CHECKLIST FOR FILING A UIC PERMIT APPLICATION

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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	Diversified Production, LLC		
Existing UIC Permit ID Number	2D10902703	UIC Well API Number	47-109-2703

Office of Oil and Gas Office Use Only	
Permit Reviewer	
Date Received	5/17/22
Administratively Complete Date	
Approved Date	
Permit Issued	

Please check the fees and payment included.

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

Ck#/Acct# 052064
$550.00
5/17/22 - rec. Date

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
- [x] Appendix E Water Sources
- [x] Appendix F Area Permit Wells
- [x] Section 8 – Geological Data on Injection and Confining Zones
- [x] Section 9 – Operating Requirements / Data
  - [x] Appendix G Wells Serviced by Injection Well
- [x] Section 10 – Monitoring
- [x] Section 11 – Groundwater Protection Plan (GPP)
  - [x] Appendix H Groundwater Protection Plan (GPP)
- [x] Section 12 – Plugging and Abandonment
- [x] Section 13 – Additional Bonding
- [x] Section 14 – Financial Responsibility
  - [x] Appendix I Financial Responsibility
- [x] Section 15 – Site Security Plan
  - [x] Appendix J Site Security for Commercial Wells
- [x] Section 16 – Additional Information
  - [x] Appendix K Other Permit Approvals

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

Reviewed by (Print Name): WADE STANSBERRY ERS III

Reviewed by (Sign): _____

Date Reviewed: begun: 5/31/22

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Section 1 – 5

UIC-1 Form

UIC-1

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PS1

UIC-1
(4/25)

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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

WV Department of Environmental Protection

UNDERGROUND INJECTION CONTROL (UIC) PERMIT APPLICATION

UIC PERMIT ID # UIC2D1092703 API # 47-109-02703 WELL # WP-400

Section I. Facility Information

Facility Name: WP-400

Address: 414 Summers Street

City: Glen Rogers State: WV Zip: 25848

County: Wyoming **District: Slab Fork**

Location description:

On the waters of Lewis Fork of Laurel Creek of Clear Fork in Slab Fork District of Wyoming County.

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

Northing: 4173148.1 Easting: 462948.9 **Latitude: 37.70482** **Longitude: -81.420327**

Environmental Contact Information:

Name: Chad Carmichael Title: Senior Environmental Coordinator

Phone: 304-539-8892 Email: ccarmichael@dgoc.com

Section 2. Operator Information

Operator Name: Diversified Production LLC

Operator ID: 494524121

Address: 414 Summers Street

City: Charleston State: WV Zip: 25301

County: Kanawha

Contact Name: Chad Carmichael Contact Title: Senior Environmental Coordinator

Contact Phone: 304-539-8892 Contact Email: ccarmichael@dgoc.com

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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 —MOD on 1/2021 to change Non-Com to Commercial

—RBDMS WS

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

We are a natural gas and crude oil producer of conventional and non-conventional wells in the state of West Virginia. Diversified Production LLC produces brine from most of it's operated wells. This facility has been operating and injecting brine for many years. Operations at this facility will not change and will continue to operate disposing of brine from the same operated wells as it has in the past.

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APPLICATION CERTIFICATION

In accordance with WV Code 47CSR13-13.11, all UIC permit applications must be signed by one of the following:

1. a principle corporate officer of at least the level of vice-president for a corporation,
2. a general partner for a partnership,
3. the proprietor or owner of a sole proprietorship,
4. a principal executive or ranking elected official for a public agency,
5. a duly authorized representative in accordance with 47CSR13-13.11.b. (A person may be duly authorized by one of the primary entities (1-4) listed above by submitting a written authorization to the Chief of the WVDEP Office of Oil and Gas designating an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility. A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

Diversified Production, LLC

Company Name

2D10902703002

UIC Permit Number

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. (47CSR13-13.11.d)

Chuck Shafer

Print Name

Production Manager

Print Title

Signature

5-17-22

Date

Section 6:

Construction

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Section 6 – Construction

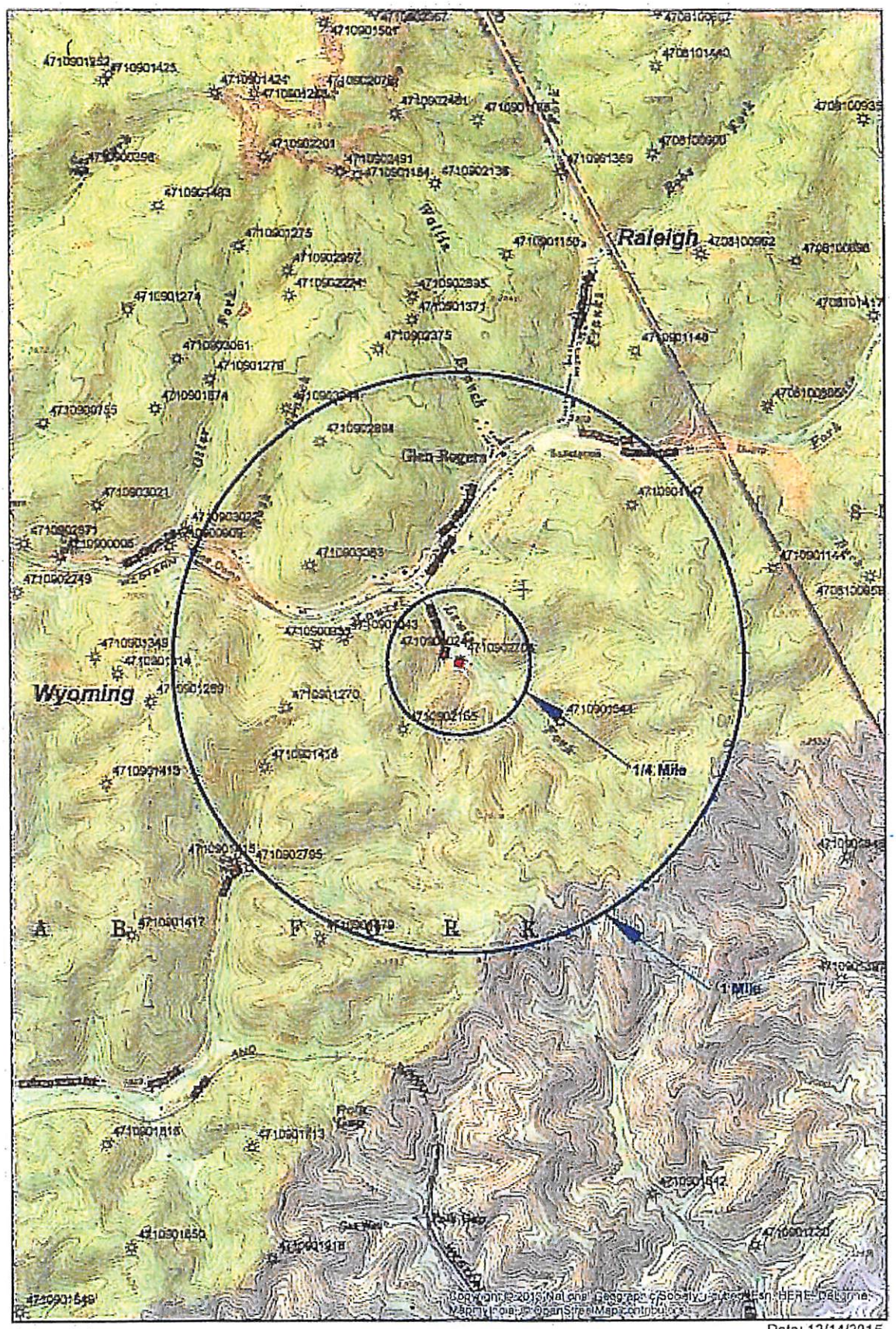
The WP-400 WIW is located at 301 Old Fireline Road, Glen Rogers, West Virginia. Access to the facility is only via Fireline Road. Access is restricted by a locked gate that allows vehicle access around the facility. The operating facility is located inside a six foot locked chain-link fence. The facility consists of a pump building, truck unloading bay, control building, transfer pump building and three HDPE lined ponds with a capacity of 24,000 bbls. An as-built drawing is provided as an attachment. Basically, product fluids are unloaded in a concrete unloading bay with an inverted pipe (for solids). Produced water then flows to the 12,000 bbl HDPE pond water then flows via inverted pipe to two 6,000 bbl HDPE ponds with a man hole. Produced water is then pumped from the manhole through canister filter, bag filter, and cartridge filters prior to being pumped to the injection well. Security cameras are employed for site security and the facility is only operated in manual mode.

Four single walled fiberglass 400 bbl ASTs are currently not active at this facility but are included in this permit. The four ASTs are located in single earthen berm with locked chain-link fencing. The earthen berm contains sufficient secondary containment capacity to support 128% of a 400 bbl tank in the event of a fracture. The four tanks are manifolded together with individual locked volumes. Thus, if one tank fails, the other three tanks cannot be emptied. Valves can only be opened.

Due to the current set up, tanks can only be loaded/unloaded manually. The produced water can only be trucked to this facility as it is not served by a pipeline. All filtration and pumping units have been removed but will be added if needed. The filtration unit will be identical to the current filtration used by the pond network of bag and cartridge filters. Any spills associated with the operation of these ASTs will be reported within 24 hours to the OOG. Additionally, Enervest maintains an approved Spill Prevention Response Plan (SPRP) for these ASTs.

Preventative maintenance of the ASTs, valves, and piping will be conducted as needed. Any sludge that accumulates in the ASTs will be cleaned out and properly disposed through Enervest's two year permit with Raleigh County landfill (same as the tank unloading bay sludge).

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



Date: 12/14/2015

Legend

- 400 WIW
- Wells
- County
- TWP
- EV

Exhibit #1
Topo Base
Disposal Well 400 WIW

0 1,250 2,500 5,000 7,500 10,000 Feet

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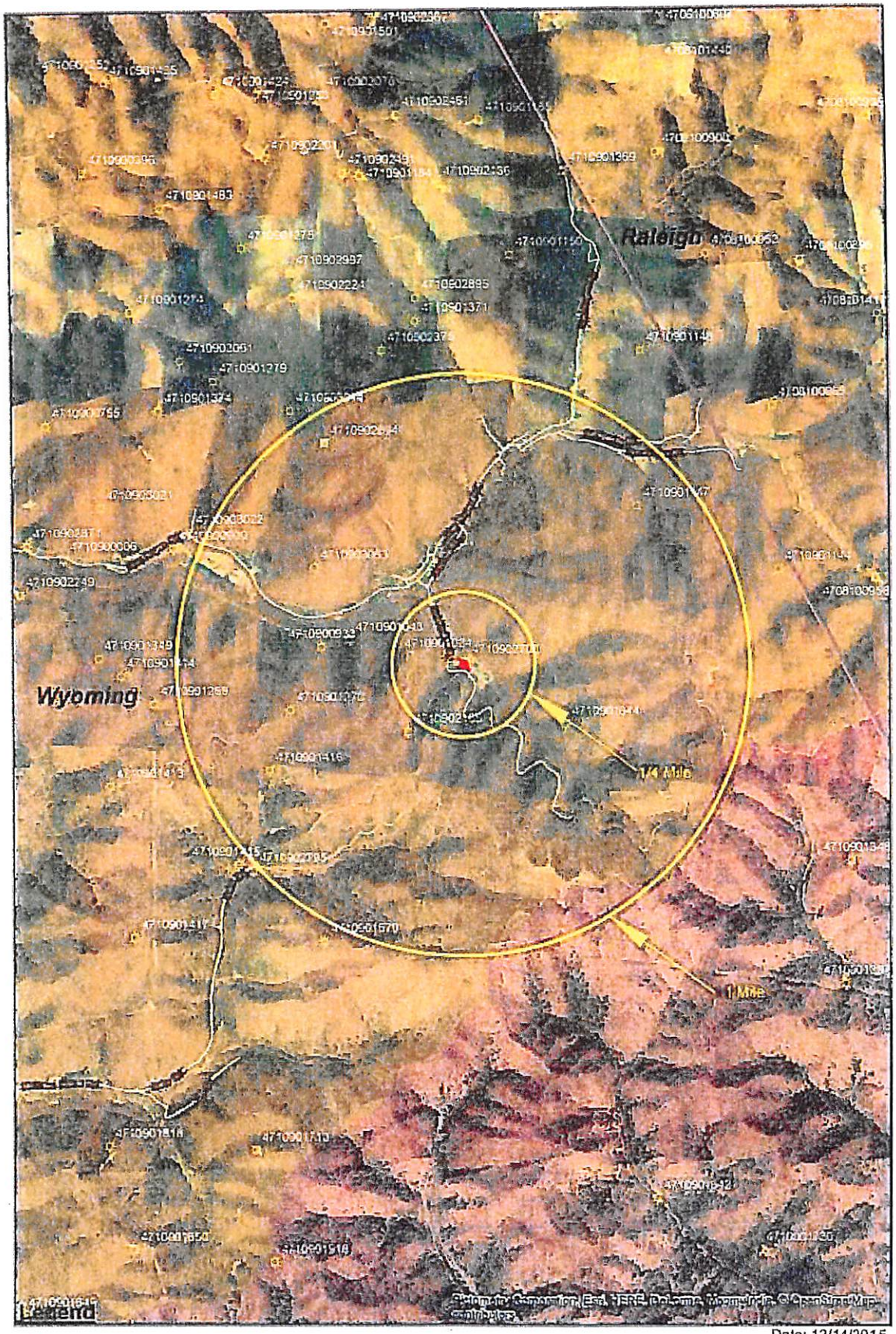

Date: 12/14/2015

- 400 WIW
- Wells
- World Transportation
- County
- TWP
- EV

Exhibit #1
Imagery Base
Disposal Well 400 WIW

0 1,250 2,500 5,000 7,500 10,000 Feet

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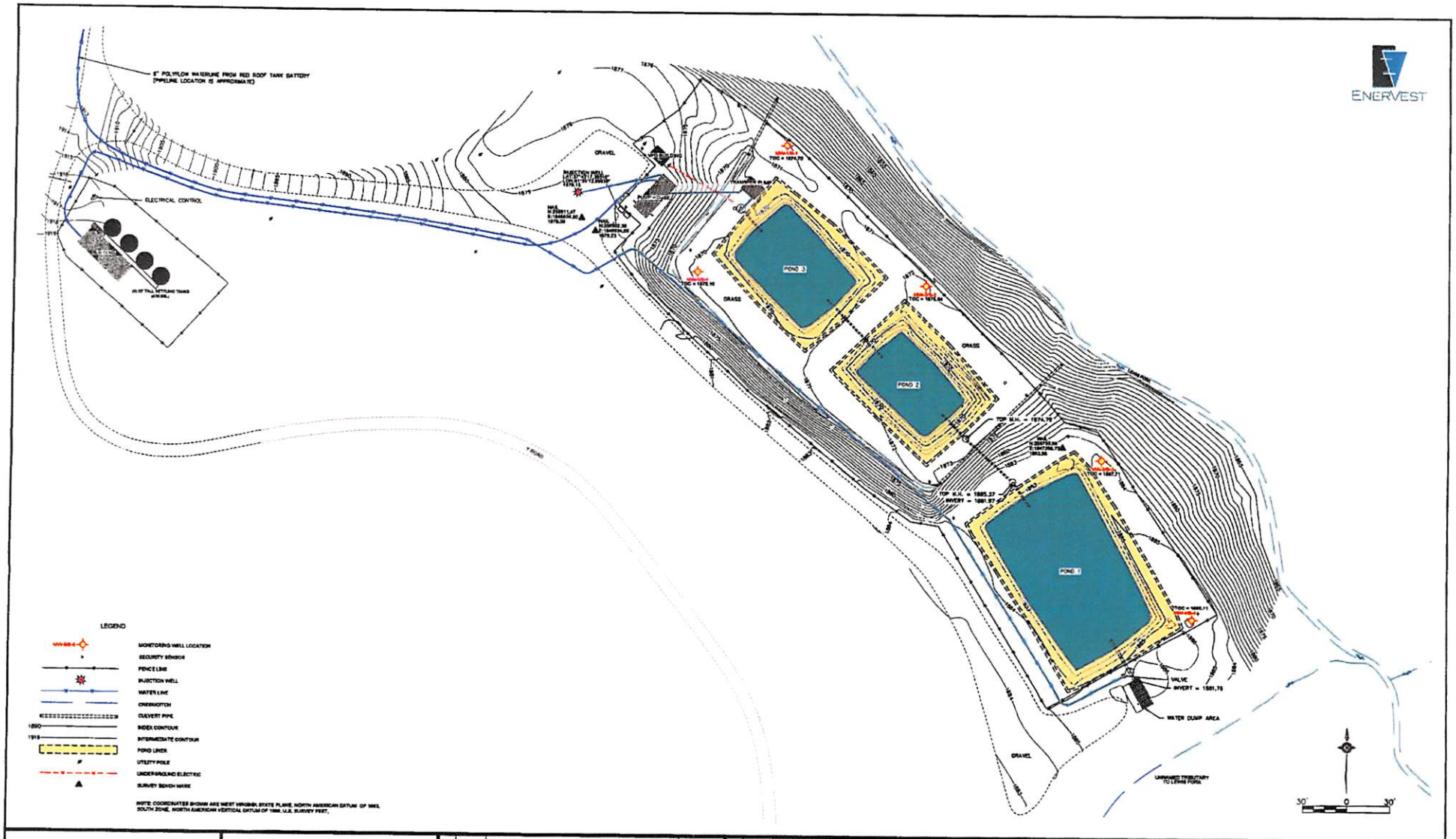

e²C
EnviroCheck, Inc.

NO.	DATE	REVISION	APPROVED	NO.	DATE	REVISION	APPROVED

DESIGNED:	JLR
DRAWN:	FL
CHECKED:	JLR
DATE:	09/07/2016
FILE NO.:	E2C1001
OFFICE LOC.:	BLUEFIELD, VA

ENERVEST OPERATING
"AS-BUILT"
UIC 10902703 "WP-400WIW"
GLEN ROGERS, WYOMING COUNTY
WEST VIRGINIA

PROJECT NO.
E2C1001

SHEET
1 OF 1

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	20"	New	LS	94	22'	22'	To Surface
Fresh Water	13 3/8"	New	H-40	48	694'	694'	To Surface
Coal							
Intermediate 1	9 5/8"	New	LS	29	1116'	1116'	To Surface
Intermediate 2							
Production	7"	New	J-55	23	3356'	3356'	3356' to 610'
Tubing	4 1/2"	New	M-65	9.5		3119'	
Liners							

TYPE	Wellbore Diameter	Casing Size	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./sk)	Cement to Surface ? (Y or N)
Conductor		20"	0.876"	?	Class A	1.18	Y
Fresh Water	17 1/2"	13 3/8"	0.66"	1,730 psi	Class A w/ 2% Salt	1.19	Y
Coal							
Intermediate 1	12 3/8"	9 5/8"	~0.562"	?	Class A w/ additives	1.35	Y
Intermediate 2							
Production	8 7/8"	7"	0.634"	4,360 psi	Class A w/ additives	1.82	N
Tubing		4 1/2"	0.41"	5180 psi			N
Liners							

PACKERS	Packer #1	Packer #2	Packer #3	Packer #4
Kind:	Production			
Sizes:	7" x 4.5"			
Depths Set:	3119'			

APPENDIX A
Injection Well Form

1) GEOLOGIC TARGET FORMATION Weir

Depth 3170 Feet (top) 3226 Feet (bottom)

2) Estimated Depth of Completed Well, (or actual depth of existing well): 3440 Feet

3) Approximate water strata depths: Fresh 35', 134', 230' Feet Salt _____ Feet

4) Approximate coal seam depths: Open Mine 668'-671', 978'-981', 1007'-1009', 1021'-1030'

5) Is coal being mined in the area? Yes ☐ No ☑

6) Virgin reservoir pressure in target formation 850 psig Source Data from wells in the field

7) Estimated reservoir fracture pressure 2300 psig (BHFP)

8) MAXIMUM PROPOSED INJECTION OPERATIONS:

Injection rate (bbl/hour) 425

Injection volume (bbl/day) 1200

Injection pressure (psig) 1034

Bottom hole pressure (psig) 2200

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

Gas Field Brine. No additives anticipated

Temperature of injected fluid: (°F) Varies with season

10) FILTERS (IF ANY)

11) SPECIFICATIONS FOR CATHODIC PROTECTION AND OTHER CORROSION CONTROL

BJ Techni - HIB 606W GL Blk, Magnacide 575

2703

WVGES GEOLOGY UNDERLIES IT ALL "Pipeline"

Select County: (109) Wyoming
Enter Permit #: 2703
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 = 109 Permit = 2703 Link to all digital records for well

Report Time: Tuesday, January 17, 2023 11:00:19 AM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4710902703	Wyoming	2703	Slab Fork	McGraws	Mullens	37.70482	-81.420327	462948.9	4173148.1

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
4710902703	9/1/2006	Original Loc	Completed	Heartwood Forestland Fnd		WP-400WIW			Penn Virginia O&G	Penn Virginia Oil & Gas Corp.			

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	KOD	G_BEF	G_AFT	O_
4710902703	9/1/2006	-/-/-	1879	Ground Level	McGraw	Price Fm & equivs	Weir	Service Well	Unsuccessful	Salt Water Disp	Rotary	unknown	3350		3350				

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
4710902703	9/1/2006	Water	Fresh Water	Vertical			35	Pennsylvanian System					1
4710902703	9/1/2006	Water	Fresh Water	Vertical			134	Pennsylvanian System					3
4710902703	9/1/2006	Water	Fresh Water	Vertical			230	Pennsylvanian System					7
4710902703	9/1/2006	Water	Fresh Water	Vertical			710	Pennsylvanian System					0
4710902703	9/1/2006	Horizon	Injection	Vertical	3171	Weir	3206	Weir					

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
4710902703	Enervest Operating, LLC	2016	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902703	Nytis Exploration Co., LLC	2017	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902703	Nytis Exploration Co., LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902703	Diversified Production, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0

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
4710902703	Enervest Operating, LLC	2016	0												
4710902703	Nytis Exploration Co., LLC	2017	0	0											
4710902703	Nytis Exploration Co., LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902703	Diversified Production, LLC	2021	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
4710902703	Enervest Operating, LLC	2016	0												
4710902703	Nytis Exploration Co., LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902703	Diversified Production, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0

Production Water Information: (Volumes in Gallons)

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_WTR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4710902703	Enervest Operating, LLC	2016	0												
4710902703	Nytis Exploration Co., LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902703	Diversified Production, LLC	2021	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
4710902703	Original Loc	unidentified coal	Well Record	134	Reasonable	2	Reasonable	1879	Ground Level
4710902703	Original Loc	unidentified coal	Well Record	220	Reasonable	4	Reasonable	1879	Ground Level
4710902703	Original Loc	unidentified coal	Well Record	302	Reasonable	2	Reasonable	1879	Ground Level
4710902703	Original Loc	unidentified coal	Well Record	484	Reasonable	3	Reasonable	1879	Ground Level
4710902703	Original Loc	unidentified coal	Well Record	668	Reasonable	3	Reasonable	1879	Ground Level
4710902703	Original Loc	unidentified coal	Well Record	978	Reasonable	3	Reasonable	1879	Ground Level
4710902703	Original Loc	unidentified coal	Well Record	1021	Reasonable	1	Reasonable	1879	Ground Level
4710902703	Original Loc	Ravencliff/Avis Ss	Well Record	1534	Reasonable	34	Reasonable	1879	Ground Level
4710902703	Original Loc	Ravencliff/Avis Ss	Well Record	1588	Reasonable	37	Reasonable	1879	Ground Level
4710902703	Original Loc	Little Lime	Well Record	2418	Reasonable	99	Reasonable	1879	Ground Level
4710902703	Original Loc	Big Lime	Well Record	2529	Reasonable	123	Reasonable	1879	Ground Level
4710902703	Original Loc	Greenbrier Group	Well Record	2529	Reasonable	424	Reasonable	1879	Ground Level
4710902703	Original Loc	Weir	Well Record	3169	Reasonable	57	Reasonable	1879	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

WR-35

DATE: 12/13/2006
API#:: 4710902703

2703

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

Well Operator's Report of Well Work

Farm Name Georgia Pacific Corporation

Operator Well No.: WP-400 WIW

LOCATION: Elevation: 1879

Quadrangle: McGraws 7 1/2'

District: Slab Fork

County: Wyoming

Latitude: 1320 Feet South of 37 Deg. 42 Min. 30 Sec.

Longitude: 1100 Feet West of 81 Deg. 25 Min. 00 Sec.

Company:
Penn Virginia Oil & Gas Corporation

Address: 2550 East Stone Drive, Suite 110
Kingsport, TN 37660

Agent: Bryant Bowman

Inspector: Barry Stollings

Date Permit Issued: 06/06/2006

Date Well Work Commenced:

Date Well Work Completed: 09/01/2006

Verbal Plugging:

Date Permission granted on:

Rotary X Cable Rig

Total Depth (feet): 3,350

Fresh Water Depth (ft):
35' - 1" stream, 134' - 3" stream; 230' - 7" stream, 710' 1 (4" stream

Salt Water Depth (ft):
None Reported

Is coal being mined in area (N/Y)? N

Coal Depths (ft):
134-136, 220-224, 302-304, 484-487, 668-671 (open mine), 978-981, 1021-1022

Casing and Tubing	Used in drilling	Left in well	Cement fill up Cu. Ft.
20"	22	22	59 cu ft
13 3/8"	698	698	89 cu ft
9 5/8"	1106	1106	407 cu ft
7"	3356	3356	342 cu ft

OPEN FLOW DATA

Producing formation SI - No Zones Completed Pay zone depth (ft)

Gas: Initial open flow MCF/d Oil: Initial open flow Bbl/d

Final open flow MCF/d Final open flow Bbl/d

Time of open flow between initial and final tests: Hours

Static rock pressure psig (surface pressure) after Hours

Second producing formation Pay zone depth (ft)

Gas: Initial open flow MCF/d Oil: Initial open flow Bbl/d

Final open flow MCF/d Final open flow Bbl/d

Time of open flow between initial and final tests: Hours

Static rock pressure psig (surface pressure) after Hours

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

Signed:

By: William M Rayne

Date: 12/18/06

FORM WR-35R
(REVERSE)

PERMIT #:4710902703
WELL #: WP-400 WIW

2703

DETAILS OF PERFORATIONS, FRACTURING, OR PHYSICAL CHANGE, ETC.

FORMATIONS	TOP	BOTTOM	REMARKS
Sand, Shale & Coal	0	1095	
Sand & Shale	1095	1391	
Sand	1391	1423	
Shale	1423	1534	
Ravencliff Sand	1534	1568	
Shale	1568	1588	
Avis Lime Stone	1588	1625	
Shale & Red Rock	1625	2010	
Sand	2010	2029	
Shale	2029	2075	
Sand	2075	2310	
Sand & Shale	2310	2418	
Little Lime	2418	2517	
Lime & Shale	2517	2529	
Big Lime	2529	2952	
Shale	2952	3169	
Weir Sand	3169	3226	
Shale	3226	TD	

24

2703

Form: WW-2B

109-02703

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

1) Well Operator Penn Virginia Oil & Gas Corporation

Operator ID	County	District	Quadrangle
	Wyoming	7 Slab Fork	466 McGraws 7 1/2'

2) Operator's Well Number: WP-400 WIW

3) Elevation: 1879

4) Well Type: (a) Oil _____ or Gas _____
(b) If Gas: Production ____ / Underground Storage _____
Deep _____ / Shallow ____

5) Proposed Target Formation(s): Weir ~~(for injection)~~ Will apply for a UIC permit to convert to injection

6) Proposed Total Depth: 3400 Feet

7) Approximate fresh water strata depths: 45, 205, 350, 630

8) Approximate salt water depths: None Reported

9) Approximate coal seam depths: 45, 405, 340, 450, 630-open mine, 815, 840, 970

10) Does land contain coal seams tributary to active mine? No

11) Describe proposed well work: Drill and complete new water well, disposal zone will be the Weir Sandstone

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Office of Chief
MAY 08 2006
WV Department of
Environmental Protection

AB 5/10/06

12) CASING AND TUBING PROGRAM

TYPE	SPECIFICATIONS Size	Grade	Weight per ft	FOOTAGE INTERVALS For Drilling	Left in Well	CEMENT Fill-up (Cu. Ft.)
Conductor	20	LS	94	20	20'	0
Fresh Water	13 3/8	H40	48	665	665	470
Coal	9 5/8	LS	29/32	1025	1025	325
Intermediate						
Production	7	K55	23	3300	3300	400
Tubing	4 1/2	M65	9.5		3100	
Liners						

Packers: Kind Baker Model Retrieva - D (or equal)
Sizes: 7" x 4 1/2"
Depths Set 3110' +/-

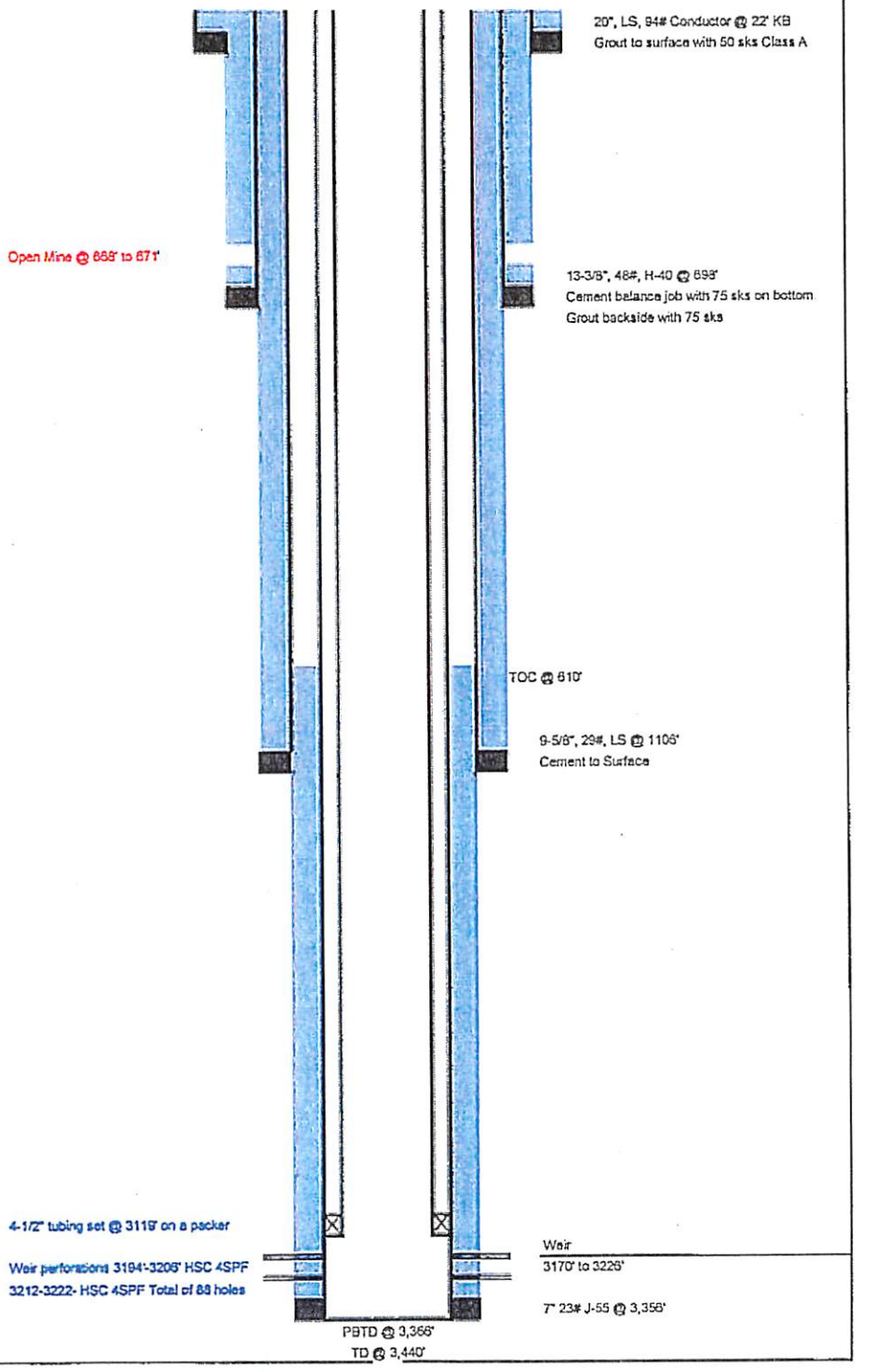
B.S. 6-2-06

Ck# 14379
650.-

Updated: 12/01/15 | WP-400 WIW | Elevations: 1879 GL

Wyoming County, West Virginia

WIW Well



TAC

Exhibit #9

FORM WW-3 (B)
1/12

1) Date:
2) Operator's Well No. WP - 400 WIW
3) API Well No.: 47 - 109 - Wyoming - 02703
State County Permit
4) UIC Permit No. UIC2D1092703

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

5) WELL TYPE: Liquid Injection [✓] / Gas Injection (not storage) [ ] / Waste Disposal [ ]
6) LOCATION: Elevation: 1879 Watershed: Lewis Fork of Laurel Fork of Clear Fork
District: Slab Fork County Wyoming Quadrangle McGraws, WV 7.5
7) WELL OPERATOR Diversified Gas and Oil
Address 414 Summers Street
Charleston, WV 25301
8) DESIGNATED AGENT Jeff Mast
Address 414 Summers Street
Charleston, WV 25301
9) OIL & GAS INSPECTOR TO BE NOTIFIED
Name ?
Address ?
?
10) DRILLING CONTRACTOR
Name
Address

11) PROPOSED WELL WORK Drill [ ] / Drill deeper [ ] / Redrill [ ] / Stimulate [ ]
Plug off old formation [ ] / Perforate new formation [ ] Convert [ ]
Other physical change in well (specify) Permit Renewal
12) GEOLOGIC TARGET FORMATION Weir Depth 3170 Feet (top) to 3226 Feet (bottom)
13) Estimated Depth of Completed Well, (or actual depth of existing well): 3440 Feet
14) Approximate water strata depths: Fresh 35', 134', 230' Feet Salt Feet
15) Approximate coal seam depths: Open Mine 668' - 671', 978' - 981', 1007' - 1009', 1021' - 1023'
16) Is coal being mined in the area? Yes No
17) Virgin reservoir pressure in target formation 850 psig Source Data from wells in the field
18) Estimated reservoir fracture pressure 2300 psig (BHFP)
19) MAXIMUM PROPOSED INJECTION OPERATIONS: Volume per hour 425 Bottom hole pressure 2200
20) DETAILED IDENTIFICATION OF MATERIALS TO BE INJECTED, INCLUDING ADDITIVES
Gas Field Brine. No additives anticipated.
21) FILTERS (IF ANY)
22) SPECIFICATIONS FOR CATHODIC PROTECTION AND OTHER CORROSION CONTROL
BJ Techni - HIB 606W GL Blk, Magnacide 575
23) CASING AND TUBING PROGRAM

CASING OR TUBING TYPE	SPECIFICATIONS					FOOTAGE INTERVALS		CEMENT FILL-UP OR SACKS (CU. FT.)	PACKERS
	Size	Grade	Weight per ft.	New	Used	For Drilling	Left In Well		
Conductor	20"	LS	94#	x		22'	22'	To Surface	Kinds
Fresh Water	13 3/8"	H-40	48#	x		694'	694'	To Surface	Production
Coal									Sizes
Intermediate	9 5/8"	LS	29#	x		1116'	1116'	To Surface	7" x 4.5"
Production	7"	J-55	23#	x		3356'	3356'	3356' to 610"	Depths set
Tubing	4 1/2"	M-65	9.5#	x			3119'		3119'
Liners									Perforations
									Top Bottom
									3194 3222

24) APPLICANT'S OPERATING RIGHTS were acquired from Sonat Exploration Company
by deed / lease / other contract x / dated of record in the
County Clerk's office in Book 9 Page 580

RECEIVED
Office of Oil and Gas
MAY 17 2022
WV Department of
Environmental Protection

FORM WW-3 (A)
1/12

1) Date:
2) Operator's Well No. WP-400 WIW
3) API Well No.: 47 - 109 - 02703
State County Permit
4) UIC Permit No. UIC2D1092703

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

5) Surface Owner(S) To Be Served
(a) Name Heartwood Forestland Fund
Address 19045 Stone Mountain Drive
Adingdon, WV 24210
(b) Name
Address
(c) Name
Address

6) Inspector
Address
Telephone

7) (a) Coal Operator
Name
Address

7) (b) Coal Owner(S) With Declaration Of Record
Name West Virginia Mid Vol Inc. 1-A1 ST 1D 11-1
Address c/o Cam Kentucky Real Estate
P.O. Box 1169, Pikeville, KY 41502-1169
Name
Address

7) (c) Coal Lessee with Declaration Of Record
Name
Address

TO THE PERSONS NAMED ABOVE: You should have received this form and the following documents

(1) The Application For A Liquid Injection or Waste Disposal Well Work Permit on Form WW-3(B), which sets out the parties involved in the drilling or other work;
(2) The plat (surveyor's map) showing the well location on Form WW-6; and
(3) The Construction and Reclamation Plan on Form WW-9 (unless the well work is only to plug a well), which sets out the plan for erosion and sediment control and for reclamation for the site and access road.

The date proposed for the first injection or waste disposal is 11/1 20 06 .

THE REASON YOU HAVE RECEIVED THESE DOCUMENTS IS THAT YOU HAVE RIGHTS REGARDING THE APPLICATION WHICH ARE SUMMARIZED IN THE "INSTRUCTIONS" ON THE REVERSE SIDE OF THE COPY OF THE APPLICATION [(FORM WW-3(B)] DESIGNATED TO YOU. HOWEVER YOU ARE NOT REQUIRED TO TAKE ACTION AT ALL.

Take notice that under Chapter 22-6 of the West Virginia Code, the undersigned well operator proposes to file or has filed this Notice and Application and accompanying documents for a Well Work Permit with the Chief of the Office of Oil and Gas, West Virginia Department of Environmental Protection, with respect to a well at the location described on the attached Application and depicted on the attached Form WW-6. Copies of this Notice, the Application, the plat, and the Construction and Reclamation Plan have been mailed by registered or certified mail or delivered by hand to the person(s) named above (or by publication in certain circumstances) on or before the day of the mailing or delivery to the Chief.

The person signing this document shall make the following certification:

"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.

Well Operator Diversified Gas and Oil
Address 414 Summers Street
Charleston, WV 25301
By: Jeff Mast
Its: Director of Technical Services
Signature:

RECEIVED
Office of Oil and Gas
MAY 17 2022
WV Department of
Environmental Protection

Scope

The material covered by the following shall be precast reinforced concrete manhole base sections, riser sections, flat slab and eccentric cone top sections and grade rings used in sanitary sewer and storm water work.

All units manufactured shall consist of a concrete wall reinforced with a cage formed of circumferential and longitudinal steel and shall be manufactured in accordance with "Precast Reinforced Concrete Manhole Sections" ASTM C478 and AASHTO M199. Pre cast Manhole design meets H-20 loading.

Dimensions

The dimensions of the precast concrete pipe, risers, and cones shall be in accordance with the attached drawings. The pipe shall be round and true. The average internal diameter of the riser sections shall not be less than the nominal diameter by more than 3/8" or one (1) percent, whichever is greater. The wall thickness shall not be less than the design by more than 3/16" or five (5) percent, whichever is greater. A wall thickness greater than design shall not be cause for rejection.

Reinforcement

Reinforcement consists of wire conforming to Specifications ASTM A82, ASTM A185, and ASTM A615. The reinforcement shall be placed in the precast manhole sections in accordance with ASTM C478 specifications.

Riser - ASTM A185; 3x8 W3/W2.1, (.5+0)
Tapered Cone Section - ASTM A82, 3 gauge bright basic cold drawn welded wire cage.
Flat slab tops - ASTM A185, 3X8, W3/W2.1 and #4 rebar two layers interlaced meeting ASTM A615

Cement

All cement used will be Type III cement, meeting ASTM C150.

Admixtures

1. Air Entraining: ASTM C260
2. Water reducing and high range water reducing, ASTM C494.

Aggregates

All aggregates will meet ASTM C33 or ASTM C330.

Concrete Mixes

The mix design for manholes will be as follows: minimum compressive strength of the concrete in manhole base, riser, and top section of 4 000 psi in 28 days. Mix design was determined using the standards in ACI 318, chapter 5.

Stone - 1 667 lbs. #57
Sand - 1 395 lbs. #14
Cement - 625 lbs.
Water - 31.42 gallons potable
Air Content - 6-1/2% +/- 1 1/2%

Project:	Eastern Vault Company, Inc.	Drawn: DC Snider
		Scale: N/A
		Approved:
Description: Specifications for Reinforced Precast Concrete Manhole Sections	P.O. Box 1134 - Courthouse Road Princeton, West Virginia 24740 Tele: (304) 425-8955 Fax: (304) 425-1171	Date:
		SHT 1 of 1

Handling & Transportation

Wear appropriate personal protective equipment when installing and handling precast concrete structures including eye protection and respirators when cutting or drilling are involved. Precast concrete structure components are relatively heavy and should be handled by equipment appropriate to the task. Your Eastern Vault representative can provide structure weights for you to assess your capabilites. Components should be unloaded, stored, transported and erected in an upright position, never rolled. In lifting, insure that adequate pins and lifting devices are available on site, before the first load arrives. Lifting pins are available for purchase from Eastern Vault Company. Please contact us in advance of the delivery of your first load, if pins are required. Carefully inspect each piece with the driver at the time of delivery. Note any damage, shortages, or the like on the delivery ticket. Handle cones, risers, tops and bases individually. The customer assumes all liability for handling multiple pieces at one lift. During the lift process care should be taken to insure that clamps, steel rope, chains and slings are not tightened excessively. Use devices of a length that is sufficient to avoid undue stress on the components.

Excavation

The diameter of the excavation for the construction of the manhole should be at least 12" greater than the outside diameter of the manhole base. Adequate precautions should be taken to prevent slips or collapse of the excavation. Excavated material should be so placed that it does not endanger people or cause damage to the property. The floor of the excavation should be excavated to an approximately level surface and all loose material should be removed before the base section is set. Any water present in the excavation should be removed by acceptable means.

Erecting the structure

The base section should be carefully leveled as any tilt will be carried up through the remaining sections of the structure. Each subsequent section should be carefully lowered onto the one preceding it and neatly joined. The safety of the person(s) in the manhole responsible for guiding the sections into place should be considered at all times. The joint sealant, if required, should be installed in accordance with the manufacture's recommendations. Sections that contain steps should be so aligned that the steps form a continuous ladder down the wall of the structure, but not directly above pipes and/or the invert channel. Select the appropriate frame, cover, grate or top depending on the structure. Generally manhole covers and frames in a roadways, walks or pavement should be set flush with the finished grade. In other locations manhole frames and covers should be set slightly higher to minimize the infiltration of storm water. Storms grates and curb inlets should be set slightly below the adjoining grade to facilitate storm water flow. Minor adjustments in elevation can often be made with concrete brick or concrete grade rings.

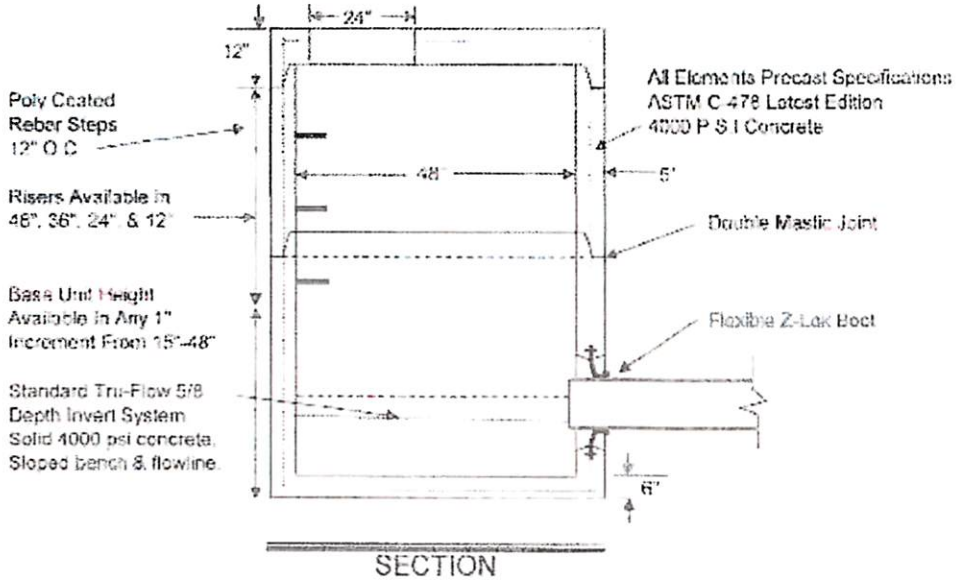
Backfilling

The backfill process should be done with select clean material that does not contain large stones, organic matter or frozen chunks in lifts not exceeding 12" in depth. Fill should be carefully and uniformly placed and compacted to the same density as the rest of the backfill over the adjacent pipeline. Shoring should be withdrawn before compaction, and care should be taken not to disturb the wall of the excavation, and the voids left by the shoring should be filled as the lifts continue. Great care should be taken to ensure that the pipes, joints and castings are not disturbed during the compaction process.

General

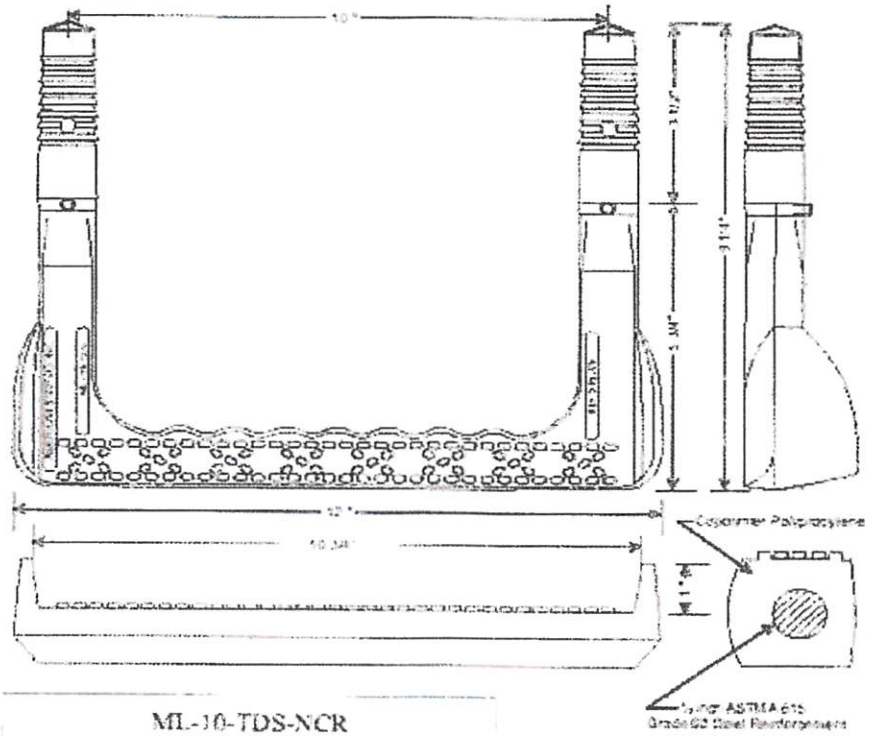
This information is provided as general in nature. Please consult and follow all applicable federal, state and local guidelines regarding the installation and handling of precast concrete structures and the operations associated with their use.

Project	Eastern Vault Company, Inc.	Drawn: DC Snider
		Scale: N/A
		Approved:
		Date
Description: Handling & Installation - General Notes Precast Concrete Structures	P.O. Box 1134 - Courthouse Road Princeton, West Virginia 24740 Tele: (304) 425-8955 Fax: (304) 425-1171	SHT 1 of 1



Project	Eastern Vault Company, Inc.	Drawn: DC Snider
		Scale: N/A
		Approved:
Description: Sanitary Manhole - Flat Top Standard Base	P.O. Box 1134 - Courthouse Road Princeton, West Virginia 24740 Tele: (304) 425-8955 Fax: (304) 425-1171	Date:
		SHT 1 of 1

ML-10-TDS-NCR



ML-10-TDS-NCR

Mechanical Load Installation Methods
Minimum Concrete Strength Must Be 5000 psi

Preformed Holes

Two preformed holes on 10" center
Holes must be parallel
Diameter of holes are 1 1/4" tapering to 7/8" in 1 1/4" of depth

Drilled Holes

Drill two 1" holes on 10" centers with a minimum depth of 3 3/4
Use 1" masonry bit for drilling
Holes must be parallel

Drive step with dodge hammer until both legs are completely seated

This step meets or exceeds ASTM C 478 and OSHA Standards when properly installed

AMERICAN Step Company, Inc.

American Step Company, Inc.
P.O. Box 137
839 East Broadway
Griffin, GA 30224-0137

800-988-STEP
770-467-9844 (OFFICE)
770-467-8011 (FAX)

Project:	Eastern Vault Company, Inc.	Drawn: DC Snider
		Scale: N/A
		Approved:
Description: American Step Company, Inc. Manhole Steps	P.O. Box 1134 - Courthouse Road Princeton, West Virginia 24740 Tele: (304) 425-8955 Fax: (304) 425-1171	Date:
		SHT 1 of 1

A-LOK PRODUCTS, INC.

The Company With Connections®

PIPE TO MANHOLE CONNECTOR FOR SANITARY SYSTEMS

Z•LOK CAST IN BOOT CONNECTOR

Z-LOK PIPE TO MANHOLE CONNECTOR

The **Z•LOK Pipe to Manhole Connector** is a flexible connector specifically engineered to produce a positive watertight seal for pipes entering precast concrete structures and the structure itself. Its neoprene wall is designed to provide the highest performance. The **Z•LOK CONNECTOR** is manufactured to meet or exceed the requirements set forth in ASTM C-923-00 titled *"Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals"*.

MATERIAL

The **Z•LOK CONNECTOR** is molded from an EPDM compound engineered to conform with the requirements of section 4.1.2 of ASTM C-923-00. Alternative compounds are available for unusual applications upon special order.

All stainless steel hardware is in compliance with section 4.2 "Mechanical Devices" of ASTM C-923-00.

KEY ADVANTAGES

The **Z•LOK CONNECTOR** assures a positive watertight connection and provides up to 20° of omnidirectional deflection and 2.50" of vertical or horizontal movement without loss of seal, providing greater flexibility in the design and installation of pipelines and structures. These design features of the **Z•LOK CONNECTOR** prevent infiltration due to shear caused by settlement or ground movement.

The inner rubber O-ring design eliminates rubber wrinkling, compensates for pipe irregularity and wall thickness insuring a watertight seal.

The unique bi-directional design permits the **Z•LOK CONNECTOR** take-down sleeve to be fastened from within the inside of sections of the structure. Once fastened, immediate backfilling is possible enhancing project safety and overcomes the normal problems encountered with water, running sand and other unstable trench conditions.

When casting the **Z•LOK CONNECTOR** into the structure making it an integral part of the wall, 90% of the opportunity for infiltration is eliminated.

PRODUCT REFERENCES

A.) ASTM C-923-00
Resilient Connectors Between Reinforced Concrete Manholes Structures, Pipe and Laterals

B.) ASTM C-1244-00
Standard Test Method For Concrete Sewer Manholes by the Negative A+ Pressure (Vacuum) Test

C.) ASTM C-478C
Standard Specification for Precast Reinforced Concrete Manhole Sections

PERFORMANCE STANDARD

The **Z•LOK Connector** meets or exceeds all material and test requirements of ASTM C-923-00 *"Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals"*.

See following chart.

RESILIENT TEST REQUIREMENTS OF A.S.T.M. C-923-00

TEST	RESULTS	ASTM METHOD
Chemical resistance 3 % Sulfuric acid 3 % Hydrochloric Acid	no extract loss no weight loss	at 23°C for 48h
Tensile strength	1225 psi or 8.5 MPa, min	D 412
Elongation at break	350% min.	
Hardness	60 Shore A durometer	D 2240 Shore A durometer
Accelerated Overaging	decr. of 15%, max. of original tensile strength, decr. of 20%, max. of elongation	D 573, 70 ± 1°C for 7 days
Compression set	decr. of 25%, max. of original deflection	D 395, Method B at 70°C for 22h
Water absorption	increase of 10%, max. of original by weight	D 471, immerse 0.75 to 0.9 gr. or 3.5 by 2.5 mm Specimen in distilled water at 70°C for 48h
Ozone resistance	rating 0	D 1171
Low-temp. brittle point	no fracture at -40°C	D 746
Tear resistance	200 lb/in or 34 N/mm	D 624 Method B

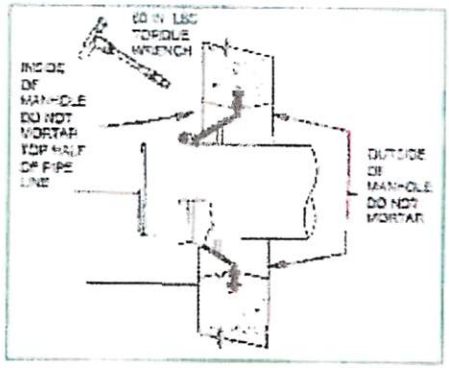
Designed ASTM C-923-00 Resilient Connectors

Project	Eastern Vault Company, Inc.	Drawn: DC Snider
		Scale: N/A
		Approved:
		Date
Description A-Lok Products Cast-In-Place Z-Lok Boot	P.O. Box 1134 - Courthouse Road Princeton, West Virginia 24740 Tele: (304) 425-8955 Fax: (304) 425-1171	SHT 1 of 2

PART 6 · DIMENSIONAL DATA

Z-LOK BOOT NO.	PIPE O.D. MIN.	INCHES MAX.	CLAMP NUMBER
C107-1	1.25"	1.75"	CL-040
C107-2	2.00"	2.50"	CL-040
C107-3	2.75"	3.75"	CL-050
C107-4	4.25"	5.25"	CL-100
C107-6	6.25"	8.25"	CL-125
C205-8	8.25"	9.10"	CL-150
C107-8	9.25"	10.25"	CL-150
C107-10	10.25"	12.25"	CL-180
C107-12	12.25"	14.75"	CL-248
C107-15	14.25"	16.00"	CL-EV15-13-L
C107-16	16.25"	18.00"	CL-EV15-16-L
C107-18	18.25"	20.25"	CL-EV15-18-L

NOTE:
- TEMPO GASKET CAN BE USED ON C107-6 MANDREL
- WHEN ORDERING CLAMPS, PIPE SIZES ARE REQUIRED
- C107-6 AND C107-8 USE THE SAME MANDREL
- C107-10 AND C107-12 USE THE SAME MANDREL
- FEDI-LOK CLAMP IS REQUIRED FOR C107-15 THROUGH C107-18 GASKETS



WARNING: To ensure the **Z LOK Connector** remains a flexible watertight connector, it is A-LOK Products, Inc. strong recommendation that **no mortar** be placed between the pipe and wall of the concrete structure. The use of mortar in this area would decrease the effectiveness of the connector to compensate for shear caused by settlement or ground movement.

NOTE: The 60 in -lb Torque Wrench is available through A-LOK Products, Inc.

CAUTION: When installing pipe stubs for future pipeline installation, all stubs must be properly restrained to prevent any movement by means other than the Z-LOK Connector.

ANY QUESTIONS REGARDING Z-LOK CONNECTOR, PLEASE CALL 1-800-822-2566

PRODUCT SPECIFICATIONS

A flexible sight in manhole connector shall be used whenever a pipe penetrates into a precast concrete manhole or structure.

The connector shall be the Z-LOK CONNECTOR as manufactured by A-LOK PRODUCTS, INC. Tulpehocken, PA or approved equal.

The design of the connector shall provide a flexible, watertight seal between the pipe and concrete structure. The connector shall ensure that a solid is made between:

(1) The connector and the structure wall by casting the connector integrally into the structure wall during the manufacturing process in a manner that will not cut or damage pipe coating.

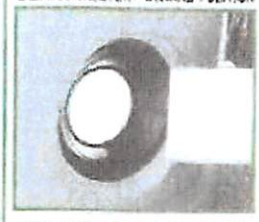
(2) The seal between the connector and the pipe joint is made by compressing the connector against the outside circumference of the pipe by means of a stainless steel tie-down band.

The connector shall be made from materials that conform to the physical and chemical requirements outlined in Section 4 "Materials and Manufacture" of ASTM C-923-00 "Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals" and the overall design will meet or exceed Section 7 "Test Methods and Requirements" of ASTM C-923-00.

The connector shall be sized specifically for the type of pipe being used and shall be installed in accordance with the recommendations of the manufacturer.

INSTALLATION INSTRUCTIONS

Z-LOK CONNECTOR – INWARD POSITION



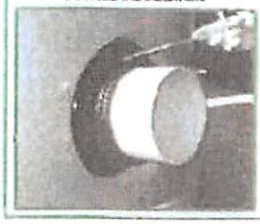
STEP 1
Break pipe
Clean connector
Check size of pipe & debris

INSIDE Z-LOK CONNECTOR INSTALLATION

STEP 2
Slide pipe in connector and push through

STEP 3
Attach proper size band around the pipe covering the center ribs of connector and **VERY IMPORTANT** tighten clamp with torque wrench to 60 inch pounds

OUTSIDE INSTALLATION



STEP 4
When installing the Z-LOK connector in the outside the manhole section pull pipe back into after inserting so the connector flips outward then **VERY IMPORTANT** - slide pipe in connector and tighten the take down clamp to 60 inch pounds with a torque wrench

A-LOK PRODUCTS INCORPORATED P.O. BOX 1547 • 697 Main Street • Tulpehocken, PA 19607 • www.a-lok.com • email: info@a-lok.com
800-822-2566 • 215-547-3266 • 215-547-3266 FAX

Project:	Eastern Vault Company, Inc.	Drawn: DC Snider
		Scale: N/A
		Approved:
Description: A-Lok Products Cast-In-Place Z-Lok Boot	P.O. Box 1134 - Courthouse Road Princeton, West Virginia 24740 Tele: (304) 425-8955 Fax: (304) 425-1171	Date:
		SHT 2 of 2

PRODUCT SPECIFICATIONS

CONSEAL CS102

Concrete Sealants Inc

Butyl Rubber Sealant For All Precast Structures; Meets Specs.

PHYSICAL PROPERTIES

	Spec	Required*	CS 102
Hydrocarbon blend content % by weight	ASTM D4 (mod.)	50% min	51%
Inert mineral filler % by weight	AASHTO T111	30% min	35%
Volatile Matter % by weight	ASTM D6	2% max.	1.2
Specific Gravity, 77°F	ASTM D71	1.15-1.50	1.25
Ductility, 77°F	ASTM D113	5.0 min	10
Penetration, cone 77°F, 150 gm, 5 sec	ASTM D217	50-100	55-60
Penetration, cone 32°F, 150 gm, 5 sec.	ASTM D217	40 mm	40-65
Flash Point, C.O.C., °F	ASTM D92	350°F min	450°F
Fire point, C.O.C., °F	ASTM D92	375°F min	475°F

IMMERSION TESTING

- 30-Day Immersion Testing: No visible deterioration when tested in 5% Caustic Potash, 5% Hydrochloric Acid, 5% Sulfuric Acid, and 5% saturated Hydrogen Sulfide *
- One Year Immersion Testing: No visible deterioration when tested in 5% Formaldehyde, 5% Formic Acid, 5% Sulfuric Acid, 5% Hydrochloric Acid, 5% Sodium Hydroxide, 5% Hydrogen Sulfide and 5% Potassium Hydroxide.
- Requirements of ASTM C-990 Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants

LIMITED WARRANTY
This information is presented in good faith, but we cannot anticipate all conditions under which this information and our products or the products of other manufacturers in combination with our products, may be used. We accept no responsibility for results obtained by the applicator of this information or the safety and suitability of our products, either alone or in combination with other products. Users are advised to make their own tests to determine the safety and suitability of each such product or product combinations for their own purposes. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. We sell this product without warranty, and buyers and users assume all responsibility and liability for loss or damage arising from the handling and use of this product, whether used alone or in combination with other products.

P.O. Box 176, New Carlisle OH, 45344 - 937.845.8776 or 800.332.7325
FAX 937.845.3587 - www.conseal.com

Project:	Eastern Vault Company, Inc.	Drawn: DC Snider
		Scale: N/A
		Approved:
Description: Concrete Sealants Inc. CS-102 Butyl Rubber Sealant	P.O. Box 1134 - Courthouse Road Princeton, West Virginia 24740 Tele: (304) 425-8955 Fax: (304) 425-1171	Date:
		SHT 1 of 2

PRODUCT SPECIFICATIONS

CONSEAL CS102

Concrete Sealants Inc.

Butyl Rubber Sealant For All Precast Structures; Meets Specs.

PHYSICAL PROPERTIES

	Spec	Required*	CS 102
Hydrocarbon blend content % by weight	ASTM D4 (mod.)	50% min	51%
Inert mineral filler % by weight	AASHTO T111	30% min	35%
Volatile Matter % by weight	ASTM D6	2% max.	1.2
Specific Gravity, 77°F	ASTM D71	1.15-1.50	1.25
Ductility, 77°F	ASTM D113	5.0 min	10
Penetration, cone 77°F, 150 gm. 5 sec	ASTM D217	50-100	55-60
Penetration, cone 32°F, 150 gm. 5 sec	ASTM D217	40 min	40-65
Flash Point, C.O.C., °F	ASTM D92	350°F min.	450°F
Fire point, C.O.C., °F	ASTM D92	375°F min	475°F

IMMERSION TESTING

- 30-Day Immersion Testing: No visible deterioration when tested in 5% Caustic Potash, 5% Hydrochloric Acid, 5% Sulfuric Acid, and 5% saturated Hydrogen Sulfide. *
- One Year Immersion Testing: No visible deterioration when tested in 5% Formaldehyde, 5% Formic Acid, 5% Sulfuric Acid, 5% Hydrochloric Acid, 5% Sodium Hydroxide, 5% Hydrogen Sulfide and 5% Potassium Hydroxide.
- Requirements of ASTM C-990 Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.

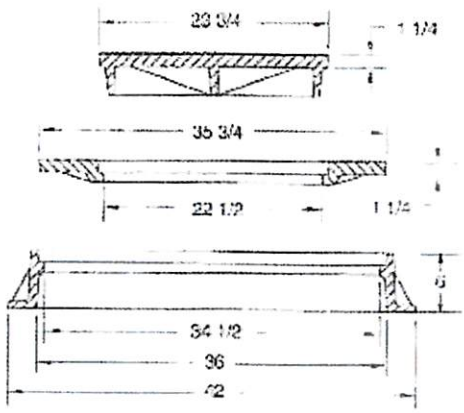
LIMITED WARRANTY
This information is presented in good faith, but we cannot anticipate all conditions under which this information and our products, or the products of other manufacturers in combination with our products, may be used. We accept no responsibility for results obtained by the application of this information or the safety and suitability of our products, either alone or in combination with other products. Users are advised to make their own tests to determine the safety and suitability of each such product or product combinations for their own purposes. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. We sell this product without warranty, and buyers and users assume all responsibility and liability for loss or damage arising from the handling and use of this product, whether used alone or in combination with other products.

P.O. Box 176, New Carlisle OH, 45344 · 937.845.8776 or 800.332.7325
FAX 937.845.3587 · www.conseal.com

Project:	Eastern Vault Company, Inc.	Drawn: DC Snider
		Scale: N/A
		Approved:
Description: Concrete Sealants Inc. CS-102 Butyl Rubber Sealant	P.O. Box 1134 - Courthouse Road Princeton, West Virginia 24740 Tele: (304) 425-8955 Fax: (304) 425-1171	Date:
		SHT 2 of 2

USF 667 RING AND CR SERIES

1. Specify lettering, if required.
2. CR outer cover comes with 4 penetrating pickholes.



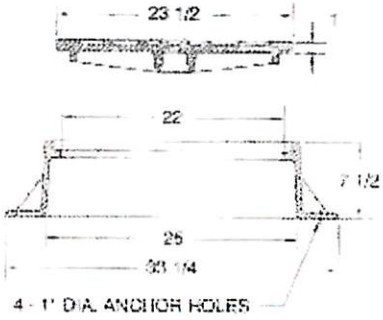
USF 657-CR-XB SHOWN
FLORIDA DOT
STANDARD

COVER TYPE	LOAD RATING	INNER WEIGHT	*TOTAL WEIGHT
F	HEAVY DUTY	130	570
T	HEAVY DUTY	145	585
H	HEAVY DUTY	150	590
J	HEAVY DUTY	150	590
W	HEAVY DUTY	165	605
X	HEAVY DUTY	200	640
BJ	HEAVY DUTY	200	640
CE	HEAVY DUTY	145	585
CZ	HEAVY DUTY	180	620
XB	HEAVY DUTY	190	630

* Includes 220# CR outer cover

USF 668 RING AND KL COVER

1. Specify lettering, if required.
2. Specify vent holes, if required.



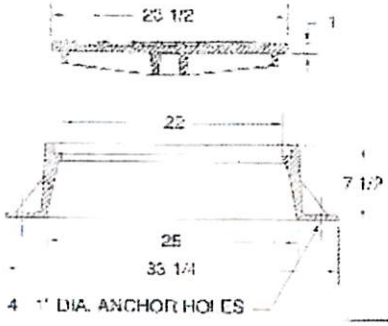
COVER TYPE	LOAD RATING	COVER WEIGHT	TOTAL WEIGHT
KL	HEAVY DUTY	125	265

THIS RING ALSO AVAILABLE WITH:

	GRATE	WATER TIGHT	"O" RING	DOUBLE COVER
USF NO.		KL COVER	-	-
PG. NO.	-	81	-	-

USF 669 RING AND COVER SERIES

1. Specify lettering, if required.
2. Specify vent holes, if required.



USF 669-KL SHOWN
NORTH CAROLINA
D.O.T. 840.54
STANDARD

COVER TYPE	LOAD RATING	COVER WEIGHT	TOTAL WEIGHT
BH	HEAVY DUTY	195	395
SG	HEAVY DUTY	125	315
KL	HEAVY DUTY	125	315
KP	HEAVY DUTY	125	315
KU	HEAVY DUTY	125	315

THIS RING ALSO AVAILABLE WITH:

	GRATE	WATER TIGHT	"O" RING	DOUBLE COVER
USF NO.	-	KL COVER		-
PG. NO.	-	81		-

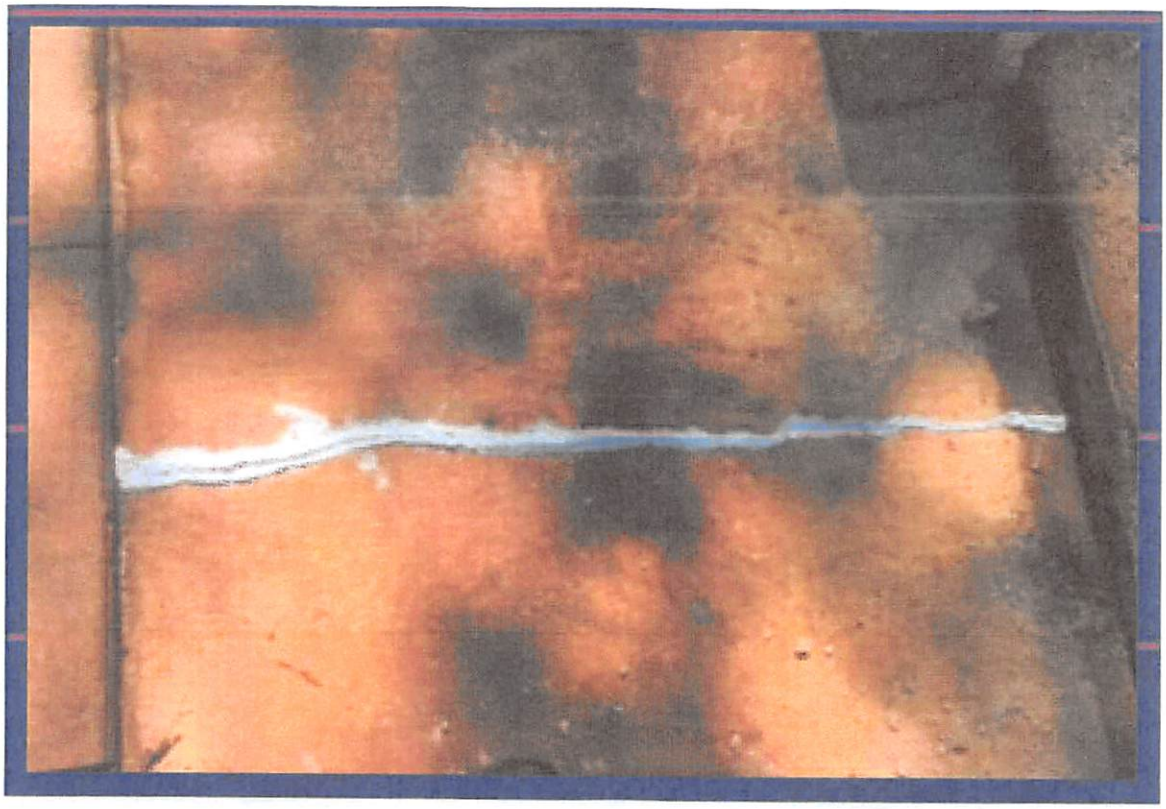


Photo 1: Crack repair on truck unloading bay.

Photo 2: Crack repair of truck unloading bay.

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							
41-109-02703	1548	4173158.01	462847.92	7/1/2006	113	Steel	16,800	Produced Brine	0	Single
41-109-02703	1549	4173158.01	462847.92	7/1/2006	113	Steel	16,800	Produced Brine	0	Single
41-109-02703	1550	4173158.01	462847.92	7/1/2006	113	Steel	16,800	Produced Brine	0	Single
41-109-02703	1551	4173158.01	462847.92	7/1/2006	113	Steel	16,800	Produced Brine	0	Single

WP-400 PROPOSED CONTAINMENT VOLUME

Containment Volume of Proposed Tank Facility for WP 400

Dike Width/ft	Dike Width/ft	Dike Depth/in	Total Volume Gallons	8820 Gallon Tank	8820 Gallon Tank	8820 Gallon Tank	8820 Gallon Tank	Usable Volume/gal	Largest Tank Volume	Volume % of the Largest Tank
40.00	30.00	24.00	17953	1175	1175	1175	1175	13253	8820	150%

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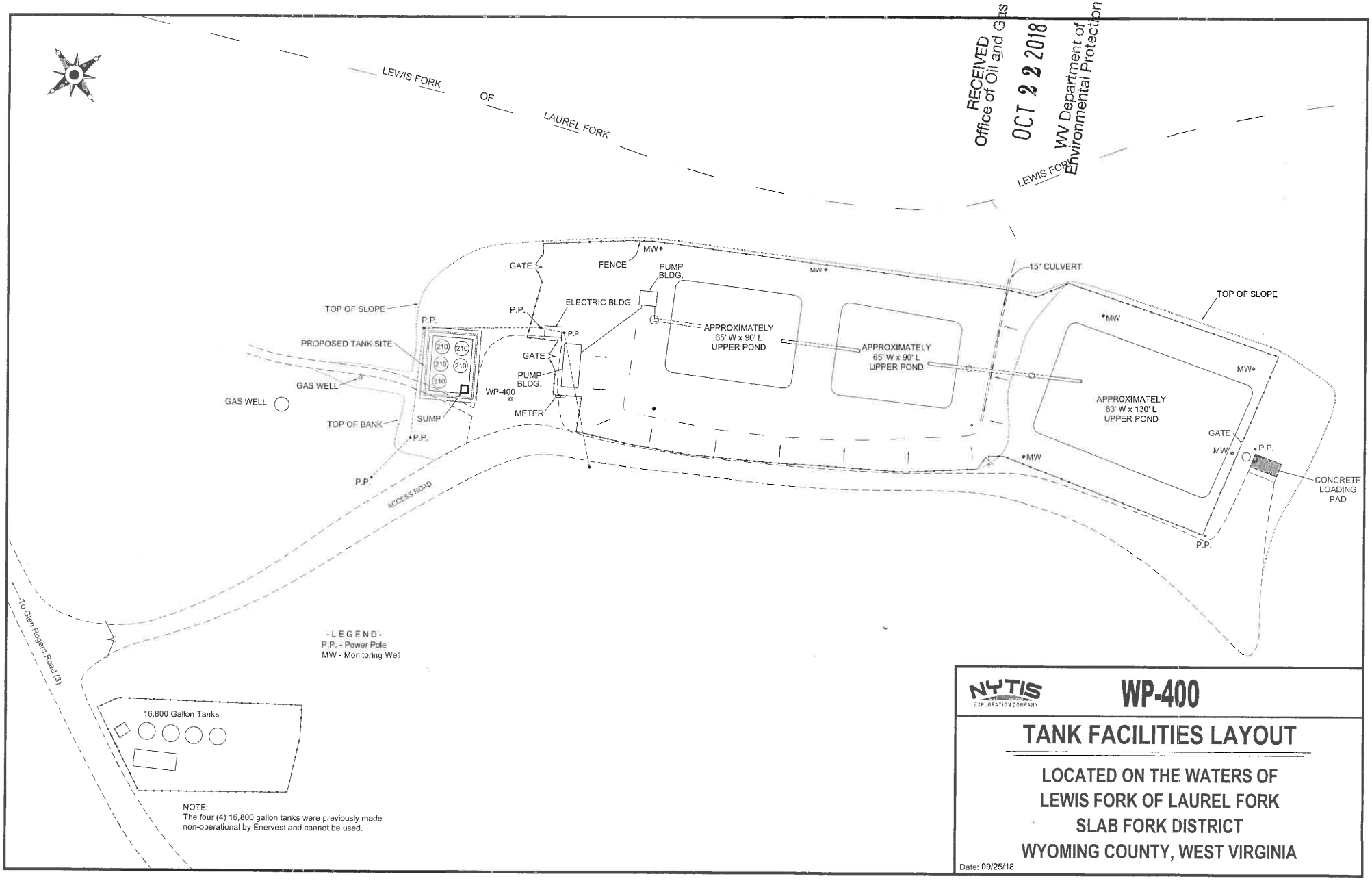


NOTE:
The four (4) 16,800 gallon tanks were previously made non-operational by Enervest and cannot be used.

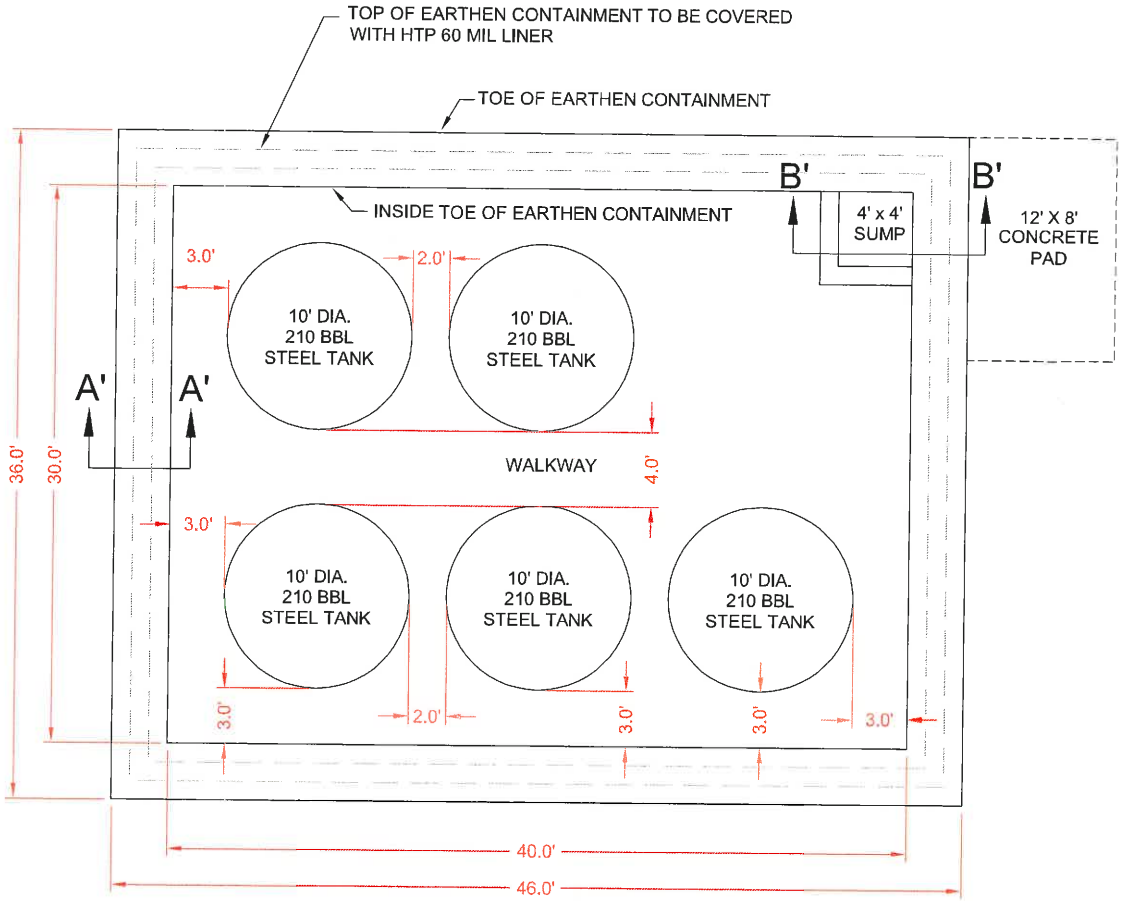
NYTIS EXPLORATION COMPANY

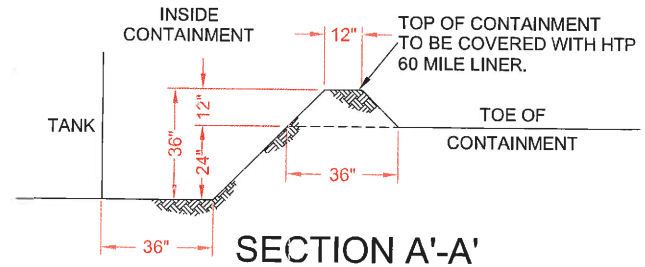
WP-400

TANK FACILITIES LAYOUT

LOCATED ON THE WATERS OF
LEWIS FORK OF LAUREL FORK
SLAB FORK DISTRICT
WYOMING COUNTY, WEST VIRGINIA

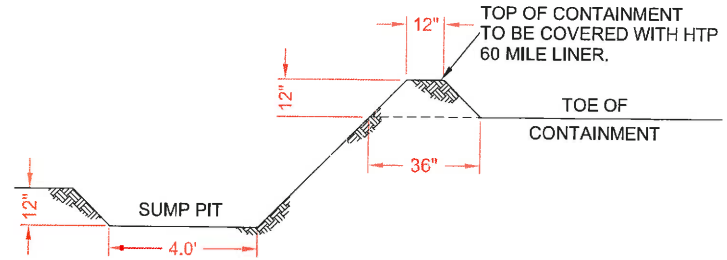
Date: 09/25/18





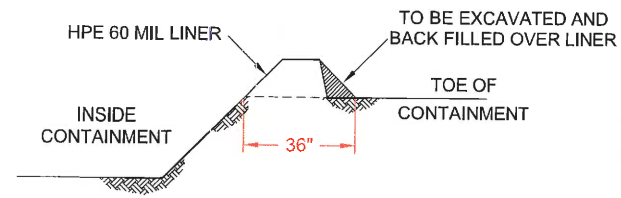
SECTION A'-A'

Containment Wall



SECTION B'-B'

Sump Pit



LINER DETAIL

CONTAINMENT WALL

NOTE:

Containment will be 40' L. x 30' W x 24" H

Containment wall construction material will use soil from the surrounding area.

Containment is to be a hole excavated out 30' x 40' x 2 feet deep

Containment walls will compacted using the equipment used to construct wall 1 foot high around top edge.

Containment will be 40 feet wide by 30 feet long and 24 inches high. Total volume is 17,953 gallons with usable volume of 13,253 gallons.

Containment walls will be covered with HTP 60 mil liner.

NOTE:

The outside containment wall will be excavated approximately 15 inches from the toe back toward inside. HTP 60 mil liner will then overlap containment wall. The excavated soil will then be used to cover the HTP 60 mil liner to the original grade of the containment wall.

Additional HTP 60 mil liner will be place over the entire length of containment wall where the pipes cross over to pump house.

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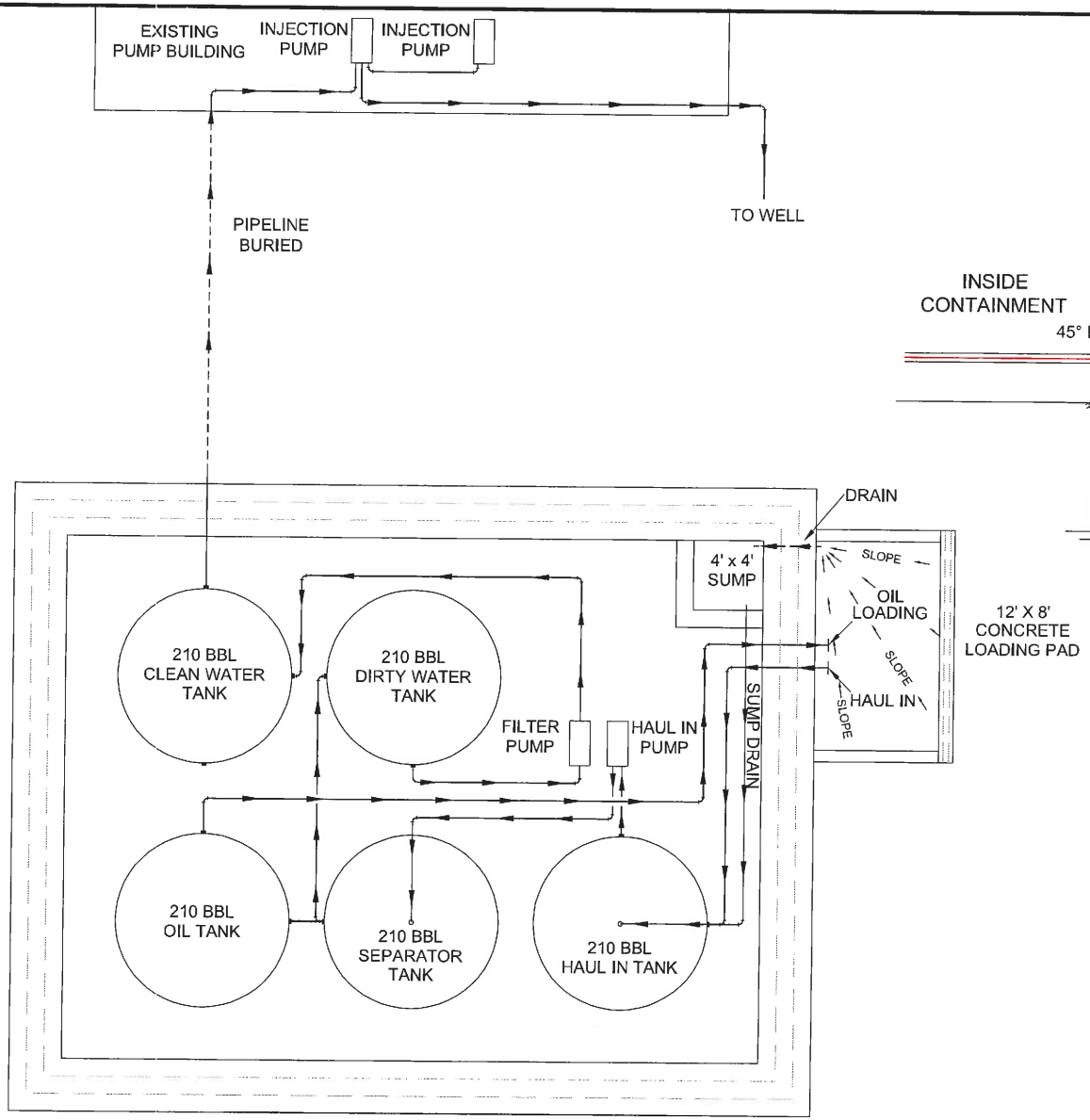
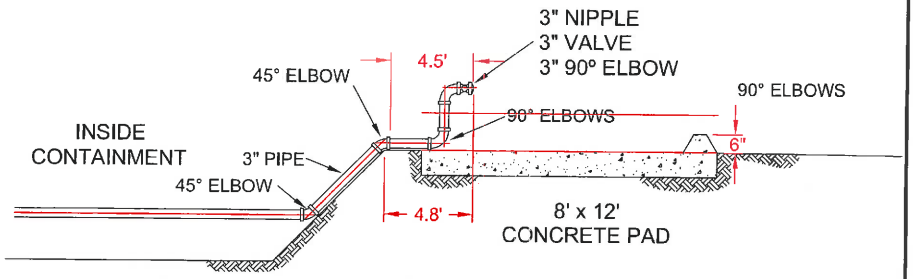
WP-400 PROPOSED CONTAINMENT AND TANK LAYOUT

10/08/18





LOADING & UNLOADING CONNECTION

NOTE:
Containment wall will be covered by HTP 60 mil liner.
Where the pipes cross over and along entire containment wall an additional HTP 60 mil liner will be installed.

WP-400 PROPOSED FLOW DIAGRAM

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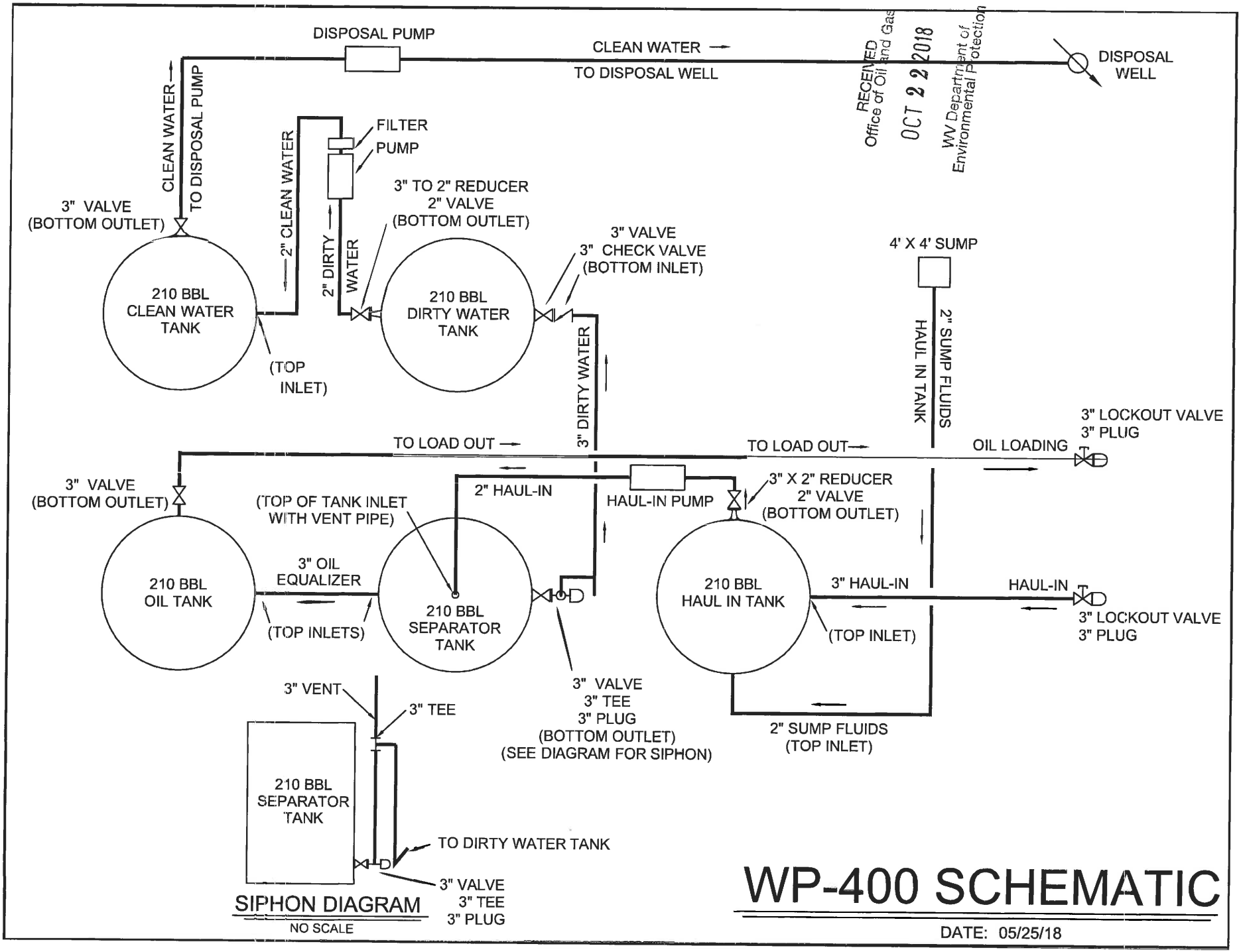

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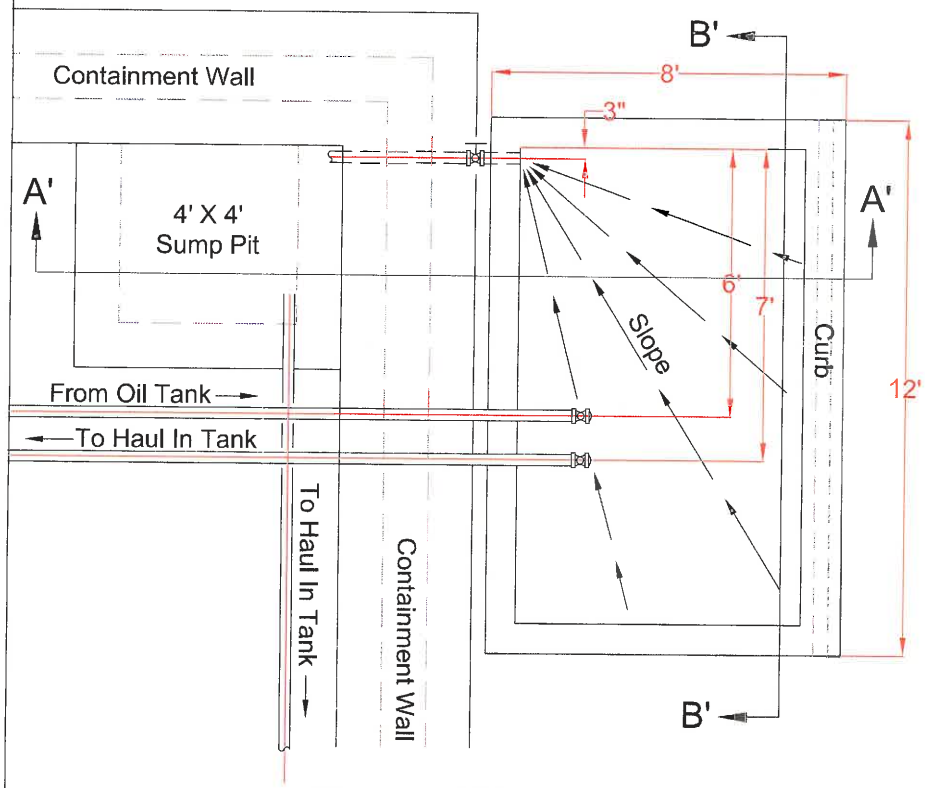
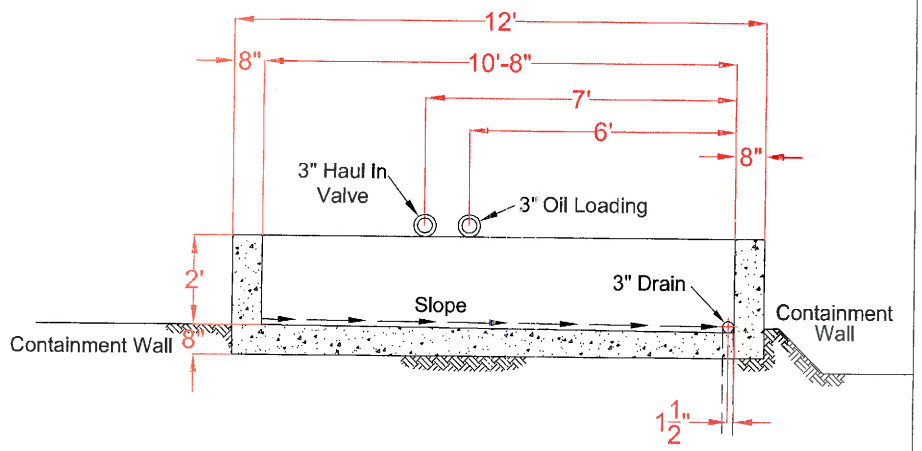
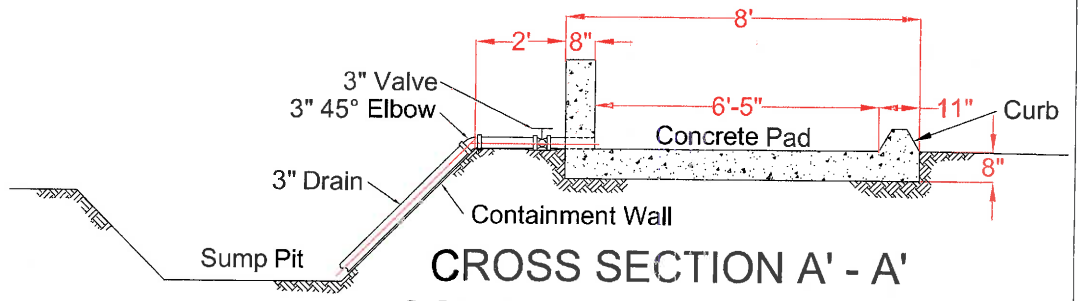


PLAN VIEW
LOADING & LOADING



CROSS SECTION B - B'
CONCRETE LOADING PAD



CROSS SECTION A' - A'
CONCRETE LOADING PAD

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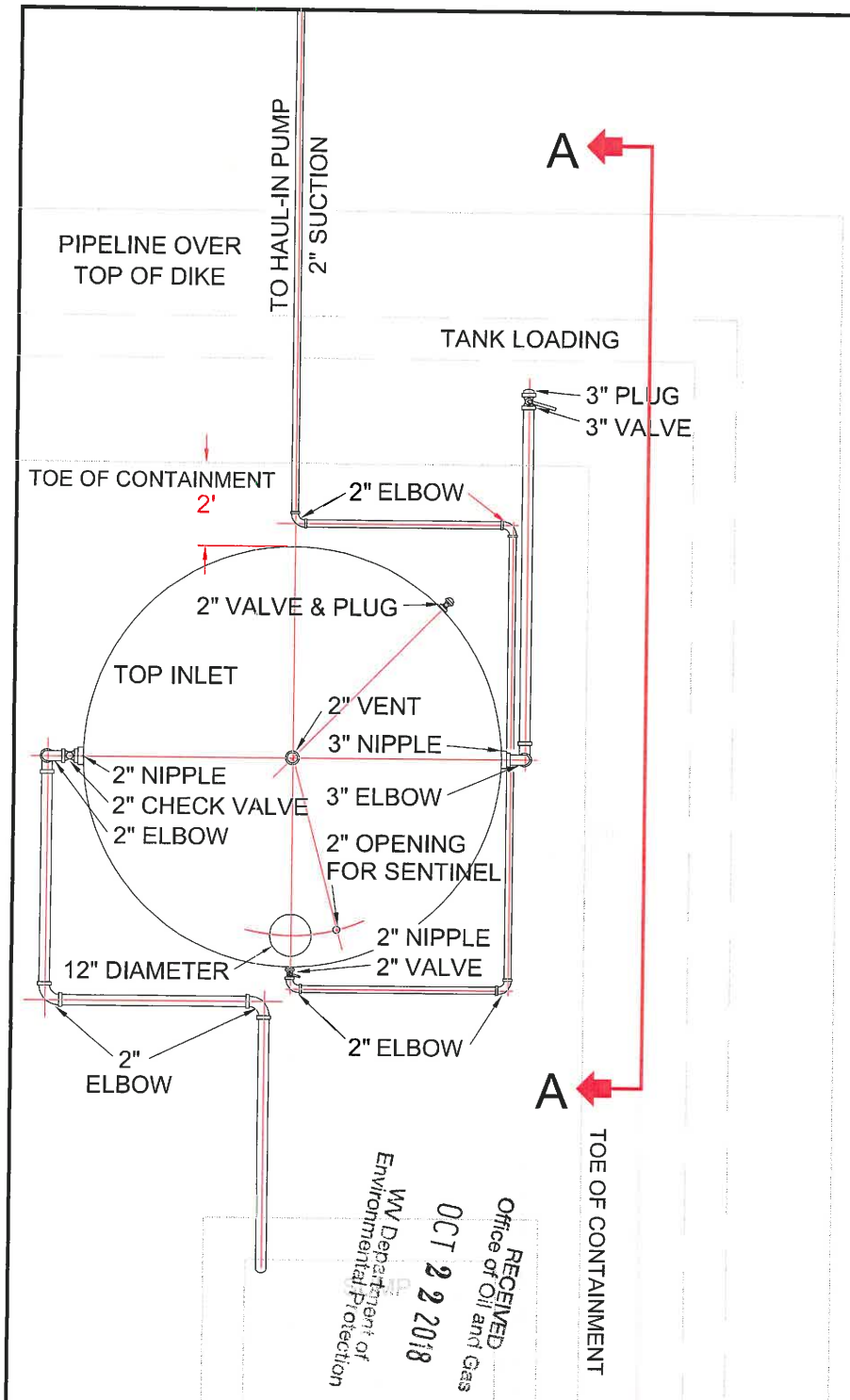
WP-400 PROPOSED LOADING FACILITY

Date: 10/08/18



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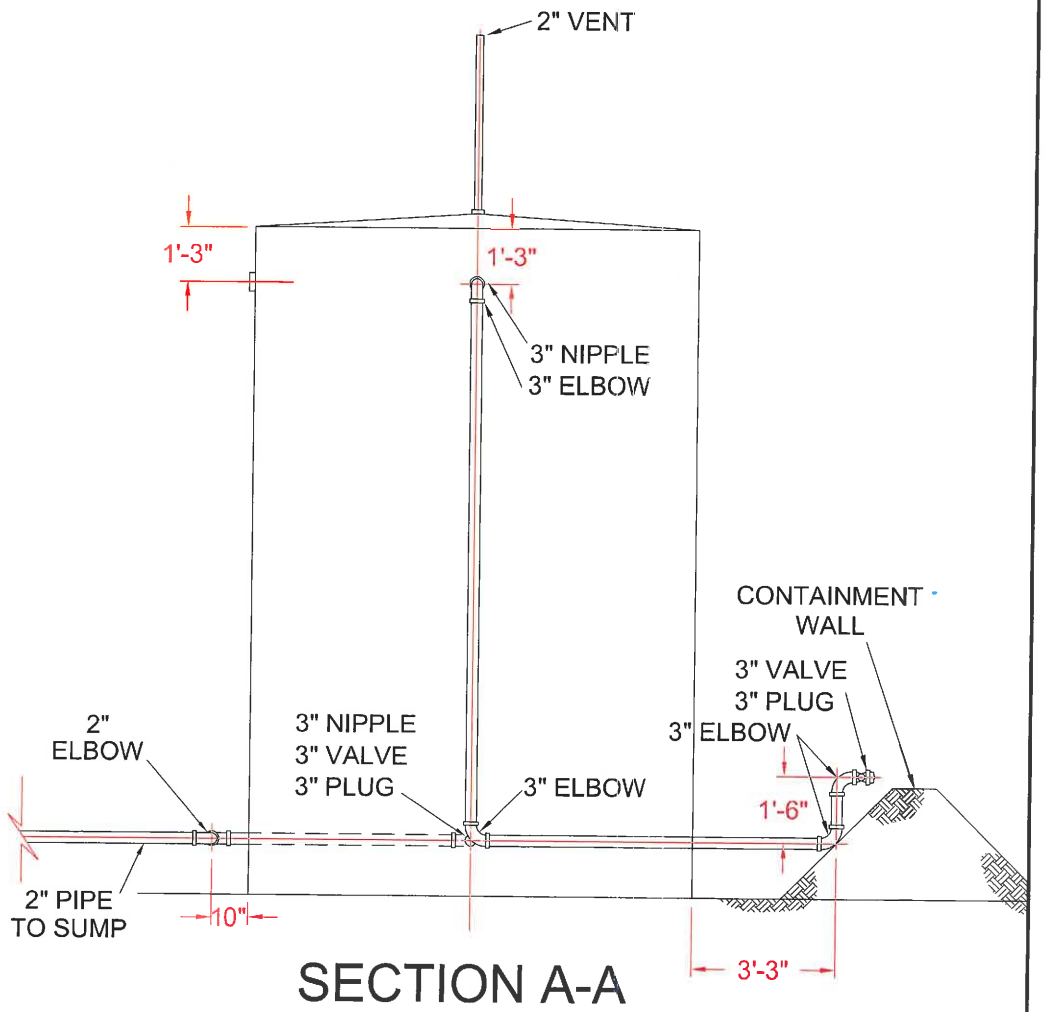
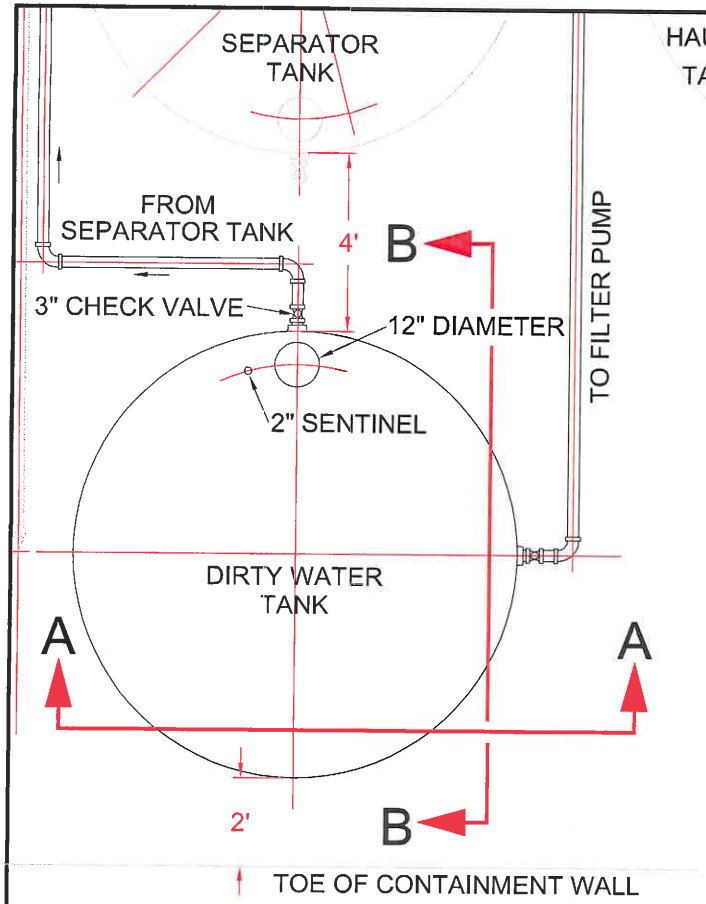
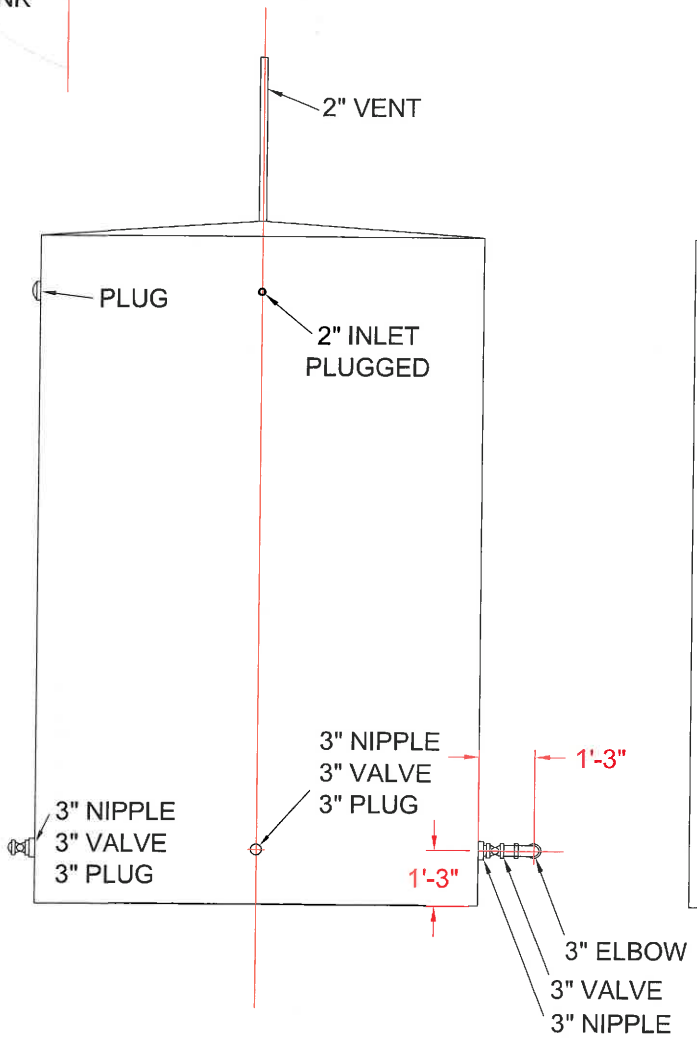


SECTION A-A

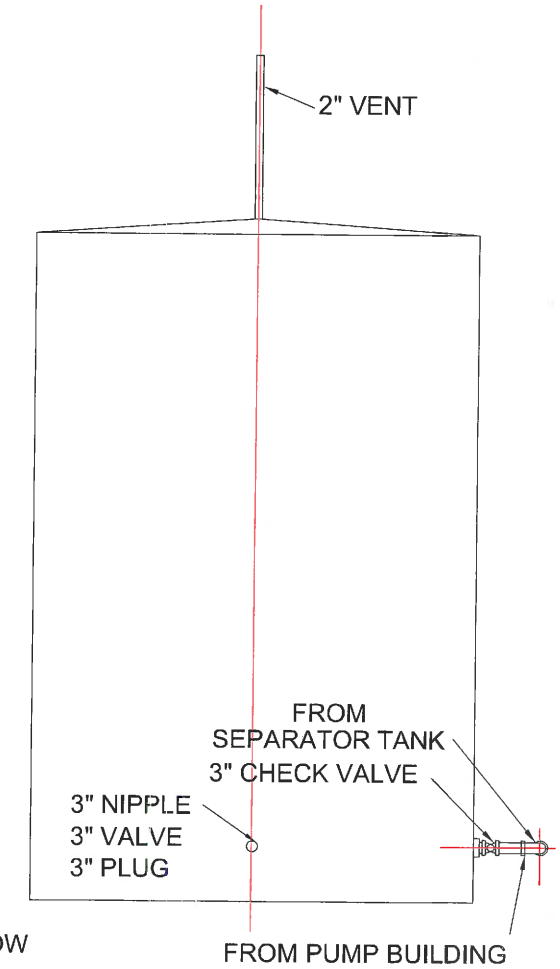
HAUL-IN TANK

DATE: 01/28/18





SECTION A-A



SECTION B-B

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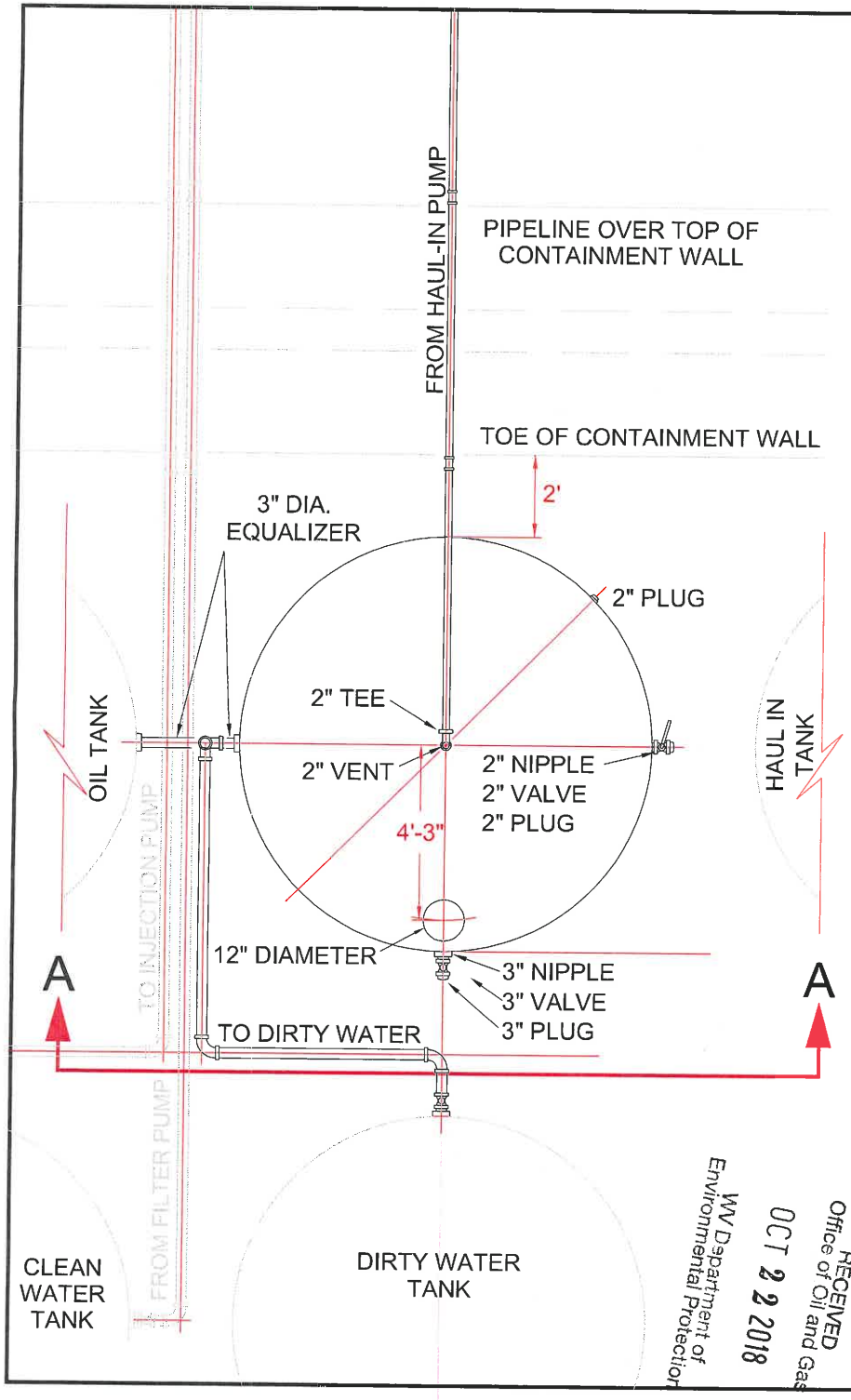
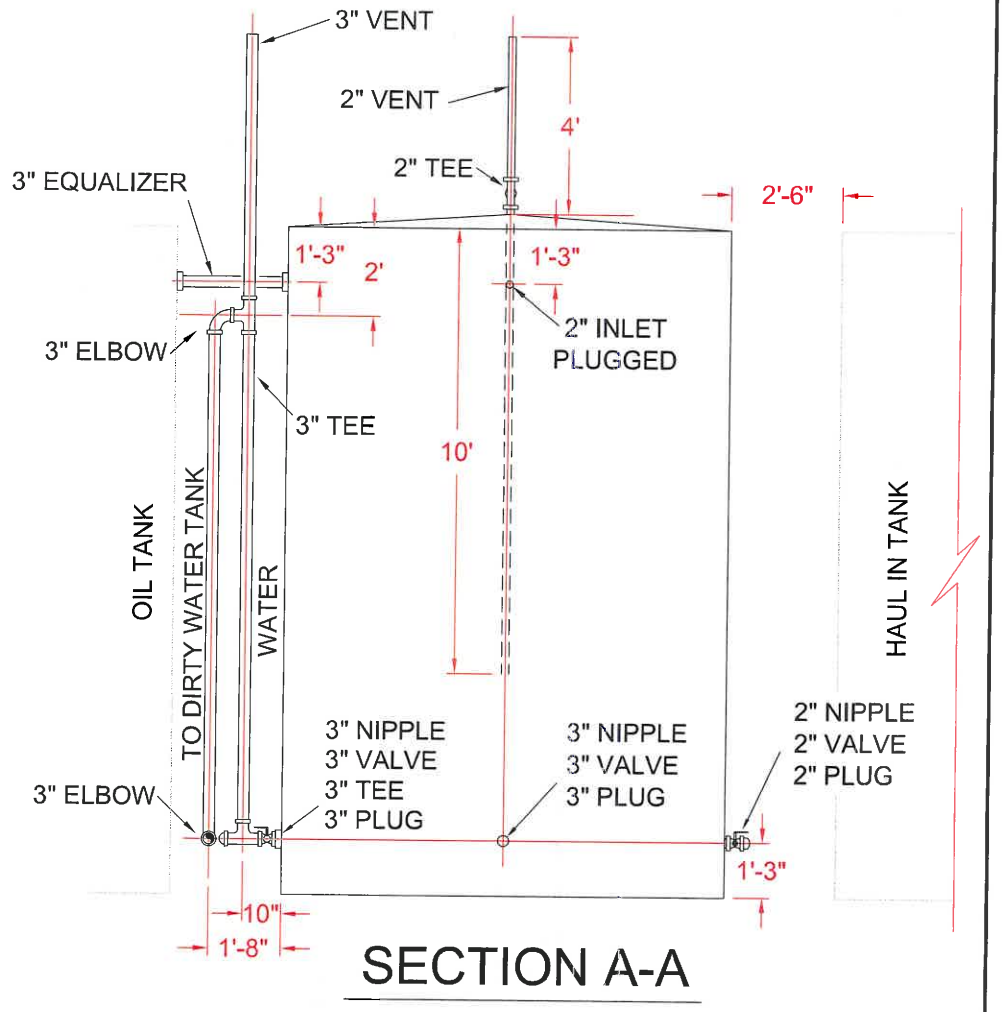
DIRTY WATER TANK

DATE: 10/08/18





SECTION A-A

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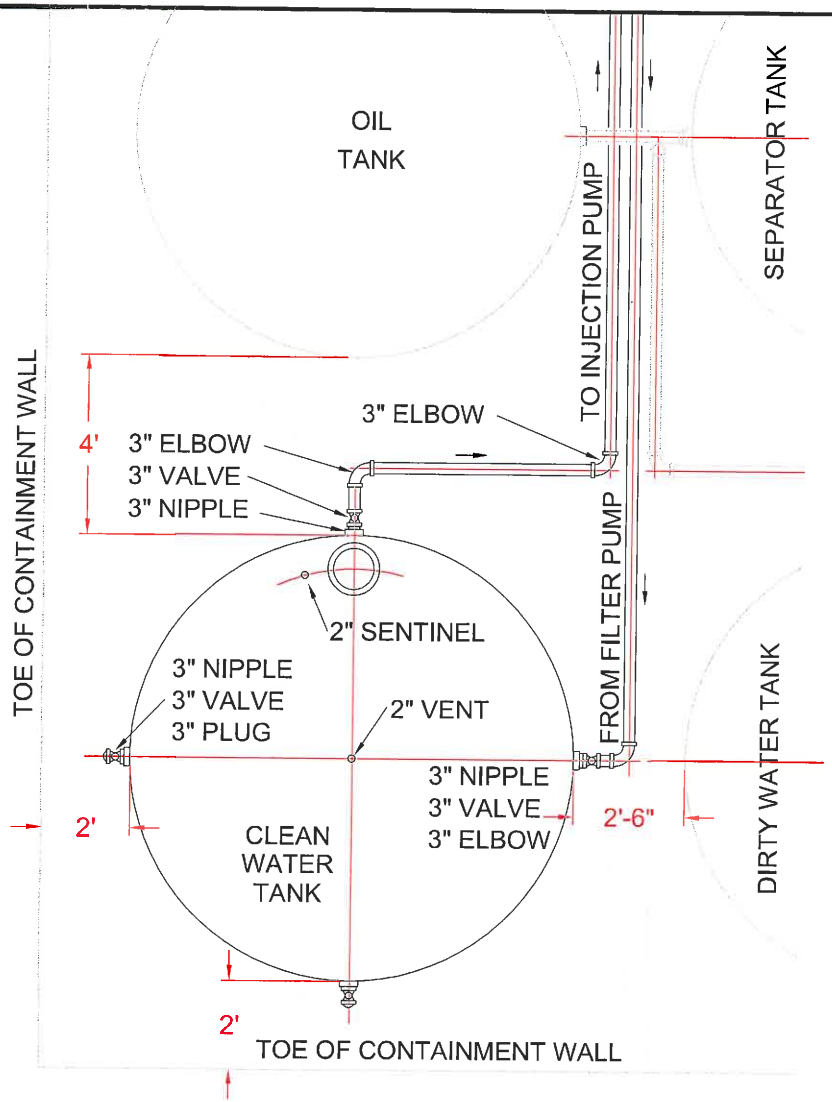
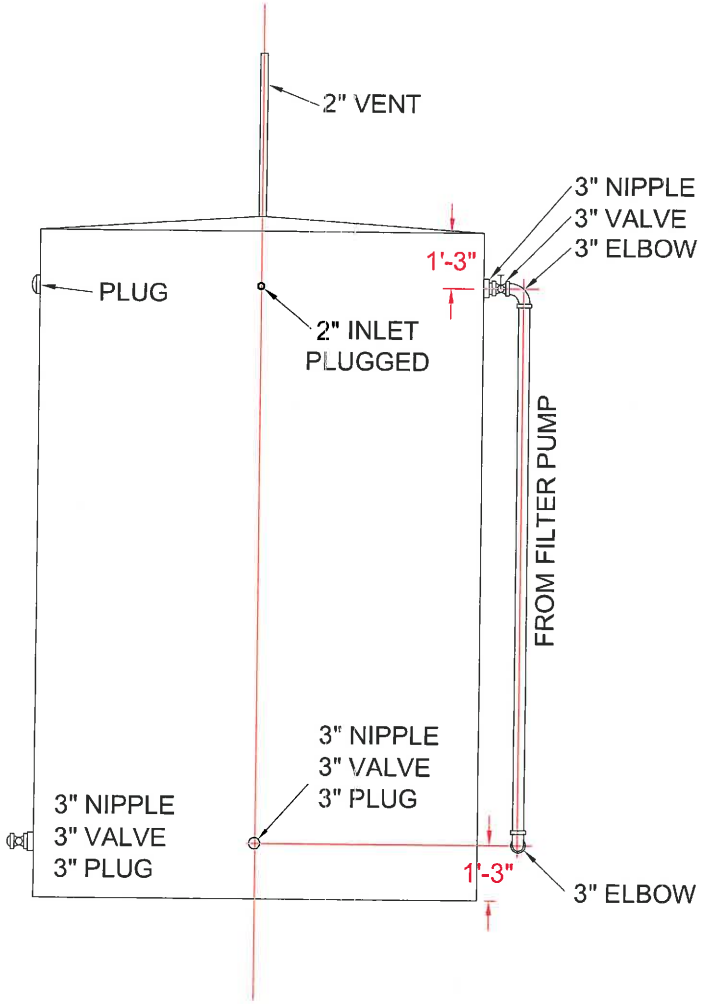
SEPARATOR TANK

DATE: 10/08/18





SECTION A-A

CLEAN WATER TANK

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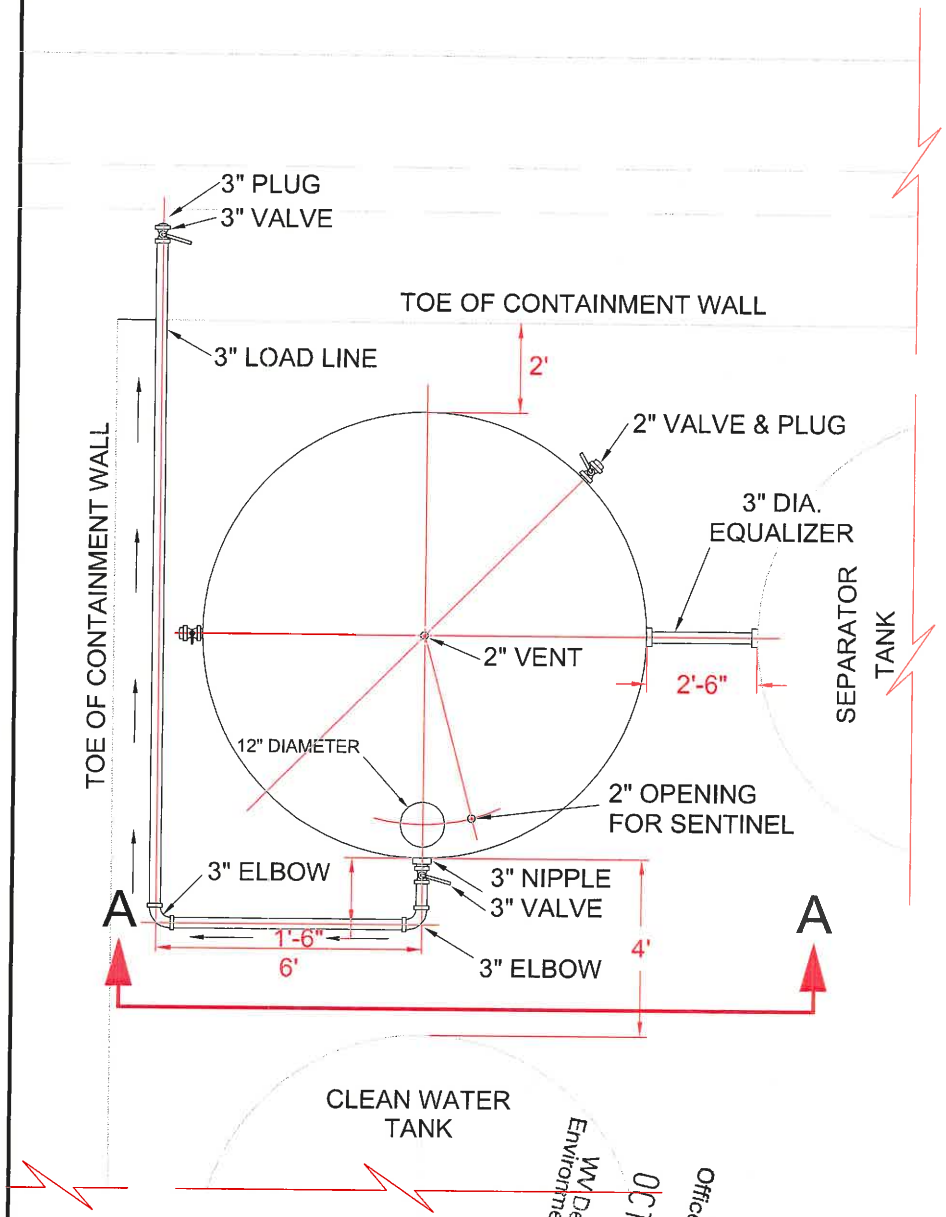

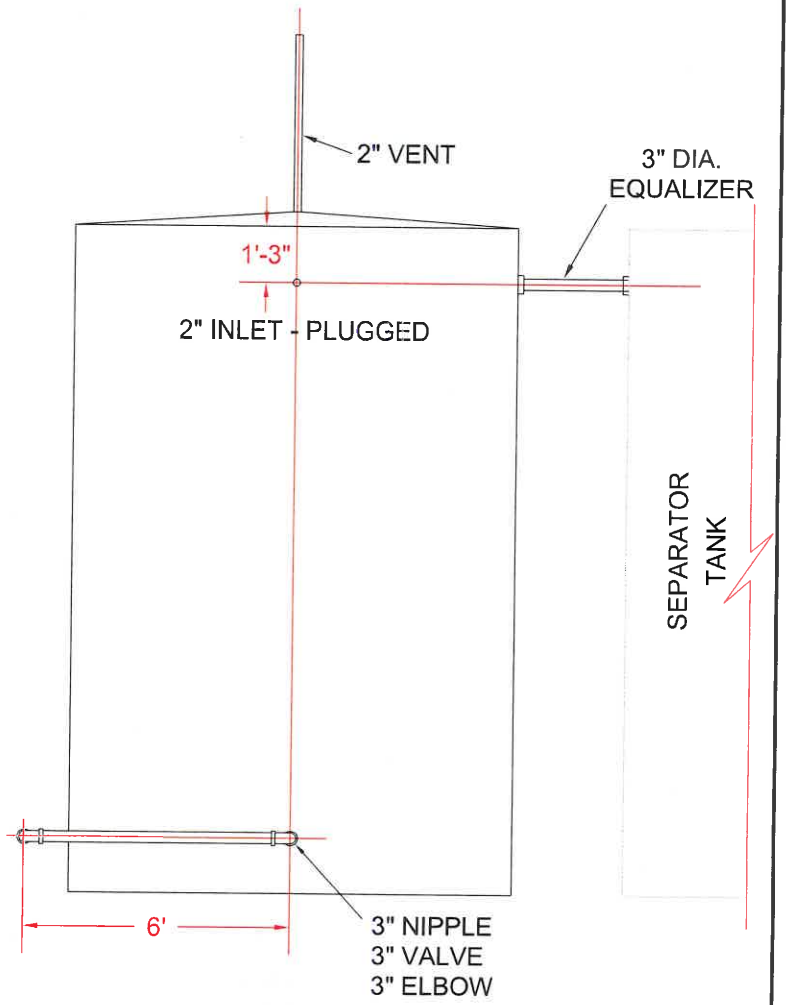

SECTION A-A

OIL TANK

10/08/18

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Section 7

Area of Review

Section 7 – Area of Review

The area of review for this well is a fixed ¼ mile radius around the well head (see attached maps). One producing gas well is located within a ¼ mile radius of this well. One drinking water spring is located within this ¼ mile radius. Lab results for this spring are provided.

Well logs that penetrate the injection zone have been reviewed and are provided.

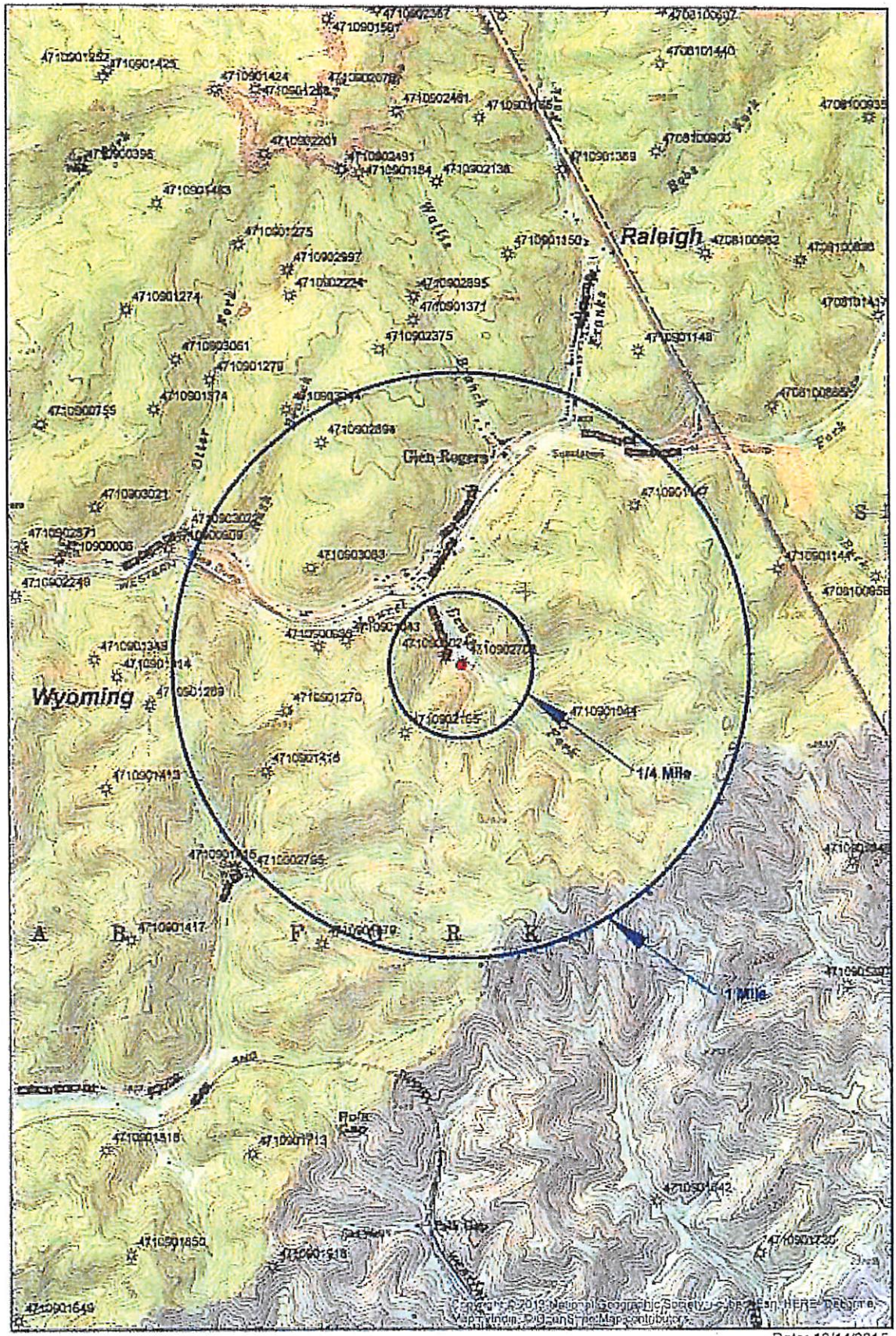
APPENDIX C

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
4710901024	Gas	Plugged	4173180.5	462852.6	Yes	Yes	3902	1892
4710902165	Gas	Active	4172763.3	462625.3	No	Yes	2055	2283
4710902703	Injection	Active	4173148.1	462948.9	Yes	Yes	3350	1879

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

Promoting a healthy environment.



Date: 12/14/2015

Legend

- 400 WIW
- Wells
- County
- TWP
- EV

Exhibit #1
Topo Base
Disposal Well 400 WIW

0 1,250 2,500 5,000 7,500 10,000 Feet

1024

WVGES GEOLOGY UNDERLIES IT ALL "Pipeline"

Select County: (109) Wyoming
Enter Permit #: 1024
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 = 109 Permit = 1024 Link to all digital records for well

Report Time: Tuesday, January 17, 2023 11:01:18 AM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4710901024	Wyoming	1024	Slab Fork	McGraws	Mullens	37.705108	-81.421421	462852.6	4173180.5

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_
4710901024	10/2/1987	Original Loc	Completed	Y & O Coal		99				Sonat Exploration Company			
4710901024	7/24/2006	Plugging	Completed	Heartwood Forestland		99	Y&O Coal		Wyoming Pocahontas Land Corp	Penn Virginia Oil & Gas Corp.			

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	KOD	G_BEF	G_AFT	O
4710901024	10/2/1987	9/18/1987	1892	Ground Level	McGraw	Gordon	Gordon	Development Well	Development Well	Gas	Rotary	Acid+Frac	3920		3920		0	192	
4710901024	7/24/2006	7/24/2006	1892	Ground Level				unclassified	unclassified	not available	unknown	unknown	3145						

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
4710901024	10/2/1987	Pay	Gas	Vertical	1376	Princeton	1404	Princeton	0	0			
4710901024	10/2/1987	Pay	Gas	Vertical	2101	Maxton	2212	Maxton	0	0			
4710901024	10/2/1987	Pay	Gas	Vertical	2648	Big Lime	2655	Big Lime	0	0			
4710901024	10/2/1987	Pay	Gas	Vertical	3721	Gordon	3748	Gordon	0	112			

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
4710901024	Sonat Exploration Company	1988	14,808	0	0	0	3,373	1,550	1,820	1,549	1,466	1,466	2,491	1,093	0
4710901024	Sonat Exploration Company	1990	12,619	1,627	1,954	1,101	1,338	1,258	1,030	914	840	212	57	1,011	1,277
4710901024	Sonat Exploration Company	1991	18,025	1,138	1,234	1,135	866	1,254	918	1,067	1,049	3,469	1,661	1,623	2,611
4710901024	Penn Virginia Oil & Gas Corp.	1992	785	0	0	0	0	0	0	0	0	0	0	0	785
4710901024	Sonat Exploration Company	1992	12,347	1,152	1,168	1,170	1,172	1,200	1,244	1,239	1,117	930	983	972	0
4710901024	Penn Virginia Resources Corp.	1993	12,153	1,031	489	1,053	1,081	1,101	1,085	1,208	956	1,182	651	1,186	1,130
4710901024	Penn Virginia Resources Corp.	1994	11,596	1,029	911	1,085	1,086	1,036	1,135	802	825	1,044	965	877	801
4710901024	Penn Virginia Resources Corp.	1995	11,546	813	1,065	899	732	882	1,008	1,003	923	842	1,044	1,206	1,129
4710901024	Penn Virginia Resources Corp.	1996	11,018	983	1,060	844	937	865	862	908	1,003	983	827	861	885
4710901024	Penn Virginia Resources Corp.	1997	10,284	918	889	819	839	840	885	848	1,115	740	541	1,022	828
4710901024	Penn Virginia Resources Corp.	1998	9,556	830	816	723	823	703	785	816	789	885	792	827	767
4710901024	Penn Virginia Resources Corp.	1999	9,894	836	770	0	644	748	800	772	847	939	1,004	936	1,598
4710901024	Penn Virginia Oil & Gas Corp.	2000	8,996	840	805	0	778	808	785	792	803	832	861	840	852
4710901024	Penn Virginia Oil & Gas Corp.	2001	9,673	809	799	800	743	861	707	803	836	902	826	784	803
4710901024	Penn Virginia Oil & Gas Corp.	2002	8,950	762	779	823	680	759	737	804	610	707	747	749	793
4710901024	Penn Virginia Oil & Gas Corp.	2003	8,655	766	812	713	643	728	664	721	712	843	771	676	606
4710901024	Penn Virginia Oil & Gas Corp.	2004	7,927	560	663	572	459	536	771	720	698	669	732	779	768
4710901024	Penn Virginia Oil & Gas Corp.	2005	9,881	695	774	770	689	751	728	760	1,758	753	734	752	717
4710901024	Penn Virginia Oil & Gas Corp.	2006	8,137	680	681	625	706	318	817	775	791	736	677	690	641
4710901024	Penn Virginia Oil & Gas Corp.	2007	7,823	647	640	570	623	648	675	676	677	691	659	679	638
4710901024	Penn Virginia Oil & Gas Corp.	2008	7,774	704	638	635	691	656	630	632	646	625	662	626	629
4710901024	Penn Virginia Oil & Gas Corp.	2009	7,277	650	558	629	613	643	597	632	610	595	589	582	579
4710901024	Penn Virginia Oil & Gas Corp.	2010	6,774	611	546	566	560	590	572	582	573	559	559	513	543
4710901024	Penn Virginia Oil & Gas Corp.	2011	6,397	553	494	545	520	559	544	544	552	524	521	517	524
4710901024	Enervest Operating, LLC	2012	6,052	539	515	534	526	531	496	546	611	464	427	419	444
4710901024	Enervest Operating, LLC	2013	5,313	453	413	456	431	444	436	451	460	453	445	427	444
4710901024	Enervest Operating, LLC	2014	4,999	428	388	424	412	437	421	426	429	402	413	394	425
4710901024	Enervest Operating, LLC	2015	4,681	418	368	417	394	422	402	405	390	367	376	338	384
4710901024	Nytis Exploration Co., LLC	2016	4,255	400	359	385	359	364	347	356	358	346	338	324	319
4710901024	Nytis Exploration Co., LLC	2017	3,515	316	286	321	324	313	327	302	320	392	313	301	0
4710901024	Nytis Exploration Co., LLC	2018	4,003	295	300	329	329	321	341	354	343	402	332	344	313
4710901024	Nytis Exploration Co., LLC	2019	3,410	313	282	401	292	306	261	319	331	339	0	316	250
4710901024	Diversified Production, LLC	2020	4,065	212	253	332	330	260	323	320	310	422	434	437	432
4710901024	Diversified Production, LLC	2021	5,333	416	445	453	445	457	430	460	463	438	456	422	443

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
4710901024	Sonat Exploration Company	1988													
4710901024	Sonat Exploration Company	1990	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Sonat Exploration Company	1991													
4710901024	Penn Virginia Oil & Gas Corp.	1992	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Sonat Exploration Company	1992	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Resources Corp.	1993	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Resources Corp.	1994	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Resources Corp.	1995	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Resources Corp.	1996	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Resources Corp.	1997	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Resources Corp.	1998	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Resources Corp.	1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Oil & Gas Corp.	2000	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Oil & Gas Corp.	2001	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Oil & Gas Corp.	2002	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Oil & Gas Corp.	2003	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Oil & Gas Corp.	2004	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Oil & Gas Corp.	2005	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Oil & Gas Corp.	2006	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Oil & Gas Corp.	2007	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Oil & Gas Corp.	2008	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Oil & Gas Corp.	2009	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Oil & Gas Corp.	2010	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Penn Virginia Oil & Gas Corp.	2011	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Enervest Operating, LLC	2012	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Enervest Operating, LLC	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Enervest Operating, LLC	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Enervest Operating, LLC	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Nytis Exploration Co., LLC	2016	0												
4710901024	Nytis Exploration Co., LLC	2017	0	0											
4710901024	Nytis Exploration Co., LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Nytis Exploration Co., LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Diversified Production, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Diversified Production, LLC	2021	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
4710901024	Enervest Operating, LLC	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Enervest Operating, LLC	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Enervest Operating, LLC	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Nytis Exploration Co., LLC	2016	0												

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4710901024	Nytis Exploration Co., LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Nytis Exploration Co., LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Diversified Production, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Diversified Production, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0

Production Water Information: (Volumes in Gallons)

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_WTR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4710901024	Nytis Exploration Co., LLC	2016	0												
4710901024	Nytis Exploration Co., LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Nytis Exploration Co., LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Diversified Production, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4710901024	Diversified Production, LLC	2021	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
4710901024	Original Loc	Princeton	Well Record	1374	Reasonable	43	Reasonable	1892	Ground Level
4710901024	Original Loc	Ravencliff/Avis Ss	Well Record	1525	Reasonable	31	Reasonable	1892	Ground Level
4710901024	Original Loc	Avis Ls	Well Record	1572	Reasonable	41	Reasonable	1892	Ground Level
4710901024	Original Loc	Lo Maxton	Well Record	2054	Reasonable	179	Reasonable	1892	Ground Level
4710901024	Original Loc	Little Lime	Well Record	2403	Reasonable	189	Reasonable	1892	Ground Level
4710901024	Original Loc	Big Lime	Well Record	2592	Reasonable	333	Reasonable	1892	Ground Level
4710901024	Original Loc	Weir	Well Record	3149	Reasonable	57	Reasonable	1892	Ground Level
4710901024	Original Loc	Gordon	Well Record	3707	Reasonable	50	Reasonable	1892	Ground Level

Wireline (E-Log) Information:

API	LOG_TOP	LOG_BOT	DEEPEST_FML	LOGS_AVAIL	SCAN	DIGITIZED	GR_TOP	GR_BOT	D_TOP	D_BOT	N_TOP	N_BOT	I_TOP	I_BOT	T_TOP	T_BOT	S_TOP	S_BOT	O_TOP	O_BOT	INCH2	INCH
4710901024	180	3923	Hampshire Grp	G,C,D,I,T,*	Y	N	180	3900	1044	3922			1052	3923	1050	3900			1044	3923	Y	Y

Comment: *logs: caliper, tension, density porosity, audio. Log image reduced in size. log scales are 1in=125' and 1in=50'

Downloadable Log Images/Data: We advise you to save the scanned log or digitized log file(s) to your PC for viewing. To do so, right-click the file of interest and select the save option. Then you can direct the file to a location of your choice. Please note the scanned log images vary in size and some may take several minutes to download.

Scanned Logs

FILENAME
4710901024gcdeo.tif
4710901024gio.tif
4710901024gto.tif

Quick Reference Guide for Log File Names For more info about WVGES scanned logs click here

geologic log types:
- d density (includes bulk density, compensated density, density porosity, grain density, matrix density, etc.)
- e photoelectric adsorption (PE or Pe, etc.)
- g gamma ray
- i induction (includes dual induction, medium induction, deep induction, etc.)
- l laterolog
- m dipmeter
- n neutron (includes neutron porosity, sidewall neutron--SWN, etc.)
- o other[1]
- s sonic or velocity
- t temperature (includes borehole temperature, BHT, differential temperature, etc.)
- z spontaneous potential or potential

mechanical log types:
- b cement bond
- c caliper
- o other[1]
- p perforation depth control or perforate

[1]other logs may include, but are not limited to, such curves as audio, bit size, CCL--casing collar locator, continuous meter, directional survey, gas detector, guard, NCTL--Nuclear Cement Top Locator, radioactive tracer, tension

Plugging Information:

API	PLG_DT	DEPTH_PBT
4710901024	7/24/2006	3145

There is no Sample data for this well

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DIVISION OF OIL & GAS
DEPARTMENT OF ENERGY

WR-35

State of West Virginia
DEPARTMENT OF ENERGY
Oil and Gas Division

Date 1/14/88
Operator's
Well No. Y & O Coal #99
Farm
API No. 47 - 109 - 1024

WELL OPERATOR'S REPORT
OF
DRILLING, FRACTURING AND/OR STIMULATING, OR PHYSICAL CHANGE

WELL TYPE: Oil ___ / Gas X / Liquid Injection ___ / Waste Disposal ___ /
(If "Gas," Production X / Underground Storage ___ / Deep ___ / Shallow ___ /)

LOCATION: Elevation: 1892' Watershed Lewis Fork
District: Slab Fork County Wyoming Quadrangle McGraws

COMPANY Sonat Exploration Co.
ADDRESS P. O. Box 1513
DESIGNATED AGENT Dana Blackshire
ADDRESS P. O. Box 766, Charleston, WV 25323
SURFACE OWNER See Attachment 1
ADDRESS
MINERAL RIGHTS OWNER See Attachment 2
ADDRESS
OIL AND GAS INSPECTOR FOR THIS WORK Arthur St. Clair ADDRESS P. O. Box 468 Brenton, WV 24818
PERMIT ISSUED 8/31/87
DRILLING COMMENCED 9/18/87
DRILLING COMPLETED 10/2/87
IF APPLICABLE: PLUGGING OF DRY HOLE ON CONTINUOUS PROGRESSION FROM DRILLING OR REWORKING. VERBAL PERMISSION OBTAINED ON

Casing & Tubing	Used in Drilling	Left in Well	Cement fill up Cu. ft.
Size 20-16 Cond.	30'	30'	by hand
13-10"			
9 5/8	685'	685'	surface
8 5/8			
7	1050'	1050'	surface
5 1/2			
4 1/2		3900'	200 sx
3			
2		3750*	
Liners used			
	AD-1 C-	Packer Packer	3650' 3100'

GEOLOGICAL TARGET FORMATION Gordon Depth 3721 feet
Depth of completed well 3920 feet Rotary X / Cable Tools
Water strata depth: Fresh ___ feet; Salt ___ feet
Coal seam depths: ___ Is coal being mined in the area? ___

OPEN FLOW DATA
Producing formation Gordon Pay zone depth 3721 feet
Gas: Initial open flow 112 Mcf/d Oil: Initial open flow 0 Bbl/d
Final open flow 112 Mcf/d Final open flow 0 Bbl/d
Time of open flow between initial and final tests 24 hours
Static rock pressure 600 psig (surface measurement) after 24 hours shut in
(If applicable due to multiple completion--)
Second producing formation Big Lime, Maxon, Princeton Pay zone depth 2648, 2188, 1376 feet
Gas: Initial open flow 140 Mcf/d Oil: Initial open flow 0 Bbl/d
Final open flow 80 Mcf/d Oil: Final open flow 0 Bbl/d
Time of open flow between initial and final tests 48 hours
Static rock pressure 500 psig (surface measurement) after 24 hours shut in

Wyo. 1024

(Continue on reverse side)

1024

DETAILS OF PERFORATED INTERVALS, FRACTURING OR STIMULATING, PHYSICAL CHANGE, ETC.

Gordon: 3734-48'; 3721-25, 2spf, Frac w/309BW W/N_2; 60,000# 20/50sd ATP 1690 psi ATR 9.8 BPM

Weir: 3171-3206' 2SPF Did not Frac Insolated Between Packers

Big Lime: 2648-55', 2SPF Acidized 3000 gals DGA 228 w/170 MSCFN_2 ATP 1900 psi; ATR 4.5 BPM

Maxon: 2184-2212'; 2101-04', 2SPF, Frac w/291BW w/N_2; 55,000# 20/50sd ATP 2250 psi, ATR 30 BPM

Princeton: 1376-82'; 1306-1404', 2SPF, Frac w/309BW w/N_2; 60,000# 20/50sd ATP 2100 psi; ATR 30 BPM

WELL LOG

FORMATION COLOR HARD OR SOFT	TOP FEET	BOTTOM FEET	REMARKS Including indication of all fresh and salt water, coal, oil and gas
Clay	0	9	
Sand & Shale	9	63	¼" stream water at 58'
Coal	63	67	
Sand	67	130	1-½" stream water at 75'
Sand & Shale	130	242	2-½" stream water at 220'
Coal	242	246	
Sand	246	369	
Coal	369	373	
Sand & Shale	373	474	1" stream water at 373'
Coal	474	477	
Sandy Shale	477	489	
Red Rock	489	546	
Sand & Shale	546	659	
Open Mine	659	662	
Sand & Shale	662	847	
Coal	847	850	
Sand	850	864	
Coal	864	867	
Sand & Shale	867	972	
Coal	972	975	
Sand & Shale	975	1001	
Coal	1001	1004	
Sand	1004	1012	
Coal	1012	1014	
Sand & Shale	1014	1374	
Princeton Sand	1374	1417	
Sand & Shale	1417	1525	
Ravencliff Sand	1525	1556	Gas check at 1588'. No show.
Shale	1556	1572	
Avis Lime	1572	1613	
Sand & Shale	1613	1659	
Red Rock & Shale	1659	1776	
Sand & Shale	1776	2054	
Lower Maxon	2054	2233	Gas Check at 2089'. 26 MCF
Sandy Shale	2233	2403	
Little Lime	2403	2592	
Big Lime	2592	2925	Gas check at 2642'. No show.
Sand & Shale	2925	3149	Gas check at 2981'. 29 MCF
Weir	3149	3206	
Sand & Shale	3206	3707	Gas check at 3294'. Trace
(Attach separate sheets as necessary)			
Gordon	3707	3757	
Sand & Shale	3757	3920	Gas check at 3818'. 34 MCF
Total Depth	3920		Gas check at TD. 29 MCF

RECEIVED
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DIVISION OF OIL & GAS
DEPARTMENT OF ENERGY

Sonat Exploration
Well Operator

By: Danita J. M. Maseles

Date: 1/14/88

Note: Regulation 2.02(i) provides as follows:
"The term 'log' or 'well log' shall mean a systematic detailed geological record of all formations, including coal, encountered in the drilling of a well."

8074 2262

1024

Rev (9-04)
WR-38
DATE: 8/2/06

API # 47-109-01024 / Partial Plug

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS
AFFIDAVIT OF PLUGGING AND FILLING WELL

AFFIDAVIT SHOULD BE IN TRIPLICATE, one copy mailed 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.

Farm name: Heartwood Forestland Operator Well No.: Y&O Coal 99

LOCATION: Elevation: 1892 Quadrangle: McGraws
District: Slab Fork County: Wyoming
Latitude: 1190 Feet South of 37 Deg. 42 Min. 30 Sec.
Longitude: 1400 Feet West of 81 Deg. 25 Min. 0 Sec.

Well Type: OIL _____ GAS ___X__

Company: Penn Virginia Oil & Gas Corporation
2550 East Stone Drive, Suite 110
Kingsport, TN 37660

Coal Operator or Owner: Wyoming Pocahontas Land Company
367 Meadows Road
Craigville, WV 26205

Coal Operator or Owner _____

Agent: Bryant Bowman

Permit Issued Date: 6/15/2006

RECEIVED
Office of Oil & Gas
Office of Chief
AUG 0 4 2006
WV Department of Environmental Protection

AFFIDAVIT

STATE OF WEST VIRGINIA,

County of Wyoming ss:

Jeff Whitehair with Whitehair Operating, 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 the above named well operator, and participated in the work of plugging and filling the above well say that said work was commenced on the 24th day of July, 2006, and the well was plugged and filled in the following manner:

TYPE	FROM	TO	PIPE REMOVED	LEFT
Solid Bridge plug & Class A cement	3700'	3689'	NONE	3826'
Treated Water	3689'	3155'	NONE	3826'
Solid Bridge plug & Class A cement	3155'	3144.5'	NONE	3826'

Description of monument: Partial Plugging of the well, no monument needed at this time. The work of plugging and filling said well was completed on the 24th day of July 2006.

WYO 1024

And further deponents saith not. Jeff N. Whitehair

Sworn and subscribed before me this 2nd day of August, 20 06
My commission expires: November 14, 2009
Richard D. Brown
Notary Public

NOTARY PUBLIC
STATE OF WEST VIRGINIA
CRYSTAL D. TROWER
PO Box 115 Ravenwood, WV
My Commission Expires November 14, 20

AUG 1 8 2006

Affidavit reviewed by the Office of Oil and Gas: _____

Title: _____

2165

WVGES
GEOLOGY UNDERLIES IT ALL
"Pipeline"

Select County: (109) Wyoming
Enter Permit #: 2165
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 = 109 Permit = 2165 Link to all digital records for well

Report Time: Tuesday, January 17, 2023 11:00:44 AM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4710902165	Wyoming	2165	Slab Fork	McGraws	Mullens	37.701339	-81.423978	462625.3	4172763.3

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
4710902165	4/24/2003	Original Loc	Completed	North American Timber Corp		WP-354			Penn Virginia O&G Corp	Penn Virginia Oil & Gas Corp.			

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	KOD	G_BEF	G_AFT	O_BEF
4710902165	4/24/2003	3/28/2003	2283	Ground Level	McGraw	Avis Ls	Ravencliff/Avis Ss	Development Well	Development Well	Gas	Rotary	Fractured	2055		2055		0	555	0

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
4710902165	4/24/2003	Water	Fresh Water	Vertical			1050	Pennsylvanian System					
4710902165	4/24/2003	Pay	Gas	Vertical	1804	Princeton	1810	Princeton					
4710902165	4/24/2003	Pay	Gas	Vertical	1816	Princeton	1820	Princeton					
4710902165	4/24/2003	Pay	Gas	Vertical	1956	Ravencliff/Avis Ss	1966	Ravencliff/Avis Ss					

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
4710902165	Penn Virginia Oil & Gas Corp.	2003	3,917	0	0	0	0	0	633	1,251	614	498	452	344	125
4710902165	Penn Virginia Oil & Gas Corp.	2004	1,995	102	168	200	130	164	262	191	176	173	154	141	134
4710902165	Penn Virginia Oil & Gas Corp.	2005	1,343	107	112	104	107	96	98	116	185	111	103	100	104
4710902165	Penn Virginia Oil & Gas Corp.	2006	1,151	79	94	85	72	75	132	111	130	81	103	95	94
4710902165	Penn Virginia Oil & Gas Corp.	2007	1,008	105	115	83	75	76	81	84	84	83	75	78	69
4710902165	Penn Virginia Oil & Gas Corp.	2008	1,000	101	78	82	91	84	98	75	80	74	76	73	88
4710902165	Penn Virginia Oil & Gas Corp.	2009	984	86	82	88	87	76	93	83	76	74	76	81	82
4710902165	Penn Virginia Oil & Gas Corp.	2010	892	84	89	82	80	83	79	69	61	60	67	68	70
4710902165	Penn Virginia Oil & Gas Corp.	2011	837	74	70	75	62	78	67	66	64	65	67	77	72
4710902165	Enervest Operating, LLC	2012	798	73	74	75	65	69	77	72	73	52	52	56	60
4710902165	Enervest Operating, LLC	2013	661	61	54	67	58	57	61	57	52	50	49	48	46
4710902165	Enervest Operating, LLC	2014	542	43	41	48	45	47	46	47	47	43	46	43	46
4710902165	Enervest Operating, LLC	2015	476	41	31	38	37	41	45	44	41	38	43	30	47
4710902165	Nytis Exploration Co., LLC	2016	484	43	39	40	38	44	42	43	44	42	33	34	42
4710902165	Nytis Exploration Co., LLC	2017	440	29	34	40	23	39	40	90	35	43	34	33	0
4710902165	Nytis Exploration Co., LLC	2018	357	32	32	35	31	30	37	25	29	3	39	35	29
4710902165	Nytis Exploration Co., LLC	2019	314	31	26	37	25	29	24	33	35	35	36	3	0
4710902165	Diversified Production, LLC	2020	378	9	7	11	11	48	53	45	39	38	43	42	32
4710902165	Diversified Production, LLC	2021	229	21	0	11	34	13	10	6	31	30	26	20	23

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
4710902165	Penn Virginia Oil & Gas Corp.	2003	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Penn Virginia Oil & Gas Corp.	2004	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Penn Virginia Oil & Gas Corp.	2005	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Penn Virginia Oil & Gas Corp.	2006	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Penn Virginia Oil & Gas Corp.	2007	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Penn Virginia Oil & Gas Corp.	2008	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Penn Virginia Oil & Gas Corp.	2009	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Penn Virginia Oil & Gas Corp.	2010	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Penn Virginia Oil & Gas Corp.	2011	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Enervest Operating, LLC	2012	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Enervest Operating, LLC	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Enervest Operating, LLC	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Enervest Operating, LLC	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Nytis Exploration Co., LLC	2016	0												
4710902165	Nytis Exploration Co., LLC	2017	0	0											
4710902165	Nytis Exploration Co., LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Nytis Exploration Co., LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Diversified Production, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Diversified Production, LLC	2021	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
4710902165	Enervest Operating, LLC	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Enervest Operating, LLC	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Enervest Operating, LLC	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Nytis Exploration Co., LLC	2016	0												
4710902165	Nytis Exploration Co., LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Nytis Exploration Co., LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Diversified Production, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Diversified Production, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0

Production Water Information: (Volumes in Gallons)

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_WTR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4710902165	Nytis Exploration Co., LLC	2016	0												
4710902165	Nytis Exploration Co., LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Nytis Exploration Co., LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Diversified Production, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4710902165	Diversified Production, LLC	2021	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
4710902165	Original Loc	unidentified coal	Well Record	301	Reasonable	5	Reasonable	2283	Ground Level
4710902165	Original Loc	unidentified coal	Well Record	317	Reasonable	1	Reasonable	2283	Ground Level
4710902165	Original Loc	unidentified coal	Well Record	481	Reasonable	2	Reasonable	2283	Ground Level
4710902165	Original Loc	unidentified coal	Well Record	746	Reasonable	2	Reasonable	2283	Ground Level
4710902165	Original Loc	unidentified coal	Well Record	774	Reasonable	4	Reasonable	2283	Ground Level
4710902165	Original Loc	unidentified coal	Well Record	1055	Reasonable	4	Reasonable	2283	Ground Level
4710902165	Original Loc	unidentified coal	Well Record	1065	Reasonable	4	Reasonable	2283	Ground Level
4710902165	Original Loc	unidentified coal	Well Record	1360	Reasonable	3	Reasonable	2283	Ground Level
4710902165	Original Loc	unidentified coal	Well Record	1397	Reasonable	2	Reasonable	2283	Ground Level
4710902165	Original Loc	unidentified coal	Well Record	1412	Reasonable	2	Reasonable	2283	Ground Level
4710902165	Original Loc	Princeton	Well Record	1770	Reasonable	55	Reasonable	2283	Ground Level
4710902165	Original Loc	Ravencliff/Avis Ss	Well Record	1937	Reasonable	34	Reasonable	2283	Ground Level
4710902165	Original Loc	Avis Ls	Well Record	1990	Reasonable	40	Reasonable	2283	Ground Level

There is no Wireline (E-Log) data for this well

2165

There is no Plugging data for this well

There is no Sample data for this well

WR-35

DATE: 07/07/2003
API#:: 4710902165

A13

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

Well Operator's Report of Well Work

Farm Name North American Timber Corp — Operator Well No.: WP-354

LOCATION: Elevation: 2283 — Quadrangle: McGraws 7 1/2'

District: Slab Fork — County: Wyoming

Latitude: 2580 Feet South of 37 Deg. 42 Min. 30 Sec.

Longitude: 2150 Feet West of 81 Deg. 25 Min. 00 Sec.

Company: Penn Virginia Oil & Gas Corporation	Casing and Tubing	Used in drilling	Left in well	Cement fill up Cu. Ft.
Address: 2550 East Stone Drive, Suite 110	12.75"	21'	21'	0
Kingsport, TN 37660	7"	1166'	1166'	312
Agent: Harry Jewell	4.5"	2045'	2045'	145
Inspector: Ronald Scott				
Date Permit Issued: 04/26/2002				
Date Well Work Commenced: 03/28/2003				
Date Well Work Completed: 04/24/2003				
Verbal Plugging:				
Date Permission granted on:				
Rotary x Cable Rig				
Total Depth (feet): 2,055				
Fresh Water Depth (ft): 6" @ 1050'				
Salt Water Depth (ft):				
Is coal being mined in area (N/Y)? N				
Coal Depths (ft): 301-306, 317-318, 481-483, 746-748, 774-778, 1055-1059, 1065-1069, 1360-1363, 1397-1399, 1412-1414				

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Permitting
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WV Department of
Environmental Protection

OPEN FLOW DATA

Producing formation Ravencliff, Princeton — Pay zone depth (ft) _____

Gas: Initial open flow 0 MCF/d — Oil: Initial open flow 0 Bbl/d

Final open flow 555 MCF/d — Final open flow 0 Bbl/d

Time of open flow between initial and final tests: 4 Hours

Static rock pressure 400 psig (surface pressure) after 144 Hours

Second producing formation _____ — Pay zone depth (ft) _____

Gas: Initial open flow _____ MCF/d — Oil: Initial open flow _____ Bbl/d

Final open flow _____ MCF/d — Final open flow _____ Bbl/d

Time of open flow between initial and final tests: _____ Hours

Static rock pressure _____ psig (surface pressure) after _____ Hours

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

Signed:

By: William M. Ryan

Date: 7/7/03

FORM WR-35R
(REVERSE)

PERMIT #:4710902165
WELL #: WP-354

DETAILS OF PERFORATIONS, FRACTURING, OR PHYSICAL CHANGE, ETC.

1st Stage-Ravencliff-Perforated from 1956' to 1966' with 20 holes. Treated with 203 BW, 413.9 MSCF N2 and 40000 lbs 20/40 sand. ISIP: 2670 psi. ATP: 3376 psi. ATR: 20 BPM.

2nd Stage-Princeton-Perforated from 1804' to 1810' with 12 holes and from 1816' to 1820' with 8 holes. Treated with 205 BW, 366 MSCF N2 and 40000 lbs 20/40 sand. ISIP: 2495 psi. ATP: 2970 psi. ATR: 20 BPM.

FORMATIONS	TOP	BOTTOM	REMARKS
Sand, Shale, & Coal	0	1414	
Sand & Shale	1414	1602	
Sand	1602	1666	
Shale	1666	1770	
Princeton Sand	1770	1825	
Shale	1825	1937	
Avis Limestone	1937	1971	
Shale	1971	1990	
Avis Limestone	1990	2030	
Shale	2030	TD	No Shows Reported.

26

Form: WW-2B

109-02165

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

109-02165

1) Well Operator Penn Virginia Oil & Gas Corporation

Operator ID	County	District	Quadrangle
	Wyoming	Slab Fork	McGraws 7 1/2'

2) Operator's Well Number: WP-354 3) Elevation 2283

4) Well Type: (a) Oil ____ or Gas X
(b) If Gas: Production X / Underground Storage ____
Deep ____ / Shallow ____

5) Proposed Target Formation(s): Princeton, Ravencliff, Maxon, Big Lime

6) Proposed Total Depth: 3400 Feet

7) Approximate fresh water strata depths: 1040

8) Approximate salt water depths: 2550

9) Approximate coal seam depths: 740 1040

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Office of Oil & Gas
APR 20 2002
WV Department of
Environmental Protection

10) Does land contain coal seams tributary to active mine? No

11) Describe proposed well work: Drill and complete a new well

12) CASING AND TUBING PROGRAM

TYPE	SPECIFICATIONS			FOOTAGE INTERVALS		CEMENT
	Size	Grade	Weight per ft	For Drilling	Left in Well	Fill-up (Cu. Ft.)
Conductor	13 3/8"	LS	37	30'	30'	0
Fresh Water	*7"	LS	17	1075'	1075'	165 CTS per 35-4.11
Coal	7"	LS	17	1075'	1075'	165
Intermediate						
Production	4 1/2"	M65	9.5	2050'	2050'	125
Tubing						
Liners						

Packers: Kind * with 8 5/8" liner across open mine
Sizes:
Depths Set

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)

_____.

Glen Rodgers PSD did not respond to this request.

DIVERSIFIED
energy

Andrew Lockwood
West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304

January 12, 2023

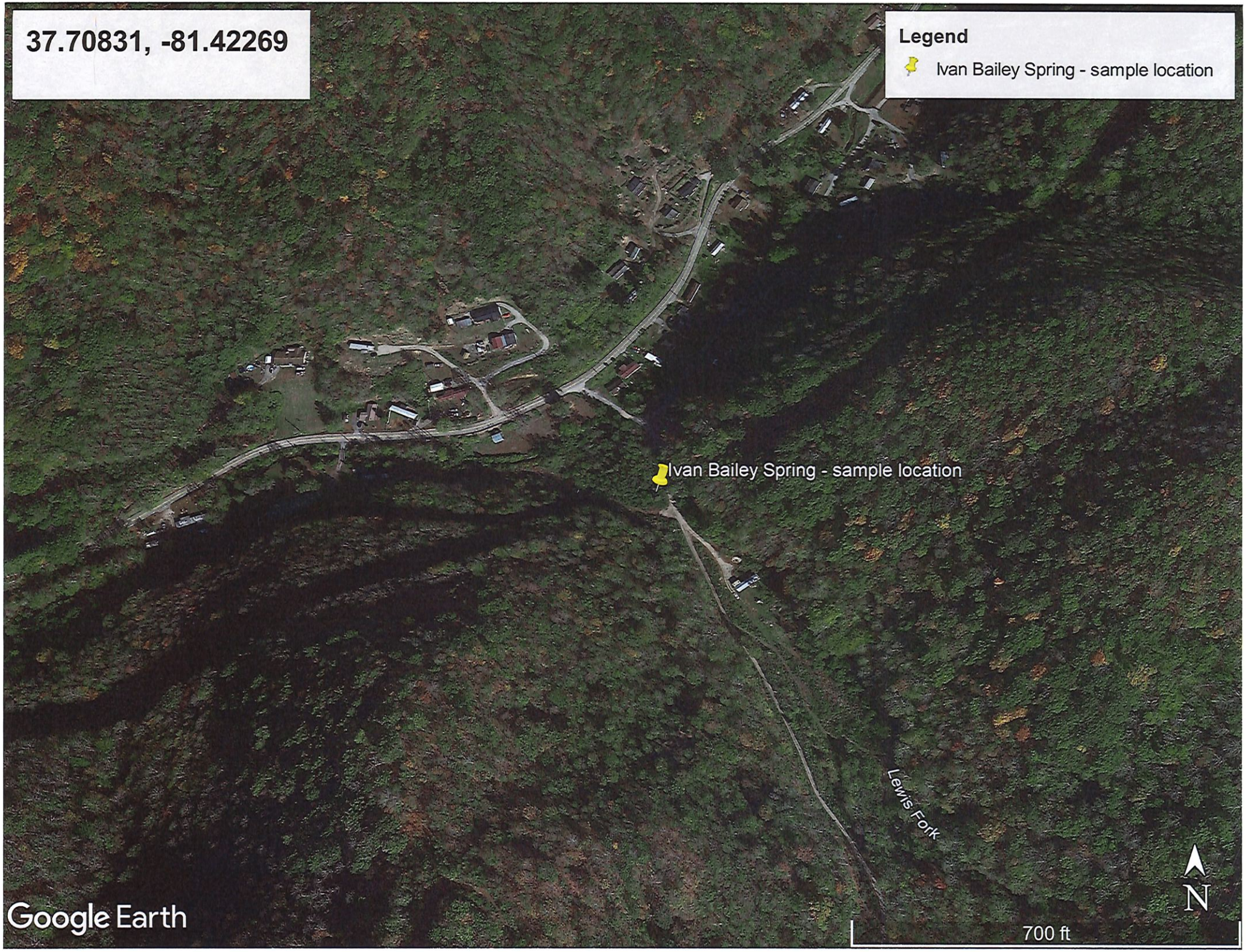
RE: WP 400 UIC Permit Application – Appendix D – Public Service District Affidavit

Dear Mr. Lockwood:

This letter is regarding the requirement in Appendix D to identify the public drinking water sources located within a 1-mile radius of the WP 400 UIC. The Ivan Bailey Spring is within the 1-mile radius and was sampled on May 18, 2022. The results were compliant with industry standards and was submitted with the permit application. Research has not revealed another public drinking water supply within the 1-mile radius. Attempts to contact Glen Rogers PSD have been unsuccessful. Please let me know if you want to discuss or need anything else, thanks.

Sincerely,

Chad Carmichael
Senior Environmental Coordinator


37.70831, -81.42269
Legend
Ivan Bailey Spring - sample location
Ivan Bailey Spring - sample location
Lewis Fork
N
700 ft
Google Earth

APPENDIX E
Water Sources

Operator: Diversified Production Year 2022 UIC Permit # UIC2D1092703

		Source # 1	Source #	Source #	Source #
Water Source Name		Ivan Bailey Spring			
Northing		4173536 (37.70831)			
Easting		462741 (-81.42269)			
Parameter	Units				
TPH - GRO	mg/L	U			
TPH - DRO	mg/L	U			
TPH - ORO	mg/L	U			
BTEX	mg/L	U			
Chloride	mg/L	2.9			
Sodium	mg/L	16			
Total Dissolved Solids (TDS)	mg/L	150			
Aluminum	mg/L	U			
Arsenic	mg/L	U			
Barium	mg/L	0.052			
Iron	mg/L	0.094			
Manganese	mg/L	.024			
pH	SU	7.01 (laboratory)			
Calcium	mg/L	20			
Sulfate	mg/L	47			
MBAS	mg/L	0.040			
Dissolved Methane	mg/L	ND			
Dissolved Ethane	mg/L	ND			
Dissolved Butane	mg/L	ND			
Dissolved Propane	mg/L	ND			
Bacteria (Total Coliform)	c/100mL	83.3			

Promoting a healthy environment.

Ivan Bailey Spring
Domestic Water Sample

31-May-2022

Chad Carmichael
Core Appalachia Operating, LLC
414 Summers Street
Charleston, WV 25301

Re: **Ivan Bailey Spring** Work Order: **22051610**

Dear Chad,

ALS Environmental received 1 sample on 18-May-2022 05:05 PM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - South Charleston and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 11.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 1740 Union Carbide Drive, South Charleston, WV, USA
PHONE: +1 (304) 356-3168 FAX: +1 (304) 205-6262

Sincerely,

Rebecca Kiser

Electronically approved by: Rebecca Kiser

Rebecca Kiser
Project Manager

ALS Group, USA

Date: 31-May-22

Client: Core Appalachia Operating, LLC
Project: Ivan Bailey Spring
Work Order: **22051610**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
22051610-01	Ivan Bailey Spring Grab	Water		5/18/2022 12:00	5/18/2022 17:05	☐
22051610-01	Ivan Bailey Spring Grab	Water		5/18/2022 12:00	5/20/2022 15:00	☐

ALS Group, USA

Date: 31-May-22

Client: Core Appalachia Operating, LLC
Project: Ivan Bailey Spring
Work Order: 22051610

Case Narrative

Samples for the above noted Work Order were received on 05/18/2022. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Wet Chemistry:
Batch R344742, Method SW9040C, Sample Ivan Bailey Spring Grab (22051610-01E): pH was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

Subcontracted analytical data has been appended to this report in its entirety.

Client: Core Appalachia Operating, LLC
Project: Ivan Bailey Spring
WorkOrder: **22051610**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Analyte accreditation is not offered
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
µg/L	Micrograms per Liter
as noted	
cfu/100ml	Colony Forming Units per 100 Milliliters
mg/L	Milligrams per Liter
s.u.	Standard Units

ALS Group, USA

Date: *31-May-22*

Client: Core Appalachia Operating, LLC
Project: Ivan Bailey Spring
Sample ID: Ivan Bailey Spring Grab
Collection Date: 5/18/2022 12:00 PM

Work Order: 22051610
Lab ID: 22051610-01
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
TOTAL COLIFORM, MF		Method: **A9222 B-06**					Analyst: **MLH**
Total Coliform, MF	**83.3**		**3.33**	**3.33**	**cfu/100ml**	1	5/18/2022 17:25
PH (LABORATORY)		Method: **SW9040C**					Analyst: **MLH**
pH (laboratory)	**7.08**	H	**0**	**0.020**	**s.u.**	1	5/19/2022 10:22
Temperature	**15.6**	H	**0**		**s.u.**	1	5/19/2022 10:22

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: 31-May-22

Client: Core Appalachia Operating, LLC

Work Order: 22051610

Project: Ivan Bailey Spring

QC BATCH REPORT

Batch ID: **R344742** Instrument ID: **STC-WC** Method: **SW9040C**

LCS Sample ID: **LCS-R344742-R344742** Units: **s.u.** Analysis Date: **5/19/2022 10:22 AM**

Client ID: Run ID: **STC-WC_220519C** SeqNo: **8438008** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	4.08	0	0.020	4	0	102	90-110	0			

DUP Sample ID: **22051610-01E DUP** Units: **s.u.** Analysis Date: **5/19/2022 10:22 AM**

Client ID: **Ivan Bailey Spring Grab** Run ID: **STC-WC_220519C** SeqNo: **8438010** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	7.01	0	0.020	0	0	0	0-0	7.08	0.994	20	H
Temperature	16.2	0	0	0	0	0		15.6	3.77		H

The following samples were analyzed in this batch: 22051610-01E

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 22051610
Project: Ivan Bailey Spring

QC BATCH REPORT

Batch ID: **R344752** Instrument ID: **STC-WC** Method: **A9222 B-06**

MBLK Sample ID: **MB-R344752-R344752** Units: **cfu/100ml** Analysis Date: **5/18/2022 05:25 PM**

Client ID: Run ID: **STC-WC_220518B** SeqNo: **8438238** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Coliform, MF	U	3.33	3.3								

DUP Sample ID: **22051610-01H DUP** Units: **cfu/100ml** Analysis Date: **5/18/2022 05:25 PM**

Client ID: **Ivan Bailey Spring Grab** Run ID: **STC-WC_220518B** SeqNo: **8438241** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Coliform, MF	76.66	3.33	3.3	0	0	0		83.33	8.34	20	

The following samples were analyzed in this batch: 22051610-01H

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

PH-9.2

Chain of Custody Form

22051610

CORE APPALACHIA: Core Appalachia Operating, LLC
Project: Ivan Bailey Spring

☒ **ALS**
1740 Union Carbide Drive
South Charleston, WV 25303
(Tel) 304.356.3168
(Fax) 304.205.6262

☐ **ALS**
3352 128th Avenue
Holland, Michigan 49424
(Tel) 616.399.6070
(Fax) 616.399.6185

ALS Work Order #:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name		A	BTEX
Work Order		Project Number		B	Dissolved: Methane, Ethane, Butane, Propane
Company Name	RSC	Bill To Company		C	TPH-GRO
Send Report To	HAD (ARM/CHAGL	Invoice Attn.		D	Chloride, Sulfate, TDS
Address	414 Summers St	Address		E	pH
				F	TPH DRO/ORO
City/State/Zip	Charleston 25301	City/State/Zip		G	Na, Al, As, Ba, Fe, Mn, Ca
Phone		Phone		H	Coliform
Fax		Fax		I	MBAS
e-Mail Address	ccarmichael@dapc.com			J	

No.	Sample Description	Comp / Grab	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1A	Ivan Bailey Spring	G	5/18	12:00	W	1	3											
2B						none	2											
3C						1	3											
4D						none	1											
5E						none	1											
6F						2	2											
7G						5	1											
8H						none	1											
9I						none	1											
10																		

Sampler(s): Please Print & Sign: HAD ARM/CHAGL

Shipment Method:

Turnaround Time in Business Days (BD): ☐ Other _____ ☐ 10 BD(STD) ☐ 5 BD ☐ 3 BD ☐ 2 BD ☐ 1 BD

Results Due Date:

Relinquished by:	Date:	Time:	Received by:	Temp:	Notes:
	5-18	5:05	Janet Sm	4.0°C AZSC	pH out of hold
Relinquished by:	Date:	Time:	Received by:		
Relinquished by:	Date:	Time:	Received by:	Temp:	QC Package: (Check Box Below)
Relinquished by:	Date:	Time:	Received by (Laboratory):		Level II: Standard QC
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):		Level III: Standard QC + Raw Data Level IV: SW846 Methods/CLP Other:

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C

Note: Any changes must be made in writing once samples and COC Form have been submitted to ALS

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ALS Environmental

1740 Union Carbide Drive
South Charleston, WV 25303

Sample Receiving Checklist

22051610
CORE APPALACHIA: Core Appalachia Operating, LLC
Project: Ivan Bailey Spring

Received by:	Janet Smith
Date/Time:	5/18/22 1705
Carrier Name:	Client
Shipping container/cooler in good condition?	Yes / No / Not Present
Custody seals intact on shipping container/cooler?	Yes / No / Not Present
Custody seals intact on sample bottles?	Yes / No / Not Present
Chain of Custody present?	Yes / No
COC signed when relinquished and received?	Yes / No
COC agrees with sample labels?	Yes / No
Samples in proper container/bottle?	Yes / No
Sample containers intact?	Yes / No
Sufficient sample volume for indicated test?	Yes / No
All samples received within holding time?	Yes / No
All sample temperatures verified to be in compliance?	Yes / No
Temperature(s) (°C):	<6°
Thermometer(s):	IR
Sample(s) received on ice?	Yes / No
Matrix/Matrices:	Water
Cooler(s)/Kit(s):	
Date/Time sample(s) sent to storage:	
Trip Blanks included? (for volatile analysis only)	Yes / No / N/A
Water – VOA vials have zero headspace?	Yes / No / No Vials
Water – pH acceptable upon receipt?	Yes / No / N/A
pH strip lot #:	Not checked
pH adjusted (note adjustments below)?	Yes / No / N/A
pH adjusted by:	

Login Notes:

pH out/hold. Client did not mark specific Analysis for each site.

22051610

CORE APPALACHIA: Core Appalachia Operating, LLC

Project: Ivan Bailey Spring

ALS Environmental

1740 Union Carbide Dr
S. Charleston, WV 25303
Phone:304.356.3168

Client: Chespeake Energy DEC

Sample ID: 5-B Time: 505 Collected By: CRC

Date: Preserv: None

Analysis:

31-May-2022

Chad Carmichael
Core Appalachia Operating, LLC
414 Summers Street
Charleston, WV 25301

Re: **Ivan Bailey Spring** Work Order: **22051610**

Dear Chad,

ALS Environmental received 1 sample on 20-May-2022 for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 20.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Rebecca Kiser

Electronically approved by: Rebecca Kiser

Rebecca Kiser
Project Manager

ALS Group, USA

Date: 31-May-22

Client: Core Appalachia Operating, LLC
Project: Ivan Bailey Spring
Work Order: **22051610**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
22051610-01	Ivan Bailey Spring Grab	Water		5/18/2022 12:00	5/18/2022 17:05	☐
22051610-01	Ivan Bailey Spring Grab	Water		5/18/2022 12:00	5/20/2022 15:00	☐

ALS Group, USA

Date: 31-May-22

Client: Core Appalachia Operating, LLC
Project: Ivan Bailey Spring
Work Order: 22051610

Case Narrative

Samples for the above noted Work Order were received on xx/yy/zzzz. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Volatile Organics:
No other deviations or anomalies were noted.

Extractable Organics:
No other deviations or anomalies were noted.

Metals:
Batch 196826, Method SW6020B, Sample 22051610-01GMS: The MS recovery was above the upper control limit. The corresponding result in the parent sample may be biased high for this analyte: Al

Batch 196826, Method SW6020B, Sample 22051610-01GMSD: The RPD between the MS and MSD was outside of the control limit. The corresponding result should be considered estimated for this compound: Al

Wet Chemistry:
No other deviations or anomalies were noted.

Client: Core Appalachia Operating, LLC
Project: Ivan Bailey Spring
WorkOrder: **22051610**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Analyte accreditation is not offered
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
µg/L	Micrograms per Liter
as noted	
cfu/100ml	Colony Forming Units per 100 Milliliters
mg/L	Milligrams per Liter
s.u.	Standard Units

ALS Group, USA

Date: *31-May-22*

Client: Core Appalachia Operating, LLC
Project: Ivan Bailey Spring
Sample ID: Ivan Bailey Spring Grab
Collection Date: 5/18/2022 12:00 PM

Work Order: 22051610
Lab ID: 22051610-01
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
DIESEL RANGE ORGANICS BY GC-FID		Method: **SW8015D**			Prep: SW3511 / 5/25/22		Analyst: **MTB**
DRO (C10-C28)	U		0.081	0.10	mg/L	1	5/27/2022 01:13
ORO (C28-C40)	U		0.051	0.10	mg/L	1	5/27/2022 01:13
Surr: 4-Terphenyl-d14	*69.5*			*30-121*	*%REC*	1	5/27/2022 01:13
GASOLINE RANGE ORGANICS BY GC-FID		Method: **SW8015D**					Analyst: **SJB**
GRO (C6-C10)	U		76	200	µg/L	1	5/26/2022 19:39
Surr: Toluene-d8	*88.8*			*79-130*	*%REC*	1	5/26/2022 19:39
METALS BY ICP-MS		Method: **SW6020B**			Prep: SW3015A / 5/24/22		Analyst: **STP**
Aluminum	U		0.0080	0.010	mg/L	1	5/24/2022 19:39
Arsenic	U		0.00019	0.0050	mg/L	1	5/24/2022 19:39
Barium	**0.052**		**0.0020**	**0.0050**	**mg/L**	1	5/24/2022 19:39
Calcium	**20**		**0.25**	**0.50**	**mg/L**	1	5/24/2022 19:39
Iron	**0.094**		**0.050**	**0.080**	**mg/L**	1	5/24/2022 19:39
Manganese	**0.024**		**0.0025**	**0.0050**	**mg/L**	1	5/24/2022 19:39
Sodium	**16**		**0.18**	**0.20**	**mg/L**	1	5/24/2022 19:39
VOLATILE ORGANIC COMPOUNDS		Method: **SW8260C**					Analyst: **HJ**
Benzene	U		0.46	1.0	µg/L	1	5/24/2022 22:00
Ethylbenzene	U		0.34	1.0	µg/L	1	5/24/2022 22:00
m,p-Xylene	U		0.81	2.0	µg/L	1	5/24/2022 22:00
o-Xylene	U		0.31	1.0	µg/L	1	5/24/2022 22:00
Toluene	U		0.45	1.0	µg/L	1	5/24/2022 22:00
Xylenes, Total	U		0.81	3.0	µg/L	1	5/24/2022 22:00
Surr: 1,2-Dichloroethane-d4	*98.0*			*75-120*	*%REC*	1	5/24/2022 22:00
Surr: 4-Bromofluorobenzene	*96.2*			*80-110*	*%REC*	1	5/24/2022 22:00
Surr: Dibromofluoromethane	*99.2*			*85-115*	*%REC*	1	5/24/2022 22:00
Surr: Toluene-d8	*97.4*			*85-110*	*%REC*	1	5/24/2022 22:00
ANIONS BY ION CHROMATOGRAPHY		Method: **E300.0**					Analyst: **QTN**
Chloride	**2.9**		**0.62**	**2.0**	**mg/L**	2	5/24/2022 14:27
Sulfate	**47**		**1.9**	**10**	**mg/L**	10	5/27/2022 21:19
TOTAL DISSOLVED SOLIDS		Method: **A2540 C-11**			Prep: FILTER / 5/24/22		Analyst: **SRN**
Total Dissolved Solids	**150**		**22**	**30**	**mg/L**	1	5/26/2022 15:51

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: 31-May-22

Client: Core Appalachia Operating, LLC

Work Order: 22051610

Project: Ivan Bailey Spring

QC BATCH REPORT

Batch ID: **196881** Instrument ID: **GC8** Method: **SW8015D**

MBLK Sample ID: **DBLKW1-196881-196881** Units: **mg/L** Analysis Date: **5/26/2022 12:23 PM**

Client ID: Run ID: **GC8_220525A** SeqNo: **8463159** Prep Date: **5/25/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	U	0.081	0.10								
ORO (C28-C40)	U	0.051	0.10								
Surr: 4-Terphenyl-d14	*0.02633*	0	0	*0.0417*	0	*63.1*	*30-121*	0			

LCS Sample ID: **DLCSW1-196881-196881** Units: **mg/L** Analysis Date: **5/26/2022 01:38 PM**

Client ID: Run ID: **GC8_220525A** SeqNo: **8463161** Prep Date: **5/25/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	3.921	0.081	0.10	4.17	0	94	64-143	0			
ORO (C28-C40)	3.838	0.051	0.10	4.17	0	92	58-141	0			
Surr: 4-Terphenyl-d14	*0.02767*	0	0	*0.0417*	0	*66.3*	*30-121*	0			

LCSD Sample ID: **DLCSDW1-196881-196881** Units: **mg/L** Analysis Date: **5/26/2022 02:16 PM**

Client ID: Run ID: **GC8_220525A** SeqNo: **8463162** Prep Date: **5/25/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	4.101	0.081	0.10	4.17	0	98.3	64-143	3.921	4.48	20	
ORO (C28-C40)	3.996	0.051	0.10	4.17	0	95.8	58-141	3.838	4.03	20	
Surr: 4-Terphenyl-d14	*0.0305*	0	0	*0.0417*	0	*73.1*	*30-121*	0.02767	*9.74*	*20*	

The following samples were analyzed in this batch: 22051610-01F

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 22051610
Project: Ivan Bailey Spring

QC BATCH REPORT

Batch ID: **R345327** Instrument ID: **GC9** Method: **SW8015D**

MBLK Sample ID: **9G-BLKW1-220526-R345327** Units: **µg/L** Analysis Date: **5/26/2022 04:42 PM**

Client ID: Run ID: **GC9_220526A** SeqNo: **8464887** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	U	76	200								
Surr: Toluene-d8	*91.98*	0	0	*100*	0	*92*	*79-130*	0			

LCS Sample ID: **9G-LCSW1-220526-R345327** Units: **µg/L** Analysis Date: **5/26/2022 03:57 PM**

Client ID: Run ID: **GC9_220526A** SeqNo: **8464886** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	5201	76	200	5000	0	104	76-126	0			
Surr: Toluene-d8	*96.48*	0	0	*100*	0	*96.5*	*79-130*	0			

MS Sample ID: **22051847-01B MS** Units: **µg/L** Analysis Date: **5/26/2022 09:51 PM**

Client ID: Run ID: **GC9_220526A** SeqNo: **8464899** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	7977	76	200	5000	3884	81.9	76-126	0			
Surr: Toluene-d8	*96.64*	0	0	*100*	0	*96.6*	*79-130*	0			

DUP Sample ID: **22051845-01B DUP** Units: **µg/L** Analysis Date: **5/26/2022 09:29 PM**

Client ID: Run ID: **GC9_220526A** SeqNo: **8464898** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	4159	76	200	0	0	0		3712	11.4	30	
Surr: Toluene-d8	*90.84*	0	0	*100*	0	*90.8*	*79-130*	89.39	*1.61*	*30*	

The following samples were analyzed in this batch: 22051610-01C

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 22051610
Project: Ivan Bailey Spring

QC BATCH REPORT

Batch ID: **196826** Instrument ID: **ICPMS3** Method: **SW6020B**

MBLK Sample ID: **MBLK-196826-196826** Units: **mg/L** Analysis Date: **5/24/2022 07:08 PM**
Client ID: Run ID: **ICPMS3_220524A** SeqNo: **8454120** Prep Date: **5/24/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	U	0.008	0.010								
Arsenic	U	0.00019	0.0050								
Barium	U	0.002	0.0050								
Calcium	U	0.25	0.50								
Iron	U	0.05	0.080								
Manganese	U	0.0025	0.0050								

MBLK Sample ID: **MBLK-196826-196826** Units: **mg/L** Analysis Date: **5/25/2022 03:03 PM**
Client ID: Run ID: **ICPMS3_220525A** SeqNo: **8455439** Prep Date: **5/24/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sodium	U	0.18	0.20								

LCS Sample ID: **LCS-196826-196826** Units: **mg/L** Analysis Date: **5/24/2022 07:10 PM**
Client ID: Run ID: **ICPMS3_220524A** SeqNo: **8454121** Prep Date: **5/24/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.09818	0.008	0.010	0.1	0	98.2	80-120	0			
Arsenic	0.09587	0.00019	0.0050	0.1	0	95.9	80-120	0			
Barium	0.1028	0.002	0.0050	0.1	0	103	80-120	0			
Calcium	10.27	0.25	0.50	10	0	103	80-120	0			
Iron	9.693	0.05	0.080	10	0	96.9	80-120	0			
Manganese	0.09289	0.0025	0.0050	0.1	0	92.9	80-120	0			
Sodium	10.24	0.18	0.20	10	0	102	80-120	0			

MS Sample ID: **22051610-01GMS** Units: **mg/L** Analysis Date: **5/24/2022 07:41 PM**
Client ID: **Ivan Bailey Spring Grab** Run ID: **ICPMS3_220524A** SeqNo: **8454140** Prep Date: **5/24/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1332	0.008	0.010	0.1	0.004193	129	75-125	0			S
Arsenic	0.09249	0.00019	0.0050	0.1	0.0000726	92.4	75-125	0			
Barium	0.1478	0.002	0.0050	0.1	0.05154	96.3	75-125	0			
Calcium	29.24	0.25	0.50	10	20.22	90.2	75-125	0			
Iron	9.383	0.05	0.080	10	0.09438	92.9	75-125	0			
Manganese	0.1113	0.0025	0.0050	0.1	0.02413	87.1	75-125	0			
Sodium	24.65	0.18	0.20	10	15.63	90.2	75-125	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 22051610
Project: Ivan Bailey Spring

QC BATCH REPORT

Batch ID: **196826** Instrument ID: **ICPMS3** Method: **SW6020B**

MSD Sample ID: **22051610-01GMSD** Units: **mg/L** Analysis Date: **5/24/2022 07:46 PM**

Client ID: **Ivan Bailey Spring Grab** Run ID: **ICPMS3_220524A** SeqNo: **8454143** Prep Date: **5/24/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1014	0.008	0.010	0.1	0.004193	97.2	75-125	0.1332	27.1	20	R
Arsenic	0.09578	0.00019	0.0050	0.1	0.0000726	95.7	75-125	0.09249	3.49	20	
Barium	0.1492	0.002	0.0050	0.1	0.05154	97.7	75-125	0.1478	0.962	20	
Calcium	29.21	0.25	0.50	10	20.22	89.8	75-125	29.24	0.118	20	
Iron	9.649	0.05	0.080	10	0.09438	95.5	75-125	9.383	2.79	20	
Manganese	0.1141	0.0025	0.0050	0.1	0.02413	90	75-125	0.1113	2.55	20	
Sodium	24.6	0.18	0.20	10	15.63	89.7	75-125	24.65	0.22	20	

The following samples were analyzed in this batch: 22051610-01G

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 22051610
Project: Ivan Bailey Spring

QC BATCH REPORT

Batch ID: **R345061a** Instrument ID: **VMS9** Method: **SW8260C**

MBLK Sample ID: **9V-BLKW2-220524-R345061a** Units: **µg/L** Analysis Date: **5/24/2022 09:13 PM**

Client ID: Run ID: **VMS9_220524B** SeqNo: **8452565** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	0.46	1.0								
Ethylbenzene	U	0.34	1.0								
m,p-Xylene	U	0.81	2.0								
o-Xylene	U	0.31	1.0								
Toluene	U	0.45	1.0								
Xylenes, Total	U	0.81	3.0								
Surr: 1,2-Dichloroethane-d4	*19.43*	0	0	*20*	0	*97.2*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*19.66*	0	0	*20*	0	*98.3*	*80-110*	0			
Surr: Dibromofluoromethane	*19.22*	0	0	*20*	0	*96.1*	*85-115*	0			
Surr: Toluene-d8	*19.97*	0	0	*20*	0	*99.8*	*85-110*	0			

LCS Sample ID: **9V-LCSW2-220524-R345061a** Units: **µg/L** Analysis Date: **5/24/2022 08:26 PM**

Client ID: Run ID: **VMS9_220524B** SeqNo: **8452563** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	19.82	0.46	1.0	20	0	99.1	70-130	0			
Ethylbenzene	20.51	0.34	1.0	20	0	103	76-123	0			
m,p-Xylene	40.72	0.81	2.0	40	0	102	75-130	0			
o-Xylene	20.55	0.31	1.0	20	0	103	76-127	0			
Toluene	19.93	0.45	1.0	20	0	99.6	76-125	0			
Xylenes, Total	61.27	0.81	3.0	60	0	102	76-127	0			
Surr: 1,2-Dichloroethane-d4	*19.15*	0	0	*20*	0	*95.8*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*20.48*	0	0	*20*	0	*102*	*80-110*	0			
Surr: Dibromofluoromethane	*19.21*	0	0	*20*	0	*96*	*85-115*	0			
Surr: Toluene-d8	*20.29*	0	0	*20*	0	*101*	*85-110*	0			

MS Sample ID: **22051908-02A MS** Units: **µg/L** Analysis Date: **5/25/2022 02:58 AM**

Client ID: Run ID: **VMS9_220524B** SeqNo: **8452587** Prep Date: DF: **100**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	1920	46	100	2000	0	96	70-130	0			
Ethylbenzene	2449	34	100	2000	947	75.1	76-123	0			S
m,p-Xylene	4499	81	200	4000	2104	59.9	75-130	0			S
o-Xylene	1987	31	100	2000	49	96.9	76-127	0			
Toluene	1943	45	100	2000	0	97.2	76-125	0			
Xylenes, Total	6486	81	300	6000	2153	72.2	76-127	0			S
Surr: 1,2-Dichloroethane-d4	*1787*	0	0	*2000*	0	*89.4*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*2003*	0	0	*2000*	0	*100*	*80-110*	0			
Surr: Dibromofluoromethane	*1877*	0	0	*2000*	0	*93.8*	*85-115*	0			
Surr: Toluene-d8	*2062*	0	0	*2000*	0	*103*	*85-110*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 22051610
Project: Ivan Bailey Spring

QC BATCH REPORT

Batch ID: **R345061a** Instrument ID: **VMS9** Method: **SW8260C**

MSD Sample ID: **22051908-02A MSD** Units: **µg/L** Analysis Date: **5/25/2022 03:14 AM**

Client ID: Run ID: **VMS9_220524B** SeqNo: **8452588** Prep Date: DF: **100**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	1886	46	100	2000	0	94.3	70-130	1920	1.79	30	
Ethylbenzene	2481	34	100	2000	947	76.7	76-123	2449	1.3	30	
m,p-Xylene	4547	81	200	4000	2104	61.1	75-130	4499	1.06	30	S
o-Xylene	2024	31	100	2000	49	98.8	76-127	1987	1.84	30	
Toluene	1986	45	100	2000	0	99.3	76-125	1943	2.19	30	
Xylenes, Total	6571	81	300	6000	2153	73.6	76-127	6486	1.3	30	S
Surr: 1,2-Dichloroethane-d4	*1732*	0	0	*2000*	0	*86.6*	*75-120*	1787	*3.13*	*30*	
Surr: 4-Bromofluorobenzene	*2069*	0	0	*2000*	0	*103*	*80-110*	2003	*3.24*	*30*	
Surr: Dibromofluoromethane	*1885*	0	0	*2000*	0	*94.2*	*85-115*	1877	*0.425*	*30*	
Surr: Toluene-d8	*2066*	0	0	*2000*	0	*103*	*85-110*	2062	*0.194*	*30*	

The following samples were analyzed in this batch: 22051610-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 22051610
Project: Ivan Bailey Spring

QC BATCH REPORT

Batch ID: **196833** Instrument ID: **TDS** Method: **A2540 C-11**

MBLK Sample ID: **MBLK-196833-196833** Units: **mg/L** Analysis Date: **5/26/2022 03:51 PM**
Client ID: Run ID: **TDS_220526A** SeqNo: **8459930** Prep Date: **5/24/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	U	22	30								

LCS Sample ID: **LCS-196833-196833** Units: **mg/L** Analysis Date: **5/26/2022 03:51 PM**
Client ID: Run ID: **TDS_220526A** SeqNo: **8459929** Prep Date: **5/24/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	506	22	30	495	0	102	85-109	0			

DUP Sample ID: **22051709-04A DUP** Units: **mg/L** Analysis Date: **5/26/2022 03:51 PM**
Client ID: Run ID: **TDS_220526A** SeqNo: **8459919** Prep Date: **5/24/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	690	37	50	0	0	0	0-0	643.3	7	10	

DUP Sample ID: **22051909-01A DUP** Units: **mg/L** Analysis Date: **5/26/2022 03:51 PM**
Client ID: Run ID: **TDS_220526A** SeqNo: **8459922** Prep Date: **5/24/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	1253	74	100	0	0	0	0-0	1227	2.15	10	

The following samples were analyzed in this batch: 22051610-01D

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 22051610
Project: Ivan Bailey Spring

QC BATCH REPORT

Batch ID: **R345062** Instrument ID: **IC3** Method: **E300.0**

MBLK Sample ID: **CCB/MBLK-A-R345062** Units: **mg/L** Analysis Date: **5/24/2022 01:37 PM**
Client ID: Run ID: **IC3_220524A** SeqNo: **8452625** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	U	0.31	1.0								

MBLK Sample ID: **CCB/MBLK-R345062** Units: **mg/L** Analysis Date: **5/24/2022 03:16 PM**
Client ID: Run ID: **IC3_220524A** SeqNo: **8452637** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	U	0.31	1.0								

MBLK Sample ID: **CCB/MBLK-R345062** Units: **mg/L** Analysis Date: **5/24/2022 04:55 PM**
Client ID: Run ID: **IC3_220524A** SeqNo: **8452650** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	U	0.31	1.0								

MBLK Sample ID: **CCB/MBLK-B-R345062** Units: **mg/L** Analysis Date: **5/24/2022 05:28 PM**
Client ID: Run ID: **IC3_220524A** SeqNo: **8452655** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	U	0.31	1.0								

MBLK Sample ID: **CCB/MBLK-C-R345062** Units: **mg/L** Analysis Date: **5/24/2022 09:19 PM**
Client ID: Run ID: **IC3_220524A** SeqNo: **8452693** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	U	0.31	1.0								

MBLK Sample ID: **CCB/MBLK-R345062** Units: **mg/L** Analysis Date: **5/24/2022 11:40 PM**
Client ID: Run ID: **IC3_220524A** SeqNo: **8452713** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	U	0.31	1.0								

MBLK Sample ID: **CCB/MBLK-R345062** Units: **mg/L** Analysis Date: **5/25/2022 12:13 AM**
Client ID: Run ID: **IC3_220524A** SeqNo: **8452717** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	U	0.31	1.0								

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 22051610
Project: Ivan Bailey Spring

QC BATCH REPORT

Batch ID: **R345062** Instrument ID: **IC3** Method: **E300.0**

LCS Sample ID: **MLCCV/LCS-A-R345062** Units: **mg/L** Analysis Date: **5/24/2022 01:29 PM**
Client ID: Run ID: **IC3_220524A** SeqNo: **8452624** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.602	0.31	1.0	10	0	96	90-110	0			

LCS Sample ID: **MLCCV/LCS-R345062** Units: **mg/L** Analysis Date: **5/24/2022 03:08 PM**
Client ID: Run ID: **IC3_220524A** SeqNo: **8452636** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.579	0.31	1.0	10	0	95.8	90-110	0			

LCS Sample ID: **MLCCV/LCS-R345062** Units: **mg/L** Analysis Date: **5/24/2022 04:47 PM**
Client ID: Run ID: **IC3_220524A** SeqNo: **8452649** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.622	0.31	1.0	10	0	96.2	90-110	0			

LCS Sample ID: **MLCCV/LCS-B-R345062** Units: **mg/L** Analysis Date: **5/24/2022 05:20 PM**
Client ID: Run ID: **IC3_220524A** SeqNo: **8452654** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.599	0.31	1.0	10	0	96	90-110	0			

LCS Sample ID: **MLCCV/LCS-C-R345062** Units: **mg/L** Analysis Date: **5/24/2022 09:11 PM**
Client ID: Run ID: **IC3_220524A** SeqNo: **8452691** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.626	0.31	1.0	10	0	96.3	90-110	0			

LCS Sample ID: **MLCCV/LCS-R345062** Units: **mg/L** Analysis Date: **5/24/2022 11:32 PM**
Client ID: Run ID: **IC3_220524A** SeqNo: **8452712** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.602	0.31	1.0	10	0	96	90-110	0			

LCS Sample ID: **MLCCV/LCS-R345062** Units: **mg/L** Analysis Date: **5/25/2022 12:05 AM**
Client ID: Run ID: **IC3_220524A** SeqNo: **8452716** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.557	0.31	1.0	10	0	95.6	90-110	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 22051610
Project: Ivan Bailey Spring

QC BATCH REPORT

Batch ID: **R345062** Instrument ID: **IC3** Method: **E300.0**

MS Sample ID: **22051562-01C MS** Units: **mg/L** Analysis Date: **5/24/2022 01:53 PM**

Client ID: Run ID: **IC3_220524A** SeqNo: **8452627** Prep Date: DF: **16**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	157.9	5	16	160	9.093	93	80-120	0			

MS Sample ID: **22051909-01A MS** Units: **mg/L** Analysis Date: **5/24/2022 03:41 PM**

Client ID: Run ID: **IC3_220524A** SeqNo: **8452640** Prep Date: DF: **100**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1057	31	100	1000	0	106	80-120	0			

MSD Sample ID: **22051562-01C MSD** Units: **mg/L** Analysis Date: **5/24/2022 02:02 PM**

Client ID: Run ID: **IC3_220524A** SeqNo: **8452628** Prep Date: DF: **16**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	157.9	5	16	160	9.093	93	80-120	157.9	0.0196	20	

MSD Sample ID: **22051909-01A MSD** Units: **mg/L** Analysis Date: **5/24/2022 03:49 PM**

Client ID: Run ID: **IC3_220524A** SeqNo: **8452641** Prep Date: DF: **100**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1054	31	100	1000	0	105	80-120	1057	0.246	20	

The following samples were analyzed in this batch: 22051610-01D

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 22051610
Project: Ivan Bailey Spring

QC BATCH REPORT

Batch ID: **R345432** Instrument ID: **IC4** Method: **SW9056A**

MBLK Sample ID: **CCB/MBLK-R345432** Units: **mg/L** Analysis Date: **5/27/2022 04:39 PM**
Client ID: Run ID: **IC4_220527A** SeqNo: **8468189** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	U	0.19	1.0								

MBLK Sample ID: **CCB/MBLK-R345432** Units: **mg/L** Analysis Date: **5/27/2022 06:18 PM**
Client ID: Run ID: **IC4_220527A** SeqNo: **8468207** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	U	0.19	1.0								

MBLK Sample ID: **CCB/MBLK-R345432** Units: **mg/L** Analysis Date: **5/27/2022 08:13 PM**
Client ID: Run ID: **IC4_220527A** SeqNo: **8468228** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	U	0.19	1.0								

MBLK Sample ID: **CCB/MBLK-R345432** Units: **mg/L** Analysis Date: **5/27/2022 09:52 PM**
Client ID: Run ID: **IC4_220527A** SeqNo: **8468262** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	U	0.19	1.0								

LCS Sample ID: **MLCCV/LCS-R345432** Units: **mg/L** Analysis Date: **5/27/2022 04:31 PM**
Client ID: Run ID: **IC4_220527A** SeqNo: **8468188** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	10.18	0.19	1.0	10	0	102	90-110	0			

LCS Sample ID: **MLCCV/LCS-R345432** Units: **mg/L** Analysis Date: **5/27/2022 06:10 PM**
Client ID: Run ID: **IC4_220527A** SeqNo: **8468205** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	10.14	0.19	1.0	10	0	101	90-110	0			

LCS Sample ID: **MLCCV/LCS-R345432** Units: **mg/L** Analysis Date: **5/27/2022 08:05 PM**
Client ID: Run ID: **IC4_220527A** SeqNo: **8468226** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	10.05	0.19	1.0	10	0	101	90-110	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 22051610
Project: Ivan Bailey Spring

QC BATCH REPORT

Batch ID: **R345432** Instrument ID: **IC4** Method: **SW9056A**

LCS Sample ID: **MLCCV/LCS-R345432** Units: **mg/L** Analysis Date: **5/27/2022 09:43 PM**

Client ID: Run ID: **IC4_220527A** SeqNo: **8468261** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	10.04	0.19	1.0	10	0	100	90-110	0			

MS Sample ID: **22052059-01C MS** Units: **mg/L** Analysis Date: **5/27/2022 05:04 PM**

Client ID: Run ID: **IC4_220527A** SeqNo: **8468193** Prep Date: DF: **100**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	2114	19	100	1000	1070	104	90-110	0			E

MSD Sample ID: **22052059-01C MSD** Units: **mg/L** Analysis Date: **5/27/2022 05:12 PM**

Client ID: Run ID: **IC4_220527A** SeqNo: **8468195** Prep Date: DF: **100**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	2219	19	100	1000	1070	115	90-110	2114	4.84	20	SE

The following samples were analyzed in this batch: 22051610-01D

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

ALS Environmental

Subcontractor:
ALS Environmental - Holland
3352 128th Avenue
Holland, MI 49424

TEL: (616) 399-6070
FAX: (616) 399-6185
Acct #:

Salesperson: **Paul Painter**

CHAIN-OF-CUSTODY RECORD

Date: 19-May-22
COC ID: 19751
Due Date: 25-May-22

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	22051610	A	Total Dissolved Solids (A2540 C-11)
Work Order		Project Number		B	Anions by Ion Chromatography (E300.0)
Company Name	ALS Group USA, Corp	Bill To Company	ALS Group USA, Corp	C	Metals by ICP-MS (SW6020B)
Send Report To	Rebecca Kiser	Inv Attn	Accounts Payable	D	Diesel Range Organics by GC-FID (SW8015D)
Address	1740 Union Carbide Dr	Address	1740 Union Carbide Dr	E	Gasoline Range Organics by GC-FID (SW8015D)
				F	Volatile Organic Compounds (SW8260C)
City/State/Zip	So Charleston, WV 25303	City/State/Zip	So Charleston, WV 25303	G	
Phone	(304) 356-3168	Phone	(304) 356-3168	H	
Fax		Fax		I	
eMail Address	rebecca.kiser@alsglobal.com	eMail CC		J	

ALS Sample ID	Client Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
22051610-01D	Ivan Bailey Spring Grab	Water	18/May/2022 12:00	(1) 500PNEAT	X	X								
22051610-01G	Ivan Bailey Spring Grab	Water	18/May/2022 12:00	(1) 250PHNO3			X							
22051610-01F	Ivan Bailey Spring Grab	Water	18/May/2022 12:00	(2) 125MLAMGNEAT				X						
22051610-01A	Ivan Bailey Spring Grab	Water	18/May/2022 12:00	(3) VOAHCL						X				
22051610-01C	Ivan Bailey Spring Grab	Water	18/May/2022 12:00	(3) VOAHCL					X					

22051610

CORE APPALACHIA: Core Appalachia Operating, LLC
Project: Ivan Bailey Spring

Comments:
WV Samples. Sampler: C. Carmichael.

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
Janet Smith	5/19/22 1700	FedEx			
FedEx	5/20/22 1500			26.0C 1R1	Std
Relinquished by:	Date/Time	Received by:	Date/Time	1/32 ALSHN	

ALS Group, USA

Sample Receipt Checklist

Client Name: **CORE APPALACHIA** Date/Time Received: **18-May-22 17:05**

Work Order: **22051610** Received by: **LYS**

Checklist completed by: Lydia Sweet (eSignature) 23-May-22 (Date) Reviewed by: (eSignature) (Date)

Matrices: Water
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	<6.0c	IR1	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	5/23/2022 2:38:21 PM		
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☑	N/A ☐
pH adjusted by:	-		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

301 Fulling Mill Road | Middletown, PA 17057 | Phone: 717-944-5541 | Fax: 717-944-1430 | www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: PJLA 74618
State Certifications: FL E871113 , WA C999 , MD 128 , VA 460157 , WV DW 9961-C , WV 343

Analytical Results Report For **ALS Environmental-Holland**

Project 20-122021161
Workorder 3243778
Report ID 171555 on 5/27/2022

Certificate of Analysis

Enclosed are the analytical results for samples received by the laboratory on May 20, 2022.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Sarah Leung (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Global.
ALS Middletown: 301 Fulling Mill Road, Middletown, PA 17057 : 717-944-5541.

Recipient(s):
- Amanda Grzybowski - ALS Environmental-Holland
- Brandon Frye - ALS - Holland
- Les Arnold - ALS Environmental-Holland
- Gary Byar - ALS Environmental-Holland
- Rebecca Kiser - ALS Environmental-South Charleston

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Sarah Leung

Sarah Leung *(ALS Digital Signature)*
Project Coordinator

Sample Summary

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collector	Collection Company
3243778001	22051610-01	Water	05/18/2022 12:00	05/20/2022 08:39	CBC	Collected By Client

Reference

Notes

- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
- Except as qualified, Clean Water Act sample analyses are consistent with methodology requirements in 40 CFR Part 136.
- Except as qualified, Safe Drinking Water Act sample analyses are consistent with methodology requirements in 40 CFR Part 141.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.
- For microbiological analyses, the "Prepared" value is the date/time into the incubator and the "Analyzed" value is the date/time out the incubator.
- An Analysis-Prep Method Cross Reference Table is included after Analytical Results & Qualifiers section in this report.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits
#	Please reference the result in the Results Section for analyte-level flags.

Project Notations

Sample Notations

Lab ID	Sample ID		
3243778001	22051610-01	**S1**	The sample was received at a temperature greater than 6 degrees C.
		S2	Sample temperature upon receipt at lab was greater than 6 ºC.

Result Notations

Notation Ref.	
1	MBAS calculated as LAS molecular weight 348 g/mol.

Detected Results Summary

Client Sample ID	22051610-01	Collected	05/18/2022 12:00
Lab Sample ID	3243778001	Lab Receipt	05/20/2022 08:39

Compound	Result	Units	RDL	MDL	Method	Flag
WET CHEMISTRY						
Surfactants (MBAS)	0.040J	mg/L	0.180	0.04	SM5540C-2011	#

Results

Client Sample ID	**22051610-01**	Collected	**05/18/2022 12:00**
Lab Sample ID	**3243778001**	Lab Receipt	**05/20/2022 08:39**

WET CHEMISTRY

Compound	Result	Flag	Units	RDL	MDL	Method	Dilution	Analysis Date/Time	By	Cntr
Surfactants (MBAS)	0.040J	J,1,S1,S2	mg/L	0.180	0.04	SM5540C-2011	1	05/20/2022 11:54	WDA	A

Sample - Method Cross Reference Table

Lab ID	Sample ID	Analysis Method	Preparation Method	Leachate Method
3243778001	22051610-01	SM5540C-2011	N/A	

QUALITY CONTROL SAMPLES

WET CHEMISTRY

QC Batch

QC Batch	848805	Prep Method	N/A
Date	N/A	Analysis Method	SM5540C-2011
Tech.			

Associated Samples

3243778001

Matrix Spike 3503813 (MS) 3243508001 (non-Project Sample) For QC Batch 848805

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

RESULTS

Compound	CAS No		Result (mg/L)	Orig. Result (mg/L)	Spk Added (mg/L)	Rec. (%)	Limits (%)	RPD Limit (%)	Qualifiers
Surfactants (MBAS)	MBAS	MS	0.6120	0.0260	0.60	97.7	75 - 125		

Duplicate 3503814 (DUP) 3243508001 (non-Project Sample) For QC Batch 848805

****NOTE - The Original Result and Duplicate Result shown below are raw results and are only used for the purpose of calculating Sample Duplicate percent recoveries. This result is not a final value and cannot be used as such.

RESULTS

Compound	CAS No		Result (mg/L)	Orig. Result (mg/L)				Qualifiers
Surfactants (MBAS)	MBAS	DUP	0.0264	0.0264	RPD	0	(Max-15)	U

Method Blank 3503810 (MB) Created on 05/20/2022 07:44 For QC Batch 848805

RESULTS

Compound	CAS No		Result	Units	RDL	Qualifiers
Surfactants (MBAS)	MBAS	BLK	0.180 U	mg/L	0.180	U

Lab Control Standard 3503811 (LCS) Created on 05/20/2022 07:44 For QC Batch 848805

RESULTS

Compound	CAS No		Result (mg/L)	Orig. Result (mg/L)	Spk Added (mg/L)	Rec. (%)	Limits (%)	RPD Limit (%)	Qualifiers
Surfactants (MBAS)	MBAS	LCS	0.5640		0.60	94	-		

Method Blank 3503815 (MB) Created on 05/20/2022 07:44 For QC Batch 848805

RESULTS

Compound	CAS No		Result	Units	RDL	Qualifiers
Surfactants (MBAS)	MBAS	BLK	0.180 U	mg/L	0.180	U

QUALITY CONTROL SAMPLES

WET CHEMISTRY (cont.)

Lab Control Standard 3503816 (LCS) Created on 05/20/2022 07:44 For QC Batch 848805

RESULTS

Compound	CAS No		Result (mg/L)	Orig. Result (mg/L)	Spk Added (mg/L)	Rec. (%)	Limits (%)	RPD Limit (%)	Qualifiers
Surfactants (MBAS)	MBAS	LCS	0.5510		0.60	91.8	-		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Lab ID	Sample ID	Preparation Method	Prep Batch	Prep Date/Time	By	Analysis Method	Anly Batch
3243778001	22051610-01	N/A	N/A	N/A		SM5540C-2011	848805

3243778
Logged By: GJM
PM: SSL

ALS Environmental

Subcontractor:
ALS Environmental
301 Fulling Mill Road
Middletown, PA 17057
TEL: (717) 944-5541
FAX: (717) 944-1430
Acct #:

CHAIN-OF-CUSTODY RECORD

Salesperson	Paul Painter

Customer Information		Project Information			Parameter/Method Request for Analysis
Purchase Order	20-122021161	Project Name	22051610	A	Surfactants (MBAS)
Work Order		Project Number		B	
Company Name	ALS Group USA, Corp	Bill To Company	ALS Group USA, Corp	C	
Send Report To	Rebecca Kiser	Inv Attn	Accounts Payable	D	
Address	1740 Union Carbide Dr	Address	1740 Union Carbide Dr	E	
				F	
City/State/Zip	So Charleston, WV 25303	City/State/Zip	So Charleston, WV 25303	G	
Phone	(304) 356-3168	Phone	(304) 356-3168	H	
Fax		Fax		I	
eMail Address	rebecca.kiser@alsglobal.com	eMail CC		J	

ALS Sample ID	Client Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
22051610-01I	Ivan Bailey Spring Grab	Water	18/May/2022 12:00	(1) 250PNEAT	1 X									

JW
5/20/22

Temp Taken By: JW
WO Temp (°C) 8
Therm ID: 569
Receipt Info Completed By: JW
Cooler Custody Seal Intact Y N NA
Sample Custody Seal Intact Y N NA
Received on Ice Y N NA
Cooler & Samples Intact Y N
Correct Containers Provided Y N
Sample Label/COC Agree Y N
Adequate Sample Volumes Y N
VOA Headspace Present Y N NA
Voa Trip Blank Y N NA
NJ≤ 4 Days? Y N
Rad Screen (uCi)
Courier/Tracking #: 7769 1037 1936

SDWA Compliance Y N
PWSID

Comments:
WV Sample. Sampler: C. Carmichael.

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
Janet Smith FEDEX	5/19/22 1700	FEDEX			Std
Relinquished by:	Date/Time	Received by:	Date/Time		

GEOCHEMICAL TESTING
Environmental and Energy Analysis

2005 N. Center Ave.
Somerset, PA 15501

814/443-1671
814/445-6666
FAX: 814/445-6729

Wednesday, May 25, 2022

Rebecca Kiser
ALS ENVIRONMENTAL - SOUTH CHARLESTON
1740 UNION CARBIDE DRIVE
CHARLESTON, WV 25303

Order No.: G2205C20

Dear Rebecca Kiser:

Geochemical Testing received 1 sample(s) on 5/20/2022 for the analyses presented in the following report.

There were no problems with sample receipt protocols and analyses met the TNI/NELAC, EPA, and laboratory specifications except where noted in the Case Narrative or Laboratory Results.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Timothy W. Bergstresser
Director of Technical Services

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306PA DEP

Geochemical Testing

Date: *25-May-22*

CLIENT: ALS ENVIRONMENTAL - SOUTH CHA
Project:
Lab Order: G2205C20

CASE NARRATIVE

No problems were encountered during analysis of this workorder, except if noted in this report.

Under West Virginia's Laboratory Certification Program, Geochemical Testing's Laboratory Certificate I.D. is 141.

Legend:

H - Method Hold Time exceeded and is not compliant with 40CFR136 Table II.
U - The analyte was not detected at or above the listed concentration, which is below the laboratory quantitation limit.
B - Analyte detected in the associated Method Blank
Q1 - See case narrative ND - Not Detected
MCL - Contaminant Limit J - Indicates an estimated value.
Q - Qualifier QL -Quantitation Limit DF - Dilution Factor

S - Surrogate Recovery outside accepted recovery limits
T - Sample received above required temperature and is not compliant with 40CFR136 Table II.
T1 - Sample received above required temperature
MDA - Minimum Detectable Activity.
** - Value exceeds Action Limit
TICs - Tentatively Identified Compounds.
E - Value above quantitation range

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *25-May-22*

CLIENT:	ALS ENVIRONMENTAL - SOUTH CHA	**Client Sample ID:**	22051610-01B
Lab Order:	G2205C20		Ivan Bailey Spring Grab
Project:		**Collection Date:**	5/18/2022 12:00:00 PM
Lab ID:	G2205C20-001	**Sampled By:**	ALS
Matrix:	AQUEOUS	**DateReceived:**	5/20/2022 2:07:22 PM

Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
DISSOLVED GASSES			Analyst: **NEP**				**ASTM D8028-17**	**ASTM D8028-17**
Butane, dissolved	ND	N3	0.010	0.030	mg/L	1	05/23/22 11:40 AM	05/23/22 4:43 PM
Ethane, dissolved	ND	N3	0.010	0.030	mg/L	1	05/23/22 11:40 AM	05/23/22 4:43 PM
Methane, dissolved	ND	N3	0.010	0.030	mg/L	1	05/23/22 11:40 AM	05/23/22 4:43 PM
Propane, dissolved	ND	N3	0.010	0.030	mg/L	1	05/23/22 11:40 AM	05/23/22 4:43 PM
Surr: Ethoxyethane	106	N3	0	70-130	%REC	1	05/23/22 11:40 AM	05/23/22 4:43 PM

NOTES:

N3 - The lab is accredited for this method in West Virginia, but not in PA (its primary accrediting body).

ACCREDITED IN ACCORDANCE WITH nelac

I.D. 56-00306 PA DEP

Section 8:

Geologic Data on Injection and Confining Zones

Section 8 – Data on Injection Zone and Confining Zone

8.1 Geology

8.1.1 Geologic Setting

The AOR is situated within the central Alleghany Plateau of the Appalachian Basin Province, along Lewis Fork in the northern portion of Wyoming County in southern West Virginia (see Exhibit 1 General Location Map). The injection zone is stratigraphically located within the Lower Mississippian clastic sedimentary system, lying approximately 3540 feet below Crane Fork. Refer to General Location Map in the Appendix.

8.1.1 Structural Geology

The principal geologic structures of the central Appalachian Basin are broad, gently folded, southwest-northeast trending anticlines and synclines. The injection area is located on the western limb of the Pineville Anticline where strata is westerly dipping at less than five degrees. Minor undulations and flexures are typical, but faulting and tectonic features are generally absent west of the Allegheny Front, the east-facing escarpment of the Allegheny Mountains which forms the Appalachian Structural Front and the eastern extent of the Allegheny Plateau. There are no documented major fault systems in the AOR or evidence of subsurface faulting or fracturing within or in proximity to the injection or confining zones.

8.1.2 Stratigraphy

8.1.2.1 Injection Zone

The Weir sandstone is characterized as a prodelta to fluvial deposit of the lower-Mississippian clastic sequence, occurring within the Rockwell and Price Formations from Pennsylvania to southwestern Virginia and southern West Virginia. The term Weir is typically used to identify sandstones occurring in the lower part of the Mississippian section, generally within 100 to 200 feet of the base. Although the Weir can be observed at thicknesses up to 200 feet, occurring as multiple sandstone units, the thickness locally ranges from 32 to 41 feet, occurring as a single sandstone unit and demonstrating relative homogeneity. General Stratigraphic Chart in the Appendix shows the general stratigraphy of southern West Virginia and highlights the location of the Weir within the stratigraphic section.

Although the depositional environment of Lower Mississippian sandstones is not clearly defined in all areas of southern West Virginia, available information suggests that the Weir sandstone is laterally extensive across southern and eastern West Virginia, and extending into southern Virginia. The Weir sandstone demonstrated relatively consistent thickness on all geophysical logs reviewed within a one-mile radius of the injection site. Lower Mississippian sandstones have been a significant source of hydrocarbons in southern West Virginia, exhibiting favorable

characteristics (porosity and permeability) for accumulation and economic development of hydrocarbons. The porosity of these units is primary in nature, meaning porosity is related to depositional processes and not post-depositional modification. Porosity of the Weir generally averages approximately 10 percent.

8.1.2.2 Confining Zone

The confining zone overlying the Weir sandstone is identified very generally on available lithologic logs as shale or shale and sand, however geophysical log records indicate that the dominant strata is shale and interbedded sandy shale, with sand content increasing upward in the section near the base of the Big Lime limestone. The confining zone, as identified in geophysical logs, ranges in thickness between 114 and 148 feet. The top of the confining zone is identified on geophysical logs below the Big Lime limestone, near the base of a fining downward sequence where and sandy zone grades to predominately shale. The base of the confining zone is defined by the top of the Weir sandstone. There is an easily identifiable high-gamma response shale present near the middle of the confining zone.

The confining zone is laterally continuous across the AOR and adjacent area where geophysical data was reviewed. Shale, by nature and in the absence of post depositional deformation, is impervious, preventing upward fluid mobility. There is no evidence from available data that suggests the presence of subsurface faulting or fracturing within the confining zone. The depth to the top of the confining layer is generally more than 3500 feet below the surface and nearly 3000 feet below the fresh water sources documented in drilling and permit records.

8.2 Groundwater Use

A groundwater inventory was conducted that showed one water well within a one mile radius from the injection well. A sample was obtained and analyzed November 2015 (results are attached). No public water wells were found within a one mile radius of the injection well. Further, baseline surface water samples were obtained from 5 immediate surface waters within a ¼ mile radius in the last year. Lab data for surface water samples is included in the Attachments. Please note Enervest operates another disposal well LC-19 in which the same injectable fluids would be injected in this well. Please note that the chlorides (due to the CBM water) are relatively low for produced fluids.

The baseline water sample results are provided as an Attachment to this document. The analysis were conducted by a WV Certified Laboratory (WV0233), Environmental Lab Sciences Corporation of Mt. Juliet, Tennessee. No anomalies were identified in the surface water samples. A schedule for additional sampling will be coordinated with the WVDEP.

8.3 Chemical Compatibility

Water analyses (provided as an Attachment) show the chemical composition of the injection water for the year 2014. Based on current chemical composition and injection history, there are no anticipated compatibility issues between injection fluid and formation fluid. The produced water was tested and has a specific gravity of 1.0 mg/L (water).

8.4 Seismic

The AOR is designated as a relatively low seismic risk zone (http://earthguakc.usgs.gov/earthguakes/states!west virginialhazards.php) with no history of major seismic activity. There are no seismically active features proximal to the AOR and the likelihood of a future seismic event of sufficient magnitude to cause future migration of injection fluid is low. For seismic history and risk mapping relevant to the AOR, see Earthquake Epicenters of West Virginia published by West Virginia Geological and Economic Survey and Seismic Hazard Map of West Virginia published by the United States Geological Survey in the Appendix.

8.4 Lithologic and Geophysical Logs

Geologic data for wells drilled within a one-mile radius of the injection site were reviewed. Lithologic logs are available for a limited number of wells reviewed. These logs are general in nature, including only general lithology and thickness observed by the driller from rotary cuttings. These logs also appear to include formation names as determined by the driller and do not include revisions and correlations based on observations and/or interpretations from geophysical logs. There are 3 geophysical logs available which penetrate the confining and injections zones. Additional geophysical logs were reviewed but were determined to be not deep enough to penetrate the injection or confining zones. If a geophysical log was available, the geophysical log was used for purposes of this review. If only a general lithologic log was available, the information is reported herein, but has a lower level of geologic assurance. Copies of all geologic well data used for the review are included in the Appendix.

8.5 Fluid Migration Model

The following is an estimation of the fluid migration given the information available for the study of the Weir formation within the A OR. The calculation utilizes the volumetric method of prediction of reservoir migration of the injection operation. This calculation uses reservoir height, porosity percent and saturation displacement percent to calculate fluid migration from the well over a given amount of fluid injected. Below is the formula used for this calculatio~ along with the fluid migration distance from the well and the respective values used.

$$R = \sqrt{Q * 5.615 \left(\frac{ft^3}{bbl}\right) / 3.14 * P * H * Sd}$$

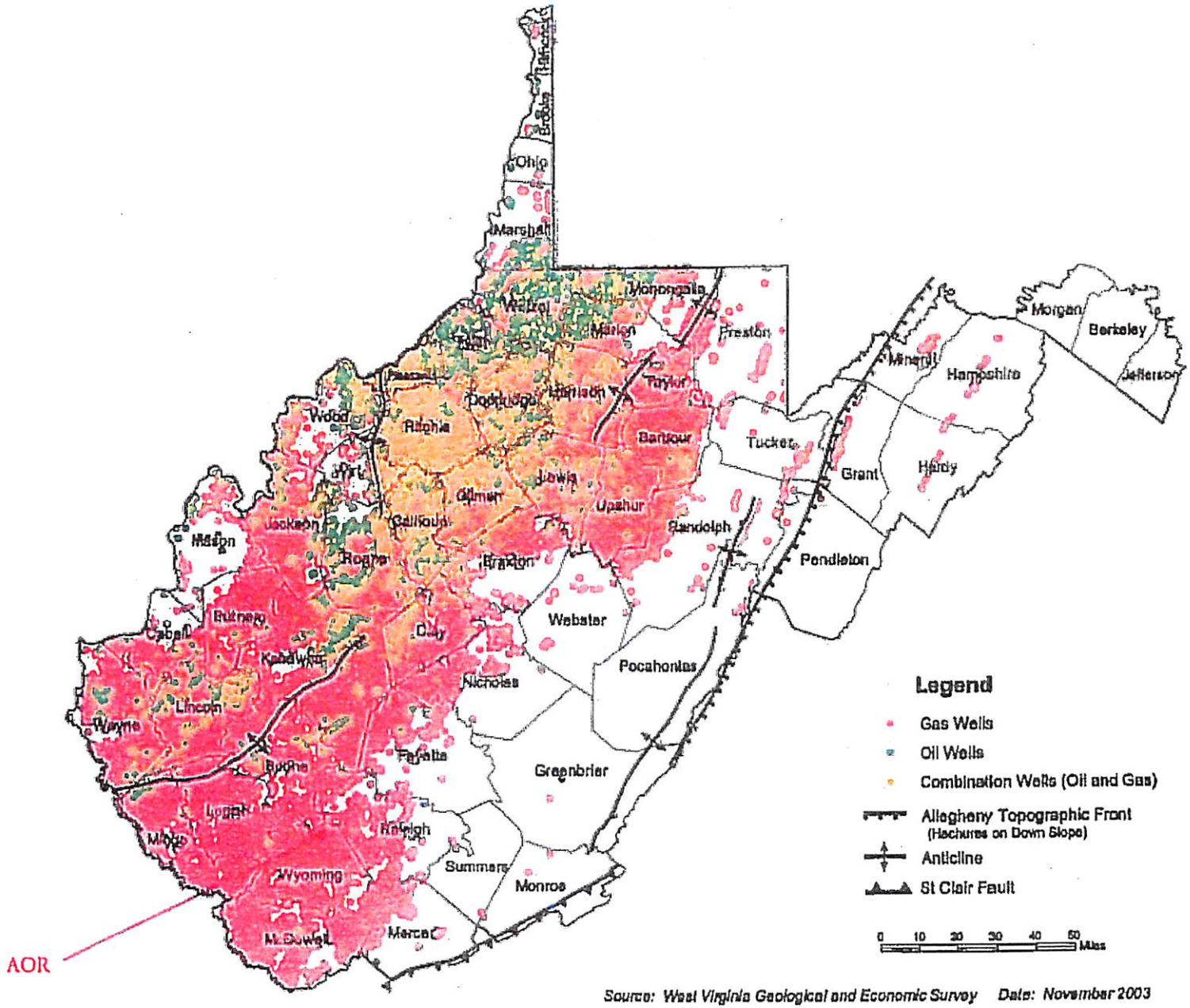
R = Lateral Distance of Fluid Bank from wellbore (ft)
Q = Cumulative Volume (bbls)
P = Porosity Average (%)
H= Reservoir Height (ft)
Sd = Saturation Displacement (%)

Q = Cumulative Volume	R = Lateral Distance of Fluid Bank From Well Bore	
100,000	433.8586431	ft
250,000	685.9907473	ft
500,000	970.1374185	ft
1,000,000	1371.981495	ft
1,500,000	1680.327299	ft
2,000,000	1940.274837	ft

Note: Volume range based on max. approved injection rate

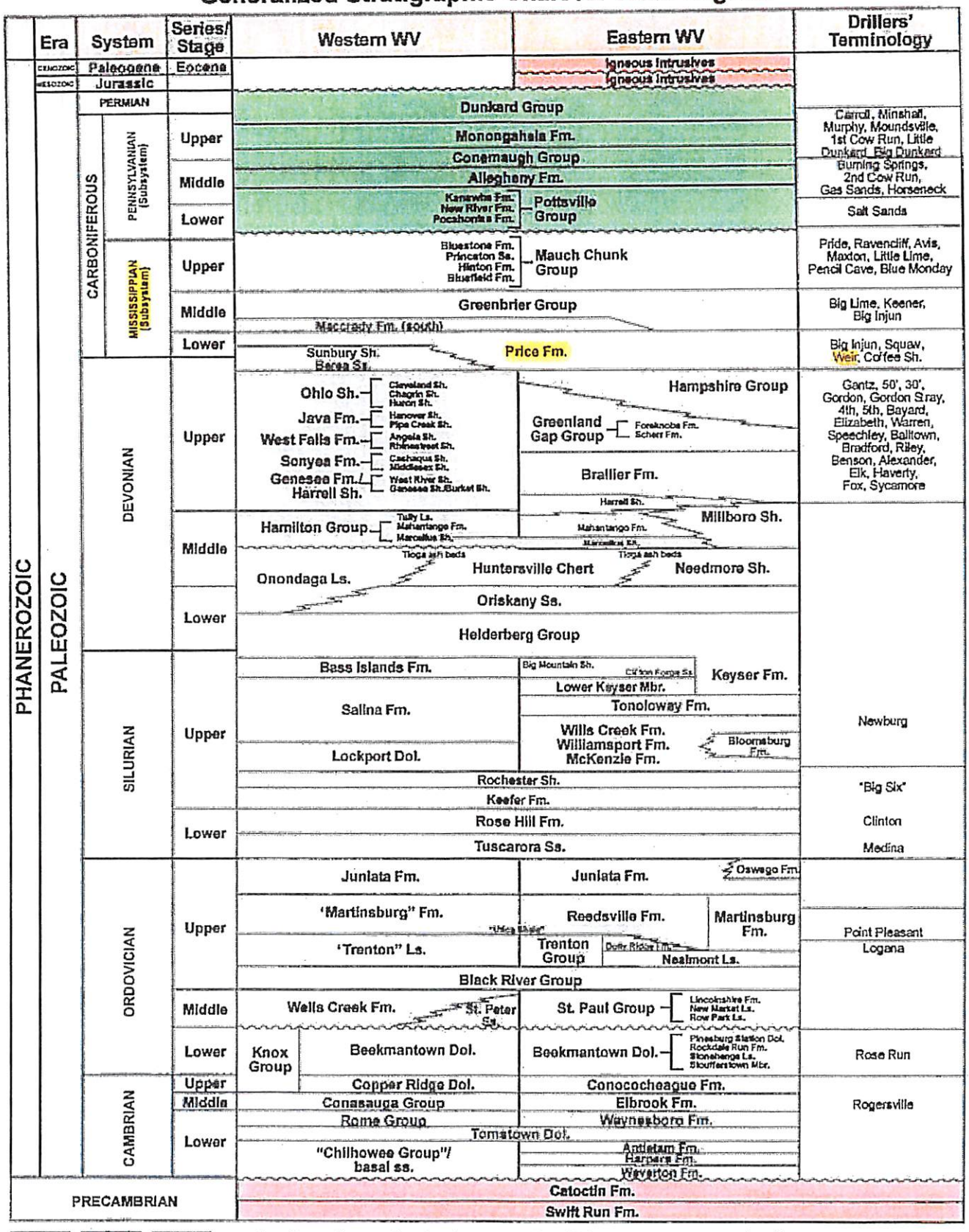
Total of 337,000 bbls injected through 5/2022.

General Location Map



Source: West Virginia Geological and Economic Survey Date: November 2003

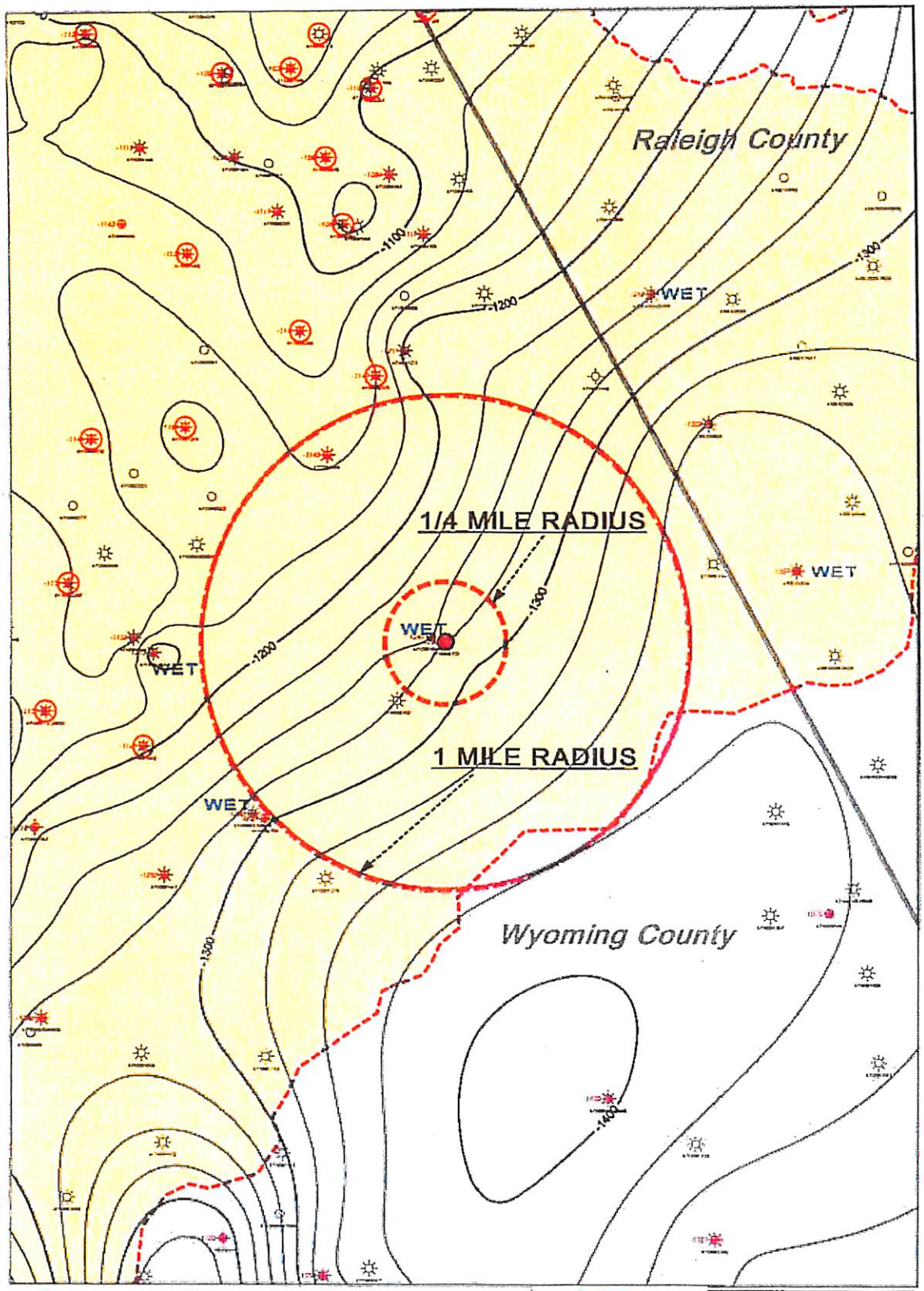
Generalized Stratigraphic Chart for West Virginia



(This chart uses current WVGES terminology and supercedes stratigraphic unit names used in older publications.)

Map-29A 2014

WVGES



N

WEIR PRODUCERS

PROPOSED DISPOSAL WELL

Data Point

EV LEASE

EV LEASE

Well Status

ABND

DRY

PGA

GAS

INJ

LOC

Unknown Status

OIL

OILGAS

PA

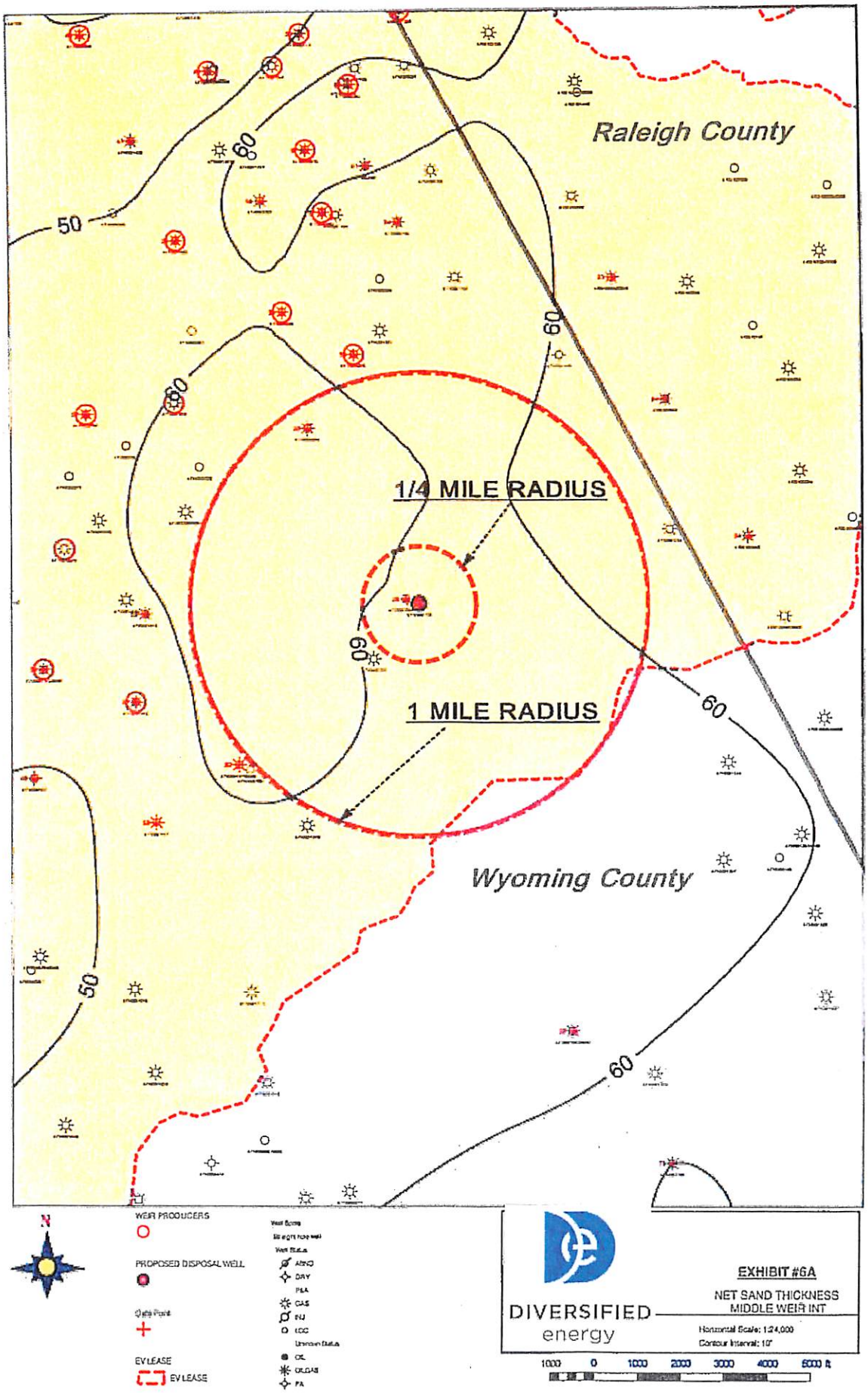
DIVERSIFIED energy

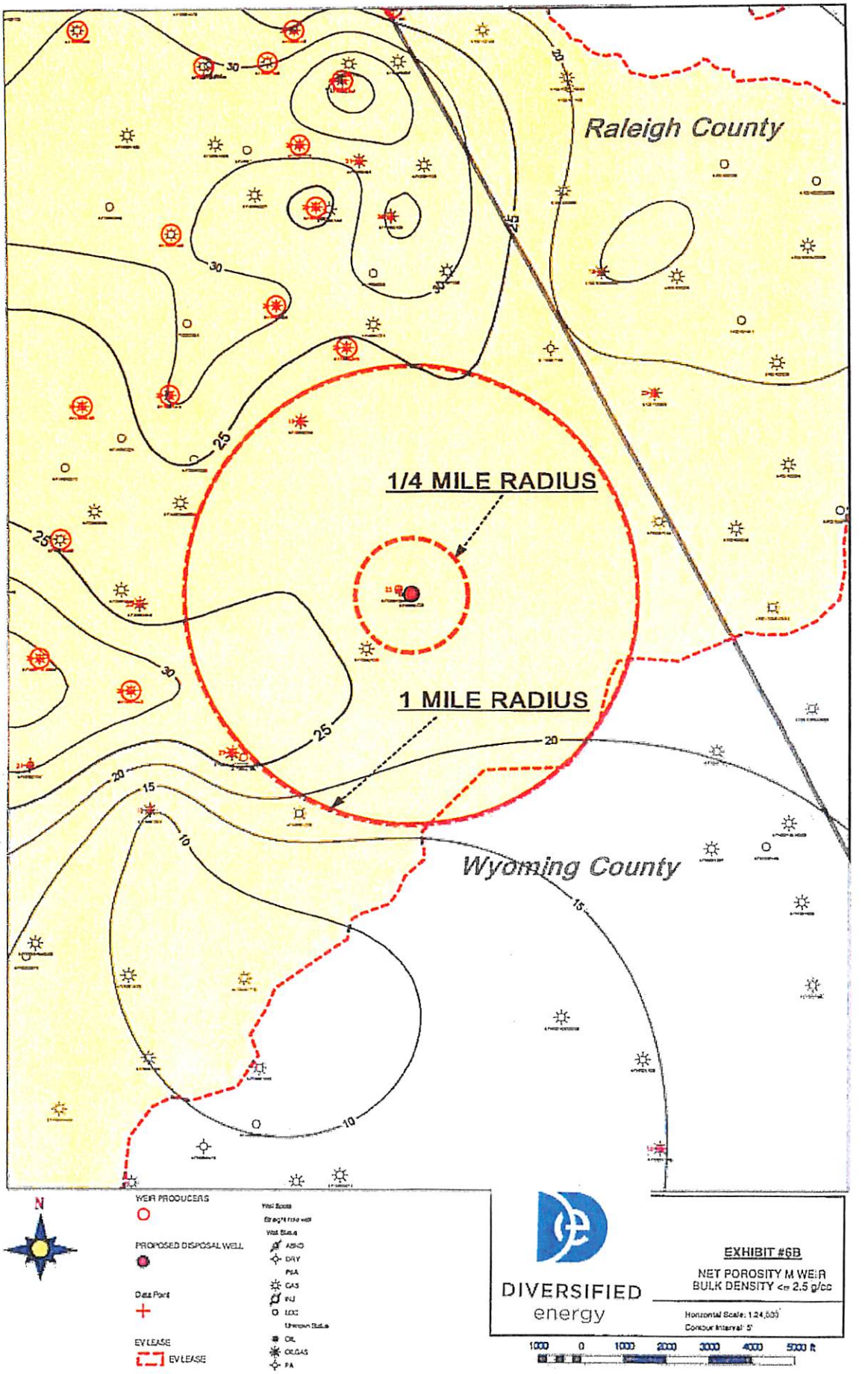
EXHIBIT #5

TOP SUBSEA STRUCTURE
MIDDLE WEIR INT

Horizontal Scale: 1:24,000
Contour Interval: 25'

1000 0 1000 2000 3000 4000 5000 ft

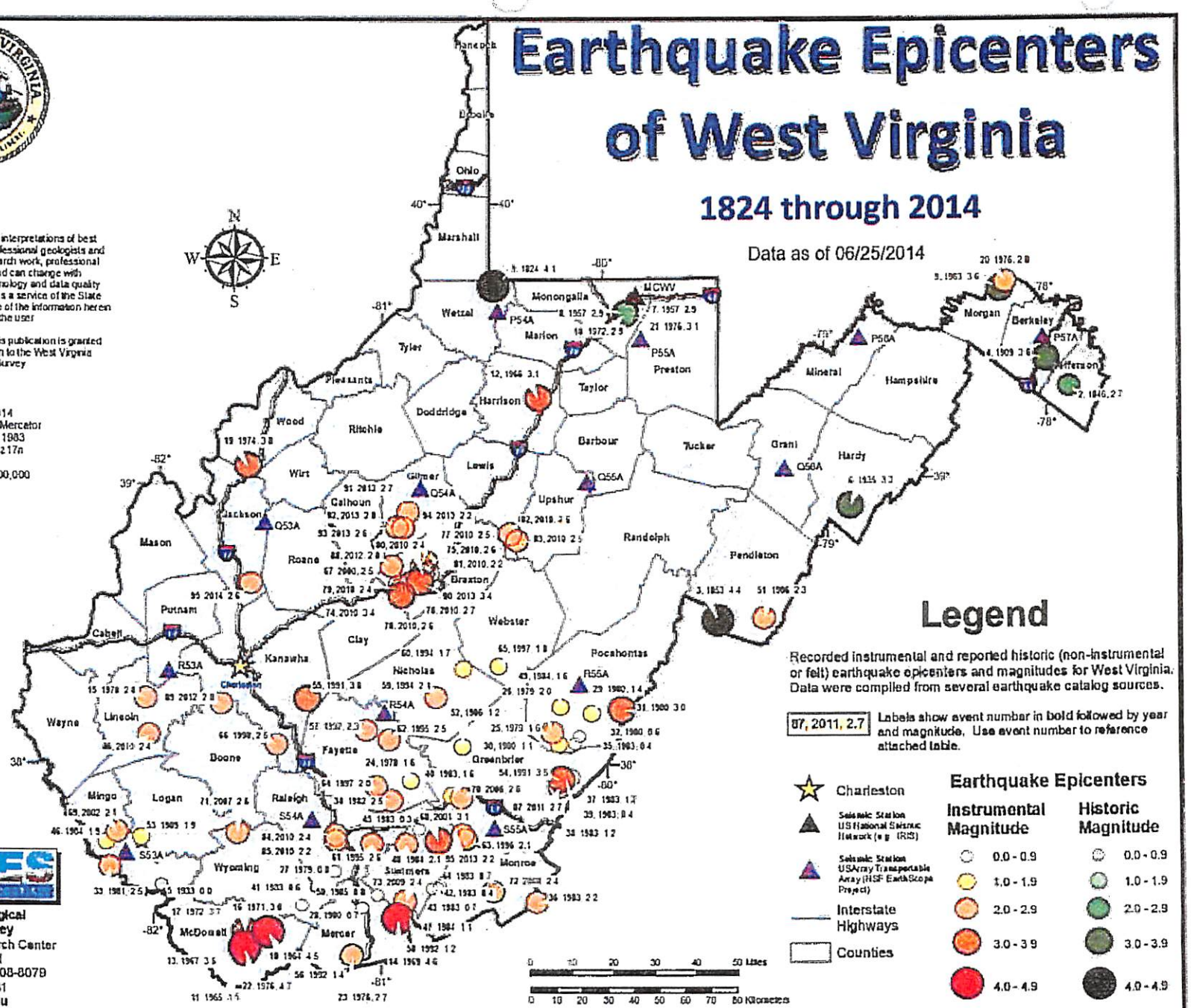

Raleigh County
Wyoming County
1/4 MILE RADIUS
1 MILE RADIUS
50
60
N
WEIR PRODUCERS
PROPOSED DISPOSAL WELL
EV LEASE
EV LEASE
DIVERSIFIED
energy
EXHIBIT #6A
NET SAND THICKNESS
MIDDLE WEIR INT
Horizontal Scale: 1:24,000
Contour Interval: 10'
1000 0 1000 2000 3000 4000 5000 ft


Raleigh County
Wyoming County
1/4 MILE RADIUS
1 MILE RADIUS
30
25
20
15
10
N
WEIR PRODUCERS
PROPOSED DISPOSAL WELL
Data Point
EV LEASE
EV LEASE
Well Status
ABND
DRY
PSA
GAS
INJ
LOC
Unknown Status
OIL
OILGAS
PA
DIVERSIFIED
energy
EXHIBIT #6B
NET POROSITY M WEIR
BULK DENSITY <= 2.5 g/cc
Horizontal Scale: 1:24,000
Contour Interval: 5'
1000 0 1000 2000 3000 4000 5000 ft

Earthquake Epicenters of West Virginia

1824 through 2014

Data as of 06/25/2014



Publications Policy,

This publication represents interpretations of best available data made by professional geologists and geographers. As in all research work, professional interpretations may vary, and can change with advancements in both technology and data quality. This publication is offered as a service of the State of West Virginia, proper use of the information herein is the sole responsibility of the user.

Permission to reproduce this publication is granted if acknowledgement is given to the West Virginia Geological and Economic Survey.

Map Date: June 25, 2014
Projection: Transverse Mercator
Horizontal Datum: NAD 1983
Coordinate System: UTM zl7n
Map scale for full 8.5" x 11" display 1:2,000,000

Legend

Recorded instrumental and reported historic (non-instrumental or felt) earthquake epicenters and magnitudes for West Virginia. Data were compiled from several earthquake catalog sources.

07, 2011, 2.7 — Labels show event number in bold followed by year and magnitude. Use event number to reference attached table.

- Charleston
- Seismic Station US National Seismic Network (e.g. IRIS)
- Seismic Station USArray Transportable Array (NSF EarthScope Project)
- Interstate Highways
- Counties

Earthquake Epicenters

Instrumental Magnitude	Historic Magnitude
0.0 - 0.9	0.0 - 0.9
1.0 - 1.9	1.0 - 1.9
2.0 - 2.9	2.0 - 2.9
3.0 - 3.9	3.0 - 3.9
4.0 - 4.9	4.0 - 4.9

West Virginia Geological and Economic Survey
Mont Chateau Research Center
1 Mont Chateau Road
Morgantown, WV 26508-6079
Phone: (304) 594-2331
www.wvgs.wvnet.edu

Event Num	WVQID	County	UTC Year	UTC Month	UTC Day	UTC HH	UTC MM	UTC SS	Latitude (N)	Longitude (W)	Magnitude	Recorded	MMI	Magnitude Type	Source 1	Source 2	USGS Link
1	18240715160	Wood	1824	7	15	16	20	0.00	39.70000	-80.50000	4.1	Historic	4.0	Mb	VTSO	NCEER	
2	18461019020	Jefferson	1846	10	19	2	0	0.00	39.30000	-77.90000	2.7	Historic	3.0	<NULL>	VTSO	<NULL>	
3	18530502140	Pendleton	1853	5	2	14	20	0.00	38.50000	-79.50000	4.4	Historic	5.5	<NULL>	NCEER	Wheeler I-2737	
4	19090402070	Berkeley	1909	4	2	7	25	0.00	39.40000	-78.00000	3.6	Historic	5.0	Mb	VTSO	Wheeler I-2737	
5	19330615010	Mingo	1933	6	15	1	14	36.80	37.56800	-81.97300	0.0	Historic	0.0	<NULL>	VTSO	<NULL>	
6	19351101080	Hardy	1935	11	1	8	30	0.00	38.90000	-78.90000	3.3	Historic	4.0	<NULL>	VTSO	NCEER	
7	19570307210	Monongalia	1957	3	7	21	5	9.00	39.60000	-79.90000	2.9	Historic	3.0	Mb	VTSO	<NULL>	
8	19570313210	Monongalia	1957	3	13	21	0	41.00	39.60000	-79.90000	2.9	Historic	3.0	Mb	VTSO	<NULL>	
9	19631010000	Morgan	1963	10	10	0	0	0.00	39.65500	-78.19700	3.6	Historic	0.0	<NULL>	Wheeler I-2737	<NULL>	
10	19641125020	McDowell	1964	11	25	2	50	5.00	37.40000	-81.50000	4.5	Instrumental	0.0	Mb	ANSS	<NULL>	
11	19650426150	McDowell	1965	4	26	15	26	19.70	37.32500	-81.60200	3.5	Instrumental	0.0	MbLg	VTSO	NCEER	
12	19660928000	Harrison	1966	9	28	0	0	0.00	39.30000	-80.30000	3.1	Instrumental	4.0	<NULL>	NCEER	<NULL>	
13	19671216120	McDowell	1967	12	16	12	23	33.40	37.36000	-81.60400	3.5	Instrumental	0.0	Mb	VTSO	NCEER	
14	19691120010	Mercer	1969	11	20	1	0	9.30	37.44900	-80.93200	4.6	Instrumental	6.0	MbLg	VTSO	NCEER	
15	19700811060	Lincoln	1970	8	11	6	14	25.50	38.23000	-82.05000	2.8	Instrumental	4.0	MbLg	VTSO	NCEER	
16	19710401050	McDowell	1971	4	1	5	5	11.00	37.40000	-81.60000	3.0	Instrumental	0.0	Mb	NCEER	ANSS	
17	19720109230	McDowell	1972	1	9	23	24	29.00	37.40000	-81.60000	3.7	Instrumental	0.0	MbLg	NCEER	ANSS	
18	19720912150	Monongalia	1972	9	12	15	17	13.70	39.60000	-79.90000	2.9	Historic	3.0	Mb	VTSO	NCEER	
19	19741020150	Wood	1974	10	20	15	13	55.60	39.06000	-81.60900	3.8	Instrumental	5.0	Mb	VTSO	NCEER	Further Info
20	19760130180	Morgan	1976	1	30	18	58	49.80	39.68300	-78.17000	2.8	Instrumental	0.0	Lg	USGS	ANSS	Further Info
21	19760506180	Monongalia	1976	5	6	18	46	8.10	39.60000	-79.90000	3.1	Historic	4.0	Mb	VTSO	NCEER	
22	19760619050	McDowell	1976	6	19	5	54	13.40	37.34400	-81.60200	4.7	Instrumental	5.0	Mb	VTSO	NCEER	Further Info
23	19760703200	Mercer	1976	7	3	20	53	45.80	37.32000	-81.13000	2.7	Instrumental	0.0	MbLg	VTSO	<NULL>	
24	19780814040	Fayette	1978	8	14	4	50	5.40	37.93900	-80.87400	1.6	Instrumental	0.0	Mc	VTSO	ANSS	
25	19790916090	Pocahontas	1979	9	16	9	39	22.60	38.09900	-80.24000	1.6	Instrumental	0.0	Mc	ANSS	<NULL>	
26	19790919000	Pocahontas	1979	9	19	0	45	57.40	38.11000	-80.24300	2.0	Instrumental	0.0	Mc	ANSS	<NULL>	
27	19791031080	Raleigh	1979	10	31	8	32	47.30	37.61700	-81.20700	0.8	Instrumental	0.0	Mc	ANSS	<NULL>	
28	19800410220	Mercer	1980	4	10	22	33	15.70	37.48700	-81.08600	0.7	Instrumental	0.0	Mc	VTSO	ANSS	
29	19800921100	Pocahontas	1980	9	21	10	2	46.30	38.17500	-80.07000	1.4	Instrumental	0.0	Mc	VTSO	ANSS	
30	19801016030	Pocahontas	1980	10	16	3	48	7.60	38.06600	-80.21500	1.1	Instrumental	0.0	Mc	VTSO	ANSS	
31	19801105210	Pocahontas	1980	11	5	21	48	14.20	38.18800	-79.93600	3.0	Instrumental	0.0	ML	ANSS	<NULL>	
32	19801125070	Pocahontas	1980	11	25	7	44	4.00	38.09500	-80.12300	0.6	Instrumental	0.0	Md	VTSO	ANSS	
33	19811130170	Mingo	1981	11	30	17	33	11.00	37.63000	-82.20000	2.5	Instrumental	0.0	Mc	VTSO	ANSS	
34	19820623160	Fayette	1982	6	23	16	17	34.10	37.87000	-80.95700	2.5	Instrumental	0.0	Md	VTSO	ANSS	
35	19830121050	Pocahontas	1983	1	21	5	33	20.40	38.06700	-80.14400	0.4	Instrumental	0.0	Md	VTSO	ANSS	
36	19830526010	Monroe	1983	5	26	1	4	44.80	37.50600	-80.31600	2.2	Instrumental	0.0	Md	VTSO	ANSS	
37	19830610000	Greenbrier	1983	6	10	0	18	40.40	37.94800	-80.16300	1.2	Instrumental	0.0	Md	VTSO	ANSS	
38	19830610001	Greenbrier	1983	6	10	0	24	57.00	37.95100	-80.18900	1.2	Instrumental	0.0	Md	VTSO	ANSS	
39	19830610002	Greenbrier	1983	6	10	0	31	8.30	37.93800	-80.16800	0.4	Instrumental	0.0	Md	VTSO	ANSS	
40	19830720040	Greenbrier	1983	7	20	4	41	40.90	37.88500	-80.69100	1.6	Instrumental	0.0	Md	VTSO	ANSS	
41	19830725030	Wyoming	1983	7	25	3	27	0.20	37.49600	-81.35200	0.6	Instrumental	0.0	Md	VTSO	ANSS	
42	19831113160	Summers	1983	11	13	16	51	6.70	37.55600	-80.77500	0.4	Instrumental	0.0	Md	VTSO	ANSS	
43	19831113170	Monroe	1983	11	13	17	50	50.10	37.55900	-80.75300	0.7	Instrumental	0.0	Md	VTSO	ANSS	
44	19831125160	Monroe	1983	11	25	16	27	47.80	37.56800	-80.74500	0.7	Instrumental	0.0	Md	VTSO	<NULL>	
45	19831223100	Summers	1983	12	23	10	51	21.90	37.76600	-80.83700	0.3	Instrumental	0.0	Md	VTSO	ANSS	
46	19840202050	Mingo	1984	2	2	5	10	19.70	37.71700	-82.21800	1.9	Instrumental	0.0	Md	VTSO	ANSS	
47	19840311040	Summers	1984	3	11	4	1	38.90	37.47400	-80.90000	1.1	Instrumental	0.0	Md	VTSO	ANSS	
48	19841009050	Summers	1984	10	9	5	33	31.50	37.71300	-80.89100	2.1	Instrumental	0.0	Md	VTSO	ANSS	
49	19841221130	Pocahontas	1984	12	21	13	12	21.90	38.19800	-80.20800	1.6	Instrumental	0.0	Md	VTSO	ANSS	
50	19850614070	Mercer	1985	6	14	7	57	10.20	37.53400	-81.02000	0.8	Instrumental	0.0	Md	VTSO	ANSS	
51	19860226210	Pendleton	1986	2	26	21	53	20.80	38.50700	-79.29200	2.3	Instrumental	0.0	Md	VTSO	ANSS	
52	19861220080	Greenbrier	1986	12	20	8	13	12.80	38.05800	-80.64300	1.2	Instrumental	0.0	Md	VTSO	ANSS	
53	19890319100	Logan	1989	3	19	10	7	55.80	37.73500	-82.06400	1.9	Instrumental	0.0	Md	VTSO	ANSS	
54	19910422010	Greenbrier	1991	4	22	1	1	20.20	37.94200	-80.20500	3.5	Instrumental	0.0	Md	VTSO	ANSS	Further Info

Event Num	WVQID	County	UTC Year	UTC Month	UTC Day	UTC Hr	UTC AM	UTC SS	Latitude (N)	Longitude (W)	Magnitude	Recorded	AMI	Magnitude Type	Source 1	Source 2	USGS link
55	19910628180	Kanawha	1991	6	28	18	34	55.50	38.23100	-81.33500	3.0	Instrumental	0.0	Mb	VTSO	ANSS	
56	19920329200	Mercer	1992	3	29	20	16	48.20	37.31400	-81.14900	1.4	Instrumental	0.0	Md	VTSO	ANSS	
57	19920506210	Fayette	1992	5	6	21	20	23.90	38.11800	-81.06900	2.3	Instrumental	0.0	Md	VTSO	ANSS	
58	19921124020	Summers	1992	11	24	2	26	50.70	37.45700	-80.88400	1.2	Instrumental	0.0	Md	VTSO	ANSS	
59	19940204070	Nicholas	1994	2	4	7	40	32.40	38.23600	-80.75900	2.1	Instrumental	0.0	Md	VTSO	ANSS	
60	19940619080	Nicholas	1994	6	19	8	36	41.30	38.33900	-80.64000	1.7	Instrumental	0.0	Md	VTSO	ANSS	
61	19951115100	Raleigh	1995	11	15	10	29	24.80	37.71700	-81.04300	2.6	Instrumental	0.0	Md	VTSO	ANSS	
62	19951228230	Fayette	1995	12	28	23	48	30.40	38.08400	-80.96800	2.5	Instrumental	0.0	Md	VTSO	ANSS	
63	19960811090	Greenbrier	1996	8	11	9	11	21.30	37.73100	-80.62800	2.1	Instrumental	<NULL>	Mc	ANSS	<NULL>	
64	19970222140	Fayette	1997	2	22	14	32	33.10	37.92100	-81.02700	2.0	Instrumental	<NULL>	Mc	ANSS	<NULL>	
65	19970315050	Webster	1997	3	15	5	56	36.40	38.34700	-80.48400	1.8	Instrumental	0.0	Md	VTSO	ANSS	
66	19970315050	Kanawha	1998	10	2	10	1	6.90	38.06800	-81.46600	2.5	Instrumental	0.0	Md	VTSO	ANSS	
67	20001016170	Braxton	2000	10	16	17	56	13.80	38.63600	-80.92000	2.5	Instrumental	0.0	Md	VTSO	ANSS	
68	20011204210	Summers	2001	12	4	21	15	13.90	37.72600	-80.75200	3.1	Instrumental	0.0	Mb	VTSO	ANSS	
69	20020327080	Mingo	2002	3	27	8	25	3.30	37.75300	-82.17100	2.1	Instrumental	0.0	Md	VTSO	ANSS	
70	20060711120	Greenbrier	2006	7	11	12	1	43.10	37.87800	-80.64900	2.6	Instrumental	0.0	Mb	CERI	VTSO	
71	20070830120	Wyoming	2007	8	30	12	52	9.34	37.75300	-81.63600	2.6	Instrumental	0.0	Lg GS	CERI	USGS ENS	Further Info
72	20080129010	Monroe	2008	1	29	1	4	20.70	37.54480	-80.50980	2.4	Instrumental	<NULL>	Md	CERI	ANSS	
73	20090411180	Summers	2009	4	11	18	11	9.07	37.51330	-80.89570	2.4	Instrumental	<NULL>	Md	CERI	ANSS	
74	20100404090	Braxton	2010	4	4	9	19	14.01	38.59900	-80.91617	3.4	Instrumental	0.0	MbLg	CERI	USGS ENS	Further Info
75	20100429010	Braxton	2010	4	29	1	36	22.59	38.68567	-80.81483	2.6	Instrumental	0.0	MbLg	CERI	USGS ENS	Further Info
76	20100429120	Braxton	2010	4	29	12	38	53.43	38.64700	-80.87200	2.7	Instrumental	0.0	MbLg	USGS ENS	CERI	Further Info
77	20100429130	Braxton	2010	4	29	23	26	39.47	38.72200	-80.80300	2.5	Instrumental	0.0	Lg GS	CERI	USGS ENS	Further Info
78	20100507100	Braxton	2010	5	7	10	26	3.47	38.60650	-80.91317	2.6	Instrumental	0.0	MbLg	CERI	USGS ENS	Further Info
79	20100508030	Braxton	2010	5	8	3	3	0.62	38.62300	-80.91133	2.4	Instrumental	0.0	Md	CERI	USGS ENS	Further Info
80	20100724090	Braxton	2010	7	24	9	15	44.13	38.67533	-80.82017	2.4	Instrumental	0.0	Md	CERI	USGS ENS	Further Info
81	20100725030	Braxton	2010	7	25	3	48	70.00	38.67900	-80.79700	2.2	Instrumental	0.0	Md	USGS ENS	LDEO	
82	20100815040	Lewis	2010	8	15	4	38	47.38	38.81833	-80.42983	2.5	Instrumental	0.0	Md	CERI	USGS	Further Info
83	20100821030	Upshur	2010	8	21	3	16	21.99	38.79250	-80.39767	2.5	Instrumental	0.0	Md	USGS ENS	LDEO	Further Info
84	20100826040	Raleigh	2010	8	26	4	22	15.19	37.74833	-81.20467	2.4	Instrumental	0.0	Md	CERI	USGS	
85	20100826041	Raleigh	2010	8	26	4	24	55.39	37.72733	-81.20433	2.2	Instrumental	0.0	Md	CERI	USGS ENS	
86	20100913150	Lincoln	2010	9	13	15	8	46.47	38.10000	-82.03400	2.4	Instrumental	0.0	Md	CERI	ANSS	
87	20110825050	Greenbrier	2011	8	25	5	59	13.76	37.91600	-80.21533	2.7	Instrumental	4.0	Md	CERI	USGS	Further Info
88	20120111190	Braxton	2012	1	10	19	38	58.66	38.70400	-80.95900	2.8	Instrumental	4.0	unk	CERI	USGS	Further Info
89	20120316150	Boone	2012	3	16	15	5	55.00	38.21200	-81.71400	2.8	Instrumental	2.0	MbLg	CERI	USGS NEIC	Further Info
90	20130331140	Braxton	2013	3	31	14	1	24.03	38.64500	-80.83317	3.4	Instrumental	5.0	Mw	CERI	USGS NEIC	Further Info
91	20130720110	Gilmer	2013	7	20	11	38	46.18	38.89567	-80.88700	2.7	Instrumental	<NULL>	MbLg	CERI	USGS ENS	Further Info
92	20130730060	Gilmer	2013	7	30	6	9	4.85	38.83933	-80.90867	2.8	Instrumental	<NULL>	Md	CERI	USGS ENS	Further Info
93	20130816110	Gilmer	2013	8	16	11	2	21.04	38.84150	-80.93867	2.6	Instrumental	3.0	MbLg	CERI	USGS ENS	Further Info
94	20131013090	Braxton	2013	10	13	9	20	58.55	38.70117	-80.82417	2.2	Instrumental	<NULL>	Md	CERI	USGS ENS	Further Info
95	20131019080	Greenbrier	2013	10	19	8	41	57.43	37.74767	-80.64333	2.2	Instrumental	<NULL>	Md	CERI	USGS ENS	Further Info
96	20140606220	Jackson	2014	6	6	22	15	40.79	38.64383	-81.58550	2.6	Instrumental	<NULL>	Md	CERI	USGS ENS	Further Info

Data as of June 25, 2014. For a more detailed listing, please download the West Virginia Earthquake spreadsheet from WVGES at http://www.wvgs.wvnet.edu/www/earthquakes/seismic.html
If you view this map and data as a PDF, you can click any of the blue hyperlinked text to view further information on a web site.
Please note that USGS Links, above, are considered "beta" at the time of this publication and USGS may change destinations, pages, etc. afterward.

Definition of terms on next page.

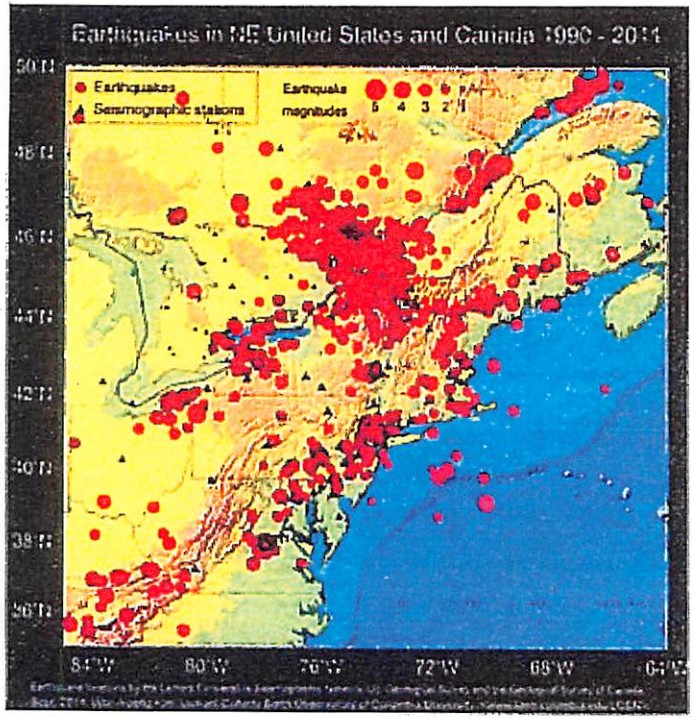
Definitions and Explanations:

- **County:** the name of the county where the epicenter was located, derived from spatial selection.
- Dates and times are in Coordinated Universal Time (UTC) for Year, Month, Day, Hours (HH), Minutes (MM) and Seconds (SS). (For Eastern Standard Time, the offset is - 5 hours).
- **Magnitude (Mag):** Magnitude numbers indicative of an earthquake's relative size and is the measured maximum motion as recorded by a seismograph. The numbers are pulled from various sources; the primary source whenever possible.
- **Recorded:** refers to the means by which magnitudes were recorded: if they were reported as "felt" (Historical) or recorded via scientific instrumentation (Instrumental) as retrieved from Source1 or Source2.
- **Latitude (Lat_N)** and **Longitude (Lon_W)** values are expressed in decimal degrees for the northern (_N) and western (_W) hemispheres, respectively.
- **MMI:** The Modified Mercalli Intensity scale for epicenter intensity, usually designated with Roman numerals. Visit USGS at **http://earthquake.usgs.gov/learn/topics/mercalli.php** for further information.
- **Mag_Type:** Magnitude type code; the method used in measuring magnitudes (e.g., *Mb* for "body-wave", *Mc* for "coda amplitude", *Md* for "coda duration").
- **Depth_KM:** The reported depth of the earthquake hypocenter or focus (below the epicenter on the surface) in kilometers.

*For other or more detailed earthquake and seismological definitions, please visit the USGS (**http://earthquake.usgs.gov/learn/glossary/**) and Rapid Earthquake Viewer (**http://rev.seis.sc.edu/definition.html**).*

Sources (Source1 and Source2):

- VTSO – **Virginia Tech Seismological Observatory** (Primary Source)
- ANSS – **Advanced National Seismic System**
- CERI – **Center for Earthquake Research and Information**
- LDEO – **Lamont-Doherty Earth Observatory**
- NCEER – **National Center for Earthquake Engineering Research**
- USGS ENS – **United States Geological Survey, Earthquake Notification Service**
- Wheeler I-2737 – Wheeler, Russell L., ***Earthquakes in and Near the Northeastern United States, 1638-1998*** (Used only as reference here)

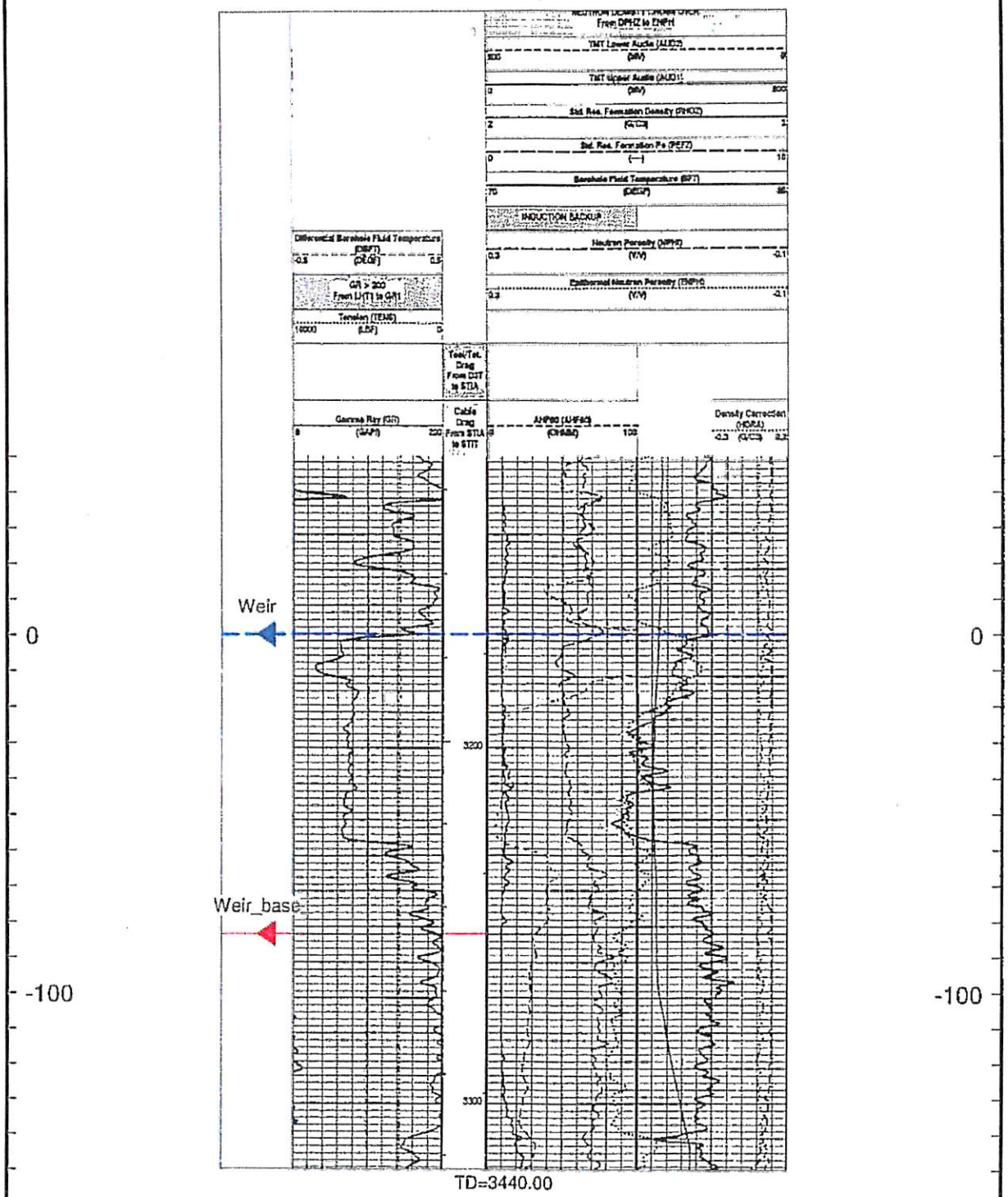


Northeastern United States and southeastern Canadian earthquakes from 1990 to 2011.
Image courtesy of the Lamont-Doherty Earth Observatory (Won-Young Kim)
of Columbia University, New York. Used by permission.

West Virginia Geological and Economic Survey
http://www.wvgs.wvnet.edu/

4710902703

Penn Virginia Oil & Gas Corp.
HEARTWOOD FOREST LAND 400WIW



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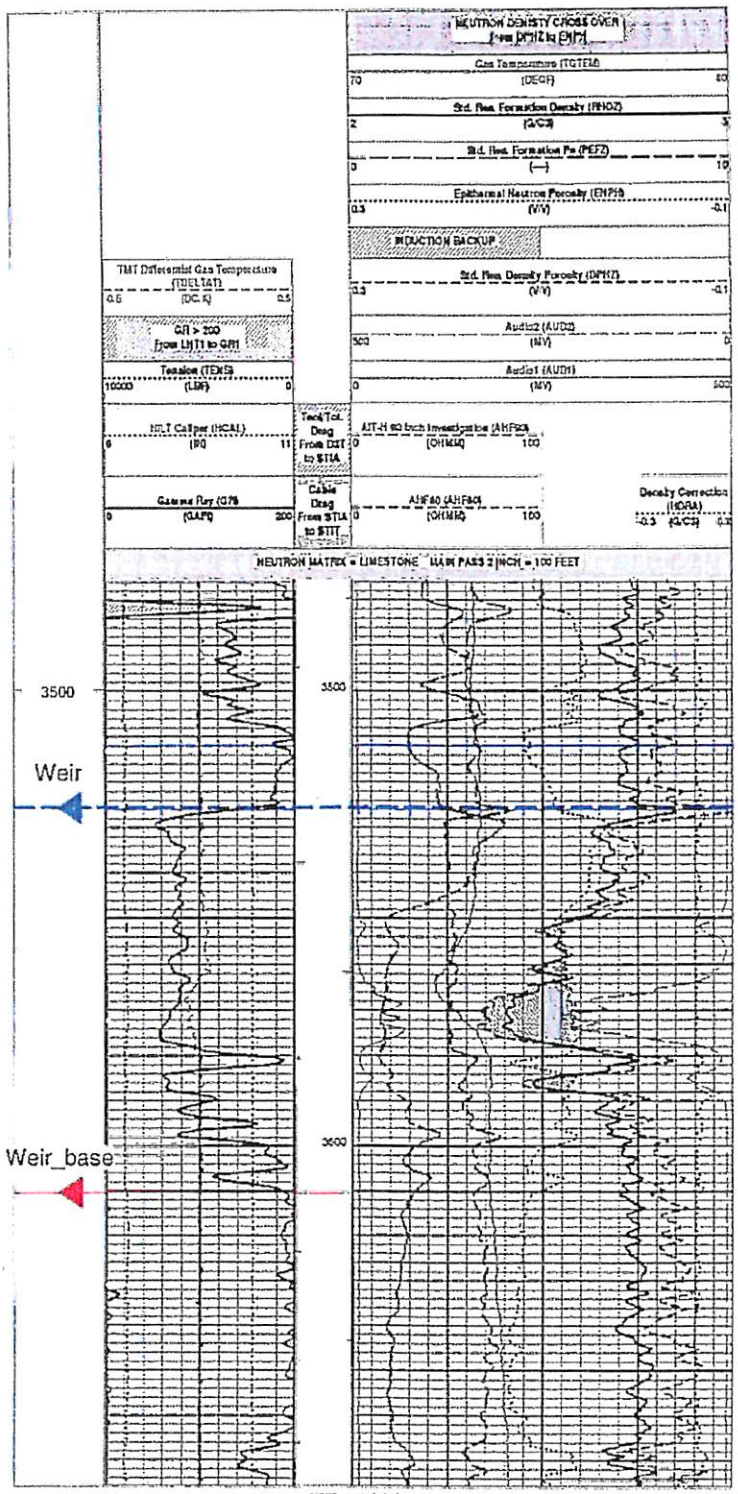
Penn Virginia Oil & Gas Corp.
#385 WP 385



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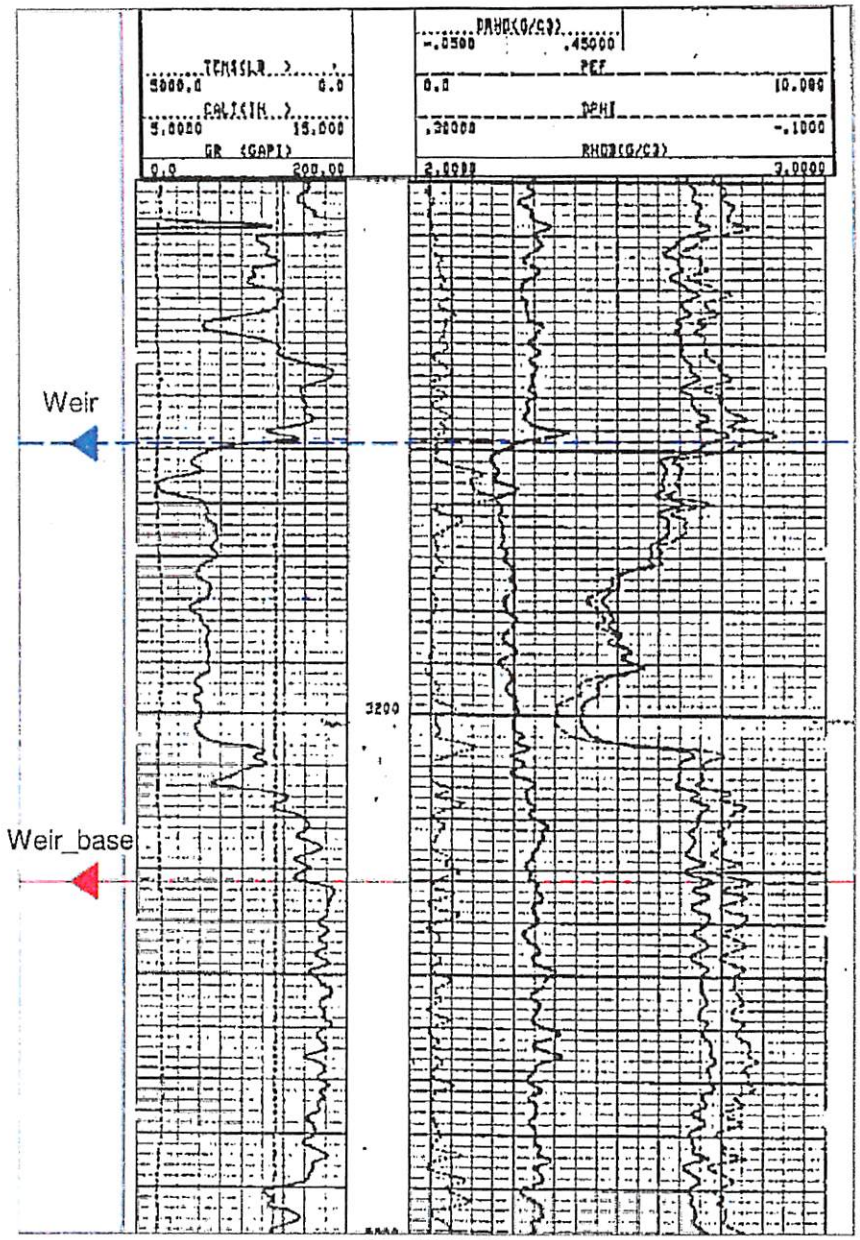

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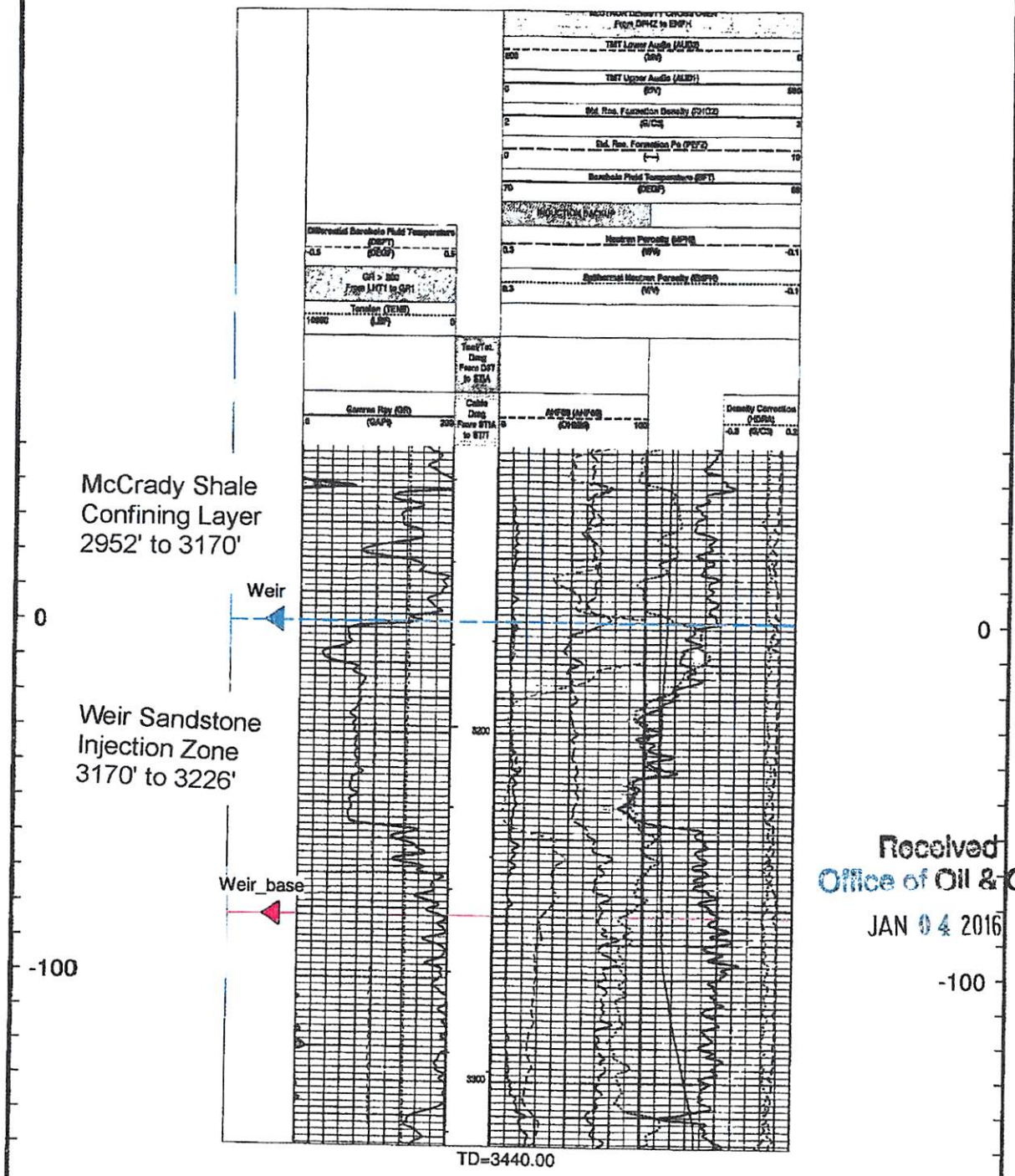
HEARTWOOD FOREST LAND 400WIW



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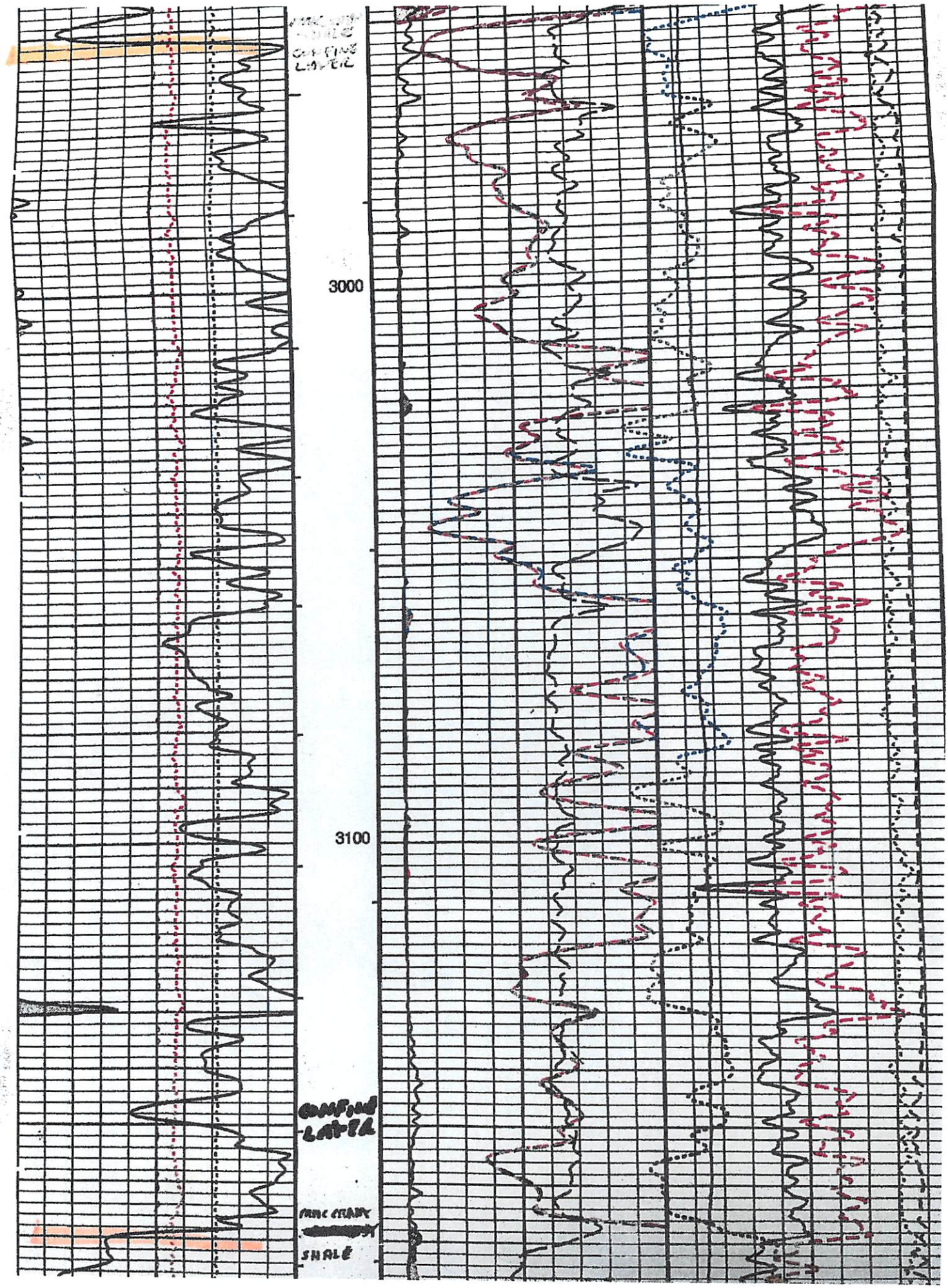
Office of Oil & Gas
JAN 04 2016


3000
3100
CONFINING LAYER
SHALE

Section 9:

Operating Requirements/Data

Section 9-Operating Requirements/Data

The WP-400 WIW has previously been permitted as a UIC Class 2D injection facility. Production casing of 7" 23# was run to a total depth of 3,356' with 4-1/2" 9.5# tubing and compression packer set at 3,119'. Virgin reservoir pressures obtained from previous reports indicated the Weir's pressure of 850 psig with a maximum injection pressure of 1,034 psig and 2,300 psig bottom hole pressure. Historically, approximately 425 barrels per hour were injected at this location. Projected use is estimated to be the same. The facility utilizes three contained surface ponds as filtration. If needed, 4-400bbl tanks are available for use. Injection fluids run though these tanks would use four types of filtration:

1. A 200 micron bag filter for removing heavy particulate matter.
2. A 50 micron bag type filter unit
3. A 20 micron cartridge type filter unit
4. A 5 micron cartridge type filter unit.

MIT inspections shall be performed a minimum of every five years or anytime service work is performed to the well or anytime routine daily/monthly inspections show the possibility of an integrity problem. Routine daily/monthly inspections shall consist of casing and tubing pressures monitoring, equipment and manifold, well head, tanks, containments and equipment inspections for corrosion and potential leaks. Monthly manifold and pipeline integrity step tests to 10% over the maximum permitted injection pressure. All daily/monthly inspections and test shall be recorded, logged and filed in the plant office. In the event of any suspected well, manifold or pipeline integrity problem the well will be immediately shut in and injection activities shall cease with proper notifications being made. In the event of any well integrity problem the well will be made "static" and evaluation of data shall be performed and remedial work will begin once a plan of action has been put into place. Any injection fluids shall be transported and disposed of in an alternated state approved disposal facility or permitted UIC Class 2D well.

Please find enclosed Appendix G.

Injectate Sample

ALS Environmental

29-Sep-2021

Josh Roberts
Core Appalachia Operating, LLC
414 Summers Street
Charleston, WV 25301

Re: **WP-400**

Work Order: **21082745**

Dear Josh,

ALS Environmental received 4 samples on 31-Aug-2021 04:08 PM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - South Charleston and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 11.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 1740 Union Carbide Drive, South Charleston, WV, USA
PHONE: +1 (304) 356-3168 FAX: +1 (304) 205-6262

Sincerely,

Rebecca Kiser

Electronically approved by: Rebecca Kiser

Rebecca Kiser
Project Manager

ALS Group, USA

Date: 29-Sep-21

Client: Core Appalachia Operating, LLC
Project: WP-400
Work Order: 21082745

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
21082745-01	WP-400 Injectate Grab	Water		8/31/2021 10:00	8/31/2021 16:08	☐
21082745-01	WP-400 Injectate Grab	Water		8/31/2021 10:00	9/1/2021 14:30	☐
21082745-02	WP-400 Upstream Grab	Water		8/31/2021 10:15	8/31/2021 16:08	☐
21082745-02	WP-400 Upstream Grab	Water		8/31/2021 10:15	9/1/2021 14:30	☐
21082745-03	WPP-400 Downstream Grab	Water		8/31/2021 10:35	8/31/2021 16:08	☐
21082745-03	WPP-400 Downstream Grab	Water		8/31/2021 10:35	9/1/2021 14:30	☐
21082745-04	Trip Blank Grab	Water		8/31/2021 10:00	9/1/2021 14:30	☐

Date: 29-Sep-21

ALS Group, USA

Client: Core Appalachia Operating, LLC
Project: WP-400
Work Order: 21082745

Case Narrative

Samples for the above noted Work Order were received on 08/31/2021. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Wet Chemistry:
Batch R325748, Method A4500-H B-11, Sample WP-400 Injectate Grab (21082745-01F): pH was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

Batch R325748, Method A4500-H B-11, Sample WP-400 Upstream Grab (21082745-02F): pH was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

Batch R325748, Method A4500-H B-11, Sample WPP-400 Downstream Grab (21082745-03F): pH was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

Client:	Core Appalachia Operating, LLC	**QUALIFIERS, ACRONYMS, UNITS**
Project:	WP-400	
WorkOrder:	21082745	

Qualifier	Description
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
µg/L	Micrograms per Liter
as noted	
mg/L	Milligrams per Liter
s.u.	Standard Units

ALS Group, USA

Date: *29-Sep-21*

Client: Core Appalachia Operating, LLC
Project: WP-400
Sample ID: WP-400 Injectate Grab
Collection Date: 8/31/2021 10:00 AM

Work Order: 21082745
Lab ID: 21082745-01
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
PH (LABORATORY)			Method:A4500-H B-11				Analyst: MLH
pH (laboratory)	5.72	H	0	0.020	s.u.	1	8/31/2021 16:55

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *29-Sep-21*

Client: Core Appalachia Operating, LLC
Project: WP-400
Sample ID: WP-400 Upstream Grab
Collection Date: 8/31/2021 10:15 AM

Work Order: 21082745
Lab ID: 21082745-02
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
PH (LABORATORY)			Method:A4500-H B-11				Analyst: MLH
pH (laboratory)	7.07	H	0	0.020	s.u.	1	8/31/2021 16:55

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *29-Sep-21*

Client: Core Appalachia Operating, LLC
Project: WP-400
Sample ID: WPP-400 Downstream Grab
Collection Date: 8/31/2021 10:35 AM

Work Order: 21082745
Lab ID: 21082745-03
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
PH (LABORATORY)			Method:A4500-H B-11				Analyst: MLH
pH (laboratory)	6.91	H	0	0.020	s.u.	1	8/31/2021 16:55

Note: See Qualifiers page for a list of qualifiers and their definitions.

Date: 29-Sep-21

ALS Group, USA

QC BATCH REPORT

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

Batch ID: R325748 Instrument ID:STC-WC Method: A4500-H B-11

LCS Sample ID: LCS-R325748-R325748 Units:s.u. Analysis Date: 8/31/2021 04:55 PM
Client ID: Run ID: STC-WC_210831B SeqNo:7712558 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	4	0	0.020	4	0	100	90-110	0			

DUP Sample ID: 21082707-01J DUP Units:s.u. Analysis Date: 8/31/2021 04:55 PM
Client ID: Run ID: STC-WC_210831B SeqNo:7712560 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	7.64	0	0.020	0	0	0	0-0	7.6	0.525	20	H

DUP Sample ID: 21082707-03L DUP Units:s.u. Analysis Date: 8/31/2021 04:55 PM
Client ID: Run ID: STC-WC_210831B SeqNo:7712571 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	7.09	0	0.020	0	0	0	0-0	7.06	0.424	20	H

The following samples were analyzed in this batch: 21082745-01F 21082745-02F 21082745-03F

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

☒ **ALS**
1740 Union Carbide Drive
South Charleston, WV 25303
(Tel) 304.356.3168
(Fax) 304.205.6262

Chain of Custody Form

Page ____ of ____

09812

☐ **ALS**
3352 128th Avenue
Holland, Michigan 49424
(Tel) 616.399.6070
(Fax) 616.399.6185

ALS Project Manager: | ALS Work Order #: 01082745

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name		A	TOC
Work Order		Project Number		B	Sr, Ba, Fe, Mg, Al, Mn, Na, Ca
Company Name	DGOC	Bill To Company		C	BTEX
Send Report To	Josh Roberts	Invoice Attn.		D	TPH/GRO
Address	414 Summers St	Address		E	TPH DRO/ORO
City/State/Zip	Chas WV 25301	City/State/Zip		F	pH
Phone	304-807-3882	Phone		G	Cl, Br, SO4, TDS
Fax		Fax		H	TSS
e-Mail Address	JRoberts@dgoc.com			I	Ra 226/228 Gross Alpha/Beta
				J	

No.	Sample Description	Comp / Grab	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	WP-400 Injectate	Grab	8/31/21	10:00	W	1,2,3	17	✓	✓	✓	✓	✓	✓	✓	✓	✓		
2	WP-400 Upstream	↓	↓	10:15	↓	1,2,3	13	✓	✓	✓	✓	✓	✓	✓	✓			
3	WP-400 Downstream	↓	↓	10:35	↓	1,2,3	13	✓	✓	✓	✓	✓	✓	✓	✓			
4	Trip Blank	↓	↓	↓	↓	1/8	2			✓								
5																		
6																		
7																		
8																		
9																		
10																		

Sampler(s): Please Print & Sign: [illegible] | Shipment Method: | Turnaround Time in Business Days (BD): ☐ Other ____ ☐ 10 BD(STD) ☐ 5 BD ☐ 3 BD ☐ 2 BD ☐ 1 BD | Results Due Date:

Relinquished by:	Date:	Time:	Received by:	Temp:	Notes:
[illegible]	8-31-21	1405	[illegible] 8/31/21 1605	2.6°C 4.5°C	
Relinquished by:	Date:	Time:	Received by:		
Relinquished by:	Date:	Time:	Received by:	Temp:	QC Package: (Check Box Below)
Relinquished by:	Date:	Time:	Received by (Laboratory):		Level II: Standard QC
					Level III: Standard QC + Raw Data
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):		Level IV: SW846 Methods/CLP
					Other:

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C

Note: Any changes must be made in writing once samples and COC Form have been submitted to ALS

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ALS Environmental

21082745

Sample Receiving Checklist

Received by:	Janet Smith
Date/Time:	8/31/21 1608
Carrier Name:	Client
Shipping container/cooler in good condition?	Yes / No / Not Present
Custody seals intact on shipping container/cooler?	Yes / No / Not Present X
Custody seals intact on sample bottles?	Yes / No / Not Present
Chain of Custody present?	Yes / No
COC signed when relinquished and received?	Yes / No
COC agrees with sample labels?	Yes / No
Samples in proper container/bottle?	Yes / No
Sample containers intact?	Yes / No
Sufficient sample volume for indicated test?	Yes / No
All samples received within holding time?	Yes / No
All sample temperatures verified to be in compliance?	Yes / No
Temperature(s) (°C):	2.6°C/ASR
Thermometer(s):	IR
Sample(s) received on ice?	Yes / No
Matrix/Matrices:	Water
Cooler(s)/Kit(s):	
Date/Time sample(s) sent to storage:	
Trip Blanks included? (for volatile analysis only)	Yes / No / N/A
Water – VOA vials have zero headspace?	Yes / No / No Vials
Water – pH acceptable upon receipt?	Yes / No / N/A
pH strip lot #:	* not checked
pH adjusted (note adjustments below)?	Yes / No / N/A
pH adjusted by:	

Login Notes:

pH out of hold. Custody seal not actually applied (Backing removed) to seal coolers.

29-Sep-2021

Josh Roberts
Core Appalachia Operating, LLC
414 Summers Street
Charleston, WV 25301

Re: **WP-400**

Work Order: **21082745**

Dear Josh,

ALS Environmental received 4 samples on 01-Sept-2021 04:08 PM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 32.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Rebecca Kiser

Electronically approved by: Rebecca Kiser

Rebecca Kiser
Project Manager

ALS Group, USA

Date: 29-Sep-21

Client: Core Appalachia Operating, LLC
Project: WP-400
Work Order: 21082745

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
21082745-01	WP-400 Injectate Grab	Water		8/31/2021 10:00	8/31/2021 16:08	☐
21082745-01	WP-400 Injectate Grab	Water		8/31/2021 10:00	9/1/2021 14:30	☐
21082745-02	WP-400 Upstream Grab	Water		8/31/2021 10:15	8/31/2021 16:08	☐
21082745-02	WP-400 Upstream Grab	Water		8/31/2021 10:15	9/1/2021 14:30	☐
21082745-03	WPP-400 Downstream Grab	Water		8/31/2021 10:35	8/31/2021 16:08	☐
21082745-03	WPP-400 Downstream Grab	Water		8/31/2021 10:35	9/1/2021 14:30	☐
21082745-04	Trip Blank Grab	Water		8/31/2021 10:00	9/1/2021 14:30	☐

ALS Group, USA

Client:	Core Appalachia Operating, LLC
Project:	WP-400
Work Order:	21082745

Case Narrative

Samples for the above noted Work Order were received on 09/01/2021. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Volatile Organics:
No other deviations or anomalies were noted.

Extractable Organics:
No other deviations or anomalies were noted.

Metals:
No other deviations or anomalies were noted.

Wet Chemistry:
Batch R326173, Method A5310C-11, Sample WP-400 Injectate Grab (21082745-01a): TOC sample was difficult to analyze due to turbid matrix

Batch R326173, Method A5310C-11, Sample 21082745-01A MS: MS and/or MSD was outside upper limit of calibration. Processed at equivalent dilution level as the parent. TOC

Client:	Core Appalachia Operating, LLC
Project:	WP-400
WorkOrder:	21082745

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
µg/L	Micrograms per Liter
as noted	
mg/L	Milligrams per Liter
s.u.	Standard Units

ALS Group, USA

Date: *29-Sep-21*

Client: Core Appalachia Operating, LLC
Project: WP-400
Sample ID: WP-400 Injectate Grab
Collection Date: 8/31/2021 10:00 AM

Work Order: 21082745
Lab ID: 21082745-01
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
DIESEL RANGE ORGANICS BY GC-FID			Method:SW8015D		Prep: SW3511 / 9/2/21		Analyst: SJB
DRO (C10-C28)	3.8		0.040	0.10	mg/L	1	9/3/2021 02:44
ORO (C28-C40)	49		0.26	0.50	mg/L	5	9/5/2021 12:42
Surr: 4-Terphenyl-d14	*72.7*			*31-124*	*%REC*	1	9/3/2021 02:44
Surr: 4-Terphenyl-d14	*65.9*			*31-124*	*%REC*	5	9/5/2021 12:42
GASOLINE RANGE ORGANICS BY GC-FID			Method:SW8015D				Analyst: SJB
GRO (C6-C10)	410		76	200	µg/L	1	9/11/2021 01:05
Surr: Toluene-d8	*97.5*			*79-130*	*%REC*	1	9/11/2021 01:05
METALS BY ICP-MS			Method:SW6020B		Prep: SW3015A / 9/6/21		Analyst: DSC
Aluminum	0.34		0.0080	0.010	mg/L	1	9/7/2021 15:56
Arsenic	0.029		0.00019	0.0050	mg/L	1	9/7/2021 15:56
Barium	270		2.0	5.0	mg/L	1000	9/9/2021 15:08
Calcium	6,300		25	50	mg/L	100	9/8/2021 12:40
Iron	240		5.0	8.0	mg/L	100	9/8/2021 12:40
Magnesium	1,100		0.50	2.0	mg/L	10	9/8/2021 12:42
Sodium	18,000		18	20	mg/L	100	9/8/2021 12:40
Strontium	450		3.6	5.0	mg/L	1000	9/9/2021 15:08
VOLATILE ORGANIC COMPOUNDS			Method:SW8260C				Analyst: HJ
Benzene	6.5		0.46	1.0	µg/L	1	9/6/2021 04:28
Ethylbenzene	1.6		0.34	1.0	µg/L	1	9/6/2021 04:28
m,p-Xylene	12		0.81	2.0	µg/L	1	9/6/2021 04:28
o-Xylene	7.4		0.31	1.0	µg/L	1	9/6/2021 04:28
Toluene	20		0.45	1.0	µg/L	1	9/6/2021 04:28
Xylenes, Total	20		0.81	3.0	µg/L	1	9/6/2021 04:28
Surr: 1,2-Dichloroethane-d4	*102*			*75-120*	*%REC*	1	9/6/2021 04:28
Surr: 4-Bromofluorobenzene	*93.6*			*80-110*	*%REC*	1	9/6/2021 04:28
Surr: Dibromofluoromethane	*101*			*85-115*	*%REC*	1	9/6/2021 04:28
Surr: Toluene-d8	*99.0*			*85-110*	*%REC*	1	9/6/2021 04:28
ANIONS BY ION CHROMATOGRAPHY			Method:E300.0				Analyst: QTN
Bromide	470		32	200	mg/L	1000	9/2/2021 20:22
Chloride	47,000		1,200	4,000	mg/L	4000	9/3/2021 13:59
Sulfate	0.98	J	0.19	1.0	mg/L	1	9/7/2021 14:27
TOTAL DISSOLVED SOLIDS			Method:A2540 C-11		Prep: FILTER / 9/3/21		Analyst: SRN
Total Dissolved Solids	79,000		1,100	1,500	mg/L	1	9/8/2021 13:25
ORGANIC CARBON, TOTAL			Method:A5310C-11				Analyst: JB
Organic Carbon, Total	200		5.6	20	mg/L	40	9/7/2021 15:57

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *29-Sep-21*

Client: Core Appalachia Operating, LLC
Project: WP-400
Sample ID: WP-400 Injectate Grab
Collection Date: 8/31/2021 10:00 AM

Work Order: 21082745
Lab ID: 21082745-01
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
TOTAL SUSPENDED SOLIDS			Method:A2540 D-11		Prep: FILTER / 9/3/21		Analyst: CDG
Total Suspended Solids	209		3.8	6.0	mg/L	1	9/7/2021 10:09

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *29-Sep-21*

Client: Core Appalachia Operating, LLC
Project: WP-400
Sample ID: WP-400 Upstream Grab
Collection Date: 8/31/2021 10:15 AM

Work Order: 21082745
Lab ID: 21082745-02
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
DIESEL RANGE ORGANICS BY GC-FID			Method:SW8015D		Prep: SW3511 / 9/2/21		Analyst: SJB
DRO (C10-C28)	0.11		0.040	0.10	mg/L	1	9/3/2021 03:21
ORO (C28-C40)	2.1		0.051	0.10	mg/L	1	9/3/2021 03:21
Surr: 4-Terphenyl-d14	*42.0*			*31-124*	*%REC*	1	9/3/2021 03:21
GASOLINE RANGE ORGANICS BY GC-FID			Method:SW8015D				Analyst: SJB
GRO (C6-C10)	U		76	200	µg/L	1	9/11/2021 01:27
Surr: Toluene-d8	*96.5*			*79-130*	*%REC*	1	9/11/2021 01:27
METALS BY ICP-MS			Method:SW6020B		Prep: SW3015A / 9/6/21		Analyst: DSC
Aluminum	0.41		0.0080	0.010	mg/L	1	9/7/2021 15:58
Arsenic	0.0016	J	0.00019	0.0050	mg/L	1	9/7/2021 15:58
Barium	9.6		0.020	0.050	mg/L	10	9/8/2021 12:43
Calcium	230		2.5	5.0	mg/L	10	9/8/2021 12:43
Iron	9.3		0.050	0.080	mg/L	1	9/7/2021 15:58
Magnesium	36		0.050	0.20	mg/L	1	9/7/2021 15:58
Sodium	680		1.8	2.0	mg/L	10	9/8/2021 12:43
Strontium	16		0.036	0.050	mg/L	10	9/8/2021 12:43
VOLATILE ORGANIC COMPOUNDS			Method:SW8260C				Analyst: HJ
Benzene	U		0.46	1.0	µg/L	1	9/6/2021 07:25
Ethylbenzene	U		0.34	1.0	µg/L	1	9/6/2021 07:25
m,p-Xylene	U		0.81	2.0	µg/L	1	9/6/2021 07:25
o-Xylene	0.34	J	0.31	1.0	µg/L	1	9/6/2021 07:25
Toluene	U		0.45	1.0	µg/L	1	9/6/2021 07:25
Xylenes, Total	U		0.81	3.0	µg/L	1	9/6/2021 07:25
Surr: 1,2-Dichloroethane-d4	*100*			*75-120*	*%REC*	1	9/6/2021 07:25
Surr: 4-Bromofluorobenzene	*90.4*			*80-110*	*%REC*	1	9/6/2021 07:25
Surr: Dibromofluoromethane	*102*			*85-115*	*%REC*	1	9/6/2021 07:25
Surr: Toluene-d8	*95.4*			*85-110*	*%REC*	1	9/6/2021 07:25
ANIONS BY ION CHROMATOGRAPHY			Method:E300.0				Analyst: QTN
Bromide	26		3.2	20	mg/L	100	9/2/2021 20:37
Chloride	1,700		50	160	mg/L	160	9/3/2021 14:30
Sulfate	16		1.9	10	mg/L	10	9/3/2021 14:15
TOTAL DISSOLVED SOLIDS			Method:A2540 C-11		Prep: FILTER / 9/3/21		Analyst: SRN
Total Dissolved Solids	3,500		220	300	mg/L	1	9/8/2021 13:25
ORGANIC CARBON, TOTAL			Method:A5310C-11				Analyst: JB
Organic Carbon, Total	6.8		0.28	1.0	mg/L	2	9/3/2021 20:01

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *29-Sep-21*

Client: Core Appalachia Operating, LLC
Project: WP-400
Sample ID: WP-400 Upstream Grab
Collection Date: 8/31/2021 10:15 AM

Work Order: 21082745
Lab ID: 21082745-02
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
TOTAL SUSPENDED SOLIDS			Method:A2540 D-11		Prep: FILTER / 9/3/21		Analyst: CDG
Total Suspended Solids	23.3		2.5	4.0	mg/L	1	9/7/2021 10:09

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *29-Sep-21*

Client: Core Appalachia Operating, LLC
Project: WP-400
Sample ID: WPP-400 Downstream Grab
Collection Date: 8/31/2021 10:35 AM

Work Order: 21082745
Lab ID: 21082745-03
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
DIESEL RANGE ORGANICS BY GC-FID			Method:SW8015D		Prep: SW3511 / 9/2/21		Analyst: SJB
DRO (C10-C28)	U		0.040	0.10	mg/L	1	9/3/2021 03:58
ORO (C28-C40)	0.25		0.051	0.10	mg/L	1	9/3/2021 03:58
Surr: 4-Terphenyl-d14	*72.3*			*31-124*	*%REC*	1	9/3/2021 03:58
GASOLINE RANGE ORGANICS BY GC-FID			Method:SW8015D				Analyst: SJB
GRO (C6-C10)	U		76	200	µg/L	1	9/11/2021 01:49
Surr: Toluene-d8	*95.8*			*79-130*	*%REC*	1	9/11/2021 01:49
METALS BY ICP-MS			Method:SW6020B		Prep: SW3015A / 9/6/21		Analyst: DSC
Aluminum	0.077		0.0080	0.010	mg/L	1	9/7/2021 16:00
Arsenic	0.00024	J	0.00019	0.0050	mg/L	1	9/7/2021 16:00
Barium	0.12		0.0020	0.0050	mg/L	1	9/7/2021 16:00
Calcium	8.2		0.25	0.50	mg/L	1	9/7/2021 16:00
Iron	0.25		0.050	0.080	mg/L	1	9/7/2021 16:00
Magnesium	3.8		0.050	0.20	mg/L	1	9/7/2021 16:00
Sodium	12		0.18	0.20	mg/L	1	9/7/2021 16:00
Strontium	0.21		0.0036	0.0050	mg/L	1	9/7/2021 16:00
VOLATILE ORGANIC COMPOUNDS			Method:SW8260C				Analyst: HJ
Benzene	U		0.46	1.0	µg/L	1	9/6/2021 07:47
Ethylbenzene	U		0.34	1.0	µg/L	1	9/6/2021 07:47
m,p-Xylene	U		0.81	2.0	µg/L	1	9/6/2021 07:47
o-Xylene	U		0.31	1.0	µg/L	1	9/6/2021 07:47
Toluene	U		0.45	1.0	µg/L	1	9/6/2021 07:47
Xylenes, Total	U		0.81	3.0	µg/L	1	9/6/2021 07:47
Surr: 1,2-Dichloroethane-d4	*99.6*			*75-120*	*%REC*	1	9/6/2021 07:47
Surr: 4-Bromofluorobenzene	*87.6*			*80-110*	*%REC*	1	9/6/2021 07:47
Surr: Dibromofluoromethane	*104*			*85-115*	*%REC*	1	9/6/2021 07:47
Surr: Toluene-d8	*95.6*			*85-110*	*%REC*	1	9/6/2021 07:47
ANIONS BY ION CHROMATOGRAPHY			Method:E300.0				Analyst: QTN
Bromide	0.12	J	0.032	0.20	mg/L	1	9/7/2021 17:20
Chloride	16		3.1	10	mg/L	10	9/3/2021 15:16
Sulfate	17		1.9	10	mg/L	10	9/3/2021 15:16
TOTAL DISSOLVED SOLIDS			Method:A2540 C-11		Prep: FILTER / 9/3/21		Analyst: SRN
Total Dissolved Solids	98		22	30	mg/L	1	9/8/2021 13:25
ORGANIC CARBON, TOTAL			Method:A5310C-11				Analyst: JB
Organic Carbon, Total	1.7		0.14	0.50	mg/L	1	9/2/2021 22:15

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *29-Sep-21*

Client: Core Appalachia Operating, LLC
Project: WP-400
Sample ID: WPP-400 Downstream Grab
Collection Date: 8/31/2021 10:35 AM

Work Order: 21082745
Lab ID: 21082745-03
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
TOTAL SUSPENDED SOLIDS			Method:A2540 D-11		Prep: FILTER / 9/3/21		Analyst: CDG
Total Suspended Solids	3.59		0.39	0.62	mg/L	1	9/7/2021 10:09

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *29-Sep-21*

Client: Core Appalachia Operating, LLC
Project: WP-400
Sample ID: Trip Blank Grab
Collection Date: 8/31/2021 10:00 AM

Work Order: 21082745
Lab ID: 21082745-04
Matrix: WATER

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		Method:SW8260C					Analyst: HJ
Benzene	U		0.46	1.0	µg/L	1	9/6/2021 00:47
Ethylbenzene	U		0.34	1.0	µg/L	1	9/6/2021 00:47
m,p-Xylene	U		0.81	2.0	µg/L	1	9/6/2021 00:47
o-Xylene	U		0.31	1.0	µg/L	1	9/6/2021 00:47
Toluene	U		0.45	1.0	µg/L	1	9/6/2021 00:47
Xylenes, Total	U		0.81	3.0	µg/L	1	9/6/2021 00:47
Surr: 1,2-Dichloroethane-d4	*99.2*			*75-120*	*%REC*	1	9/6/2021 00:47
Surr: 4-Bromofluorobenzene	*91.8*			*80-110*	*%REC*	1	9/6/2021 00:47
Surr: Dibromofluoromethane	*97.6*			*85-115*	*%REC*	1	9/6/2021 00:47
Surr: Toluene-d8	*98.0*			*85-110*	*%REC*	1	9/6/2021 00:47

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: 29-Sep-21

QC BATCH REPORT

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

Batch ID: **183075** Instrument ID: **GC8** Method: **SW8015D**

MBLK Sample ID: **DBLKW1-183075-183075** Units: **mg/L** Analysis Date: **9/2/2021 07:15 PM**
Client ID: Run ID: **GC8_210902A** SeqNo: **7720637** Prep Date: **9/2/2021** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	U	0.04	0.10								
ORO (C28-C40)	0.07833	0.051	0.10								J
Surr: 4-Terphenyl-d14	*0.02567*	0	0	*0.0417*	0	*61.6*	*31-124*	0			

LCS Sample ID: **DLCSW1-183075-183075** Units: **mg/L** Analysis Date: **9/2/2021 08:30 PM**
Client ID: Run ID: **GC8_210902A** SeqNo: **7720639** Prep Date: **9/2/2021** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	3.763	0.04	0.10	4.17	0	90.2	62-146	0			
ORO (C28-C40)	3.971	0.051	0.10	4.17	0	95.2	68-122	0			
Surr: 4-Terphenyl-d14	*0.02517*	0	0	*0.0417*	0	*60.4*	*31-124*	0			

LCSD Sample ID: **DLCSDW1-183075-183075** Units: **mg/L** Analysis Date: **9/2/2021 09:08 PM**
Client ID: Run ID: **GC8_210902A** SeqNo: **7720640** Prep Date: **9/2/2021** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	3.824	0.04	0.10	4.17	0	91.7	62-146	3.763	1.62	30	
ORO (C28-C40)	4.018	0.051	0.10	4.17	0	96.3	68-122	3.971	1.16	30	
Surr: 4-Terphenyl-d14	*0.02733*	0	0	*0.0417*	0	*65.5*	*31-124*	0.02517	*8.25*	*30*	

The following samples were analyzed in this batch: 21082745-01E 21082745-02E 21082745-03E

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

Batch ID: R326443 Instrument ID:GC9 Method: SW8015D

MBLK Sample ID: 9G-BLKW1-210910-R326443 Units:µg/L Analysis Date: 9/10/2021 05:08 PM
Client ID: Run ID: GC9_210910B SeqNo:7737722 Prep Date: DF:1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	U	76	200								
Surr: Toluene-d8	*99.41*	0	0	*100*	0	*99.4*	*79-130*	0			

LCS Sample ID: 9G-LCSW1-210910-R326443 Units:µg/L Analysis Date: 9/10/2021 04:24 PM
Client ID: Run ID: GC9_210910B SeqNo:7737721 Prep Date: DF:1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	4909	76	200	5000	0	98.2	76-126	0			
Surr: Toluene-d8	*99.5*	0	0	*100*	0	*99.5*	*79-130*	0			

MS Sample ID: 21090876-13A MS Units:µg/L Analysis Date: 9/10/2021 05:51 PM
Client ID: Run ID: GC9_210910B SeqNo:7737724 Prep Date: DF:1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	5736	76	200	5000	0	115	76-126	0			
Surr: Toluene-d8	*101.5*	0	0	*100*	0	*102*	*79-130*	0			

MSD Sample ID: 21090876-13A MSD Units:µg/L Analysis Date: 9/10/2021 06:13 PM
Client ID: Run ID: GC9_210910B SeqNo:7737725 Prep Date: DF:1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	5403	76	200	5000	0	108	76-126	5736	5.98	30	
Surr: Toluene-d8	*97.5*	0	0	*100*	0	*97.5*	*79-130*	101.5	*4.04*	*30*	

The following samples were analyzed in this batch: 21082745-01D 21082745-02D 21082745-03D

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

Batch ID: 183208 Instrument ID:ICPMS4 Method: SW6020B (Dissolve)

MBLK Sample ID: MBLK-183207-183208 Units:mg/L Analysis Date: 9/7/2021 03:23 PM
Client ID: Run ID: ICPMS4_210907A SeqNo:7726104 Prep Date: 9/6/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	U	0.008	0.010								
Arsenic	0.0002068	0.00019	0.0050								J
Barium	U	0.002	0.0050								
Calcium	U	0.25	0.50								
Iron	U	0.05	0.080								
Magnesium	U	0.05	0.20								
Sodium	U	0.18	0.20								
Strontium	U	0.0036	0.0050								

MBLK Sample ID: MBLK-183208-183208 Units:mg/L Analysis Date: 9/7/2021 03:26 PM
Client ID: Run ID: ICPMS4_210907A SeqNo:7726106 Prep Date: 9/6/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.008423	0.008	0.010								J
Arsenic	U	0.00019	0.0050								
Barium	U	0.002	0.0050								
Calcium	U	0.25	0.50								
Iron	U	0.05	0.080								
Magnesium	U	0.05	0.20								
Sodium	U	0.18	0.20								
Strontium	U	0.0036	0.0050								

LCS Sample ID: LCS-183207-183208 Units:mg/L Analysis Date: 9/7/2021 03:24 PM
Client ID: Run ID: ICPMS4_210907A SeqNo:7726105 Prep Date: 9/6/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1069	0.008	0.010	0.1	0	107	80-120	0			
Arsenic	0.09651	0.00019	0.0050	0.1	0	96.5	80-120	0			
Barium	0.1006	0.002	0.0050	0.1	0	101	80-120	0			
Calcium	10.16	0.25	0.50	10	0	102	80-120	0			
Iron	9.844	0.05	0.080	10	0	98.4	80-120	0			
Magnesium	10.6	0.05	0.20	10	0	106	80-120	0			
Sodium	10.82	0.18	0.20	10	0	108	80-120	0			
Strontium	0.1	0.0036	0.0050	0.1	0	100	80-120	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

QC BATCH REPORT

Batch ID: 183208 Instrument ID:ICPMS4 Method: SW6020B (Dissolve)

LCS Sample ID: LCS-183208-183208 Units:mg/L Analysis Date: 9/7/2021 03:28 PM
Client ID: Run ID: ICPMS4_210907A SeqNo:7726107 Prep Date: 9/6/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1176	0.008	0.010	0.1	0	118	80-120	0			
Arsenic	0.09353	0.00019	0.0050	0.1	0	93.5	80-120	0			
Barium	0.09646	0.002	0.0050	0.1	0	96.5	80-120	0			
Calcium	9.807	0.25	0.50	10	0	98.1	80-120	0			
Iron	9.509	0.05	0.080	10	0	95.1	80-120	0			
Magnesium	10.2	0.05	0.20	10	0	102	80-120	0			
Sodium	10.33	0.18	0.20	10	0	103	80-120	0			
Strontium	0.09687	0.0036	0.0050	0.1	0	96.9	80-120	0			

MS Sample ID: 21090365-07AMS Units:mg/L Analysis Date: 9/7/2021 04:16 PM
Client ID: Run ID: ICPMS4_210907A SeqNo:7726761 Prep Date: 9/6/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.3211	0.008	0.010	0.1	0.2386	82.5	75-125	0			
Arsenic	0.09975	0.00019	0.0050	0.1	0.0037	96	75-125	0			
Barium	0.1375	0.002	0.0050	0.1	0.03758	99.9	75-125	0			
Calcium	78.68	0.25	0.50	10	72.06	66.2	75-125	0			SO
Iron	9.434	0.05	0.080	10	1.102	83.3	75-125	0			
Magnesium	10.99	0.05	0.20	10	0.8982	101	75-125	0			
Sodium	323.9	0.18	0.20	10	325.9	-19.8	75-125	0			SEO
Strontium	0.5601	0.0036	0.0050	0.1	0.4761	84	75-125	0			O

MSD Sample ID: 21090365-07AMSD Units:mg/L Analysis Date: 9/7/2021 04:18 PM
Client ID: Run ID: ICPMS4_210907A SeqNo:7726763 Prep Date: 9/6/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.323	0.008	0.010	0.1	0.2386	84.4	75-125	0.3211	0.595	20	
Arsenic	0.09817	0.00019	0.0050	0.1	0.0037	94.5	75-125	0.09975	1.6	20	
Barium	0.1354	0.002	0.0050	0.1	0.03758	97.8	75-125	0.1375	1.55	20	
Calcium	79.35	0.25	0.50	10	72.06	72.9	75-125	78.68	0.85	20	SO
Iron	9.293	0.05	0.080	10	1.102	81.9	75-125	9.434	1.5	20	
Magnesium	10.8	0.05	0.20	10	0.8982	99	75-125	10.99	1.75	20	
Sodium	323.9	0.18	0.20	10	325.9	-20	75-125	323.9	0.0062	20	SEO
Strontium	0.5583	0.0036	0.0050	0.1	0.4761	82.2	75-125	0.5601	0.319	20	O

The following samples were analyzed in this batch: 21082745-01B 21082745-02B 21082745-03B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

QC BATCH REPORT

Batch ID: R326082b Instrument ID: VMS11 Method: SW8260C

MBLK Sample ID: 11V-BLKW2-210903-R326082b Units: µg/L Analysis Date: 9/6/2021 12:03 AM
Client ID: Run ID: VMS11_210905B SeqNo: 7724421 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	0.46	1.0								
Ethylbenzene	U	0.34	1.0								
m,p-Xylene	U	0.81	2.0								
o-Xylene	U	0.31	1.0								
Toluene	U	0.45	1.0								
Xylenes, Total	U	0.81	3.0								
Surr: 1,2-Dichloroethane-d4	*19.33*	0	0	*20*	0	*96.6*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*18.1*	0	0	*20*	0	*90.5*	*80-110*	0			
Surr: Dibromofluoromethane	*19.48*	0	0	*20*	0	*97.4*	*85-115*	0			
Surr: Toluene-d8	*19.16*	0	0	*20*	0	*95.8*	*85-110*	0			

LCS Sample ID: 11V-LCSW2-210903-R326082b Units: µg/L Analysis Date: 9/5/2021 10:57 PM
Client ID: Run ID: VMS11_210905B SeqNo: 7724419 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	19.18	0.46	1.0	20	0	95.9	70-130	0			
Ethylbenzene	18.96	0.34	1.0	20	0	94.8	76-123	0			
m,p-Xylene	38.85	0.81	2.0	40	0	97.1	75-130	0			
o-Xylene	19	0.31	1.0	20	0	95	76-127	0			
Toluene	19.8	0.45	1.0	20	0	99	76-125	0			
Xylenes, Total	57.85	0.81	3.0	60	0	96.4	76-127	0			
Surr: 1,2-Dichloroethane-d4	*17.7*	0	0	*20*	0	*88.5*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*20.49*	0	0	*20*	0	*102*	*80-110*	0			
Surr: Dibromofluoromethane	*17.73*	0	0	*20*	0	*88.6*	*85-115*	0			
Surr: Toluene-d8	*20.3*	0	0	*20*	0	*102*	*85-110*	0			

MS Sample ID: 21082462-10A MS Units: µg/L Analysis Date: 9/6/2021 08:09 AM
Client ID: Run ID: VMS11_210905B SeqNo: 7724443 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	20.29	0.46	1.0	20	0	101	70-130	0			
Ethylbenzene	18.23	0.34	1.0	20	0	91.2	76-123	0			
m,p-Xylene	37.4	0.81	2.0	40	0	93.5	75-130	0			
o-Xylene	18.55	0.31	1.0	20	0	92.8	76-127	0			
Toluene	19.46	0.45	1.0	20	0	97.3	76-125	0			
Xylenes, Total	55.95	0.81	3.0	60	0	93.2	76-127	0			
Surr: 1,2-Dichloroethane-d4	*18.94*	0	0	*20*	0	*94.7*	*75-120*	0			
Surr: 4-Bromofluorobenzene	*20.41*	0	0	*20*	0	*102*	*80-110*	0			
Surr: Dibromofluoromethane	*19.29*	0	0	*20*	0	*96.4*	*85-115*	0			
Surr: Toluene-d8	*20.44*	0	0	*20*	0	*102*	*85-110*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

QC BATCH REPORT

Batch ID: **R326082b** Instrument ID: **VMS11** Method: **SW8260C**

MSD Sample ID: **21082462-10A MSD** Units: **µg/L** Analysis Date: **9/6/2021 08:31 AM**
Client ID: Run ID: **VMS11_210905B** SeqNo: **7724444** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	19.56	0.46	1.0	20	0	97.8	70-130	20.29	3.66	30	
Ethylbenzene	16.9	0.34	1.0	20	0	84.5	76-123	18.23	7.57	30	
m,p-Xylene	34.27	0.81	2.0	40	0	85.7	75-130	37.4	8.73	30	
o-Xylene	17.32	0.31	1.0	20	0	86.6	76-127	18.55	6.86	30	
Toluene	18.26	0.45	1.0	20	0	91.3	76-125	19.46	6.36	30	
Xylenes, Total	51.59	0.81	3.0	60	0	86	76-127	55.95	8.11	30	
Surr: 1,2-Dichloroethane-d4	*18.84*	0	0	*20*	0	*94.2*	*75-120*	18.94	*0.529*	*30*	
Surr: 4-Bromofluorobenzene	*20.57*	0	0	*20*	0	*103*	*80-110*	20.41	*0.781*	*30*	
Surr: Dibromofluoromethane	*19.14*	0	0	*20*	0	*95.7*	*85-115*	19.29	*0.781*	*30*	
Surr: Toluene-d8	*20.4*	0	0	*20*	0	*102*	*85-110*	20.44	*0.196*	*30*	

The following samples were analyzed in this batch: 21082745-01C 21082745-02C 21082745-03C 21082745-04A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

Batch ID: 183155 Instrument ID:TSS Method: A2540 D-11

MBLK Sample ID: MBLK-183155-183155 Units:mg/L Analysis Date: 9/7/2021 10:09 AM
Client ID: Run ID: TSS_210907A SeqNo:7724584 Prep Date: 9/3/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Suspended Solids	U	0.38	0.60								

MBLK Sample ID: MBLK-183155-183155 Units:mg/L Analysis Date: 9/7/2021 10:09 AM
Client ID: Run ID: TSS_210907A SeqNo:7724585 Prep Date: 9/3/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Suspended Solids	U	0.38	0.60								

LCS Sample ID: LCS-183155-183155 Units:mg/L Analysis Date: 9/7/2021 10:09 AM
Client ID: Run ID: TSS_210907A SeqNo:7724583 Prep Date: 9/3/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Suspended Solids	97	3.8	6.0	100	0	97	70-113	0			

LCS Sample ID: LCS-183155-183155 Units:mg/L Analysis Date: 9/7/2021 10:09 AM
Client ID: Run ID: TSS_210907A SeqNo:7724586 Prep Date: 9/3/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Suspended Solids	97	3.8	6.0	100	0	97	70-113	0			

DUP Sample ID: 21080088-29A DUP Units:mg/L Analysis Date: 9/7/2021 10:09 AM
Client ID: Run ID: TSS_210907A SeqNo:7724563 Prep Date: 9/3/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Suspended Solids	122	7.6	12	0	0	0	0-0	120	1.65	10	

DUP Sample ID: 21082745-02H DUP Units:mg/L Analysis Date: 9/7/2021 10:09 AM
Client ID: WP-400 Upstream Grab Run ID: TSS_210907A SeqNo:7724575 Prep Date: 9/3/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Suspended Solids	23.33	2.5	4.0	0	0	0	0-0	23.33	0	10	

The following samples were analyzed in this batch: 21082745-01H 21082745-02H 21082745-03H

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

QC BATCH REPORT

Batch ID: 183191 Instrument ID:TDS Method: A2540 C-11

MBLK Sample ID: MBLK-183191-183191 Units:mg/L Analysis Date: 9/8/2021 01:25 PM
Client ID: Run ID: TDS_210908A SeqNo:7728534 Prep Date: 9/3/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	U	22	30								

LCS Sample ID: LCS-183191-183191 Units:mg/L Analysis Date: 9/8/2021 01:25 PM
Client ID: Run ID: TDS_210908A SeqNo:7728533 Prep Date: 9/3/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	514	22	30	495	0	104	85-109	0			

DUP Sample ID: 21082744-01B DUP Units:mg/L Analysis Date: 9/8/2021 01:25 PM
Client ID: Run ID: TDS_210908A SeqNo:7728504 Prep Date: 9/3/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	1870	110	150	0	0	0	0-0	1890	1.06	10	

DUP Sample ID: 21090322-01A DUP Units:mg/L Analysis Date: 9/8/2021 01:25 PM
Client ID: Run ID: TDS_210908A SeqNo:7728528 Prep Date: 9/3/2021 DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	870	37	50	0	0	0	0-0	830	4.71	10	

The following samples were analyzed in this batch: 21082745-01G 21082745-02G 21082745-03G

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

QC BATCH REPORT

Batch ID: R325939 Instrument ID:IC3 Method: E300.0

MBLK Sample ID: MBLK-R325939 Units:mg/L Analysis Date: 9/2/2021 11:24 AM
Client ID: Run ID: IC3_210902A SeqNo:7719104 Prep Date: DF:1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromide	U	0.032	0.20								

LCS Sample ID: LCS-R325939 Units:mg/L Analysis Date: 9/2/2021 12:10 PM
Client ID: Run ID: IC3_210902A SeqNo:7719107 Prep Date: DF:1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromide	1.996	0.032	0.20	2	0	99.8	90-110	0			

MS Sample ID: 21082153-03B MS Units:mg/L Analysis Date: 9/2/2021 01:15 PM
Client ID: Run ID: IC3_210902A SeqNo:7719111 Prep Date: DF:4

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromide	8.289	0.13	0.80	8	0	104	80-120	0			

MS Sample ID: 21082744-01B MS Units:mg/L Analysis Date: 9/2/2021 07:52 PM
Client ID: Run ID: IC3_210902A SeqNo:7719137 Prep Date: DF:100

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromide	202.2	3.2	20	200	0	101	80-120	0			

MSD Sample ID: 21082153-03B MSD Units:mg/L Analysis Date: 9/2/2021 01:30 PM
Client ID: Run ID: IC3_210902A SeqNo:7719112 Prep Date: DF:4

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromide	8.304	0.13	0.80	8	0	104	80-120	8.289	0.188	20	

MSD Sample ID: 21082744-01B MSD Units:mg/L Analysis Date: 9/2/2021 08:07 PM
Client ID: Run ID: IC3_210902A SeqNo:7719138 Prep Date: DF:100

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromide	202.2	3.2	20	200	0	101	80-120	202.2	0.005	20	

The following samples were analyzed in this batch: 21082745-01G 21082745-02G 21082745-03G

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

QC BATCH REPORT

Batch ID: R325952 Instrument ID:TOC3 Method: A5310C-11

MBLK Sample ID: CCB/mblk-R325952 Units:mg/L Analysis Date: 9/2/2021 02:53 PM
Client ID: Run ID: TOC3_210902A SeqNo:7719687 Prep Date: DF:1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	U	0.14	0.50								

LCS Sample ID: LCS-R325952 Units:mg/L Analysis Date: 9/2/2021 03:22 PM
Client ID: Run ID: TOC3_210902A SeqNo:7719688 Prep Date: DF:1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	4.818	0.14	0.50	5	0	96.4	80-120	0			

MS Sample ID: 21082707-01F MS Units:mg/L Analysis Date: 9/2/2021 11:20 PM
Client ID: Run ID: TOC3_210902A SeqNo:7719703 Prep Date: DF:1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	7.676	0.14	0.50	5	3.041	92.7	65-133	0			

MS Sample ID: 21082707-01G MS Units:mg/L Analysis Date: 9/3/2021 12:58 AM
Client ID: Run ID: TOC3_210902A SeqNo:7719706 Prep Date: DF:1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	7.599	0.14	0.50	5	2.86	94.8	65-133	0			

MS Sample ID: 21082707-01H MS Units:mg/L Analysis Date: 9/3/2021 03:39 AM
Client ID: Run ID: TOC3_210902A SeqNo:7719711 Prep Date: DF:1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	7.524	0.14	0.50	5	2.848	93.5	65-133	0			

MS Sample ID: 21082707-01I MS Units:mg/L Analysis Date: 9/3/2021 05:18 AM
Client ID: Run ID: TOC3_210902A SeqNo:7719714 Prep Date: DF:1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	7.556	0.14	0.50	5	2.954	92	65-133	0			

MSD Sample ID: 21082707-01F MSD Units:mg/L Analysis Date: 9/2/2021 11:53 PM
Client ID: Run ID: TOC3_210902A SeqNo:7719704 Prep Date: DF:1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	7.595	0.14	0.50	5	3.041	91.1	65-133	7.676	1.06	6.16	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

QC BATCH REPORT

Batch ID: R325952 Instrument ID:TOC3 Method: A5310C-11

MSD Sample ID: 21082707-01G MSD Units:mg/L Analysis Date: 9/3/2021 01:31 AM
Client ID: Run ID: TOC3_210902A SeqNo:7719707 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	7.502	0.14	0.50	5	2.86	92.8	65-133	7.599	1.28	6.16	

MSD Sample ID: 21082707-01H MSD Units:mg/L Analysis Date: 9/3/2021 04:12 AM
Client ID: Run ID: TOC3_210902A SeqNo:7719712 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	7.447	0.14	0.50	5	2.848	92	65-133	7.524	1.03	6.16	

MSD Sample ID: 21082707-01I MSD Units:mg/L Analysis Date: 9/3/2021 05:50 AM
Client ID: Run ID: TOC3_210902A SeqNo:7719715 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	7.5	0.14	0.50	5	2.954	90.9	65-133	7.556	0.744	6.16	

The following samples were analyzed in this batch: 21082745-01A 21082745-02A 21082745-03A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

QC BATCH REPORT

Batch ID: R326054 Instrument ID:TOC3 Method: A5310C-11

MBLK Sample ID: CCB/mblk-R326054 Units:mg/L Analysis Date: 9/3/2021 06:29 PM
Client ID: Run ID: TOC3_210903A SeqNo:7723278 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	U	0.14	0.50								

LCS Sample ID: LCS-R326054 Units:mg/L Analysis Date: 9/3/2021 07:00 PM
Client ID: Run ID: TOC3_210903A SeqNo:7723279 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	5.004	0.14	0.50	5	0	100	80-120	0			

MS Sample ID: 21082707-03F MS Units:mg/L Analysis Date: 9/4/2021 04:41 AM
Client ID: Run ID: TOC3_210903A SeqNo:7723298 Prep Date: DF: 2

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	11.11	0.28	1.0	10	0.937	102	65-133	0			

MSD Sample ID: 21082707-03F MSD Units:mg/L Analysis Date: 9/4/2021 05:14 AM
Client ID: Run ID: TOC3_210903A SeqNo:7723299 Prep Date: DF: 2

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	11.19	0.28	1.0	10	0.937	103	65-133	11.11	0.736	6.16	

The following samples were analyzed in this batch: 21082745-01a 21082745-02A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

Batch ID: R326075 Instrument ID:IC3 Method: E300.0

MBLK Sample ID: MBLK-R326075 Units:mg/L Analysis Date: 9/3/2021 10:56 AM
Client ID: Run ID: IC3_210903A SeqNo:7724058 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	U	0.31	1.0								
Sulfate	U	0.19	1.0								

LCS Sample ID: LCS-R326075 Units:mg/L Analysis Date: 9/3/2021 11:42 AM
Client ID: Run ID: IC3_210903A SeqNo:7724061 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.611	0.31	1.0	10	0	96.1	90-110	0			
Sulfate	9.841	0.19	1.0	10	0	98.4	90-110	0			

MS Sample ID: 21082307-09C MS Units:mg/L Analysis Date: 9/3/2021 12:28 PM
Client ID: Run ID: IC3_210903A SeqNo:7724064 Prep Date: DF: 10

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	175.7	3.1	10	100	71.13	105	80-120	0			
Sulfate	117.8	1.9	10	100	21.68	96.2	80-120	0			

MS Sample ID: 21090097-01A MS Units:mg/L Analysis Date: 9/3/2021 04:17 PM
Client ID: Run ID: IC3_210903A SeqNo:7724079 Prep Date: DF: 40

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	10040	12	40	400	9188	214	80-120	0			SEO
Sulfate	4794	7.6	40	400	4089	176	80-120	0			SEO

MS Sample ID: 21082744-01B MS Units:mg/L Analysis Date: 9/3/2021 06:34 PM
Client ID: Run ID: IC3_210903A SeqNo:7724088 Prep Date: DF: 10

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1006	3.1	10	100	877.1	128	80-120	0			SEO
Sulfate	96.49	1.9	10	100	1.17	95.3	80-120	0			

MS Sample ID: 21090286-01A MS Units:mg/L Analysis Date: 9/3/2021 09:52 PM
Client ID: Run ID: IC3_210903A SeqNo:7724101 Prep Date: DF: 10

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	137.3	1.9	10	100	38.28	99	80-120	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

Batch ID: R326075 Instrument ID:IC3 Method: E300.0

MSD Sample ID: 21082307-09C MSD Units:mg/L Analysis Date: 9/3/2021 12:43 PM
Client ID: Run ID: IC3_210903A SeqNo:7724065 Prep Date: DF: 10

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	175.5	3.1	10	100	71.13	104	80-120	175.7	0.157	20	
Sulfate	117.5	1.9	10	100	21.68	95.9	80-120	117.8	0.262	20	

MSD Sample ID: 21090097-01A MSD Units:mg/L Analysis Date: 9/3/2021 04:32 PM
Client ID: Run ID: IC3_210903A SeqNo:7724080 Prep Date: DF: 40

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	10040	12	40	400	9188	214	80-120	10040	0.003	20	SEO
Sulfate	4795	7.6	40	400	4089	177	80-120	4794	0.0267	20	SEO

MSD Sample ID: 21082744-01B MSD Units:mg/L Analysis Date: 9/3/2021 06:50 PM
Client ID: Run ID: IC3_210903A SeqNo:7724089 Prep Date: DF: 10

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1005	3.1	10	100	877.1	128	80-120	1006	0.0746	20	SEO
Sulfate	96.75	1.9	10	100	1.17	95.6	80-120	96.49	0.272	20	

MSD Sample ID: 21090286-01A MSD Units:mg/L Analysis Date: 9/3/2021 10:08 PM
Client ID: Run ID: IC3_210903A SeqNo:7724102 Prep Date: DF: 10

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	135.9	1.9	10	100	38.28	97.6	80-120	137.3	1.06	20	

The following samples were analyzed in this batch: 21082745-01G 21082745-02G 21082745-03G

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

Batch ID: R326165 Instrument ID:IC3 Method: E300.0

MBLK Sample ID: MBLK-R326165 Units:mg/L Analysis Date: 9/7/2021 12:06 PM
Client ID: Run ID: IC3_210907A SeqNo:7727329 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromide	U	0.032	0.20								
Sulfate	U	0.19	1.0								

LCS Sample ID: LCS-R326165 Units:mg/L Analysis Date: 9/7/2021 12:55 PM
Client ID: Run ID: IC3_210907A SeqNo:7727332 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromide	1.899	0.032	0.20	2	0	94.9	90-110	0			
Sulfate	9.243	0.19	1.0	10	0	92.4	90-110	0			

MS Sample ID: 21090109-01A MS Units:mg/L Analysis Date: 9/7/2021 01:41 PM
Client ID: Run ID: IC3_210907A SeqNo:7727335 Prep Date: DF: 1000

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromide	1932	32	200	2000	0	96.6	80-120	0			
Sulfate	11360	190	1,000	10000	2057	93	80-120	0			

MS Sample ID: 21090308-01A MS Units:mg/L Analysis Date: 9/7/2021 07:37 PM
Client ID: Run ID: IC3_210907A SeqNo:7727348 Prep Date: DF: 10

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	113.3	1.9	10	100	20.83	92.5	80-120	0			

MS Sample ID: 21090308-05A MS Units:mg/L Analysis Date: 9/7/2021 10:39 PM
Client ID: Run ID: IC3_210907A SeqNo:7727360 Prep Date: DF: 10

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromide	19.34	0.32	2.0	20	0	96.7	80-120	0			
Sulfate	118	1.9	10	100	25.58	92.4	80-120	0			

MS Sample ID: 21090322-01A MS Units:mg/L Analysis Date: 9/8/2021 01:42 AM
Client ID: Run ID: IC3_210907A SeqNo:7727372 Prep Date: DF: 10

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	553.2	1.9	10	100	432.8	120	80-120	0			SEO

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

QC BATCH REPORT

Batch ID: **R326165** Instrument ID:**IC3** Method: **E300.0**

MSD Sample ID: **21090109-01A MSD** Units:**mg/L** Analysis Date: **9/7/2021 01:56 PM**
Client ID: Run ID: **IC3_210907A** SeqNo:**7727336** Prep Date: DF: **1000**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromide	1929	32	200	2000	0	96.4	80-120	1932	0.181	20	
Sulfate	11300	190	1,000	10000	2057	92.5	80-120	11360	0.5	20	

MSD Sample ID: **21090308-01A MSD** Units:**mg/L** Analysis Date: **9/7/2021 07:52 PM**
Client ID: Run ID: **IC3_210907A** SeqNo:**7727349** Prep Date: DF: **10**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	113.5	1.9	10	100	20.83	92.7	80-120	113.3	0.181	20	

MSD Sample ID: **21090308-05A MSD** Units:**mg/L** Analysis Date: **9/7/2021 10:55 PM**
Client ID: Run ID: **IC3_210907A** SeqNo:**7727361** Prep Date: DF: **10**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Bromide	19.45	0.32	2.0	20	0	97.3	80-120	19.34	0.572	20	
Sulfate	118.4	1.9	10	100	25.58	92.9	80-120	118	0.385	20	

MSD Sample ID: **21090322-01A MSD** Units:**mg/L** Analysis Date: **9/8/2021 01:57 AM**
Client ID: Run ID: **IC3_210907A** SeqNo:**7727373** Prep Date: DF: **10**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	554	1.9	10	100	432.8	121	80-120	553.2	0.139	20	SEO

The following samples were analyzed in this batch: 21082745-01G 21082745-03G

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Core Appalachia Operating, LLC
Work Order: 21082745
Project: WP-400

QC BATCH REPORT

Batch ID: R326173 Instrument ID:TOC3 Method: A5310C-11

MBLK Sample ID: CCB/mblk-R326173 Units:mg/L Analysis Date: 9/7/2021 02:57 PM
Client ID: Run ID: TOC3_210907A SeqNo:7727580 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	U	0.14	0.50								

LCS Sample ID: LCS-R326173 Units:mg/L Analysis Date: 9/7/2021 03:27 PM
Client ID: Run ID: TOC3_210907A SeqNo:7727581 Prep Date: DF: 1

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	5.509	0.14	0.50	5	0	110	80-120	0			

MS Sample ID: 21082745-01A MS Units:mg/L Analysis Date: 9/7/2021 04:26 PM
Client ID: WP-400 Injectate Grab Run ID: TOC3_210907A SeqNo:7727583 Prep Date: DF: 40

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	412.6	5.6	20	200	196.1	108	65-133	0			E

MSD Sample ID: 21082745-01A MSD Units:mg/L Analysis Date: 9/7/2021 04:55 PM
Client ID: WP-400 Injectate Grab Run ID: TOC3_210907A SeqNo:7727584 Prep Date: DF: 40

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Organic Carbon, Total	420.9	5.6	20	200	196.1	112	65-133	412.6	1.98	6.16	E

The following samples were analyzed in this batch: 21082745-01a

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

ALS Environmental

Subcontractor:
ALS Environmental - Holland
3352 128th Avenue
Holland, MI 49424
TEL: (616) 399-6070
FAX: (616) 399-6185
Acct #:

CHAIN-OF-CUSTODY RECORD

Date: 31-Aug-21
COC ID: 17630
Due Date: 08-Sep-21

Salesperson: Paul Painter

Customer Information		Project Information	
Purchase Order		Project Name	21082745
Work Order		Project Number	
Company Name	ALS Group USA, Corp	Bill To Company	ALS Group USA, Corp
Send Report To	Rebecca Kiser	Inv Attn	Accounts Payable
Address	1740 Union Carbide Dr	Address	1740 Union Carbide Dr
City/State/Zip	1740 Union Carbide Dr	City/State/Zip	So Charleston, WV 25303
Phone	(304) 356-3168	Phone	(304) 356-3168
Fax		Fax	
eMail Address	rebecca.kiser@alsglobal.com	eMail CC	

	Parameter/Method Request for Analysis
A	Total Suspended Solids (A2540 D-11)
B	Organic Carbon, Total (A5310C-11)
C	Anions by Ion Chromatography (E300.0)
D	Metals by ICP-MS (SW6020B)
E	Diesel Range Organics by GC-FID (SW8015D)
F	Gasoline Range Organics by GC-FID (SW8015D)
G	Volatile Organic Compounds (SW8260C)
H	
I	
J	

ALS Sample ID	Client Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
21082745-01A	WP-400 Injectate Grab	Water	31/Aug/2021 10:00	(1) 125MLAMGH2SO4		X								
21082745-01B	WP-400 Injectate Grab	Water	31/Aug/2021 10:00	(1) 250PHNO3				X						
21082745-01G	WP-400 Injectate Grab	Water	31/Aug/2021 10:00	(1) 250PNEAT			X							
21082745-01H	WP-400 Injectate Grab	Water	31/Aug/2021 10:00	(1) 1LPNEAT	X									
21082745-02A	WP-400 Upstream Grab	Water	31/Aug/2021 10:15	(1) 125MLAMGH2SO4		X								
21082745-02B	WP-400 Upstream Grab	Water	31/Aug/2021 10:15	(1) 250PHNO3				X						
21082745-02G	WP-400 Upstream Grab	Water	31/Aug/2021 10:15	(1) 250PNEAT			X							
21082745-02H	WP-400 Upstream Grab	Water	31/Aug/2021 10:15	(1) 1LPNEAT	X									
21082745-03A	WPP-400 Downstream Grab	Water	31/Aug/2021 10:35	(1) 125MLAMGH2SO4		X								
21082745-03B	WPP-400 Downstream Grab	Water	31/Aug/2021 10:35	(1) 250PHNO3				X						
21082745-03G	WPP-400 Downstream Grab	Water	31/Aug/2021 10:35	(1) 250PNEAT			X							
21082745-03H	WPP-400 Downstream Grab	Water	31/Aug/2021 10:35	(1) 1LPNEAT	X									

Comments:
WV Samples.

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
[signature]	8/31/21 1700	FED EX		AISHW <6.0-c IR1 pH29	STD
Relinquished by: FED EX	Date/Time 9/1/21 1430	Received by: [signature]	Date/Time		

CHAIN-OF-CUSTODY RECORD

Date: 31-Aug-21
COC ID: 17630
Due Date: 08-Sep-21

ALS Environmental

Subcontractor:
ALS Environmental - Holland
3352 128th Avenue
Holland, MI 49424
TEL: (616) 399-6070
FAX: (616) 399-6185
Acct #:

Salesperson: Paul Painter

Customer Information		Project Information	
Purchase Order		Project Name	21082745
Work Order		Project Number	
Company Name	ALS Group USA, Corp	Bill To Company	ALS Group USA, Corp
Send Report To	Rebecca Kiser	Inv Attn	Accounts Payable
Address	1740 Union Carbide Dr	Address	1740 Union Carbide Dr
City/State/Zip	1740 Union Carbide Dr	City/State/Zip	1740 Union Carbide Dr
Phone	(304) 356-3168	Phone	(304) 356-3168
Fax		Fax	
eMail Address	rebecca.kiser@alsglobal.com	eMail CC	

	Parameter/Method Request for Analysis
A	Total Suspended Solids (A2540 D-11)
B	Organic Carbon, Total (A5310C-11)
C	Anions by Ion Chromatography (E300.0)
D	Metals by ICP-MS (SW6020B)
E	Diesel Range Organics by GC-FID (SW8015D)
F	Gasoline Range Organics by GC-FID (SW8015D)
G	Volatile Organic Compounds (SW8260C)
H	
I	
J	

ALS Sample ID	Client Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
21082745-01E	WP-400 Injectate Grab	Water	31/Aug/2021 10:00	(2) 125MLAMGNEAT					X					
21082745-02E	WP-400 Upstream Grab	Water	31/Aug/2021 10:15	(2) 125MLAMGNEAT					X					
21082745-03E	WPP-400 Downstream Grab	Water	31/Aug/2021 10:35	(2) 125MLAMGNEAT					X					
21082745-04A	Trip Blank Grab	Water	31/Aug/2021 10:00	(2) VOAHCL							X			
21082745-01C	WP-400 Injectate Grab	Water	31/Aug/2021 10:00	(3) VOAHCL							X			
21082745-01D	WP-400 Injectate Grab	Water	31/Aug/2021 10:00	(3) VOAHCL						X				
21082745-02C	WP-400 Upstream Grab	Water	31/Aug/2021 10:15	(3) VOAHCL							X			
21082745-02D	WP-400 Upstream Grab	Water	31/Aug/2021 10:15	(3) VOAHCL						X				
21082745-03C	WPP-400 Downstream Grab	Water	31/Aug/2021 10:35	(3) VOAHCL							X			
21082745-03D	WPP-400 Downstream Grab	Water	31/Aug/2021 10:35	(3) VOAHCL						X				

Comments:
WV Samples.

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
[signature]	8/31/21 1200	FED EX		ALSHW	Std
Relinquished by: FED EX	Date/Time 9/1/21 1438	Received by: [signature]	Date/Time	560-C	
				IRJ pH29	

ALS Group, USA

Sample Receipt Checklist

Client Name: CORE APPALACHIA

Date/Time Received: 31-Aug-21 16:08

Work Order: 21082745

Received by: DS

Checklist completed by: Diane Shaw (eSignature) 02-Sep-21 (Date)

Reviewed by: Rebecca Kerr (eSignature) 05-Sep-21 (Date)

Matrices: Water

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	<6.0 c	IR1	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	9/2/2021 9:30:39 AM		
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☑	N/A ☐
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

September 28, 2021

Ms. Rebecca Kiser
ALS Environmental
1740 Union Carbide Drive
Charleston, WV 25303

RE: Project: 21082745
Pace Project No.: 30439307

Dear Ms. Kiser:

Enclosed are the analytical results for sample(s) received by the laboratory on September 03, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carin A. Ferris

Carin Ferris
carin.ferris@pacelabs.com
724-850-5615
Project Manager

Enclosures

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Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: 21082745
Pace Project No.: 30439307

Pace Analytical Services Pennsylvania
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

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Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: 21082745
Pace Project No.: 30439307

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30439307001	21082745-011	Water	08/31/21 10:00	09/03/21 09:20

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SAMPLE ANALYTE COUNT

Project: 21082745
Pace Project No.: 30439307

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30439307001	21082745-011	EPA 900.0	CLA	2	PASI-PA
		EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA

PASI-PA = Pace Analytical Services - Greensburg

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Greensburg, PA 15601
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PROJECT NARRATIVE

Project: 21082745
Pace Project No.: 30439307

Method: EPA 900.0
Description: 900.0 Gross Alpha/Beta
Client: ALS Life Sciences Division | Environmental
Date: September 28, 2021

General Information:
1 sample was analyzed for EPA 900.0 by Pace Analytical Services Greensburg. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 21082745
Pace Project No.: 30439307

Method: EPA 903.1
Description: 903.1 Radium 226
Client: ALS Life Sciences Division | Environmental
Date: September 28, 2021

General Information:
1 sample was analyzed for EPA 903.1 by Pace Analytical Services Greensburg. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
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PROJECT NARRATIVE

Project: 21082745
Pace Project No.: 30439307

Method: EPA 904.0
Description: 904.0 Radium 228
Client: ALS Life Sciences Division | Environmental
Date: September 28, 2021

General Information:
1 sample was analyzed for EPA 904.0 by Pace Analytical Services Greensburg. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21082745
Pace Project No.: 30439307

Sample: 21082745-011 **Lab ID: 30439307001** Collected: 08/31/21 10:00 Received: 09/03/21 09:20 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Gross Alpha	EPA 900.0	**-643 ± 634 (1,350)** **C:NA T:NA**	pCi/L	09/20/21 17:45	12587-46-1	
Gross Beta	EPA 900.0	**438 ± 615 (1,135)** **C:NA T:NA**	pCi/L	09/20/21 17:45	12587-47-2	
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**379 ± 50.0 (1.05)** **C:NA T:99%**	pCi/L	09/27/21 12:19	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**280 ± 50.7 (2.66)** **C:83% T:88%**	pCi/L	09/27/21 14:25	15262-20-1	

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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 21082745
Pace Project No.: 30439307

QC Batch: 464191
QC Batch Method: EPA 900.0

Analysis Method: EPA 900.0
Analysis Description: 900.0 Gross Alpha/Beta
Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 30439307001

METHOD BLANK: 2241057
Matrix: Water

Associated Lab Samples: 30439307001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Gross Alpha	-0.885 ± 0.733 (2.42) C:NA T:NA	pCi/L	09/21/21 07:54	
Gross Beta	-0.913 ± 0.499 (1.68) C:NA T:NA	pCi/L	09/21/21 07:54	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 21082745
Pace Project No.: 30439307

QC Batch: 464869
QC Batch Method: EPA 903.1

Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 30439307001

METHOD BLANK: 2244713
Matrix: Water

Associated Lab Samples: 30439307001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0687 ± 0.356 (0.739) C:NA T:88%	pCi/L	09/27/21 12:19	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 21082745
Pace Project No.: 30439307

QC Batch: 464870
QC Batch Method: EPA 904.0

Analysis Method: EPA 904.0
Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 30439307001

METHOD BLANK: 2244714
Matrix: Water

Associated Lab Samples: 30439307001

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.573 ± 0.402 (0.777) C:69% T:83%	pCi/L	09/27/21 11:21	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: 21082745
Pace Project No.: 30439307

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

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ALS Environmental

Subcontractor:
Pace Analytical Services, Inc.
1638 Roseytown Rd
Suites 2,3 & 4
Greensburg, PA 15601

TEL: (724) 850-5600
FAX:
Acct #:

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Date: 01-Sep-21
COC ID: 17632
Due Date: 08-Sep-21

Salesperson: Paul Painter

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	21082745	A	Ra 226/228; Gross Alpha/Beta
Work Order		Project Number		B	
Company Name	ALS Group USA, Corp	Bill To Company	ALS Group USA, Corp	C	
Send Report To	Rebecca Kiser	Inv Attn	Accounts Payable	D	
Address	1740 Union Carbide Dr	Address	1740 Union Carbide Dr	E	
				F	
City/State/Zip	So Charleston, WV 25303	City/State/Zip	So Charleston, WV 25303	G	
Phone	(304) 356-3168	Phone	(304) 356-3168	H	
Fax		Fax		I	
eMail Address	rebecca.kiser@alsglobal.com	eMail CC		J	

ALS Sample ID	Client Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
21082745-01I	WP-400 Injectate Grab	Water	31/Aug/2021 10:00	(4) 1LPHNO3	X									

001

WO# : 30439307

30439307

Comments:
WV Samples.

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
	9/2/21 1700		9-3-21 0920		Std
Relinquished by:	Date/Time	Received by:	Date/Time		

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: ALS Project #

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other

Label RM
LIMS Login RM

Tracking #: 7747 1233 7260

Custody Seal on Cooler/Box Present: ☑ yes ☐ no Seals Intact: ☑ yes ☐ no

Thermometer Used — Type of Ice: Wet Blue None

Cooler Temperature Observed Temp — °C Correction Factor: — °C Final Temp: — °C

Temp should be above freezing to 6°C

WO#: 30439307

Due Date: 09/27/21

PM: CAF

CLIENT: ALS-WV

Comments:	Yes	No	N/A	pH paper Lot# 100411 / Date and initials of person examining contents: RM 9-7-21
Chain of Custody Present:	✓			1.
Chain of Custody Filled Out:	✓			2.
Chain of Custody Relinquished:	✓			3.
Sampler Name & Signature on COC:		✓		4.
Sample Labels match COC: -Includes date/time/ID Matrix: WT	✓			5.
Samples Arrived within Hold Time:	✓			6.
Short Hold Time Analysis (<72hr remaining):		✓		7.
Rush Turn Around Time Requested:		✓		8.
Sufficient Volume:	✓			9.
Correct Containers Used:	✓			10.
-Pace Containers Used:		✓		
Containers Intact:	✓			11.
Orthophosphate field filtered			✓	12.
Hex Cr Aqueous sample field filtered			✓	13.
Organic Samples checked for dechlorination:			✓	14.
Filtered volume received for Dissolved tests			✓	15.
All containers have been checked for preservation. exceptions: VOA, coliform, TOC, O&G, Phenolics, Radon, Non-aqueous matrix	✓			16.
All containers meet method preservation requirements.	✓			Initial when completed RM / Date/time of preservation / Lot # of added preservative
Headspace in VOA Vials (>6mm):			✓	17.
Trip Blank Present:			✓	18.
Trip Blank Custody Seals Present			✓	
Rad Samples Screened < 0.5 mrem/hr	✓			Initial when completed: RM / Date: 9-7-21 / Survey Meter SN: 1563

Client Notification/ Resolution:

Person Contacted: Date/Time: Contacted By:

Comments/ Resolution:

☐ A check in this box indicates that additional information has been stored in ereports.

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

west virginia department of environmental protection

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

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

By E-Mail Transmission:

October 6, 2020

Nytis Exploration Company, Inc.
Attn: Mr. Lloyd Hall
2480 Fortune Dr #300
Lexington, KY 40509

Re: Mechanical Integrity Test Failure – 2D10902703 (WP-400)

Dear Mr. Hall:

Attached are two WR-37 MIT records for tests conducted 8/11/2020 on the above referenced injection well. The MIT for the well failed and according to Mr. Jeff Roberts of DR Consulting Services, the 4 ½" injection tubing in this well has failed and your intentions are to replace it in the near future. The MIT for the injection line from the pump to the well passed.

The well must be repaired and pass a new MIT before injection operations can be authorized.
If you have any questions please feel free to contact Andrew Lockwood via email at Andrew.L.Lockwood@wv.gov or by phone at (304) 719-9802.

Respectfully,

Charles T. Brewer Assistant Chief - Permitting
Digitally signed by Charles T. Brewer Assistant Chief - Permitting
Date: 2021.01.15 09:55:41 -05'00'

Taylor Brewer
Assistant Chief of Permitting
WVDEP Office of Oil & Gas

CC: Jeff Roberts

4710902703
FAIL
AV

WR-37
12/23/19

WV DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS
PRE-OPERATION CERTIFICATE FOR LIQUID INJECTION
MECHANICAL INTEGRITY TEST RECORD

MIT Date: 8/11/2020
Operator's Well Name / #: WP-400 WIW
API#: 47- 109 - 02703
UIC Permit #: UIC 2 D10902703002
Field Name (2R only):

WELL OPERATOR NYTIS Exploration Company
Address: 2480 Fortune Dr # 300,
Lexington, KY 40509

DESIGNATED AGENT Jeffrey L Roberts DR Consulting Services
Address: 262 Ashbrooke Hill
Ashland KY 41102

INJECTION FORMATION Weir Depth 3170 feet (top) to 3226 feet (bottom)
Perforation Interval 3194'-3206', 3212 - 3222' or Open Hole Interval N/A

INJECTION PERMIT TYPE
☐ 2D Commercial Disposal ☑ 2D Non-Commercial Disposal ☐ 2R Area Permit (EOR) ☐ 3S Solution Mining

INJECTATE TYPE (Check all that apply):
☑ Produced Water ☑ Fresh Water ☑ Completion Flowback Water ☑ Tank & Pipeline Residuals
☑ Drilling Waste Liquids ☐ Solution Mining Waste ☐ Gas (2R) ☐ Other (Specify)
Additives (ie. biocides, inhibitors, etc.)

WELL CONSTRUCTION / CASING PROGRAM

CASING OR TUBING TYPE	SIZE	GRADE	WEIGHT PER FT.	NEW	USED	FOOTAGE USED IN DRILLING	FOOTAGE LEFT IN WELL	CEMENT USED
CONDUCTOR	20"	LS	94#	X		22	22	To Surface
FRESH WATER	13 3/8"	H-40	48#	X		694	694	To Surface
COAL								
INTERMEDIATE	9 5/8"	LS	29#	X		1116	1116	To Surface
PRODUCTION	7"	K-55	23#	X		3356	3356	3356' to 610'
TUBING	4 1/2"	M-65	9.5#	X		3115	3115	
LINERS								

PACKER	TYPE: Weatherford 440	SIZE: 4.5" to 7"	DEPTH: 3115

MECHANICAL INTEGRITY TEST TYPE
☑ Standard Annulus Pressure Test
Is Test Annulus Filled? ☑ Yes ☐ No If Yes, Specify Fluid Type? Fresh water and corrosion inhibitor
☐ Pump Line Test ☐ Other (Specify)

MAXIMUM PERMITED WELLHEAD INJECTION PRESSURE 1034 psi **MIT PRESSURE** 1545 psi

MECHANICAL INTEGRITY TEST DESCRIPTION
Refilled annulus with fresh water after multiple attempts to test. Still would not pressure above 1000#.
Opened tubing which was on vacuum reached static pressure. Tried to test annulus again tubing blew as injecting nitrogen on annulus. Possible tubing leak
(2R Area Permits: If multiple pump lines are tested together, please list wells serviced by the tested pump lines.)

WR-37
12/23/19

API#: 47-109 -02703

NOTE:

- If the well and the pump line are tested together the MIT pressure must be 1.5 times the maximum permitted injection pressure held for a minimum of 20 minutes with no more than a 5% loss.
- If the well is tested separately, the MIT pressure must be 1.5 times the maximum permitted injection pressure held for a minimum of 20 minutes with no more than a 5% loss.
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- All MITs that fail must be submitted using this form and chart.
- Submit all MIT required documentation to OOG within 30 days of test.
- The mechanical integrity of this well must be demonstrated at least 5 years from this test date and each time work is completed on the well or pump line to continue injection.

The undersigned certify:

The MIT was performed on 8/11/2020
The well and/or pump line:
☐ demonstrated mechanical integrity or ☑ failed to demonstrate mechanical integrity.

The MIT was witnessed by Gary Kennedy, Inspector WVDEP - Office of Oil and Gas.

NYTIS Exploration Company
Permit Holder Company Name

8/11/2020
Date

Jeffrey L. Roberts
Agent or Responsible Party (Print Name)

Signature

SR Consultant
Title

----------**Office of Oil and Gas Use Only:**----------

THIS WELL IS AUTHORIZED FOR INJECTION
UP TO A MAXIMUM WELLHEAD INJECTION PRESSURE OF TBD psi

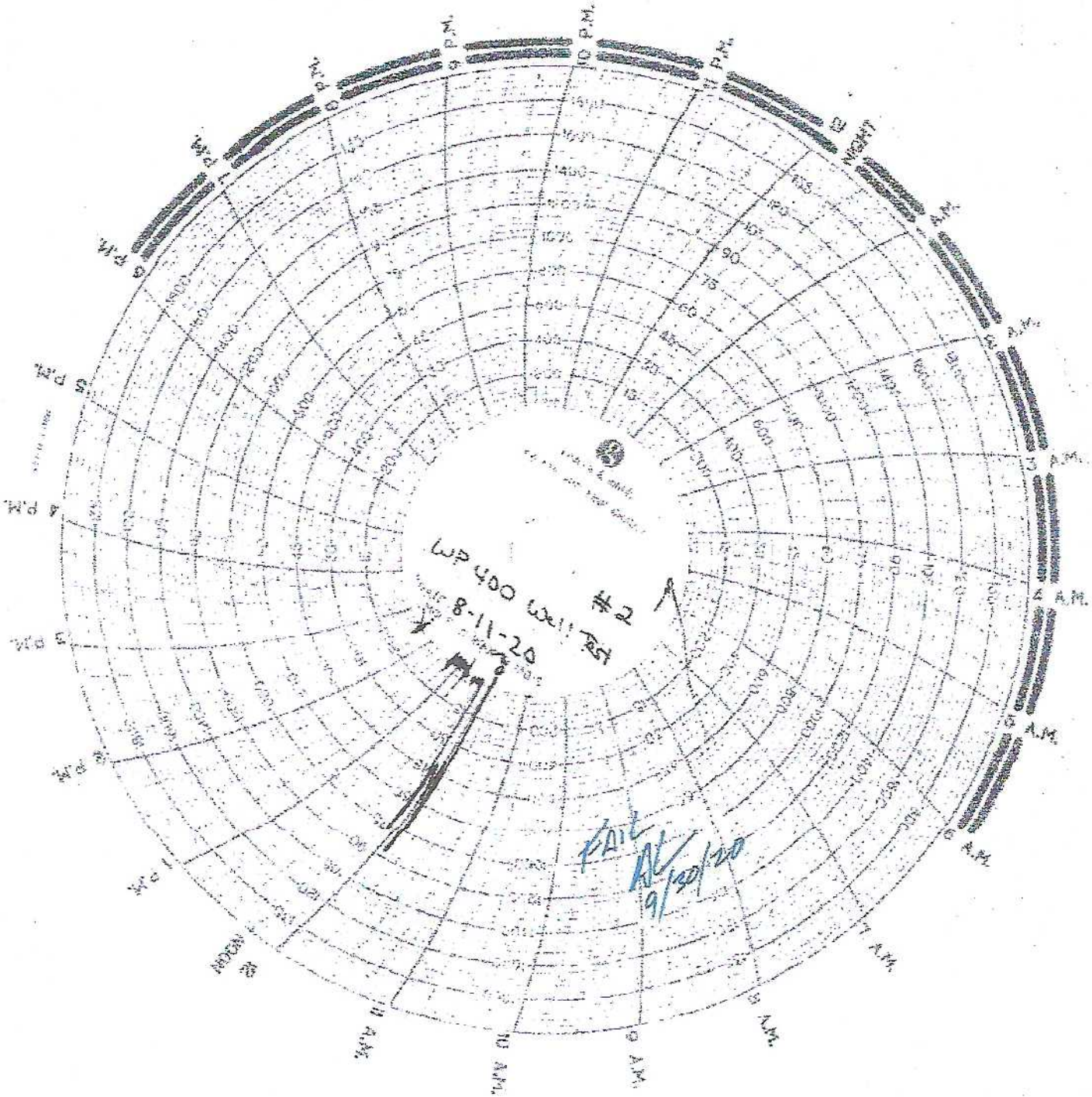
Special Conditions:
WELL CANNOT INJECT UNTIL MIT PASSES.

UIC Program Manager
WVDEP-Office of Oil and Gas

Date

Charles T. Brewer
Assistant Chief - Permitting

Digitally signed by Charles T. Brewer Assistant Chief - Permitting
Date: 2021.01.20 09:47:11 -05'00'


WP 400 well #2
8-11-20
PAIT
AL
9/30/20
NOON
NIGHT

4710902703
PUMPLINE
PASS

WR-37
12/23/19

WV DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS
PRE-OPERATION CERTIFICATE FOR LIQUID INJECTION
MECHANICAL INTEGRITY TEST RECORD

MIT Date: 8/11/2020
Operator's Well Name / #: WP-400 WIW
API#: 47- 109 - 02703
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Field Name (2R only):

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Ashland KY 41102

INJECTION FORMATION Weir Depth 3170 feet (top) to 3226 feet (bottom)
Perforation Interval 3194'-3206', 3212 - 3222' or Open Hole Interval N/A

INJECTION PERMIT TYPE
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INJECTATE TYPE (Check all that apply):
☑ Produced Water ☑ Fresh Water ☐ Completion Flowback Water ☐ Tank & Pipeline Residuals
☐ Drilling Waste Liquids ☐ Solution Mining Waste ☐ Gas (2R) ☐ Other (Specify)
Additives (ie. biocides, inhibitors, etc.)

WELL CONSTRUCTION / CASING PROGRAM

CASING OR TUBING TYPE	SIZE	GRADE	WEIGHT PER FT.	NEW	USED	FOOTAGE USED IN DRILLING	FOOTAGE LEFT IN WELL	CEMENT USED
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FRESH WATER	13 3/8"	H-40	48#	X		694	694	To Surface
COAL								
INTERMEDIATE	9 5/8"	LS	29#	X		1116	1116	To Surface
PRODUCTION	7"	K-55	23#	X		3356	3356	3356' to 610'
TUBING	4 1/2"	M-65	9.5#	X		3115	3115	
LINERS								

PACKER	TYPE: Weatherford 440	SIZE: 4.5" to 7"	DEPTH: 3115

MECHANICAL INTEGRITY TEST TYPE
☐ Standard Annulus Pressure Test
Is Test Annulus Filled? ☐ Yes ☐ No If Yes, Specify Fluid Type?
☑ Pump Line Test ☐ Other (Specify)

MAXIMUM PERMITED WELLHEAD INJECTION PRESSURE 1034 psi **MIT PRESSURE** 1150 psi

MECHANICAL INTEGRITY TEST DESCRIPTION
Tested with Nitrogen. No drop in pressure

(2R Area Permits: If multiple pump lines are tested together, please list wells serviced by the tested pump lines.)

WR-37
12/23/19

API#: 47- 109 - 02703

NOTE:

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The well and/or pump line:
☑ demonstrated mechanical integrity or ☐ failed to demonstrate mechanical integrity.

The MIT was witnessed by Gary Kennedy, Inspector WVDEP - Office of Oil and Gas.

NYTIS Exploration Company
Permit Holder Company Name

8/11/2020
Date

Jeffrey L Roberts
Agent or Responsible Party (Print Name)

Signature

SR Consultant
Title

Office of Oil and Gas Use Only:

THIS WELL IS AUTHORIZED FOR INJECTION UP TO A MAXIMUM WELLHEAD INJECTION PRESSURE OF 1034 psi

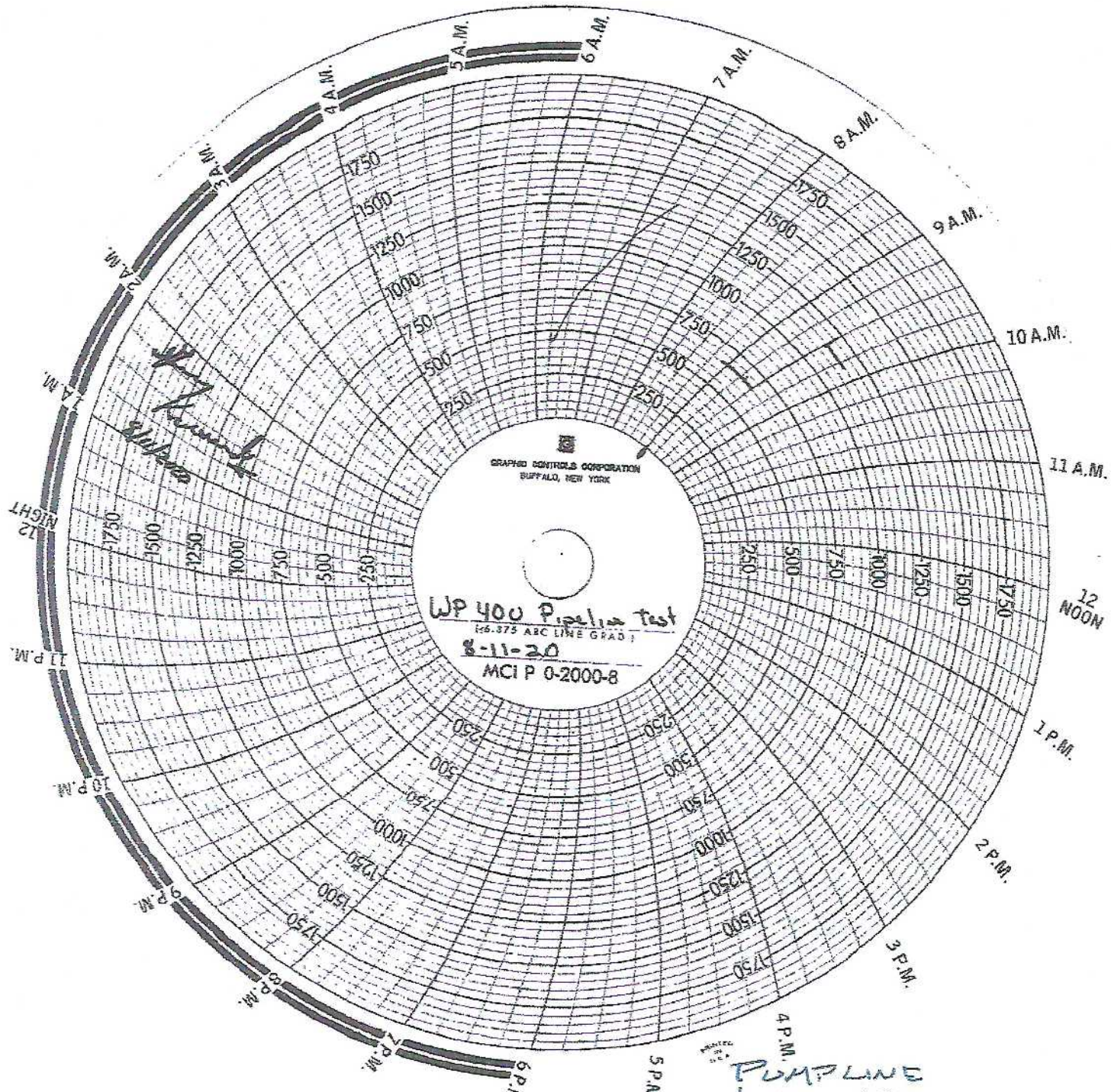
Special Conditions:
PUMPLINE ONLY. LINE RATED TO 1034 PSI WELLHEAD INJECTION PRESURE. MIT FOR WELL FAILED ON THIS DATE. NO INJECTION UNTIL WELL PASSES MIT.

UIC Program Manager
WVDEP-Office of Oil and Gas

Date

Charles T. Brewer Assistant Chief - Permitting

Digitally signed by Charles T. Brewer Assistant Chief - Permitting
Date: 2021.01.20 09:43:58 -05'00'



PUMPLINE
HELD 1150
FOR 20 min.
PASSED

west virginia department of environmental protection

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

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

By E-Mail Transmission:

October 6, 2020

Nytis Exploration Company, Inc.
Attn: Mr. Lloyd Hall
2480 Fortune Dr #300
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Re: Mechanical Integrity Test Failure – 2D10902703 (WP-400)

Dear Mr. Hall:

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Digitally signed by Charles T. Brewer Assistant Chief - Permitting
Date: 2021.01.15 09:55:41 -05'00'

Taylor Brewer
Assistant Chief of Permitting
WVDEP Office of Oil & Gas

CC: Jeff Roberts

4710902703
FAIL
AV

WR-37
12/23/19

WV DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS
PRE-OPERATION CERTIFICATE FOR LIQUID INJECTION
MECHANICAL INTEGRITY TEST RECORD

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Operator's Well Name / #: WP-400 WIW
API#: 47- 109 - 02703
UIC Permit #: UIC 2 D10902703002
Field Name (2R only):

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Address: 2480 Fortune Dr # 300,
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DESIGNATED AGENT Jeffrey L Roberts DR Consulting Services
Address: 262 Ashbrooke Hill
Ashland KY 41102

INJECTION FORMATION Weir Depth 3170 feet (top) to 3226 feet (bottom)
Perforation Interval 3194'-3206', 3212 - 3222' or Open Hole Interval N/A

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INJECTATE TYPE (Check all that apply):
☑ Produced Water ☑ Fresh Water ☑ Completion Flowback Water ☑ Tank & Pipeline Residuals
☑ Drilling Waste Liquids ☐ Solution Mining Waste ☐ Gas (2R) ☐ Other (Specify)
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PACKER	TYPE: Weatherford 440	SIZE: 4.5" to 7"	DEPTH: 3115

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WR-37
12/23/19

API#: 47-109 -02703

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NYTIS Exploration Company
Permit Holder Company Name

8/11/2020
Date

Jeffrey L. Roberts
Agent or Responsible Party (Print Name)

Signature

SR Consultant
Title

----------**Office of Oil and Gas Use Only:**----------

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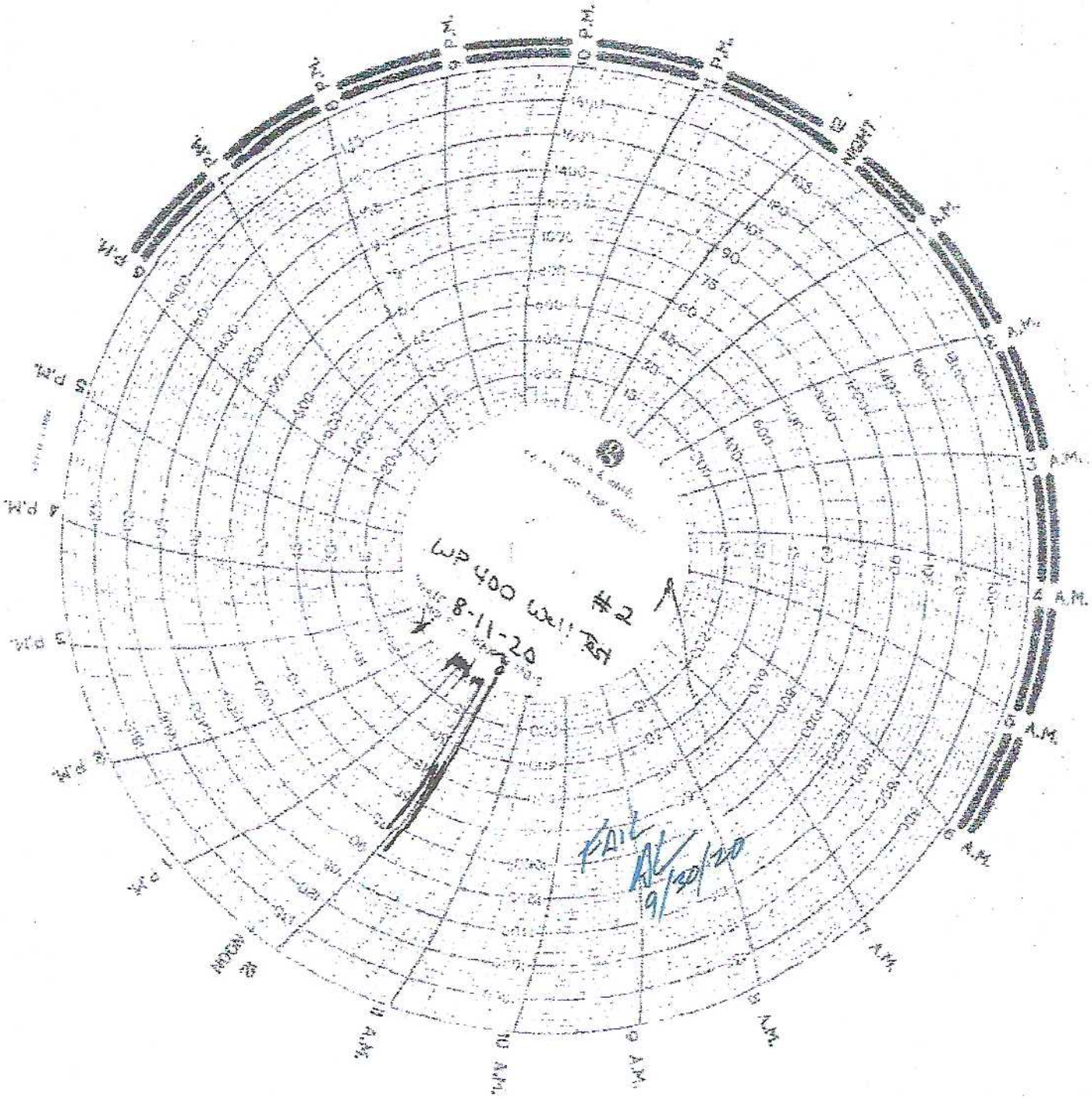
Special Conditions:
WELL CANNOT INJECT UNTIL MIT PASSES.

UIC Program Manager
WVDEP-Office of Oil and Gas

Date

Charles T. Brewer
Assistant Chief - Permitting

Digitally signed by Charles T. Brewer Assistant Chief - Permitting
Date: 2021.01.20 09:47:11 -05'00'


WP 400 well #2
8-11-20
PAIT
AL
9/30/20
NOON
NIGHT

4710902703
PUMPLINE
PASS

WR-37
12/23/19

WV DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS
PRE-OPERATION CERTIFICATE FOR LIQUID INJECTION
MECHANICAL INTEGRITY TEST RECORD

MIT Date: 8/11/2020
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INJECTION PERMIT TYPE
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INJECTATE TYPE (Check all that apply):
☑ Produced Water ☑ Fresh Water ☐ Completion Flowback Water ☐ Tank & Pipeline Residuals
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FRESH WATER	13 3/8"	H-40	48#	X		694	694	To Surface
COAL								
INTERMEDIATE	9 5/8"	LS	29#	X		1116	1116	To Surface
PRODUCTION	7"	K-55	23#	X		3356	3356	3356' to 610'
TUBING	4 1/2"	M-65	9.5#	X		3115	3115	
LINERS								

PACKER	TYPE: Weatherford 440	SIZE: 4.5" to 7"	DEPTH: 3115

MECHANICAL INTEGRITY TEST TYPE
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Is Test Annulus Filled? ☐ Yes ☐ No If Yes, Specify Fluid Type?
☑ Pump Line Test ☐ Other (Specify)

MAXIMUM PERMITED WELLHEAD INJECTION PRESSURE 1034 psi **MIT PRESSURE** 1150 psi

MECHANICAL INTEGRITY TEST DESCRIPTION
Tested with Nitrogen. No drop in pressure

(2R Area Permits: If multiple pump lines are tested together, please list wells serviced by the tested pump lines.)

WR-37
12/23/19

API#: 47- 109 - 02703

NOTE:

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NYTIS Exploration Company
Permit Holder Company Name

8/11/2020
Date

Jeffrey L Roberts
Agent or Responsible Party (Print Name)

Signature

SR Consultant
Title

Office of Oil and Gas Use Only:

THIS WELL IS AUTHORIZED FOR INJECTION UP TO A MAXIMUM WELLHEAD INJECTION PRESSURE OF 1034 psi

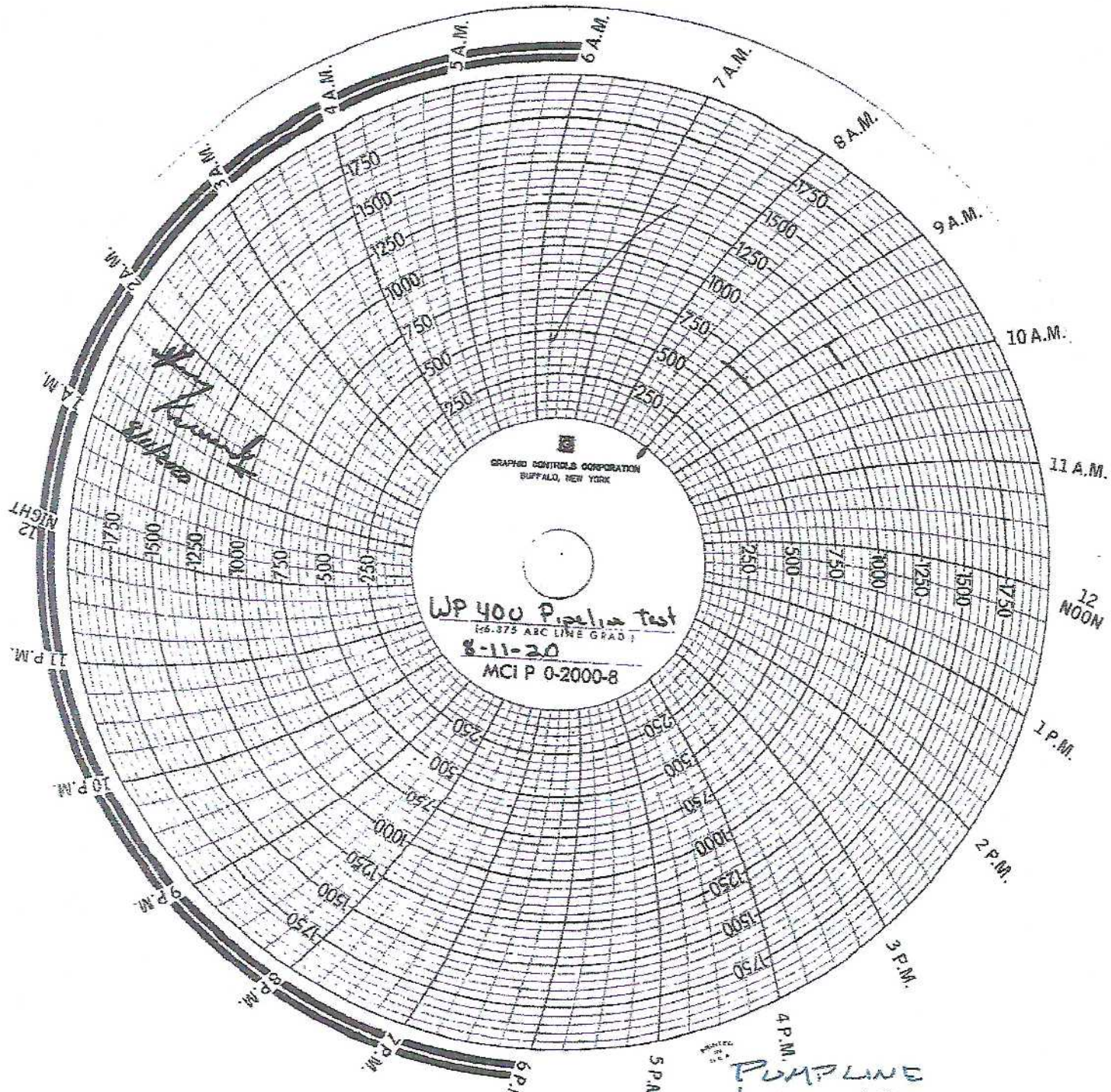
Special Conditions:
PUMPLINE ONLY. LINE RATED TO 1034 PSI WELLHEAD INJECTION PRESURE. MIT FOR WELL FAILED ON THIS DATE. NO INJECTION UNTIL WELL PASSES MIT.

UIC Program Manager
WVDEP-Office of Oil and Gas

Date

Charles T. Brewer Assistant Chief - Permitting

Digitally signed by Charles T. Brewer Assistant Chief - Permitting
Date: 2021.01.20 09:43:58 -05'00'



PUMPLINE
HELD 1150
FOR 20 min.
PASSED

APPENDIX G

Wells Serviced by Injection Wells

API #	Operator	Producing Formation
	Facility is Commercial Status.	
	Complete list of wells	
	serviced on file with WVDEP	

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

Promoting a healthy environment.

Section 10:

Monitoring

Section 10-Monitoring

Monitoring of all injection parameters shall be reported and logged daily consisting of startup/shutdown pressures, total injection volumes, injection rates, average injection pressures and annulus pressure along with the integrity of all tanks, containments, equipment and manifolds/lines. WR-40's shall be completed and filed in accordance with state regulations and kept on file at the facility office and be made available upon request. Fluids manifests shall be completed documenting every load of fluid delivered to the facility for disposal These manifests shall report the following:

- Operator
- Well Name, Number, and API number
- Amount of fluid
- Type of fluid
- Contractor Hauling Fluid
- Name of Driver/Truck number
- Fluid Sampling/Testing, if required

Records of this information shall be kept at the facilities office and shall be made available upon request.

Attached is a map of the well site with numbered/marked monitoring locations.

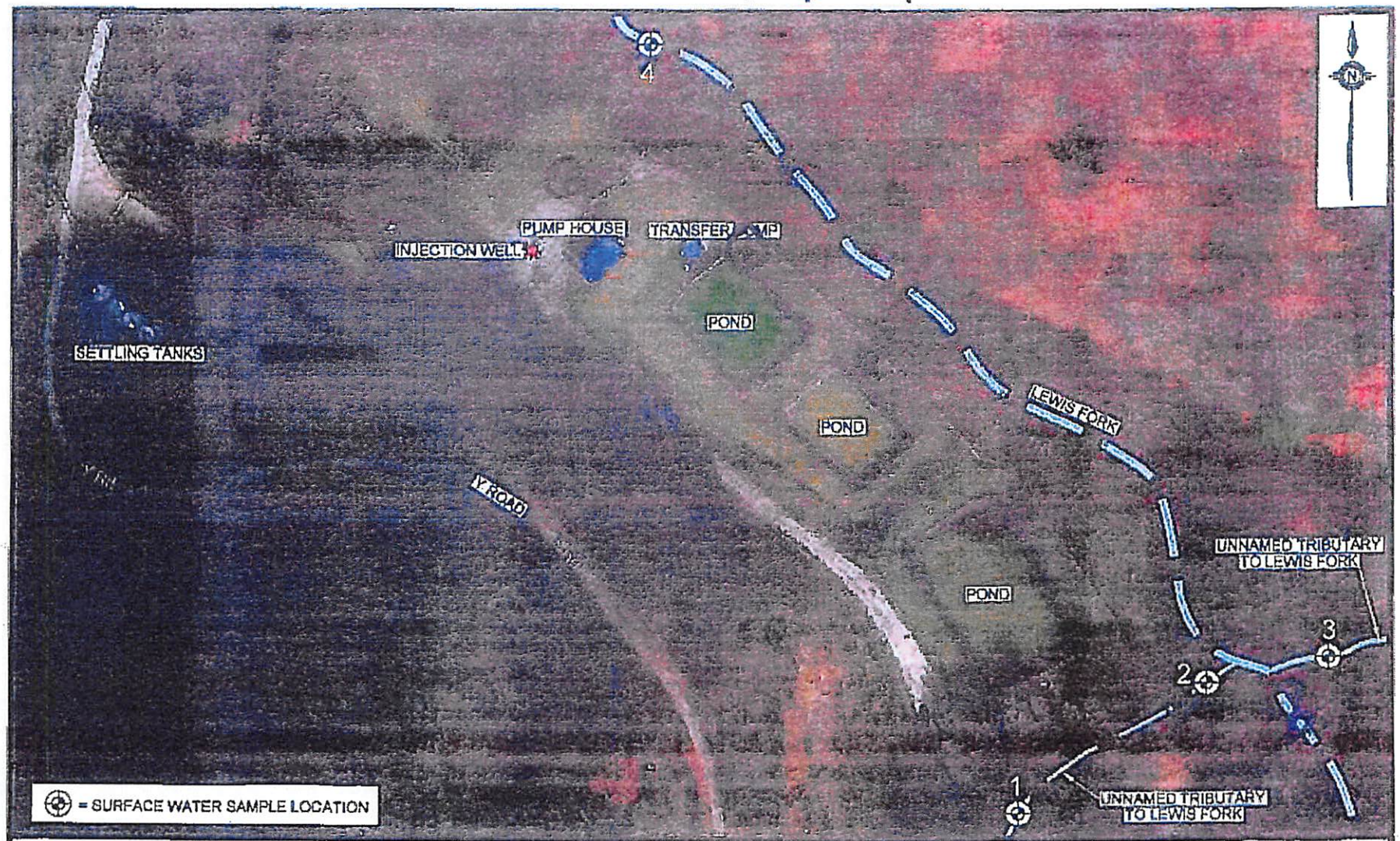
Groundwater Monitoring

Markers have been erected at these monitoring locations for future inspection and sampling will use the same parameters as requested by your office for surface water analytical results.

A site map depicting the sample locations are provided as an attachment. Results will be provided annually or as requested along with Chain of Custody documentation provided with the laboratory data sheets.

AP 1-8 on well

settling ponds



MAP-2

WELL SITE

UIC 10902703 "WP-400WIW"
GLEN ROGERS, WYOMING COUNTY
WEST VIRGINIA

DATE:	SEPT. 2014
SCALE	1"=100'
DRAWN:	JLR
CHECKED	JLR
PROJ. #	EC

e²C EnviroCheck, Inc.

100' 0 100'

1" = 100'

Proposed wells

OPTIONAL observation well

Section 11:

Groundwater Protection Plan

APPENDIX H

GROUNDWATER PROTECTION PLAN

Facility Name: WP-400 WIW

County: Wyoming

Facility Location:

Postal Service Address:	414 Summers Street		
Charleston, WV 25301			
Latitude :	37.704905	Longitude:	-81.421473

Contact Information:

Person:	Chad Carmichael
Phone Number:	304-539-8892
E-mail Address:	ccarmichael@dgoc.com

Date: 5/5/22

1. A list of all operations that may contaminate the groundwater.

- Water trucks unloading produced fluids (oil, glycol, road salt, disel fuel)

- Produced fluids (chlorides, metals, petroleum)

2. A description of procedures and facilities used to protect groundwater quality from the list of potential contaminant sources above.

- lined filtration ponds
- secondary containment for tanks
- all bag filters located in secondary containment
- proper disposal of all solid waste

3. List procedures to be used when designing and adding new equipment or operations.

- provide site security to prevent unauthorized entry
- use of security cameras and alarms
- design for secondary containment for all pipelines and tanks
- consult with the WVDEP

4. Summarize all activities at your facility that are already regulated for groundwater protection.

- AST act
- this permit

5. Discuss any existing groundwater quality data for your facility or an adjacent property.

See section 7: creeks sampled monthly, no outside groundwater monitoring wells within a mile of site

6. Provide a statement that no waste material will be used for deicing or fill material on the property unless allowed by another rule.

All wastes generated at this site will be properly managed, Diversified Energy maintains a blanket permit with the Raleigh County solid Waste Authority.

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.

- UIC well is inspected two - three times while in operation
- all waste generated will be placed in containers to prevent surface water or precipitation to affect surface soils
- tank battery has overfill and spill alarms that prohibit overfills
- all contract drivers and employees have understood and agreed to DEC's operational policies

8. Include provisions for inspections of all GPP elements and equipment. Inspections must be made quarterly at a minimum.

- Employees are on-site daily. Leaks are repaired immediately. Tank battery has overfill and spill alarms.
- Pipeline is inspected monthly and injection pressure is monitored in real time.

Signature: _____

Date: 5/5/22

Section 12:

Plugging and Abandonment

Section 12 -Plugging and Abandonment

After completion of injection fluids or in the event the well inspection data concludes that a well integrity issue may occur, the injection well will be plugged and abandoned in accordance with all applicable WVDEP regulations. Prior to abandonment, the small building on-top of the well ahead will be inspected for asbestos containing materials (ACM) and will be properly demolished per applicable regulations. The plan is to have the well in static condition, remove the 4-1/2", 9.5# tubing and packer. Run a CBL to determine the top of cement and a production backoff point. Tubing will then be ran back into the hole with cement plugs balanced over all perforated intervals in the well spacing from 50 feet below the perforations to 50 feet above the perforations. The cement plugs will then be displaced with freshwater and the tubing removed from the well. The 7" production casing shall then be backed off at free point and a 100 foot balanced cement plug shall be set at the backoff point and a 50 foot cement plug set at the surface. Upon completion of the well abandonment, the well head will be removed, cemented to surface and permanent abandonment monument will be erected. Finally. a completed WR-38 form will be submitted to the OOG within 30 days of well abandonment.

Section 13:

Additional Bonding

Section 13 – Additional Bonding

Proper performance bonding is in place for the WP-400.

Section 14:

Financial Responsibility

6/2002

APPENDIX I

Requirement for Financial Responsibility to Plug/Abandon an Injection Well

In accordance with Legislative Rule 47 CSR 13-13.7.g, all UIC permits shall require the permittee to maintain financial responsibility and resources to close, plug, and abandon underground injection wells in a manner prescribed by the Chief. The permittee must show evidence of financial responsibility to the Chief by submission of a surety bond, or other adequate assurance, such as a financial statement or other material acceptable to the Chief. This certification must be signed by one of the following:

1. a principle corporate officer of at least the level of vice-president for a corporation,
2. a general partner for a partnership,
3. the proprietor or owner of a sole proprietorship,
4. a principal executive or ranking elected official for a public agency,
5. a duly authorized representative in accordance with Legislative Rule 47 CSR 13-13.11.b (A person may be duly authorized by one of the primary entities (1-4) listed above by submitting a written authorization to the Chief of the WVDEP Office of Oil and Gas designating an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility. A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

Diversified Production, LLC

Company Name

2D10902703002

UIC Permit Number

I certify in accordance with Legislative Rule 47 CSR 13-13.7.g, the company/permit holder cited above 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 and that documents to support this requirement are on record with the same.

Chuck Shafer

Print Name

Production Manager

Print Title

Chuck Shafer 5-17-22

Signature **Date**

Section 15:

Site Security Plan

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.

Due to site construction, the only vehicle access is through a locked gate. Security cameras monitor the truck unloading bays, tank battery, ponds, and unloading controls. Fluid levels in the ponds are monitored continuously by Enervest personnel through telemetry. All valves are locked and only authorized representatives have access to the tank battery.

The injection well pump building is locked at all times. Upon departure from deliveries, gate is locked by the driver.

Section 16:

Additional Information

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	NA
NPDES Program	NA
Prevention of Significant Deterioration (PSD)	NA
Nonattainment Program	NA
Dredge or Fill	NA
NPDES/NPDES – Stormwater	NA
WVDEP – Office of Waste Management (OWM) – Solid Waste Facility	Blanket permit with Raleigh County Landfill
WVDEP – OWM – RCRA (Hazardous Waste TSD or Transporter)	NA
WVDEP – OWM – UST	NA
CERCLA – Superfund	NA
WV Voluntary Remediation – Brownfields	NA
FIFRA – Federal Insecticide, Fungicide and Rodenticide Act	NA
Well Head Protection Program (WHPP)	NA
Underground Injection Control (UIC)	UIC 2D1092703
Toxic Substances Control Act (TSCA)	NA
Best Management Plans	NA
Management of Used Oil	Recycled as needed
Other Relevant Permits (Specify):	
AST Act	Tanks registered with DWWM