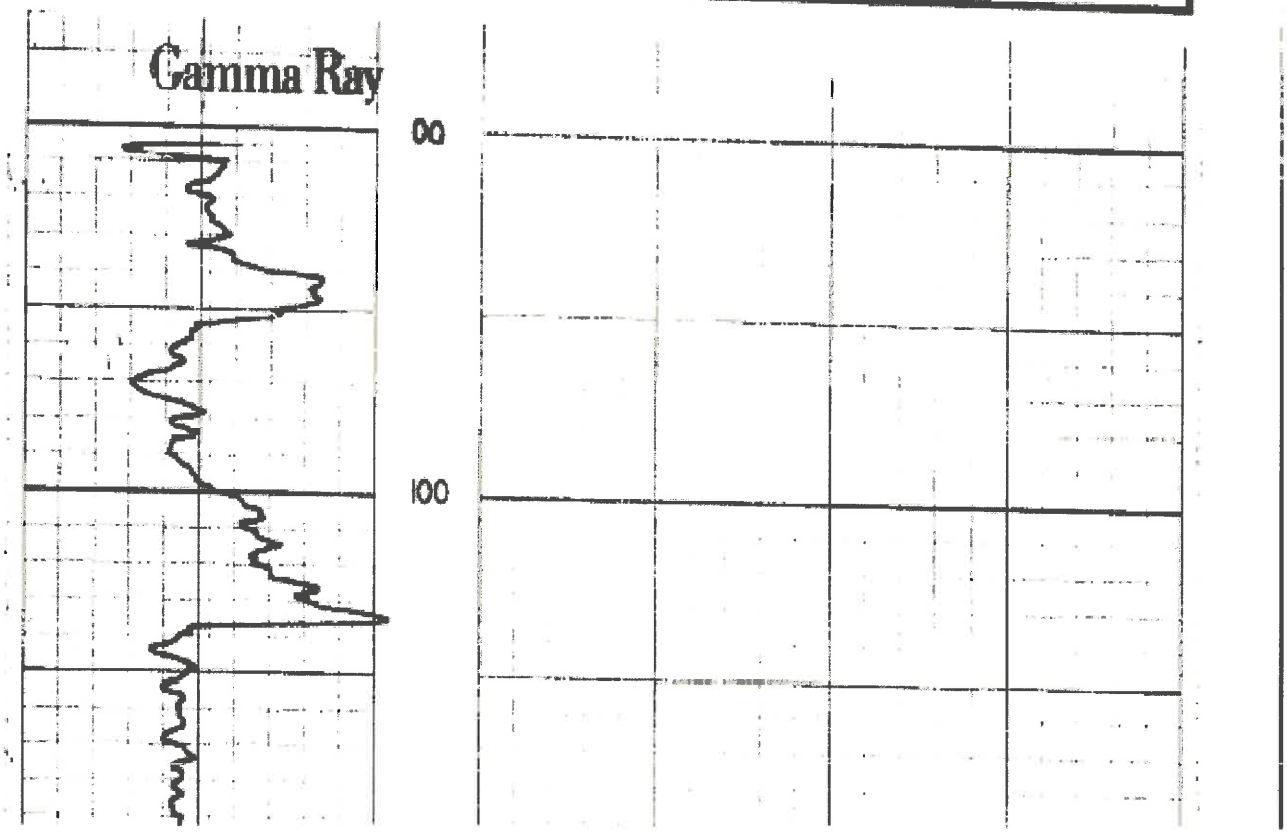
Remarks:

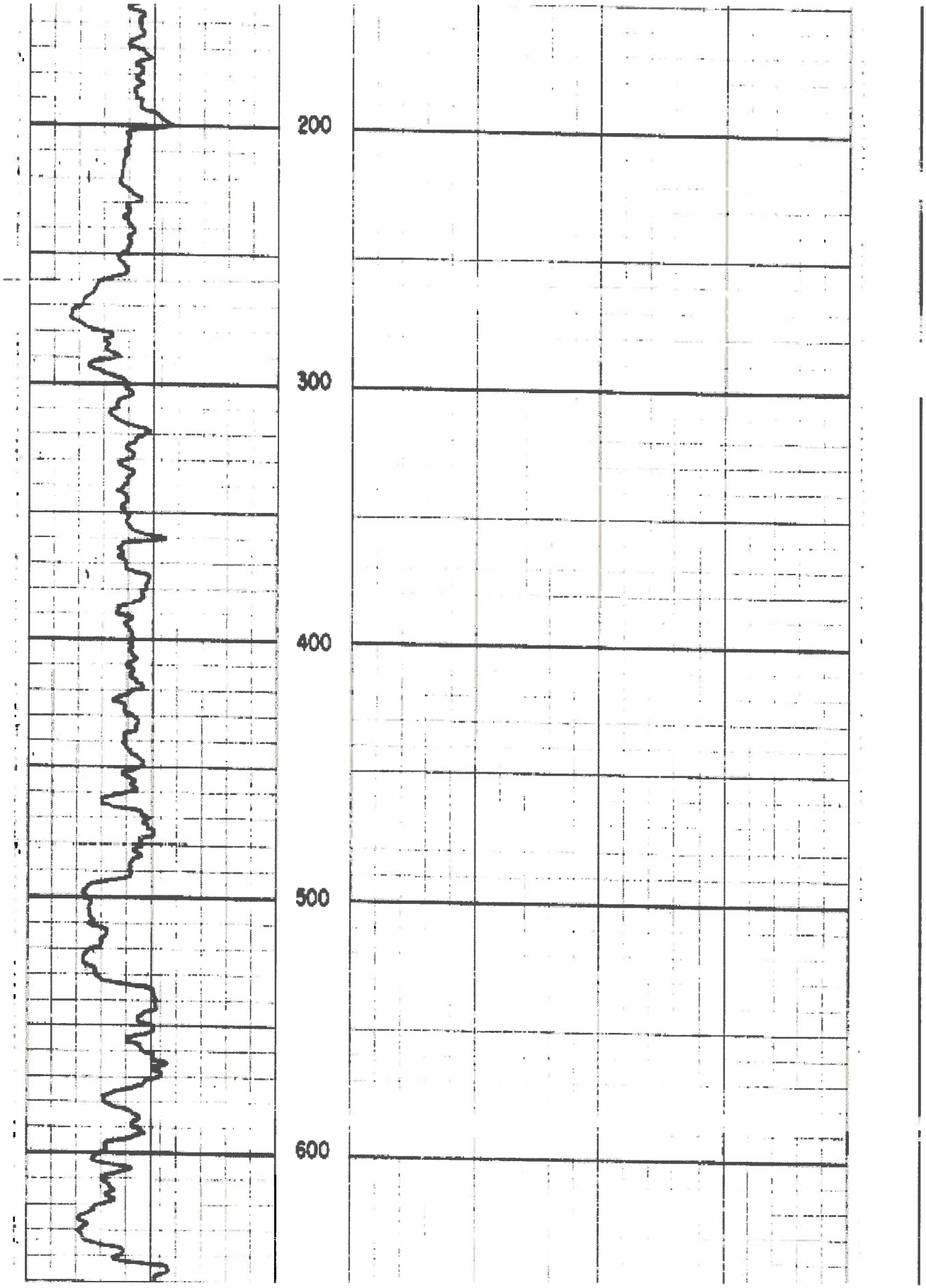
GAMMA RAY
API UNITS
0 250

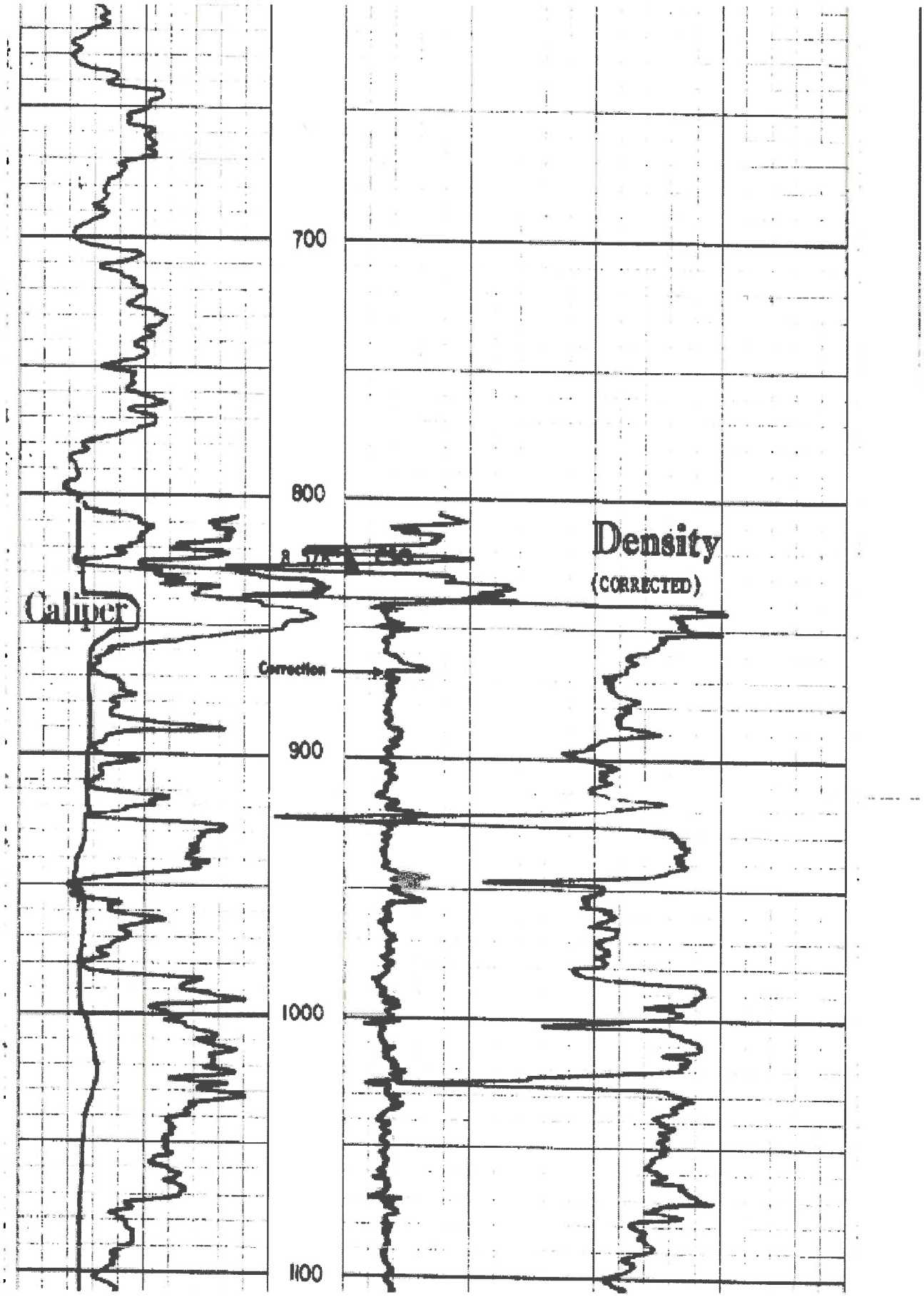
DEPTHS

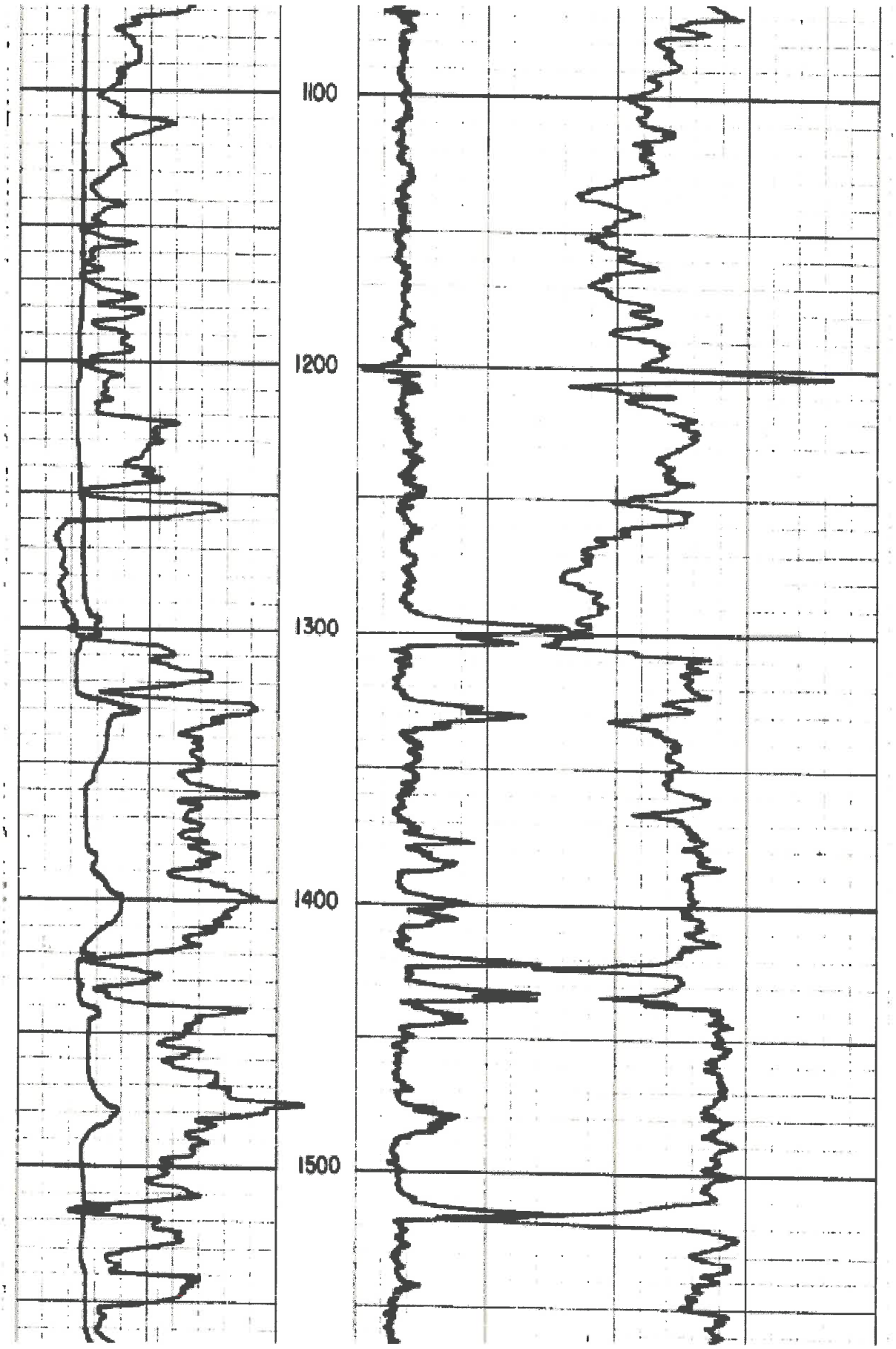
BULK DENSITY
GRAMS/CC
2.0 2.5 3.0

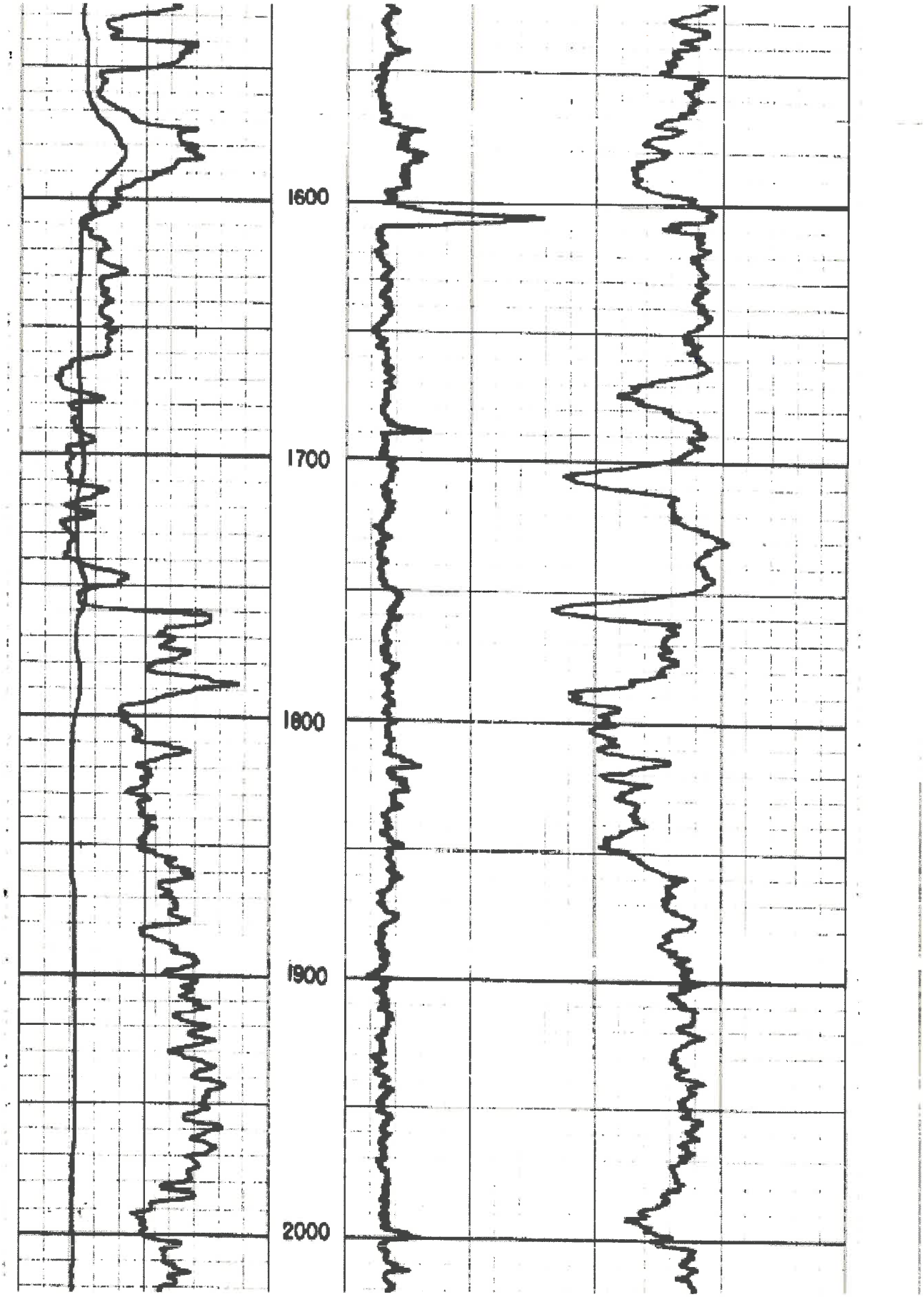
CALIPER
HOLE SIZE - INCHES
6 16

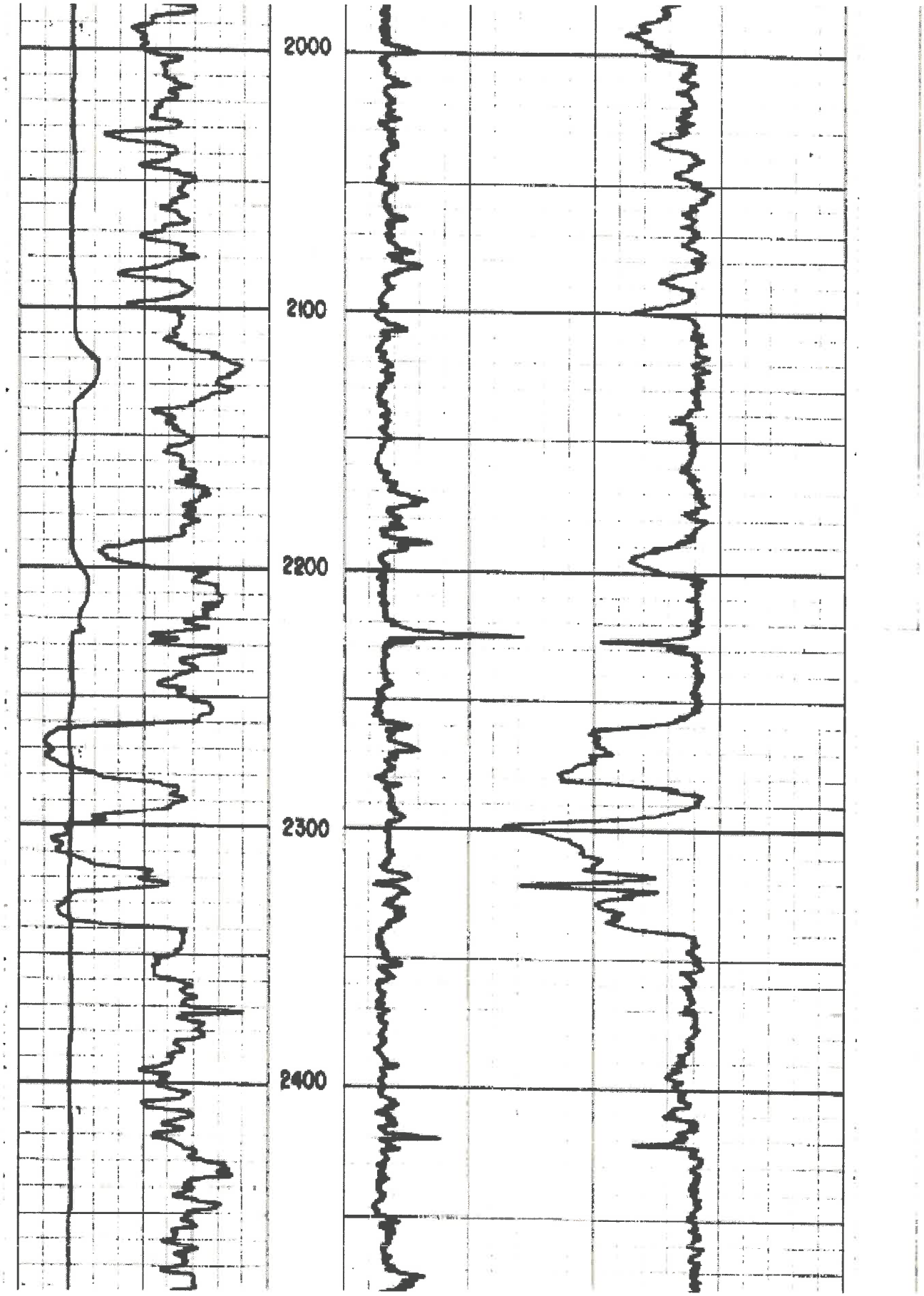


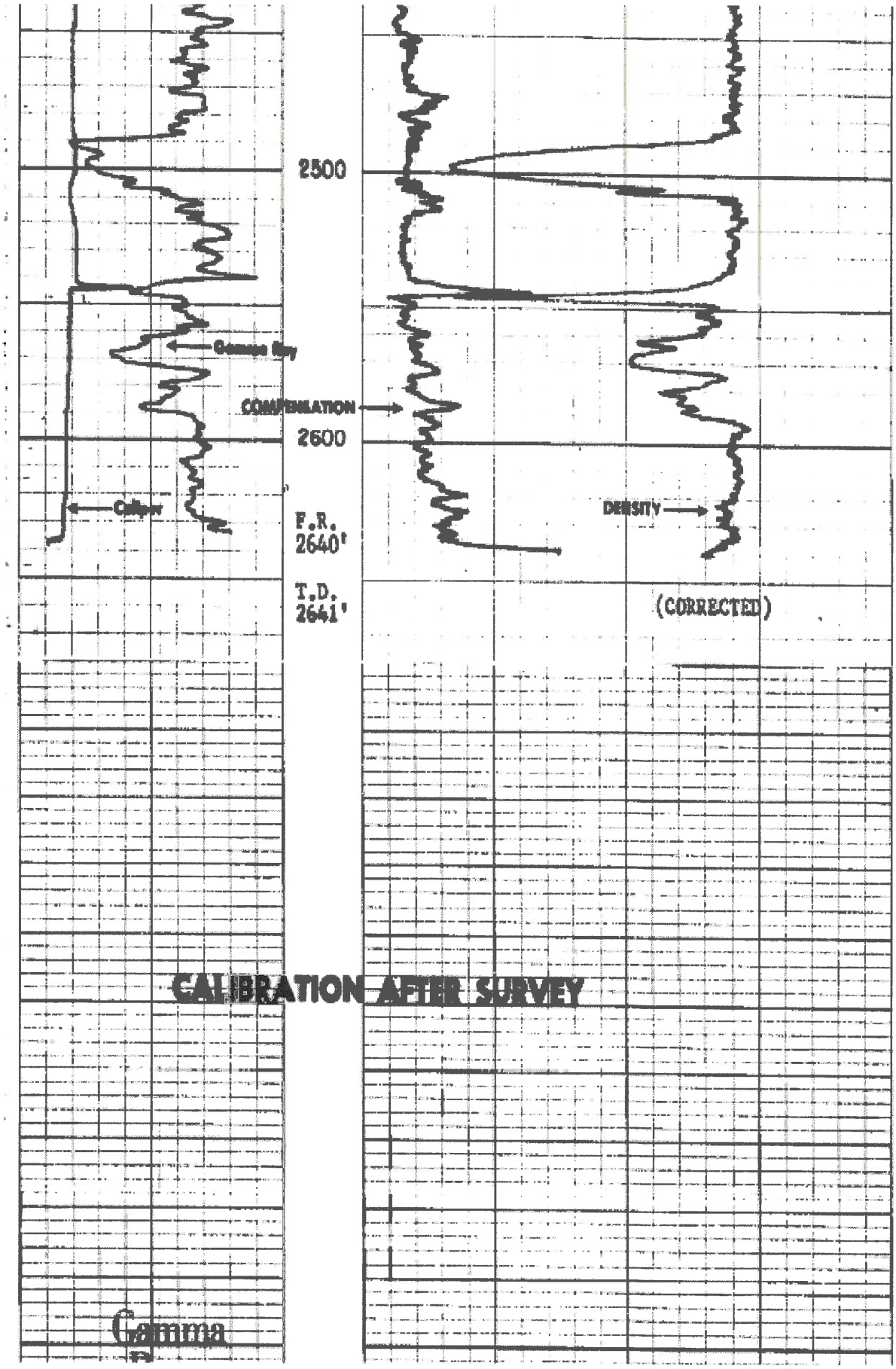

200
300
400
500
600

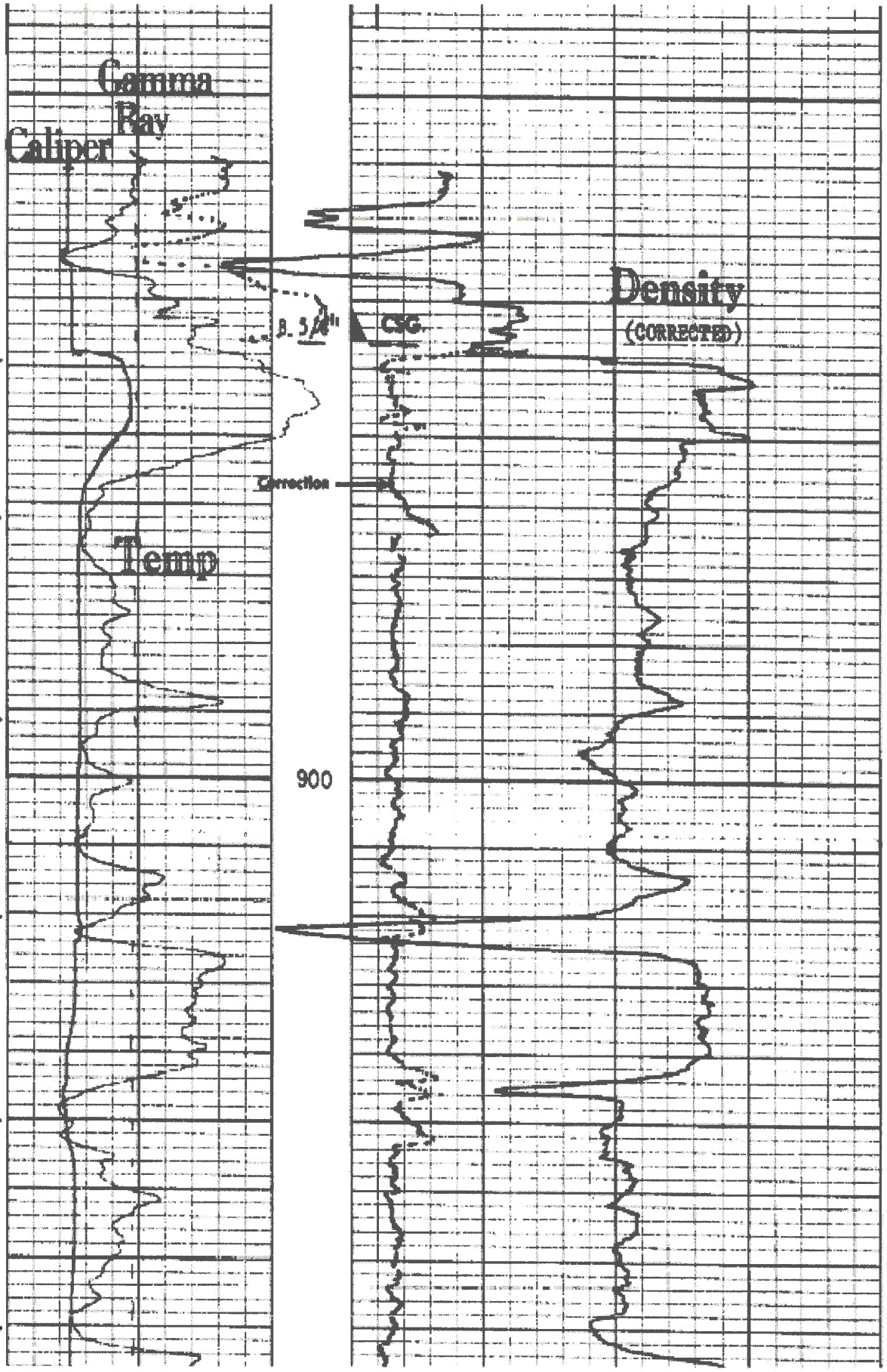

700
800
Density
(CORRECTED)
Caliper
Correction
900
1000
1100

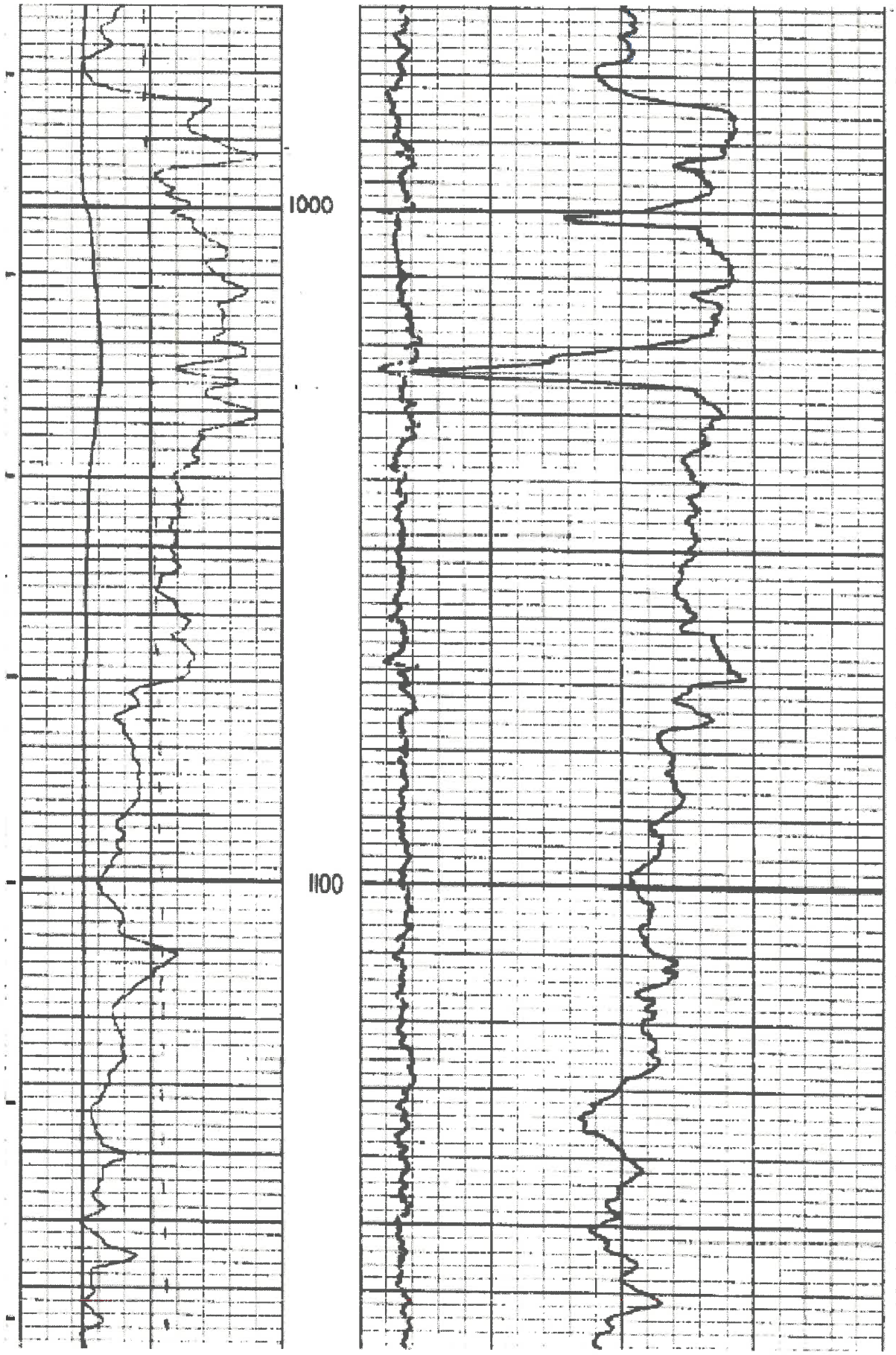

1100
1200
1300
1400
1500

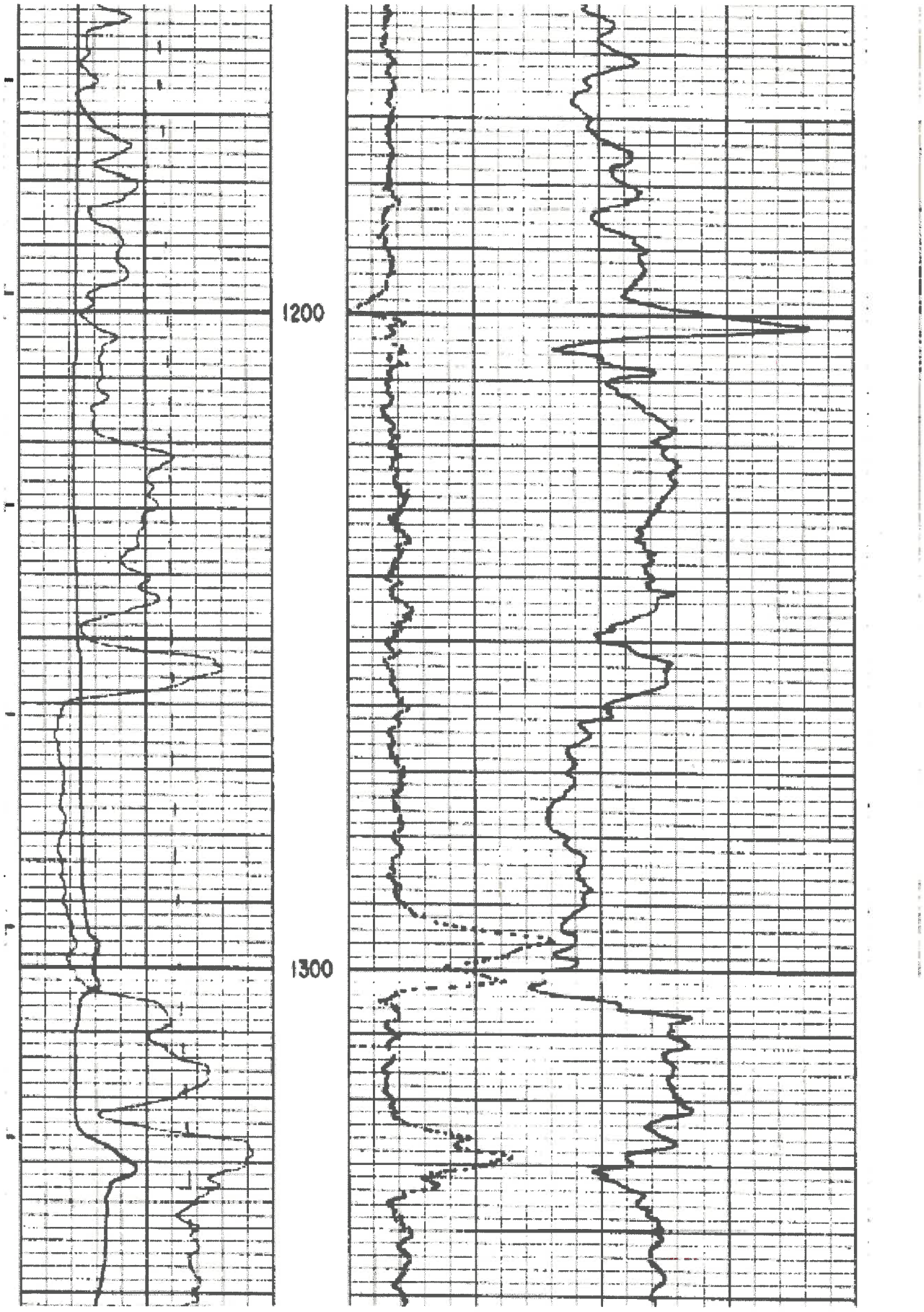

1600
1700
1800
1900
2000

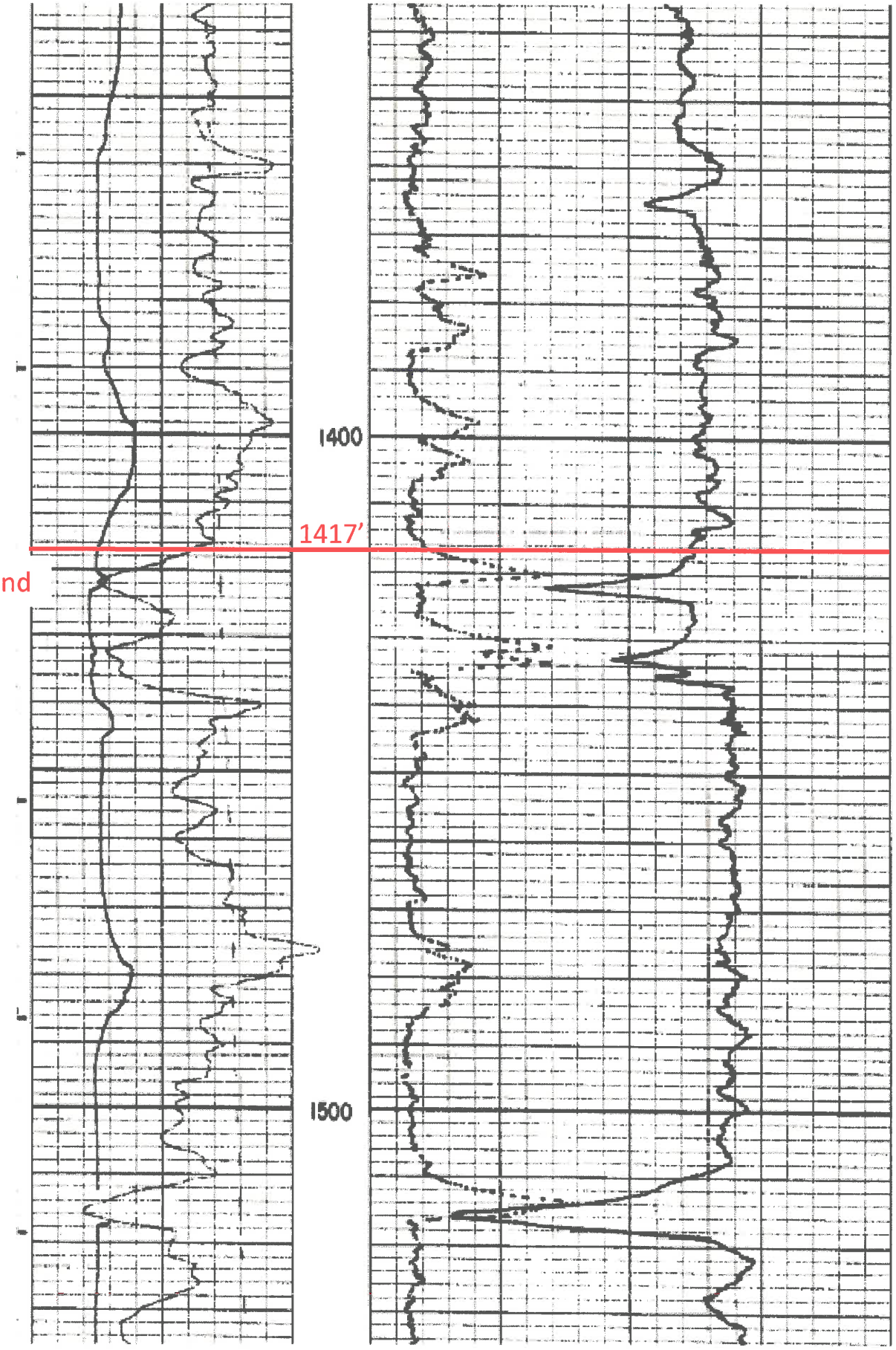

2000
2100
2200
2300
2400

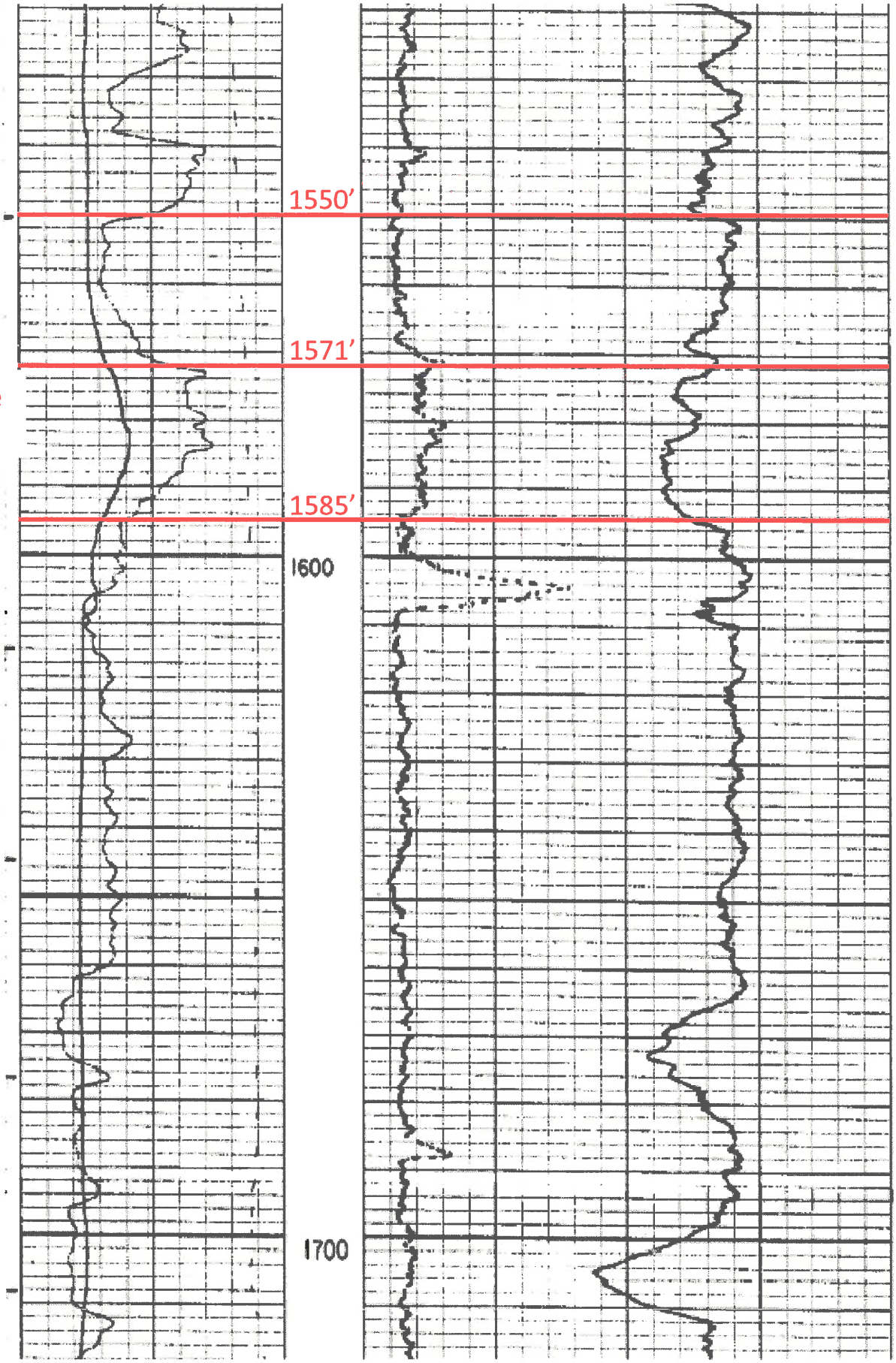

2500
Gamma Ray
COMPENSATION
2600
Caliper
F.R.
2640'
T.D.
2641'
DENSITY
(CORRECTED)
CALIBRATION AFTER SURVEY
Gamma

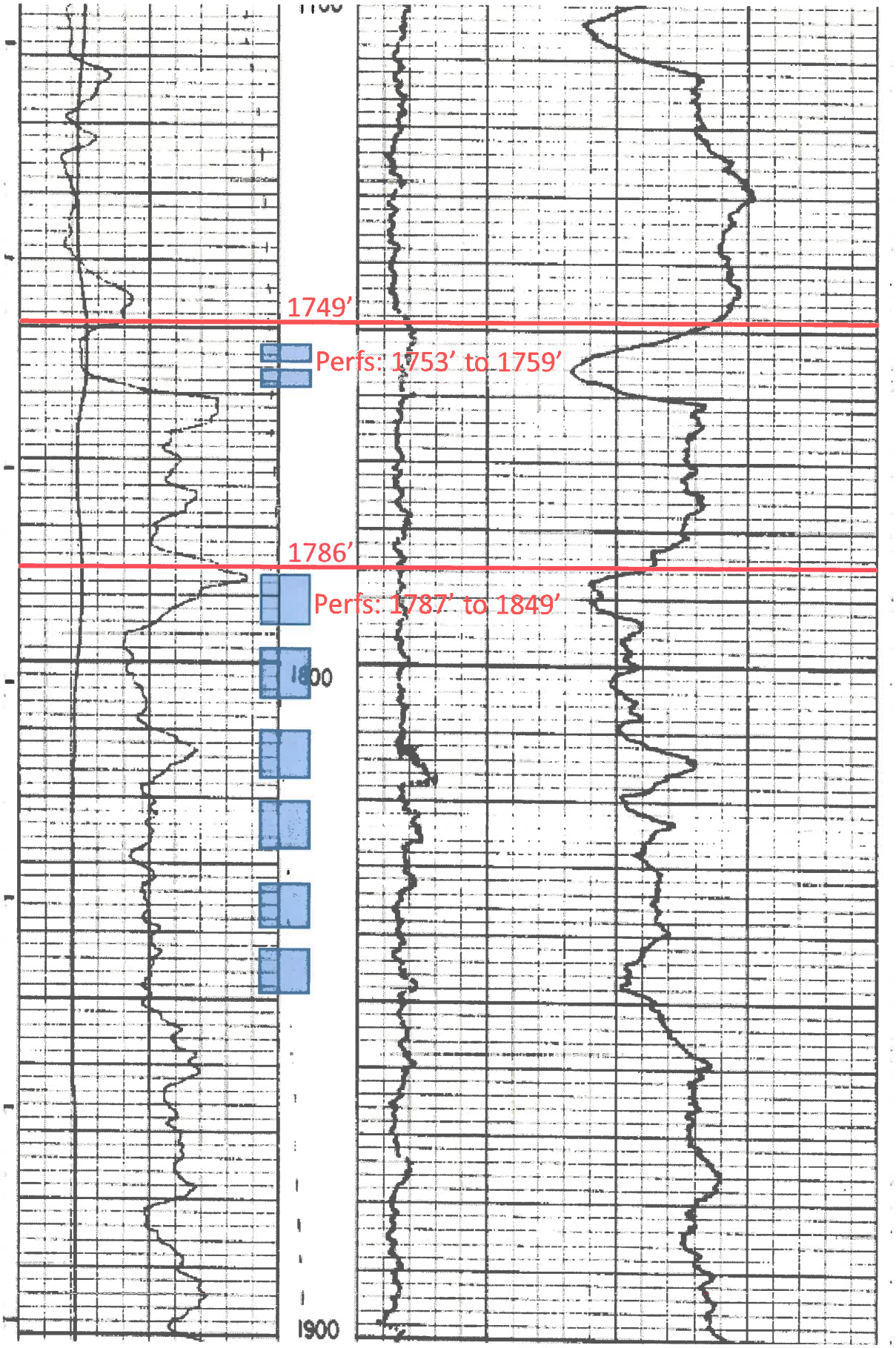

Gamma Ray
Caliper
8.5"
CSG
Density
(CORRECTED)
Correction
Temp
900

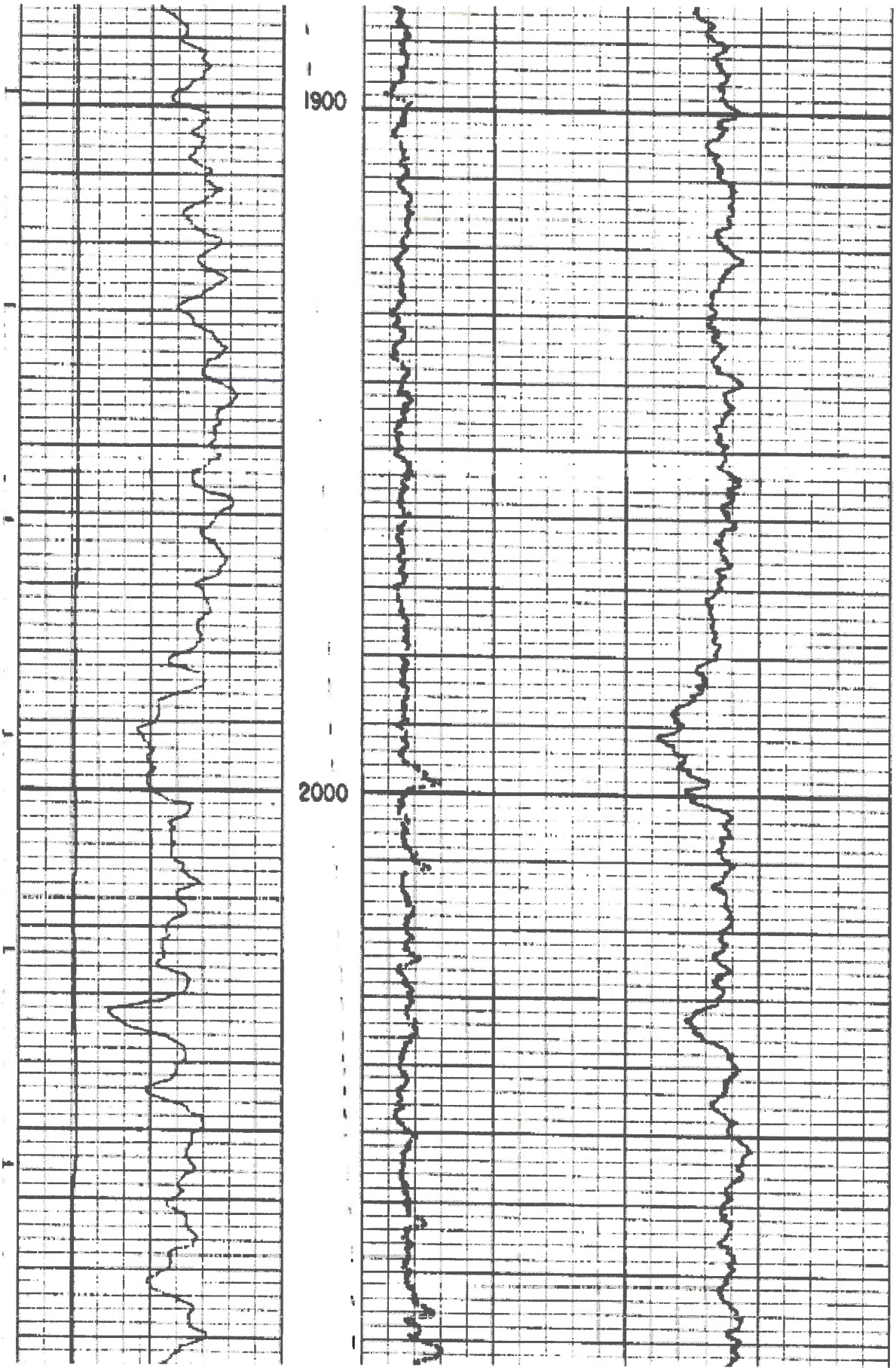

1000
1100

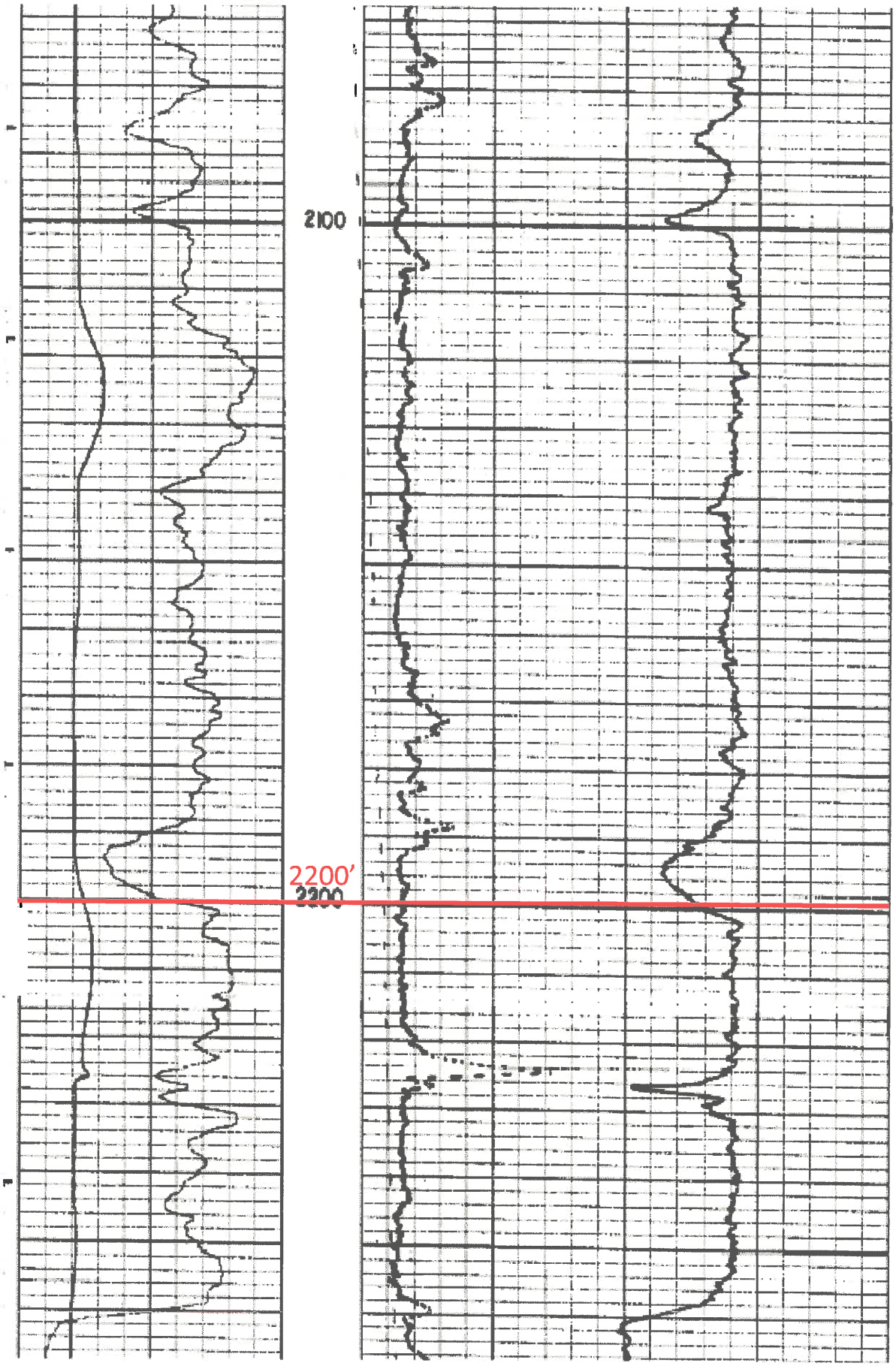

1200
1300


1400
1417'
Top Maxon Sand
1500

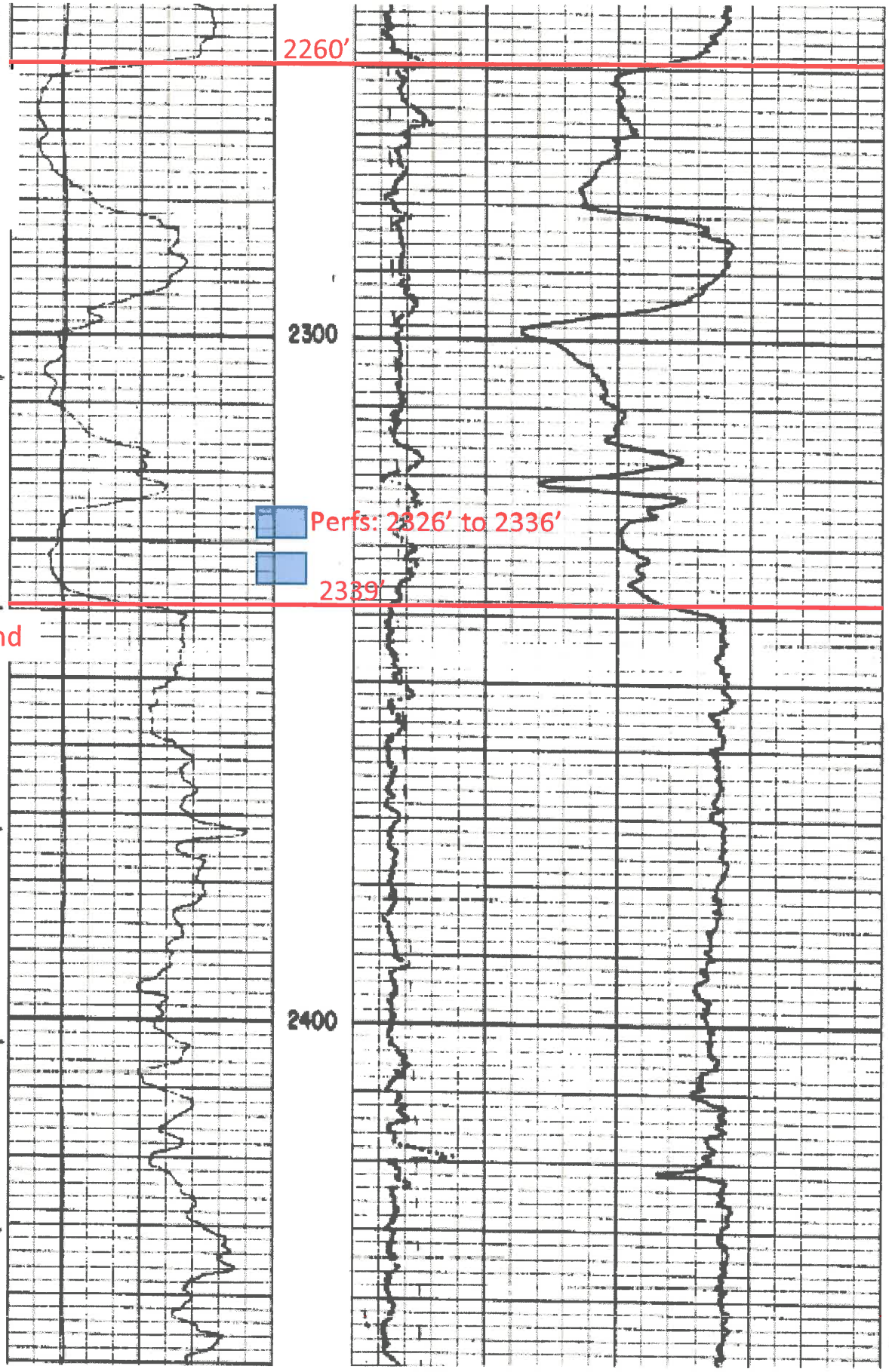

1550'
Top Little Lime
1571'
Top Pencil Cave Shale
1585'
Top Big Lime
1600
1700


1749'
Top Big Injun Sand
Perfs: 1753' to 1759'
1786'
Top Weir Sand
Perfs: 1787' to 1849'
1800
1900


1900
2000

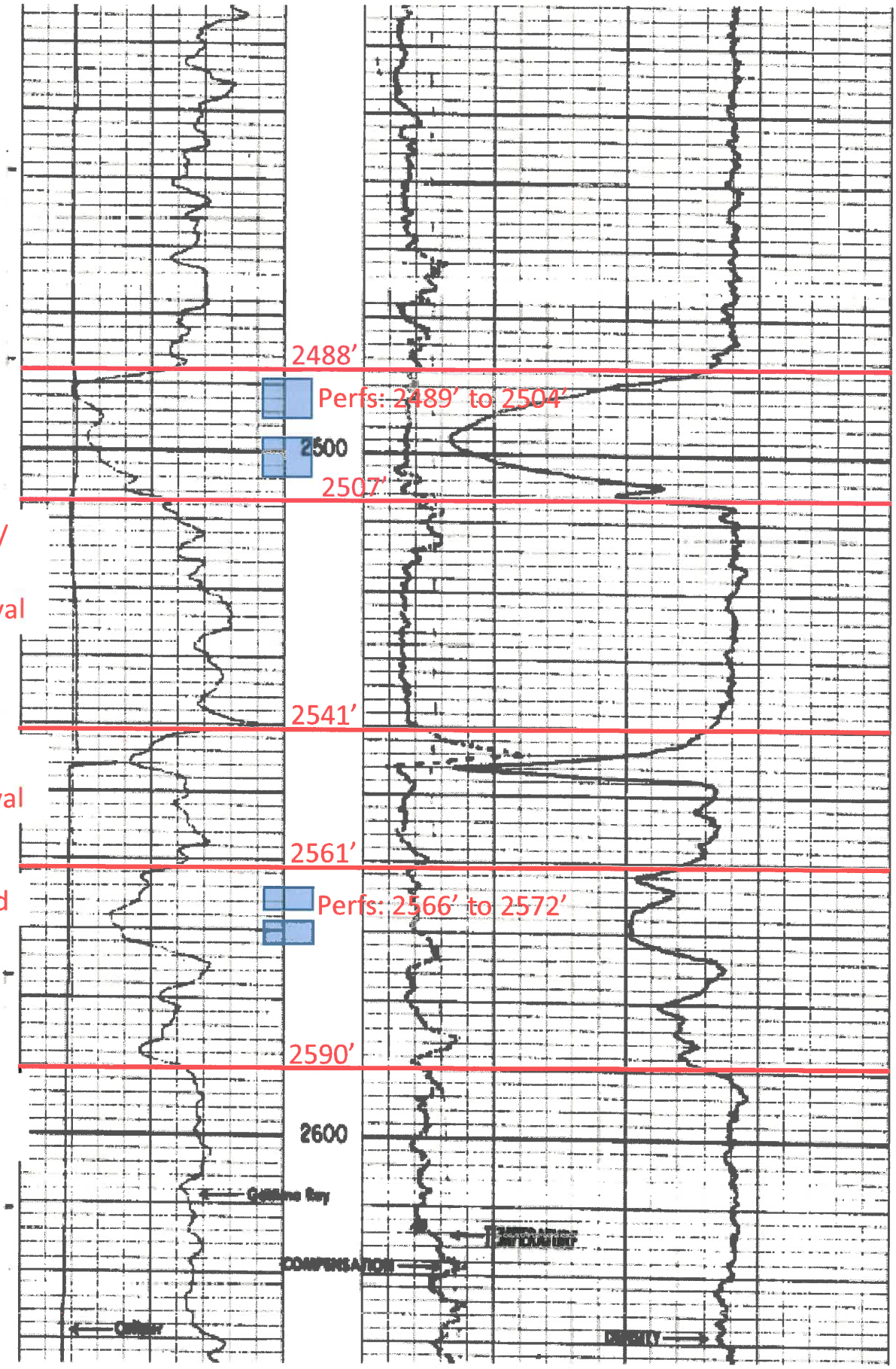


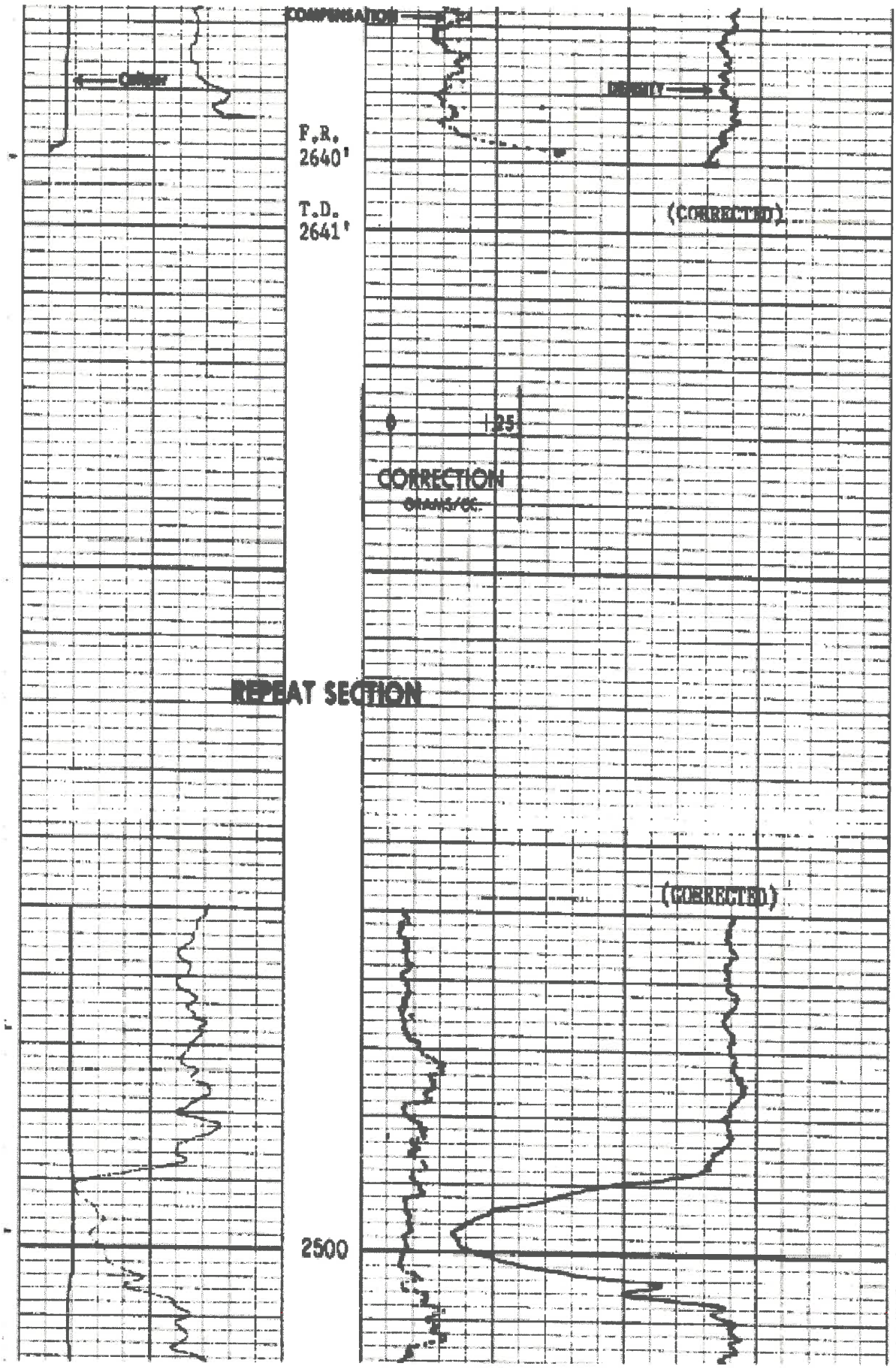
Top Upper
Confining Layer

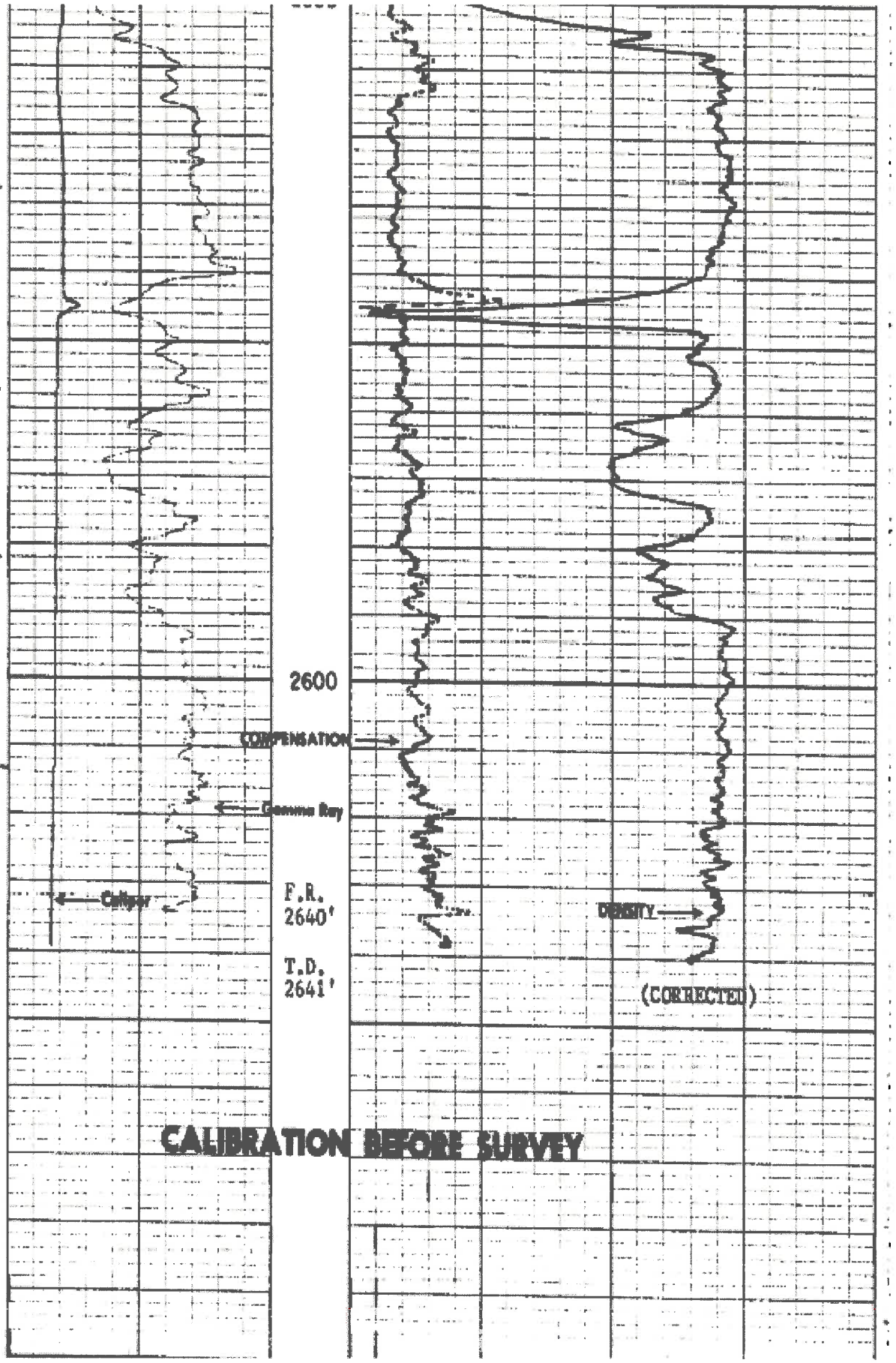


Top Gordon Sand/ Base Upper Confining Layer

Base Gordon Sand


2488'
Top Fifth Sand
Perfs: 2489' to 2504'
2500
2507'
Base Fifth Sand/
Top Lower
Confining Interval
2541'
Base Lower
Confining Interval
2561'
Top Bayard Sand
Perfs: 2566' to 2572'
2590'
Base Bayard
Sand
2600


COMPENSATION
Caliper
DENSITY
F.R.
2640'
T.D.
2641'
(CORRECTED)
0
.25
CORRECTION
GRAMS/CC.
REPEAT SECTION
(CORRECTED)
2500


2600
COMPENSATION
Gamma Ray
Caliper
F.R.
2640'
T.D.
2641'
DENSITY
(CORRECTED)
CALIBRATION BEFORE SURVEY

GAMMA RAY API UNITS	DEPTHS	BULK DENSITY GRAMS/CC
0 — 250		2.0 — 2.5 — 3.0
CALIPER		
HOLE SIZE - INCHES 6 — 16		CORRECTION 0 — +.25

COMPANY ALLEGHENY LAND & MINERAL COMPANY

WELL CONSOLIDATED GAS SUPPLY CORP. #A-1141

FIELD FREEMANS CREEK DIST. STATE WV

SEC. _____ COUNTY LEWIS

Log TD 2640'
Log TD 2641'
DRLR TD 2631'
Elev.
DF 1207'
KB 1208'
GL 1198'

BILLMAN GEOLOGIC CONSULTANTS, INC.

TO: MR. JAMIE ANDREWS, MOUNTIN V OIL & GAS, INC.

FROM: DAN A. BILLMAN, PG, CPG, PRESIDENT, BILLMAN GEOLOGIC CONSULTANTS, INC.

SUBJECT: GEOLOGIC REVIEW OF THE J.T. LAW #1 (47-041-03175), LEWIS COUNTY, WEST VIRGINIA.

DATE: 3/08/17

CC:

Mr. Jamie Andrews of Mountain V Oil & Gas, Inc. has requested that Billman Geologic Consultants, Inc. (BGC) review geologic questions associated with the proposed J.T. Law #1 salt water disposal (SWD) well (47-041-03175), located in Freemans Creek District, Lewis County, West Virginia. The well is also located on Camden 7.5 minute quadrangle. The proposed UIC SWD well in question is permit application 2D04103175003.

This discussion is being completed to address some of the geologic questions posed by the WV DEP in its letter of 1/21/2017 and posed by the West Virginia Geologic and Economic Survey in its letter of 11/18/2015.

Correlated and Marked Copy of the Open Hole Electric Log

Included as an attachment to this report is a paginated and correlated, marked copy of the J.T. Law #1 (47-041-03175) electric log. The well was initially drilled and logged by Allegheny Land and Mineral Company. The well was logged on 4/8/1982.

The well log includes the tops of the proposed injection zone (the Gordon Sandstone and Fifth Sandstone), other pertinent shallower and deeper historic producing reservoirs from the area, and the confining shale layers above and below the proposed injection zones. Also, included on the marked log are the perforated intervals in the proposed storage horizon as well as previously perforated reservoirs that will be either injection intervals and proposed paker set depths (refer to previously presented well schematic).

Structural and Isopach Mapping

BGC has reviewed the previous mapping completed for the initial UIC SWD well application, presented to the WV DEP and is utilizing the maps for its interpretation. Anticline and syncline axes were projected, based on the structure mapping and potential water flow paths were projected.

Included as an attachment to this report is a structural map on the top of the Gordon Sandstone. The structure was interpreted and water flow direction(s) from the proposed injection well was interpreted. Those same proposed water flow paths were plotted on the included isopach maps for the "Net Sand (porosity)" of the injection interval, and for the thickness of the Upper and Lower Confining Intervals (i.e. shales above the Gordon Sandstone and below the Fifth Sandstone). Also, the proposed water flow lines (within the injection reservoir) were included on the surface base map (wells and topographic map).

Based on the provided maps and the BGC interpretation, water in the proposed SWD well would likely move east to west, down dip from the proposed well (as seen in the including mapping). Within the proposed injection reservoir, water would likely be moving from a mapped interval of 40 +/- feet of net reservoir toward a thinner portion of the reservoir, projected as 20 +/- feet thick.

The Confining Intervals, both above and below the proposed injection reservoir are thicker in the direction of the proposed water flow.

Tectonic Position of the Law #1

The Law #1, proposed UIC SWD well is located above some of the deepest portions of the Rome Trough (http://www.wvgs.wvnet.edu/www/tbr/41856R02.asp) (Refer to map included as an attachment to this report). The top of the Pre-Cambrian basement in the area of the Law #1 well is approximately 21,000 feet below sea level, were as the proposed injection interval is at 1,050 feet below sea level. This equates to an almost 3.75 mile distance difference between the basement structures (brought up in the WVGES questions) and the proposed injection interval. There is no evidence that waters are mixing from these great depths, with waters closer to the surface (or vice versa). There is no evidence of through going structures in this area. Between the proposed injection interval and the basement are 100's of feet of impermeable/low permeability shales (of Devonian and Ordovician age) and the impermeable/low permeability Salina Salts and Evaporites.

Water Show Mapping in the Area of Review

From the pre-existing wells in the area of review (quarter mile radius) completion reports were reviewed to catalog the water shows reported in those wells. Those findings are posted on a map included with this report and listed below.

Well Permit #:	Report:
041-03175 (Law #1 SWD well)	No Show Reported
041-30113	No Show Reported
041-04583	Fresh Water Encountered at 42 feet
041-30658	Fresh Water Encountered at 85 feet

Conclusion

BGC has reviewed the data provided and has provided sound geologic interpretations, based on that data. BGC reserves the right to reinterpret based on the inclusion of new or uncovered data not previously provided.

Respectfully submitted by:

Dan A. Billman, PG, CPG
President, Billman Geologic Consultants, Inc.

DISCLAIMER

This document includes forward-looking statements as well as historical information. Forward-looking statements include, but are not limited to statements relating to geological and seismic data interpretations, prospect reserve estimates and prospect risk. Although BGC believes that its expectations reflected in these forward-looking statements are reasonable, such statements involve risks and uncertainties, and no assurance can be given that actual results will be consistent with these forward-looking statements. Investment in oil and gas exploration is high risk by its very nature. Important factors that could cause actual results to differ from these forward-looking statements include, but are not limited to: erroneous interpretations of the seismic and geological data; the inability to acquire leases on identified prospects; mechanical problems while drilling and producing wells which prevent completion of a well or result in plugging of a well; dry holes; less reserves than originally estimated due to poor sand development or drainage by offsetting wells; non-commercial wells; and the variations in future gas pricing. BGC cannot and has not beyond normal due diligence care standards confirmed the accuracy and completeness of all the information we have reviewed in the course of this consulting engagement. Data for this review has been provided by Mountain V Oil & Gas, Inc., LLC, its clients or is publicly available and BGC, Inc. cannot be held responsible for errors in this provided data. Further, we express no opinion regarding any legal or securities issues. BGC shall assume no liability whatsoever for the use or reliance there upon by Mountain V Oil & Gas, Inc., their clients and/or their investors, of information, opinions and interpretations provided by BGC. BGC reserves the right to adjust these findings and interpretations with the discovery of relevant data or future production data.

Exhibit 8a.)

Structure Map on Upper Gordon Sand C.I. 20 FT

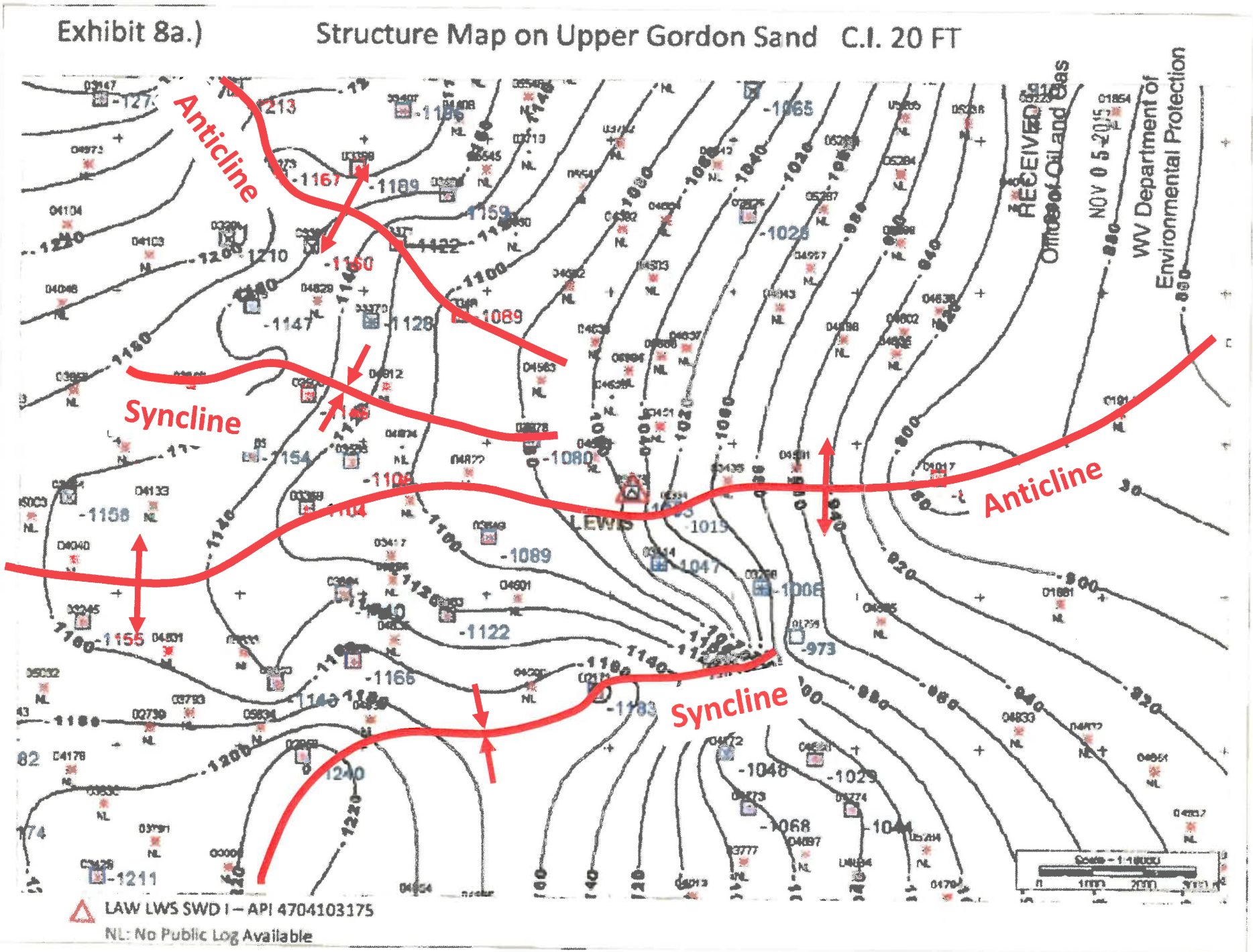


Exhibit 8a.)

Structure Map on Upper Gordon Sand C.I. 20 FT

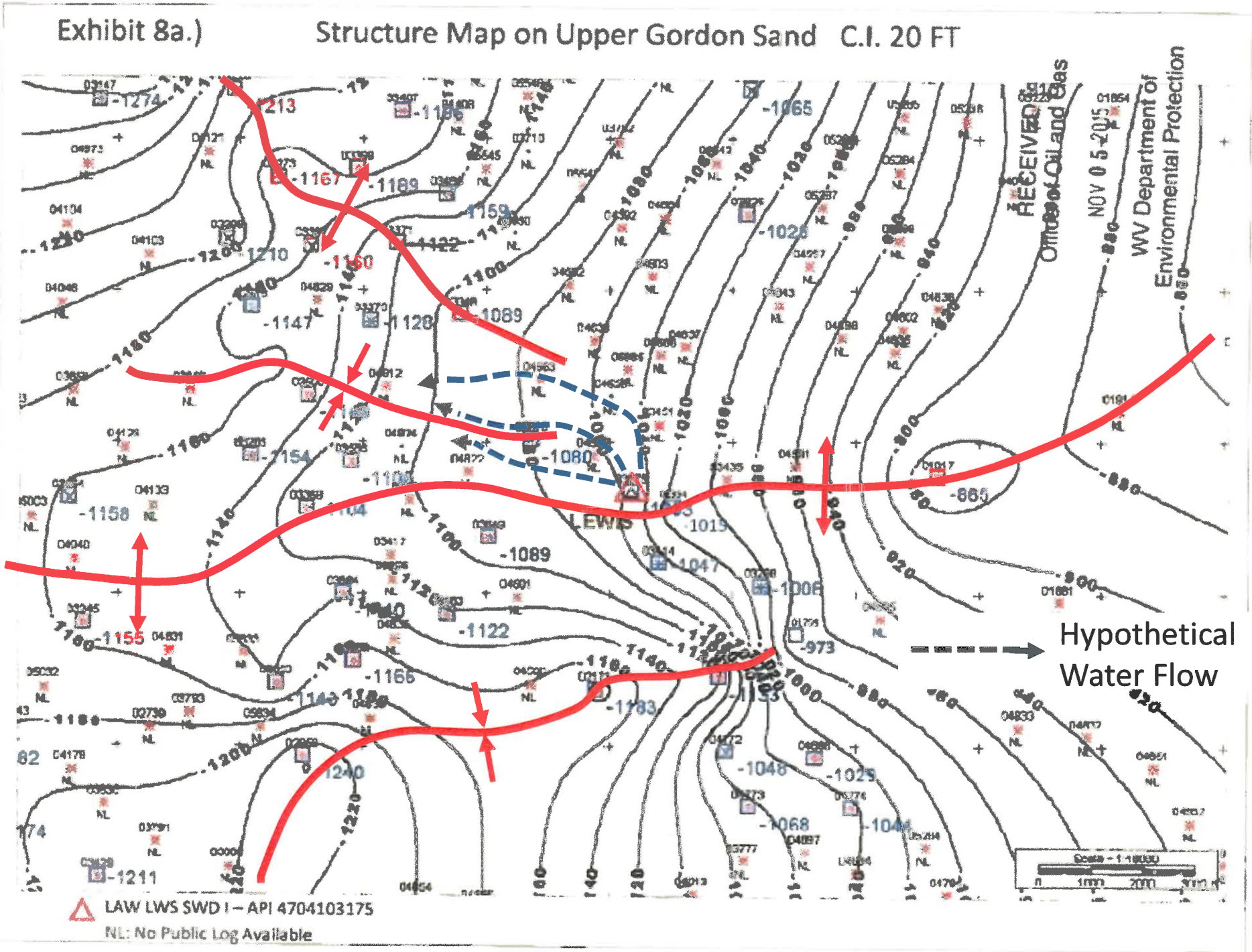
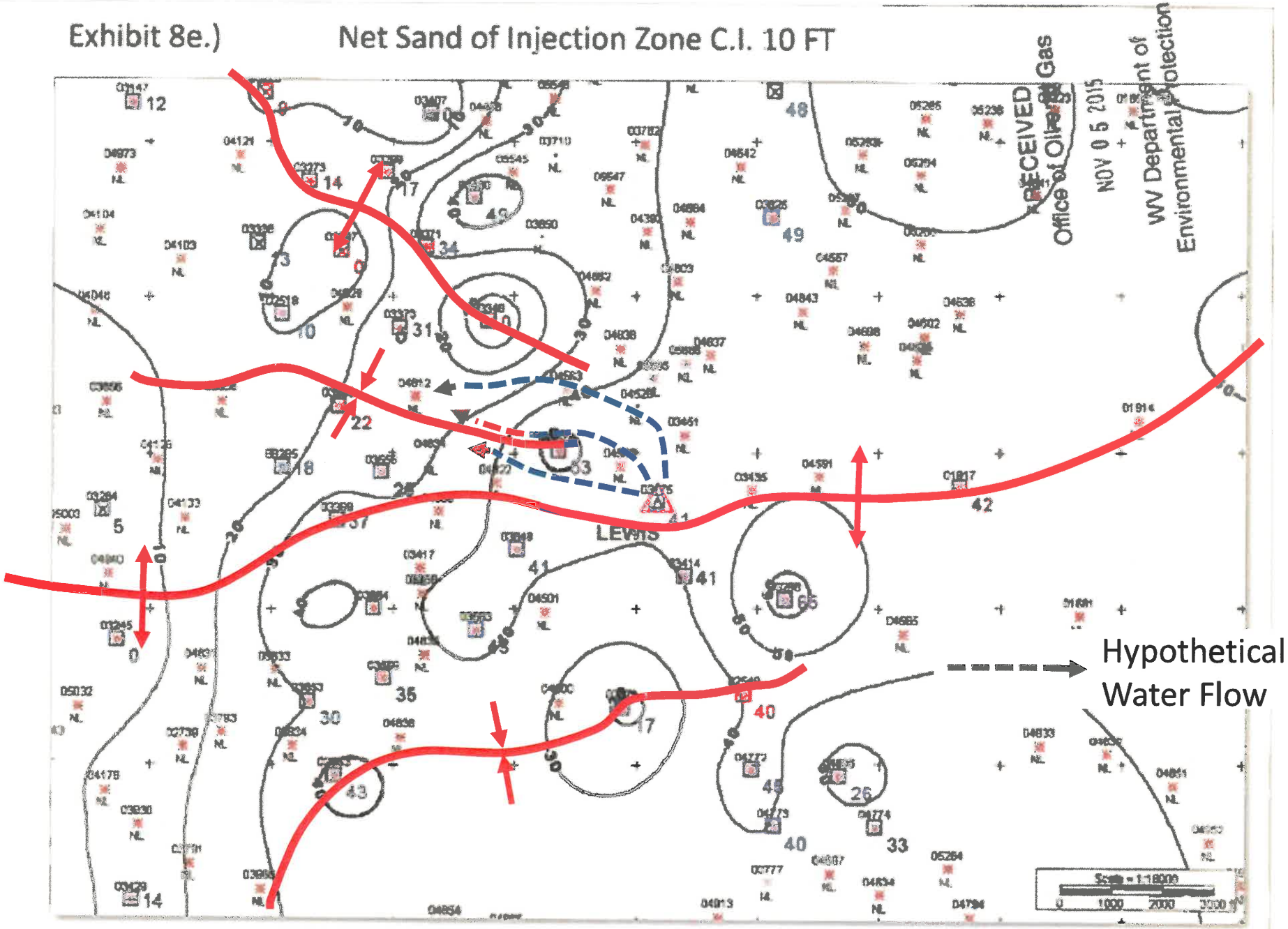


Exhibit 8e.)

Net Sand of Injection Zone C.I. 10 FT

RECEIVED
Office of Oil & Gas
NOV 05 2015
WV Department of
Environmental Protection

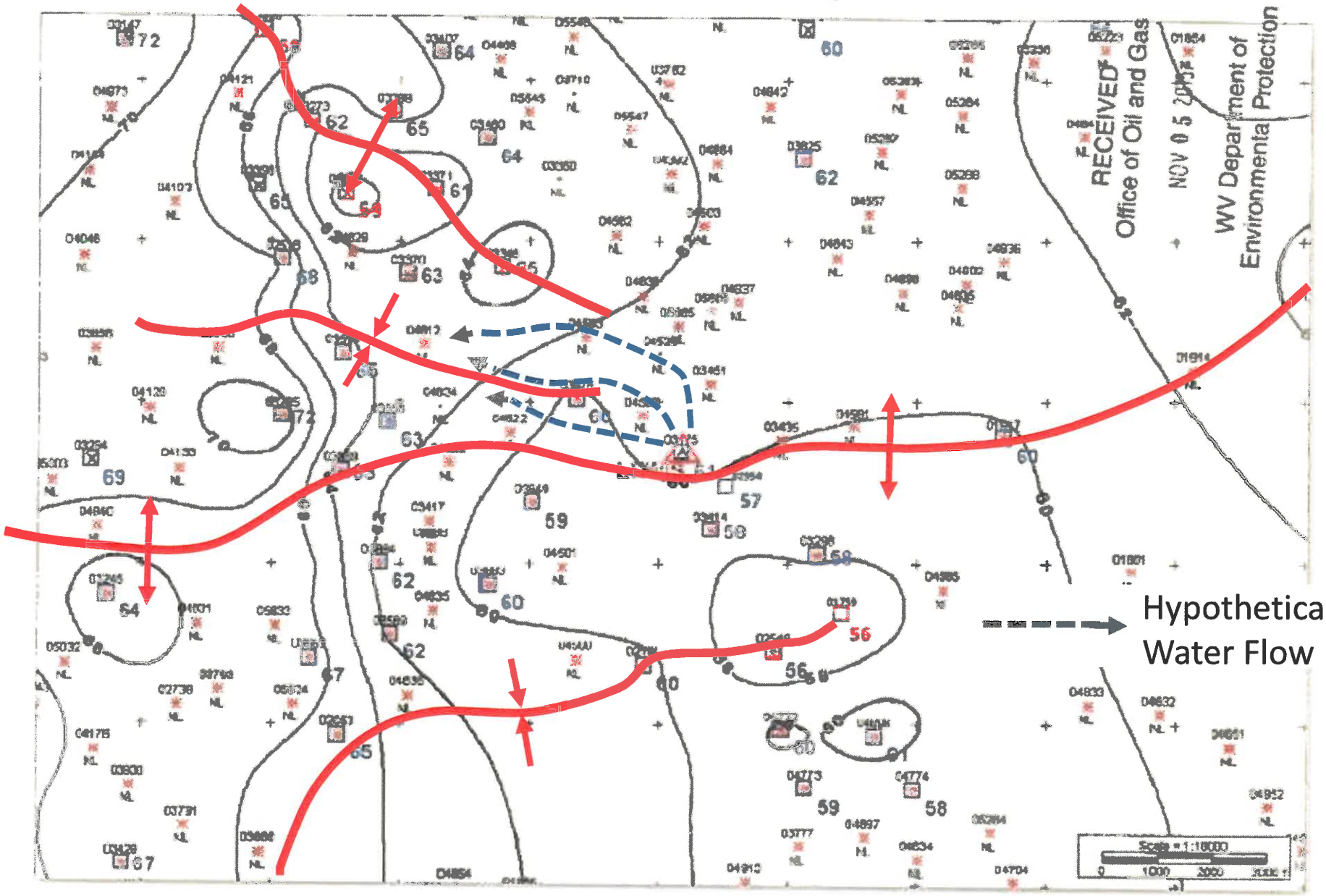


△ LAW LWS SWD I – API 4704103175

NL: No Public Log Available

Exhibit 8c.)

Total Thickness of Upper Confining Zone C.I. 2 FT

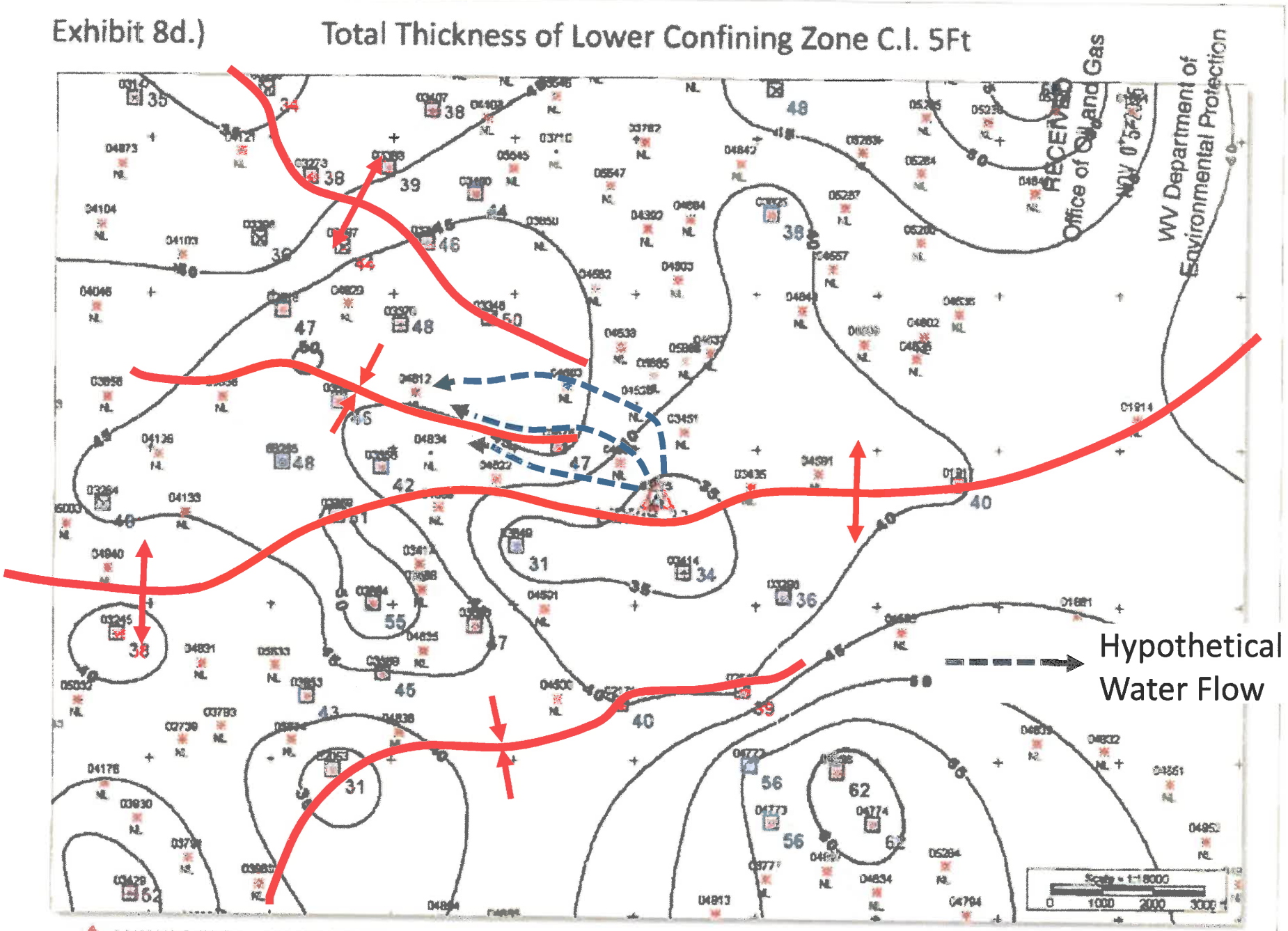


△ LAW LWS SWD I – API 4704103175

NL: No Public Log Available

Exhibit 8d.)

Total Thickness of Lower Confining Zone C.I. 5Ft



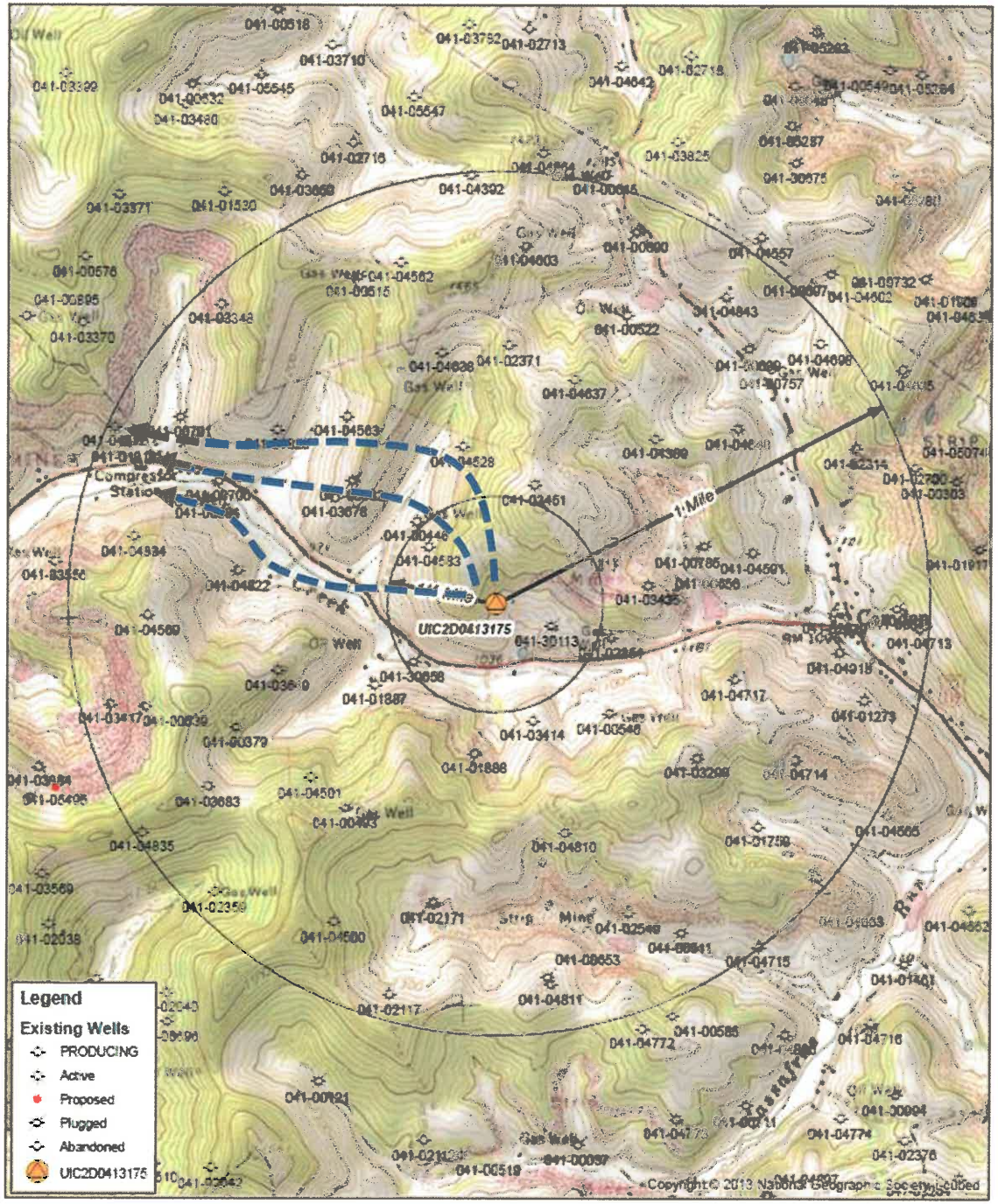
△ LAW LWS SWD I – API 4704103175

NL: No Public Log Available

- Based on the structural interpretation at the SWD interval, water flow is expected to move roughly east to west, down dip from the proposed SWD well.

- Based on the isopach mapping of the SWD interval, water flow is expected to the west, toward a thinner portion of the reservoir.

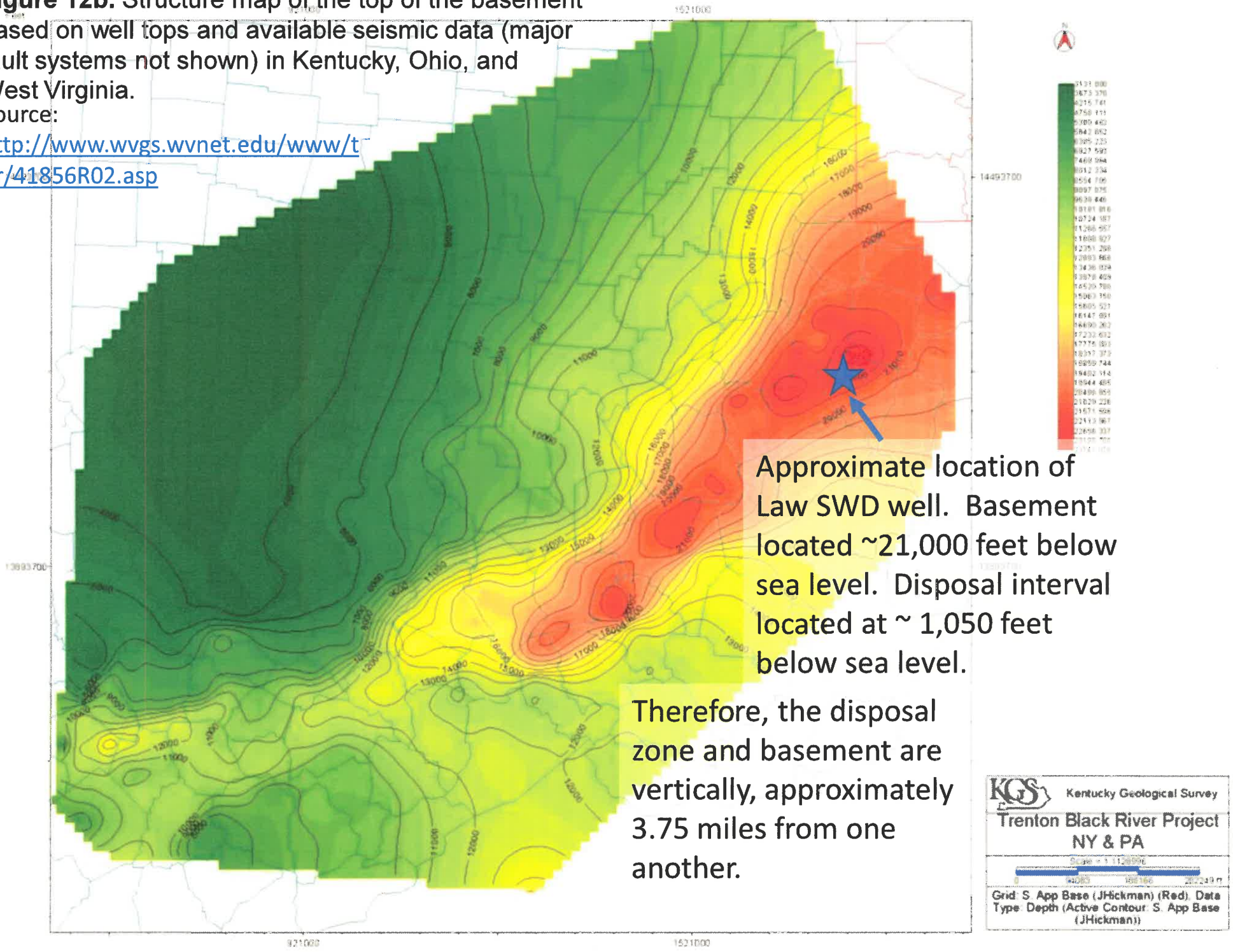
- Based on the isopach mapping of the lower and upper confining intervals, water flow is expected to flow, through the reservoir, above a thicker portion of the lower confining interval and beneath a thicker portion of the upper confining interval.



1 inch = 1,500 feet

LAW SWS SWD UIC2D0413175
Freemans Creek District, Lewis County, WV
Camden 7.5' Quad

Figure 12b. Structure map of the top of the basement based on well tops and available seismic data (major fault systems not shown) in Kentucky, Ohio, and West Virginia.
Source:
http://www.wvgs.wvnet.edu/www/tbr/41856R02.asp



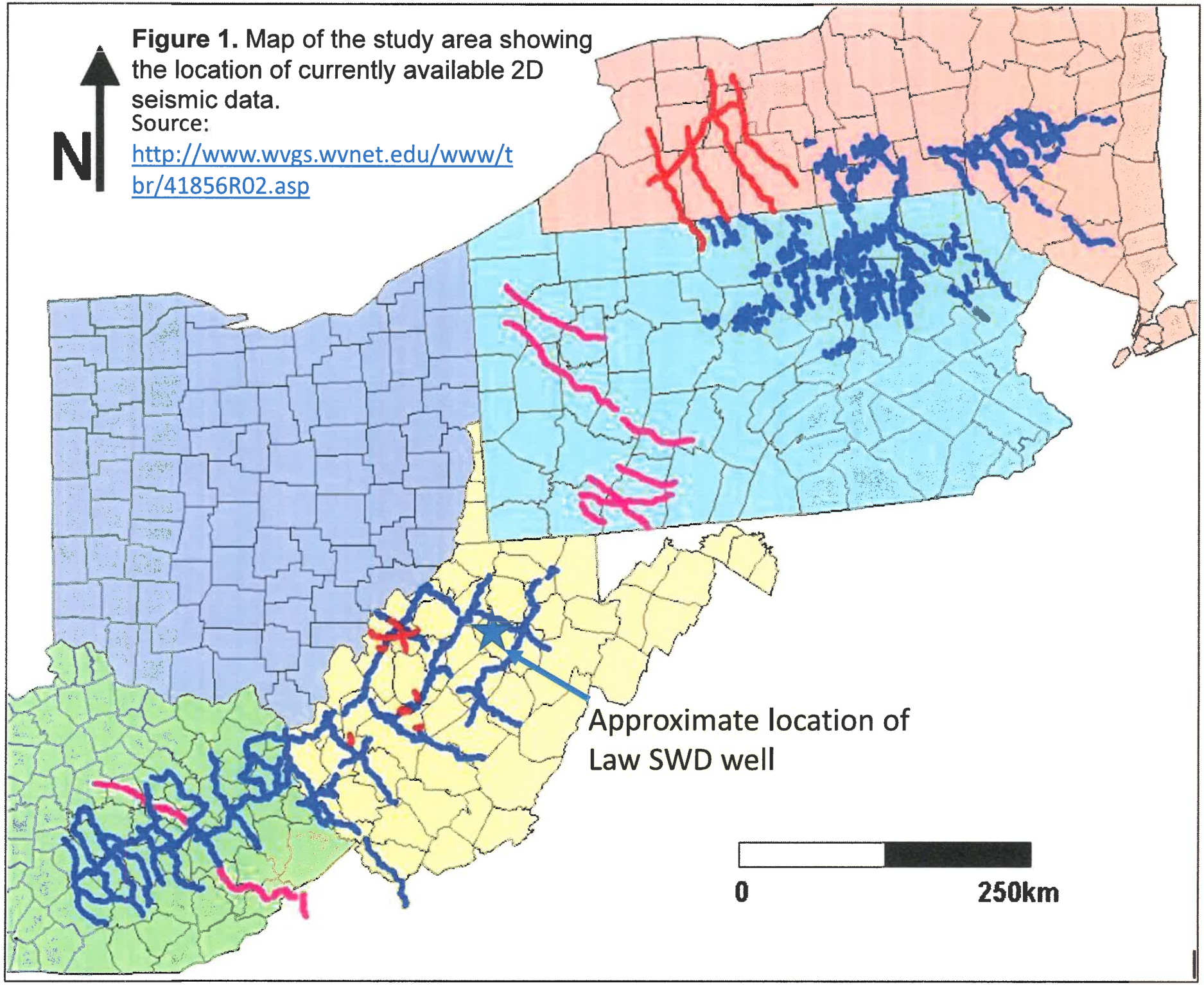
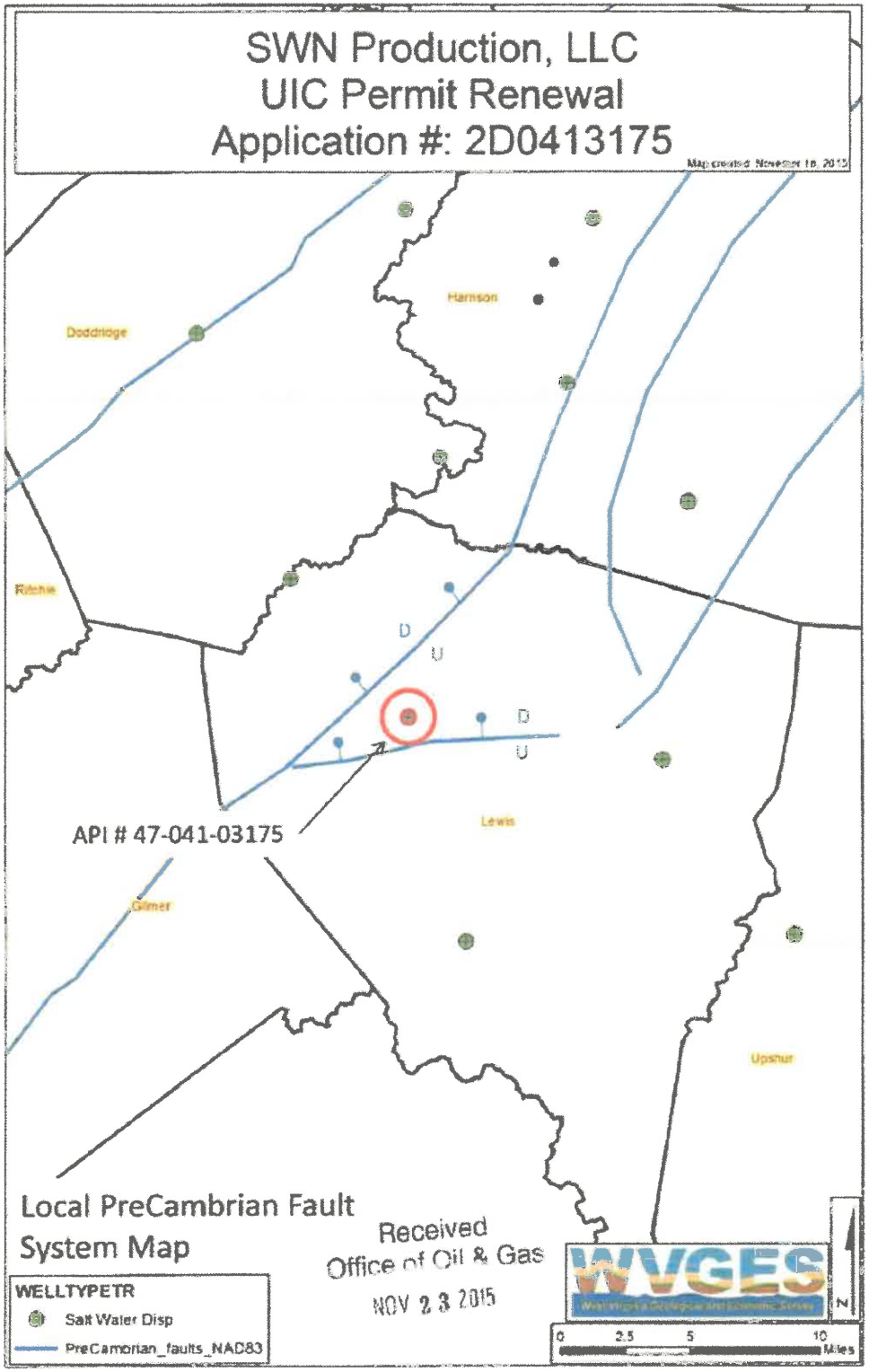
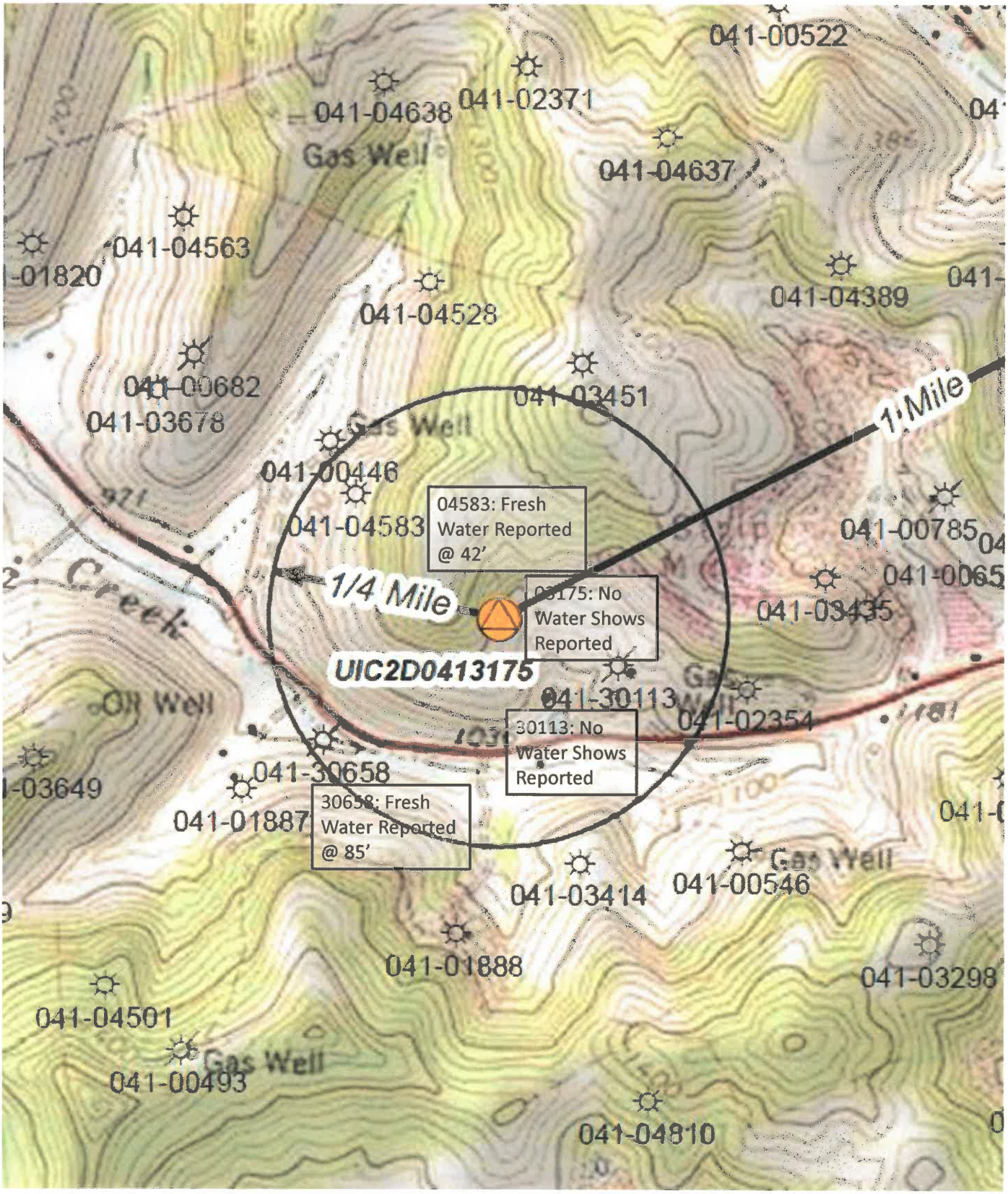


Figure 1. Map of the study area showing the location of currently available 2D seismic data.
Source:
http://www.wvgs.wvnet.edu/www/tbr/41856R02.asp

Based on the basement mapping as seen in the previous slides, the "Local Pre-Cambrian Fault System" is located approximately 3.75 miles from the proposed SWD interval (the Gordon and Fifth Sandstones). The Basement and the proposed SWD interval are separated by 100's of feet of impermeable/low permeability shales (both Devonian and Ordovician in age) and the Salina Salts/Evaporites. No communication is expected between the SWD interval and the Basement, across that great vertical distance.




041-00522
041-02371
041-04638
Gas Well
041-04637
041-04563
-01820
041-04528
041-04389
041-00682
041-03678
041-03451
Gas Well
041-00446
1 Mile
041-04583
04583: Fresh Water Reported @ 42'
041-00785
041-0065
1/4 Mile
03175: No Water Shows Reported
041-03435
UIC2D0413175
Oil Well
041-30113
041-02354
30113: No Water Shows Reported
-03649
041-30658
041-01887
30658: Fresh Water Reported @ 85'
Gas Well
041-00546
041-03414
041-01888
041-03298
041-04501
Gas Well
041-00493
041-04810

Lew-30113

Form G-8

Ewt-11-A

AFFIDAVIT IN TRIPLICATE TO TIME AND MANNER OF PLUGGING AND FILLING WELL

(REQUIRED BY SECTION 9, ARTICLE 4, CHAPTER 22 OF THE CODE)

WEST VIRGINIA DEPARTMENT OF MINES
OIL AND GAS DIVISION

No coal operations in vicinity.
COAL OPERATOR OR OWNER

Surface Owner; ADDRESS
Lot Woofter, Weston, W. Va.,
COAL OPERATOR OR OWNER

Coal Owner; ADDRESS
O. P. White Estate, Charleston, W. Va.,
LEASE OR PROPERTY OWNER

ADDRESS

Reserve Gas Company
NAME OF WELL OPERATOR

Clarksburg, W. Va.,
COMPLETE ADDRESS

December 1, 1936

WELL AND LOCATION

Freemans Creek District
Lewis County
Well No. 360
E. H. Dodson Farm

AFFIDAVIT TO BE MADE IN TRIPLICATE, ONE COPY TO BE MAILED BY REGISTERED MAIL TO THE DEPARTMENT, ONE COPY TO BE RETAINED BY THE WELL OPERATOR AND THE THIRD COPY (AND EXTRA COPIES IF REQUIRED) TO BE MAILED TO EACH COAL OPERATOR ABOVE NAMED AT THEIR RESPECTIVE ADDRESSES.

AFFIDAVIT

STATE OF WEST VIRGINIA,
COUNTY OF Lewis } ss:

Ona B. Middleton and Mick Bonnett being first duly sworn according to law depose and say that they are experienced in the work of plugging and filling oil and gas wells and were employed by Reserve Gas Co., well operator, and participated in the work of plugging and filling the above well, that said work was commenced on the 12th day of October, 19 36, and that the well was plugged and filled in the following manner:

Manner in which sand was plugged: Attempted to pull 2" tubing, parted same leaving 68' in hole. Hole then caved and was unable to set plug at 2418. Run 5-3/16" wood plug at 2196. Attempted to pull 5-3/16" casing, parted same leaving 898' in hole. Installed permanent bridge at 1756', filled with clay to 1604' and run 6-5/8" wood plug. Pulled out 1594' 6-5/8" casing. Installed permanent bridge at 946' and pulled out 925' 8¼" casing, filled with clay to 750' and run 1-8¼" wood Plug. Installed bridge and placed one 8¼" wood plug at 500'. Filled hole with clay to 156' and run one 10" wood plug, which shut off all gas. Pulled out 146' 10" casing. Filled solid with clay to surface and erected concrete monument over hole.

Manner in which coal was plugged:

Description of monument: Concrete with well number and company's name on same extending 36" above surface of ground.

(THE ABOVE DESCRIPTIONS MUST BE IN DETAIL AND IN ACCORDANCE WITH THE PROVISIONS OF SECTION 10, ARTICLE 4, CHAPTER 22 OF THE CODE)

and that the work of plugging and filling said well was completed on the 1st day of December, 19 36.

And further deponents saith not.

Ona B. Middleton
Mick Bonnett

Sworn to and subscribed before me this 22 day of December, 19 36

O O Jarrett
Notary Public

My Commission expires:
March 9, 1941

OK
Ewt
10-29-37

DEC 1936

LeW-30113

WEST VIRGINIA DEPARTMENT OF MINES
OIL AND GAS DIVISION

Form-11A

WELL RECORD

Permit No. _____

Oil or Gas Well Gas (Kind)

Company Reserve Gas Company
Address Clarksburg, W. Va.,
Farm E. H. Dodson Acres 27½
Location (waters) Freemans Creek
Well No. 360 Elev. 1187
District Freemans Creek County Lewis
The surface of tract is owned in fee by Lot Wooster
Address Weston, W. Va.,
Mineral rights are owned by O. P. White Estate
Address Charleston, W. Va.,
Drilling commenced 5-28-1918
Drilling completed 7-25-1918
Date shot 10-23-1930 Depth of shot 2440-2445
Open Flow /10ths Water in Inch
/10ths Merc. in Inch
Volume Cu. Ft.
Rock Pressure lbs. hrs.
Oil bbls., 1st 24 hrs.
Fresh water None recorded feet feet
Salt water None recorded feet feet

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer
13			Callahan Anchor
10	143	146	Size of 5-3/16 x 2"
8¼	925	925	
6 5/8	1594	1594	Depth set 2263
5 3/16	2161	2161	
3			Perf. top
2	2474	2474	Perf. bottom
Liners Used			Perf. top
			Perf. bottom

CASING CEMENTED SIZE No. FT. Date
Not cemented

COAL WAS ENCOUNTERED AT FEET INCHES
FEET INCHES FEET INCHES
FEET INCHES FEET INCHES

Formation	Color	Hard or Soft	Top	Bottom	Oil Gas or Water	Depth Found	Remarks
		Well below coal.					
Little Dunkard Sand			490	515			
Big Dunkard Sand			565	615			
Gas Sand			700	753			
First Salt Sand			750	810			
Second Salt Sand			815	916			
Maxon Sand			1475	1487			
Little Lime			1489	1501			
Pencil Cave			1501	1516			
Big Lime			1516	1581			
Big Injun Sand			1581	1726			
Squaw Sand			1797	1851			
Gordon Stray Sand			2147	2159	Gas	2219 & 2239	
Gordon Sand			2216	2278			
Fourth Sand			2285	2297			
Fifth Sand			2435	2447	Gas	2440-2445	
		Total Depth -------		2474			

(Over)

LEW-30113

...on	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth Found	Remarks

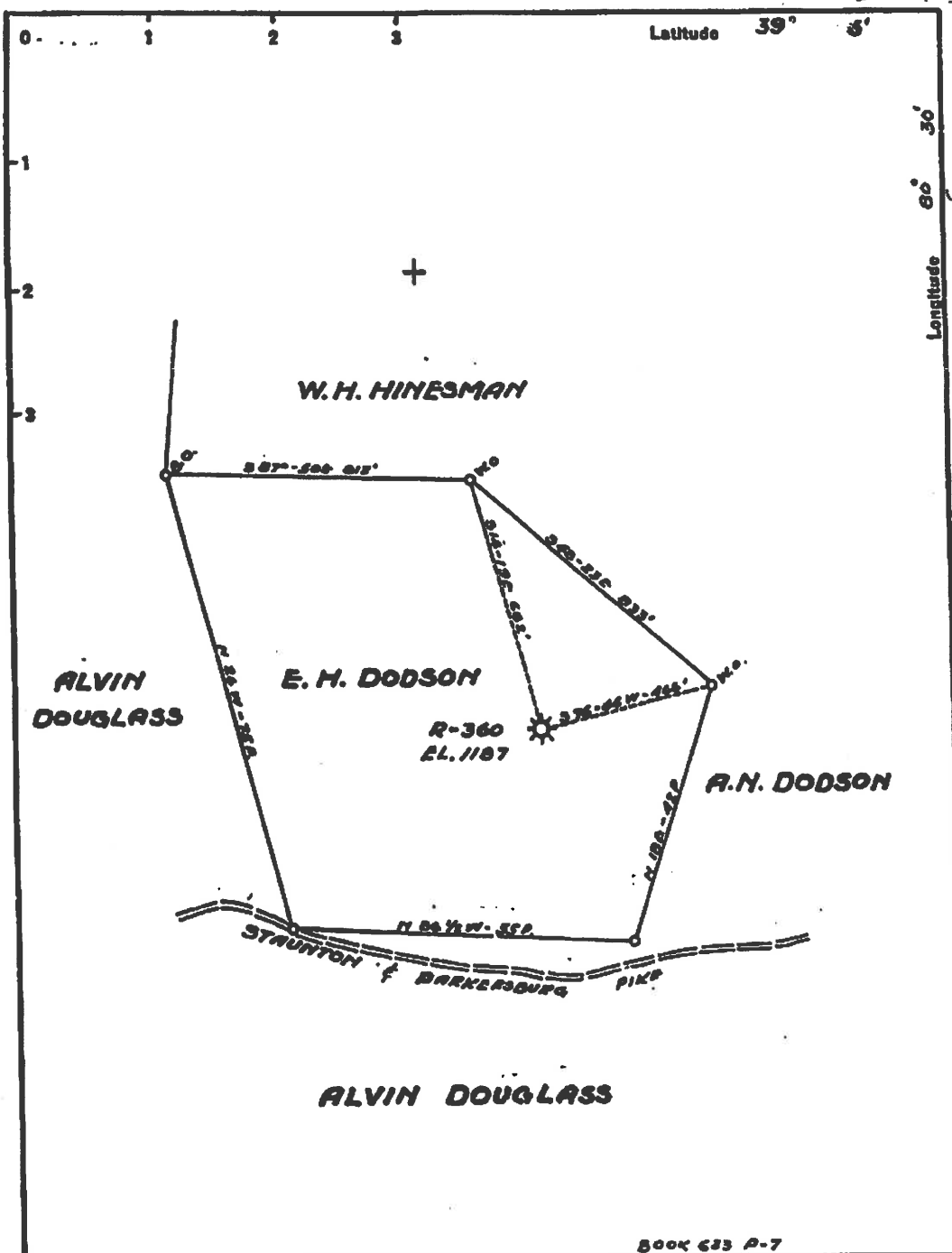
Date 12/2/36, 19....

APPROVED ..., Owner

By ...

(Title) ...

Lew-30113



BOOK 633 P-7

Company RESERVE GAS CO.
Address CLARKSBURG, W.VA.
Farm E.H. DODSON
Tract ____ Acres 27¼ Lease No. ____
Well (Farm) No. 1 Serial No. R-360
Elevation (Spirit Level) EL. 1187
Quadrangle VADIS
County LEWIS District FREEMANS CREEK
Engineer B.H. Bradley
Engineer's Registration No. 136
File No. ____ Drawing No. ____
Date SEPT. 18-34 Scale 1" = 20 PLS.

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION
CHARLESTON

WELL LOCATION MAP

FILE NO. LEW-113

+ Denotes location of well on United States Topographic Maps, scale 1 to 62,500, latitude and longitude lines being represented by border lines as shown.

— Denotes one inch spaces on border line of original tracing.

Lew - 30658

FORM 00-6

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION

AFFIDAVIT OF PLUGGING AND FILLING WELL

AFFIDAVIT SHOULD BE MADE IN TRIPLICATE. ONE COPY MARKED TO THE DEPARTMENT, ONE COPY TO BE RETAINED BY THE WELL OPERATOR AND THE THIRD COPY (AND EXTRA COPIES IF REQUIRED) SHOULD BE MAILED TO EACH COAL OPERATOR AT THEIR RESPECTIVE ADDRESSES.

No Coal Operations
COAL OPERATOR OR OWNER

ADDRESS

Unknown
COAL OPERATOR OR OWNER

ADDRESS

Russel B. Woofter
LEASE OR PROPERTY OWNER

Camden, W. Va.
ADDRESS

Hope Natural Gas Company
NAME OF WELL OPERATOR

445 West Main St., Clarksburg, W. Va.
COMPLETE ADDRESS

October 31, 19 55
WELL AND LOCATION

Freemans Creek District

Lewis County

Well No. 8343

C. Z. Grant Farm

STATE INSPECTOR SUPERVISING PLUGGING

AFFIDAVIT

STATE OF WEST VIRGINIA,
County of LEWIS } ss:

Michael Montgomery and Robert S. Stewart being first duly sworn according to law depose and say that they are experienced in the work of plugging and filling oil and gas wells and were employed by Hope Natural Gas Company, well operator, and participated in the work of plugging and filling the above well, that said work was commenced on the 28th day of October, 19 55, and that the well was plugged and filled in the following manner:

SAND OR ZONE RECORD	FILLING MATERIAL			PLUGS USED	CASING	
FORMATION				SIZE & KIND	CSG PULLED	CSG LEFT IN
						7" Casing
	Clay	2353	2313		1105	503
	Cement	2313	2303			
	Clay	2303	2085			5-1/2" Casing
	Cement	2085	2065		2026	none
	Clay	2065	1625			
	Cement	1625	1608			2-3/8" Tubing
	Aquagel	1608	1445		2367	none
	Cement	1445	1415			
	Aquagel	1415	1220			
	Cement	1220	1190			
	Aquagel	1190	577			
	Cement	577	337			
	Aquagel	337	100			
	Clay & Rock	100	surface			
COAL SEAMS				DESCRIPTION OF MONUMENT		
(NAME)				Regular concrete well marker.		
(NAME)						
(NAME)						
(NAME)						

and that the work of plugging and filling said well was completed on the 8th day of December, 19 55.

And further deponents saith not.

Michael Montgomery
Robert S. Stewart

Sworn to and subscribed before me this 16 day of Dec, 19 55.

Robert C. Spray
Notary Public.

My commission expires:
November 27, 1965

Permit No. Lew-658

Lew-30658

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION

WELL RECORD

Quadrangle Va dia
Permit No. Lew-658-A
Oil or Gas Well Gas (KIND)

Company Hope Natural Gas Company
Address 445 West Main St., Clarksburg, W. Va.
Farm C. Z. Grant Acres 108
Location (waters)
Well No. 8343 Elev. 1018'
District Freemans Creek County Lewis
The surface of tract is owned in fee by
Address
Mineral rights are owned by
Address
Drilling commenced 3-4-09
Drilling completed 4-15-09
Date Shot Not shot From To
With
Open Flow /10ths Water in Inch
/10ths Merc. in Inch
Volume Exhausted Cu. Ft.
Rock Pressure lbs. hrs.
Oil None bbls., 1st 24 hrs.
Fresh water 85' feet feet
Salt water None feet feet

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer
13			
10	200	200	Size of
8¼			
6⅝	1608	1608	Depth set
5 3/16	2026	2026	
3			Perf. top
2	2367	2367	Perf. bottom
Liners Used			Perf. top
			Perf. bottom

CASING CEMENTED SIZE No. Ft. Date
No Record of Cementing
COAL WAS ENCOUNTERED AT FEET INCHES
Below Coal(Pittsburgh)
FEET INCHES FEET INCHES
544 FEET 36 INCHES FEET INCHES

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth Found	Remarks
Big Dunkard			336	390			
Gas Sand			426	544			
Coal			544	547			
First Salt			590	632			
2nd Salt			784	830			
Maxon Sand			1230	1230			
Little Lime			1367	1382			
Big Lime			1405	1465			
Big Injun			1465	1612			
Squaw			1620	1665			
Fifty Foot			1795	1815			
Thirty Foot			1860	1916			
Gordon Stray			2013	2033			
Gordon Sand			2085	2112	Gas	2095 &	2106
" "			2112	2143	Gas	2125	
Fifth			2313	2328	Gas	2318	
Total Depth				2353'			

RECEIVED
NOV 1955
WEST VIRGINIA
DEPT. OF MINES

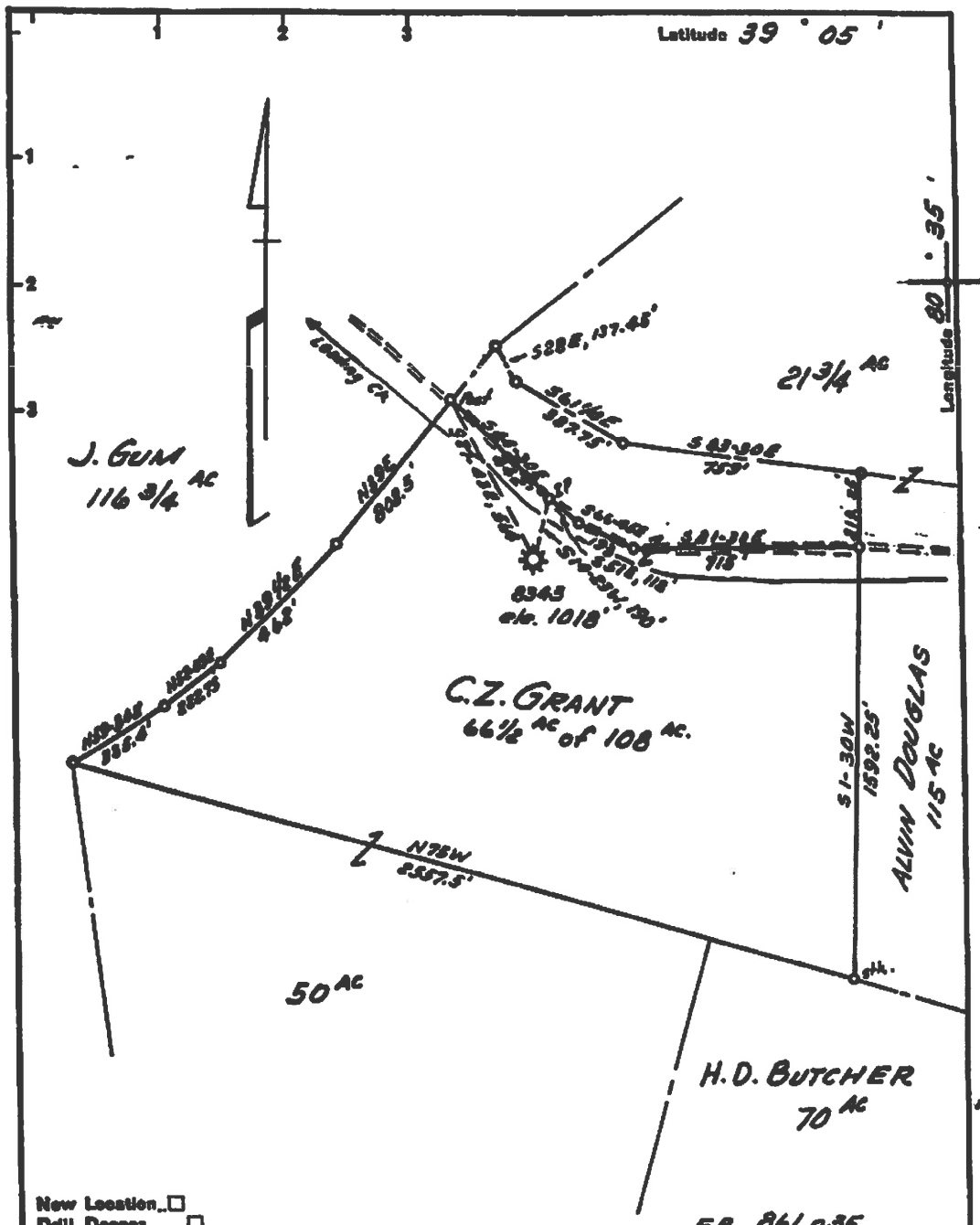
October 31, 1955

Hope Natural Gas Company

(Over)

(4)

Lew-30658



New Location ☐
Drill Deeper ☐
Abandonment ☒ 8343

F.B. 861 p35
M.S. 69 528E1 F.B. 1193 p.35

Company HOPE NATURAL GAS CO.
Address CLARKSBURG, W.VA.
Farm C.Z. GRANT
Tract ____ Acres 108 Lease No. 52210
Well (Farm) No. ____ Serial No. 8343
Elevation (Spirit Level) 1018'
Quadrangle VADIS
County LEWIS District FREEMANS CK.
Engineer Guy H. Bradley
Engineer's Registration No. 2425
File No. ____ Drawing No. ____
Date Oct. 21, 1955 Scale 1" = 400'

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION
CHARLESTON

WELL LOCATION MAP

FILE NO. LEW-658-A

+ Denotes location of well on United States Topographic Maps, scale 1 to 62,500, latitude and longitude lines being represented by border lines as shown.

-- Denotes one inch spaces on border line of original tracing.

3921

WR-35

API #: 47-041-04583

State of West Virginia
Division of Environmental Protection
Section of Oil and Gas

Well Operator's Report of Well Work

Farm Name: POPE, ROBERT & ARLE Operator Well No.: DEBRULAR LOHAN # 3
B-234

LOCATION: Elevation: 1180 Quadrangle: CAMDEN

District: Freemans Creek County: LEWIS
Latitude: 9400 Feet South of 39 Deg. 5 Min. 0 Sec.
Longitude: 300 Feet West of 80 Deg. 35 Min. 0 Sec.

Company: BOWIE, INC.
PO DRAWER 1430
CLARKSBURG, WV 26302-1430

Agent: William H. Bowie

Inspector: Tim Bennett
Permit Issued: 06/18/2002
Well Work Commenced: 9/18/2003
Well Work Completed: 9/22/2003
Verbal Plugging
Permission granted on:
Rotary: ☑ Cable: ☐ Rig
Total Depth (feet): 3509
Fresh Water Dept 42

Salt Water Depth NA

Is Coal Being Mined in the Area? (Y/N) N
Coal Depths (ft): NA

Casing & Tubing	Used in Drilling	Left in Well	Cement Fill Up in SKS
9 5/8	40	40	CTS
7	1153	1153	205 sks
4 1/2	3384	3384	120 sks

RECEIVED
Office of Oil & Gas
Office of Chief
OCT 2 2 2003
WV Department of
Environmental Protection

OPEN FLOW DATA

Producing formation Baltown, Speechley Elizabeth Pay zone depth (ft) 3178-3345, 2914-2916
Gas: Initial open flow: 189 MCF/day *Oil:* Initial open flow: NA BBL/day
Final open flow: 200 MCF/day Final open flow: NA BBL/day
Time of open flow between initial and final tests: after frac Hours
Static Rock Pressure: 250 psig (surface pressure) after 12 Hours

Producing formation 5th Sand, Bayard 30', Gordon Pay zone depth (ft) 2464-2442, 2246-2312
Gas: Initial open flow: comingled MCF/day *Oil:* Initial open flow: NA BBL/day
Final open flow: comingled MCF/day Final open flow: NA BBL/day
Time of open flow between initial and final tests: NA Hours
Static Rock Pressure: comingled psig (surface pressure) after NA 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 WELBORE.

For: Bowie, Inc.
By: William C. Bowie
Date: 10/9/2003

LEW 4583

API: 47-041-04583 BOWIE #: 234 DEBRULAR LOHAN 3

Fracture Record: Elizabeth, Speechley, Balltown (2914-3345) 20 holes, 750 gal 15% HCl, 208 sks sand, 359 bbl X-Link H2O, 25bpm@2654#, 2-4-6ppg

Bayard, 5th Sand (2464-2442) 15 holes, 500 gal 15% HCl, 159 sks sand, 272 bbl X-Link H2O, 29bpm@1862#, 1,2.5,4,6ppg

30', Gordon (2246-2312) 16 holes, 500 gal 15% HCl, 180 sks sand, 340 bbl X-Link H2O, 26bpm@2062#, 1,2,3,4ppg

FORMATION	COMMENT
Maxton, 1400-1415	-H2O: 1/4"@42'
Little Lime, 1520-1540	-Gas: 1839' 133k, 2566' 60k, 2521' 103k, 3105' 198k, 3250' 189k, 3446' 189k, TD 189k
Big Lime, 1570-1675	
Keener, 1675-1680	
Big Injun, 1680-1730	
30', 2235-2290	
Gordon, 2300-2320	
5th Sand, 2460-2500	
Bayard, 2520-2550	
Elizabeth, 2910-2920	
Warren, 3080-3090	
Speechley, 3180-3190	
Balltown, 3340-3350	

"Pipeline"

Select County: (041) Lewis
Enter Permit #: 4583
Get Data | Reset

Select datatypes: (Check All)
Location | Production | Plugging
Owner/Completion | Stratigraphy | Sample
Pay/Show/Water | Logs | Btm Hole Loc

Table Descriptions
County Code Translations
Permit-Numbering Series
Usage Notes
Contact Information
Disclaimer
WVGES Main
"Pipeline-Plus" New

WV Geological & Economic Survey

Well: County = 41 Permit = 4583

Report Time: Wednesday, January 25, 2017 2:19:10 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4704104583	Lewis	4583	Freemans Creek	Camden	Vadis	39.057611	-80.584267	535969.9	4323252

There is no Bottom Hole Location data for this well

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VD	PROP_TRGT_FM	TFM_EST_PR
4704104583	9/22/2003	Original Loc	Completed	Robert G/Arlene A Pope 3					Robert Lohan	Bowie, Inc.			

Completion Information:

API	CMP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTG	G_BEF	G_AFT	O_BEF	O_AFT	NGL_BEF	NGL_AFT	P_BEF	TI_BEF	P_AFT	TI_AFT	BH_P_BEF	BH_P_AFT	G_MSRD_BY
4704104583	9/22/2003	9/18/2003	1180	Ground Level	Murphy Creek	Greenland Gap Fm	Balltown	Development Well	Development Well	Gas	Rotary	Acid+Frac	3509		3509	189	200							250	12			

Pay/Show/Water Information:

API	CMP_DT	ACTIVITY	PRODUCT	SECTION	DEPTH_TOP	FM_TOP	DEPTH_BOT	FM_BOT	G_BEF	G_AFT	O_BEF	O_AFT	WATER_QNTY
4704104583	9/22/2003	Water	Fresh Water	Vertical	42		42	Pennsylvanian System					
4704104583	9/22/2003	Pay	Gas	Vertical	2246	Thirty-foot	2312	Gordon					
4704104583	9/22/2003	Pay	Gas	Vertical	2464	Fifth	2542	Bayard					
4704104583	9/22/2003	Pay	Gas	Vertical	2914	Elizabeth	3345	Balltown					

Production Gas Information: (Volumes in Mcf)

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_GAS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4704104583	Bowie, Inc.	2004	20,049	1,363	2,626	1,130	1,225	1,898	1,745	2,009	1,826	1,688	1,608	1,379	1,552
4704104583	Bowie, Inc.	2005	14,768	1,643	1,269	1,300	1,204	1,099	1,686	1,337	825	1,212	1,093	894	1,104
4704104583	Bowie, Inc.	2006	12,168	1,206	1,206	827	1,085	1,006	1,066	1,298	899	878	897	883	917
4704104583	Bowie, Inc.	2007	7,172	905	1,163	1,058	394	504	511	459	478	424	431	412	433
4704104583	Bowie, Inc.	2008	6,031	536	546	656	579	532	456	448	484	520	413	421	438
4704104583	Bowie, Inc.	2009	5,640	477	513	463	425	450	506	509	463	529	540	476	295
4704104583	Bowie, Inc.	2010	5,251	489	459	324	511	304	486	472	409	461	448	420	468
4704104583	Bowie, Inc.	2011	4,462	435	202	555	442	484	484	353	433	388	182	302	202
4704104583	Bowie, Inc.	2012	6,037	599	563	542	509	580	493	501	363	459	442	473	513
4704104583	Bowie, Inc.	2013	4,220	331	58	134	58	556	541	504	268	427	462	450	431
4704104583	Bowie, Inc.	2014	3,340	427	377	280	258	15	150	112	316	383	388	266	368
4704104583	Bowie, Inc.	2015	3,677	376	510	349	370	480	269	31	242	217	278	239	316

Production Oil Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_OIL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4704104583	Bowie, Inc.	2004	0	0	0	0	0	0	0	0	0	0	0	0	0
4704104583	Bowie, Inc.	2005	0	0	0	0	0	0	0	0	0	0	0	0	0
4704104583	Bowie, Inc.	2006	0	0	0	0	0	0	0	0	0	0	0	0	0
4704104583	Bowie, Inc.	2007	0	0	0	0	0	0	0	0	0	0	0	0	0
4704104583	Bowie, Inc.	2008	0	0	0	0	0	0	0	0	0	0	0	0	0
4704104583	Bowie, Inc.	2009	0	0	0	0	0	0	0	0	0	0	0	0	0
4704104583	Bowie, Inc.	2010	0	0	0	0	0	0	0	0	0	0	0	0	0
4704104583	Bowie, Inc.	2011	0	0	0	0	0	0	0	0	0	0	0	0	0
4704104583	Bowie, Inc.	2012	48	0	0	0	0	0	0	48	0	0	0	0	0
4704104583	Bowie, Inc.	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
4704104583	Bowie, Inc.	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4704104583	Bowie, Inc.	2015	0	0	0	0	0	0	0	0	0	0	0	0	0

Production NGL Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_NGL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4704104583	Bowie, Inc.	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
4704104583	Bowie, Inc.	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4704104583	Bowie, Inc.	2015	0	0	0	0	0	0	0	0	0	0	0	0	0

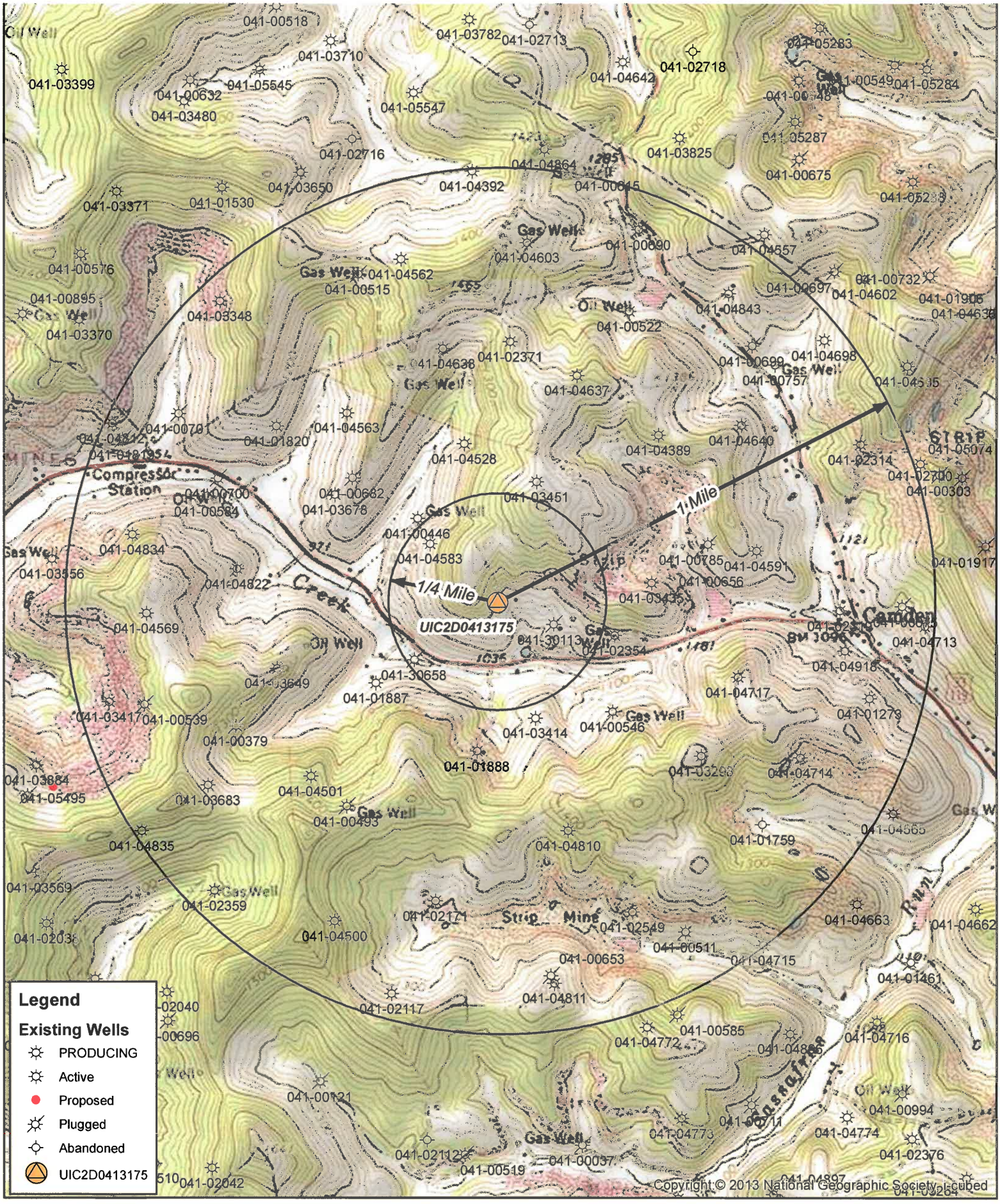
Stratigraphy Information:

API	SUFFIX	FM	FM_QUALITY	DEPTH_TOP	DEPTH_QUALITY	THICKNESS	THICKNESS_QUALITY	ELEV	DATUM
4704104583	Original Loc	Maxton	Well Record	1400	Reasonable	15	Reasonable	1180	Ground Level
4704104583	Original Loc	Little Lime	Well Record	1520	Reasonable	20	Reasonable	1180	Ground Level
4704104583	Original Loc	Big Lime	Well Record	1570	Reasonable	105	Reasonable	1180	Ground Level
4704104583	Original Loc	Keener	Well Record	1675	Reasonable	5	Reasonable	1180	Ground Level
4704104583	Original Loc	Big Injun (Grnbr)	Well Record	1680	Reasonable	50	Reasonable	1180	Ground Level
4704104583	Original Loc	Thirty-foot	Well Record	2235	Reasonable	55	Reasonable	1180	Ground Level
4704104583	Original Loc	Gordon	Well Record	2300	Reasonable	20	Reasonable	1180	Ground Level
4704104583	Original Loc	Fifth	Well Record	2460	Reasonable	40	Reasonable	1180	Ground Level
4704104583	Original Loc	Bayard	Well Record	2520	Reasonable	30	Reasonable	1180	Ground Level
4704104583	Original Loc	Elizabeth	Well Record	2910	Reasonable	10	Reasonable	1180	Ground Level
4704104583	Original Loc	Warren	Well Record	3080	Reasonable	10	Reasonable	1180	Ground Level
4704104583	Original Loc	Speechley	Well Record	3180	Reasonable	10	Reasonable	1180	Ground Level
4704104583	Original Loc	Balltown	Well Record	3340	Reasonable	10	Reasonable	1180	Ground Level

There is no Wireline (E-Log) data for this well

There is no Plugging data for this well

There is no Sample data for this well



1 inch = 1,500 feet

LAW SWS SWD UIC2D0413175
Freemans Creek District, Lewis County, WV
Camden 7.5' Quad

APPENDIX H

GROUNDWATER PROTECTION PLAN

Facility Name: Law SWS SWD 1

County: Lewis

Facility Location:

Postal Service Address:		
Latitude and Longitude:	4,322,755	536,172

Contact Information:

Person:	Jamie Andrews
Phone Number:	304-203-7555
E-mail Address:	jandrews@mountainvoilandgas.com

Date: August 15, 2016

1. A list of all operations that may contaminate the groundwater.

   1. Storage of produced formation brine.
   2. Injection of produced formation brine.

2. A description of procedures and facilities used to protect groundwater quality from the list of potential contaminant sources above.

   1. All storage facilities have secondary containment.
   2. Injected fluids are confined to the tubing in the injection well by utilizing, an isolation packer. The annulus pressure is continuously monitored to check for leaks.

3. List procedures to be used when designing and adding new equipment or operations.

   No new equipment or operations will be added to this facility.

4. Summarize all activities at your facility that are already regulated for groundwater protection.

None

5. Discuss any existing groundwater quality data for your facility or an adjacent property.

See attached map and water analysis results. Section 7.4.

6. Provide a statement that no waste material will be used for deicing or fill material on the property unless allowed by another rule.

No waste material will be used for deicing or fill material at the facility, unless allowed by some other regulation or permit.

7. Describe the groundwater protection instruction and training to be provided to the employees. Job procedures shall provide direction on how to prevent groundwater contamination.

1. Employees are trained in secondary containment construction, maintenance, and monitoring.
2. Employees are trained in leak detection.
3. Employees are trained in spill prevention and counter measure procedures.

8. Include provisions for inspections of all GPP elements and equipment. Inspections must be made quarterly at a minimum.

1. Secondary containment is inspected monthly. 2. Tubing / casing annulus pressure is monitored continuously. 3. Piping and fitting are inspected monthly for leaks.

Signature: _____

Date: 3/22/17

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 [1]duly authorized representative in accordance with 47CSR13-13.11.b.

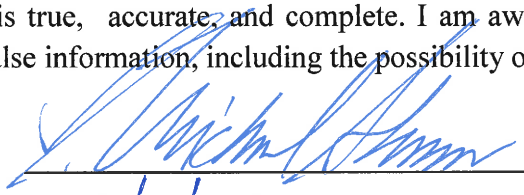
A. Name and title of person applying for permit:

Print Name: Mike Shaver

Print Title: Manager

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: 3/22/2017

[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.

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dep

Basin Surveys, INC

COMPENSATED DENSITY LOG

FILING NO.

PERMIT # LEW-3175-47-041

COMPANY ALLEGHENY LAND & MINERAL COMPANY

WELL CONSOLIDATED GAS SUPPLY CORP. #A-1141

FIELD FREEMANS CREEK DISTRICT

COUNTY LEWIS STATE WV

LOCATION: WATERSHED: LEADING CREEK
QUAD: CAMDEN 7.5'

SEC TWP RGE

OTHER SERVICES: IND

Permanent Datum: GROUND LEVEL Elev. 1198'
Log Measured From K. B. 10 Ft. Above Perm. Datum
Drilling Measured From K. B.

Elev. K B 1208'
D F 1207'
G L 1198'

Date	4/8/82
Run No.	ONE
Type Log	GR/CD/CAL/TEMP
Depth—Driller	2631'
Depth—Logger	2641'
Bottom logged interval	2640'
Top logged interval	810'
Type fluid in hole	DUSTED
Salinity, PPM Cl.	-
Density	-
Level	-
Max rec. temp., deg F.	79.8
Operating rig time	5 HRS.
Recorded by	K. HOWELL
Witnessed by	MR. LOUK

Bore-Hole Record

Run No.	Bit From	To	Size	Wgt.
1	7 7/8" 827.15'	2641'	8 5/8"	

Casing Record

From	To
SURF.	827.15'

BEST COPY AVAILABLE

FOLD HERE

THIS HEADING AND LOG CONFORMS TO API RP 33

Equipment Data

Run No.	Tool No	Source No	Panel No		Logging Unit	Location
ONE	M-8012	CSV-919	3244		80,670	020

Calibration Data

Run No.	Gamma Ray API Scale	Gamma Ray Background CPS	Gamma Ray Std. CPS	CDT Ds CPS AT	CDT 2.0	CDT 3.0	CDT Dt CPS AT	CDT 2.0	CDT 3.0
ONE	0 250								

Logging Data

Run No.	Depths From	Depths To	Speed Ft/Min	GR TC
ONE	2641'	810'	30	2

OCT 2 0 2016

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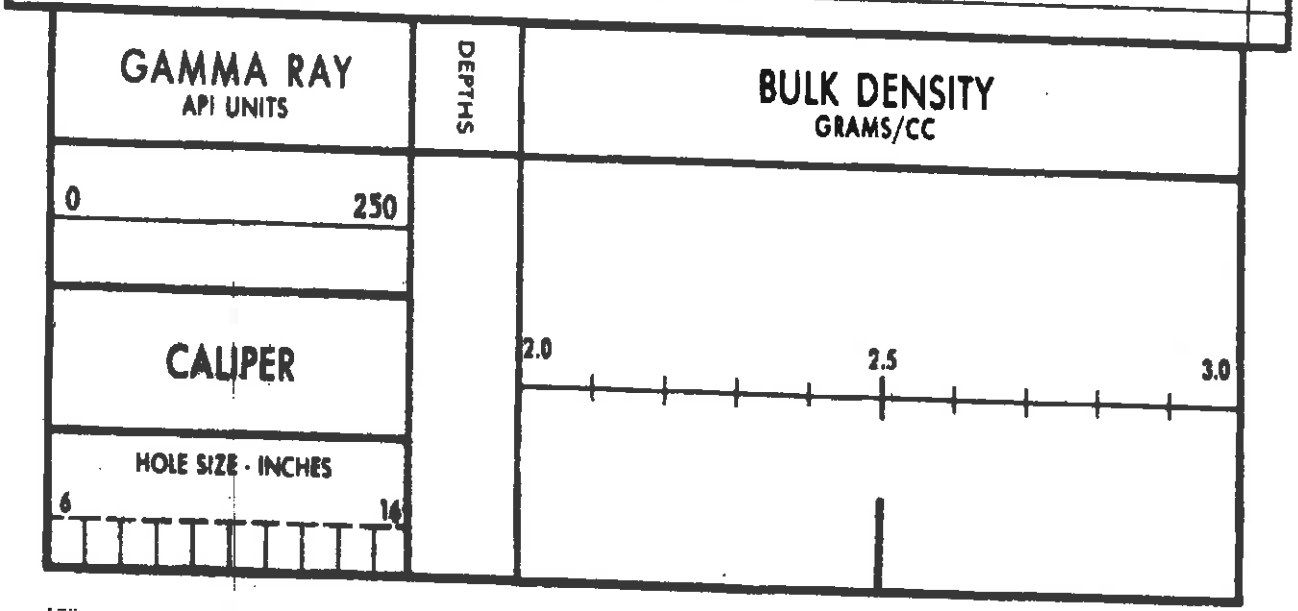
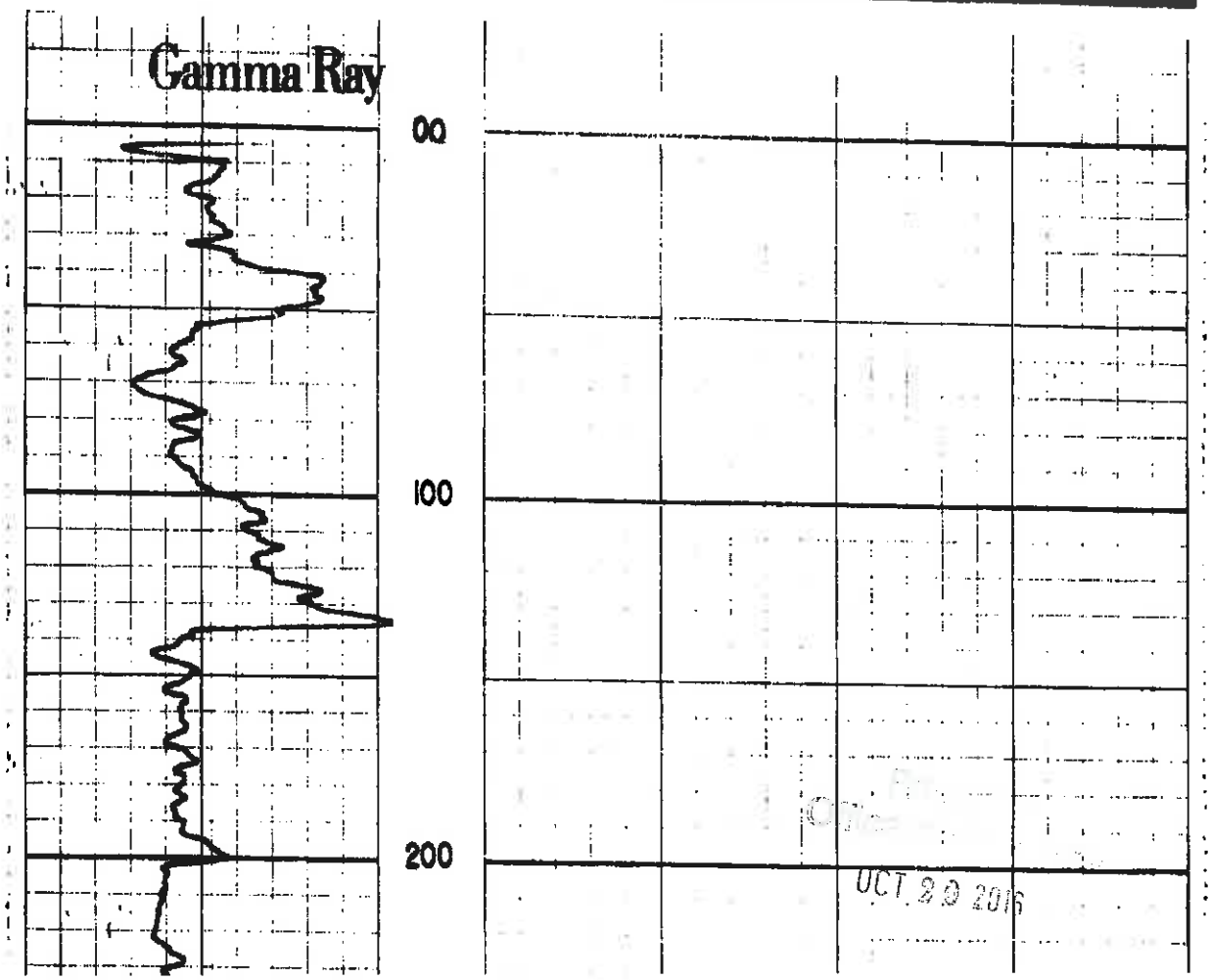
Remarks:





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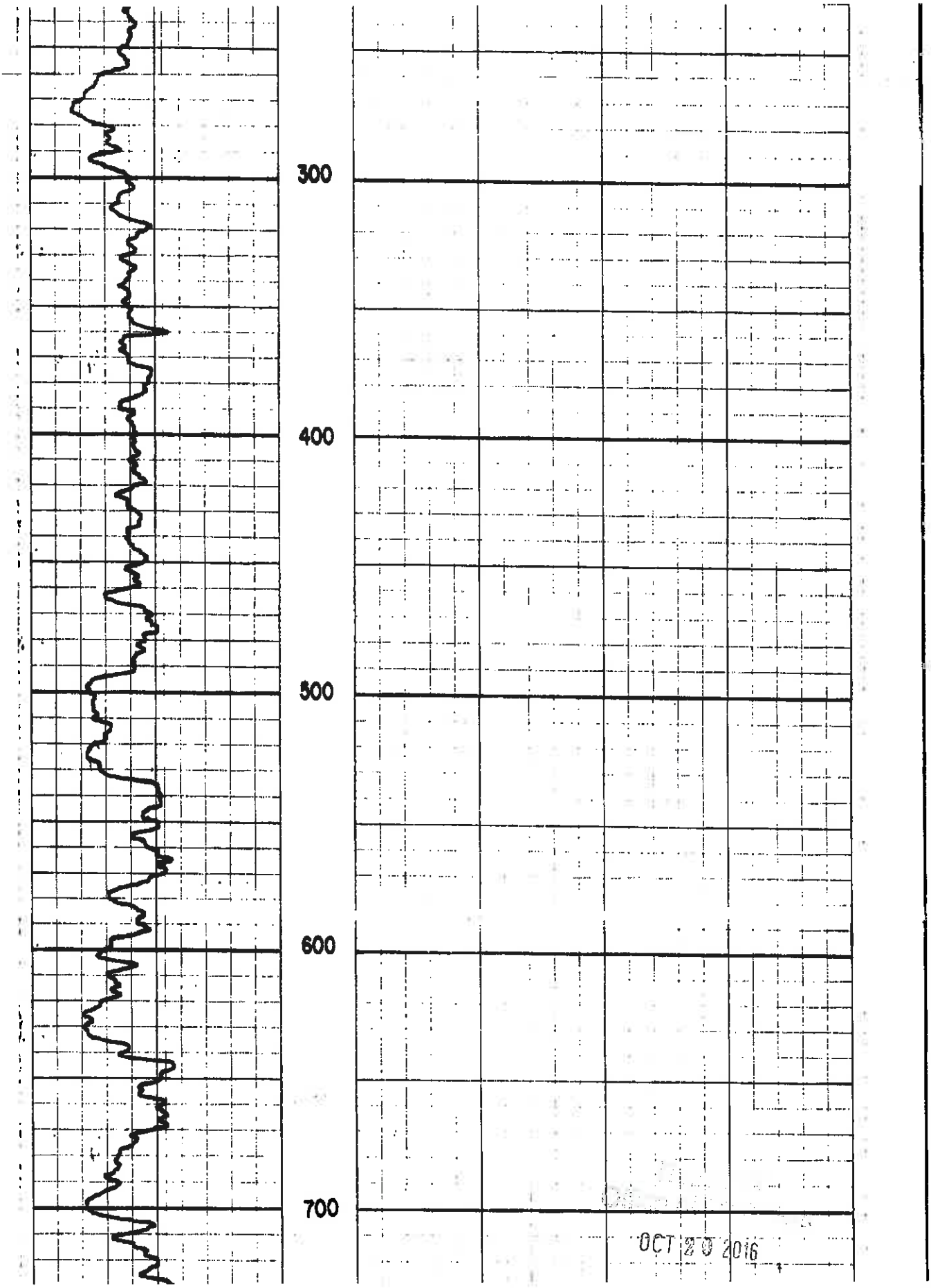
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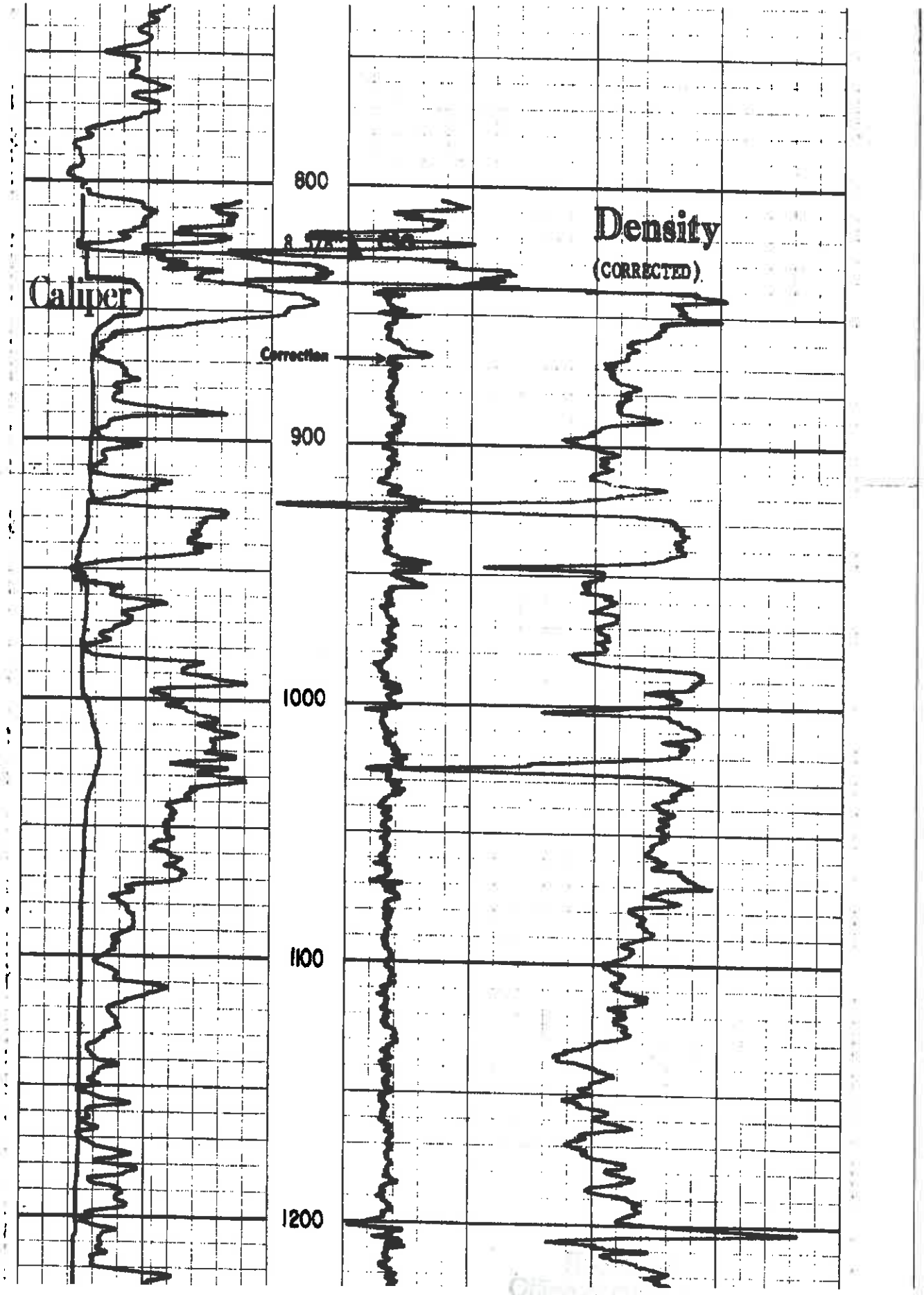

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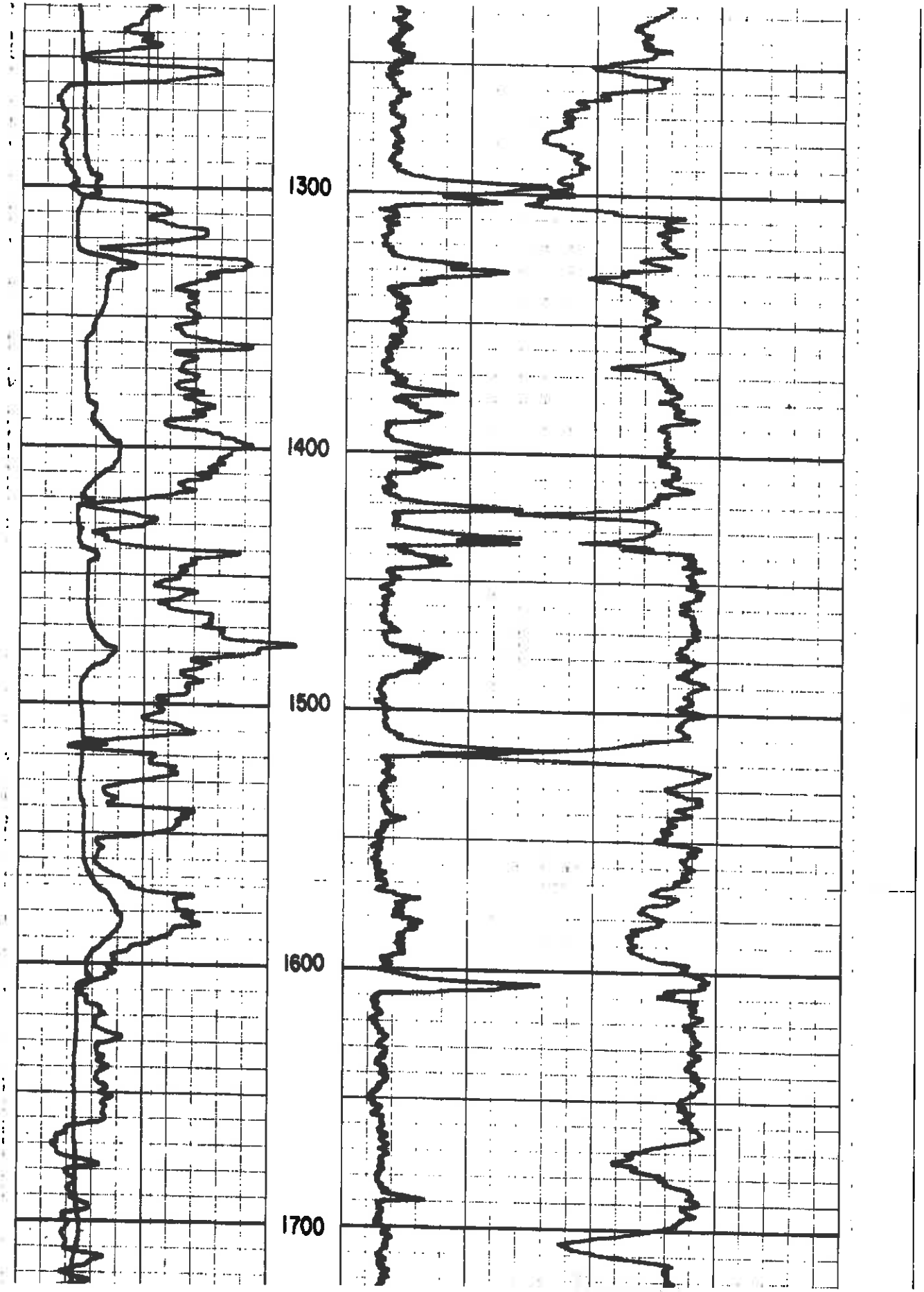

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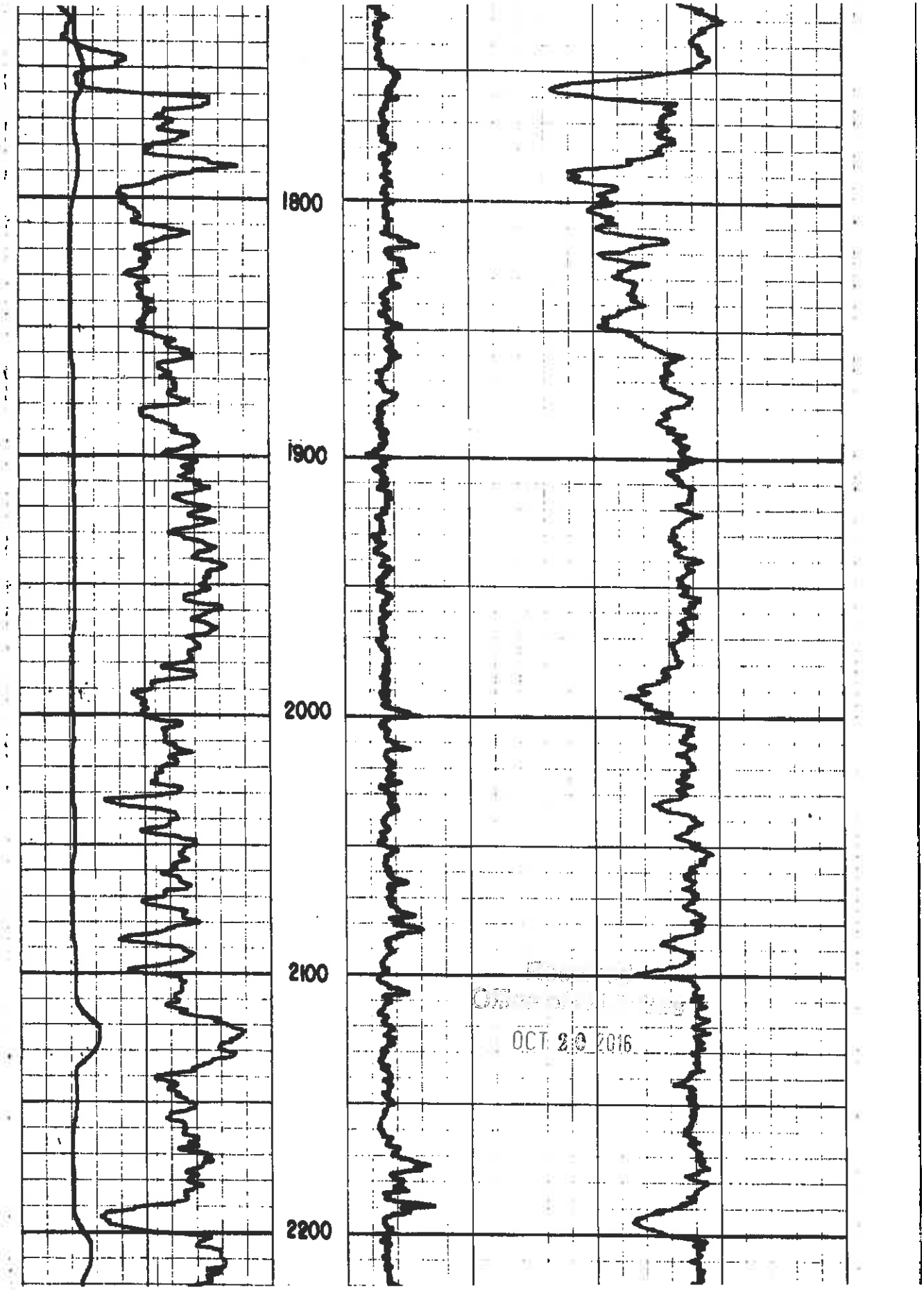
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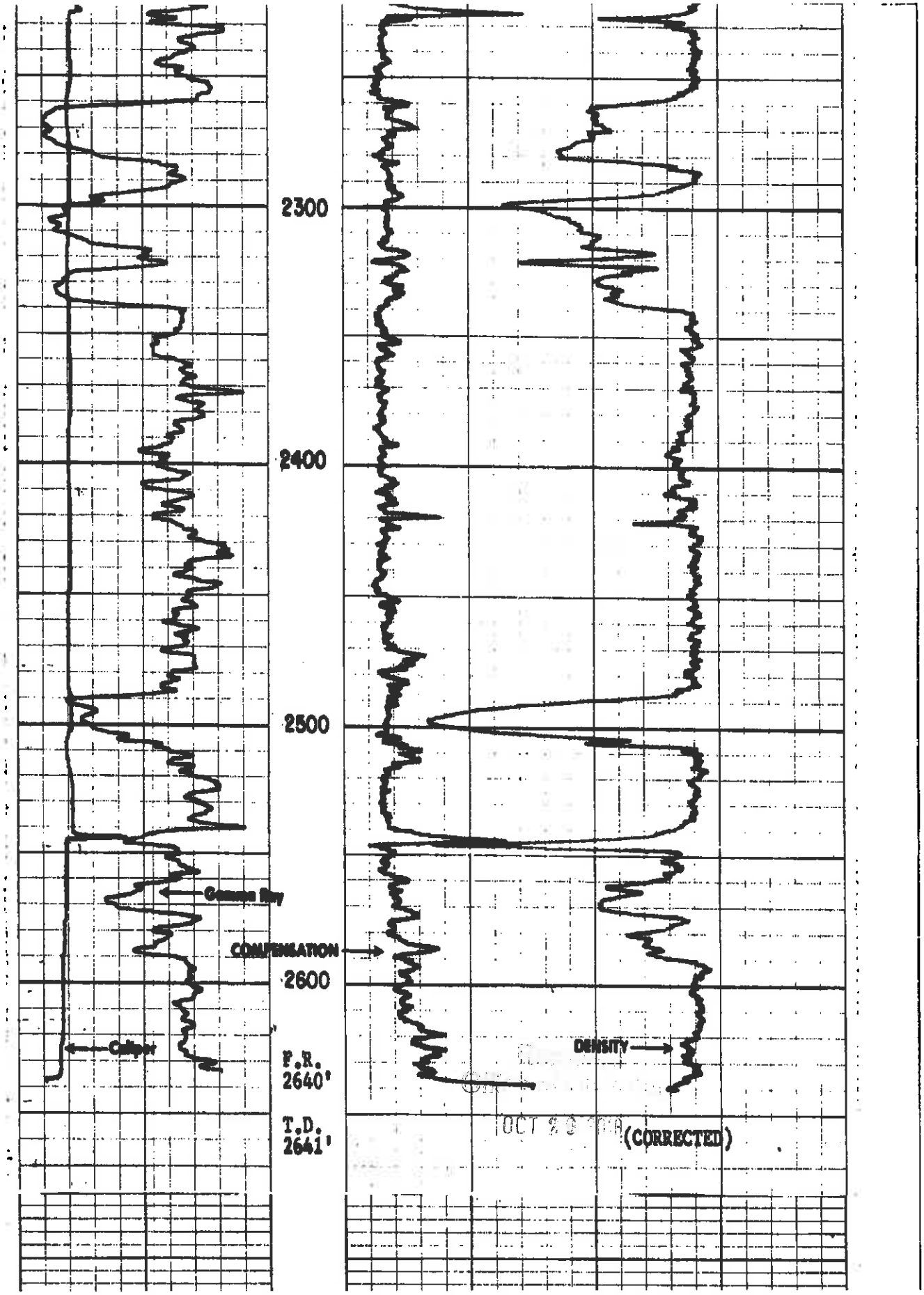
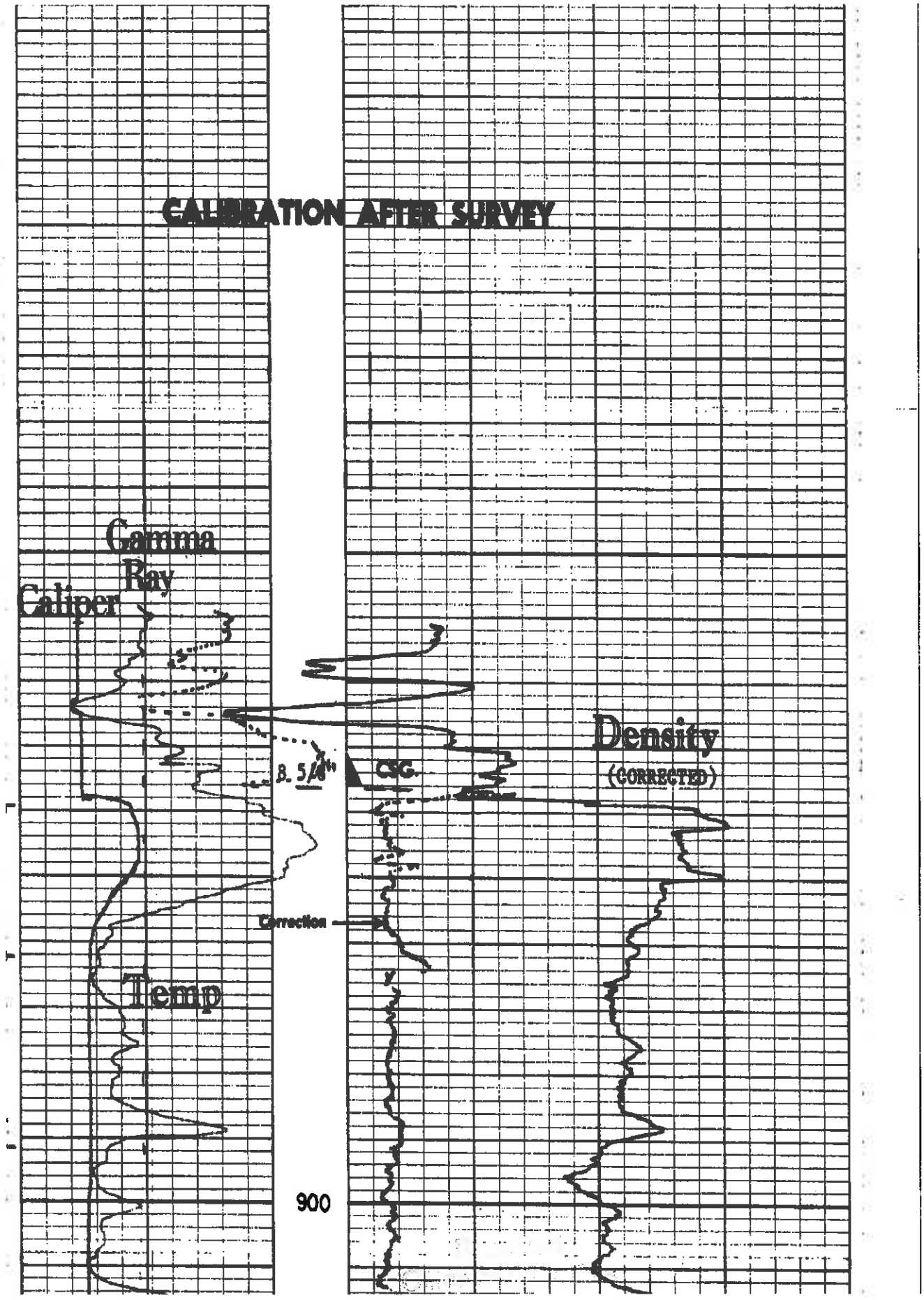
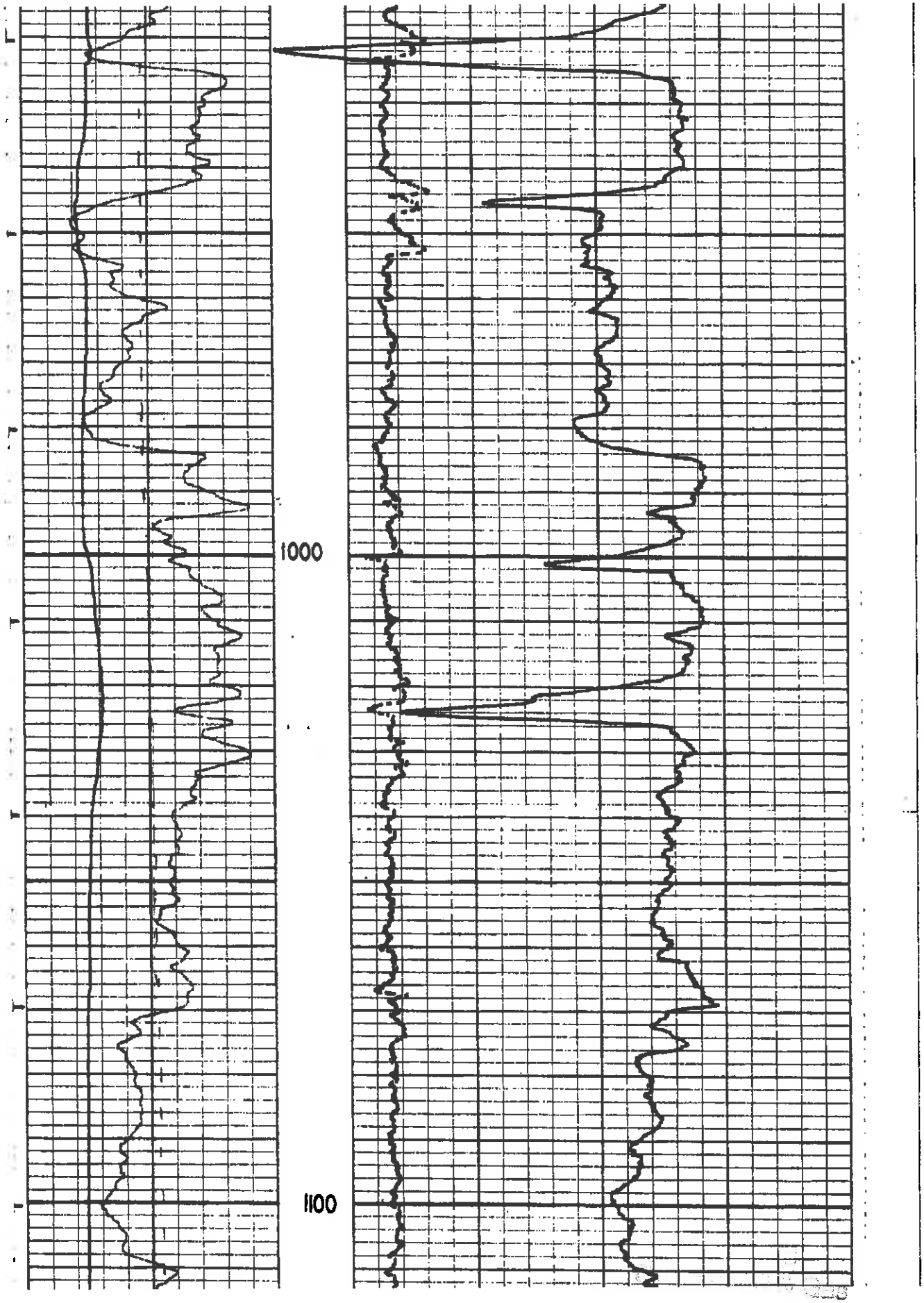

2300
2400
2500
Gamma Ray
COMPENSATION
2600
Caliper
F.R.
2640'
T.D.
2641'
DENSITY
(CORRECTED)


CALIBRATION AFTER SURVEY
Gamma Ray
Caliper
Density
(CORRECTED)
8. 5/8"
CSG.
Correction
Temp
900

OCT 20 2016



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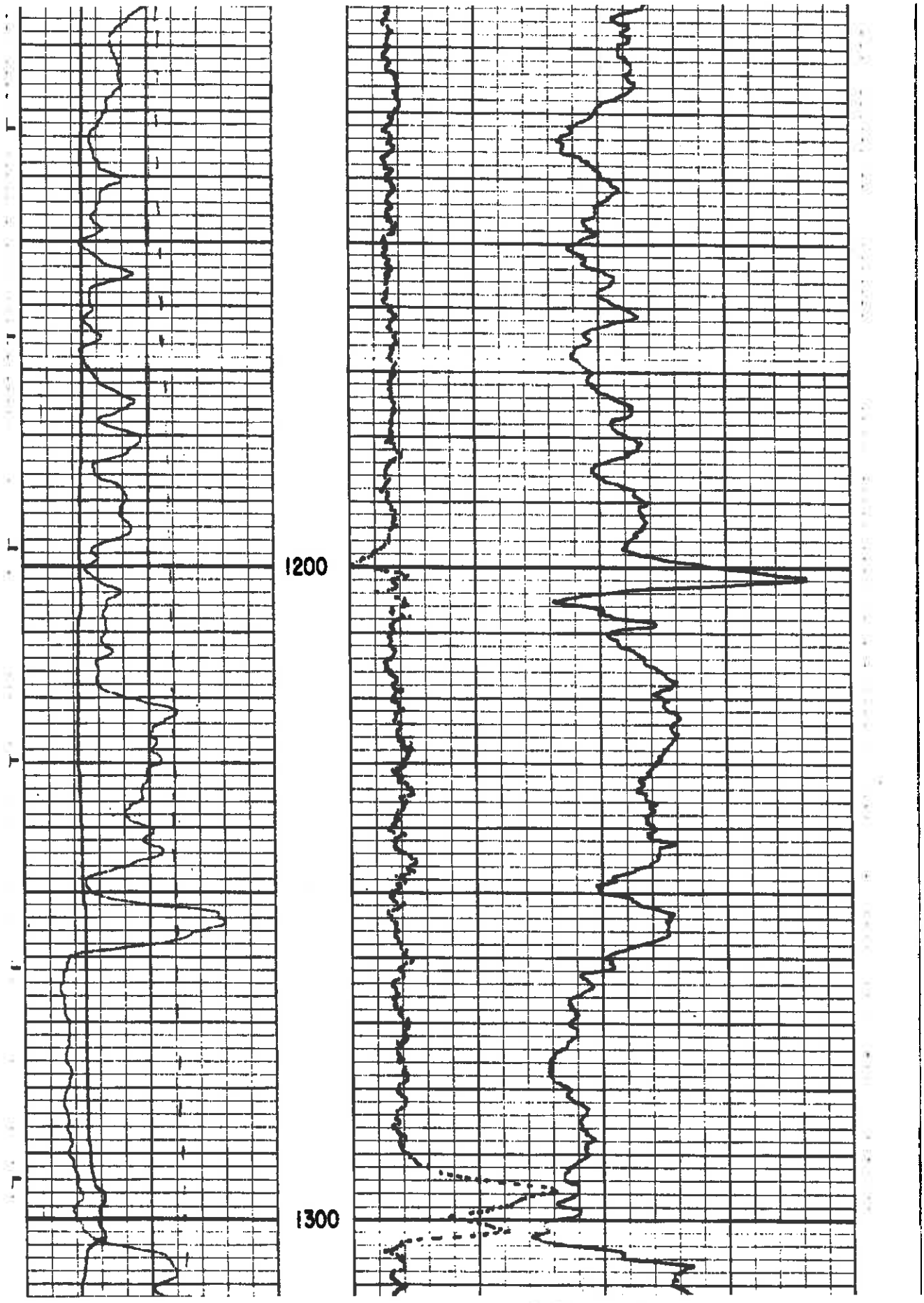

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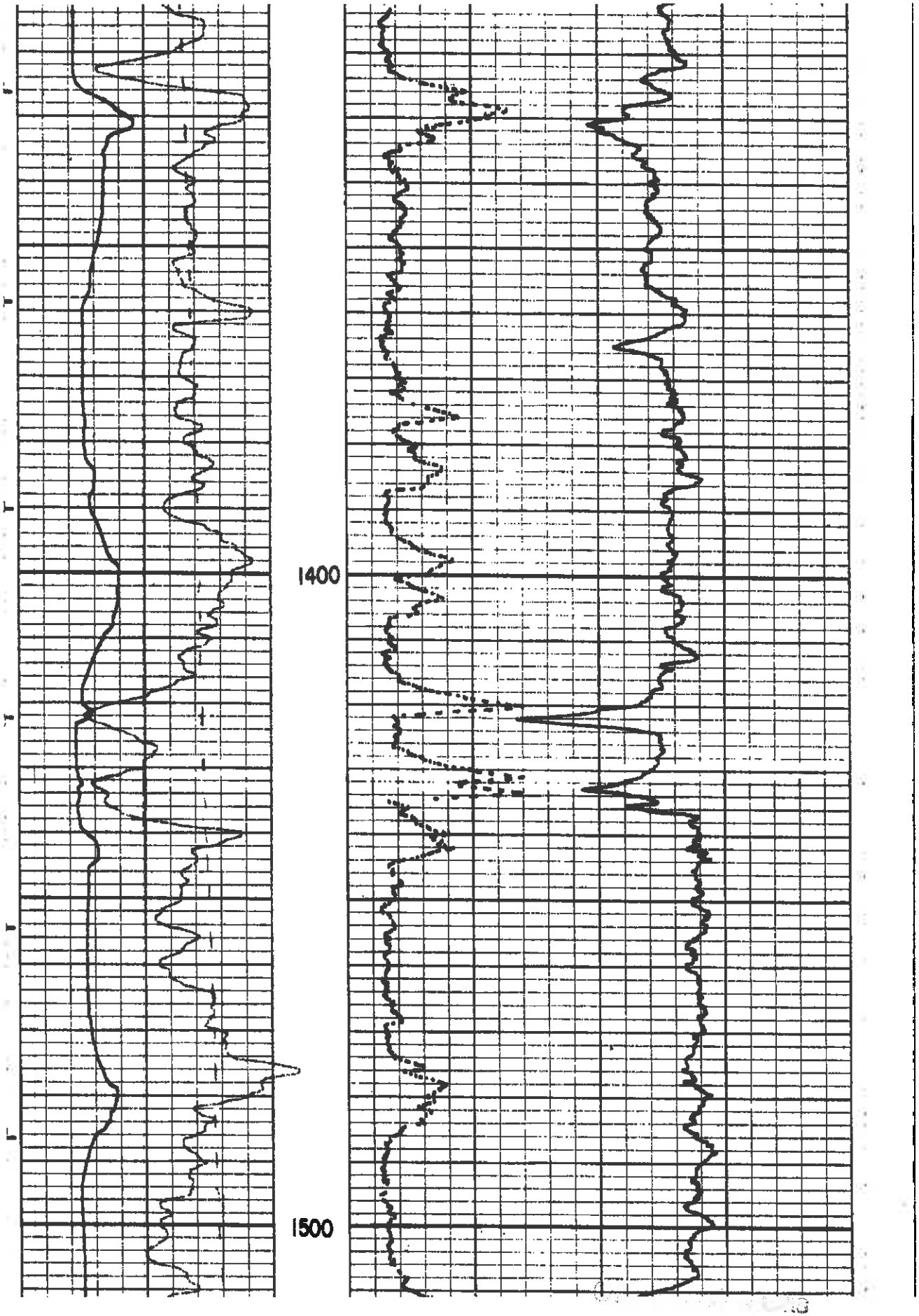
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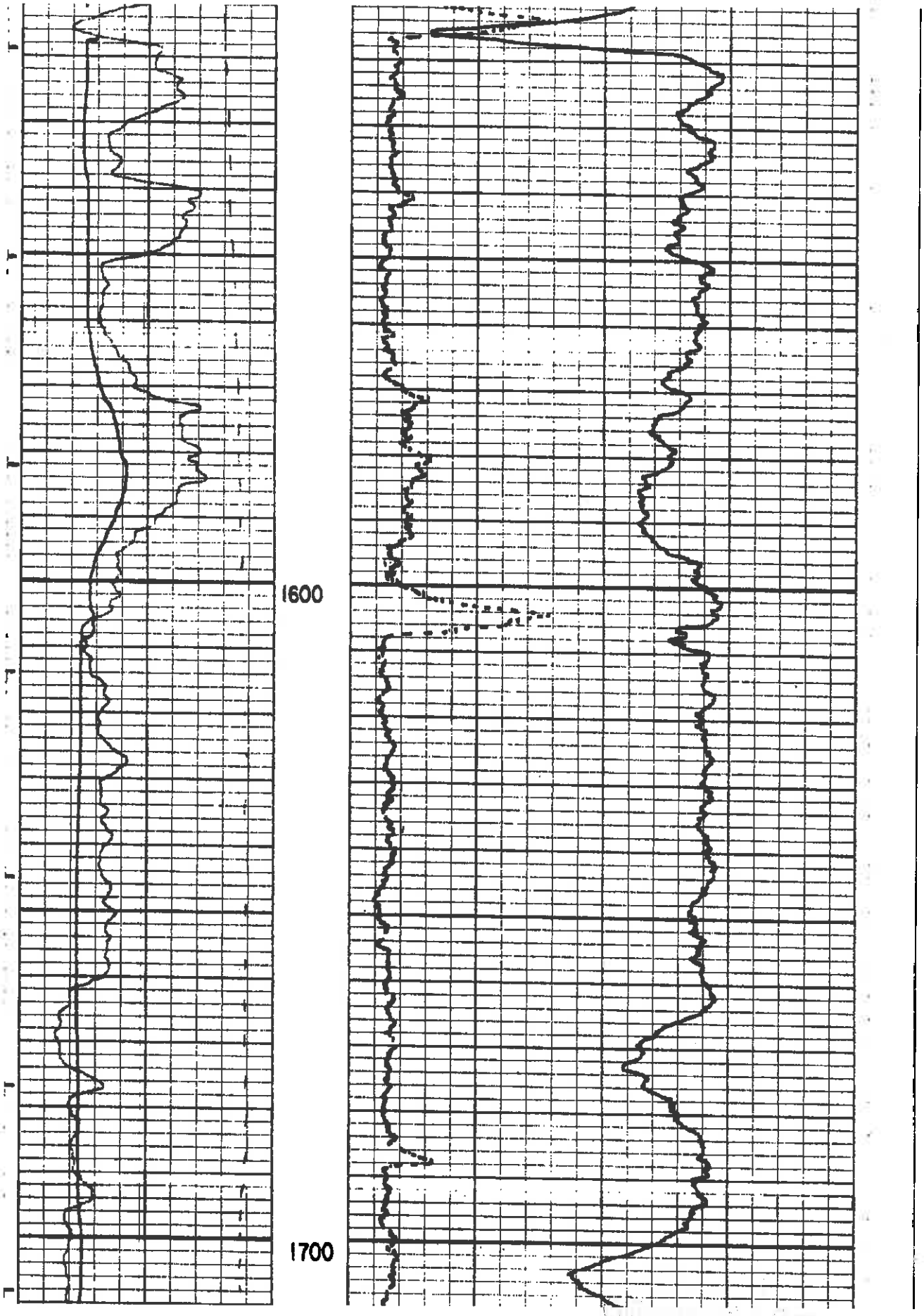
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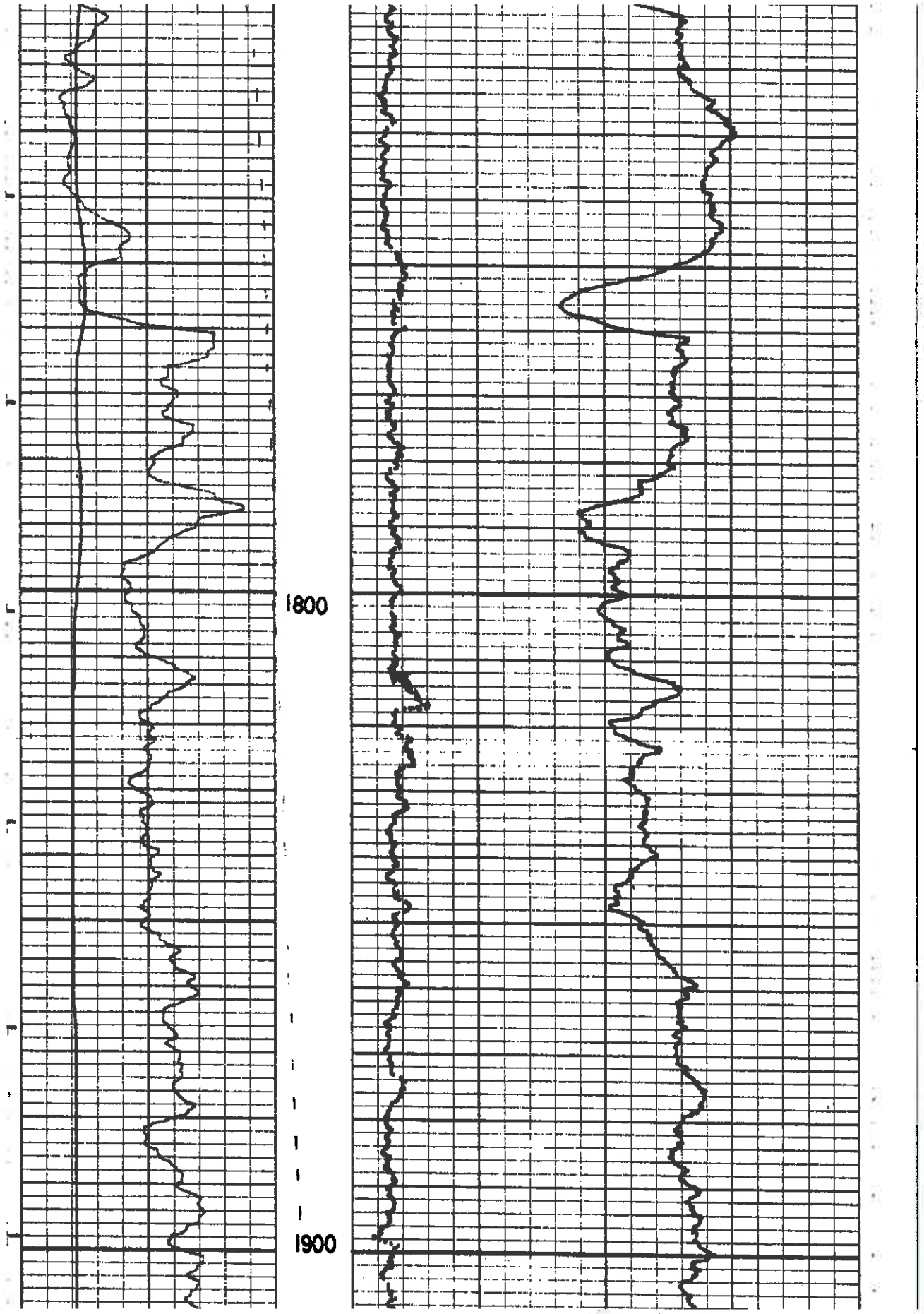

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Office of Oil & Gas

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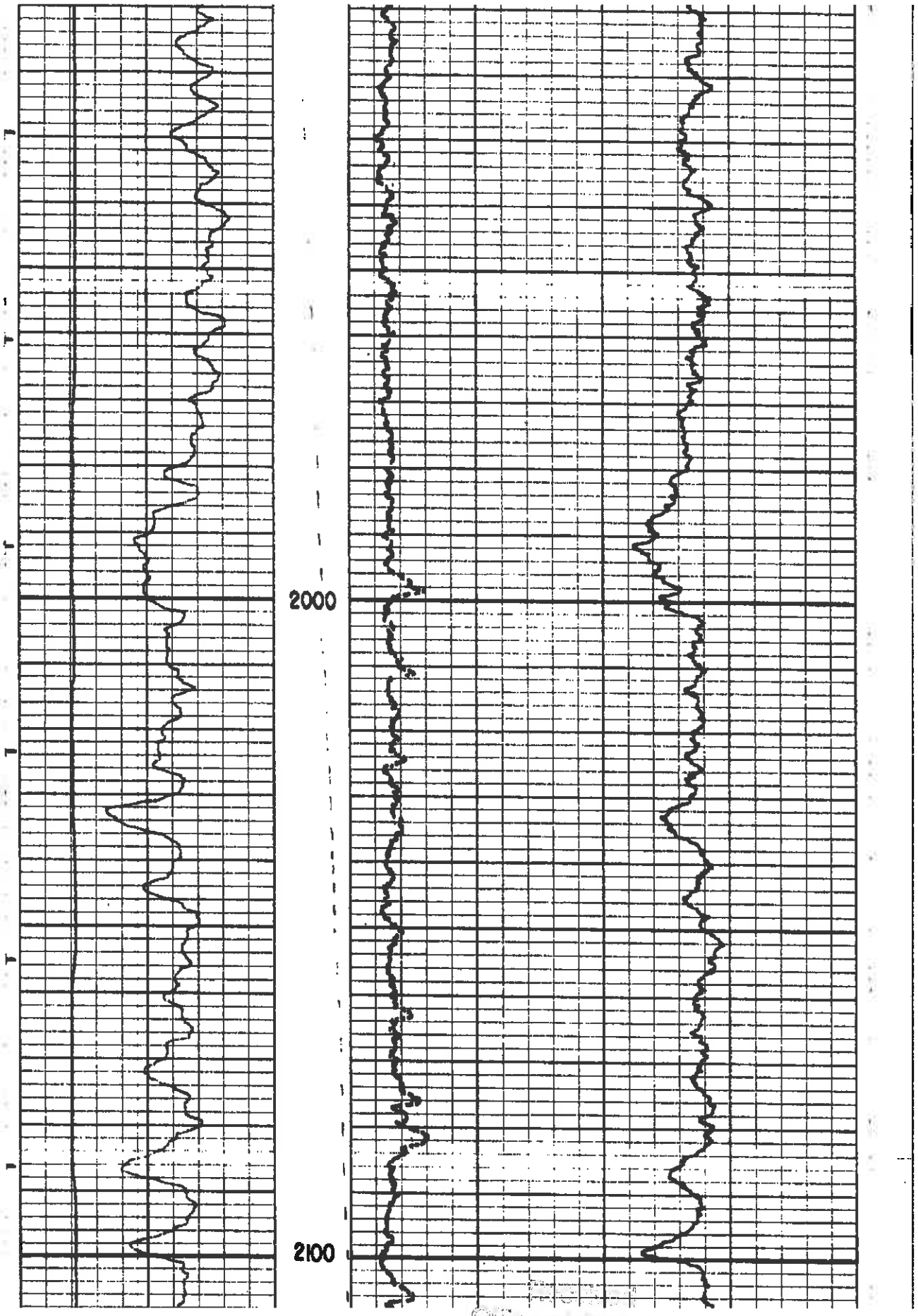

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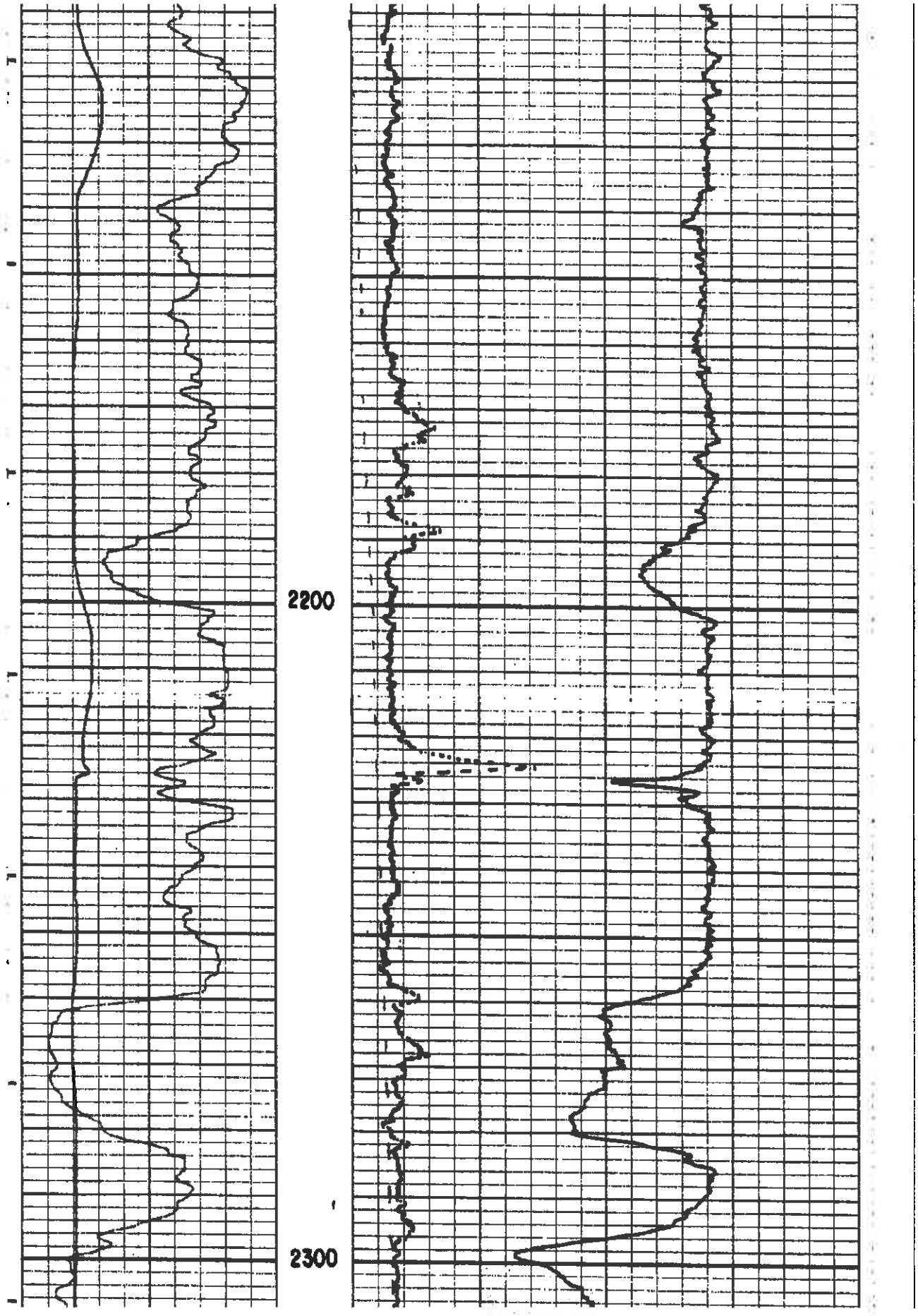

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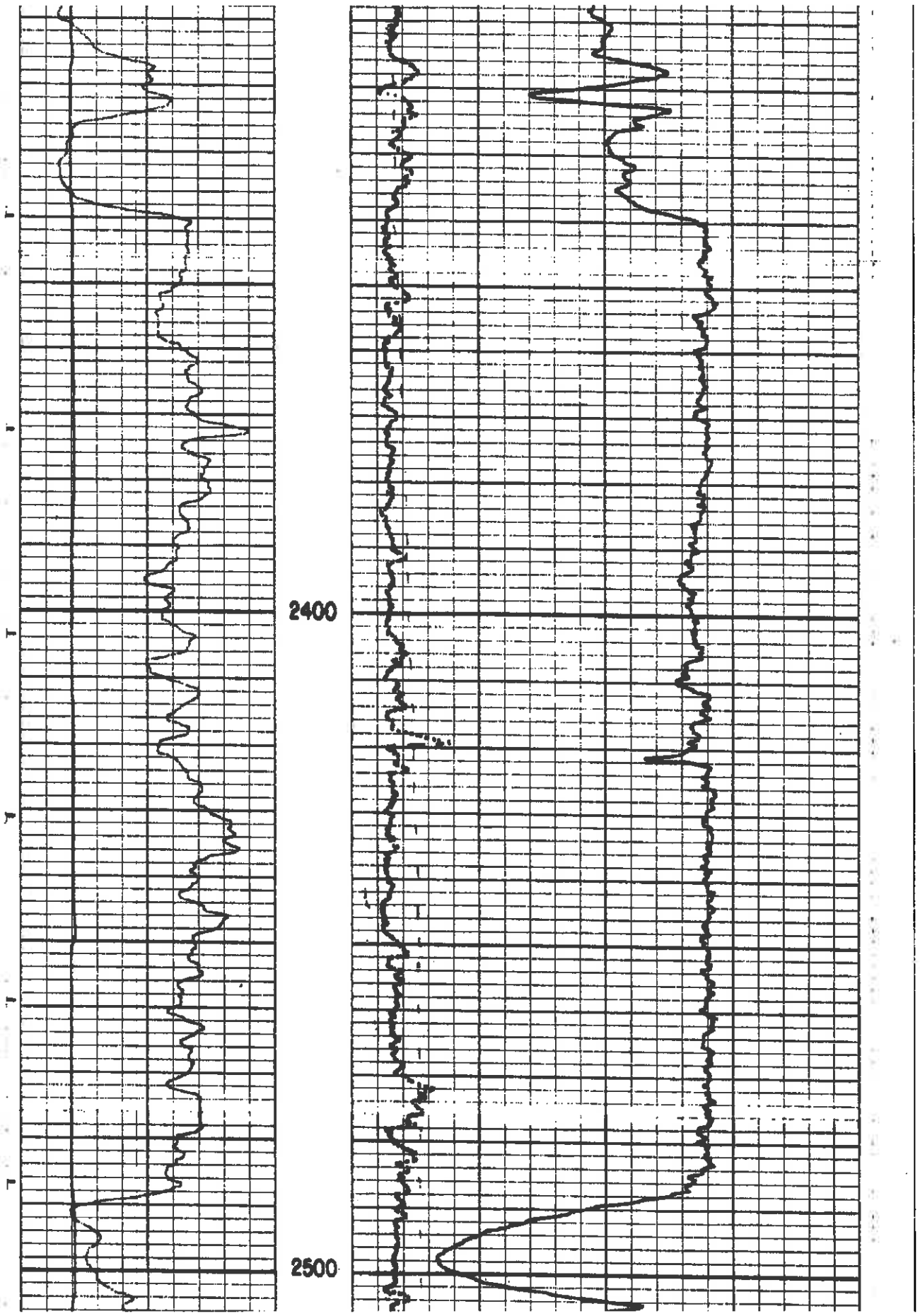

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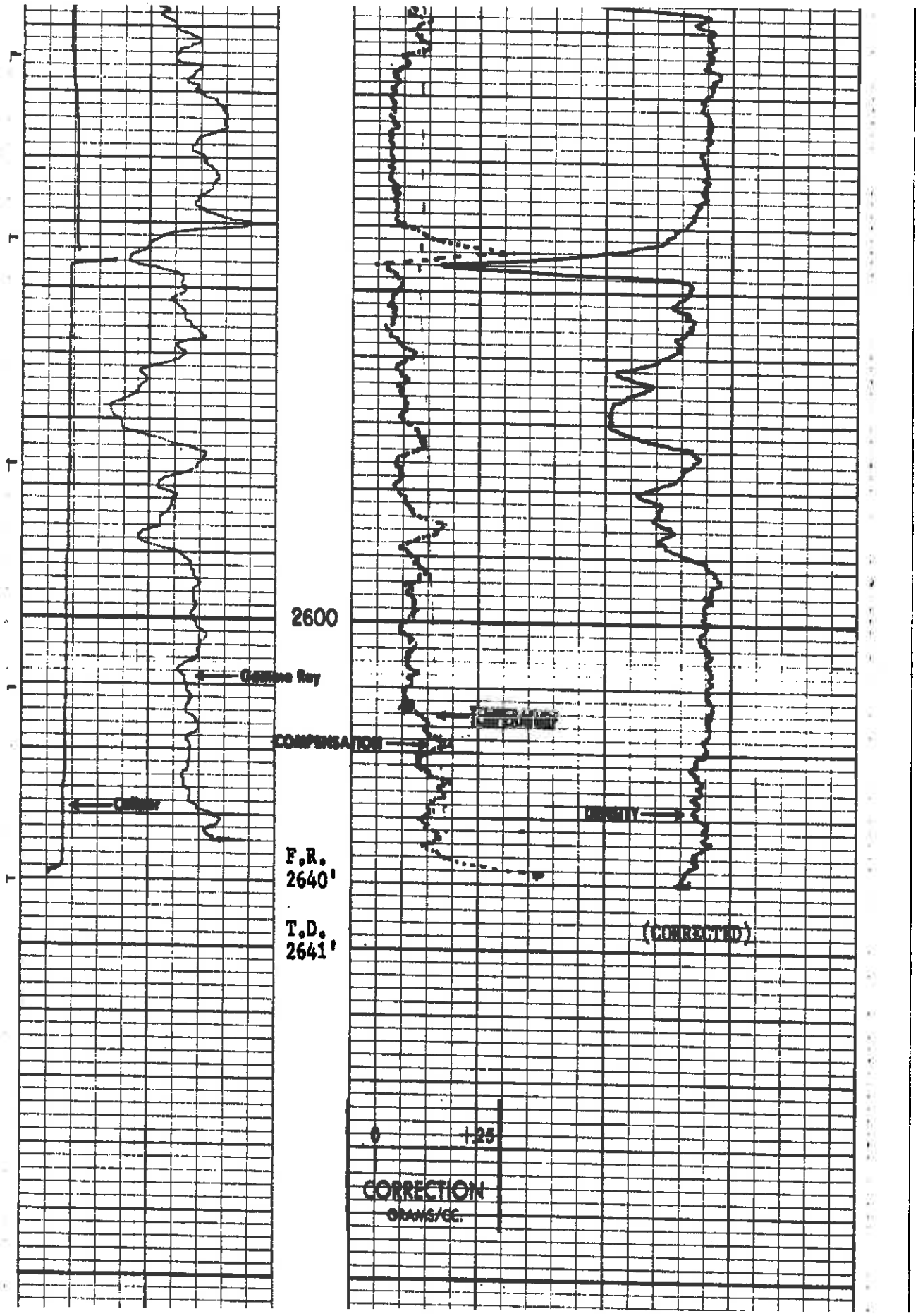

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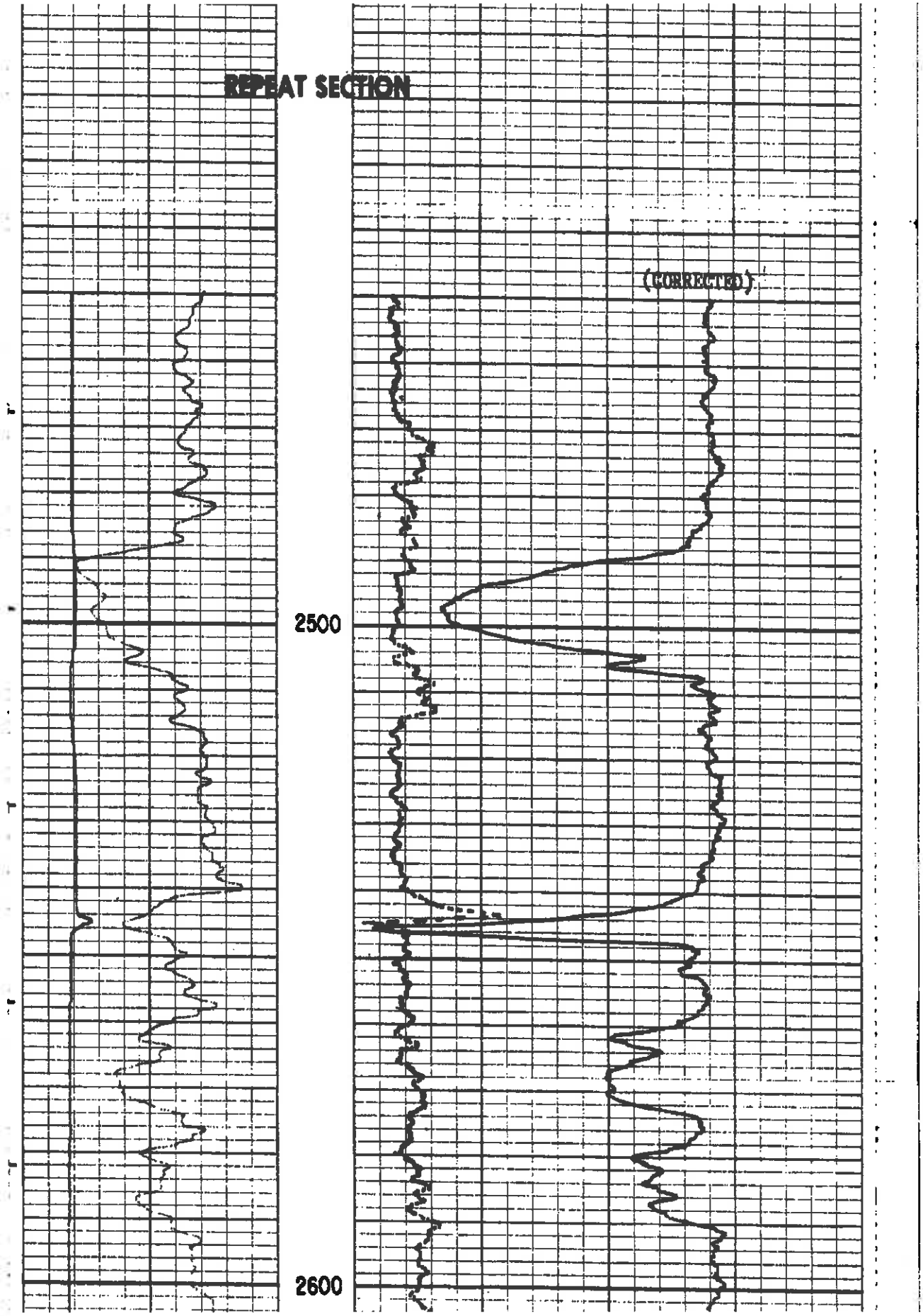

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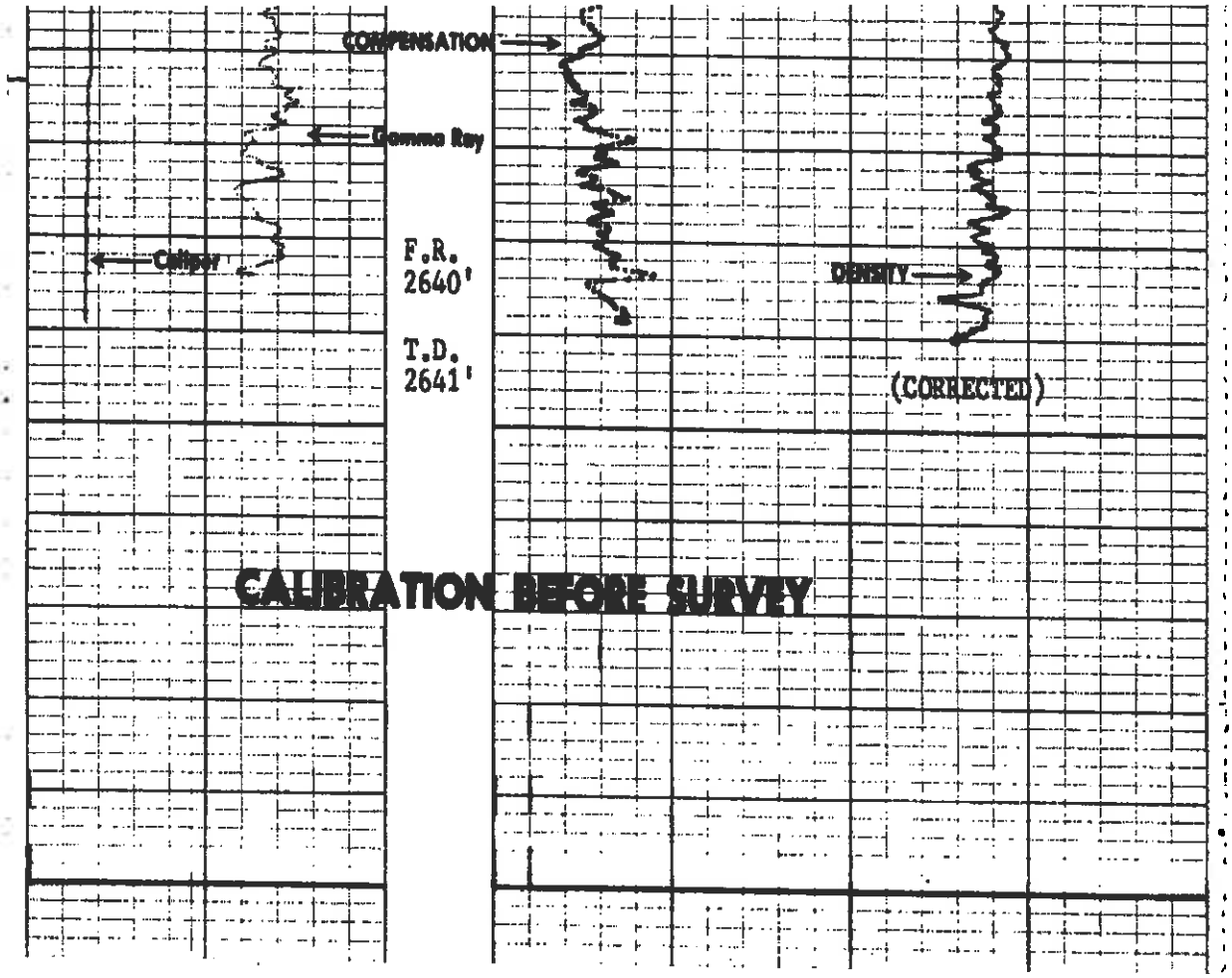

GAMMA RAY API UNITS	DEPTHS	BULK DENSITY GRAMS/CC
0 — 250		2.0 — 2.5 — 3.0
CALIPER		
HOLE SIZE - INCHES 6 — 16		CORRECTION 0 — +.25

COMPANY ALLEGHENY LAND & MINERAL COMPANY

WELL CONSOLIDATED GAS SUPPLY CORP. #A-1141

FIELD FREEMANS CREEK DIST. STATE WV

SEC. _____ COUNTY LEWIS

Log FR 2640'
Log TD 2641'
DRLR TD 2631'
Elev.
DF 1207'
KB 1208'
GL 1198'

Received
Office of Oil & Gas
OCT 20 2016

Weatherford

4704103175gdtc

UNDERGROUND INJECTION CONTROL (UIC)
PERMIT APPLICATION

SECTION 9

UIC #: 2D0413175
FACILITY NAME: Law SWS SWD 1
OPERATOR: Lewis Camden, LLC

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Section 9 – Operating Requirements / Data:

- Average daily rate or volume of fluid to be injected: 450 BBL
- Maximum daily rate or volume of fluid to be injected: 575 BBL
- Average injection pressure: 100 psi
- Maximum Injection pressure: 1200 psi (permitted)

2. See attached Appendix G.

3. Results analysis of injection fluid:
   - Total TPH = 18
   - pH = 5.7
   - Total Chloride = 164,000
   - Total Dissolved Solids = 264,000
   - Total Suspended Solids = 15.2
   - See attached sample results.

4. See number 3.

5. Annulus fluid consists of natural gas for domestic use. There are no chemicals being used in the annulus between the tubing and the casing, and the annulus has a pressure on average of 50 psi.

6. Two scenarios could potentially allow fluids to migrate to a USDW: 1) A failure within the wellbore itself and 2) a failure of surface equipment. In order for fluids to migrate to any USDW from a wellbore failure, three different casing/tubing systems would all have to fail at the same time: 1) A hole could develop in the tubing which would allow fluids to migrate into the space between the tubing and the production casing or 2) the packer on the tubing could lose its sealing ability which could allow fluids to migrate into the space between the tubing and the production casing, and 3) only if 1 or 2 happens then the production casing would be breached only if a hole develops in the producing casing above the top of the cement behind the production casing, and 4) Only if 1 or 2 and 3 occur then the fresh water casing would have to be breached as a result of a hole in that casing in order for fluids to migrate from the injection well to USDW.

   Contingency plan in case of a wellbore failure:

   The pressure between the tubing and the production casing is continuously monitored, so any failure of the tubing or the packer should be promptly identified. If a tubing or packer failure occurs: 1) injection would immediately cease, 2) the tubing and packer would be pulled utilizing a stripper head that confines wellbore fluids to the wellbore, 3) the faulty packer or damaged tubing would be identified and replaced, and 4) the repaired tubing/packer assembly would be run back into the well and set utilizing the stripping head..

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Contingency plan in case of a production casing failure:

The pressure between the tubing and the production casing is continuously monitored, so any failure of the production casing should be promptly identified. If a hole is detected in the production casing: 1) injection would immediately cease, 2) the tubing and packer would be pulled utilizing a stripper head that confines wellbore fluids to the wellbore, 3) a pipe integrity log would be secured to identify the location of the leak, 4) a retrievable bridge plug would be set in the casing which would block any fluids from migrating up the wellbore from the injection zone, 5) the production casing hole would be repaired using whichever method is suitable for the size and type of the hole, 6) the production casing would be pressure tested to ensure that the production casing is not leaking, 7) the bridge plug would be removed, and 8) the tubing/packer assembly would be run back into the well and set utilizing the stripping head.

Contingency plan in case of a surface equipment leak:

The facility is visited daily by operations personnel, so any failure of surface equipment would be promptly identified. If a leak is detected in any surface equipment: 1) injection would immediately cease, 2) the tubing valve would be immediately shut to prevent injected fluids from returning to surface through the tubing, 3) if the leak occurred outside of the secondary containment, berms, ditches, or other means of diversion would be immediately employed to prevent the spilled fluids from migrating beyond the location, 4) the location of the leak would be determined and isolated from the remainder of the surface facilities, 5) any spilled fluids would be returned to tankage on location, 6) the leaking equipment will be repaired or replaced, 7) the surface equipment will be checked for leaks, and 8) the tubing valve will be opened and injection operations resumed.

Fluid Disposal Alternative:

The fluid disposal alternative would be to have the fluids transported by third party haulers to commercial disposal facilities servicing oil and gas operators in West Virginia.

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APPENDIX G

Wells Serviced by Injection Wells

API	OPERATOR	PRODUCING FORMATION
47-007-00269	JACKSON FUEL CORP	INJUN
47-007-00284	JACKSON FUEL CORP	INJUN
47-007-00285	JACKSON FUEL CORP	INJUN
47-007-00315	JACKSON FUEL CORP	INJUN
47-007-00322	JACKSON FUEL CORP	INJUN
47-007-00697	JACKSON FUEL CORP	INJUN / SQUAW
47-007-00991	JACKSON FUEL CORP	INJUN
47-017-00227	JACKSON FUEL CORP	INJUN
47-017-00228	JACKSON FUEL CORP	BENSON
47-017-00281	JACKSON FUEL CORP	BENSON
47-017-00663	JACKSON FUEL CORP	BENSON
47-017-00844	JACKSON FUEL CORP	INJUN
47-017-00876	JACKSON FUEL CORP	INJUN
47-017-00971	JACKSON FUEL CORP	BENSON
47-017-01077	JACKSON FUEL CORP	INJUN
47-017-01223	JACKSON FUEL CORP	INJUN
47-017-01520	JACKSON FUEL CORP	INJUN
47-017-01523	JACKSON FUEL CORP	INJUN
47-017-01542	JACKSON FUEL CORP	INJUN
47-017-01555	JACKSON FUEL CORP	INJUN
47-017-01556	JACKSON FUEL CORP	INJUN
47-017-01588	JACKSON FUEL CORP	INJUN
47-017-01788	JACKSON FUEL CORP	BEREA
47-017-04487	JACKSON FUEL CORP	BENSON
47-017-05097	JACKSON FUEL CORP	RILEY
47-021-02077	JACKSON FUEL CORP	INJUN
47-021-02096	JACKSON FUEL CORP	INJUN
47-021-02223	JACKSON FUEL CORP	INJUN
47-033-00898	JACKSON FUEL CORP	INJUN
47-033-01133	JACKSON FUEL CORP	BALLTOWN
47-033-01134	JACKSON FUEL CORP	BALLTOWN
47-033-01135	JACKSON FUEL CORP	BALLTOWN
47-033-01138	JACKSON FUEL CORP	BALLTOWN
47-033-01931	JACKSON FUEL CORP	FIFTH, SPEECHLEY
47-033-01932	JACKSON FUEL CORP	BALLTOWN
47-033-01934	JACKSON FUEL CORP	BALLTOWN
47-033-01944	JACKSON FUEL CORP	BALLTOWN
47-033-01967	JACKSON FUEL CORP	BALLTOWN
47-033-02155	JACKSON FUEL CORP	BALLTOWN
47-033-02156	JACKSON FUEL CORP	BALLTOWN
47-033-02377	JACKSON FUEL CORP	BALLTOWN
47-033-02394	JACKSON FUEL CORP	BALLTOWN
47-033-02569	JACKSON FUEL CORP	SPEECHLEY
47-033-02624	JACKSON FUEL CORP	BALLTOWN
47-033-02650	JACKSON FUEL CORP	BALLTOWN
47-033-02810	JACKSON FUEL CORP	BALLTOWN
47-033-02852	JACKSON FUEL CORP	BENSON
47-033-02931	JACKSON FUEL CORP	BALLTOWN
47-033-02932	JACKSON FUEL CORP	BALLTOWN
47-033-03075	JACKSON FUEL CORP	BALLTOWN
47-033-03345	JACKSON FUEL CORP	BALLTOWN
47-041-00301	JACKSON FUEL CORP	BENSON
47-041-00307	JACKSON FUEL CORP	BENSON
47-041-02007	JACKSON FUEL CORP	INJUN
47-041-02041	JACKSON FUEL CORP	INJUN
47-041-02052	JACKSON FUEL CORP	INJUN
47-041-02913	JACKSON FUEL CORP	BENSON
47-017-05455	MOUNTAIN V OIL & GAS, INC.	GORDON, BENSON
47-033-00430	MOUNTAIN V OIL & GAS, INC.	BENSON
47-033-00446	MOUNTAIN V OIL & GAS, INC.	BENSON
47-033-00481	MOUNTAIN V OIL & GAS, INC.	BENSON
47-033-04607	MOUNTAIN V OIL & GAS, INC.	RILEY
47-033-04898	MOUNTAIN V OIL & GAS, INC.	ALEXANDER
47-033-04899	MOUNTAIN V OIL & GAS, INC.	BENSON

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APPENDIX G

Wells Serviced by Injection Wells

API	OPERATOR	PRODUCING FORMATION
47-033-04900	MOUNTAIN V OIL & GAS, INC.	GORDON, BENSON
47-033-04901	MOUNTAIN V OIL & GAS, INC.	ALEXANDER
47-033-04902	MOUNTAIN V OIL & GAS, INC.	BENSON
47-033-05092	MOUNTAIN V OIL & GAS, INC.	FOURTH
47-033-05093	MOUNTAIN V OIL & GAS, INC.	FOURTH
47-033-05094	MOUNTAIN V OIL & GAS, INC.	BENSON
47-033-05095	MOUNTAIN V OIL & GAS, INC.	GORDON
47-033-05096	MOUNTAIN V OIL & GAS, INC.	FOURTH
47-033-05145	MOUNTAIN V OIL & GAS, INC.	RILEY
47-041-04053	MOUNTAIN V OIL & GAS, INC.	GORDON
47-041-04054	MOUNTAIN V OIL & GAS, INC.	GORDON
47-041-04130	MOUNTAIN V OIL & GAS, INC.	BENSON
47-041-04449	MOUNTAIN V OIL & GAS, INC.	BENSON
47-041-04976	MOUNTAIN V OIL & GAS, INC.	ALEXANDER
47-041-05045	MOUNTAIN V OIL & GAS, INC.	BENSON
47-041-05046	MOUNTAIN V OIL & GAS, INC.	BENSON
47-041-05047	MOUNTAIN V OIL & GAS, INC.	BENSON
47-041-05048	MOUNTAIN V OIL & GAS, INC.	BENSON
47-041-05057	MOUNTAIN V OIL & GAS, INC.	ALEXANDER
47-041-05058	MOUNTAIN V OIL & GAS, INC.	BENSON
47-041-05059	MOUNTAIN V OIL & GAS, INC.	RILEY
47-041-05060	MOUNTAIN V OIL & GAS, INC.	ALEXANDER
47-041-05343	MOUNTAIN V OIL & GAS, INC.	RILEY, BENSON
47-041-05375	MOUNTAIN V OIL & GAS, INC.	BALLTOWN
47-041-05421	MOUNTAIN V OIL & GAS, INC.	BENSON
47-041-05427	MOUNTAIN V OIL & GAS, INC.	MARCELLUS
47-017-00239	MOUNTAIN V, LLC	LIME, BIG LIME
47-017-00284	MOUNTAIN V, LLC	INJUN
47-017-00502	MOUNTAIN V, LLC	INJUN
47-017-00538	MOUNTAIN V, LLC	INJUN
47-017-00547	MOUNTAIN V, LLC	INJUN
47-017-00638	MOUNTAIN V, LLC	INJUN
47-017-00741	MOUNTAIN V, LLC	INJUN
47-017-00772	MOUNTAIN V, LLC	INJUN
47-017-00921	MOUNTAIN V, LLC	INJUN
47-017-00938	MOUNTAIN V, LLC	INJUN
47-017-00945	MOUNTAIN V, LLC	KEENER,INJUN
47-017-01025	MOUNTAIN V, LLC	INJUN
47-017-01039	MOUNTAIN V, LLC	INJUN
47-017-01136	MOUNTAIN V, LLC	POCONO,INJUN,KEENER
47-017-01294	MOUNTAIN V, LLC	POCONO,INJUN
47-017-01353	MOUNTAIN V, LLC	INJUN
47-017-01354	MOUNTAIN V, LLC	INJUN
47-017-01609	MOUNTAIN V, LLC	INJUN
47-017-01610	MOUNTAIN V, LLC	INJUN
47-017-01612	MOUNTAIN V, LLC	INJUN
47-017-01641	MOUNTAIN V, LLC	INJUN
47-017-01642	MOUNTAIN V, LLC	INJUN
47-017-01802	MOUNTAIN V, LLC	INJUN,WEIR
47-017-01805	MOUNTAIN V, LLC	INJUN
47-017-01822	MOUNTAIN V, LLC	INJUN
47-017-01840	MOUNTAIN V, LLC	INJUN,WEIR
47-017-01841	MOUNTAIN V, LLC	INJUN,WEIR
47-017-01861	MOUNTAIN V, LLC	INJUN,WEIR
47-017-02338	MOUNTAIN V, LLC	INJUN,WEIR
47-017-02352	MOUNTAIN V, LLC	INJUN,WEIR
47-017-02793	MOUNTAIN V, LLC	ALEXANDER,BENSON
47-017-02953	MOUNTAIN V, LLC	BENSON,ALEXANDER
47-017-03005	MOUNTAIN V, LLC	FOURTH,BEREA, GRIT BEREA,INJUN
47-017-03034	MOUNTAIN V, LLC	INJUN,POCONO,FOURTH
47-017-03051	MOUNTAIN V, LLC	ALEXANDER
47-017-03084	MOUNTAIN V, LLC	INJUN,POCONO,WEIR
47-017-03135	MOUNTAIN V, LLC	BENSON,BALLTOWN
47-017-03140	MOUNTAIN V, LLC	ALEXANDER,BENSON

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APPENDIX G

Wells Serviced by Injection Wells

API	OPERATOR	PRODUCING FORMATION
47-017-03146	MOUNTAIN V, LLC	ALEXANDER,BALLTOWN,WEIR,SPEECHLEY
47-017-03245	MOUNTAIN V, LLC	RILEY,BENSON,ALEXANDER
47-017-03262	MOUNTAIN V, LLC	WARREN,RILEY,BENSON
47-017-03269	MOUNTAIN V, LLC	BENSON,RILEY,WARREN
47-017-03278	MOUNTAIN V, LLC	WARREN,RILEY,BENSON
47-017-03281	MOUNTAIN V, LLC	ALEXANDER,BENSON,WARREN
47-017-03283	MOUNTAIN V, LLC	ALEXANDER,BENSON,BALLTOWN,WARREN
47-017-03335	MOUNTAIN V, LLC	LEOPOLD,BENSON,WARREN
47-017-03350	MOUNTAIN V, LLC	BENSON,BALLTOWN,SPEECHLEY,WARREN
47-017-03512	MOUNTAIN V, LLC	POCONO,GORDON, JORDON,RILEY,BENSON
47-017-03513	MOUNTAIN V, LLC	RILEY,BENSON
47-017-03515	MOUNTAIN V, LLC	ALEXANDER,BENSON
47-017-04048	MOUNTAIN V, LLC	ALEXANDER,BENSON
47-017-04049	MOUNTAIN V, LLC	BENSON,ALEXANDER
47-033-00250	MOUNTAIN V, LLC	SPEECHLEY
47-033-00256	MOUNTAIN V, LLC	INJUN,SPEECHLEY,BALLTOWN
47-033-00370	MOUNTAIN V, LLC	FIFTH,INJUN
47-033-00456	MOUNTAIN V, LLC	SPEECHLEY
47-033-00908	MOUNTAIN V, LLC	BENSON
47-033-00909	MOUNTAIN V, LLC	BENSON
47-033-00910	MOUNTAIN V, LLC	BRADFORD,BENSON
47-033-00911	MOUNTAIN V, LLC	BENSON
47-033-00912	MOUNTAIN V, LLC	BENSON
47-033-00914	MOUNTAIN V, LLC	BENSON
47-033-00916	MOUNTAIN V, LLC	BALLTOWN,FIFTH
47-033-00928	MOUNTAIN V, LLC	FIFTH
47-033-00972	MOUNTAIN V, LLC	BENSON,BALLTOWN,SPEECHLEY
47-033-00975	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN
47-033-00982	MOUNTAIN V, LLC	BENSON,RILEY,BALLTOWN
47-033-00983	MOUNTAIN V, LLC	BENSON
47-033-00996	MOUNTAIN V, LLC	BENSON
47-033-01014	MOUNTAIN V, LLC	BALLTOWN
47-033-01018	MOUNTAIN V, LLC	FIFTH,FOURTH
47-033-01026	MOUNTAIN V, LLC	BALLTOWN,BRADFORD,BENSON
47-033-01049	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN
47-033-01052	MOUNTAIN V, LLC	BALLTOWN
47-033-01053	MOUNTAIN V, LLC	THIRTY FOOT,BALLTOWN,FIFTY FOOT,SPEECHLEY,BIG INJUN
47-033-01058	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN,RILEY
47-033-01071	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN
47-033-01072	MOUNTAIN V, LLC	BALLTOWN
47-033-01105	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY
47-033-01106	MOUNTAIN V, LLC	BALLTOWN
47-033-01148	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN,BENSON
47-033-01152	MOUNTAIN V, LLC	RILEY
47-033-01158	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN
47-033-01169	MOUNTAIN V, LLC	INJUN,RILEY,BENSON
47-033-01176	MOUNTAIN V, LLC	RILEY
47-033-01181	MOUNTAIN V, LLC	BALLTOWN
47-033-01182	MOUNTAIN V, LLC	BALLTOWN,BENSON
47-033-01207	MOUNTAIN V, LLC	BALLTOWN
47-033-01208	MOUNTAIN V, LLC	BALLTOWN,BENSON
47-033-01209	MOUNTAIN V, LLC	BALLTOWN,BRADFORD,BENSON
47-033-01224	MOUNTAIN V, LLC	BALLTOWN
47-033-01225	MOUNTAIN V, LLC	BALLTOWN,BENSON
47-033-01227	MOUNTAIN V, LLC	BALLTOWN,BENSON
47-033-01248	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN,BENSON
47-033-01252	MOUNTAIN V, LLC	INJUN
47-033-01253	MOUNTAIN V, LLC	BALLTOWN
47-033-01259	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN,BENSON
47-033-01260	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN,BRADFORD
47-033-01709	MOUNTAIN V, LLC	BALLTOWN
47-033-01914	MOUNTAIN V, LLC	FIFTH
47-033-01933	MOUNTAIN V, LLC	BALLTOWN
47-033-01943	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN

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API	OPERATOR	PRODUCING FORMATION
47-033-01945	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN
47-033-01964	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN
47-033-01992	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN
47-033-01994	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN,BENSON
47-033-02017	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN
47-033-02050	MOUNTAIN V, LLC	SPEECHLEY,BENSON,BALLTOWN
47-033-02058	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN,BENSON
47-033-02069	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN
47-033-02073	MOUNTAIN V, LLC	BALLTOWN
47-033-02082	MOUNTAIN V, LLC	BALLTOWN
47-033-02085	MOUNTAIN V, LLC	BALLTOWN,BENSON
47-033-02091	MOUNTAIN V, LLC	BENSON
47-033-02172	MOUNTAIN V, LLC	BALLTOWN
47-033-02207	MOUNTAIN V, LLC	BALLTOWN
47-033-02543	MOUNTAIN V, LLC	BALLTOWN
47-033-02556	MOUNTAIN V, LLC	INJUN,BAYARD,FOURTH,SPEECHLEY
47-033-02557	MOUNTAIN V, LLC	INJUN
47-041-00378	MOUNTAIN V, LLC	INJUN
47-041-00379	MOUNTAIN V, LLC	BENSON
47-041-00388	MOUNTAIN V, LLC	INJUN
47-041-00417	MOUNTAIN V, LLC	FIFTH
47-041-00418	MOUNTAIN V, LLC	INJUN
47-041-00422	MOUNTAIN V, LLC	BENSON
47-041-00513	MOUNTAIN V, LLC	INJUN
47-041-00514	MOUNTAIN V, LLC	INJUN
47-041-00539	MOUNTAIN V, LLC	BENSON
47-041-00545	MOUNTAIN V, LLC	INJUN,POCONO
47-041-00546	MOUNTAIN V, LLC	INJUN
47-041-00576	MOUNTAIN V, LLC	INJUN
47-041-00578	MOUNTAIN V, LLC	INJUN
47-041-00619	MOUNTAIN V, LLC	FIFTH,BAYARD,INJUN
47-041-00667	MOUNTAIN V, LLC	INJUN
47-041-00689	MOUNTAIN V, LLC	INJUN
47-041-00724	MOUNTAIN V, LLC	INJUN
47-041-00751	MOUNTAIN V, LLC	INJUN
47-041-00793	MOUNTAIN V, LLC	FIFTH
47-041-00882	MOUNTAIN V, LLC	GORDON, JORDON,INJUN
47-041-00949	MOUNTAIN V, LLC	INJUN
47-041-01088	MOUNTAIN V, LLC	INJUN
47-041-01158	MOUNTAIN V, LLC	INJUN
47-041-01261	MOUNTAIN V, LLC	INJUN
47-041-01307	MOUNTAIN V, LLC	INJUN
47-041-01382	MOUNTAIN V, LLC	BENSON
47-041-01500	MOUNTAIN V, LLC	BENSON
47-041-01507	MOUNTAIN V, LLC	BENSON
47-041-01510	MOUNTAIN V, LLC	BENSON
47-041-01529	MOUNTAIN V, LLC	BALLTOWN,BENSON,GANTZ,BIG INJUN
47-041-01531	MOUNTAIN V, LLC	BALLTOWN,BENSON
47-041-01533	MOUNTAIN V, LLC	GORDON,FIFTH,FIFTH
47-041-01540	MOUNTAIN V, LLC	BENSON
47-041-01541	MOUNTAIN V, LLC	BENSON
47-041-01626	MOUNTAIN V, LLC	INJUN
47-041-01633	MOUNTAIN V, LLC	INJUN
47-041-01643	MOUNTAIN V, LLC	BENSON
47-041-01679	MOUNTAIN V, LLC	INJUN
47-041-01710	MOUNTAIN V, LLC	INJUN
47-041-01864	MOUNTAIN V, LLC	ORISKANY,CHERT, HUNTERSVILLE CHERT
47-041-01866	MOUNTAIN V, LLC	CHERT, HUNTERSVILLE CHERT
47-041-01871	MOUNTAIN V, LLC	ORISKANY,CHERT, HUNTERSVILLE CHERT
47-041-01889	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN
47-041-01947	MOUNTAIN V, LLC	BENSON
47-041-01978	MOUNTAIN V, LLC	INJUN
47-041-01979	MOUNTAIN V, LLC	INJUN
47-041-01980	MOUNTAIN V, LLC	BENSON

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API	OPERATOR	PRODUCING FORMATION
47-041-01981	MOUNTAIN V, LLC	BENSON
47-041-01982	MOUNTAIN V, LLC	INJUN
47-041-01997	MOUNTAIN V, LLC	INJUN
47-041-01998	MOUNTAIN V, LLC	INJUN
47-041-01999	MOUNTAIN V, LLC	FIFTH,INJUN
47-041-02075	MOUNTAIN V, LLC	BENSON,BALLTOWN,SPEECHLEY
47-041-02101	MOUNTAIN V, LLC	BAYARD,FIFTH
47-041-02120	MOUNTAIN V, LLC	BENSON
47-041-02490	MOUNTAIN V, LLC	BALLTOWN,BENSON
47-041-02521	MOUNTAIN V, LLC	BALLTOWN,BENSON
47-041-02540	MOUNTAIN V, LLC	BALLTOWN,BENSON
47-041-02548	MOUNTAIN V, LLC	BALLTOWN,BENSON
47-041-02554	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN
47-041-02559	MOUNTAIN V, LLC	FIFTY FOOT,THIRTY FOOT,FOURTH,BAYARD
47-041-02560	MOUNTAIN V, LLC	INJUN,FOURTH
47-041-02685	MOUNTAIN V, LLC	BALLTOWN,BENSON
47-041-02688	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN
47-041-02911	MOUNTAIN V, LLC	INJUN
47-041-02936	MOUNTAIN V, LLC	BALLTOWN,BENSON
47-041-02946	MOUNTAIN V, LLC	BALLTOWN,BENSON
47-041-03012	MOUNTAIN V, LLC	FIFTH,SPEECHLEY,BALLTOWN
47-041-03014	MOUNTAIN V, LLC	BALLTOWN,BENSON
47-041-03025	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,BENSON
47-041-03028	MOUNTAIN V, LLC	BALLTOWN,BAYARD,GORDON, JORDON
47-041-03064	MOUNTAIN V, LLC	BENSON,BALLTOWN
47-041-03074	MOUNTAIN V, LLC	BAYARD,GORDON, JORDON,WEIR
47-041-03095	MOUNTAIN V, LLC	BENSON,BALLTOWN
47-041-03097	MOUNTAIN V, LLC	BAYARD,WEIR,POCONO
47-041-03116	MOUNTAIN V, LLC	POCONO,GORDON, JORDON,GORDON
47-041-03135	MOUNTAIN V, LLC	BENSON,RILEY,BALLTOWN
47-041-03137	MOUNTAIN V, LLC	BAYARD,GORDON, JORDON,POCONO,INJUN
47-041-03139	MOUNTAIN V, LLC	GANTZ,BALLTOWN
47-041-03144	MOUNTAIN V, LLC	BAYARD,GORDON, JORDON,WEIR
47-041-03145	MOUNTAIN V, LLC	BENSON,BAYARD,FIFTH,GORDON, JORDON,WEIR
47-041-03147	MOUNTAIN V, LLC	GORDON STRAY,BALLTOWN,GORDON,SPEECHLEY
47-041-03160	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,BAYARD,BRADFORD
47-041-03163	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,BAYARD
47-041-03164	MOUNTAIN V, LLC	BEREA, GRIT BEREA,GORDON, JORDON,BAYARD
47-041-03165	MOUNTAIN V, LLC	BAYARD,GORDON, JORDON,WEIR
47-041-03167	MOUNTAIN V, LLC	GORDON, JORDON,FIFTH,BAYARD,GORDON, JORDON
47-041-03168	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,GORDON, JORDON
47-041-03170	MOUNTAIN V, LLC	ALEXANDER,RILEY,BAYARD,GORDON, JORDON
47-041-03171	MOUNTAIN V, LLC	BAYARD,GORDON, JORDON,POCONO
47-041-03174	MOUNTAIN V, LLC	ALEXANDER,BENSON,BAYARD,SPEECHLEY
47-041-03177	MOUNTAIN V, LLC	BENSON,BALLTOWN,BAYARD
47-041-03178	MOUNTAIN V, LLC	BAYARD,SPEECHLEY,BALLTOWN
47-041-03191	MOUNTAIN V, LLC	BAYARD,FIFTH,WEIR,POCONO
47-041-03207	MOUNTAIN V, LLC	BAYARD,POCONO,WEIR
47-041-03210	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,SPEECHLEY,BAYARD
47-041-03211	MOUNTAIN V, LLC	GORDON,BAYARD,BALLTOWN,SPEECHLEY
47-041-03217	MOUNTAIN V, LLC	BAYARD,WEIR,POCONO
47-041-03218	MOUNTAIN V, LLC	BALLTOWN,BAYARD,SPEECHLEY
47-041-03228	MOUNTAIN V, LLC	BAYARD,SPEECHLEY,BALLTOWN
47-041-03240	MOUNTAIN V, LLC	BENSON,RILEY,ALEXANDER
47-041-03241	MOUNTAIN V, LLC	BENSON,BALLTOWN,SPEECHLEY
47-041-03245	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,BAYARD
47-041-03246	MOUNTAIN V, LLC	BAYARD,WEIR,POCONO
47-041-03249	MOUNTAIN V, LLC	BENSON,BALLTOWN,SPEECHLEY,THIRTY FOOT,FIFTY FOOT
47-041-03264	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY
47-041-03265	MOUNTAIN V, LLC	FIFTH,BALLTOWN,GORDON,SPEECHLEY,GORDON STRAY,WARREN,BALLTOWN,SPEECHLEY,WARREN
47-041-03267	MOUNTAIN V, LLC	BENSON,RILEY,BAYARD,BALLTOWN,WEIR
47-041-03272	MOUNTAIN V, LLC	BENSON,RILEY,BALLTOWN
47-041-03273	MOUNTAIN V, LLC	BAYARD,SPEECHLEY,BALLTOWN

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APPENDIX G

Wells Serviced by Injection Wells

API	OPERATOR	PRODUCING FORMATION
47-041-03298	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,BAYARD
47-041-03311	MOUNTAIN V, LLC	BENSON,BAYARD,WEIR,FIFTH
47-041-03312	MOUNTAIN V, LLC	BENSON,BALLTOWN,SPEECHLEY,BAYARD
47-041-03332	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,BAYARD,GORDON, JORDON,WEIR
47-041-03342	MOUNTAIN V, LLC	ALEXANDER,BALLTOWN,SPEECHLEY
47-041-03348	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,BAYARD
47-041-03365	MOUNTAIN V, LLC	BAYARD,WEIR,POCONO
47-041-03367	MOUNTAIN V, LLC	SPEECHLEY,BAYARD,ALEXANDER,BENSON,BALLTOWN
47-041-03368	MOUNTAIN V, LLC	ALEXANDER,BENSON,BAYARD,WARREN,SPEECHLEY
47-041-03369	MOUNTAIN V, LLC	GORDON,BAYARD,FIFTH,WARREN,BAYARD,SPEECHLEY, WARREN,BALLTOWN,SPEECHLEY,BALLTOWN
47-041-03370	MOUNTAIN V, LLC	BIG INJUN,BALLTOWN,GORDON,SPEECHLEY, BALLTOWN,WARREN,SPEECHLEY,BAYARD,WARREN,BAYARD
47-041-03371	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,WARREN,BAYARD,BEREA, GRIT BEREA
47-041-03376	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,WARREN,BAYARD
47-041-03392	MOUNTAIN V, LLC	ELK,ALEXANDER,BENSON,BALLTOWN,SPEECHLEY
47-041-03393	MOUNTAIN V, LLC	BAYARD,SPEECHLEY,RILEY,BENSON
47-041-03397	MOUNTAIN V, LLC	BIG INJUN,GORDON,BALLTOWN,SPEECHLEY,BAYARD
47-041-03398	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,BAYARD
47-041-03399	MOUNTAIN V, LLC	BAYARD,WARREN,SPEECHLEY,BALLTOWN
47-041-03403	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,WARREN
47-041-03404	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,BAYARD
47-041-03406	MOUNTAIN V, LLC	BENSON,BALLTOWN,SPEECHLEY,BAYARD
47-041-03407	MOUNTAIN V, LLC	GORDON,BALLTOWN,SPEECHLEY,WARREN,BAYARD
47-041-03408	MOUNTAIN V, LLC	BENSON,RILEY,BALLTOWN,SPEECHLEY,BAYARD
47-041-03411	MOUNTAIN V, LLC	ALEXANDER,BENSON,BALLTOWN,SPEECHLEY,WARREN
47-041-03412	MOUNTAIN V, LLC	BAYARD,SPEECHLEY,BALLTOWN,ALEXANDER
47-041-03414	MOUNTAIN V, LLC	BAYARD,WARREN,SPEECHLEY,BALLTOWN
47-041-03417	MOUNTAIN V, LLC	GORDON,BALLTOWN,FIFTH,SPEECHLEY,BALLTOWN,BAYARD, SPEECHLEY,BAYARD
47-041-03418	MOUNTAIN V, LLC	BAYARD,ALEXANDER,FIFTH,BENSON,GORDON,BALLTOWN, SPEECHLEY
47-041-03419	MOUNTAIN V, LLC	BENSON,RILEY,BALLTOWN
47-041-03420	MOUNTAIN V, LLC	BENSON,SPEECHLEY,WARREN,BAYARD
47-041-03423	MOUNTAIN V, LLC	ALEXANDER,BENSON,BALLTOWN,SPEECHLEY,BAYARD
47-041-03424	MOUNTAIN V, LLC	BENSON,BALLTOWN,ALEXANDER,SPEECHLEY
47-041-03428	MOUNTAIN V, LLC	BENSON,BALLTOWN,SPEECHLEY
47-041-03429	MOUNTAIN V, LLC	RILEY,BALLTOWN,WARREN,SPEECHLEY,BAYARD
47-041-03431	MOUNTAIN V, LLC	ALEXANDER,BENSON,RILEY,BALLTOWN,SPEECHLEY
47-041-03433	MOUNTAIN V, LLC	BENSON,BALLTOWN,SPEECHLEY,WARREN
47-041-03434	MOUNTAIN V, LLC	BENSON,BALLTOWN,SPEECHLEY
47-041-03440	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,WARREN,BAYARD
47-041-03442	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,WARREN
47-041-03444	MOUNTAIN V, LLC	ALEXANDER,BALLTOWN,SPEECHLEY,WARREN,BAYARD
47-041-03446	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,WARREN,BAYARD
47-041-03449	MOUNTAIN V, LLC	ALEXANDER,BENSON,BALLTOWN,SPEECHLEY,WARREN
47-041-03454	MOUNTAIN V, LLC	BENSON,BALLTOWN,SPEECHLEY,BAYARD
47-041-03455	MOUNTAIN V, LLC	FIFTH,ALEXANDER,BALLTOWN,SPEECHLEY,BAYARD
47-041-03456	MOUNTAIN V, LLC	ALEXANDER,BENSON,BALLTOWN,SPEECHLEY,WARREN
47-041-03457	MOUNTAIN V, LLC	POCONO,WEIR,INJUN
47-041-03479	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,WARREN,BAYARD
47-041-03480	MOUNTAIN V, LLC	FIFTH,BAYARD,BALLTOWN,SPEECHLEY,WARREN
47-041-03481	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,WARREN,POCONO,WEIR
47-041-03482	MOUNTAIN V, LLC	BALLTOWN,WARREN,BAYARD,POCONO,WEIR
47-041-03493	MOUNTAIN V, LLC	ALEXANDER,BENSON,BALLTOWN
47-041-03523	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,SPEECHLEY,BAYARD,FIFTH
47-041-03528	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,SPEECHLEY,WARREN,BAYARD
47-041-03529	MOUNTAIN V, LLC	GORDON
47-041-03532	MOUNTAIN V, LLC	SPEECHLEY,WARREN,BAYARD
47-041-03543	MOUNTAIN V, LLC	ALEXANDER,BALLTOWN,SPEECHLEY,WARREN,BAYARD
47-041-03546	MOUNTAIN V, LLC	BENSON,BALLTOWN,SPEECHLEY,WARREN,BAYARD
47-041-03564	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,BAYARD
47-041-03570	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,WARREN,BAYARD,GORDON, JORDON,BENSON,SPEECHLEY

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APPENDIX G

Wells Serviced by Injection Wells

API	OPERATOR	PRODUCING FORMATION
47-041-03571	MOUNTAIN V, LLC	GORDON, JORDON,FIFTH,BAYARD,LEOPOLD,BENSON
47-041-03663	MOUNTAIN V, LLC	BALLTOWN,SPEECHLEY,WARREN,BAYARD
47-041-03907	MOUNTAIN V, LLC	BAYARD,FIFTH,GORDON, JORDON,GORDON, JORDON,POCONO
47-041-03942	MOUNTAIN V, LLC	SPEECHLEY,BENSON
47-041-03986	MOUNTAIN V, LLC	BAYRD
47-041-04177	MOUNTAIN V, LLC	GANTZ,FIFTY FOOT,FOURTH,FIFTH,ELIZABETH
47-041-04184	MOUNTAIN V, LLC	WEIR,GORDON, JORDON,FIFTH,BAYARD
47-041-04192	MOUNTAIN V, LLC	BAYARD,FIFTY FOOT
47-041-04228	MOUNTAIN V, LLC	GANTZ,FIFTY FOOT,GORDON, JORDON
47-041-04239	MOUNTAIN V, LLC	WEIR,FIFTH,BAYARD
47-041-04242	MOUNTAIN V, LLC	COMINGLED
47-041-04245	MOUNTAIN V, LLC	WEIR,GORDON, JORDON,FIFTH,BAYARD
47-049-00327	MOUNTAIN V, LLC	INJUN,FIFTH,BALLTOWN,POCONO
47-049-00638	MOUNTAIN V, LLC	FIFTH,BALLTOWN
47-085-01866	MOUNTAIN V, LLC	INJUN
47-085-01945	MOUNTAIN V, LLC	INJUN
47-085-01989	MOUNTAIN V, LLC	INJUN
47-085-02011	MOUNTAIN V, LLC	INJUN
47-085-02036	MOUNTAIN V, LLC	INJUN
47-085-02052	MOUNTAIN V, LLC	INJUN
47-085-02053	MOUNTAIN V, LLC	INJUN
47-085-02194	MOUNTAIN V, LLC	BEREA, GRIT BEREA, WEIR
47-085-03023	MOUNTAIN V, LLC	INJUN
47-085-03056	MOUNTAIN V, LLC	INJUN
47-085-03060	MOUNTAIN V, LLC	INJUN
47-085-03089	MOUNTAIN V, LLC	INJUN
47-085-03254	MOUNTAIN V, LLC	INJUN
47-085-03438	MOUNTAIN V, LLC	INJUN
47-085-03667	MOUNTAIN V, LLC	INJUN
47-085-05553	MOUNTAIN V, LLC	ALEXANDER,RILEY,BALLTOWN
47-085-05796	MOUNTAIN V, LLC	ALEXANDER,SPEECHLEY
47-085-05818	MOUNTAIN V, LLC	MAXON,ALEXANDER,POCONO,SPEECHLEY,BIG INJUN
47-085-05903	MOUNTAIN V, LLC	MAXON,BENSON,BIG LIME,RILEY,BIG INJUN,BALLTOWN,SPEECHLEY
47-085-06221	MOUNTAIN V, LLC	SHALE
47-085-06222	MOUNTAIN V, LLC	SPEECHLEY,RILEY,SHALE
47-085-06226	MOUNTAIN V, LLC	RILEY,SHALE
47-085-06227	MOUNTAIN V, LLC	SPEECHLEY,SHALE
47-085-06325	MOUNTAIN V, LLC	ELK,BENSON,ALEXANDER,RILEY,SPEECHLEY
47-085-06326	MOUNTAIN V, LLC	SHALE,SPEECHLEY,ELK
47-085-06327	MOUNTAIN V, LLC	ELK,SHALE
47-085-06342	MOUNTAIN V, LLC	BENSON,ALEXANDER,SHALE
47-085-06345	MOUNTAIN V, LLC	ALEXANDER,ELK,SHALE
47-085-06522	MOUNTAIN V, LLC	SHALE,BENSON,RILEY
47-085-06685	MOUNTAIN V, LLC	ALEXANDER,RILEY,BALLTOWN,SPEECHLEY
47-085-06686	MOUNTAIN V, LLC	SPEECHLEY,BALLTOWN,RILEY,ALEXANDER
47-085-06724	MOUNTAIN V, LLC	ALEXANDER,RILEY,SPEECHLEY
47-085-06746	MOUNTAIN V, LLC	ALEXANDER,RILEY,SPEECHLEY
47-085-06752	MOUNTAIN V, LLC	RILEY,SPEECHLEY
47-085-06753	MOUNTAIN V, LLC	SHALE,ALEXANDER,RILEY,SPEECHLEY
47-085-06792	MOUNTAIN V, LLC	ALEXANDER,BENSON,RILEY,SPEECHLEY
47-085-06793	MOUNTAIN V, LLC	SPEECHLEY,RILEY,ALEXANDER
47-085-06854	MOUNTAIN V, LLC	SHALE,ELK, ALEXANDER,RILEY
47-085-06858	MOUNTAIN V, LLC	BIG INJUN,ALEXANDER,WEIR,BENSON,RILEY
47-085-06859	MOUNTAIN V, LLC	KEENER,ALEXANDER,BIG INJUN,RILEY,WEIR,BALLTOWN,SPEECHLEY
47-085-06943	MOUNTAIN V, LLC	BIG INJUN,SHALE,ELK,BALLTOWN,SPEECHLEY
47-085-07004	MOUNTAIN V, LLC	SHALE,ALEXANDER,BENSON,RILEY
47-085-07024	MOUNTAIN V, LLC	SHALE,ELK, ALEXANDER,BENSON,RILEY
47-085-07025	MOUNTAIN V, LLC	SHALE,ELK,RILEY,BALLTOWN,SPEECHLEY
47-085-07126	MOUNTAIN V, LLC	ELK,SHALE
47-085-07127	MOUNTAIN V, LLC	SHALE,ELK, ALEXANDER,BENSON,RILEY
47-085-07130	MOUNTAIN V, LLC	ALEXANDER,SHALE
47-085-07135	MOUNTAIN V, LLC	SHALE,ELK, ALEXANDER,RILEY
47-085-07180	MOUNTAIN V, LLC	RILEY,SHALE
47-085-07184	MOUNTAIN V, LLC	SPEECHLEY,RILEY,BENSON,SHALE

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APPENDIX G

Wells Serviced by Injection Wells

API	OPERATOR	PRODUCING FORMATION
47-085-07193	MOUNTAIN V, LLC	WEIR,ALEXANDER,BENSON,RILEY,BALLTOWN,SPEECHLEY
47-085-07195	MOUNTAIN V, LLC	SHALE,ALEXANDER,SPEECHLEY,LEOPOLD,RILEY
47-085-07196	MOUNTAIN V, LLC	SHALE,BENSON
47-085-07224	MOUNTAIN V, LLC	SHALE,ELK,ALEXANDER,RILEY
47-085-07237	MOUNTAIN V, LLC	ELK,SHALE
47-085-07363	MOUNTAIN V, LLC	RILEY,SHALE
47-085-07447	MOUNTAIN V, LLC	SHALE,ELK
47-085-07475	MOUNTAIN V, LLC	ALEX
47-085-07481	MOUNTAIN V, LLC	SHALE,ELIZABETH,BENSON,RILEY
47-085-07551	MOUNTAIN V, LLC	INJUN,WEIR,GORDON, JORDON,FIFTH
47-085-07584	MOUNTAIN V, LLC	WEIR,INJUN,LIME, BIG LIME
47-085-07954	MOUNTAIN V, LLC	INJUN,WEIR
47-085-08155	MOUNTAIN V, LLC	MAXON,WEIR
47-085-08159	MOUNTAIN V, LLC	INJUN,WEIR
47-085-08160	MOUNTAIN V, LLC	WEIR
47-085-08164	MOUNTAIN V, LLC	MAXON,WEIR
47-085-08168	MOUNTAIN V, LLC	MAXON,WEIR
47-085-08172	MOUNTAIN V, LLC	MAXON
47-085-08335	MOUNTAIN V, LLC	MAXON

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Analysis Report

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

January 15, 2016

Project: A-1141 Injection Well

Submittal Date: 01/05/2016
Group Number: 1621066
State of Sample Origin: WV

Client Sample Description	Lancaster Labs (LL) #
0104201660201 Grab	8194864
0104201660201 Filtered Grab	8194865

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/.

Respectfully Submitted,

Stephen J. Gordon
Project Manager

(724) 597-2027

OCT 20 2016

Sample Description: 0104201660201 Grab
Brine UIC Law Well
A-1141 Injection Well

LL Sample # WW 8194864
LL Group # 1621066
Account # 20810

Project Name: A-1141 Injection Well

Collected: 01/04/2016 11:00 by MC

Submitted: 01/05/2016 09:30
Reported: 01/15/2016 14:12

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

UICL-

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC/MS Volatiles									
SW-846 8260B, SW-846 5030B									
10335	Benzene	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	Carbon Tetrachloride	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	Chlorobenzene	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	1,2-Dichlorobenzene	N.D.		50	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	1,4-Dichlorobenzene	N.D.		50	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	1,1-Dichloroethane	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	1,2-Dichloroethane	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	1,1-Dichloroethene	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	cis-1,2-Dichloroethene	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	trans-1,2-Dichloroethene	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	1,2-Dichloropropane	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	Ethylbenzene	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	Methyl Tertiary Butyl Ether	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	Methylene Chloride	N.D.		100	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	Styrene	N.D.		50	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	**Tetrachloroethene**	**30**	J	25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	Toluene	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	1,2,4-Trichlorobenzene	N.D.		50	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	1,1,1-Trichloroethane	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	1,1,2-Trichloroethane	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	Trichloroethene	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	Vinyl Chloride	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	m+p-Xylene	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	o-Xylene	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
10335	Xylene (Total)	N.D.		25	ug/l		01/08/16 03:40	01/08/16 03:40	7494
Reporting limits were raised due to sample foaming.									
GC Volatiles									
SW-846 8015B, SW-846 5030B									
01635	**TPH-GRO water C6-C10**	**3,300**		400	ug/l		01/11/16 18:53	01/11/16 18:53	7172
The container used for this analysis was submitted with headspace.									
GC Miscellaneous									
RSKSOP-175 modified									
07105	n-butane	N.D.		1.0	ug/l			01/09/16 01:12	9051
07105	Ethane	N.D.		1.0	ug/l			01/09/16 01:12	9051
07105	**Methane**	**28**		3.0	ug/l			01/09/16 01:12	9051
07105	Propane	N.D.		1.0	ug/l			01/09/16 01:12	9051
GC Petroleum Hydrocarbons									

OCT 20 2016

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Analysis Report

Sample Description: 0104201660201 Grab
Brine UIC Law Well
A-1141 Injection Well

LL Sample # WW 8194864
LL Group # 1621066
Account # 20810

Project Name: A-1141 Injection Well

Collected: 01/04/2016 11:00 by MC

Submitted: 01/05/2016 09:30
Reported: 01/15/2016 14:12

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

UICL-

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
GC Petroleum Hydrocarbons									
SW-846 8015B, SW-846 3510C									
02740	**C10-C28**	15		0.47	mg/l		01/07/16 11:05	01/11/16 21:27	2027
02740	**C24-C40**	5.2		0.47	mg/l		01/07/16 11:05	01/11/16 21:27	2027
02740	**Total TPH (C10-C40)**	18		0.47	mg/l		01/07/16 11:05	01/11/16 21:27	2027
Metals									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	9.29	mg/l	X	01/07/16 07:19	01/14/16 11:50	3282
	Reporting limits were raised due to interference from the sample matrix.								
01750	**Calcium**	17,800		3.47	mg/l		01/07/16 07:19	01/14/16 11:50	3282
01754	**Iron**	177	.3	3.33	mg/l	X	01/07/16 07:19	01/14/16 11:50	3282
07058	**Manganese**	3.24	.05	0.120	mg/l	X	01/07/16 07:19	01/14/16 11:50	3282
01767	**Sodium**	44,600		33.4	mg/l		01/07/16 07:19	01/14/16 11:54	3282
EPA 200.8 rev 5.4									
06025	Arsenic	N.D.	.01	0.0400	mg/l	X	01/06/16 09:10	01/11/16 12:26	1281
	Reporting limits were raised due to interference from the sample matrix.								
06026	**Barium**	461	2	0.460	mg/l	X	01/06/16 09:10	01/11/16 12:54	1281
Wet Chemistry									
EPA 300.0									
00224	**Chloride**	164,000	250	10,000	mg/l	XX		01/05/16 11:57	6676
00228	Sulfate	N.D.	250	60.0	mg/l			01/05/16 15:06	6676
	Reporting limits were raised due to interference from the sample matrix.								
EPA 415.1									
00273	**Total Organic Carbon**	122		1.3	mg/l			01/07/16 23:00	495
EPA 170.1									
12151	**Temperature of pH**	22.6		0.010	Degrees C			01/12/16 16:38	1198
SM 2540 C-1997									
00212	**Total Dissolved Solids**	264,000	500	19,400	mg/l	XX		01/07/16 06:09	9246
	The recovery of the Laboratory Control Spike (LCS) is within the QC acceptance limits as noted on the QC Summary, however the LCS duplicate recovery is outside the limits. Since the method holding time has expired, the client was contacted and the data reported.								
SM 2540 D-1997									
10457	**Total Suspended Solids**	15.2		1.00	mg/l			01/06/16 08:49	9246
SM 4500-H+ B-2000									
12152	**pH**	5.7		0.010	Std. Units			01/12/16 16:38	1198

OCT 20 2016

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Analysis Report

Sample Description: 0104201660201 Grab
Brine UIC Law Well
A-1141 Injection Well

LL Sample # WW 8194864
LL Group # 1621066
Account # 20810

Project Name: A-1141 Injection Well

Collected: 01/04/2016 11:00 by MC

Submitted: 01/05/2016 09:30
Reported: 01/15/2016 14:12

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

UICL-

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Wet Chemistry									
SM 4500-H+ B-2000	The 40 CFR Part 136 requires that this analysis be performed immediately (within 15 minutes) upon sample collection. Because this was not possible, the result may not be used for reporting purposes.								
Wet Chemistry									
SM 5540 C-2000									
00225	**M. B. A. S.**	**1.8**	.5	0.16	mg/l LAS MW 320	**XX**		01/06/16 00:25	237

General Sample Comments

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

OCT 20 2016

Sample Description: 0104201660201 Filtered Grab
Brine UIC Law Well
A-1141 Injection Well

LL Sample # WW 8194865
LL Group # 1621066
Account # 20810

Project Name: A-1141 Injection Well

Collected: 01/04/2016 11:00 by MC

Submitted: 01/05/2016 09:30
Reported: 01/15/2016 14:12

Southwestern Energy Production
917 State Route 92 North
Tunkhannock PA 18657

CAT No.	Analysis Name	Result	MCL	Method Detection Limit	Units	Note	Prepared	Analyzed	Analyst
Metals Dissolved									
EPA 200.7 rev 4.4									
01743	Aluminum	N.D.	.2	1.86	mg/l	X	01/07/16 07:19	01/14/16 11:05	3282
	Reporting limits were raised due to interference from the sample matrix.								
01750	**Calcium**	**20,300**		17.4	mg/l		01/07/16 07:19	01/14/16 11:25	3282
01754	**Iron**	**204**	.3	0.666	mg/l	X	01/07/16 07:19	01/14/16 11:05	3282
07058	**Manganese**	**3.69**	.05	0.0240	mg/l	X	01/07/16 07:19	01/14/16 11:05	3282
01767	**Sodium**	**62,800**		83.5	mg/l		01/07/16 07:19	01/14/16 11:25	3282
EPA 200.8 rev 5.4									
06025	**Arsenic**	**0.00066 J**	.01	0.00040	mg/l		01/06/16 09:10	01/11/16 13:01	1281
06026	**Barium**	**0.0597**	2	0.00092	mg/l		01/06/16 09:10	01/11/16 13:01	1281

General Sample Comments

This sample was filtered in the lab for dissolved metals.

DEFINITIONS:
X: The result or reporting limit exceeded the MCL.
MCL: Maximum Contamination Level
PQL: Practical Quantitation Limit

Received
Oil & Gas
OCT 20 2016

Laboratory Name: Eurofins Lancaster Laboratories Environmental, LLC **Lab PM Contact Name:** Wendy Kozma **Lab Address:** 2425 New Holland Pike **City, State ZIP:** Lancaster, PA 17601 **Phone:** 717-556-7257 **Fax:** 717-656-6766 **Email:** WendyKozma@eurofinsus.com	**Client:** Southwestern Energy Company **Client Contact Name:** Tyler Spear **Client Address:** 179 Innovation Drive **City, State ZIP:** Jane Lew, WV 26378 **Phone:** 304-884-1681 **Email:** Tyler_Spear@SWN.com 20810 / 1621066 / 8194864-66	**Environmental Chain of Custody (COC)** **Consultant Name:** GES, Inc. **Consultant PM Contact Name:** Nicholas Lohr **Phone:** 800-267-2549, Ext. 3634 **Fax:** 866-902-2187 **Email:** Nlohr@gesonline.com	eurofins | Lancaster Laboratories

***WELL PAD NAME:** A-1191 Injection Well *Please circle which type of site this is: IMPOUNDMENT (WELL PAD) SPECIAL PROJECT	***Analysis Turnaround Time (working days)** Standard TAT = 10 working days (unless otherwise noted below) ☐ *Check if RUSH (1-day) TAT is needed for Dissolved Gases Analysis only ☐ Rush TAT = _____ working days	***SAMPLER(s):** Matt Crownover 602
***PROPERTY # (AFE# if applicable):** 4001161668 ***MAJOR/MINOR CODE:** 52695/007 ***STATE SAMPLED:** WV		COC Page 1 of 1
***OWNER NAME:** UIC Law Well		Lab SDG Label
☐ *Sample Collected - PRE-Treatment System (also applies if no treatment system is present) ☒ *Pre-drill Sample	☒ *Sample Collected - POST-Treatment System ☐ *Post-drill Sample	

*Sample Identification	*Sample Date	*Sample Time	Sample Type	*Matrix (GW or SW)	# of Cont.	Filtered Sample (Y/N)	Total Coli/E.Coli	TPH-GRO water C6-C10	Custom TPH with Ranges (Water) - TPH 8015 (DRO/ORO)	Aluminum, Arsenic, Barium, Calcium, Iron, Manganese, Sodium	M.B.A.S. and Total Dissolved Solids	Total Suspended Solids	VOCs - 5ml Water by 8260B UST	Chloride, Sulfate	Volatile Headspace Hydrocarbon	pH, Temperature of pH	Total Organic Carbon	Sample Specific Notes / Additional Parameters:
0104201660201	1-4-16	1100	grab	Brine	22	Y	x	x	x	x	x	x	x	x	x	x	x	
Trip Blank	use sample collection date above	0:01	grab	W	2	N												
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____							1,6	1,2	1	1,4	1	1	1,2	1	1,2	1	1,6	

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Possible Hazard Identification (Must be updated by consultant sampler if outside of unknown category)

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 2 months)

☐ Return To Client ☒ Disposal By Lab after two (2) months of final report date

Special Instructions/QC Requirements & Comments:

***PARCEL ID #:** N/A

***FEDEX TRACKING #:** 8091 6027 7530

***SAMPLE SOURCE DESCRIPTION/SAMPLE LOCATION DESCRIPTION:** Injection well brine water / Release valve in pump building

*RELINQUISHED BY:	*COMPANY NAME:	*DATE/TIME:	Received by:		Date/Time:
	GES	1-4-16/1500	Fed Ex		1-9-16 /1500
Relinquished by:	Company:	Date/Time:	Received by:		Date/Time:
			Krista Abel		1/5/16 0930

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Sample Administration Receipt Documentation Log

Doc Log ID: 132680

Group Number(s): 1621066

Client: Southwestern Energy Company

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	01/05/2016 9:30
Number of Packages:	1	Number of Projects:	1
State/Province of Origin:	WV		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	No
Samples Chilled:	Yes	Total Trip Blank Qty:	2
Paperwork Enclosed:	Yes	Trip Blank Type:	HCL
Samples Intact:	Yes	Air Quality Samples Present:	No
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Krista Abel (3058) at 09:39 on 01/05/2016

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT121	0.2	DT	Wet	Y	Bagged	N

Per-bottle Temperature Details

All Temperatures in °C

Cooler #	Thermometer	Bottle Temperature Range
1	32170023	1.5 - 2.7

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2425 New Holland Pike
Lancaster, PA 17605-2425
T 717-656-2300
F 717-656-2681
www.LancasterLabs.com

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

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UNDERGROUND INJECTION CONTROL (UIC)
PERMIT APPLICATION

SECTION 10

UIC #: 2D0413175
FACILITY NAME: Law SWS SWD 1
OPERATOR: Lewis Camden, LLC

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Office

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Section 10 – Monitoring:

1. On a daily basis Lewis Camden's personnel visits the facility, and accounts for all the information required to fill-in the WR-40 "Report for Waste Disposal Wells", and on a monthly basis sends the department records of those reports.

2. For every barrel of fluid that is received at this facility, Lewis Camden receives a haul ticket from the trucking company hauling the fluid; on that ticket will be the oil and/or gas well where the fluid was hauled from and the quantity. This allows us to track where the fluid is from, and when it was received at the facility.

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UNDERGROUND INJECTION CONTROL (UIC)
PERMIT APPLICATION

SECTION 11

UIC #: 2D0413175
FACILITY NAME: Law SWS SWD 1
OPERATOR: Lewis Camden, LLC

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APPENDIX H

GROUNDWATER PROTECTION PLAN

Facility Name: Law SWS SWD 1

County: Lewis

Facility Location:

Postal Service Address:		
Latitude and Longitude:	4,322,755	536,172

Contact Information:

Person:	Jamie Andrews
Phone Number:	304-203-7555
E-mail Address:	jandrews@mountainvoilandgas.com

Date: August 15, 2016

1. A list of all operations that may contaminate the groundwater.

   1. Storage of produced formation brine.
   2. Injection of produced formation brine.

2. A description of procedures and facilities used to protect groundwater quality from the list of potential contaminant sources above.

   1. All storage facilities have secondary containment.
   2. Injected fluids are confined to the tubing in the injection well by utilizing, an isolation packer. The annulus pressure is continuously monitored to check for leaks.

3. List procedures to be used when designing and adding new equipment or operations.

   No new equipment or operations will be added to this facility.

4. Summarize all activities at your facility that are already regulated for groundwater protection.

None

5. Discuss any existing groundwater quality data for your facility or an adjacent property.

See attached map and water analysis results. Section 7.4.

6. Provide a statement that no waste material will be used for deicing or fill material on the property unless allowed by another rule.

No waste material will be used for deicing or fill material at the facility, unless allowed by some other regulation or permit.

7. Describe the groundwater protection instruction and training to be provided to the employees. Job procedures shall provide direction on how to prevent groundwater contamination.

1. Employees are trained in secondary containment construction, maintenance, and monitoring.
2. Employees are trained in leak detection.
3. Employees are trained in spill prevention and counter measure procedures.

8. Include provisions for inspections of all GPP elements and equipment. Inspections must be made quarterly at a minimum.

1. Secondary containment is inspected monthly. 2. Tubing / casing annulus pressure is monitored continuously. 3. Piping and fitting are inspected monthly for leaks.

Signature: _____

Date: 3/22/17

UNDERGROUND INJECTION CONTROL (UIC)
PERMIT APPLICATION

SECTION 12

UIC #: 2D0413175
FACILITY NAME: Law SWS SWD 1
OPERATOR: Lewis Camden, LLC

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Section 12 – Plugging and Abandonment:

1. A workover rig will pull the tubing and packer, then run tubing to PBTD and circulate 6% gel to surface.
2. 200' of cement will be displaced across and above each perforated interval through the tubing as the tubing is pulled from the well.
3. The 4-1/2" casing will be cut at approximately 1,325' and a 200' cement plug will be spotted from 1,325' to 1,125' after the hole is circulated with 6% gel.
4. A portion of the casing will be pulled and a 200' cement plug will be spotted from 933' to 733'.
5. Casing will be pulled up and a final cement plug will be spotted from 400' to surface.
6. All 8-5/8" casing will remain in the well and a plugging monument will be installed.

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Office of Oil & Gas
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UNDERGROUND INJECTION CONTROL (UIC)
PERMIT APPLICATION

SECTION 13

UIC #: 2D0413175
FACILITY NAME: Law SWS SWD 1
OPERATOR: Lewis Camden, LLC

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Section 13 – Additional Bonding:

Please find enclosed with this application a certified check in the amount of Five Thousand Dollars ($5,000.00) to cover the additional bond amount for UIC2D0413175.

UNDERGROUND INJECTION CONTROL (UIC)
PERMIT APPLICATION

SECTION 14

UIC #: 2D0413175
FACILITY NAME: Law SWS SWD 1
OPERATOR: Lewis Camden, LLC

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(4/25)

APPENDIX I

Requirement for Financial Responsibility to Plug/Abandon an Injection Well

To: WV Department of Environmental Protection
Office of Oil and Gas
601 57th Street, SE
Charleston, West Virginia 25304-2345
ATTN: Underground Injection Control Program

From: Lewis Camden, LLC
PO Box 470
Bridgeport, WV 26330

Date: 9/28/16

Subject: Underground Injection Control (UIC) Permit Application
2D0413175
Requirement for Financial Responsibility

I, Mike Shaver, verify in accordance with 47CSR13-13.7.g., that I will maintain financial responsibility and resources to close, plug, and abandon underground injection wells(s) in a manner prescribed by the Chief of the Office of Oil and Gas.

Name: Mike Shaver

Signature:

Date: 9/28/16

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UNDERGROUND INJECTION CONTROL (UIC)
PERMIT APPLICATION

SECTION 15
UIC #: 2D0413175
FACILITY NAME: Law SWS SWD 1
OPERATOR: Lewis Camden, LLC

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APPENDIX J

Site Security for Commercial Facilities

Provide a detailed description of the method(s) utilized at the facility to restrict or prohibit illegal dumping of unauthorized waste or vandalism at the facility.

1. Complete enclosure of all wells, holding tank/pits and manifold assemblies within a chain link or other suitable fencing; and

2. Require that all gates and other entry points be locked when the facility is unattended; or

3. Providing tamper-proof seals for the master valve on each well (a "lock-out" or chain & padlock system would be more secure; however, these devices could create a potential safety hazard if the well needed to be quickly shut in due to an emergency); and

4. Installing locking caps on all valves and connections on holding tanks, unloading racks, and headers.

Security at the site is maintained by a locked gate at the entrance of the facility from the county road. The site is located approximately 0.25 of a mile from US 119 and is not visible from US 119.

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UNDERGROUND INJECTION CONTROL (UIC)
PERMIT APPLICATION

SECTION 16

UIC #: 2D0413175
FACILITY NAME: Law SWS SWD 1
OPERATOR: Lewis Camden, LLC

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APPENDIX K

Identify permit or construction approvals received or applied for under the following programs:

Permit/approvals	ID Number
Hazardous Waste Management Program under RCRA	
NPDES Program	
Prevention of Significant Deterioration (PSD)	
Nonattainment Program	
Dredge or Fill	
NPDES/NPDES – Stormwater	
WVDEP – Office of Waste Management (OWM) – Solid Waste Facility	
WVDEP – OWM – RCRA (Hazardous Waste TSD or Transporter)	
WVDEP – OWM – UST	
CERCLA – Superfund	
WV Voluntary Remediation – Brownfields	
FIFRA – Federal Insecticide, Fungicide and Rodenticide Act	
Well Head Protection Program (WHPP)	
Underground Injection Control (UIC)	2D0413175
Toxic Substances Control Act (TSCA)	
Best Management Plans	
Management of Used Oil	
Other Relevant Permits (Specify):	

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