DELTA HELIX ENERGY LLC

W. M. KAUFMAN W-7

UIC PERMIT APPLICATION

UIC #2D08700985

12/15/24

CHECKLIST FOR FILING A UIC PERMIT APPLICATION

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

Operator	Delta Helix Energy, LLC		
Existing UIC Permit ID Number	2D08700985-002	UIC Well API Number	4708700985

Office of Oil and Gas Office Use Only	
Permit Reviewer	
Date Received	
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	
		Other	

Please check the items completed and enclosed.

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

N/A ☑ Appendix D Public Service District Affidavit

☑ Appendix E Water Sources

☑ Appendix F Area Permit Wells

☑ Section 8 – Geological Data on Injection and Confining Zones

☑ Section 9 – Operating Requirements / Data

☑ Appendix G Wells Serviced by Injection Well

☑ Section 10 – Monitoring

☑ Section 11 – Groundwater Protection Plan (GPP)

☑ Appendix H Groundwater Protection Plan (GPP)

☑ Section 12 – Plugging and Abandonment

☑ Section 13 – Additional Bonding

☑ Section 14 – Financial Responsibility

☑ Appendix I Financial Responsibility

☑ Section 15 – Site Security Plan

☑ Appendix J Site Security for Commercial Wells

☑ Section 16 – Additional Information

☑ Appendix K Other Permit Approvals

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

Reviewed by (Print Name): Brad Morris

Reviewed by (Sign): Brad L. Morris

Date Reviewed: 5/28/25

Section 1 – 5

UIC-1 Form

4708700985

UIC-1
(4/25)

WEST VIRGINIA DEPARTMENT OF
ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS
601 57th Street, SE
Charleston, WV 25304
(304) 926-0450
www.dep.wv.gov/oil-and-gas

UNDERGROUND INJECTION CONTROL (UIC) PERMIT APPLICATION

UIC PERMIT ID # 2D08700985002 API # 4708700985 WELL # Kaufman W-7

Section I. Facility Information

Facility Name: Kaufman W-7 Disposal

Address: 1.25 miles East on Kaufman Road (CR 48/3) off of Otto Road (CR 48)

City: Spencer State: WV Zip: 25276

County: Roane District: Smithfield 7.5' Quad: Spencer

Location description:
1.25 miles East on Kaufman Road (CR 48/3) off of Otto Road (CR 48) on the waters of Millstone Run

Location of well(s) or approximate center of field/project in UTM NAD 83 (meters) Latitude: 38.756034
Northing: 4289738 Easting: 476780 Longitude: -81.267241

Environmental Contact Information:
Name: Brad Morris Title: Office Manager
Phone: 681-229-1558 Email: bmorris@topdrilling.com

Section 2. Operator Information

Operator Name: Delta Helix Energy, LLC
Operator ID: 494530855

Address: 300 Star Avenue, Suite 321
City: Parkersburg State: WV Zip: 26101
County: Roane

Contact Name: Brian Haught Contact Title: Operator Manager
Contact Phone: 681-229-1558 Contact Email: bhaught@topdrilling.com

4708700985

Section 3. Applicant Information

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

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

Section 4. Applicant / Activity Request and Type:

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

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

Oil & Natural Gas production. Water Produced from approximately 75 shallow wells is injected into the Big Injun Sand.

APPLICATION CERTIFICATION

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

1. For a corporation: by a principle corporate officer of at least the level of vice-president;
2. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively;
3. For a municipality, State, Federal, or other public agency: by either a principle executive officer or ranking elected official;
4. Or a duly authorized representative in accordance with 47CSR13.13.11.b.
   (A person may be duly authorized by one of the primary entities (1-3) 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.)

Delta Helix Energy, LLC

(Company Name)

2D08700985-002 (Kaufman W-7)

(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)

B. Douglas Haught

(Print Name)

CEO

(Print Title)

(Signature)

5-28-25

(Date)

Section 6

Construction

Section No. 6

6. The water produced in conjunction with crude oil from the William Kaufman lease is separated from the oil and gathered in a 100 bbl storage tank near the location of Kaufman W- 17. This water along with the water produced from nearby Clover Field Big Injun wells is filtered and injected into Kaufman W- 7. A Schematic of the production facility is shown in the attached Fig No. 1. The attached Fig No. 2 shows the location of the tanks, injection facility, and injection line to W M Kaufman W-7 and W M Kaufman W-19. Figure No. 3 (attached) shows the oil lines and oil and water stock tank locations. The ¼ mile AOR is shown on both Fig Nos 2 and 3. There are no USDWs located withing the AOR. Two USDWs located approximately 1000' and 2200' from the AOR were sampled.

7. The attached Fig No. 4 is a schematic of the as drilled injection well, W M Kaufman W-7 with Big Injun (injection zone), Big lime and shale (confining layers) marked. Tubing and casing depths along with cement info (TOC) is also shown on the schematic.

8. See Appendices A& B.

9. This disposal well was drilled in 1963 and logged with Gamma Ray / Density/ Caliper logs. A copy of the United States Department of the Interior Report No. 6992 (Reservoir Study of the William Kaufman Clover-Rush Run Oilfield, Roane County, WV by Karl-Heinz Frohne) is enclosed in Fig No. 5. This study provides a detailed study of the reservoir based on a core from W M Kaufman No. 7 located approximately 1300' South of Kaufman W-7. Reservoir properties as determined from that study are:

   Gross Sand thickness: 24'

   Pay thickness:12.5'

   Permeability: .8 md

   Porosity: 15%

   Connate water saturation: 65%

   Kaufman W-7 was completed with a small fracture treatment soon after drilling. Both the Breakdown Pressure and Instantaneous Shut In Pressure were recorded at 1300 psig (surface).

   The attached Fig No. 6 is a copy of the McCullough Scintillometer/ Gamma Ray long run at the time the well was drilled. The tops of the relevant formations are marked on this log.

API No.: 4708700985

APPENDIX A
Injection Well Form

1) GEOLOGIC TARGET FORMATION Big Injun Sandstone

Depth 2150 Feet (top) 2188 Feet (bottom)

2) Estimated Depth of Completed Well, (or actual depth of existing well): 2219 Feet

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

4) Approximate coal seam depths: None

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

6) Virgin reservoir pressure in target formation 960 psig Source Estimated

7) Estimated reservoir fracture pressure 2164 per step rate test (1987) psig (BHFP)

8) MAXIMUM PROPOSED INJECTION OPERATIONS:

Injection rate (bbl/hour) 12

Injection volume (bbl/day) 50

Injection pressure (psig) 883

Bottom hole pressure (psig) 1943

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

Produced Big Injun brine

Temperature of injected fluid: (°F) 60

10) FILTERS (IF ANY)

10 micron at the well and at injection plant

11) SPECIFICATIONS FOR CATHODIC PROTECTION AND OTHER CORROSION CONTROL

Corrosion inhibitor in annular fluid

API No.: 4708700985

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							
Fresh Water	8 5/8	New	LS	28#	172	172	30 sks CTS
Coal							
Intermediate 1							
Intermediate 2							
Production	4 1/2	New	J-55	9.5#	2219	2219	53 sks
Tubing	2 3/8	New	J-55	4.6#	2130	2130	
Liners							

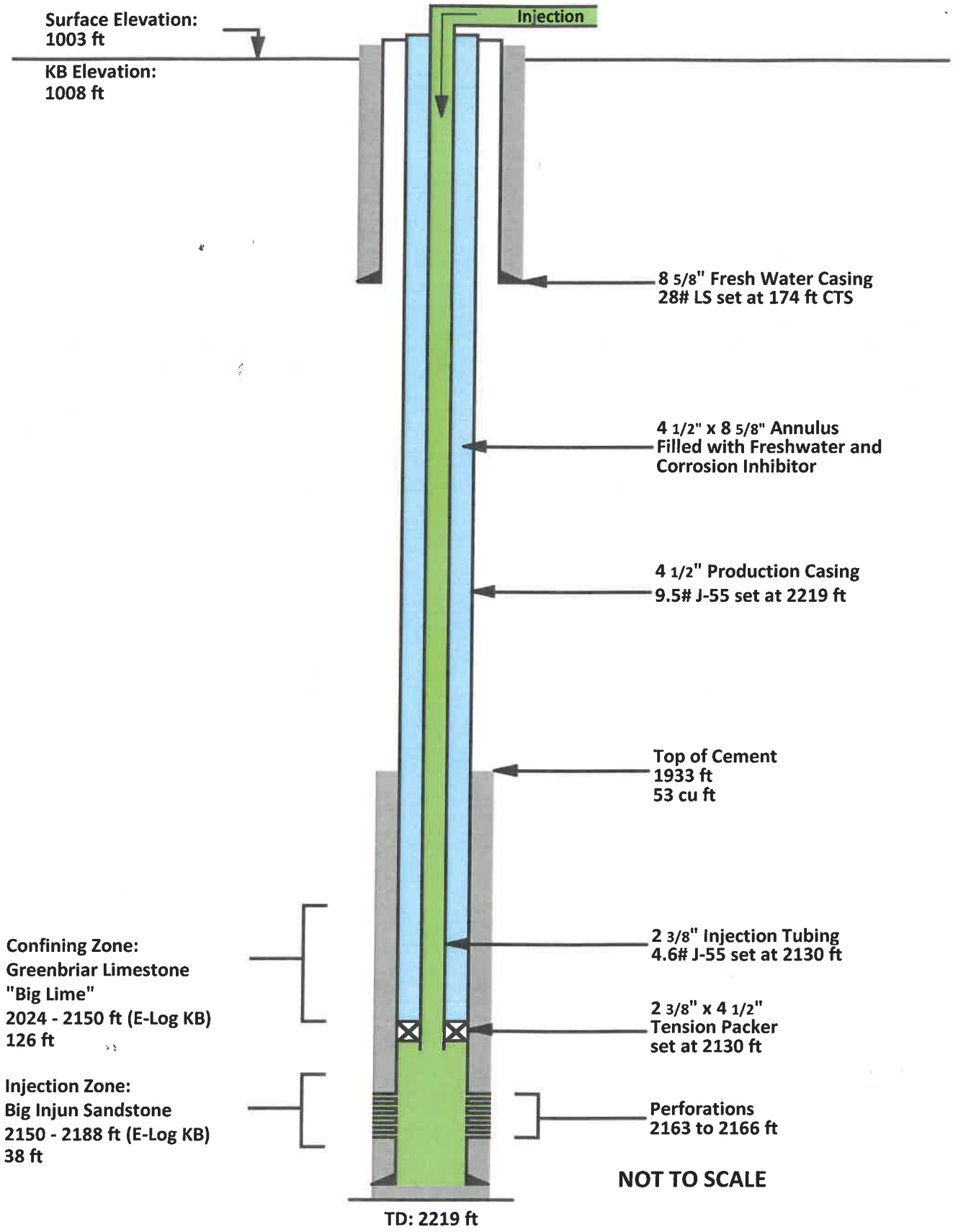
TYPE	Wellbore Diameter	Casing Size	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./sk)	Cement to Surface ? (Y or N)
Conductor							
Fresh Water	10 5/8	8 5/8	.264	2950	Reg. Neat	1.18	Y
Coal							
Intermediate 1							
Intermediate 2							
Production	7 7/8	4 1/2"	.205	4380	50/50 Poz	1.26	N
Tubing		2 3/8	.167	6770	NA	NA	N
Liners							

PACKERS	Packer #1	Packer #2	Packer #3	Packer #4
Kind:	tension			
Sizes:	4 x 2			
Depths Set:	2130			

Well Bore Diagram

W.M. Kaufman W-7
API 47-087-00985

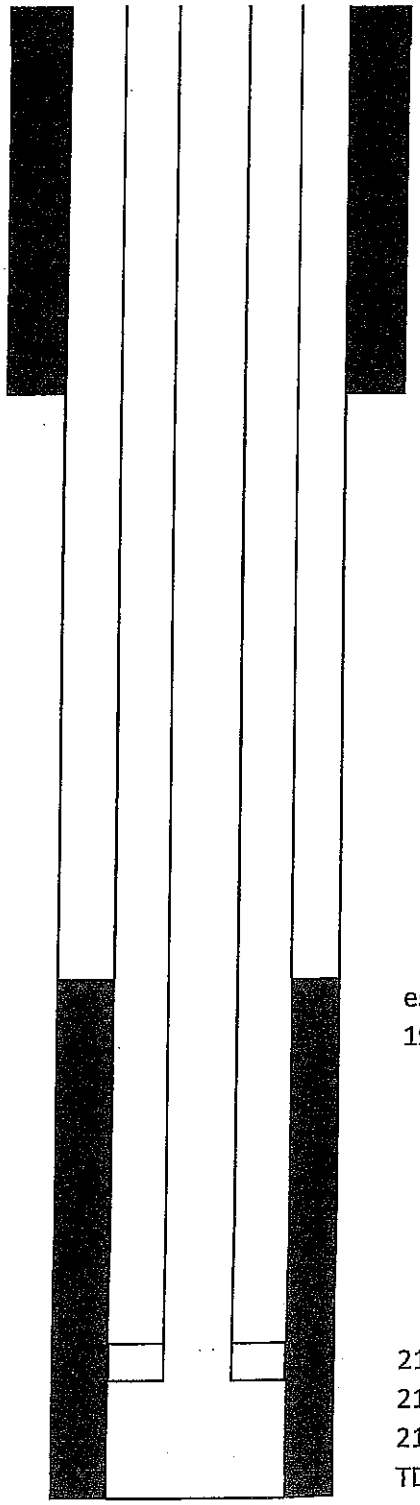
Delta Helix Energy, LLC
UIC 2D08700985-003



4708700985

W M Kaufman W-7
47-087-00985

FIG No. 4



8 5/8" csng set @ 174'- CTS

est TOC = 1933'

1975'-2130'	Big Lime
2130'	2 3/8" tubing on tension packer
2163'-2166'	Big Injun perforations
2170'-2219'	Shale
TD 2219	4 1/2" csng @ 2219'

5/24/2018

Not to scale

Form OG-10

4708700985

W-7

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION

Quadrangle SPENCER

Permit No. ROA-985

WELL RECORD

Oil or Gas Well (KIND)

Company WOLF'S HEAD OIL REFINING COMPANY, INC.
Address P. O. Box 1588, Parkersburg, W. Va.
Farm Wm. Kaufman Acres 800
Location (waters) Slab Camp Run
Well No. W-7 Elev. 1003.40
District Smithfield County Roane
The surface of tract is owned in fee by Harold Rhodes
Otto Route Address Spencer, W. Va.
Mineral rights are owned by Alfred M. Oppenheimer II, et al.
300 South Lang Avenue Address Pittsburgh 8, Pa.
Drilling commenced November 20, 1963
Drilling completed November 27, 1963
Date Shot - From To
With
Open Flow /10ths Water in Inch
/10ths Merc. in Inch
Volume Show Oil & Gas (Drilled w/Rotary) Cu. Ft.
Rock Pressure lbs. hrs.
Oil bbls., 1st 24 hrs.
WELL ACIDIZED
WELL FRACTURED December 12, 1963

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer Steel Shoe
13			Float Collar
10			Guide Shoe
8 5/8"	174'2"	174'2"	Size of 8 5/8" OD
6¼			4 1/2" OD
4½"OD	2230' 7"	2230' 7"	4 1/2" OD
3			Depth set 2188
2 3/8" Tbg.	2230'	2230'	2219
Liners Used			Perf. top
			Perf. bottom
			Perf. top
			Perf. bottom

CASING CEMENTED 8 5/8" SIZE 172 No. Ft. 11/21/63 Date
4½" 2219 11/29/63

COAL WAS ENCOUNTERED AT - FEET INCHES
FEET INCHES FEET INCHES
FEET INCHES FEET INCHES

RESULT AFTER TREATMENT Gas - 42,000 Cu. Ft.
Oil - 33 Bbls.
ROCK PRESSURE AFTER TREATMENT 508 Lbs.
Fresh Water - Feet Salt Water Feet

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth	Remarks
Clay			0	10			
Sand			10	70			
Red Rock			70	110			
Shale			110	130			
Sand			130	172			
Shale			172	200			
Sand			200	240			
Red Rock			240	295			
Sand			295	375			
Sandy Shale			375	575			
Shale			575	600			
Red Rock			600	610			
Shale			610	630			
Sand			630	635			
Shale			635	670			
Sand			670	705			
Sand & Shale			705	935			
Sand			935	1020			
Shale			1020	1040			
Sand			1040	1150			
Shale			1150	1300			
Sand			1300	1350			
Sand & Shale			1350	1435			
Sand			1435	1500			
Shale			1500	1530			
Sandy Shale			1530	1600			
Sand			1600	1665			
Lime			1665	1770			
Sand			1770	1925			
Shale			1925	1955			

(over)

4708700985 W-7

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth Found	Remarks
Little Lime			1955	1970			
Sandy Shale			1970	1975			
Big Lime			1975	2130			
Keener Sand			2130	2141			
Big Injun			2141	2170			
					Oil & Gas	2141-2170	Show
Shale			2170	2219			
4½" Casing				2219			
TOTAL DEPTH				2219			

Date December 23, 1963

APPROVED WOLF'S HEAD OIL REFINING COMPANY, INC. Owner

By George W. Wilsman

George W. Wilsman, (Title) Agent

4708700985

W-7

WVGES GEOLOGY UNDERLIES IT ALL "Pipeline"

Select County: (087) Roane
Enter Permit #: 985
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 = 087 Permit = 985 Link to all digital records for well

Report Time: Thursday, April 03, 2025 1:09:14 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4708700985	Roane	985	Smithfield	Spencer	Spencer	38.755755	-81.267503	476757	4289707

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
4708700985	11/27/1963	Original Loc	Completed	Harold Rhodes	W-7		William Kaufman	81219	Alfred M Oppenheimer II et al	Wolf's Head Oil Refining Co., Inc.		
4708700985	-/-/-	Worked Over	Completed	Terry A Samples	W-7		W M Kaufman			Pennzoil Company		Big Injun (Price&eq)

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_E
4708700985	11/27/1963	11/20/1963	1003	Ground Level	Clvr-Rsh Rn	Price Fm & equivs	Price Fm & equivs	Development Well	Development Well	Oil and Gas	unknown	Fractured	2219		2219		
4708700985	-/-/-	-/-/-	1003	Ground Level	Clvr-Rsh Rn	Price Fm & equivs	Big Injun (Price&eq)	Service Well	Unsuccessful	Salt Water Disp	unknown	unknown	2219		0		

Comment: -/-/- Injection zone footage proposed.

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
4708700985	-/-/-	Horizon	Injection	Vertical	2163	Big Injun (Price&eq)	2166	Big Injun (Price&eq)					
4708700985	11/27/1963	Pay	Oil & Gas	Vertical			2170	Big Injun (Price&eq)	0	0			

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
4708700985	Pennzoil Company	1981	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Pennzoil Company	1982	999	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Pennzoil Company	1983	1,492	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Pennzoil Company	1984	1,470	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Delta Helix Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	HG Energy, LLC	2023	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
4708700985	Pennzoil Company	1981	440	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Pennzoil Company	1982	307	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Pennzoil Company	1983	445	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Pennzoil Company	1984	382	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Delta Helix Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	HG Energy, LLC	2023	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
4708700985	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	HG Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Delta Helix Energy, LLC	2023	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
4708700985	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	HG Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Delta Helix Energy, LLC	2023	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
4708700985	Original Loc	Little Lime	Well Record	1955	Reasonable	15	Reasonable	1003	Ground Level
4708700985	Original Loc	Big Lime	Well Record	1975	Reasonable	155	Reasonable	1003	Ground Level
4708700985	Original Loc	Greenbrier Group	Past WVGES Staff Geologst	1975	Reasonable	155	Reasonable	1003	Ground Level
4708700985	Original Loc	Big Injun (Price&eq)	Past WVGES Staff Geologst	2130	Reasonable	11	Reasonable	1003	Ground Level
4708700985	Original Loc	Keener	Well Record	2130	Reasonable	11	Reasonable	1003	Ground Level

Wireline (E-Log) Information:

* There is no Scanned/Raster Log data for this well

* There is no Digitized/LAS Log data for this well

* There is no Scanned or Digital Logs available for download

There is no Plugging data for this well

There is no Sample data for this well

Section 7

Area of Review

`**Section No. 7**

9. A ¼ mile fixed radius from the injection well, W M Kaufman W-7, was utilized for the AOR investigation.

10. Attached in Fig No 3 is a map showing the wells within the AOR. The wells within the AOR are listed in the attached APPENDIX C. The Well Records available are also enclosed in Fig No. 7. The attached Fig No 8 is a topographic map extending a mile from the Kaufman W-7 injection well. The maps show the facilities and injection, producing, plugged and abandoned wells within the one mile radius.

11. The Local PSD (Clover PSD) was contacted and the required Affidavit obtained. It is enclosed in APPENDIX D.

12. The USDWs in this area vary from approximately 20' to 100'. No USDWs are located within the AOR. Two USDWs located outside the AOR boundary were sampled. The results of the analysis are shown in the attached APPENDIX E. TDS was measured as part of the analysis. Most of the USDWs in this field were drilled prior to the current owner and they know very little about the wells. The results of the analysis are shown in APPENDIX E.

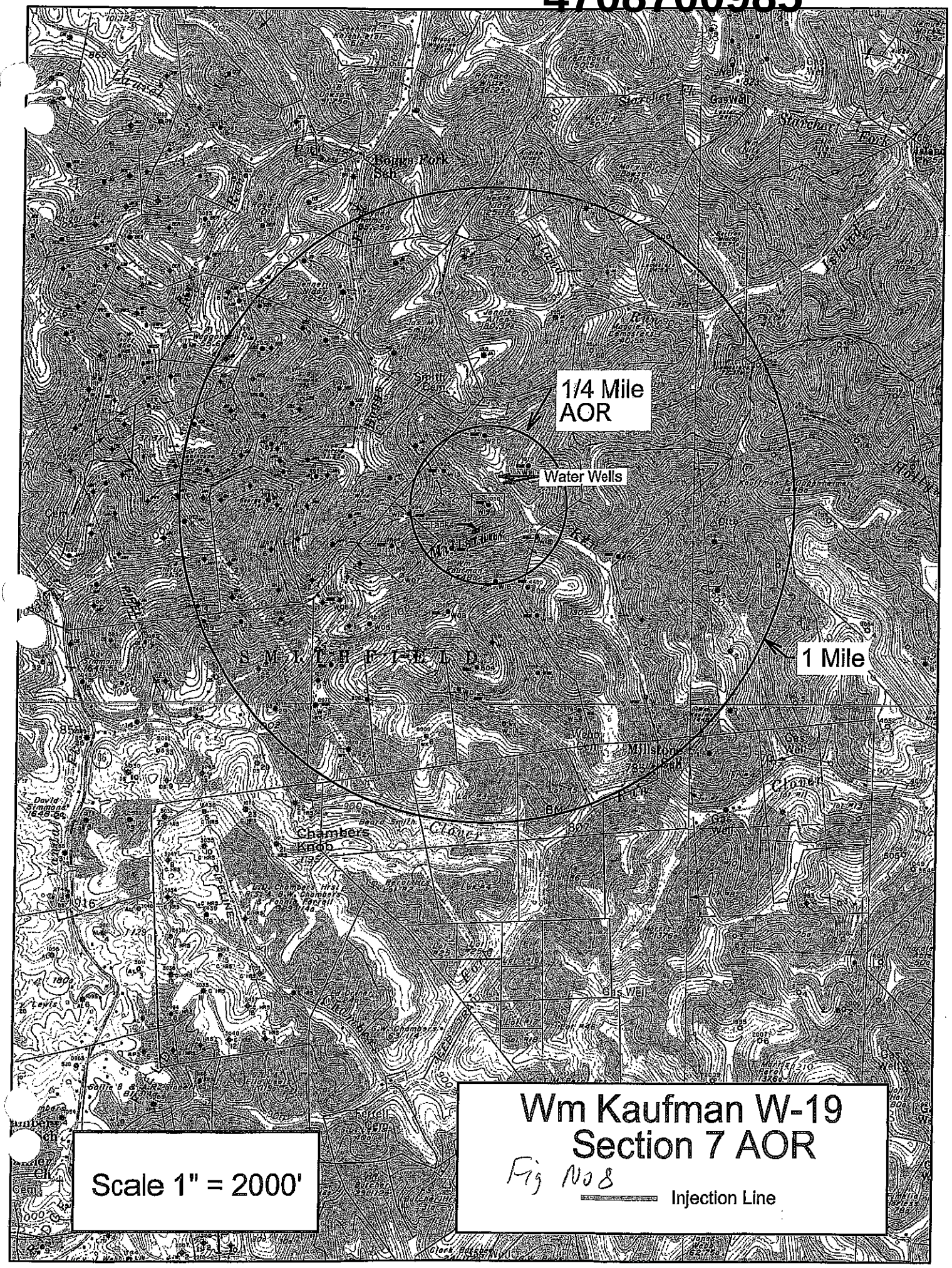
13. The samples were collected by a WVDEP certified laboratory as set forth in 40CFR Part 136.

14. No corrective action is deemed necessary at this time.

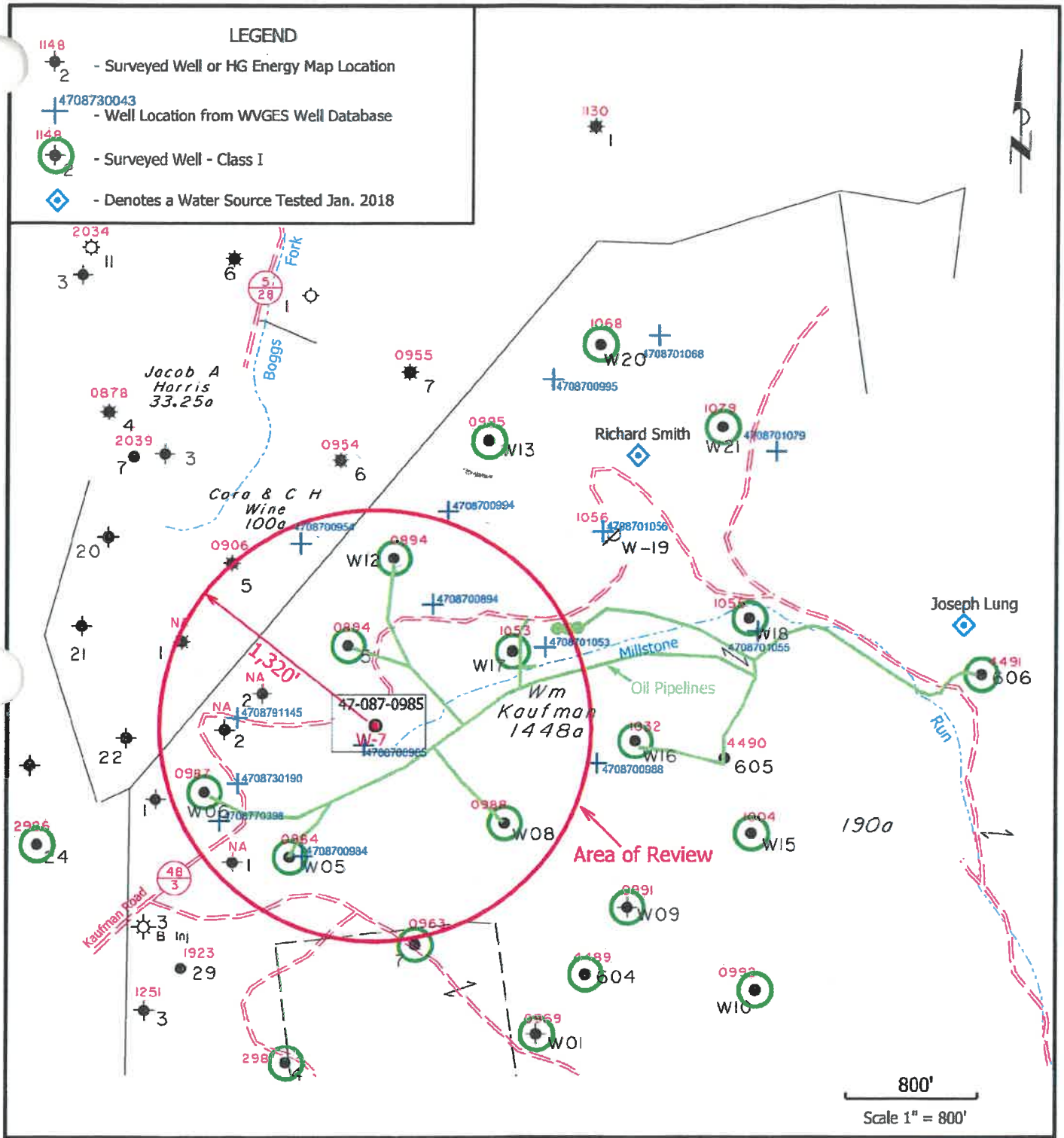
15. This application is for a single disposal well and not an area permit.

16. Groundwater use in this area of Roane County is limited. Located approximately 3 miles from this injection well is the Charles Fork Lake. This lake is utilized as a water source for the City of Spencer as well as recreational activities. It is located on a different drainage than W M Kaufman W-7. Other than the water supply for the City of Spencer the only other know Ground Water uses are agricultural.

4708700985


1/4 Mile AOR
Water Wells
1 Mile
Chambers Knob
Millstone
Clover
Gas Well
Scale 1" = 2000'
Wm Kaufman W-19
Section 7 AOR
Fig No 8
Injection Line

4708700985



- CLOVER FIELD -
Injection Wells

Wm. Kaufman No.W-7 (47-087-00985)

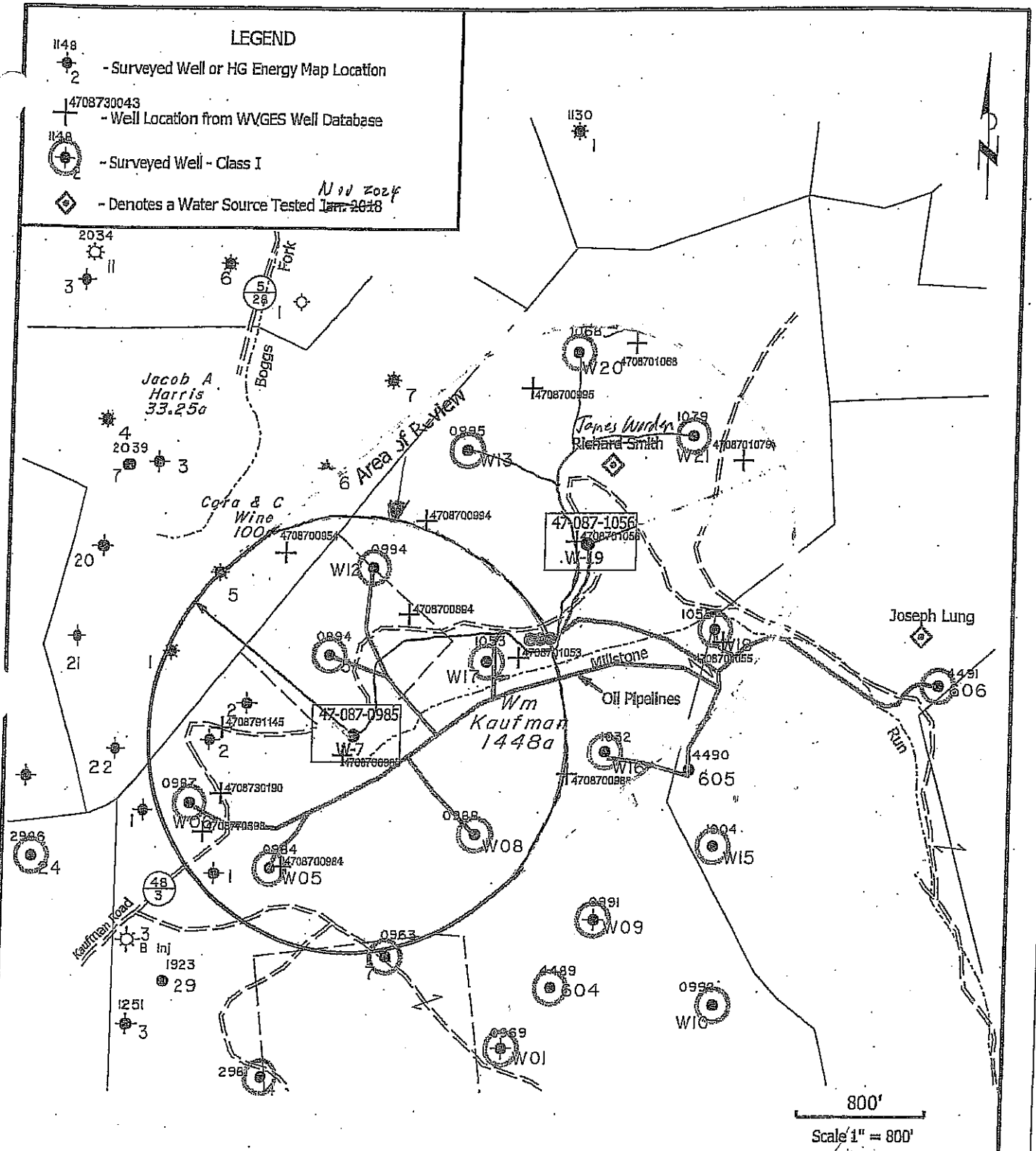
Roane Co., WV

Map Showing All Known Wells
Within the Quarter-Mile AOR
& WVGES Well Data Spots

1/29/2018

HG ENERGY LLC

4708700985 Fig No 2



- CLOVER FIELD -
Injection Wells
Wm. Kaufman No.W-7 (47-087-00985)
Injection + pipeline facilities

ROANE Co., WV

Map Showing All Known Wells
Within the Quarter-Mile AOR
& WVGES Well Data Spots

Fig No 2

1/25/2018

APPENDIX B

UIC Permit No. **2D08700985**

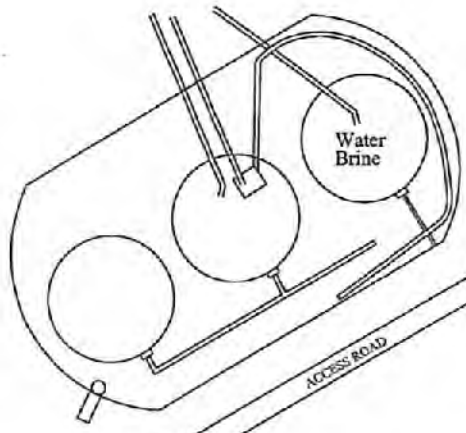
Storage Tank Inventory

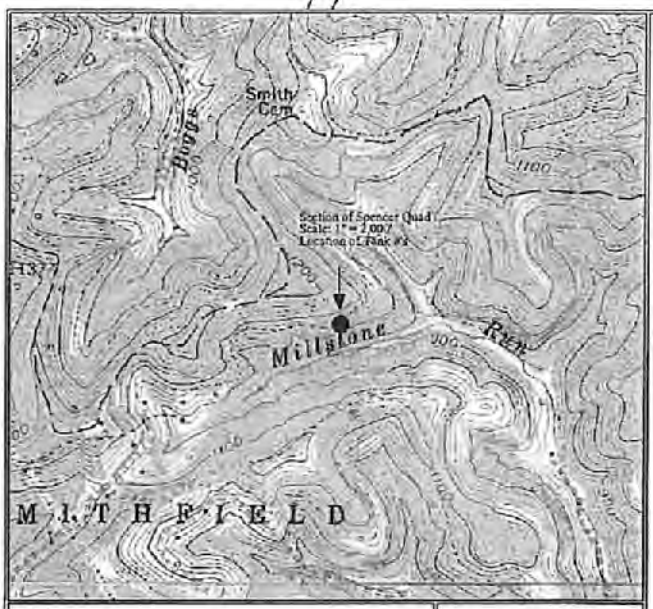
Tank ID No.	AST Registration No.	Tank Location		Capacity (barrels)	Type of Fluid Stored	Construction Material (Steel, Plastic, etc.)	Tank Type (Single / Double Wall)	Installation Date	Tank Age (Months)
		Northing	Easting						
324	044-00000032	4289305.8	476875.7	210	Brine	Steel	Single	2013	144
325	044-00000033	4289308.4	476873.2	210	Brine	Steel	Single	2013	144
326	044-00000034	4289310.5	476870.9	100	Brine	Steel	Single	206	228

4708700985

Fig No 1

FACILITY SITE PLAN





HG ENERGY, LLC
SPCC PLAN

Drawn By KAB
File Name Clover Area
Scale
Date 11-6-14
Point No.

Facility Name: Kaufman, Wm. W-5, W-6, W-8, W-12, W-13, W-17, W-18, W-20, W-21, 5, 605 & 606

State: WV

County: Roane

District: Smithfield

Name of Nearest Stream: Millstone Run

Direction & Distance from Facility: 185° @ 300'

~STORAGE TANKS~

No. 3

Volume bbl: 210

Tank #'s: 321-323

Dike Dimensions: 150' peri. X 2.2' depth

Calculated Capacity: 471 bbl

Operator: Delta Helix Energy, LLC
UIC Permit No.: 2D08700985

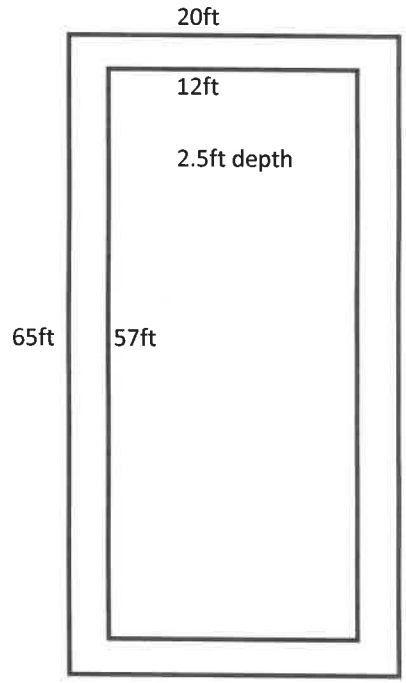
Secondary Containment Calculations
Earth Berm Containment
(Input Measurements In Blue Cells)

Tank	Tank Dimensions		Capacity		
	Height (Ft)	Dia (Ft)	Barrels	Gallons	Cu Ft
1	15	10	209.8	8812.8	1178.1
2	15	10	209.8	8812.8	1178.1
3	10	8.5	101.1	4244.8	567.4
4			0.0	0.0	0.0
5			0.0	0.0	0.0
6			0.0	0.0	0.0
7			0.0	0.0	0.0
8			0.0	0.0	0.0
9			0.0	0.0	0.0
10			0.0	0.0	0.0
		Total	520.7	21,870.4	2,923.6

Enter largest tank as Tank 1.

Tank	Tank Base Exclusions		
	Dia (Ft)	Depth (Ft)	Vol (CuFt)
1	0	2.50	0.0
2	10	2.50	196.3
3	8.5	2.50	141.9
4	0	2.50	0.0
5	0	2.50	0.0
6	0	2.50	0.0
7	0	2.50	0.0
8	0	2.50	0.0
9	0	2.50	0.0
10	0	2.50	0.0
Total Tank Base Exclusions			338.2

Tank 1 entered as "0" diameter to exclude it from the tank base exclusion calculations.



Containment Dimensions	
Top Interior Perimeter	
Length (Ft)	Width (Ft)
65.00	20.00
Bottom Interior Perimeter	
Length (Ft)	Width (Ft)
57.00	12.00
Depth (Ft)	
2.50	
Total Containment Volume (CuFt)	2439.1

All containment measurements must be interior dimensions.

Tank Containment Volume (CuFt)	2439.1
Minus Tank Base Exclusions (CuFt)	338.2
Net Containment Volume (CuFt)	2100.9
Largest Tank Volume (CuFt)	1178.1
Available Containment Volume (CuFt)	178.3%

4708700985

APPENDIX C

Wells within the Area of Review

	API No.	Well No.	Well Type	Well Status	Northing	Easting	Penetrate Injection Zone	Penetrate Confining Zone	Total Vertical Depth	Surface Elevation
1	4708700878	Wines 1	Oil Prod	Active	4289856.6	476352.3	Y	Y	2273	1076
2	4708700894	Kaufman 5	Oil Prod	Active	4289879.0	476728.0	Y	Y	2281	1109
3	4708700954	Wines 3	Gas Prod	Active	4290082.6	476637.5	Y	Y	2180	1092
4	4708700984	W-5	Oil Prod	Active	4299499.9	476642.1	Y	Y	2270	1040
5	4708700985	W-7	Injector	Active	4289738.0	476780.0	Y	Y	2219	1003
6	4708700987	W-6	Gas Prod	Active	4289588.2	476357.8	Y	Y	2335	1132
7	4708700988	W-8	Oil Prod	Active	4289673.2	477190.2	Y	Y	2430	1225
8	4708701053	W-17	Oil Prod	Active	4289888.7	477092.4	Y	Y	2190	971
9	4708730190	?	Plugged	Abandonded	4289635.7	476521.2	Y	Y	2245	1052
10	4708770398	?	Unknown	Abandonded	4289564.9	476487.5	?	?	?	?
11	4708791143	?	Unknown	Abandonded	4289549.2	476326.3	?	?	?	?
12	4708791144	?	Unknown	Abandonded	4289645.6	476423.3	?	?	?	?
13	4708791145	?	Unknown	Abandonded	4289758.0	476520.2	?	?	?	?

See Completion Logs Attached Below

NOT REQUIRED

(4/25)

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)

Top Drilling / Delta Helix

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

Clover Public Service District

that there are no such publically recorded sources.

Allison Spaur

(Signature of Authorized Representative)

Sworn and subscribed to before me this 15th day of October, 2024.

Ella D. Cottrell, my commission expires Dec. 7th 2025.

(Notary Signature)

Ella D. Cottrell.

OFFICIAL SEAL
NOTARY PUBLIC, STATE OF WEST VIRGINIA
ELLA D COTTRELL
Peoples Bank
150 Bigley Road
Spencer, WV 25276
My Commission Expires December 07, 2025

4708700985

APPENDIX E

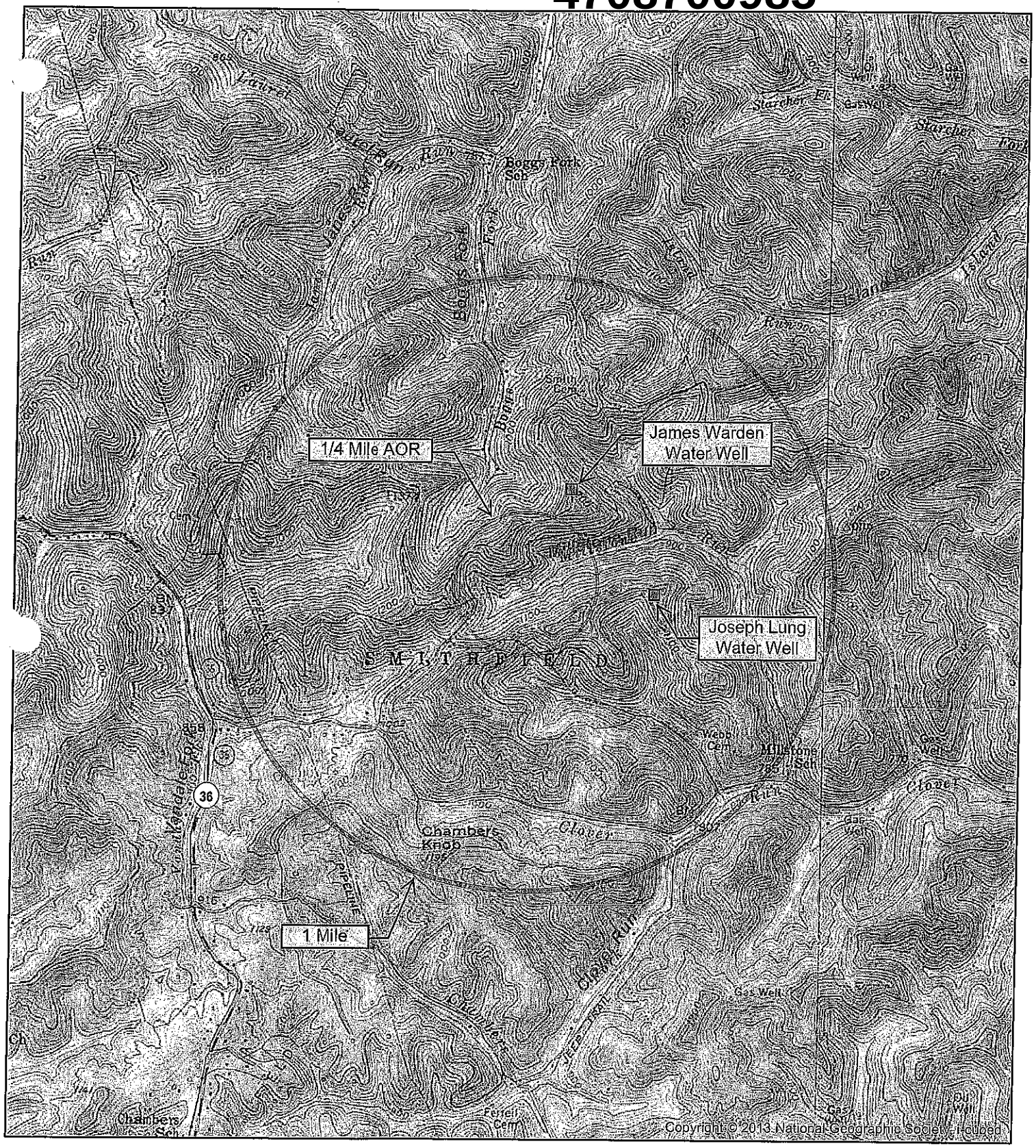
Water Sources

Operator: Delta Helix Energy Year: 2024 UIC Permit: 2D08700985

		Source # 1	Source# 2
Water Source Name		Joseph Lung	James Warden
Norhting		4,289,922.12	4,290,238.23
Easting		477,868.12	477,263.23
Parameter	Units		
Chloride	mg/L	4.9	5.8
Bromide	mg/L	0.10	0.10
Strontium	mg/L	0.093	0.054
Barium	mg/L	0.051	0.14
Iron	mg/L	0.050	0.76
Total Dissolved Solids	mg/L	254	210
pH	SI Units	8.57	6.93
Manganese	mg/L	0.0081	0.10
Aluminum	mg/L	0.020	0.020
Arsenic	mg/L	0.020	0.020
Sodium	mg/L	101	66.3
Calcium	mg/L	2.4	8.5
Sulfate	mg/L	5.0	5.1
MABAS	mg/L	ND	ND

DOMESTIC WATER ANALYSES

4708700985



0 1,000 2,000 4,000 Feet

N

Delta Helix Energy, LLC

Wm Kaufman W-7
Section 7 AOR
Clover Injection System

Roane County, WV

Fig No 8

TABLE 1A. Chemical water quality for stations (KJL) and (KJW) associated with HG Energy's Kaufman Sites. Kirk Environmental, LLP., October 31, 2024.

PARAMETER	SAMPLING STATION	
	KJL	KJW
Field Water Temperature (°C)	16.4	18.0
Field Dissolved Oxygen (mg/L)	7.08	3.64
Field pH (SI Units)	8.57	6.93
Field Conductivity (µS)	561.1	434.0
Aluminum (mg/L)	< 0.020	< 0.020
Arsenic (mg/L)	< 0.020	< 0.020
Barium (mg/L)	0.051	0.14
Calcium (mg/L)	2.4	8.5
Total Iron (mg/L)	< 0.050	0.76
Manganese (mg/L)	0.0081	0.10
Sodium (mg/L)	101	66.3
Strontuum (mg/L)	0.093	0.054
TDS (mg/L)	254	210
Bromide (mg/L)	< 0.10	< 0.10
Chloride (mg/L)	4.9	5.8
Sulfate (mg/L)	< 5.0	5.1

KJL = Joseph Long USDW

KJW = James Warden USDW

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

Laboratory Report

ED KIRK
KIRK ENVIRONMENTAL,LLP
PO BOX 1783
Beaver, WV 25813

Report Date: 11/26/2024
Date Received: 10/31/2024

Project: KAUFMAN SITES
Pace Project No.: 30730511

Sample: KJL Joe Lung **Lab ID: 30730511001** Collected: 10/31/24 11:55 Matrix: Water

Method	Parameters	Results	Units	Report Limit	Analyzed	Qualifiers
EPA 200.7	Aluminum	ND	mg/L	0.020	11/04/24 17:08	
EPA 200.7	Arsenic	ND	mg/L	0.020	11/04/24 17:08	
EPA 200.7	Barium	**0.051**	mg/L	0.0050	11/04/24 17:08	
EPA 200.7	Calcium	**2.4**	mg/L	0.50	11/04/24 17:08	
EPA 200.7	Iron	ND	mg/L	0.050	11/04/24 17:08	
EPA 200.7	Manganese	**0.0081**	mg/L	0.0050	11/04/24 17:08	
EPA 200.7	Sodium	**101**	mg/L	0.50	11/04/24 17:08	
EPA 200.7	Strontium	**0.093**	mg/L	0.010	11/04/24 17:08	N2
SM 2540C-2015	Total Dissolved Solids	**254**	mg/L	10.0	11/01/24 18:20	
EPA 300.0, Rev 2.1	Bromide	ND	mg/L	0.10	11/20/24 21:28	
EPA 300.0, Rev 2.1	Chloride	**4.9**	mg/L	1.0	11/20/24 21:28	
EPA 300.0, Rev 2.1	Sulfate	ND	mg/L	5.0	11/20/24 21:28	
	Collected By	**EK**			11/01/24 09:53	
	Field pH	**8.57**	Std. Units		11/01/24 09:53	
	Field Temperature, C	**16.4**	deg C		11/01/24 09:53	
	Field Specific Conductance	**561.1**	umhos/cm		11/01/24 09:53	
	Oxygen, Dissolved	**7.08**	mg/L		11/01/24 09:53	

Sample: KJW James Worden **Lab ID: 30730511002** Collected: 10/31/24 12:45 Matrix: Water

Method	Parameters	Results	Units	Report Limit	Analyzed	Qualifiers
EPA 200.7	Aluminum	ND	mg/L	0.020	11/04/24 17:10	
EPA 200.7	Arsenic	ND	mg/L	0.020	11/04/24 17:10	
EPA 200.7	Barium	**0.14**	mg/L	0.0050	11/04/24 17:10	
EPA 200.7	Calcium	**8.5**	mg/L	0.50	11/04/24 17:10	
EPA 200.7	Iron	**0.76**	mg/L	0.050	11/04/24 17:10	
EPA 200.7	Manganese	**0.10**	mg/L	0.0050	11/04/24 17:10	
EPA 200.7	Sodium	**66.3**	mg/L	0.50	11/04/24 17:10	
EPA 200.7	Strontium	**0.054**	mg/L	0.010	11/04/24 17:10	N2
SM 2540C-2015	Total Dissolved Solids	**210**	mg/L	10.0	11/01/24 18:20	
EPA 300.0, Rev 2.1	Bromide	ND	mg/L	0.10	11/20/24 21:48	
EPA 300.0, Rev 2.1	Chloride	**5.8**	mg/L	1.0	11/20/24 21:48	
EPA 300.0, Rev 2.1	Sulfate	**5.1**	mg/L	5.0	11/20/24 21:48	
	Collected By	**EK**			11/01/24 09:56	
	Field pH	**6.93**	Std. Units		11/01/24 09:56	
	Field Temperature, C	**18.0**	deg C		11/01/24 09:56	
	Field Specific Conductance	**434.0**	umhos/cm		11/01/24 09:56	
	Oxygen, Dissolved	**3.64**	mg/L		11/01/24 09:56	

Sample: KPW **Lab ID: 30730511003** Collected: 10/31/24 10:50 Matrix: Water

Method	Parameters	Results	Units	Report Limit	Analyzed	Qualifiers
EPA 200.7	Aluminum	**0.29**	mg/L	0.20	11/05/24 13:38	

Pace Analytical™

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY - Affix Workor

WO#: 30730511

ALL SHADE

30730511

Company: Kirk Environmental

Address:

Billing Information:

Report To: Ed Kirk

Email To:

Copy To: Crystal Bennett

Site Collection Info/Address:

Customer Project Name/Number: Kaufman sites

State: / County/City: Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET

Phone:
Email:

Site/Facility ID #:

Compliance Monitoring? [X] Yes [ ] No

Collected By (print): Ed Kirk

Purchase Order #:
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature): Ed J. Kirk

Turnaround Date Required: Normal

Immediately Packed on Ice: [X] Yes [ ] No

Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: ____ [ ] Hold: ____

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [X] No

Analysis: ____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Container Preservative Type: 4 | 1

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ____

Analyses: Chloride, Bromide, Strontium, Barium; Fe, Mn, Al, As, Na, Ca, Sulfate; TDS

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Chloride, Bromide, Strontium, Barium	Fe, Mn, Al, As, Na, Ca, Sulfate	TDS
KJL	GW	grab	10/31/24	1155				3	X	X	X
KJW	GW	grab	10/31/24	1245				3	X	X	X

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:
KJL: DO 7.08; pH 8.57; cond 561.1 temp 16.4
KJW: DO 3.64; pH 6.93; cond 434.0 temp 18.0

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2959225

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: 2a
Cooler 1 Temp Upon Receipt: 4 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 4 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Ed J. Kirk	10/31/24 1530	10-31-24	1530
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workor

WO#: 30730511

ALL SHADE!

30730511

Company: Kirk Environmental

Address:

Billing Information:

Report To: Ed Kirk

Email To:

Copy To: Crystal Bennett

Site Collection Info/Address:

Customer Project Name/Number: Kaufman sites

State: / County/City: Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET

Phone:
Email:

Site/Facility ID #:

Compliance Monitoring? [X] Yes [ ] No

Collected By (print): Ed Kirk

Purchase Order #:
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature): Ed K Kirk

Turnaround Date Required: normal

Immediately Packed on Ice: [X] Yes [ ] No

Sample Disposal:
[X] Dispose as appropriate [ ] Return
[ ] Archive: _____
[ ] Hold: _____

Rush:
[ ] Same Day [ ] Next Day
[ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day
(Expedite Charges Apply)

Field Filtered (if applicable):
[ ] Yes [X] No
Analysis: _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Container Preservative Type: 4 1

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Analyses: Chloride, Bromide, Sulfate, Barium; Fe, Mn, Al, As, Na, Ca, Sulfide; TDS

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

LAB USE ONLY:
Lab Sample # / Comments:

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Chloride, Bromide, Sulfate, Barium	Fe, Mn, Al, As, Na, Ca, Sulfide	TDS
KJL	GW	grab	10/31/24	1155				3	X	X	X
KJW	GW	grab	10/31/24	1245				3	X	X	X

Received by Pace Greensburg 10/1-4/24
Therm ID 19 Corr Factor +0.05
Receipt Temp 2.4
Corrected Temp 2.4
Correct Preservation - Y/N
Res. Chlorine - Y/N Lot#
Rad Samples Screened <0.05 mrem/hr - Y/N
Survey Meter 2504366

Customer Remarks / Special Conditions / Possible Hazards:
KJL: DO 7.08; pH 8.57; cond 561.1 temp 16.4
KJW: DO 8.64; pH 6.93; cond 434.0 temp 18.0

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2959225

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: 26
Cooler 1 Temp Upon Receipt: 4 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 4 oC
Comments:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: _____ of: _____

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Ed K Kirk	10/31/24 1530	10-31-24	1530
Relinquished by/Company: (Signature) Nicely's Del. Service	11-1-24 23:00	Received by/Company: (Signature) Pace	11-1-24 23:00
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Page 9 of 27

Pace Analytical Services, LLC
225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

Laboratory Report

ED KIRK
KIRK ENVIRONMENTAL,LLP
PO BOX 1783
Beaver, WV 25813

Report Date: 12/18/2024
Date Received: 12/13/2024

Project: KAUFMAN HOMES
Pace Project No.: 30742291

Sample: KAUFMAN JI LUNG **Lab ID: 30742291001** Collected: 12/13/24 10:20 Matrix: Water

Method	Parameters	Results	Units	Report Limit	Analyzed	Qualifiers
SM5540C-2011	LAS Molecular Weight, g/mol	**340**			12/17/24 12:28	H1,H2
SM5540C-2011	MBAS, Calculated as LAS	ND	mg/L	0.10	12/17/24 12:28	H1,H2,M1,R1

Sample: KAUFMAN JI WODEN **Lab ID: 30742291002** Collected: 12/13/24 10:30 Matrix: Water

Method	Parameters	Results	Units	Report Limit	Analyzed	Qualifiers
SM5540C-2011	MBAS, Calculated as LAS	ND	mg/L	0.10	12/17/24 12:28	H1,H2
SM5540C-2011	LAS Molecular Weight, g/mol	**340**			12/17/24 12:28	H1,H2

ANALYTE QUALIFIERS

H1	Analysis conducted outside the EPA method holding time.
H2	Extraction or preparation conducted outside EPA method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.

Reviewed by: Beth Johnson

Beth Johnson
(800)999-0105
beth.johnson@pacelabs.com

Pace Analytical Services Beaver
225 Industrial Park Road, Beaver, WV 25813
Virginia VELAP 460148
West Virginia DEP 060
West Virginia DHHR 00412CM

North Carolina DEQ 466
Kentucky Wastewater Certification KY90039
Pennsylvania DEP 68-00839

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Log MTJL L

WO#: 30742291

30742291

ALL SHADED ARE

Company: Kirk Environmental

Billing Information:

Address:

Report To: Ed Kirk

Email To: Ed@KirkEnvironmental.US

Copy To: Crystal Bennet

Site Collection Info/Address:

Customer Project Name/Number: Kaufman Homes

State: WV County/City: Time Zone Collected: [ ] PT [ ] MT [ ] CT [✓] ET

Phone:
Email:

Site/Facility ID #:

Compliance Monitoring? [✓] Yes [ ] No

Collected By (print): Jason Shuttlesworth

Purchase Order #:
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature): Jason Shuttlesworth

Turnaround Date Required:

Immediately Packed on Ice: [✓] Yes [ ] No

Sample Disposal:
[ ] Dispose as appropriate [ ] Return
[ ] Archive: _____
[ ] Hold: _____

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [✓] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [ ] No
Analysis: _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Container Preservative Type **: U

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Analyses: MBAS

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns
Kaufman J. Lang	W	G	12/13/2024	1020				1
Kaufman J. Warden	W	G		1030				1

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2950253

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: 5
Cooler 1 Temp Upon Receipt: 2.4 oC
Cooler 1 Therm Corr. Factor: -0.1 oC
Cooler 1 Corrected Temp: 2.5 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Jason Shuttlesworth	12/13/2024 1311	BMM / PACE	12/13/24 13:11
BMM / PACE	12/13/24 14:00	[signature]	12-13-24 14:00
[signature]	12-13-24 1600	[signature]	12-13-24 1600

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

[signature] 12-13-24 1800

12-13-24 1800

Notes _____ Profile # 15528

Client _____

Sample Line Item	Matrix	AG1H	AG1U	AG2S	AG3S	AG4U	BP1N	BP1U	BP1Z	BP2N	BP2S	BP2U	BP3B	BP3N	BP3S	BP3U	BP4N	BP4O	CG3H	WGKU	WGFU	CG1U	AG74	DG9H	DG9S	DG9U	VG9A	VG9B	VG9H	VG9U	GN	SP5T	ZPLC			
1																																				
2																																				
3																																				
4																																				
5																																				
6																																				
7																																				
8																																				
9																																				
10																																				
11																																				
12																																				

Glass

DG9H	40mL HCl amber voa vial	GBOD	300mL BOD Glass Stopper
DG9M	40mL MeOH clear vial	WGKU	8oz clear soil jar
DG9P	40mL TSP amber vial	WGFU	4oz clear soil jar
DG9S	40mL H_2SO_4 amber vial	BJFU	4oz unpreserved amber wide
DG9T	40mL Na Thio amber vial	CG3H	250mL clear glass HCl
DG9U	40mL amber unpreserved	AG1H	1L HCl amber glass
VG9A	40mL Asc Acid glass	AG1S	1L H_2SO_4 amber glass
VG9B	40mL Sodium Bisulfate glass	AG1U	1liter unpres amber glass
VG9C	40mL NaOH clear vial	AG2S	500mL H_2SO_4 amber glass
VG9H	40mL HCl clear vial	AG3S	250mL H_2SO_4 amber glass
VG9T	40mL Na Thio. clear vial	AG3U	250mL unpres amber glass
VG9U	40mL unpreserved clear vial	AG74	60mL amber glass NH4Cl
		AG4U	100mL unpres amber glass

Plastic

BP1N	1L HNO_3 plastic
BP1S	1L H_2SO_4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn Acetate
BP2A	500mL NaOH,Asc Acid plastic
BP2N	500mL HNO_3 plastic
BP2S	500mL H_2SO_4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Acetate
BP3B	250mL NaOH plastic
BP3N	250mL HNO_3 plastic
BP3U	250mL unpreserved plastic
BP3S	250mL H_2SO_4 plastic
BP4N	125mL HNO_3 plastic
BP4O	125mL (NH4) 2SO4/NH4OH plastic

Misc.

I	Wipe/Swab
SP5T	120mL Coliform Na Thiosulfate
ZPLC	Ziploc Bag
GN	General Unpreserved
GNN	General Nitric
GNS	General Sulfuric

Matrix

WT	Water
SL	Solid
OL	Non-aqueous liquid
WP	Wipe
DW	Drinking Water

WO#: 30742291

PM: BMJ Due Date: 12/31/24
CLIENT: BV-KIRKENV

LIMS30 Lab Sample Condition Upon Receipt (West Virgi

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ 3rd Party Courier ☑ Pace ☐ Other _____

Tracking #: _____

Custody Seal on Cooler/Box/Containers Present: ☐ yes ☐ no Seals intact: ☐ yes ☐ no

Thermometer Used 24 **Type of Ice:** (Wet) Blue None

Cooler Temperature **Observed Temp** 0.8 °C Correction Factor: 0.0 °C Final Temp: 0.8 °C

Thermal Preservation Requirement Met Yes ☑ No ☐

pH paper Lot#	Date and Initials of person examining contents:

	Yes	No	N/A		
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:	✓	on		8. 5 Day	
Sufficient Volume:	✓			9.	
Correct Containers Used: -Pace Containers Used:	✓			10.	
Containers Intact:	✓			11.	
Orthophosphate field filtered:			✓	12.	
Hex Cr Aqueous sample field filtered: -pH adjusted within 24 hours? (If yes, indicate acid lot #)			✓ ✓	13.	
Filtered volume received for Dissolved tests:			✓	14.	
All containers have been checked for chemical preservation: exceptions: VOA, coliform, O&G, LLMercury, Non-aqueous matrix			✓	15.	
All containers meet method/chemical preservation requirements:			✓	Initial when completed	Date:
				Tests not preserved:	
Headspace in VOA Vials:			✓	16.	
Trip Blank Present:			✓	17.	
				Initial when completed: AW	Date: 12/13/24

Comments: _____

*PM review is documented electronically in LIMS, when the Project Manager closes the SRF Review schedule in LIMS. The status may be reviewed in the Status section of the Workorder Edit Screen.

Section 8

Geological Data Injection and Confining Zones

Section No. 8

The Clover Field is located on the western flank of the Arches Fork Anticline. The reservoir boundary, as determined from early drilling, was controlled on the west and down dip by water and on the east and up dip by a decrease in permeability. The Big Injun Sandstone is the productive interval in this field. The Keener is a very fine grained to coarse grained, tightly cemented, with very low permeability, sandstone. The Keener grades into the oil productive Pocono Big Injun Sandstone. The Big Injun is light gray to light green, very fine to medium grained, moderate to well sorted, sub angular, calcite or dolomite cemented sandstone. The Big Lime overlays the Keener and the Pocono Shale underlies the Big Injun. Both are thick impermeable formations. The Big Injun Sandstone on the Kaufman lease can be described as follows:

Gross Sand thickness: 24'

Pay thickness:12.5'

Permeability: .8 md

Porosity: 15%

Connate water saturation: 65%

The full core report from W M Kaufman No. 7 is included in the Department of the Interior Report No. 6992 and is shown in Figure No. 5. Also included in the report are isopach and structure maps of the Big Injun that include the area surrounding this injection well.

A search of the West Virginia Geologic and economic Survey web site revealed data on earthquakes from 1824-2023. There was one event recorded in western Roane County in 2016 (2.51 magnitude). Kanawha and Jackson Counites also recorded a small number of quakes. All the recorded quakes were 20 miles or further from this injection well. A copy of this data is shown in the attached Fig No. 9.

Water injection (both Disposal and Secondary recovery) projects have been active in Roane County since the 1960's. Water injection in the Clover Field has been active since the 1970's with no known cases of induced seismic activity.

The accumulated volume of produced water injected into this well as of 9/30/2024 is 177,120 bbls. Based on this volume and the following reservoir characteristics:

Gross thickness- 33'

Net thickness (pay) -10'

Porosity- 15%

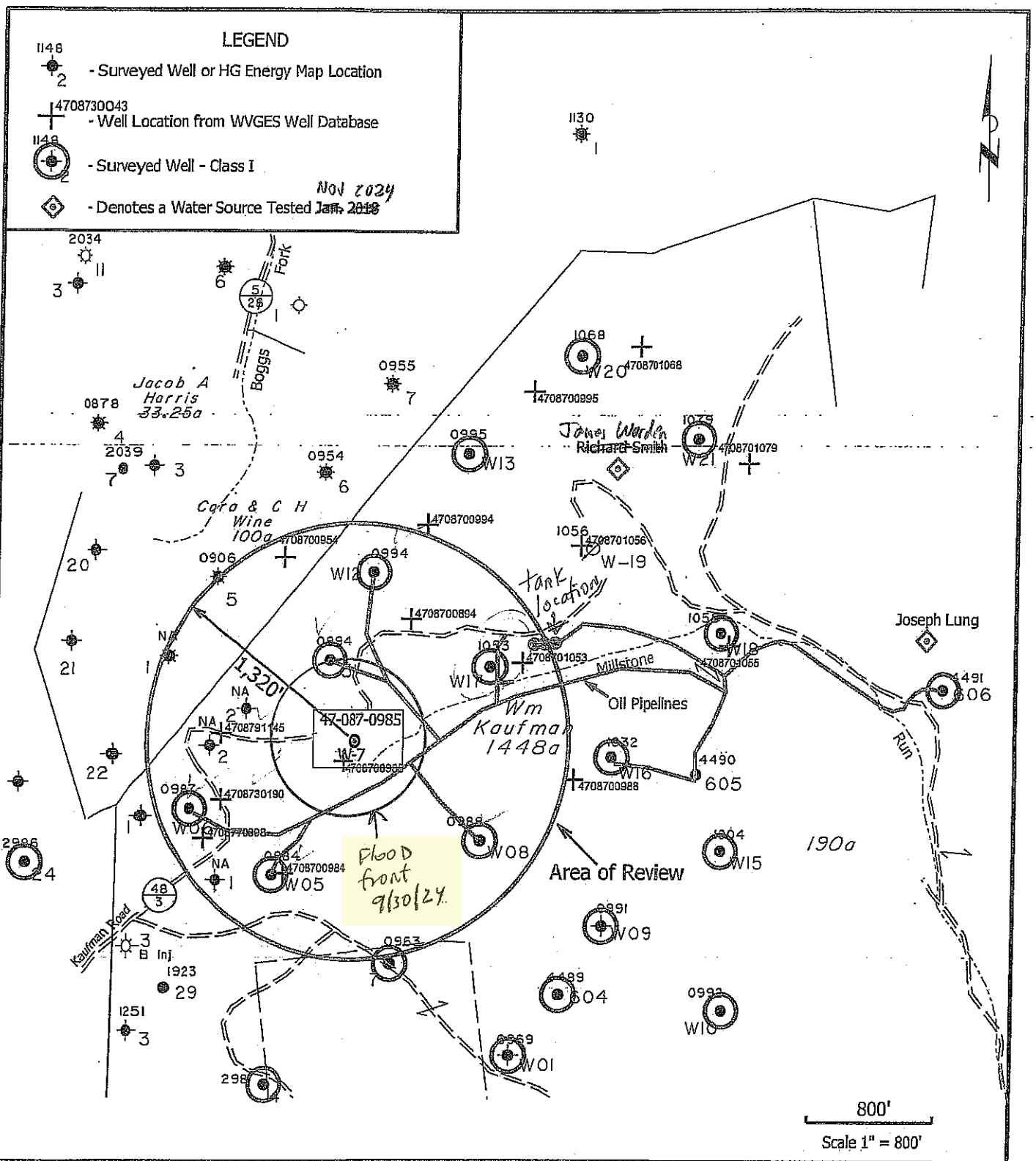
Water saturation – 32%

The Fluid flood front is 460' from the well bore of this injection well.

Section No. 8 (cont)

Fig No. 3 shows the calculated radial distance the water injected into this well has moved in the Big Injun formation. Assuming 2000 barrels of water are injected into this well in a years' time over the next 5 years the flood front would advance an additional 12' to 472' from the injection well W M Kaufman W-7.

4708700985



- CLOVER FIELD -
Injection Wells

Wm. Kaufman No.W-7 (47-087-00985)

ROANE CO., WV

Map Showing All Known Wells
Within the Quarter-Mile AOR
& WVGES Well Data Spots

Fig No 3

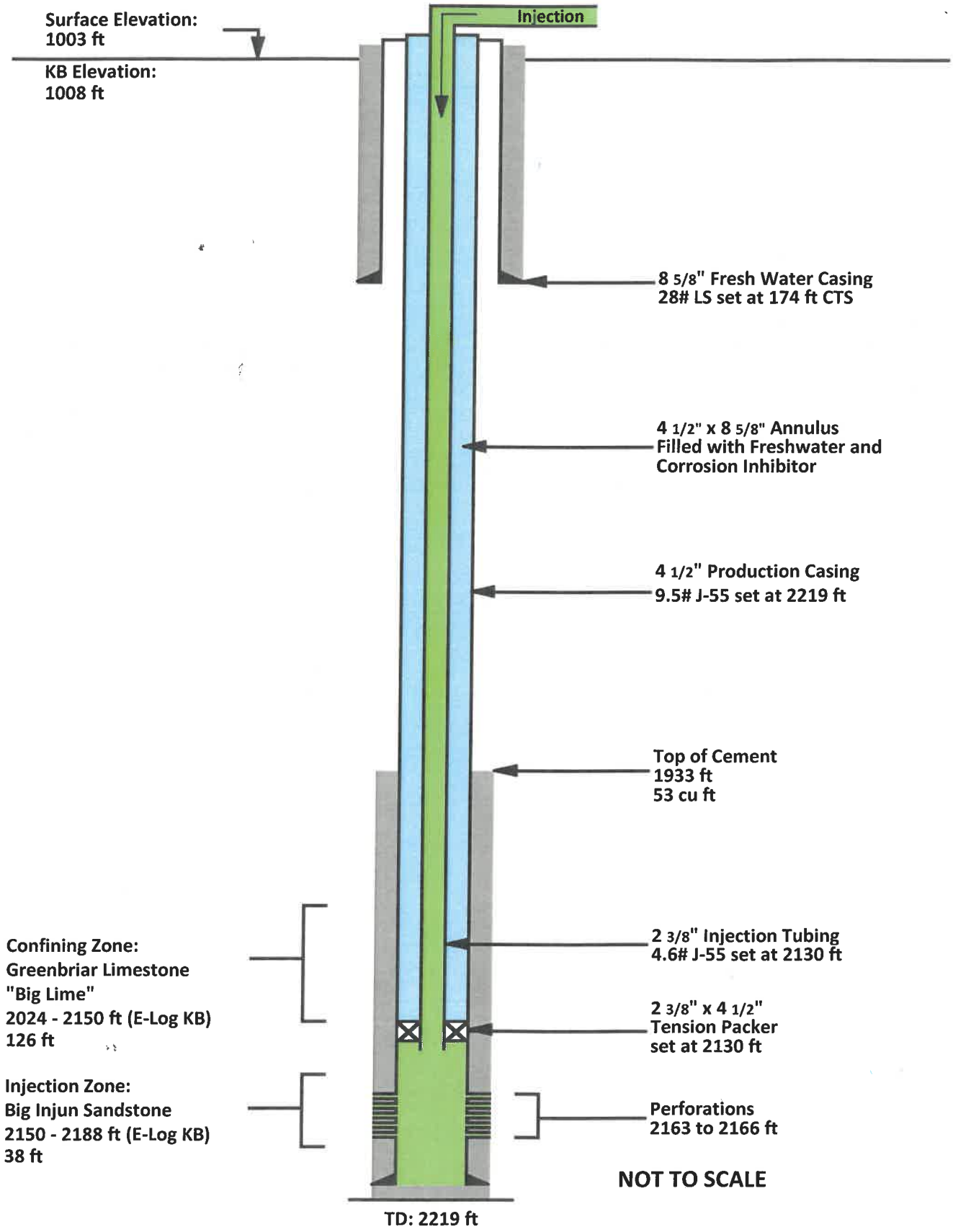
1/29/2018

HG ENERGY LLC

Well Bore Diagram

W.M. Kaufman W-7
API 47-087-00985

Delta Helix Energy, LLC
UIC 2D08700985-003



4708700985

Mc Collough

SCINTILLOMETER

GAMMA RAY LOG

R04-985

COMPANY HOLBERT OIL & REFINING COMPANY

WELL KAUFMAN #2 W-7

FIELD GLOVER POOL

COUNTY ROANE STATE W. VIRGINIA

LOCATION:

OTHER SERVICES:

PLUNG NO. H-14441

PERMANENT DATUM	SEC. TWP. RGE. ELEV. 1003.40'
LOG MEASURED FROM	5' ABOVE PERMANENT DATUM
DRILLING MEASURED FROM	G.L.
DATE	11-28-63
RUN NO.	1
TYPE LOG	GAMMA RAY
DEPTH—DRILLER	2218'
DEPTH—LOGGER	2220'
BOTTOM LOGGED INTERVAL	2220'
TOP LOGGED INTERVAL	2118'
TYPE FLUID IN HOLE	MUD
SALINITY, PPM CL	
DENSITY LB./GAL.	
LEVEL	
MAX. REC. TEMP. DEG. F	
OPR. RIG TIME	3 HOURS
RECORDED BY	[illegible]
WITNESSED BY	MR. [illegible]

ELEVATIONS: KB. 1008.40' DF. GL. 1003.40'

BORE HOLE RECORD

RUN NO.	BIT	FROM	TO	SIZE	WGT.
1	10-5/8	0'	172'	8-5/8	
	7-7/8	172'	2219'		

CASING RECORD

SIZE	WGT.	FROM	TO
8-5/8		0'	172'

FOLD HERE

THIS HEADING AND LOG CONFORMS TO API RECOMMENDED STANDARD PRACTICE RP-34

EQUIPMENT DATA

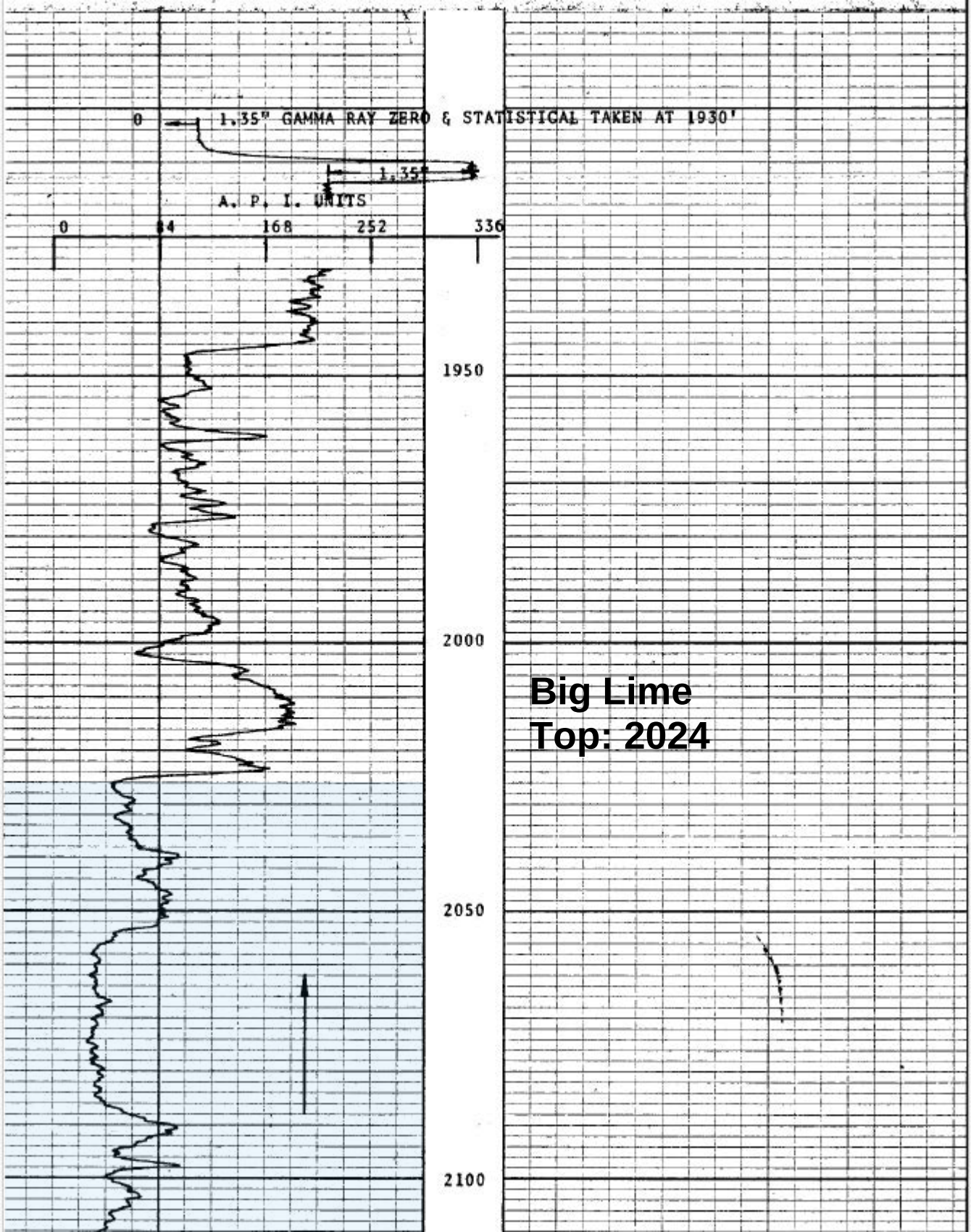
GAMMA RAY				NEUTRON			
RUN NO.	1			RUN NO.			
TOOL MODEL NO.	G-133-C			LOG TYPE			
DIAM.	1.5"			TOOL MODEL NO.			
DETECT. MODEL NO.	133			DIAM.			
TYPE	SCINT			DETECT MODEL NO.			
LENGTH	1"			TYPE			
DIST. TO N. SOURCE				LENGTH			
GENERAL				SOURCE MODEL NO.			
HOIST TRUCK NO.	2086			SERIAL NO.			
INST. TRUCK NO.	2086			SPACING			
TOOL SERIAL NO.	D-8			TYPE			
LOG TICKET NO.	B-15073			STRENGTH			

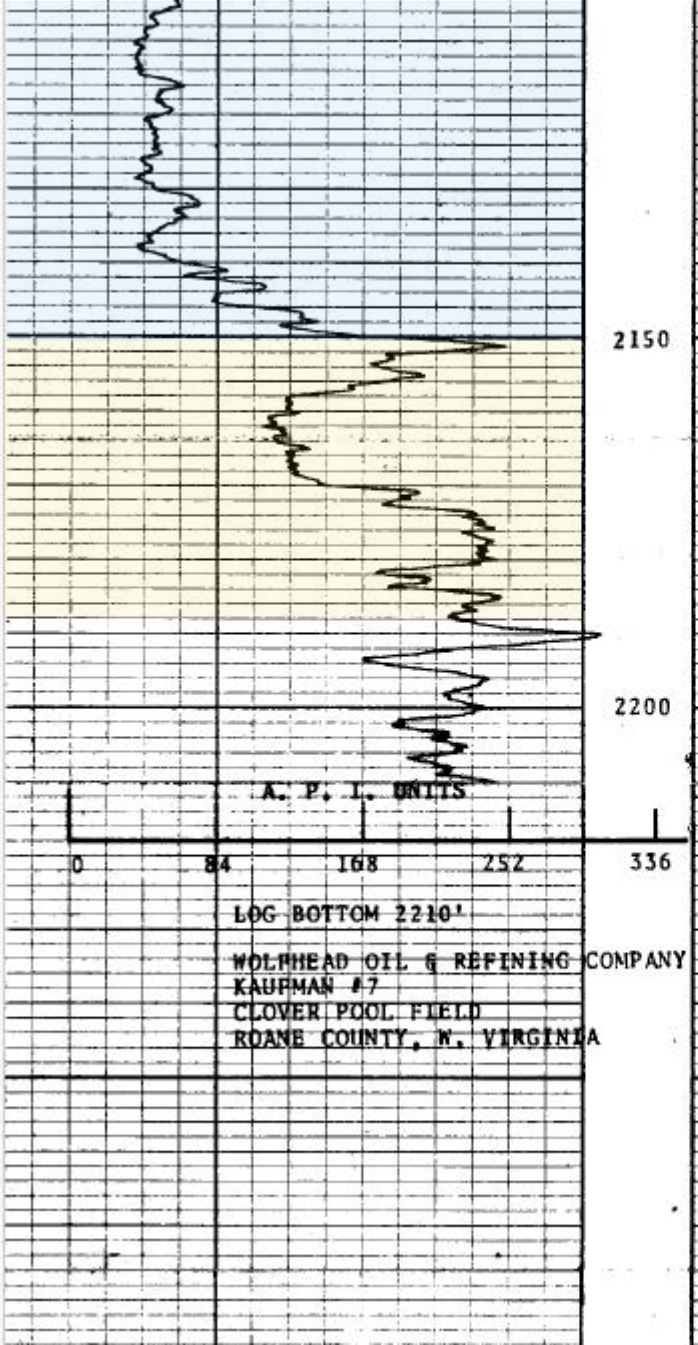
LOGGING DATA

GENERAL					GAMMA RAY			NEUTRON			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED FT./MIN.	T.C. SEC.	SENS. SETTINGS	ZERO DIV. L. or R.	API G.R. UNITS PER LOG DIV.	T.C. SEC.	SENS. SETTINGS	ZERO DIV. L. or R.	API N. UNITS PER LOG DIV.
1	2216	2150	18	1.8	D-150	L-4	21				
2	2000	15			D-150	L-3.5					
					R-7A						

REFERENCE LITERATURE:

REMARKS:

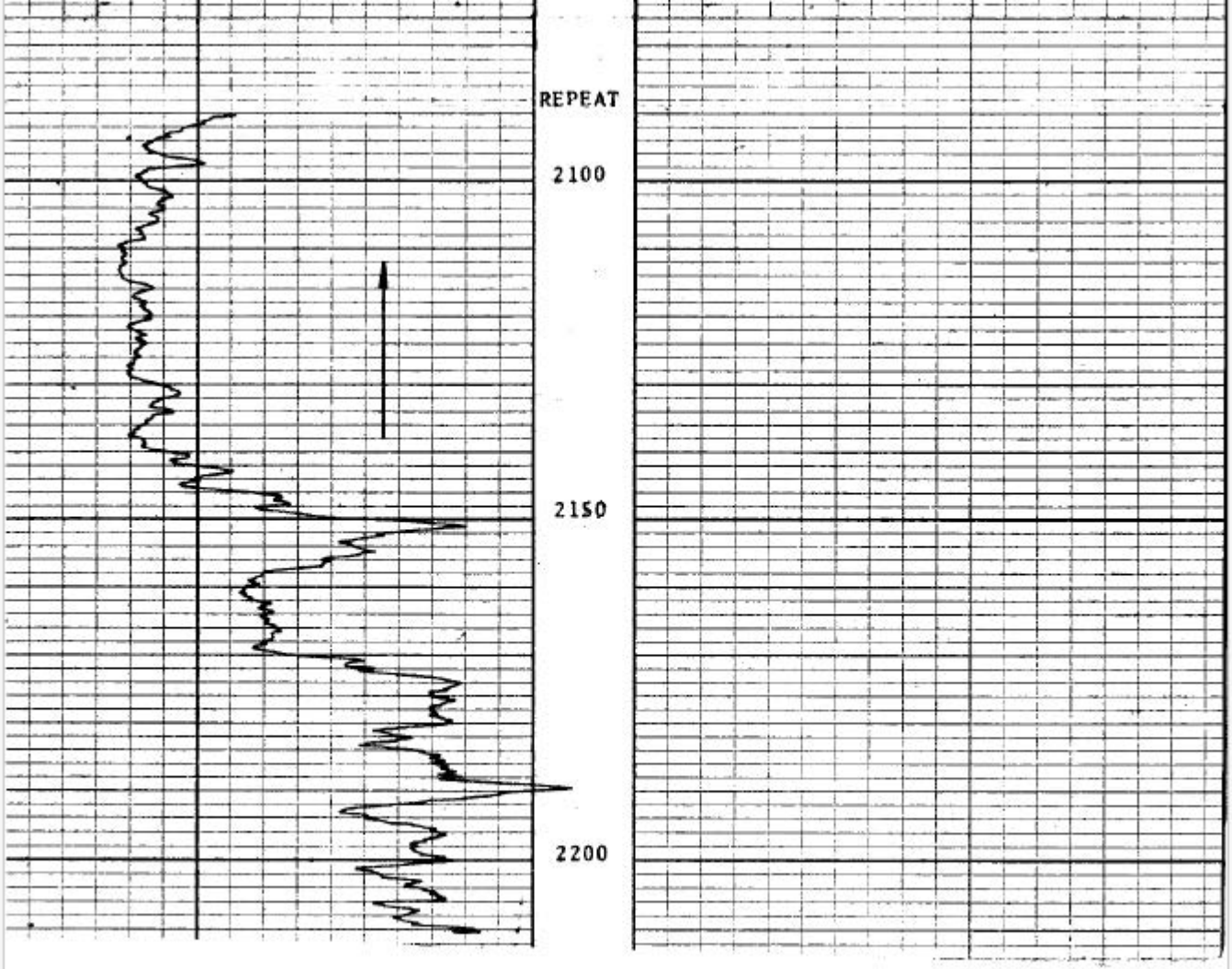

0
1.35" GAMMA RAY ZERO & STATISTICAL TAKEN AT 1930'
1.35"
A. P. I. UNITS
0
84
168
252
336
1950
2000
2050
2100
Big Lime
Top: 2024



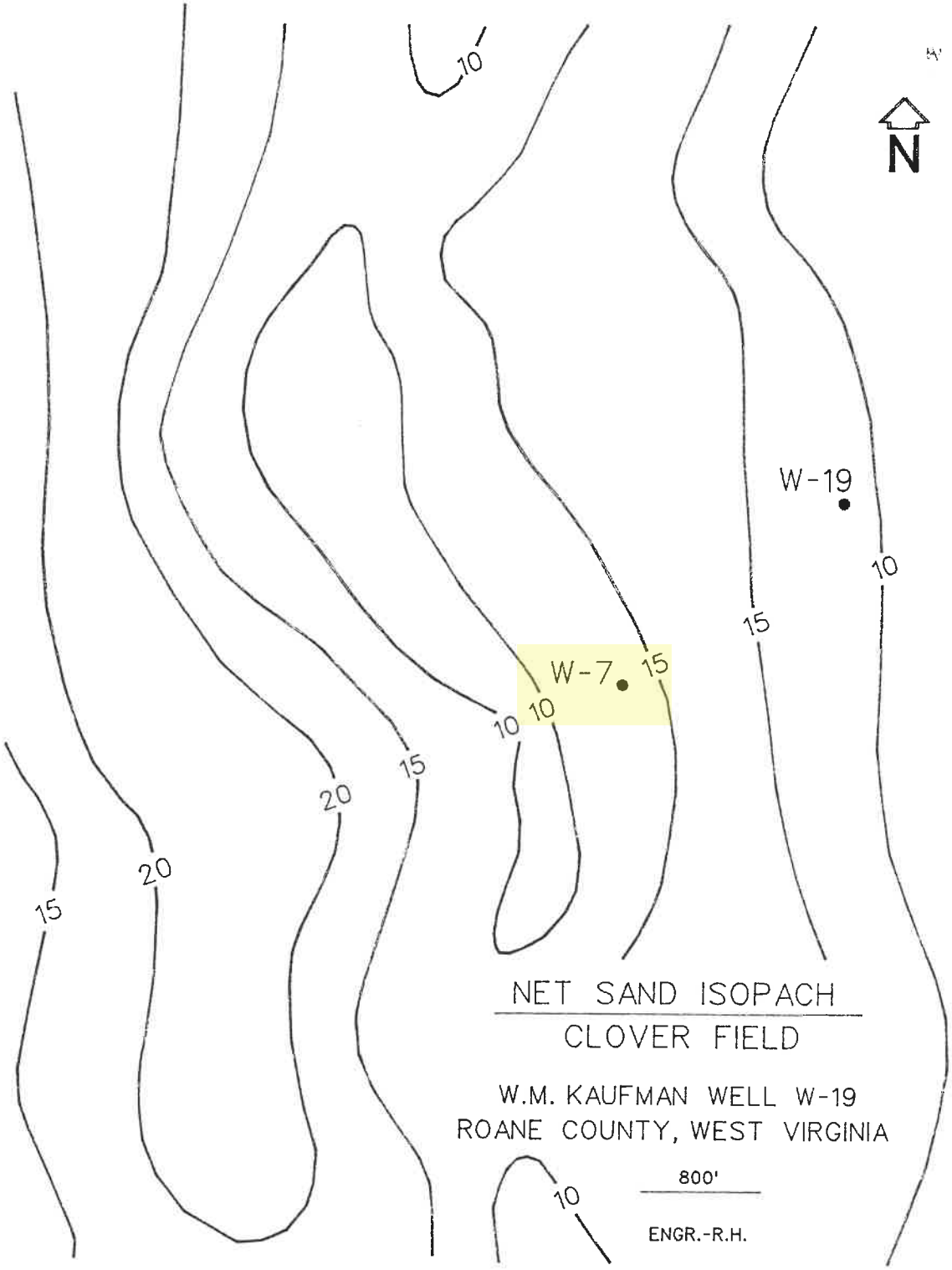
Big Lime
Bottom: 2150

Big Injun
Top: 2150
Bottom: 2188

2150
2016
34


REPEAT
2100
2150
2200

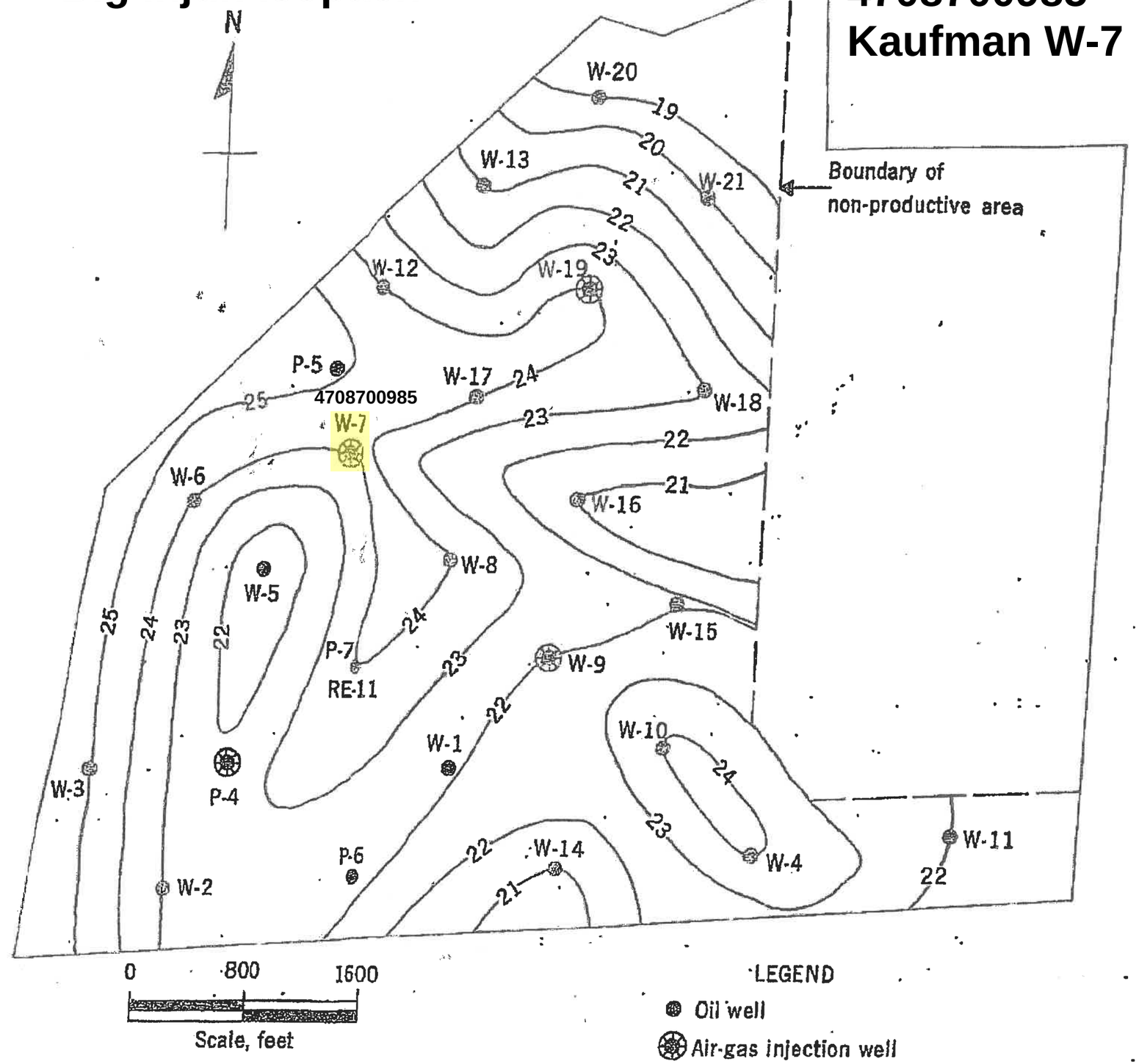
4708700985 W-7
4708701056 W-19



Pay Sand

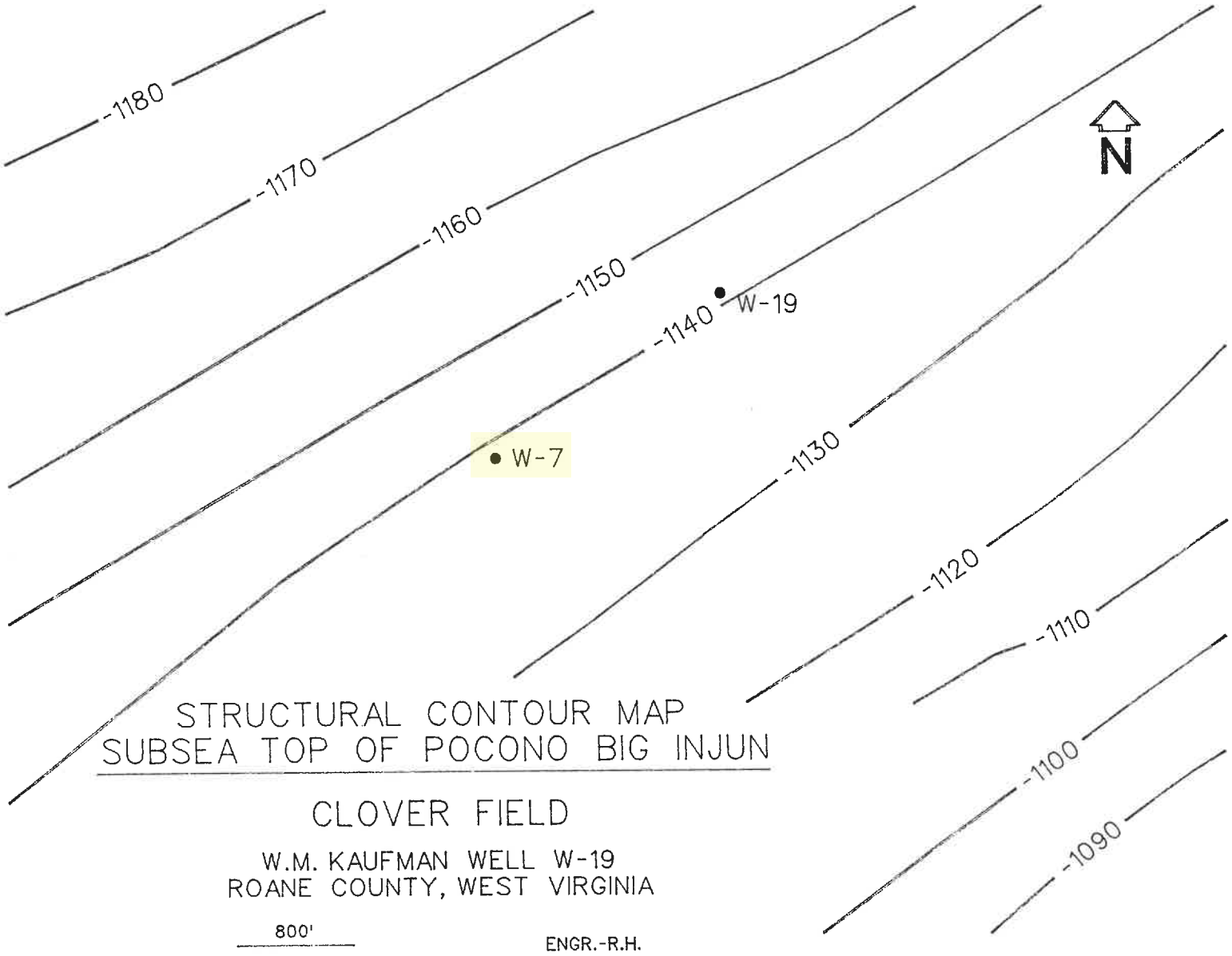
Big Injun Isopach

4708700985 Kaufman W-7

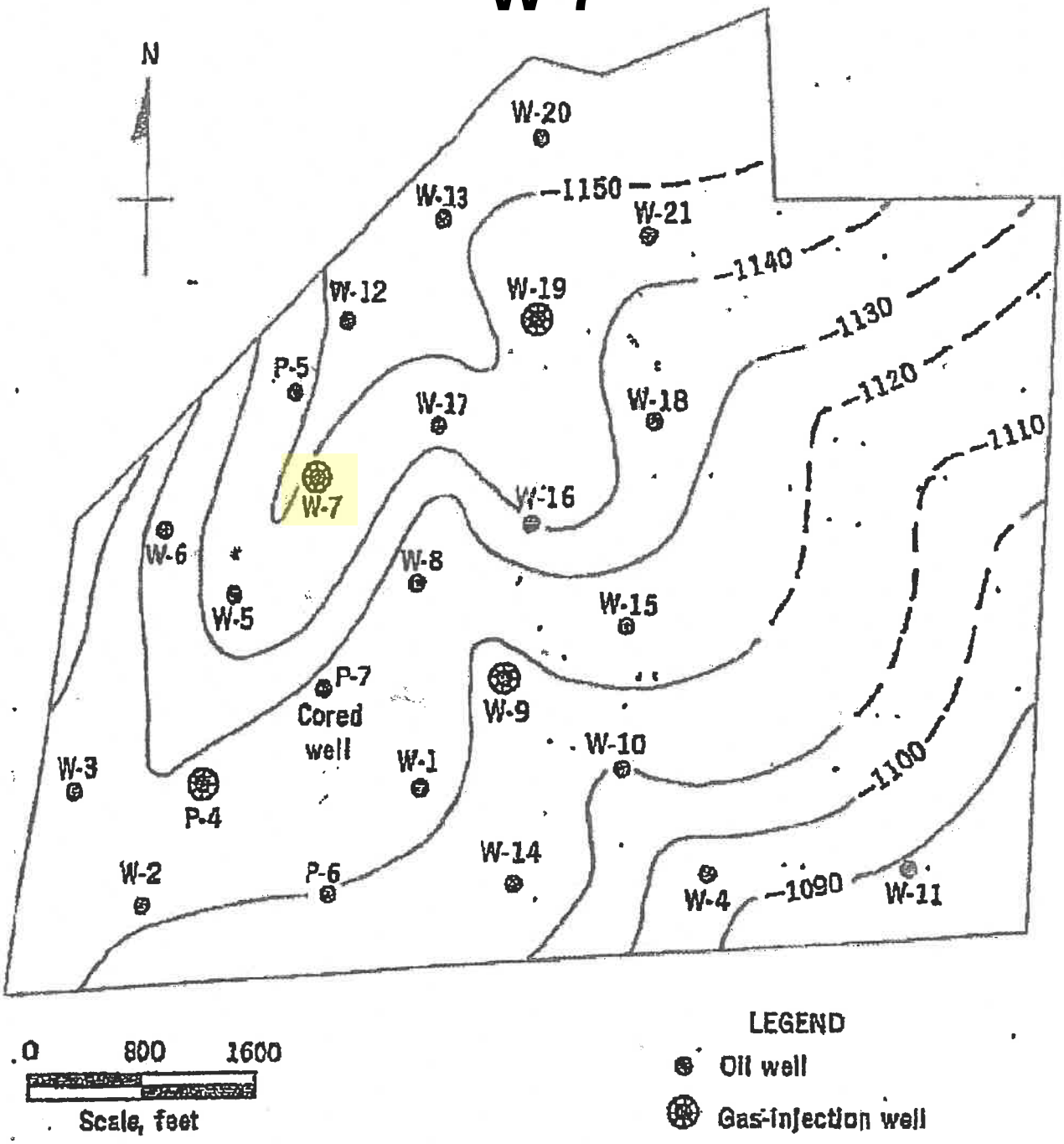


Isopachous Map of the Big Injun Sand, William Kaufman Lease, Clover-Rush Run Oilfield.

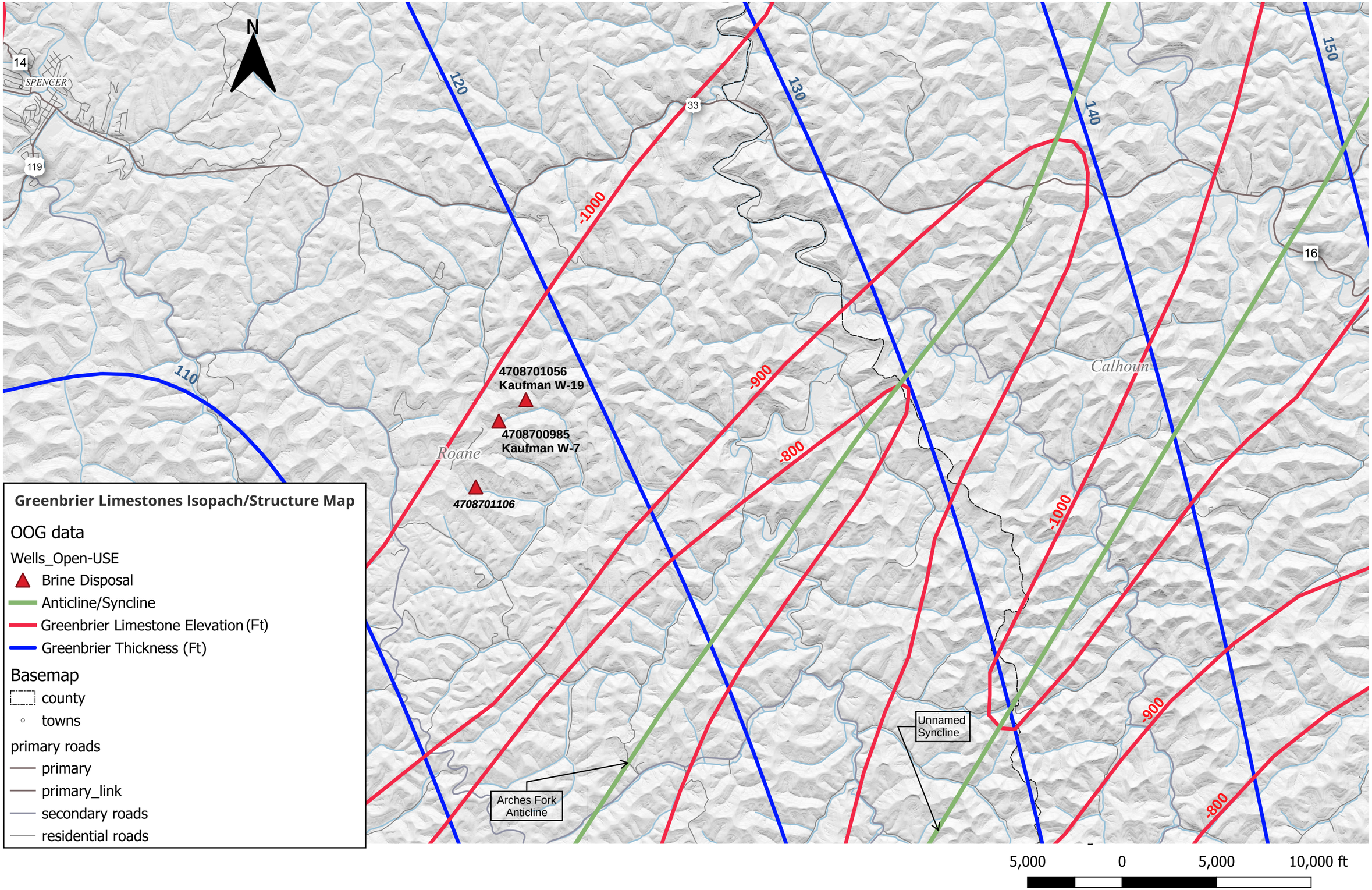
4708700985 W-7
4708701056 W-19



4708700985
W-7



- Structure Contour Map on Top of Big Injun Sand, William Kaufman Lease, Clover-Rush Run Oilfield.


N
14
SPENCER
119
33
16
120
130
140
150
110
-1000
-900
-800
-1000
-900
-800
Calhoun
Roane
4708701056
Kaufman W-19
4708700985
Kaufman W-7
4708701106
Unnamed Syncline
Arches Fork Anticline
Greenbrier Limestones Isopach/Structure Map
OOG data
Wells_Open-USE
Brine Disposal
Anticline/Syncline
Greenbrier Limestone Elevation (Ft)
Greenbrier Thickness (Ft)
Basemap
county
towns
primary roads
primary
primary_link
secondary roads
residential roads
5,000
0
5,000
10,000 ft

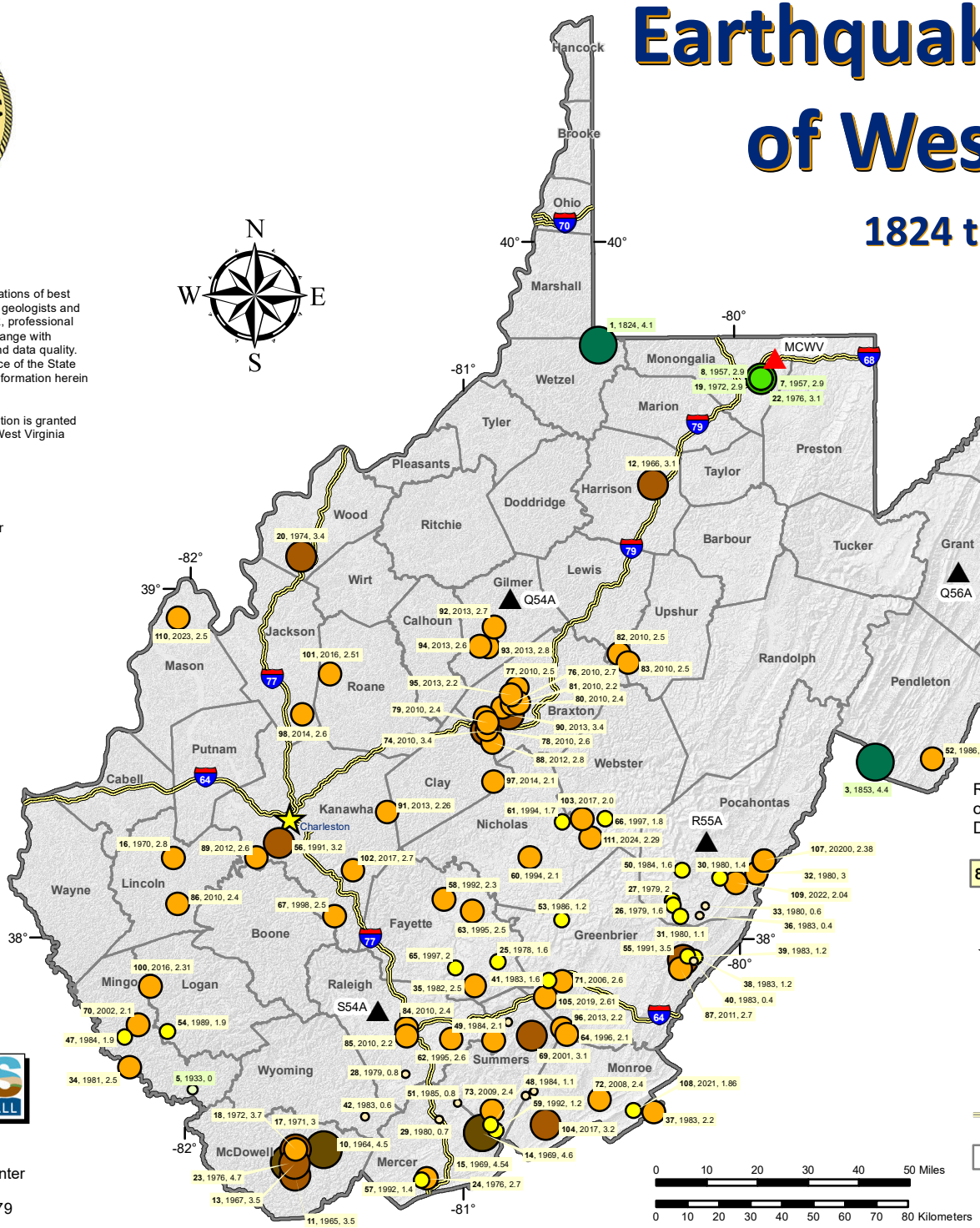
Earthquake Epicenters of West Virginia

1824 through 2024

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.

Map Date: 2/23/2024
Earthquake Data: 2/16/2024
Projection: Transverse Mercator
Horizontal Datum: NAD 1983
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.

87, 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., US, IRIS)
- **Seismic Station** USArray, Central and Eastern US Network (CEUSN-N4)
- 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 26508-8079
Phone: (304) 594-2331
www.wvgs.wvnet.edu

Map Num	Time (event ID)	County	UTC Year	UTC Month	UTC Day	UTC Hour	UTC Minute	UTC Seconds	Latitude	Longitude	Magnitude	Magnitude Type	Recorded	MMI	Event URL
1	1824-07-15T16:20:00	Wetzel	1824	07	15	16	20	00	39.70000	-80.50000	4.1	mb	Historic	4.0	<NULL>
2	1846-10-19T02:00:00	Jefferson	1846	10	19	02	00	00	39.30000	-77.90000	2.7	<NULL>	Historic	3	<NULL>
3	1853-05-02T14:20:00	Pendleton	1853	05	02	14	20	00	38.50000	-79.50000	4.4	<NULL>	Historic	5	<NULL>
4	1909-04-02T07:25:00	Berkeley	1909	04	02	07	25	00	39.40000	-78.00000	3.6	mb	Historic	5	<NULL>
5	1933-06-15T01:14:36.8	Mingo	1933	06	15	01	14	36.8	37.56800	-81.97300	0.0	<NULL>	Historic	<NULL>	<NULL>
6	1935-11-01T08:30:00	Hardy	1935	11	01	08	30	00	38.90000	-78.90000	3.3	<NULL>	Historic	4	<NULL>
7	1957-03-07T21:05:09	Monongalia	1957	03	07	21	05	09	39.60000	-79.90000	2.9	mb	Historic	3	<NULL>
8	1957-03-13T21:00:41	Monongalia	1957	03	13	21	00	41	39.60000	-79.90000	2.9	mb	Historic	3	<NULL>
9	1963-10-10T00:00:00	Morgan	1963	10	10	00	00	00	39.65500	-78.19700	3.6	<NULL>	Historic	<NULL>	<NULL>
10	1964-11-25T02:50:05	McDowell	1964	11	25	02	50	05	37.40000	-81.50000	4.5	mb	Instrumental	<NULL>	<NULL>
11	1965-04-26T15:26:19.7	McDowell	1965	04	26	15	26	19.7	37.32500	-81.60200	3.5	mblg	Instrumental	<NULL>	<NULL>
12	1966-09-28T00:00:00	Harrison	1966	09	28	00	00	00	39.30000	-80.30000	3.1	<NULL>	Instrumental	4	<NULL>
13	1967-12-16T12:23:33.4	McDowell	1967	12	16	12	23	33.4	37.36000	-81.60400	3.5	mb	Instrumental	<NULL>	<NULL>
14	1969-11-20T01:00:09.3	Mercer	1969	11	20	01	00	09.3	37.44900	-80.93200	4.6	mblg	Instrumental	6	<NULL>
15	1969-11-20T01:00:10.700Z	Mercer	1969	11	20	01	00	10.700	37.449000	-80.932000	4.54	mw	Instrumental	5	https://earthquake.usgs.gov/earthquakes/eventpage/ushis3082/
16	1970-08-11T06:14:25.5	Lincoln	1970	08	11	06	14	25.5	38.23000	-82.05000	2.8	mblg	Instrumental	4	<NULL>
17	1971-04-01T05:05:11	McDowell	1971	04	01	05	05	11	37.40000	-81.60000	3.0	mb	Instrumental	0	<NULL>
18	1972-01-09T23:24:29	McDowell	1972	01	09	23	24	29	37.40000	-81.60000	3.7	mblg	Instrumental	0	<NULL>
19	1972-09-12T15:17:13.7	Monongalia	1972	09	12	15	17	13.7	39.60000	-79.90000	2.9	mb	Historic	3	<NULL>
20	1974-10-20T15:13:55.100Z	Wood	1974	10	20	15	13	55.100	39.095000	-81.593000	3.40	lg	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/usp00008g9/
21	1976-01-30T18:58:49.800Z	Morgan	1976	01	30	18	58	49.800	39.683000	-78.170000	2.80	lg	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/usp0000eu9/
22	1976-05-06T18:46:08.1	Monongalia	1976	05	06	18	46	08.1	39.60000	-79.90000	3.1	mb	Historic	4	<NULL>
23	1976-06-19T05:54:13.900Z	McDowell	1976	06	19	05	54	13.900	37.362000	-81.624000	4.70	mb	Instrumental	6	https://earthquake.usgs.gov/earthquakes/eventpage/usp0000gyg/
24	1976-07-03T20:53:45.08	Mercer	1976	07	03	20	53	45.08	37.32000	-81.13000	2.7	mblg	Instrumental	<NULL>	<NULL>
25	1978-08-14T04:50:05.4	Fayette	1978	08	14	04	50	05.4	37.93900	-80.87400	1.6	mc	Instrumental	<NULL>	<NULL>
26	1979-09-16T09:39:22.6	Pocahontas	1979	09	16	09	39	22.6	38.09900	-80.24000	1.6	mc	Instrumental	<NULL>	<NULL>
27	1979-09-19T00:45:57.4	Pocahontas	1979	09	19	00	45	57.4	38.11000	-80.24300	2.0	mc	Instrumental	<NULL>	<NULL>
28	1979-10-31T08:32:47.3	Raleigh	1979	10	31	08	32	47.3	37.61700	-81.20700	0.8	mc	Instrumental	<NULL>	<NULL>
29	1980-04-10T22:33:15.7	Mercer	1980	04	10	22	33	15.7	37.48700	-81.08600	0.7	mc	Instrumental	<NULL>	<NULL>
30	1980-09-21T10:02:46.3	Pocahontas	1980	09	21	10	02	46.3	38.17500	-80.07000	1.4	mc	Instrumental	<NULL>	<NULL>
31	1980-10-16T03:48:07.6	Pocahontas	1980	10	16	03	48	07.6	38.06600	-80.21500	1.1	mc	Instrumental	<NULL>	<NULL>
32	1980-11-05T21:48:14.2	Pocahontas	1980	11	05	21	48	14.2	38.18800	-79.93600	3.0	ml	Instrumental	<NULL>	<NULL>
33	1980-11-25T07:44:04	Pocahontas	1980	11	25	07	44	04	38.09500	-80.12300	0.6	md	Instrumental	<NULL>	<NULL>
34	1981-11-30T17:33:11	Mingo	1981	11	30	17	33	11	37.63000	-82.20000	2.5	mc	Instrumental	<NULL>	<NULL>
35	1982-06-23T16:17:34.1	Fayette	1982	06	23	16	17	34.1	37.87000	-80.95700	2.5	md	Instrumental	<NULL>	<NULL>
36	1983-01-21T05:33:20.4	Pocahontas	1983	01	21	05	33	20.4	38.06700	-80.14400	0.4	md	Instrumental	<NULL>	<NULL>
37	1983-05-26T01:04:44.8	Monroe	1983	05	26	01	04	44.8	37.50600	-80.31600	2.2	md	Instrumental	<NULL>	<NULL>
38	1983-06-10T00:18:40.4	Greenbrier	1983	06	10	00	18	40.4	37.94800	-80.16300	1.2	md	Instrumental	<NULL>	<NULL>
39	1983-06-10T00:24:57	Greenbrier	1983	06	10	00	24	57	37.95100	-80.18900	1.2	md	Instrumental	<NULL>	<NULL>
40	1983-06-10T00:31:08.3	Greenbrier	1983	06	10	00	31	08.3	37.93800	-80.16800	0.4	md	Instrumental	<NULL>	<NULL>
41	1983-07-20T04:41:40.9	Greenbrier	1983	07	20	04	41	40.9	37.88500	-80.69100	1.6	md	Instrumental	<NULL>	<NULL>
42	1983-07-25T03:27:00.2	Wyoming	1983	07	25	03	27	00.2	37.49600	-81.35200	0.6	md	Instrumental	<NULL>	<NULL>
43	1983-11-13T16:51:06.7	Summers	1983	11	13	16	51	06.7	37.55600	-80.77500	0.4	md	Instrumental	<NULL>	<NULL>
44	1983-11-13T17:50:50.1	Monroe	1983	11	13	17	50	50.1	37.55900	-80.75300	0.7	md	Instrumental	<NULL>	<NULL>
45	1983-11-25T16:27:47.8	Monroe	1983	11	25	16	27	47.8	37.56800	-80.74500	0.7	md	Instrumental	<NULL>	<NULL>
46	1983-12-23T10:51:21.9	Summers	1983	12	23	10	51	21.9	37.76600	-80.83700	0.3	md	Instrumental	<NULL>	<NULL>
47	1984-02-02T05:10:19.7	Mingo	1984	02	02	05	10	19.7	37.71700	-82.21800	1.9	md	Instrumental	<NULL>	<NULL>
48	1984-03-11T04:01:38.9	Summers	1984	03	11	04	01	38.9	37.47400	-80.90000	1.1	md	Instrumental	<NULL>	<NULL>
49	1984-10-09T05:33:31.5	Summers	1984	10	09	05	33	31.5	37.71300	-80.89100	2.1	md	Instrumental	<NULL>	<NULL>
50	1984-12-21T13:12:21.9	Pocahontas	1984	12	21	13	12	21.9	38.19800	-80.20800	1.6	md	Instrumental	<NULL>	<NULL>
51	1985-06-14T07:57:10.2	Mercer	1985	06	14	07	57	10.2	37.53400	-81.02000	0.8	md	Instrumental	<NULL>	<NULL>
52	1986-02-26T21:53:20.8	Pendleton	1986	02	26	21	53	20.8	38.50700	-79.29200	2.3	md	Instrumental	<NULL>	<NULL>
53	1986-12-20T08:13:12.8	Greenbrier	1986	12	20	08	13	12.8	38.05800	-80.64300	1.2	md	Instrumental	<NULL>	<NULL>
54	1989-03-19T10:07:55.8	Logan	1989	03	19	10	07	55.8	37.73500	-82.06400	1.9	md	Instrumental	<NULL>	<NULL>
55	1991-04-22T01:01:20.270Z	Greenbrier	1991	04	22	01	01	20.270	37.941000	-80.207000	3.50	mblg	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/usp0004qn8/
56	1991-06-28T18:34:51.920Z	Kanawha	1991	06	28	18	34	51.920	38.276000	-81.668000	3.20	mblg	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/usp0004thc/
57	1992-03-29T20:16:48.2	Mercer	1992	03	29	20	16	48.2	37.31400	-81.14900	1.4	md	Instrumental	<NULL>	<NULL>
58	1992-05-06T21:20:23.9	Fayette	1992	05	06	21	20	23.9	38.11800	-81.06900	2.3	md	Instrumental	<NULL>	<NULL>
59	1992-11-24T02:26:50.7	Summers	1992	11	24	02	26	50.7	37.45700	-80.88400	1.2	md	Instrumental	<NULL>	<NULL>
60	1994-02-04T07:40:32.4	Nicholas	1994	02	04	07	40	32.4	38.23600	-80.75900	2.1	md	Instrumental	<NULL>	<NULL>

Map Num	Time (event ID)	County	UTC Year	UTC Month	UTC Day	UTC Hour	UTC Minute	UTC Seconds	Latitude	Longitude	Magnitude	Magnitude Type	Recorded	MMI	Event URL
61	1994-06-19T08:36:41.3	Nicholas	1994	06	19	08	36	41.3	38.33900	-80.64000	1.7	md	Instrumental	<NULL>	<NULL>
62	1995-11-15T10:29:24.8	Raleigh	1995	11	15	10	29	24.8	37.71700	-81.04300	2.6	md	Instrumental	<NULL>	<NULL>
63	1995-12-28T23:48:30.4	Fayette	1995	12	28	23	48	30.4	38.08400	-80.96800	2.5	md	Instrumental	<NULL>	<NULL>
64	1996-08-11T09:11:21.3	Greenbrier	1996	08	11	09	11	21.3	37.73100	-80.62800	2.1	mc	Instrumental	<NULL>	<NULL>
65	1997-02-22T14:32:33.1	Fayette	1997	02	22	14	32	33.1	37.92100	-81.02700	2.0	mc	Instrumental	<NULL>	<NULL>
66	1997-03-15T05:56:36.4	Webster	1997	03	15	05	56	36.4	38.34700	-80.48400	1.8	md	Instrumental	<NULL>	<NULL>
67	1998-10-02T10:01:06.9	Kanawha	1998	10	02	10	01	06.9	38.06800	-81.46600	2.5	md	Instrumental	<NULL>	<NULL>
68	2000-10-16T17:56:13.8	Braxton	2000	10	16	17	56	13.8	38.63600	-80.92000	2.5	md	Instrumental	<NULL>	<NULL>
69	2001-12-04T21:15:13.9	Summers	2001	12	04	21	15	13.9	37.72600	-80.75200	3.1	mb	Instrumental	<NULL>	<NULL>
70	2002-03-27T08:25:03.3	Mingo	2002	03	27	08	25	03.3	37.75300	-82.17100	2.1	md	Instrumental	<NULL>	<NULL>
71	2006-07-11T12:01:43.100Z	Greenbrier	2006	07	11	12	01	43.100	37.882167	-80.641333	2.60	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se606219/
72	2008-01-29T01:04:20.700Z	Monroe	2008	01	29	01	04	20.700	37.544833	-80.509833	2.40	mlg	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se606830/
73	2009-04-11T18:11:09.070Z	Summers	2009	04	11	18	11	09.070	37.513333	-80.895667	2.40	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se607139/
74	2010-04-04T09:19:14.010Z	Braxton	2010	04	04	09	19	14.010	38.599000	-80.916167	3.40	mlg	Instrumental	5	https://earthquake.usgs.gov/earthquakes/eventpage/se608185/
75	2010-04-29T01:36:21.260Z	Braxton	2010	04	29	01	36	21.260	38.685667	-80.814833	2.60	mlg	Instrumental	4	https://earthquake.usgs.gov/earthquakes/eventpage/se608194/
76	2010-04-29T12:38:53.430Z	Braxton	2010	04	29	12	38	53.430	38.664833	-80.856167	2.70	mlg	Instrumental	3	https://earthquake.usgs.gov/earthquakes/eventpage/se608196/
77	2010-04-29T23:26:39.470Z	Braxton	2010	04	29	23	26	39.470	38.722000	-80.803000	2.50	mblg	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/usp000hc39/
78	2010-05-07T10:26:03.540Z	Braxton	2010	05	07	10	26	03.540	38.602333	-80.912167	2.60	mlg	Instrumental	3	https://earthquake.usgs.gov/earthquakes/eventpage/se608197/
79	2010-05-08T03:03:00.620Z	Braxton	2010	05	08	03	03	00.620	38.623000	-80.911333	2.40	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se608198/
80	2010-07-24T09:15:44.130Z	Braxton	2010	07	24	09	15	44.130	38.675333	-80.820167	2.40	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se608209/
81	2010-07-25T03:48:35.550Z	Braxton	2010	07	25	03	48	35.550	38.679167	-80.797167	2.20	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se608210/
82	2010-08-15T04:38:47.380Z	Lewis	2010	08	15	04	38	47.380	38.818333	-80.429833	2.50	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se608213/
83	2010-08-21T03:16:21.990Z	Upshur	2010	08	21	03	16	21.990	38.792500	-80.397667	2.50	md	Instrumental	3	https://earthquake.usgs.gov/earthquakes/eventpage/se608214/
84	2010-08-26T04:22:15.190Z	Raleigh	2010	08	26	04	22	15.190	37.748333	-81.204667	2.40	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se608215/
85	2010-08-26T04:24:55.390Z	Raleigh	2010	08	26	04	24	55.390	37.727333	-81.204333	2.20	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se608216/
86	2010-09-13T15:08:46.470Z	Lincoln	2010	09	13	15	08	46.470	38.099833	-82.034000	2.40	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se608218/
87	2011-08-25T05:59:13.760Z	Greenbrier	2011	08	25	05	59	13.760	37.916000	-80.215333	2.70	md	Instrumental	4	https://earthquake.usgs.gov/earthquakes/eventpage/se609219/
88	2012-01-10T19:38:58.660Z	Braxton	2012	01	10	19	38	58.660	38.566833	-80.893833	2.80	mlg	Instrumental	4	https://earthquake.usgs.gov/earthquakes/eventpage/se609646/
89	2012-03-16T15:05:53.570Z	Kanawha	2012	03	16	15	05	53.570	38.234000	-81.748000	2.60	mblg	Instrumental	3	https://earthquake.usgs.gov/earthquakes/eventpage/usp000jgbk/
90	2013-03-31T14:01:24.030Z	Braxton	2013	03	31	14	01	24.030	38.645000	-80.833167	3.40	mw	Instrumental	5	https://earthquake.usgs.gov/earthquakes/eventpage/se610164/
91	2013-05-29T21:06:11.100Z	Kanawha	2013	05	29	21	06	11.100	38.365333	-81.275667	2.26	ml	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/ld60041041/
92	2013-07-20T11:38:46.180Z	Gilmer	2013	07	20	11	38	46.180	38.895667	-80.887000	2.70	mlg	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se610199/
93	2013-07-30T06:09:04.850Z	Gilmer	2013	07	30	06	09	04.850	38.839333	-80.908667	2.80	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se610203/
94	2013-08-16T11:02:21.040Z	Gilmer	2013	08	16	11	02	21.040	38.841500	-80.938667	2.60	mlg	Instrumental	3	https://earthquake.usgs.gov/earthquakes/eventpage/se610207/
95	2013-10-13T09:20:58.550Z	Braxton	2013	10	13	09	20	58.550	38.701167	-80.824167	2.20	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se610225/
96	2013-10-19T08:41:57.430Z	Greenbrier	2013	10	19	08	41	57.430	37.747667	-80.643333	2.20	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se610227/
97	2014-04-14T17:44:27.380Z	Clay	2014	04	14	17	44	27.380	38.453000	-80.889500	2.10	ml	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/ld60066331/
98	2014-06-06T22:15:40.790Z	Jackson	2014	06	06	22	15	40.790	38.643833	-81.585500	2.60	md	Instrumental	3	https://earthquake.usgs.gov/earthquakes/eventpage/se610630/
99	2016-01-17T19:12:49.050Z	Jefferson	2016	01	17	19	12	49.050	39.319333	-77.828333	3.03	ml	Instrumental	1	https://earthquake.usgs.gov/earthquakes/eventpage/ld60108801/
100	2016-08-06T12:39:14.210Z	Mingo	2016	08	06	12	39	14.210	37.863000	-82.128833	2.31	md	Instrumental	1	https://earthquake.usgs.gov/earthquakes/eventpage/se60029113/
101	2016-12-01T01:27:04.780Z	Roane	2016	12	01	01	27	04.780	38.760833	-81.485333	2.51	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se60032413/
102	2017-06-21T08:01:32.720Z	Kanawha	2017	06	21	08	01	32.720	38.199500	-81.398500	2.70	md	Instrumental	4	https://earthquake.usgs.gov/earthquakes/eventpage/se60172362/
103	2017-08-13T06:52:15.080Z	Webster	2017	08	13	06	52	15.080	38.345833	-80.568500	2.01	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se60042903/
104	2017-09-13T17:33:10.930Z	Monroe	2017	09	13	17	33	10.930	37.472833	-80.703000	3.20	md	Instrumental	4	https://earthquake.usgs.gov/earthquakes/eventpage/se60179327/
105	2019-03-04T07:41:54.780Z	Greenbrier	2019	03	04	07	41	54.780	37.838167	-80.704167	2.61	md	Instrumental	2	https://earthquake.usgs.gov/earthquakes/eventpage/se60076828/
106	2020-07-29T00:36:35.820Z	Pocahontas	2020	07	29	00	36	35.820	38.222333	-79.911500	2.43	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se60322771/
107	2020-07-30T05:57:13.780Z	Pocahontas	2020	07	30	05	57	13.780	38.222000	-79.908333	2.38	md	Instrumental	4	https://earthquake.usgs.gov/earthquakes/eventpage/se60323026/
108	2021-12-07T10:06:15.620Z	Monroe	2021	12	07	10	06	15.620	37.512000	-80.388500	1.86	md	Instrumental	2	https://earthquake.usgs.gov/earthquakes/eventpage/se60139853/
109	2022-08-10T00:36:34.020Z	Pocahontas	2022	08	10	00	36	34.020	38.160667	-80.013167	2.04	md	Instrumental	2	https://earthquake.usgs.gov/earthquakes/eventpage/se60158843/
110	2023-02-17T21:54:06.190	Mason	2023	02	17	21	54	06.190	38.917000	-82.043000	2.50	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se60500438/
111	2024-02-10T10:24:49.840Z	Nicholas	2024	02	10	10	24	49.840	38.29283333	-80.53816667	2.29	md	Instrumental	<NULL>	https://earthquake.usgs.gov/earthquakes/eventpage/se60501603/

Data as of 2/16/2024. For a more detailed listing, please download the West Virginia Earthquake spreadsheet/workbook from 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 infromation on a website.

Some definition of terms are provided with this map. Please consult the West Virginia Earthquake Catalog 202402.xlsx spreadsheet/workbook for complete definitions.

WVGES GEOLOGY UNDERLIES IT ALL

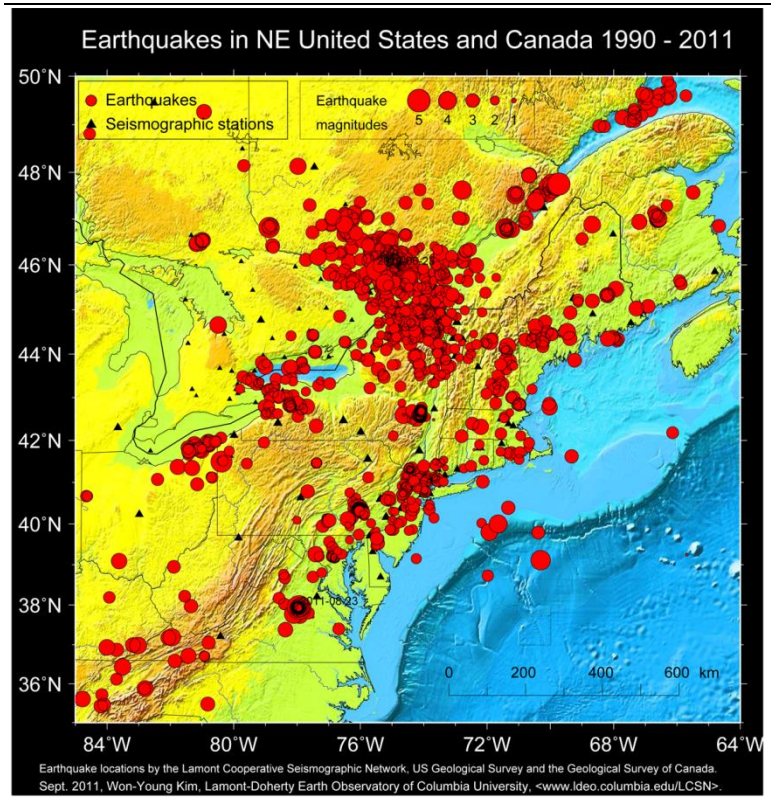
Some Definitions and Explanations:

• **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** and **Longitude** values are expressed in decimal degrees for the northern and western hemispheres, respectively.
• **MMI**: The Modified Mercalli Intensity scale for epicenter intensity, usually designated with Roman numerals. Visit USGS at https://www.usgs.gov/programs/earthquake-hazards/modified-mercalli-intensity-scale for further information.
• **MagnitudeType**: Magnitude type code; the method used in measuring magnitudes (e.g., *Mb* for "body-wave", *Mc* for "coda amplitude", *Md* for "coda duration").

For other or more detailed earthquake and seismological definitions, please visit the USGS (https://earthquake.usgs.gov/learn/glossary/).

Sources (Source1 and Source2):

• USGS ENS – United States Geological Survey, Earthquake Hazards (A Primary Source)
• VTSO – Virginia Tech Seismological Observatory (A Secondary Source)
• ANSS – Advanced National Seismic System
• CERI – Center for Earthquake Research and Information
• LDEO – Lamont-Doherty Earth Observatory
• 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
https://www.wvgs.wvnet.edu/

RESERVOIR STUDY OF THE WILLIAM KAUFMAN LEASE CLOVER-RUSH RUN OILFIELD, ROANE COUNTY, W. VA.

By Karl-Heinz Frohne

* * * * * * * * * * * report of investigations 6992

UNITED STATES DEPARTMENT OF THE INTERIOR
Stewart L. Udall, Secretary

BUREAU OF MINES
Walter R. Hibbard, Jr., Director

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1. Oil fields—West Virginia—Roane County. 2. Secondary oil recovery. 3. Oil field flooding. I. Title. (Series)

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ILLUSTRATIONS

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TABLES

RESERVOIR STUDY OF THE WILLIAM KAUFMAN LEASE, CLOVER-RUSH RUN OILFIELD, ROANE COUNTY, W. VA.

by

Karl-Heinz Frohne[1]

ABSTRACT

This report presents the findings of a study of a portion of the Clover-Rush Run oilfield located in Roane County, W. Va. The study was made to investigate the possibilities of secondary oil recovery in the Big Injun sandstone underlying the William Kaufman lease. Reservoir properties, original reserves, and primary oil recovery are also presented.

The investigation is based on a core analysis and related labortory tests, well records, field production data, and subsurface information from the Kaufman property. A theoretical primary oil recovery of 9.7 percent of original oil in place is predicted for the reservoir.

A waterflood performance prediction of a hypothetical pilot area was made by use of a computer. The prediction showed that, based on laboratory oil-water relative permeability curves, the water-injection time needed to initiate oil production is excessive and that the stabilized water-injection and corresponding oil-production rates are very low. This precludes waterflooding the reservoir on an economic basis.

A prediction for secondary oil recovery by gas injection was attempted but could not be completed because essential reservoir data were not available. In July 1965, the lease operator initiated, and is currently conducting, a gas-injection program, but there had been no increase in oil production up to November 1966.

INTRODUCTION

Production records and well logs show that primary oil production from the Big Injun sand has been by solution-gas drive in the Clover-Rush Run oilfield. Solution gas is the most inefficient of natural drives and can be

[1] Petroleum research engineer, Morgantown Petroleum Research Laboratory, Bureau of Mines, Morgantown, W. Va.

expected to recover only 5 to 25 percent (2)[a] of oil in place. Primary oil recovery from Appalachian area reservoirs is usually in the lower end of this range because of the very low permeability of the hydrocarbon-bearing formations, thus a large part of the oil is unrecovered.

In order to aid the reclamation of this valuable resource, the Bureau of Mines is currently engaged in evaluating methods of increasing the secondary recovery of oil from selected Appalachian area reservoirs. The work, of which this report is a part, is being carried out under the Bureau's Reservoir Evaluation Project by utilizing detailed core analyses and other field data to perform reservoir evaluations and provide secondary recovery recommendations. The plans and objectives of the project have been described in detail in another publication (7).

Even though one of the older Kaufman wells produced from the Big Lime formation, the only zone of consequence underlying the lease is the Big Injun sandstone which is the main area of interest of this report. At the present time, the lease operator is injecting natural gas into the Big Injun formation in order to stimulate oil recovery. This project is described in more detail later in the report.

A preliminary report on the Kaufman lease and the well cored by the Bureau has been published (6).

ACKNOWLEDGMENTS

The cooperation of the Pennzoil Co., operator of the William Kaufman lease, in providing well records, logs, and other data for this report is acknowledged.

GENERAL GEOLOGY

Location and Topography

The Clover-Rush Run oilfield is located in Smithfield and Spencer Districts, Roane County, W. Va. (fig. 1). The area topography is typical of the Appalachian Plateau. Outcropping rocks belong to either the Dunkard Series of the Lower Permian Period or the Monongahela Series of the Pennsylvania Period (5). The rugged terrain, formed by stream erosion of the plateau, consists mainly of narrow V-shaped valleys and steep ridges, although a few bottom lands and flat-topped hills can be found. Maximum elevation differences are on the order of 600 feet.

Area Structure and Stratigraphy

The Clover-Rush Run oilfield lies on the western flank of the Arches Fork anticline, and the Big Injun sand strikes north 30° east (4). In the Kaufman lease area, the sand dips to the northwest at about 70 feet per mile.

[a]Underlined numbers in parentheses refer to items in the list of references at the end of this report.

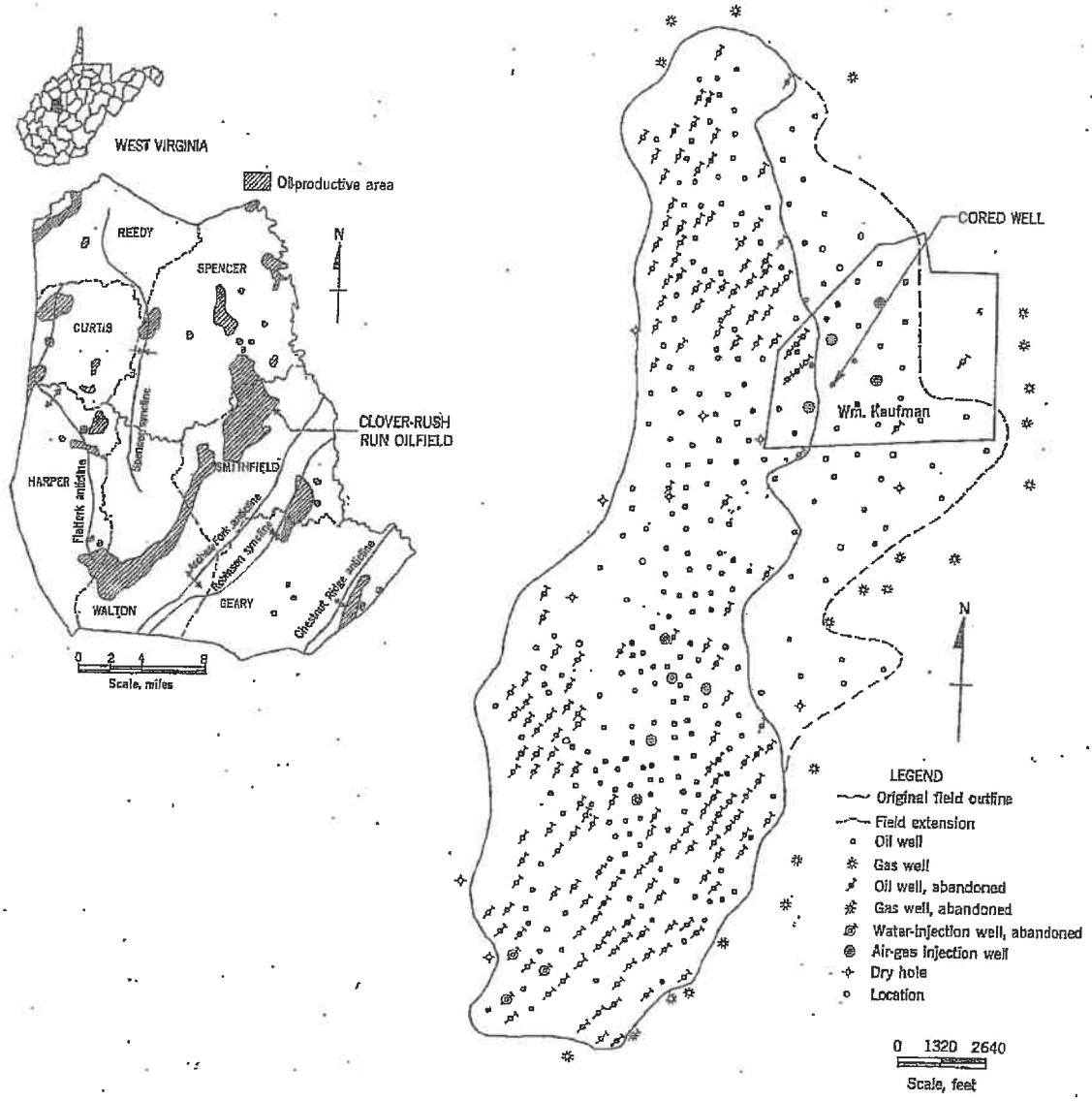

FIGURE 1. - Oil-Productive Areas in Roane County, W. Va., and the William Kaufman Lease in the Clover-Rush Run Oilfield.

A generalized geologic column for Roane County illustrates the stratigraphy of the area (fig. 2). Below the outcropping Dunkard and Monongahela formations lie the intermingled sandstones, limestones, shales, and coal seams of the Pennsylvanian Period. Next come the limestones, sands, and shales of the Mississippian Period, including the basal Greenbrier limestone and dolomite and the Keener and Big Injun sandstones which were cored in well P-7 on the William Kaufman lease.

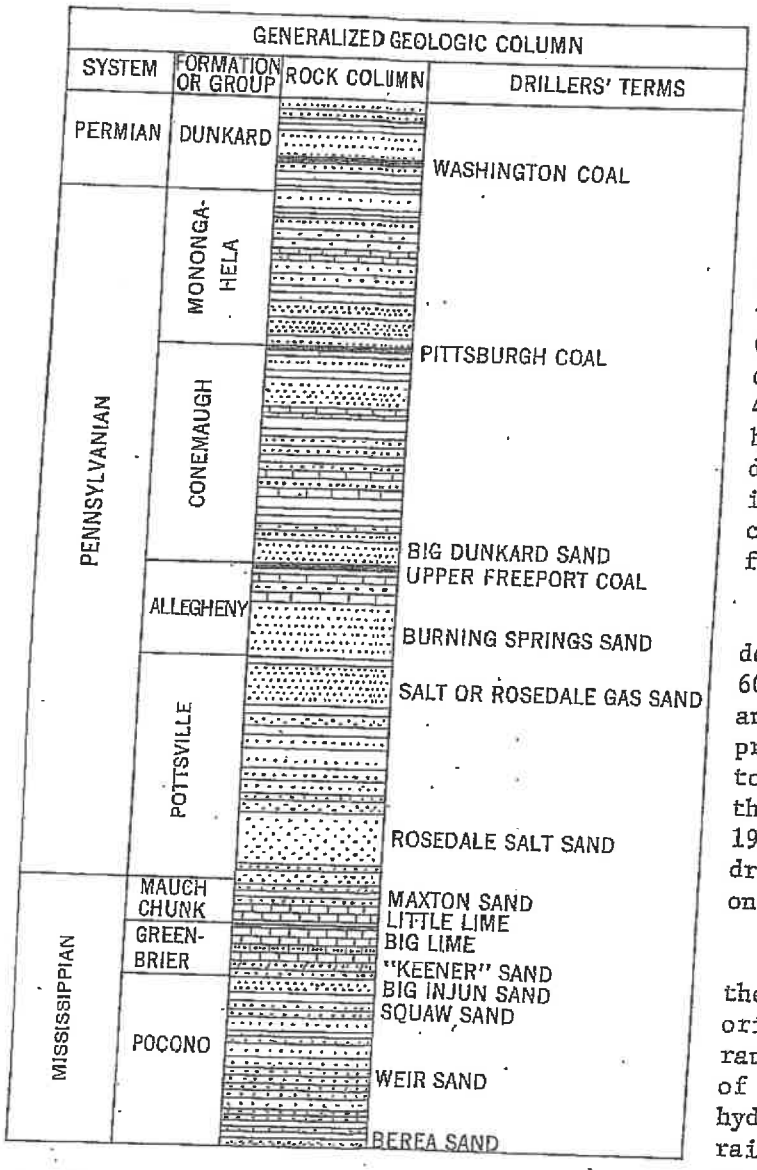

FIGURE 2. - Generalized Geologic Column of Subsurface Formations, Clover-Rush Run Oilfield.

FIELD DEVELOPMENT AND LEASE HISTORY

Development of Clover-Rush Run Oilfield

The original discovery well for the Clover-Rush Run oilfield was Heasley and Co. well 1, drilled on the L. D. Chambers lease in 1909. An oil-productive area of about 4,200 acres had been outlined by 1926 through development drilling, and by 1961 approximately 350 wells had been completed within the original field limits (fig. 1).

In the summer of 1961 a development boom began; about 60 new wells were drilled, and approximately 1,600 new productive acres were added to the northeastern side of the field by the summer of 1964. A large part of this drilling activity took place on the Kaufman lease.

Initial production from the old wells within the original field boundaries ranged from 2 to 40 barrels of oil per day. The use of hydraulic fracturing then raised the initial oil-production rates of the new development wells to a range of 15 to 250 barrels per day.

History of William Kaufman Lease

The present Kaufman lease (fig. 3) consists of 700 acres and was originally part of a larger Heasley and Co. holding. Sometime between 1909 and 1918, three oil wells were drilled within the lease area. About 1918, the Carter Oil Co. bought the lease and drilled three more producing wells. Next, the Hope Construction and Refining Co. leased the property. By 1920, Hope had also drilled three wells, each of which initially produced less than five barrels of oil per day. Finally the South Penn Oil Co., now the Pennzoil Co., bought the Kaufman lease from Hope in 1943 and completed two new oil wells by 1962.

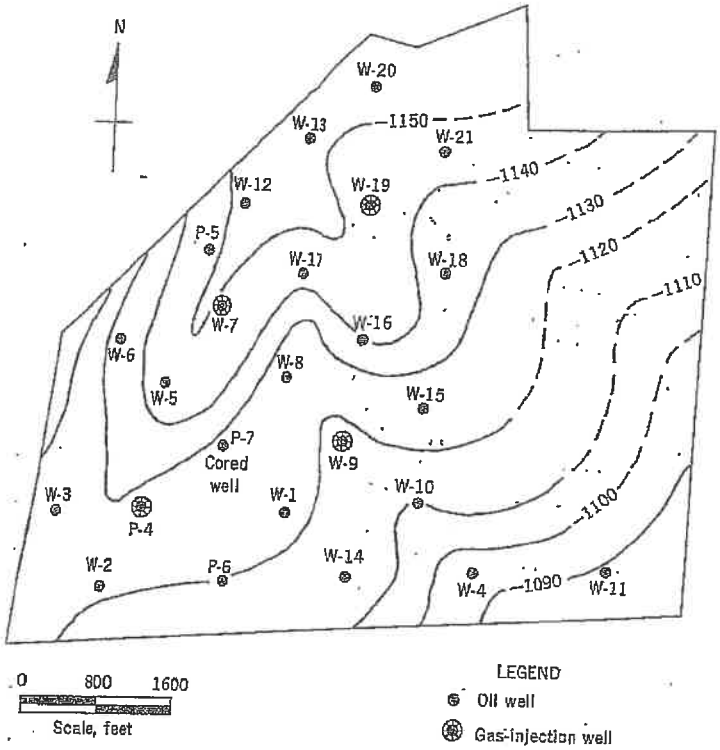

FIGURE 3. - Structure Contour Map on Top of Big Injun Sand, William Kaufman Lease, Clover-Rush Run Oilfield.

All of the producing wells on the Kaufman lease except one of the wells drilled by South Penn had been abandoned by the summer of 1962 when a new flurry of development activity hit the lease. This drilling program produced 24 new oil wells in the Big Injun sandstone by July 1964 when development was stopped. A permeability pinchout in the formation to the northeast limits the new field addition. The Kaufman property is situated in this area of low to zero permeability, and lease wells had only slight shows of oil on initial completion. After fracturing, however, the wells produced 15 to 50 barrels of oil per day.

CORING AND LOGGING OPERATIONS

Kaufman lease well P-7 was cored in September 1963 by personnel of the Pennzoil Co. and the Bureau of Mines. The 3½-inch-diameter core was taken with rotary tools using a low-water-loss bentonite water-base mud. The cored interval extended from 2,131 to 2,212 feet with 100-percent recovery.

A group of well logs, including guard, spontaneous potential, 16- and 64-inch normals, continuous velocity, gamma ray-neutron, and caliper, was run after coring operations were completed. The log curves covering the cored interval have been previously published (6).

RESERVOIR DATA

Structure

The Big Injun sandstone underlying the Kaufman lease is at an average depth of 2,200 feet. The reservoir is bounded on the downdip western edge of the field by water and updip by a permeability pinchout which cuts across the northeastern corner of the Kaufman property. The sand ranges in gross thickness from 50 feet on the downdip side of the field to 15 feet updip, and averages 24 feet under the Kaufman lease. Structure and isopachous maps of the Big Injun sand are shown in figures 3 and 4, respectively.

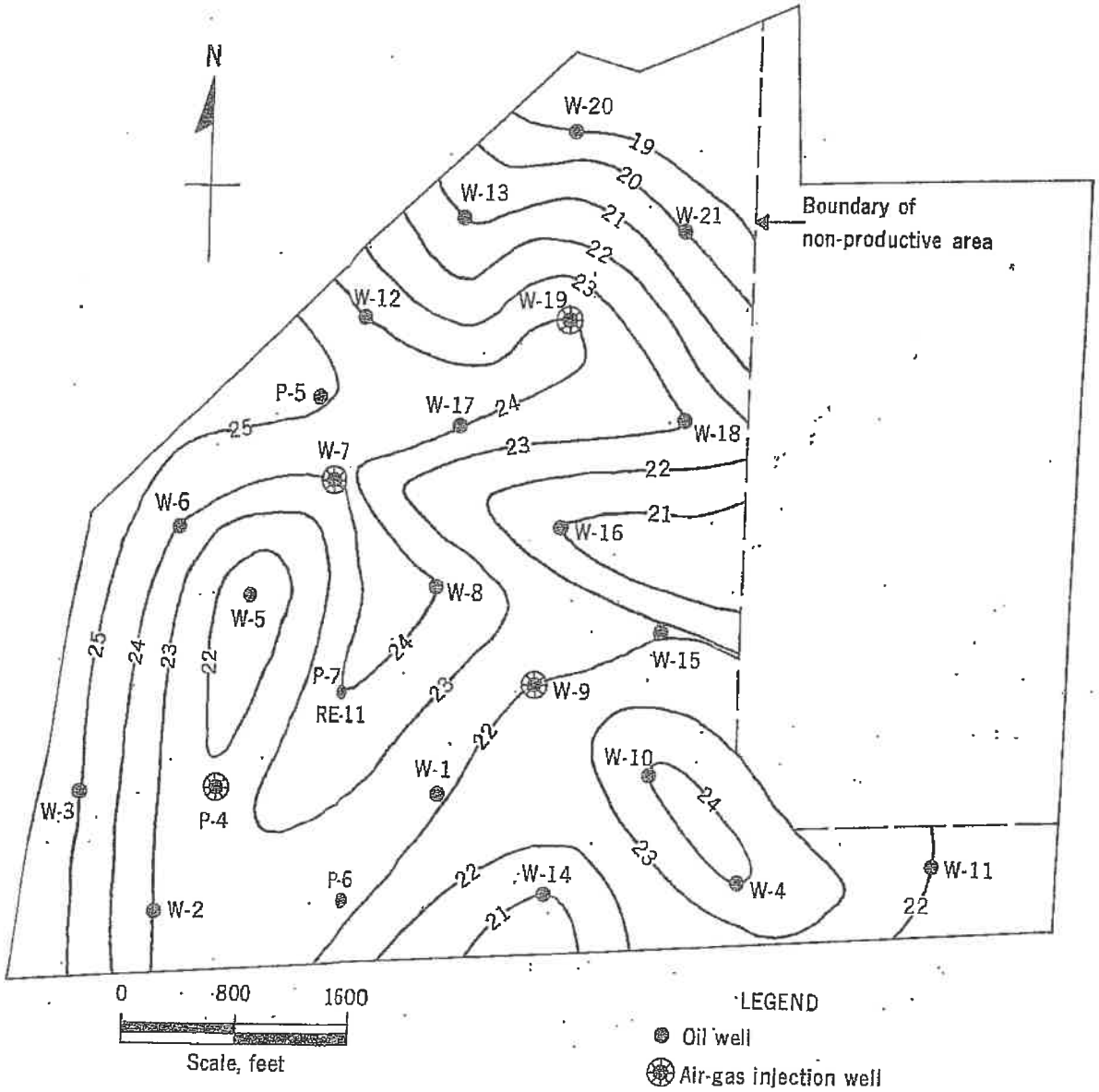

FIGURE 4. - Isopachous Map of the Big Injun Sand, William Kaufman Lease, Clover-Rush Run Oilfield.

Lithology

The cored interval in Kaufman well P-7 included the basal Greenbrier limestone and the Keener and Big Injun sandstone formations. The Greenbrier, locally called Big Lime, is light gray to gray brown, is slightly sandy and oölitic, and contains traces of glauconite (6). The basal section consists of light gray to tan, granular, calcareous, and glauconitic dolomite bottomed by a conglomerate of calcium carbonate, cemented quartz pebbles, and pieces of limestone.

The conglomerate grades into what is known locally as the Keener sandstone which extends from 2,168 to 2,182 feet. This is a white, medium- to coarse-grained, calcareous sandstone with a quartz pebble, limestone fragment, and clay material conglomerate at the bottom.

The Keener is immediately followed by the oil-productive Big Injun, a light-gray, fine-grained, subgraywacke sandstone that covers the interval 2,182 to 2,206 feet. The formation is glauconitic, very slightly calcareous, and contains traces of mica and argillaceous material. The argillaceous matter consists of illite and kaolinite which, together with montmorillonite, coat the quartz grains and occupy some of the pore spaces. The quartz grains are poorly sorted and loosely bonded, primarily by the coating clay material.

Core Analysis

The Kaufman lease contains 800 acres, 567 of which are considered oil productive based on logs and production records of wells. Kaufman well P-7, located near the center of the productive area and one of the best producers on the lease, has a total sand thickness of 24 feet for the Big Injun.

Using 0.1 millidarcy as a limiting minimum permeability, only 12.5 feet, or 52 percent of the total interval of well P-7, are considered effective net sand. This factor has been applied to the effective area gross sand volume of the lease, as determined from the isopachous map, to give an areally weighted average net sand thickness of 12.7 feet.

Core data for the Big Injun sand in Kaufman well P-7 are summarized below:

	Interval	
	Effective	Total
Thickness.....feet..	12.5	24.0
Air permeability..... millidarcy..	.8	.5
Porosity.....percent..	15.2	12.7
Saturation:		
Oil.....do..	8.7	7.4
Water.....do..	65.1	68.0

Complete core analysis data for the portion of the cored interval, which includes the Keener and Big Injun sands, are presented in table A-1.

Log Analysis

Quantitative analyses of the logs run in Kaufman well P-7 gave no conclusive results for the Big Injun reservoir. Water saturations calculated from guard log resistivities and core porosities gave an average value of 25 percent for the gross sand interval. This is much lower than the established area saturation of approximately 50 percent. A possible explanation for the low reading is that fresh-water-mud filtrate may have invaded the logged interval.

Porosities for the Big Injun sandstone were calculated from both neutron and velocity logs. The average neutron log value of 9.5 percent is lower than the core analysis figure of 12.7 percent, which may be due to the presence of free gas saturation in the formation. The velocity log, however, gave a value of 21.7 percent. This high porosity may be the result of velocity log signal attenuation, or cycle skipping; also due to a free-gas saturation.

The caliper log showed that the borehole was very uniform and in-gage through the Big Injun interval, indicating a uniformly hard formation.

Reservoir Limits

As mentioned previously, only 567 acres of the 800-acre Kaufman property are considered commercially oil productive. The remaining 233 acres (fig. 4) have not been assigned reserves. This is based on Kaufman well P-3, the only well drilled on this part of the lease. The exact location of this well is not known, but its approximate position is shown in figure 1. No formal records are available for well P-3, but operating personnel believe that the well was plugged and abandoned shortly after completion. Only a few quarts of oil were bailed out after the well was shot with nitroglycerin.

The eastern side of the commercially nonproductive area is formed arbitrarily by the lease line, and the western and southern sides are based on one-half well spacing from the adjacent row of Kaufman lease wells. During 1964 and 1965, the M & M Drilling Co. of Spencer, W. Va., drilled and completed four gas wells (fig. 1) about 900 feet east of the Kaufman lease. The wells had estimated initial open flows of 1 million cubic feet per day, and oil production ranged from a show to 20 barrels per day.

In view of this production to the east, only a test well, completed with modern techniques in the portion of the lease now considered nonproductive, will determine if the formation underlying this part of the Kaufman property contains any producible oil reserves.

Reservoir Temperature and Pressure

On May 1, 1964, several bottom-hole surveys were taken in Kaufman well P-7. One of the measurements was a reservoir temperature survey which recorded a formation temperature of 74° F for the Big Injun sand.

Leasewide bottom-hole pressure surveys were conducted on three occasions on wells on the Kaufman property. Tests run in November 1963, gave an areally weighted average pressure of 462 psig for the Big Injun sand; in June 1964, the pressure was 379 psig; and in May 1965, it had dropped to 268 psig.

Since the formation in the lease area had been tapped as early as 1909 when reservoir-pressure surveys were unheard of, an original formation pressure had to be estimated. Using established area pressure gradients applicable to the Big Injun sandstone, the original formation pressure was estimated as 700 psig. The original crude oil is assumed to have been saturated at the initial reservoir pressure of 700 psig.

Permeability

Permeability measurements were made in the laboratory on sample plugs cut at 1-foot intervals from the core material from Kaufman well P-7. The average air permeabilities of the gross and net effective intervals of the Big Injun sandstone are 0.5 and 0.8 millidarcy, respectively. These values illustrate the extreme tightness of the sand, especially since well P-7 is considered the best oil producer on the lease. Core analysis results, including a complete list of permeabilities, are given in table A-1.

Reservoir-Fluid Saturations

Oil and water saturations were also measured at 1-foot intervals along the core. Average oil and water saturations of the effective net interval are 8.7 and 65.1 percent, respectively. These values cannot be considered representative since the well was cored with a fresh-water-base drilling mud, and because filtrate invasion and solution-gas expansion undoubtedly took place during coring.

Analysis of the electric log gave an average water saturation of 25 percent over the gross sand interval. This value, also, may be too low because of mud filtrate invasion of the logged formation.

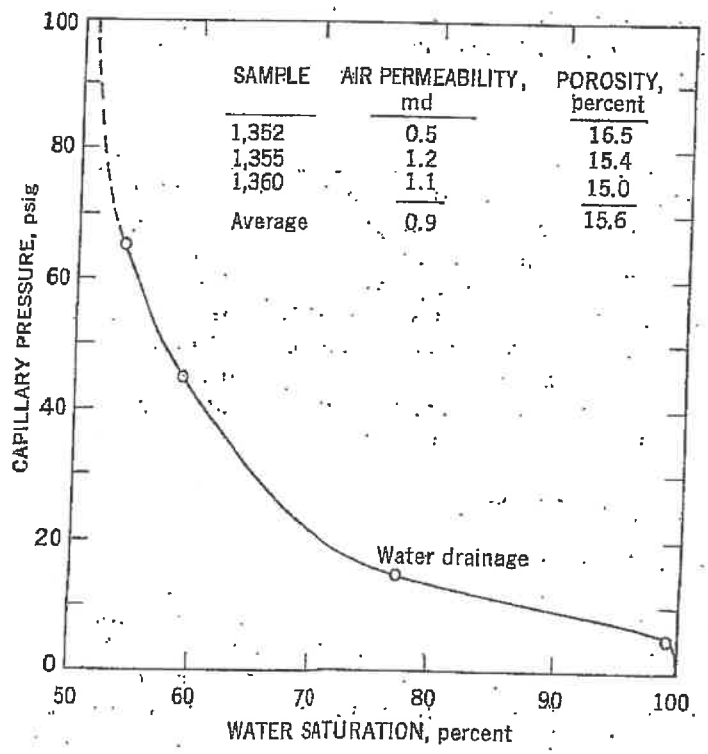

FIGURE 5. - Capillary Pressure Versus Water Saturation for the Big Injun Sand in Kaufman Well P-7, Clover-Rush Run Oilfield.

Finally, a graph of capillary pressure versus water saturation (fig. 5) prepared from laboratory test data shows an irreducible water saturation of 51 percent. This value is in agreement with established saturations of the Big Injun sandstone in the area and is used in this report.

To date, no water has been produced from the Kaufman lease, and the 51-percent saturation is considered immobile and equal to the original reservoir water saturation. The original oil saturation would then be 49 percent, based on the assumption that the reservoir was initially 100 percent liquid filled.

Reservoir-Fluid Properties

Because the area under study has been produced since 1909, no direct analysis of the original reservoir fluids is available. However, a reservoir-fluid sample taken from Kaufman well P-7 in May 1964, when the bottom-hole sampling pressure of the well was 483 psig, was analyzed. By using a technique reported by Clark (1), and several assumed factors, this fluid analysis has been adjusted to represent the original reservoir fluid.

An outline for pressure-volume-temperature analysis tests necessary to fully utilize the above adjustment procedure is given in appendix B. The outline applies where the fluid sampling pressure is lower than the original reservoir pressure. The adjustment procedure and original and adjusted PVT analysis data for Kaufman well P-7 are given in appendix C.

In May 1964, the stock-tank crude oil gravity was 48.3° API at 60° F and the crude oil viscosity was 2.43 centipoises at 77° F.

RESERVOIR PERFORMANCE

Primary-Performance Prediction

The primary-recovery mechanism of the Big Injun sandstone under the Kaufman property is a dissolved-gas or depletion drive. This production method is inherently the most inefficient natural drive and, in the Appalachian area, will usually produce only about 5 to 25 percent of the oil in the reservoir.

The crude oil originally in place was calculated volumetrically, using core, electric log, and fluid analysis data, and was found to be 3,291,000 stock-tank barrels, or 457 barrels per acre-foot. A prediction of primary recovery was then made by analysis (3) of the production-decline curve (fig. 6) for the Kaufman lease. Overall primary recovery over the producing life from the original reservoir pressure of 700 psig to theoretical lease abandonment conditions--10 barrels of oil per day--was calculated to be 319,000 stock-tank barrels of oil. This represents a recovery of 9.7 percent of the oil in place, or 44 barrels per acre-foot, by primary solution-gas drive. Theoretical abandonment conditions would be reached in April 1970.

Secondary Recovery

Waterflood Prediction

A computer prediction for theoretical secondary oil recovery by waterflooding the Big Injun sandstone under the Kaufman property was made. The hypothetical pilot area consisted of a pattern of four 5-spots totaling 23 acres. An essential part of the prediction is based on the oil-water relative permeability curves obtained in the laboratory (fig. 7). As can be seen from the curves, the relative permeability to oil at initial conditions is good. This may explain the initial completion gages of 15 to 50 barrels of oil per day after fracturing. The relative permeability to water, however, stays very low through the laboratory test range of water saturations.

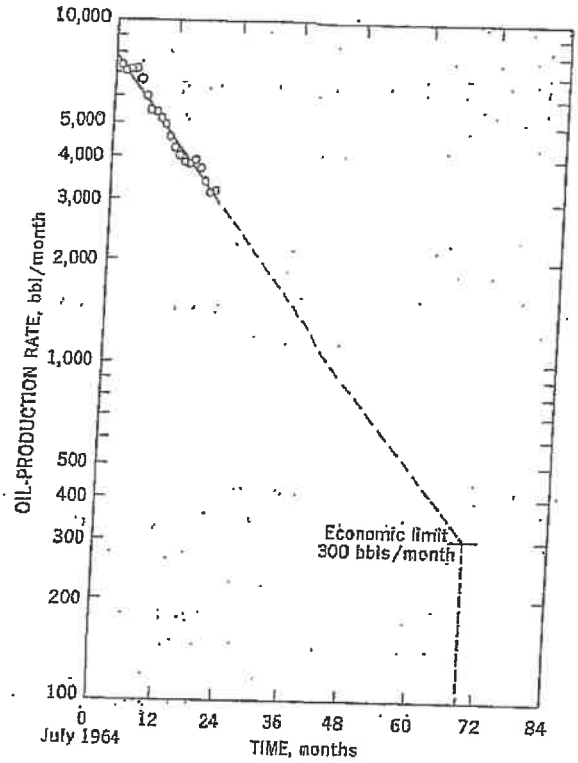

FIGURE 6. - Production Decline Curve for the William Kaufman Lease, Clover-Rush Run Oilfield.

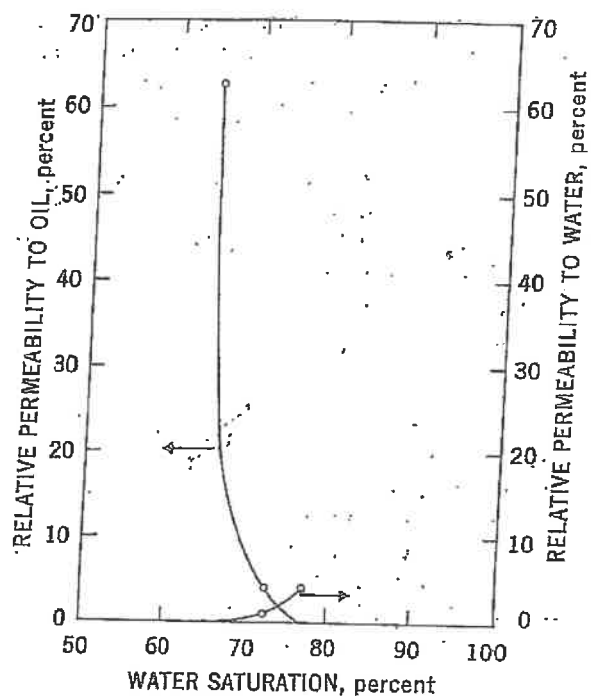

FIGURE 7. - Oil and Water Relative Permeability Curve for the Big Injun Sand in Kaufman Well P-7, Clover-Rush Run Oilfield.

Due to this low relative water permeability, the predicted time required to fill the initial gas saturation space in the pilot area with water and for oil production to begin is 17 years. After fill-up, the stabilized water-injection rate reached was less than one-half barrel per well per day, and the oil-production rates were correspondingly low. These low water-injection and oil-production rates preclude waterflooding the lease on an economic basis under present-day reservoir technology.

Gas-Injection Project

A prediction of secondary-recovery performance by gas injection could not be made because of the absence of essential data, such as a gas-oil relative permeability relationship. Several attempts to determine a K_g/K_o curve in the laboratory failed because of the tightness of the core samples. Reasonable theoretical K_g/K_o curves could not be estimated for the same reason.

At the present time, the lease operator is conducting a gas-injection program on the property. The project was started July 1, 1965, with the reinjection of lease-produced gas into four wells (fig. 3). Lease injection volumes have averaged 400,000 to 500,000 cubic feet per day since the project was begun.

To date, there has been gas breakthrough in several producing wells, including well P-7. The rapidity with which breakthrough occurred in some wells seems to indicate at least partial communication between injection and producing wells. The communication may possibly be through joints or hydraulically induced fractures. An east-west trend in the direction of communication has also been observed.

After 14 months of gas injection, no production increase was noted. In the last few months, however, the rate of decline of oil production has been partially arrested. A program to decrease the high producing gas-oil ratios in order to conserve reservoir energy was recently initiated by selectively choking back some producers.

SUMMARY

Because of the inherent inefficiency of the solution-gas drive, primary recovery will be only a fraction of the oil reserves in the Big Injun sand, and more than 90 percent of the oil will be left behind in the reservoir. Secondary recovery by waterflooding is precluded by the relative oil-water permeability characteristics of the sand, and a prediction of secondary recovery by gas injection could not be made because essential reservoir data were not available. In order to stimulate oil production, the Kaufman lease operator is currently reinjecting natural gas into the producing formation.

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APPENDIX A.--CORE ANALYSIS DATA FOR KAUFMAN WELL P-7

TABLE A-1. - Core analysis results, Kaufman well P-7

Sample	Depth, ft	Air permeability, md	Porosity, pct	Fluid saturation, percent pore space		Oil content, bbl/acre-ft	Salinity, equivalent NaCl, ppm
				Oil	Water		
1,304	2,140.0	<0.1	0.1	(1)	(1)	(1)	(1)
1,305	2,141.0	<.1	.6	-	-	-	-
1,306	2,142.0	<.1	.6	-	-	-	-
1,307	2,148.9	<.1	.1	-	-	-	-
1,308	2,150.4	<.1	4.9	-	-	-	-
1,309	2,151.0	<.1	5.1	-	-	-	-
1,310	2,151.4	<.1	4.5	-	-	-	200,000
1,311	2,152.6	<.1	6.3	-	-	-	-
1,312	2,161.0	<.1	5.4	-	-	-	194,000
1,313	2,165.0	<.1	.4	-	-	-	200,000
1,314	2,165.6	.5	1.7	-	-	-	159,000
1,315	2,166.0	<.1	1.5	-	-	-	-
1,316	2,166.4	<.1	1.5	-	-	-	-
1,317	2,167.0	<.1	2.1	-	-	-	-
1,318	2,167.4	<.1	1.6	-	-	-	-
1,319	2,168.0	<.1	1.9	-	-	-	-
1,320	2,168.5	<.1	.6	-	-	-	146,000
1,321	2,169.0	.2	3.2	8.8	17.1	23	-
1,322	2,169.6	.3	3.5	-	-	-	-
1,323	2,170.2	.2	5.4	4.3	27.8	18	-
1,324	2,170.9	.2	6.3	1.8	16.9	9	13,000
1,325	2,171.5	.1	6.1	4.0	31.8	19	-
1,326	2,172.0	.5	8.1	-	-	-	-
1,327	2,172.5	.3	5.7	-	-	-	-
1,328	2,173.0	.3	5.3	21.4	12.8	90	317,000
1,329	2,174.0	.2	5.3	-	-	-	-
1,330	2,175.0	<.1	4.0	4.9	75.1	-	-
1,331	2,175.5	<.1	2.6	-	-	-	-
1,332	2,177.0	.5	2.4	-	-	-	116,000
1,333	2,177.8	<.1	1.8	-	-	-	-
1,334	2,178.2	.1	11.6	-	-	-	-
1,335	2,179.0	.8	11.6	5.7	63.5	52	-
1,336	2,179.4	1.7	11.9	.1	52.0	1	-
1,337	2,180.0	<.1	3.5	-	-	-	178,000
1,338	2,180.5	.6	12.7	-	-	-	-
1,339	2,181.0	<.1	2.9	-	-	-	-
1,340	2,182.0	.1	12.4	3.5	70.1	35	-
1,341	2,182.5	.4	14.8	-	-	-	-
1,342	2,183.0	.2	11.9	-	-	-	176,000
1,343	2,184.0	<.1	7.8	-	-	-	-
1,344	2,185.0	.1	13.3	2.1	73.9	22	-
1,345	2,186.0	.1	11.5	2.1	85.2	20	188,000
1,346	2,187.0	<.1	2.6	-	-	-	-
1,347	2,188.0	<.1	2.6	-	-	-	-
1,348	2,189.0	.2	13.5	3.1	69.9	34	190,000
1,349	2,190.0	<.1	12.0	3.2	77.0	31	-
1,350	2,191.0	.4	14.3	14.3	56.7	160	-
1,351	2,192.0	<.1	5.2	4.6	80.7	19	200,000
1,352	2,193.0	.5	16.5	9.6	61.3	124	-
1,353	2,194.0	1.0	16.5	11.0	61.5	142	-
1,354	2,195.0	.6	16.5	8.7	61.4	113	188,000
1,355	2,196.0	1.2	15.4	8.6	67.2	104	-
1,356	2,197.0	1.1	15.5	8.8	67.9	106	-
1,357	2,198.0	1.0	15.6	9.4	64.8	115	184,000
1,358	2,199.0	.5	15.2	9.2	68.5	109	-
1,359	2,200.0	.8	16.4	8.9	61.9	115	-
1,360	2,201.0	1.1	15.0	10.3	63.9	120	183,000
1,361	2,201.7	1.8	15.5	8.0	64.6	97	-
1,362	2,209.0	.1	13.1	-	-	-	-
1,363	2,212.0	.1	10.2	-	-	-	-
Average	-	.4	9.3	7.1	58.1	70	159,000

[1]No test run.

APPENDIX B.--RECOMMENDED ANALYSES FOR PRESSURE-VOLUME-TEMPERATURE SAMPLES AT PRESSURES BELOW ORIGINAL RESERVOIR PRESSURE

The following tests are considered necessary for maximum use of pressure-volume-temperature (PVT) data in reservoir calculations:

(If the PVT sample is saturated, record test data relative to oil at reservoir temperature and pressure at sampling time; if not saturated, relate the data to oil at saturation pressure and reservoir temperature.)

1. Differential liberation at reservoir temperature at different pressures, including liberated gas, gas specific gravity and compressibility, and oil shrinkage factors.

2. Flash separation of sample oil in 0, 25, 50, and 100 psig separators, recording separator GOR, oil shrinkage, and oil API gravity.

3. Pressure-volume relationship at reservoir temperature, including thermal expansion.

4. Oil viscosity at various pressures, and oil compressibility over several pressure ranges.

The foregoing PVT analysis data can then be adjusted to original reservoir conditions for use in reservoir calculations (1).

APPENDIX C.--PRESSURE-VOLUME-TEMPERATURE ANALYSIS ADJUSTMENT PROCEDURE

Given a PVT analysis taken at a pressure lower than initial conditions, the procedure and equations outlined below (1) can be used to adjust the PVT data to original reservoir conditions.

Given

p_i = estimated original reservoir pressure = 700 psig,

p_s = reservoir pressure at PVT sampling time = 468 psig,

p = some lower pressure = 400 psig,

T_r = reservoir temperature = 74° F,

G_{1s} = differentially liberated gas from p_s to p = 25 scf per bbl of saturated oil at p_s, T_r,

G_1 = adjusted gas value, scf per bbl of saturated oil at p_i, T_r,

B_o/B_{os} = differential shrinkage factor, bbl saturated oil at p per bbl saturated oil at p_s, T_r,

B_o/B_{oi} = adjusted differential shrinkage factor, bbl saturated oil at p per bbl saturated oil at p_i, T_r,

B_o = adjusted formation volume factor, bbl saturated oil at p per bbl stock-tank oil,

SF = adjusted flash shrinkage factor, stb oil per bbl initial reservoir oil,

CGV = corrective gas volume, cu ft gas per bbl oil at p_s, T_r,

COV = corrective oil volume, bbl oil at p_i, T_r per bbl oil at p_s, T_r.

Find

$$CGV = \frac{p_i - p}{p_s - p}(G_{1s}) \qquad (1)$$

$$= \frac{700 - 468}{468 - 400}(25)$$

$$= 85 \text{ scf,}$$

$$COV = 1 + \left[\left(\frac{p_i - p_s}{p_s - p}\right) \left[(B_o/B_{os} \text{ at } p_s) - (B_o/B_{os} \text{ at } p)\right]\right] \quad (2)$$

$$= 1 + \left[\left(\frac{700 - 468}{468 - 400}\right) \left[1.0000 - 0.9920\right]\right]$$

$$= 1.027 \text{ bbl at } p_i, T_r/\text{bbl at } p_s, T_r,$$

$$G_1 = \frac{G_{1s} + CGV}{COV}, \quad (3)$$

$$B_o/B_{oi} = \frac{B_o/B_{os}}{COV}, \quad (4)$$

$$B_o = \frac{B_o/B_{oi}}{SF}. \quad (5)$$

This adjustment procedure is applied to Kaufman well P-7 in table C-1.

TABLE C-1. - Original and adjusted pressure-volume-temperature analyses data, Kaufman well P-7

Reservoir pressure, psig[1]	G_{1s}[1]	G_1[2]	B_o/B_{os}[1]	B_o/B_{oi}[2]	B_o[2]
700.....	-	0	-	1.000	1.264
468.....	4	87	1.0000	.974	1.231
450.....	10	92	.9976	.971	1.228
400.....	29	111	.9920	.966	1.221
300.....	68	149	.9752	.950	1.201
200.....	112	192	.9556	.930	1.176
100.....	166	244	.9306	.906	1.145
0.....	340	414	.8193	.798	1.009

[1] Original PVT analysis data.
[2] Adjusted values.

INT.-BU.OF MINES,PGH.,PA. 11070

Section 9

Operating Requirements

Section No. 9

The current operating conditions of this disposal well are:

Average daily volume – 2 bbl.

Maximum daily rate- 50 bbl.

Average daily injection pressure 380 psig

Maximum injection pressure – 1000 psig

2. The attached Appendix G lists the wells served by this disposal well

3. The injection fluid was sampled and analyzed for the required constituents. A copy of the analysis is enclosed in Fig No. 10.

4. Currently no additives are utilized in the injection fluid.

5. The tubing / casing annulus is filled with fresh water and packer fluid (corrosion inhibitor (1 gal /1000 gal fresh water)). The MSDS for Baker CRW 1321 (packer fluid) is attached in Fig No. 11.

6. In the event of the discovery of a well failure the injection well will immediately be shut in. The surface casing in this injection well is set at 174' and cemented to surface. The depth of this casing is well below any USDW in the area. If there is a failure in the injection string (tubing) there will still be three levels of protection between the injection fluid and any USDW. These three layers are the 4 ½" casing, 8 5/8" casing, and the cement outside of the 8 5/8" casing. The tubing / casing annulus is shut in with approximately 25 psig held. The well tender checks this pressure when he visits the well. Any failure will be quickly noticed and the well shut in. In the event of a mechanical integrity failure that cannot be repaired immediately the produced water will either be disposed of in a commercial disposal well or the producing wells shut in until the well can be repaired.

NOT APPLICABLE

APPENDIX F

Area Permit Wells

API #	Well Type (Injection, Production, Observation, Monitoring)	Well Status (Active, Abandoned, Shut-in, Plugged)	Northing (UTM NAD 83 Meters)	Easting (UTM NAD 83 Meters)
N/A	N/A	N/A	N/A	N/A

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

4708700985

	Appendix G		
	Wells Serviced by Injection Wells		
API #	Operator	Well No.	Producing Formation
47-087-03022	Delta Helix Energy, LLC	1	Big Injun
47-087-01955	Delta Helix Energy, LLC	6	Big Injun
47-087-04492	Delta Helix Energy, LLC	601	Big Injun
47-087-02435	Delta Helix Energy, LLC	4	Devonian Shale
47-087-03050	Delta Helix Energy, LLC	1	Big Injun
47-087-02436	Delta Helix Energy, LLC	5	Big Injun
47-087-02994	Delta Helix Energy, LLC	6	Big Injun
47-087-03032	Delta Helix Energy, LLC	7	Big Injun
47-087-03247	Delta Helix Energy, LLC	8	Big Injun
47-087-03035	Delta Helix Energy, LLC	10	Big Injun
47-087-03033	Delta Helix Energy, LLC	11	Big Injun
47-087-02993	Delta Helix Energy, LLC	15	Big Injun
47-087-02438	Delta Helix Energy, LLC	17	Big Injun
47-087-02439	Delta Helix Energy, LLC	18	Big Injun
47-087-00913	Delta Helix Energy, LLC	21	Big Injun
47-087-01076	Delta Helix Energy, LLC	23	Big Injun
47-087-03076	Delta Helix Energy, LLC	2	Big Injun
47-087-02980	Delta Helix Energy, LLC	3	Big Injun
47-087-03075	Delta Helix Energy, LLC	4	Big Injun
47-087-02995	Delta Helix Energy, LLC	14	Big Injun
47-087-01872	Delta Helix Energy, LLC	16	Big Injun
47-087-01927	Delta Helix Energy, LLC	17	Big Injun
47-087-01962	Delta Helix Energy, LLC	18	Big Injun
47-087-01953	Delta Helix Energy, LLC	19	Big Injun
47-087-00970	Delta Helix Energy, LLC	W-2	Big Injun
47-087-00971	Delta Helix Energy, LLC	W-3	Big Injun
47-087-00978	Delta Helix Energy, LLC	W-4	Big Injun
47-087-00984	Delta Helix Energy, LLC	W-5	Big Injun
47-087-00987	Delta Helix Energy, LLC	W-6	Big Injun
47-087-00988	Delta Helix Energy, LLC	W-8	Big Injun
47-087-00992	Delta Helix Energy, LLC	W-10	Big Injun
47-087-00993	Delta Helix Energy, LLC	W-11	Big Injun
47-087-00994	Delta Helix Energy, LLC	W-12	Big Injun
47-087-00995	Delta Helix Energy, LLC	W-13	Big Injun
47-087-00996	Delta Helix Energy, LLC	W-14	Big Injun
47-087-01004	Delta Helix Energy, LLC	W-15	Big Injun
47-087-01032	Delta Helix Energy, LLC	W-16	Big Injun
47-087-01053	Delta Helix Energy, LLC	W-17	Big Injun
47-087-01055	Delta Helix Energy, LLC	W-18	Big Injun
47-087-01068	Delta Helix Energy, LLC	W-20	Big Injun

4708700985

	Appendix G		
	Wells Serviced by Injection Wells		
API #	Operator	Well No.	Producing Formation
47-087-01079	Delta Helix Energy, LLC	W-21	Big Injun
47-087-02981	Delta Helix Energy, LLC	4	Big Injun
47-087-00894	Delta Helix Energy, LLC	5	Big Injun
47-087-00909	Delta Helix Energy, LLC	6	Big Injun
47-087-00963	Delta Helix Energy, LLC	7	Big Injun
47-087-01923	Delta Helix Energy, LLC	29	Big Injun
47-087-04489	Delta Helix Energy, LLC	604	Big Injun
47-087-04490	Delta Helix Energy, LLC	605	Big Injun
47-087-04491	Delta Helix Energy, LLC	606	Big Injun
47-087-02578	Delta Helix Energy, LLC	3	Devonian Shale
47-087-03040	Delta Helix Energy, LLC	1	Big Injun
47-087-00027	Delta Helix Energy, LLC	2	Big Injun
47-087-03041	Delta Helix Energy, LLC	3	Big Injun
47-087-01026	Delta Helix Energy, LLC	5	Big Injun
47-087-01095	Delta Helix Energy, LLC	6	Big Injun
47-087-01096	Delta Helix Energy, LLC	7	Big Injun
47-087-04493	Delta Helix Energy, LLC	602	Big Injun
47-087-00565	Delta Helix Energy, LLC	2	Big Injun
47-087-02743	Delta Helix Energy, LLC	3	Big Injun
47-087-03061	Delta Helix Energy, LLC	6	Big Injun
47-087-03030	Delta Helix Energy, LLC	10	Big Injun
47-087-03047	Delta Helix Energy, LLC	11	Big Injun
47-087-02988	Delta Helix Energy, LLC	12	Big Injun
47-087-03013	Delta Helix Energy, LLC	13	Big Injun
47-087-03053	Delta Helix Energy, LLC	14	Big Injun
47-087-03048	Delta Helix Energy, LLC	15	Big Injun
47-087-03045	Delta Helix Energy, LLC	17	Big Injun
47-087-03029	Delta Helix Energy, LLC	19	Big Injun
47-087-03031	Delta Helix Energy, LLC	23	Big Injun
47-087-02986	Delta Helix Energy, LLC	24	Big Injun
47-087-00889	Delta Helix Energy, LLC	26	Big Injun
47-087-01027	Delta Helix Energy, LLC	27	Big Injun
47-087-01072	Delta Helix Energy, LLC	28	Big Injun
47-087-01086	Delta Helix Energy, LLC	29	Big Injun
47-087-01873	Delta Helix Energy, LLC	31	Big Injun
47-087-01954	Delta Helix Energy, LLC	32	Big Injun
47-087-02082	Delta Helix Energy, LLC	33	Big Injun

4708700985

Kaufman W-7 & W-19 Injection / Production Facility Quarterly Inspection

To be performed first day of each calendar quarter

Date 10-23-24

Person performing inspection Dakota C.

Produced water tanks

Gas vents ✓ Gas Blanket supply, regulator, piping N/A

Produced water Injection Pump

Suction/discharge piping ✓ Bypass Regulator & line ✓

Water meter ✓ Pressure recorder ✓

Separator

Vessel ✓ Piping ✓ Dump Valves ✓ Regulator ✓

Oil Storage tanks

Tanks ✓ Piping ✓

Items needing attention:

Copies to Forman and Parkersburg office

STEP RATE TEST

1987

Step Rate Test 1987 (for W-7 and W-19)

RECEIVED
JAN 04 1988
DIVISION OF OIL & GAS
DEPARTMENT OF ENERGY

UIC PERMIT UIC2DO870985

WELLHEAD PRESSURE INCREASE JUSTIFICATION

W. M. KAUFMAN NO. W-7

CLOVER FIELD - BIG INJUN RESERVOIR

PENNZOIL PRODUCTS COMPANY

EXPLORATION & PRODUCTION DIVISION

NOEL W. PUTSCHER

DECEMBER 29, 1987

INTRODUCTION

The purpose of this report is to provide test data to the West Virginia Department of Energy, Division of Oil & Gas, which justifies increasing wellhead injection pressure on Roane 0985 from 694 psig to 1000 psig. The West Virginia Department of Energy recently issued an Underground Injection Control permit for Roane 0985 which limited surface pressure to 694 psig. Pennzoil Products Company, operator of subject well, performed a step-rate test to determine the pressure at which the Big Injun would part in the subject well.

DISCUSSION

A step-rate injectivity test is normally used to estimate fracture pressure in an injection well.[1] Fluid is injected at a series of increasing rates, with each rate preferably lasting the same length of time. In relatively low permeability formations (k <5md) each injection rate should last about 1 hour; 30 minute injection times are adequate for formations with permeability exceeding 10 md. As few as four rates may be used, but normally six, seven or eight rates are preferred. The analysis consists of plotting injection pressure at the end of each rate vs injection rate. It is preferable to plot bottom-hole pressure, but surface pressure may be used if it is positive throughout the test and friction effects are not significant. The plot should have two straight line segments. The break in the line indicates formation fracture pressure.

TEST RESULTS

On December 16, 1987, a step-rate test was run on Roane 0985. The initial pressure was 545 psi and was increased to 1160 psig, with five points in between. With each rate increase the pressure was read after at least one hour had passed. The results of this test are attached and the parting pressure was found to be 1104 psig. Pennzoil is requesting permission to inject into subject well at a wellhead pressure of 1000 psig.

1 Robert C. Earlougher, Jr., Advances in Well Test Analysis Monograph Series, Society of Petroleum Engineers of AIME, Dallas (1977), Vol. 5, Chapter 7.

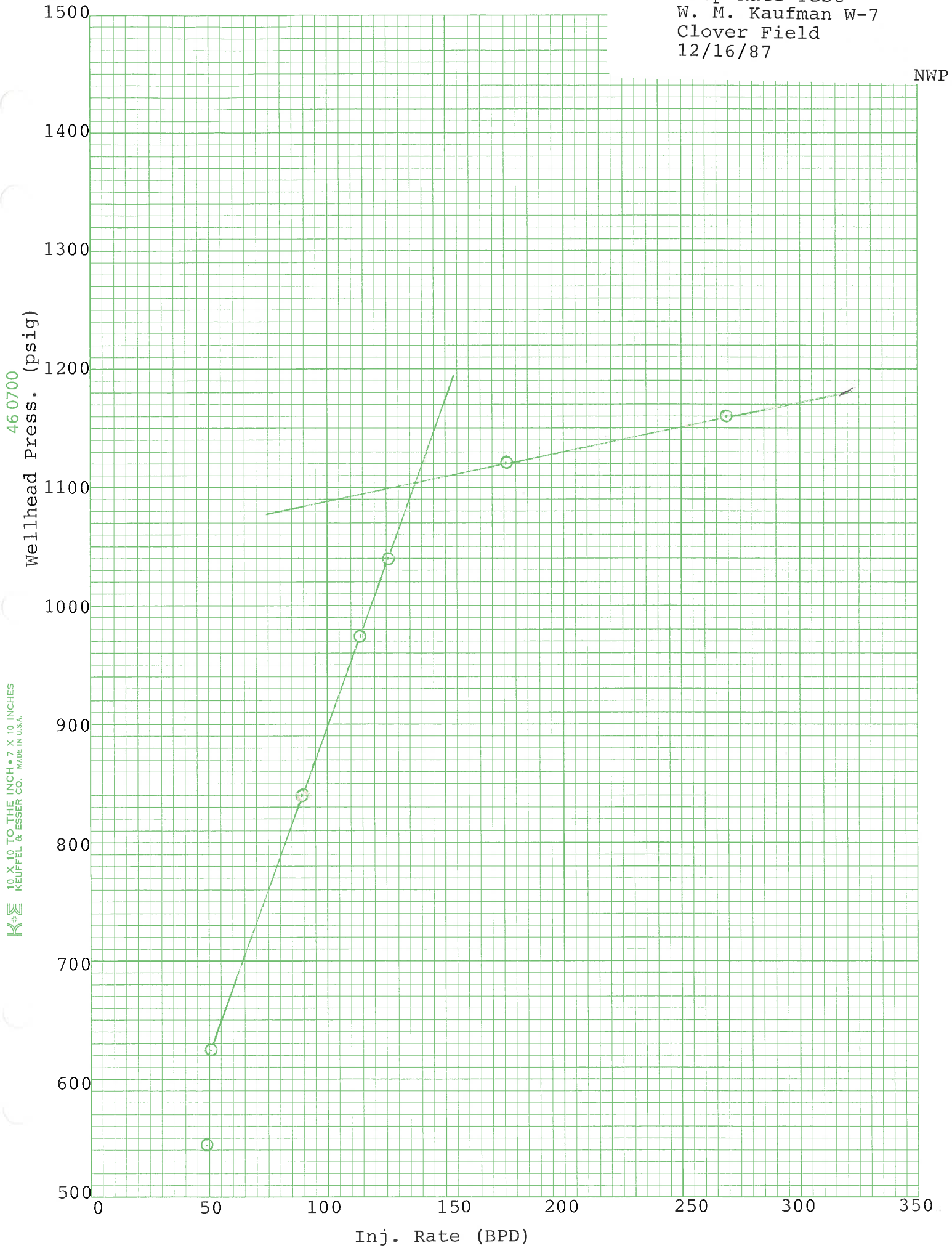
STEP RATE TEST

W. M. Kaufman W-7
Clover Field
12/16/87

WHP Press. (psig)	Rate (BPD)
545	49
625	51
840	89
975	114
1040	126
1120	176
1160	269

Step Rate Test
W. M. Kaufman W-7
Clover Field
12/16/87

NWP



MIT **4708700985**

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 Email Transmission

October 5, 2023

HG Energy LLC
Attn: Roger Heldman
5260 Dupont Road
Parkersburg WV 26101

Re: Mechanical Integrity Test Approvals and Authorization for Injection
UIC Permit 2D08700985 (Wm Kaufman W-7)

Roger:

Attached is the approved WR-37 Mechanical Integrity Test Record (MITs) for the above referenced disposal well. The permitted injection pressure for this well is 883 psi. The permitted test pressure is 1325 psi (883 x 1.5). This MIT was performed at a test pressure of 1160 psi. The well is approved for a revised injection pressure of 773 psi (1160 / 1.5) and must be retested at 1325 psi to regain the full permitted injection pressure of 883 psi. If you have any questions, please contact Andrew Lockwood via email at Andrew.L.Lockwood@wv.gov or by phone at (304) 926-0499 ext. 41104.

Respectfully,

Charles T. Brewer
Assistant Chief of Permitting
WVDEP Office of Oil & Gas

4708700985

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: 8/21/23
Operator's Well Name / #: Wm Kaufman W-7
API#: 47- 087 - 00985002
UIC Permit #: 2D0487
Field Name (2R only):

RECEIVED
Office Of Oil and Gas
AUG 23 2023
WV Department of Environmental Protection

WELL OPERATOR HG Energy LLC
Address: 5260 Dupont Rd
Parkersburg, WV 26101

DESIGNATED AGENT Diane White
Address: 5260 Dupont Rd
Parkersburg, WV 26101

INJECTION FORMATION Big Injun Depth 2141 feet (top) to 2170 feet (bottom)
Perforation Interval 2163-2166 or Open Hole Interval

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.) Bactericides and other chemicals as necessary to maintain water quality

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								
FRESH WATER	8 5/8	LS	28	X		172	172	25 sks
COAL								
INTERMEDIATE								
PRODUCTION	4 1/2	K-55	9.5	X		2219	2219	65 cu ft
TUBING	2 3/8	J-55	4.6	X		2170	2170	
LINERS								

PACKER	TYPE: tension	SIZE: 4x 2	DEPTH: 2170

MECHANICAL INTEGRITY TEST TYPE
☑ Standard Annulus Pressure Test
Is Test Annulus Filled? ☑ Yes ☐ No If Yes, Specify Fluid Type? fresh water and packer fluid
☐ Pump Line Test ☐ Other (Specify)

MAXIMUM PERMITED WELLHEAD INJECTION PRESSURE ~~1000~~ 883 psi **MIT PRESSURE** ~~1100~~ ~~1325~~ 1160 psi

MECHANICAL INTEGRITY TEST DESCRIPTION
Pressure tested tubing / casing annulus to 1160 psig for 32 minutes. Chart attached

(2R Area Permits: If multiple pump lines are tested together, please list wells serviced by the tested pump lines.)

4708700985

WR-37
12/23/19

API#: 47-087 - 00985002

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.
- If the pump line is tested separately, the MIT pressure shall be the maximum permitted injection pressure plus 100 psi held for a minimum of 20 minutes with no more than a 5% loss. Multiple pump lines can be tested together.
- All MITs must be witnessed by a state inspector. A valid recording chart containing the inspector's signature must accompany this completed form.
- 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 8/21/23
The well and/or pump line:
☑ demonstrated mechanical integrity or ☐ failed to demonstrate mechanical integrity.

The MIT was witnessed by Joe Taylor, Inspector WVDEP - Office of Oil and Gas.

H G Energy LLC
Permit Holder Company Name

8/22/23
Date

Roger Heldman
Agent of Responsible Party (Print Name)

Signature

Operations Manager
Title

----------**Office of Oil and Gas Use Only:**----------

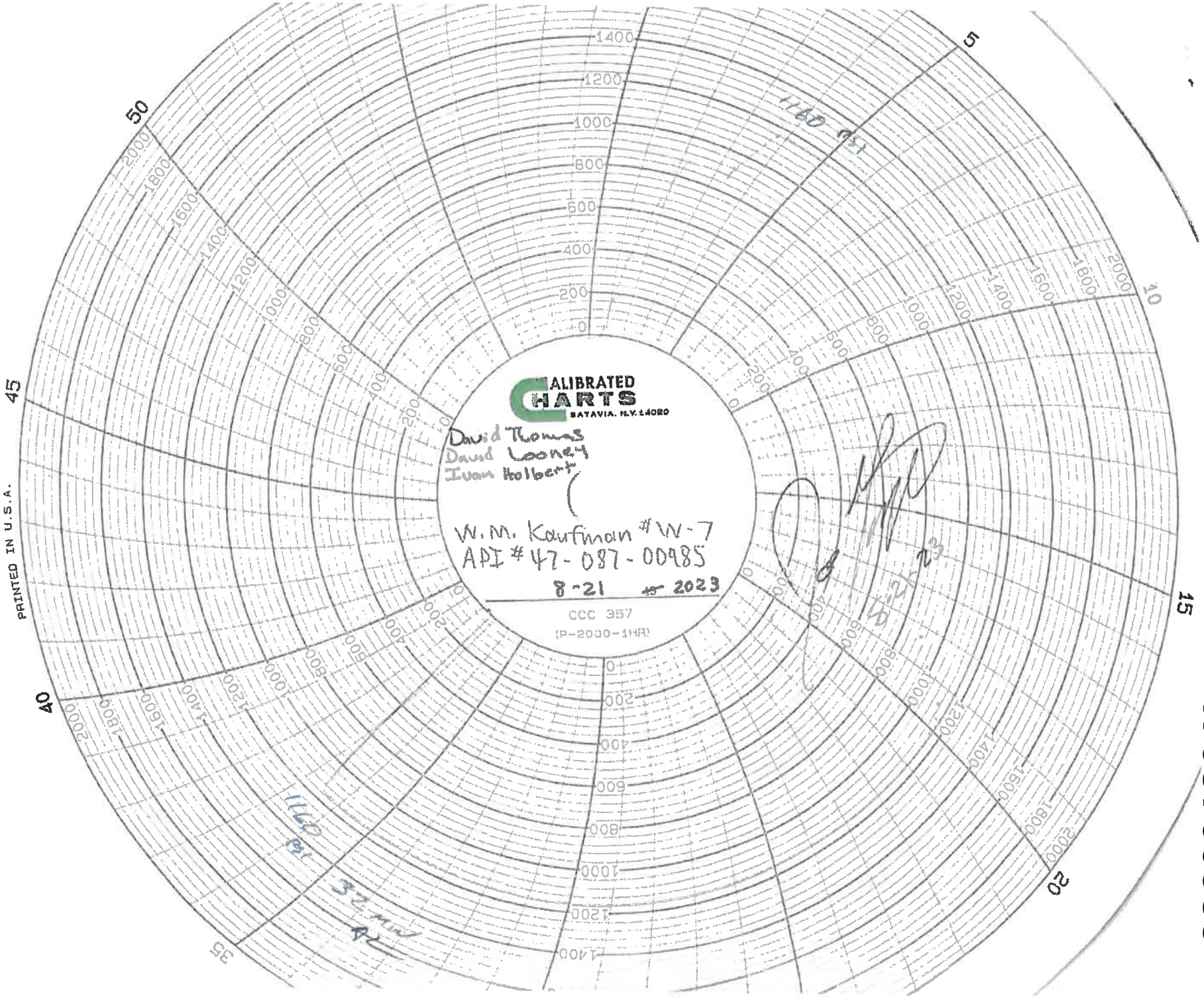
THIS WELL IS AUTHORIZED FOR INJECTION
UP TO A MAXIMUM WELLHEAD INJECTION PRESSURE OF ~~500~~ 773 psi

Special Conditions:

Permitted injection pressure is 883 psi. Permitted test pressure is 1325 psi (883 x 1.5). This MIT was performed at 1160 psi. This well is approved for a revised injection pressure of 773 psi (1160 / 1.5) and must be retested at 1325 psi to regain full injection pressure of 883 psi.

UIC Program Manager
WVDEP-Office of Oil and Gas

Date 10/5/23


CALIBRATED CHARTS
BATAVIA, N.Y. 14020
David Thomas
David Looney
Ivan Holbert
W.M. Kaufman #W-7
API # 47-087-00985
8-21 2023
CCC 357
(P-2000-1HR)
PRINTED IN U.S.A.
1160 psi
32 min

47087009 85

4708700985

FIGURE # 10

W M Kaufman W-7 (2D0870095) & W M Kaufman W-19 (2D08701056)
Injection fluid

INJECTATE ANALYSES

Paramater	units	
Chloride	mg/L	125,000
Bromide	mg/L	1,030
Strontium	mg/L	515
Barium	mg/L	174
Iron	mg/L	45.3
Total Dissolved Solids	mg/L	202,000
pH	SI Units	5.62
Specific Gravity		1.132
Manganese	mg/L	1.8
Aluminum	mg/L	0.29
Arsenic	mg/L	0.20
Sodium	mg/L	46,100
Calcium	mg/L	15,300
Sulfate	mg/L	5,000
Radium 226	pCi/L	2.54
Radium 228	pCi/L	11
Gross Alpha	pCi/L	1,685
Gross Beta	pCi/L	1,067

Delta Helix

TABLE 1B. Chemical water quality for station (KPW) associated with ~~HE~~ Energy's Kaufman Water. Kirk Environmental, LLP., October 31, 2024.

PARAMETER	SAMPLING STATION KAUFMAN WATER (KPW)
Field Water Temperature (°C)	18.5
Field Dissolved Oxygen (mg/L)	2.44
Field pH (SI Units)	5.62
Field Conductivity (mS)	> 150
DRO (C10-C28)	6.4
ORO (C20-C40)	< 4.0
TPH (C06-C10)	1420
Aluminum (mg/L)	0.29
Arsenic (mg/L)	< 0.20
Barium (mg/L)	174
Calcium (mg/L)	15300
Total Iron (mg/L)	45.3
Manganese (mg/L)	1.8
Sodium (mg/L)	46100
Strontium (mg/L)	515
Benzene (ug/L)	157
Toluene (ug/L)	79.9
Ethylbenzene (ug/L)	3.3
Xylene Total (ug/L)	53.6
TDS (mg/L)	202000
TSS (mg/L)	90.0
Chloride (mg/L)	125000
Bromide (mg/L)	1030
Sulfate (mg/L)	< 5000
TOC (mg/L)	66.7
Gross Alpha (pCi/L)	1,685
Gross Beta (pCi/L)	1,067
Radium-226 (pCi/L)	2.54
Radium-228 (pCi/L)	11.0

56 1.132

Kaufman W-7 & W19 Injectate

GEOCHEMICAL TESTING
Environmental and Energy Analysis

2005 N. Center Ave.
Somerset, PA 15501

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

Thursday, November 7, 2024

Beth Johnson
REIC A DIVISION OF PACE ANALYTICAL
SERVICES LLC
PO BOX 286
225 INDUSTRIAL PARK ROA
BEAVER, WV 25813

Order No.: G2411144

Dear Beth Johnson:

Geochemical Testing received 1 sample(s) on 11/5/2024 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,

Joelle Streczywilk
Environmental Laboratory Manager

Leslie A. Nemeth
Project Manager

ACCREDITED IN ACCORDANCE WITH nelac
I.D. 66-00306PA DEP

Glossary (continued)

1 Spike recovery limits are not applicable when the sample concentration exceeds the spike concentration by a factor of four or greater.

B1 Dilution water blank exceeded method criterion.

C1 CCV recovery above the acceptance limits. Results may be biased high.

C2 CCV recovery below the acceptance limits. Results may be biased low.

C3 ICV recovery above the acceptance limits. Results may be biased high.

C4 ICV recovery below the acceptance limits. Results may be biased low.

C5 Positive values verified by second column confirmation.

C6 Confirmation analysis by another detector or chromatographic column was not performed.

D1 The analysis did not meet the minimum DO depletion of at least 2 mg/L.

D2 The analysis did not meet the minimum residual DO of at least 1 mg/L.

D3 Sample required dilution due to a matrix interference.

D4 Sample was diluted in the extraction steps due to marked matrix interferences.

D5 Sample required dilution due to a chloride interference.

D6 Sample was diluted and the reporting limits were raised to achieve method compliant internal standard recovery.

D7 Sample was digested at a dilution due to the formation of a post-digestion precipitate.

8 Sample was digested at a dilution to achieve method compliant matrix spike recovery.

D9 Sample was digested at a dilution to meet method compliant digestion criteria.

E2 Unable to obtain a stable weight within specified limits due to sample matrix. Value is estimated.

F1 Fecal sample tested positive for residual chlorine.

H1 Due to under-depletion from the initial dilutions for BOD, the sample was reanalyzed outside the hold time.

H2 Due to over-depletion from the initial dilutions for BOD, the sample was reanalyzed outside the hold time.

H3 Sample was re-analyzed outside of hold time due to error during original analysis.

H4 The Nitrite result used to report Nitrate was analyzed past the 48-hour holding time.

I1 Internal standard recovery above method acceptance limits. Results are estimated.

I2 Internal standard recovery was below method acceptance limits. Results are estimated.

IP One of the instrument performance checks ( ) did not meet the acceptance criteria.

L1 LCS above the acceptance limits. Result may be biased high.

L2 LCS below the acceptance limits. Result may be biased low.

L3 Analyte was spiked into the LCS, but was not recovered.

M1 Matrix Spike recovery above the acceptance limits.

M2 Matrix Spike recovery below the acceptance limits.

4 The matrix spike failed high for the surrogate.

M5 The matrix spike failed low for the surrogate.

M6 The reporting limits were raised due to sample matrix interference.

M7 Recovery for matrix spike could not be quantified due to matrix interference.

M8 Analyte was spiked into the MS, but was not recovered.

M9 Analyte concentration was determined by the method of standard addition (MSA).

N1 The lab does not hold accreditation from PA-DEP for this parameter by this method

N2 PADEP does not accredit labs for this analyte by this method.

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

N4 PADEP does not accredit labs for this analyte by this method in drinking water.

O1 The flashpoint tester cannot detect below 50 degrees F.

O2 Result is temperature of the sample when flame observed. No flash observed. Result qualified.

O3 The reporting limits were raised due to the high concentration of non-target compounds.

O4 Sample was received with headspace.

O5 Sample was received in incorrect container and is not compliant with 40CFR136 Table II.

O6 Insufficient sample volume was received to comply with the method.

P1 The pH of the sample was >2 and is not compliant with 40CFR136 Table II.

P2 Sample contained residual chlorine and is not compliant with 40CFR136 Table II

P3 The pH of the sample was <10 and is not compliant with 40CFR136 Table II.

P4 Field preservation does not meet EPA or method recommendations for this analysis.

P5 Acid preservation may not be appropriate for the analysis of 2-Chloroethylvinyl ether.

P6 Sample required additional preservative upon receipt.

P7 The sample was received unpreserved.

P8 The pH of the sample was < 9 and is not compliant with 40 CFR136 Table II.

R Relative Percent Difference (RPD) was above the control limit.

R1 RPD above control limits between matrix spike and MS duplicates.

R2 RPD above the control limit between duplicates.

R3 RSD above the control limit between replicates.

R4 RPD above control limits between Inorganic Carbon check and spike.

R5 RPD above control limits between control sample and control sample duplicates.

S2 Surrogate recovery in the blank was below the control limit.

S3 Surrogate recovery in the blank was above the control limit.

S4 Surrogate recovery in the LCS is above the control limit.

S5 Surrogate recovery in the LCS is below the control limit.

SR Analyte recovery was outside the accepted recovery limits and above the control limit for RPD.

T3 Target analyte found in trip/field blank.

TC The MS tune check (tailing factor) did not meet the acceptance criteria.

Geochemical Testing

Date: *07-Nov-24*

CLIENT: REIC A DIVISION OF PACE ANALYTIC
Project:
Lab Order: G2411144

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.

Glossary:

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

4708700985
SG

Laboratory Results

Geochemical Testing

Date: *07-Nov-24*

CLIENT:	REIC A DIVISION OF PACE ANALYTIC	**Client Sample ID:**	30730511003
Lab Order:	G2411144		KPW
Project:		**Collection Date:**	10/31/2024 10:50:00 AM
Lab ID:	G2411144-001	**Sampled By:**	Pace
Matrix:	AQUEOUS	**DateReceived:**	11/5/2024 9:50:34 AM

Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
SPECIFIC GRAVITY			Analyst: **MAG**					**ASTM D1429-08**
Specific Gravity	1.132		0.3000	0.300		1		11/06/24 8:07 AM

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

Delta Helix

TABLE 1C. Chemical water quality for stations (UKS) and (LKS) associated with ~~HG~~ Energy's Kaufman Sites. Kirk Environmental, LLP., October 31, 2024.

PARAMETER	SAMPLING STATION	
	UKS	LKS
Field Water Temperature (°C)	13.0	12.8
Field Dissolved Oxygen (mg/L)	6.16	2.24
Field pH (SI Units)	7.32	6.54
Field Conductivity (µS)	632.4	351.5
Stream Flow (ft^3/s)	< 1 gpm	0.0
DRO (C10-C28)	< 0.19	< 0.20
ORO (C20-C40)	< 0.38	< 0.40
TPH (C06-C10)	< 200	< 200
Aluminum (mg/L)	0.087	< 0.020
Arsenic (mg/L)	< 0.020	< 0.020
Barium (mg/L)	0.19	0.22
Calcium (mg/L)	54.6	28.5
Total Iron (mg/L)	0.13	0.17
Manganese (mg/L)	0.16	0.40
Sodium (mg/L)	20.1	10.3
Strontium (mg/L)	0.35	0.21
Benzene (ug/L)	< 1.0	< 1.0
Toluene (ug/L)	< 1.0	< 1.0
Ethylbenzene (ug/L)	< 1.0	< 1.0
Xylene Total (ug/L)	< 3.0	< 3.0
TDS (mg/L)	247	150
TSS (mg/L)	15.0	15.0
Chloride (mg/L)	13.4	35.7
Bromide (mg/L)	< 0.10	0.13
Sulfate (mg/L)	28.8	10.9
TOC (mg/L)	4.2	4.0

UKS - upper Stream Sample

LKS - lower Stream Sample

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225 Industrial Park RD
Beaver, WV 25813
(800)999-0105

Sample: KPW Injection **Lab ID: 30730511003** Collected: 10/31/24 10:50 Matrix: Water

Method	Parameters	Results	Units	Report Limit	Analyzed	Qualifiers
EPA 200.7	Arsenic	ND	mg/L	0.20	11/05/24 13:38	
EPA 200.7	Barium	**174**	mg/L	0.50	11/05/24 13:40	
EPA 200.7	Calcium	**15300**	mg/L	50.0	11/05/24 13:40	
EPA 200.7	Iron	**45.3**	mg/L	0.50	11/05/24 13:38	
EPA 200.7	Manganese	**1.8**	mg/L	0.050	11/05/24 13:38	
EPA 200.7	Sodium	**46100**	mg/L	500	11/06/24 18:23	
EPA 200.7	Strontium	**515**	mg/L	10.0	11/06/24 18:23	N2
SM 2540C-2015	Total Dissolved Solids	**202000**	mg/L	1000	11/01/24 18:20	
SM 2540D-2015	Total Suspended Solids	**90.0**	mg/L	5.0	11/01/24 11:16	
EPA 300.0, Rev 2.1	Bromide	**1030**	mg/L	100	11/20/24 22:08	
EPA 300.0, Rev 2.1	Chloride	**125000**	mg/L	1000	11/20/24 22:08	
EPA 300.0, Rev 2.1	Sulfate	ND	mg/L	5000	11/20/24 22:08	D3
SM 5310B-2014	Total Organic Carbon	**66.7**	mg/L	1.0	11/05/24 21:44	
	Collected By	**EK**			11/01/24 10:04	
	Field pH	**5.62**	Std. Units		11/01/24 10:04	
	Field Temperature, C	**18.5**	deg C		11/01/24 10:04	
	Field Specific Conductance	**>150 ms**	umhos/cm		11/01/24 10:04	
	Oxygen, Dissolved	**2.44**	mg/L		11/01/24 10:04	
EPA 8015C	TPH (C10-C28)	**6.4**	mg/L	2.0	11/11/24 21:14	
EPA 8015C	TPH (C28-C40)	ND	mg/L	4.0	11/11/24 21:14	CH
EPA 8015C	TPH (C06-C10)	**1420**	ug/L	200	11/04/24 17:16	
EPA 8260D	Benzene	**157**	ug/L	1.0	11/04/24 15:48	
EPA 8260D	Ethylbenzene	**3.3**	ug/L	1.0	11/04/24 15:48	
EPA 8260D	Toluene	**79.9**	ug/L	1.0	11/04/24 15:48	
EPA 8260D	Xylene (Total)	**53.6**	ug/L	3.0	11/04/24 15:48	

Sample: UKS Upper Steam **Lab ID: 30730511004** Collected: 10/31/24 11:20 Matrix: Water

Method	Parameters	Results	Units	Report Limit	Analyzed	Qualifiers
EPA 200.7	Aluminum	**0.087**	mg/L	0.020	11/04/24 17:14	
EPA 200.7	Arsenic	ND	mg/L	0.020	11/04/24 17:14	
EPA 200.7	Barium	**0.19**	mg/L	0.0050	11/04/24 17:14	
EPA 200.7	Calcium	**54.6**	mg/L	0.50	11/04/24 17:14	
EPA 200.7	Iron	**0.13**	mg/L	0.050	11/04/24 17:14	
EPA 200.7	Manganese	**0.16**	mg/L	0.0050	11/04/24 17:14	
EPA 200.7	Sodium	**20.1**	mg/L	0.50	11/04/24 17:14	
EPA 200.7	Strontium	**0.35**	mg/L	0.010	11/04/24 17:14	N2
SM 2540C-2015	Total Dissolved Solids	**247**	mg/L	10.0	11/01/24 20:10	
SM 2540D-2015	Total Suspended Solids	**15.0**	mg/L	2.5	11/01/24 11:16	
EPA 300.0, Rev 2.1	Bromide	ND	mg/L	0.10	11/20/24 22:28	
EPA 300.0, Rev 2.1	Chloride	**13.4**	mg/L	1.0	11/20/24 22:28	
EPA 300.0, Rev 2.1	Sulfate	**28.8**	mg/L	5.0	11/20/24 22:28	
SM 5310B-2014	Total Organic Carbon	**4.2**	mg/L	1.0	11/05/24 22:35	
	Collected By	**EK**			11/01/24 10:07	
	Field pH	**7.32**	Std. Units		11/01/24 10:07	
	Field Temperature, C	**13.0**	deg C		11/01/24 10:07	
	Field Specific Conductance	**632.4**	umhos/cm		11/01/24 10:07	
	Oxygen, Dissolved	**6.16**	mg/L		11/01/24 10:07	
	Flow	**<1 gpm**			11/01/24 10:07	
EPA 8015C	TPH (C10-C28)	ND	mg/L	0.19	11/07/24 04:55	
EPA 8015C	TPH (C28-C40)	ND	mg/L	0.38	11/07/24 04:55	
EPA 8015C	TPH (C06-C10)	ND	ug/L	200	11/04/24 17:52	
EPA 8260D	Benzene	ND	ug/L	1.0	11/04/24 14:57	
EPA 8260D	Ethylbenzene	ND	ug/L	1.0	11/04/24 14:57	
EPA 8260D	Toluene	ND	ug/L	1.0	11/04/24 14:57	
EPA 8260D	Xylene (Total)	ND	ug/L	3.0	11/04/24 14:57	

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Sample: LKS Lower Stream **Lab ID: 30730511005** Collected: 10/31/24 12:20 Matrix: Water

Method	Parameters	Results	Units	Report Limit	Analyzed	Qualifiers
EPA 200.7	Aluminum	ND	mg/L	0.020	11/04/24 17:16	
EPA 200.7	Arsenic	ND	mg/L	0.020	11/04/24 17:16	
EPA 200.7	Barium	**0.22**	mg/L	0.0050	11/04/24 17:16	
EPA 200.7	Calcium	**28.5**	mg/L	0.50	11/04/24 17:16	
EPA 200.7	Iron	**0.17**	mg/L	0.050	11/04/24 17:16	
EPA 200.7	Manganese	**0.40**	mg/L	0.0050	11/04/24 17:16	
EPA 200.7	Sodium	**10.3**	mg/L	0.50	11/04/24 17:16	
EPA 200.7	Strontium	**0.21**	mg/L	0.010	11/04/24 17:16	N2
SM 2540C-2015	Total Dissolved Solids	**150**	mg/L	10.0	11/01/24 20:11	
SM 2540D-2015	Total Suspended Solids	**15.0**	mg/L	2.5	11/01/24 11:16	
EPA 300.0, Rev 2.1	Bromide	**0.13**	mg/L	0.10	11/20/24 12:55	
EPA 300.0, Rev 2.1	Chloride	**35.7**	mg/L	1.0	11/20/24 12:55	
EPA 300.0, Rev 2.1	Sulfate	**10.9**	mg/L	5.0	11/20/24 12:55	
SM 5310B-2014	Total Organic Carbon	**4.0**	mg/L	1.0	11/05/24 22:52	
	Collected By	**EK**			11/01/24 10:08	
	Field pH	**6.54**	Std. Units		11/01/24 10:08	
	Field Temperature, C	**12.8**	deg C		11/01/24 10:08	
	Field Specific Conductance	**351.5**	umhos/cm		11/01/24 10:08	
	Oxygen, Dissolved	**2.24**	mg/L		11/01/24 10:08	
	Flow	**0.0**			11/01/24 10:08	
EPA 8015C	TPH (C10-C28)	ND	mg/L	0.20	11/07/24 05:19	
EPA 8015C	TPH (C28-C40)	ND	mg/L	0.40	11/07/24 05:19	
EPA 8015C	TPH (C06-C10)	ND	ug/L	200	11/04/24 18:10	
EPA 8260D	Benzene	ND	ug/L	1.0	11/04/24 15:22	
EPA 8260D	Ethylbenzene	ND	ug/L	1.0	11/04/24 15:22	
EPA 8260D	Toluene	ND	ug/L	1.0	11/04/24 15:22	
EPA 8260D	Xylene (Total)	ND	ug/L	3.0	11/04/24 15:22	

Sample: TRIP BLANK **Lab ID: 30730511006** Collected: 10/31/24 00:00 Matrix: Water

Method	Parameters	Results	Units	Report Limit	Analyzed	Qualifiers
EPA 8015C	TPH (C06-C10)	ND	ug/L	200	11/04/24 18:28	
EPA 8260D	Benzene	ND	ug/L	1.0	11/04/24 14:31	
EPA 8260D	Ethylbenzene	ND	ug/L	1.0	11/04/24 14:31	
EPA 8260D	Toluene	ND	ug/L	1.0	11/04/24 14:31	
EPA 8260D	Xylene (Total)	ND	ug/L	3.0	11/04/24 14:31	

Sample: KPW **Lab ID: 30730511003** Collected: 10/31/24 10:50 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 900.0	**329 ± 886 (1,685)** **C:NA T:NA**	pCi/L	11/21/24 19:12	12587-46-1	
Gross Beta	EPA 900.0	**670 ± 606 (1,067)** **C:NA T:NA**	pCi/L	11/21/24 19:12	12587-47-2	
Radium-226	EPA 903.1	**490 ± 70.7 (2.54)** **C:NA T:100%**	pCi/L	11/21/24 15:14	13982-63-3	
Radium-228	EPA 904.0	**347 ± 65.1 (11.0)** **C:84% T:93%**	pCi/L	11/18/24 15:11	15262-20-1	

SAMPLE QUALIFIERS

Sample: 3441786

[1] Post-analysis pH measurement indicates pH > 2.

Sample: 3441787

[1] Post-analysis pH measurement indicates pH > 2.

ANALYTE QUALIFIERS

CH The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.

D3 Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

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Beaver, WV 25813
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ANALYTE QUALIFIERS

N2	The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.
S4	Surrogate recovery not evaluated against control limits due to sample dilution.

Reviewed by: Beth Johnson

Beth Johnson
(800)999-0105
beth.johnson@pacelabs.com

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
ANABISO/IEC 17025:2017 Rad Cert#: L24170
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 2950
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA010
Louisiana DEQ/TNI Certification #: 04086
Maine Certification #: 2023021
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 #: PA014572023-03
New Hampshire/TNI Certification #: 297622
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 #: PA200002-015
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: TN02867
Texas/TNI Certification #: T104704188-22-18
Utah/TNI Certification #: PA014572223-14
USDA Soil Permit #: 525-23-67-77263
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad

Pace Analytical Services Beaver

225 Industrial Park Road, Beaver, WV 25813
Virginia VELAP 460148
West Virginia DEP 060
West Virginia DHHR 00412CM
North Carolina DEQ 466
Kentucky Wastewater Certification KY90039
Pennsylvania DEP 68-00839

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY - Affix Workor

WO#: 30730511

30730511

ALL SHADE

Company: Kirk Environmental	Billing Information:
Address:	
Report To: Ed Kirk	Email To:
Copy To: Crystal Bennett	Site Collection Info/Address:
Customer Project Name/Number: Kaufman sites	State: / County/City: Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET
Phone: Email:	Site/Facility ID #: Compliance Monitoring? [X] Yes [ ] No
Collected By (print): Ed Kirk	Purchase Order #: Quote #: DW PWS ID #: DW Location Code:
Collected By (signature): Ed J. Kirk	Turnaround Date Required: Normal Immediately Packed on Ice: [X] Yes [ ] No
Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: ____ [ ] Hold: ____	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) Field Filtered (if applicable): [ ] Yes [X] No Analysis: ____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Container Preservative Type

G 1

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ____

Analyses

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Chloride, Bromide, Fluoride, Nitrate, Nitrite	Fe, Mn, Al, As, Na, Ca, Sulfate	TDS
KJL	GW	grab	10/31/24	1155				3	X	X	X
KJW	GW	grab	10/31/24	1245				3	X	X	X

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
VOA Preservation Correct	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:
KJL: DO 7.02; pH 8.57; cond 561.1 temp 16.4
KJW: DO 3.64; pH 6.93; cond 434.0 temp 18.0

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2959225

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: 36
Cooler 1 Temp Upon Receipt: 4 oC
Cooler 1 Therm Corr Factor: 0 oC
Cooler 1 Corrected Temp: 4 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Ed J. Kirk	10/31/24 1530	10-31-24	1830
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJ LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

NonConformance(s): YES / NO

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: Kirk Environmental

Address:

Billing Information:

Report To: Ed J. Kirk

Email To:

Copy To: Crystal Bennett

Site Collection Info/Address:

Customer Project Name/Number: Kaufman sites

State: / County/City: Time Zone Collected: [ ]PT [ ]MT [ ]CT [ ]ET

Phone:
Email:

Site/Facility ID #:

Compliance Monitoring? [X] Yes [ ] No

Collected By (print): Ed J. Kirk

Purchase Order #:
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature): Ed J. Kirk

Turnaround Date Required: normal

Immediately Packed on Ice: [X] Yes [ ] No

Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: ____ [ ] Hold: ____

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [X] No

Analysis: ____

Container Preservative Type **: 1 | 2 | 3

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Chloride, Bromide, Strontium, Boron	Fe, Mn, Al, As, Na, Ca, Sulfate	Specific cond, TPH GRO DRO, COD	BETX, TDS, TSS, TOC	Rad 226, Rad 228	Gross Alpha, Gross Beta
KPW	GW	grab	10/31/24	1050					X	X	X	X	X	X

Analyses

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact Y N NA
Custody Signatures Present Y N NA
Collector Signature Present Y N NA
Bottles Intact Y N NA
Correct Bottles Y N NA
Sufficient Volume Y N NA
Samples Received on Ice Y N NA
VOA - Headspace Acceptable Y N NA
USDA Regulated Soils Y N NA
Samples in Holding Time Y N NA
Residual Chlorine Present on Strips Y N NA
Sample pH Acceptable pH Strips Y N NA
Sulfide Present Lead Acetate Strips Y N NA

LAB USE ONLY:
Lab Sample # / Comments:

NON-CONFORMANCE
# of ctns not filled out

Customer Remarks / Special Conditions / Possible Hazards:
DO 2.44 mg/L temp 18.5°C
Cond > 150 mS
pH 5.62

Type of Ice Used: (Wet) Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm) Y N NA

SHORT HOLDS PRESENT (<72 hours) Y N N/A

Lab Tracking #: 2959226

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received Y N NA
Therm ID# 20
Cooler 1 Temp Upon Receipt 1.4 °C
Cooler 1 Therm Corr. Factor 0 °C
Cooler 1 Corrected Temp 1.4 °C
Comments:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Ed J. Kirk	10/31/24 1530	10-31-24	1548
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY-Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: Kirk Environmental

Address:

Billing Information:

Report To: Ed Kirk

Email To:

Copy To: Crystal Barnett

Site Collection Info/Address:

Customer Project Name/Number: Kaufman Sites

State: / County/City: Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET

Phone:
Email:

Site/Facility ID #:

Compliance Monitoring? [X] Yes [ ] No

Collected By (print): Ed J. Kirk

Purchase Order #:
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature): Ed J Kirk

Turnaround Date Required: normal

Immediately Packed on Ice: [X] Yes [ ] No

Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [X] No

Analysis: _____

Container Preservative Type **: U L 2 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Lab Project Manager:

Analyses: Chloride, Bromide, Fluoride, Sulfate; Mn, Al, As, Na, Ca; TPH-GRO, DRO, 4-ORO; BETX; TDS, TSS, TOC

Lab Profile/Line:

Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N NA
Custody Signatures Present Y N NA
Collector Signature Present Y N NA
Bottles Intact Y N NA
Correct Bottles Y N NA
Sufficient Volume Y N NA
Samples Received on Ice Y N NA
VOA - Headspace Acceptable Y N NA
USDA Regulated Soils Y N NA
Samples in Holding Time Y N NA
Residual Chlorine Present Y N NA
Cl Strips:
Sample pH Acceptable Y N NA
pH Strips:
Sulfide Present Y N NA
Lead Acetate Strips:

LAB USE ONLY:
Lab Sample # / Comments:

NON CONFORMANCE
8 of 5 ms MS/MSD only

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT).

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Chloride, Bromide, Fluoride, Sulfate	Mn, Al, As, Na, Ca	TPH-GRO, DRO, 4-ORO	BETX	TDS, TSS, TOC
UKS	GW	grab	10/31/24	1120					X	X	X	X	X
LKS	GW	grab	10/31/24	1220					X	X	X	X	X
* Trip Blank								6			X	X	

Customer Remarks / Special Conditions / Possible Hazards:
UKS: DO 6.16; pH 7.32; cond 632.4 temp 13.0 flow 2 gpm
LKS: DO 2.24; pH 6.54; cond 351.5 temp 12.8 flow 0.0

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2959227

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: 2
Cooler 1 Temp Upon Receipt: 1.6 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 1.6 oC
Comments: Rec cont 2°C 11/1/24

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Ed J. Kirk	10/31/24 1530	[signature] 10-31-24	1530
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Non Conformance(s): YES / NO

WO#: 30730511
PM: BMJ Due Date: 12/13/24
CLIENT: BV-KIRKENV

LIMS30 Lab Sample Condition Upon Receipt (West Virgin

Page 8 of 27

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ 3rd Party Courier ☐ Pace ☐ Other _____

Tracking #: _____

Custody Seal on Cooler/Box/Containers Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Thermometer Used 26 **Type of Ice:** (Wet) Blue None

Cooler Temperature **Observed Temp** 0.4 °C Correction Factor: 0 °C Final Temp: 0.4 °C

Thermal Preservation Requirement Met Yes ☑ No ☐

pH paper Lot#	Date and Initials of person examining contents:
204524	10/31/24 (J-NP)

	Yes	No	N/A	
Chain of Custody Present:	✓			1.
Chain of Custody Filled Out:	✓	✓		2. # of ctns missing on 2 COCs
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: -Pace Containers Used:	✓ ✓			10.
Containers Intact:	✓			11.
Orthophosphate field filtered:			✓	12.
Hex Cr Aqueous sample field filtered: -pH adjusted within 24 hours? (If yes, indicate acid lot #)			✓ ✓	13.
Filtered volume received for Dissolved tests:			✓	14.
All containers have been checked for chemical preservation: exceptions: VOA, coliform, O&G, LLMercury, Non-aqueous matrix	✓			15.
All containers meet method/chemical preservation requirements:	✓			Initial when completed: ZC Date: 11/1/24
				Tests not preserved:
Headspace in VOA Vials:		✓		16.
Trip Blank Present:	✓			17.
				Initial when completed: ZC Date: 11/1/24

Comments: _____

*PM review is documented electronically in LIMS, when the Project Manager closes the SRF Review schedule in LIMS. The status may be reviewed in the Status section of the Workorder Edit Screen.

Pace Analytical

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-In Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: Kirk Environmental

Address:

Billing Information:

Report To: Ed J. Kirk

Email To:

Copy To: Crystal Bennett

Site Collection Info/Address:

Customer Project Name/Number: Kauffman sites

State: / County/City: Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET

Phone:
Email:

Site/Facility ID #:

Compliance Monitoring? [X] Yes [ ] No

Collected By (print): Ed J. Kirk

Purchase Order #:
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature): Ed J. Kirk

Turnaround Date Required: normal

Immediately Packed on Ice: [X] Yes [ ] No

Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [X] No

Analysis: _____

Lab Project Manager:

Container Preservative Type**: 1 | 1 | 2 | 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Lab Profile/Line:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res. Cl	# of Ctns	Chloride, Bromide, Strontium, Barium	Fe, Mn, Al, As, Na, Cu, Sulfate	SPC, pH, TPH GRO, DRO & ORO	BETX, TDS, TSS, TOC	Rad 226, Rad 228	Gross Alpha, Gross Beta				
KPW	GW	grab	10/31/24	1050					X	X	X	X	X	X				

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA - Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

LAB USE ONLY:
Lab Sample # / Comments:

NON CONFORMANCE:
Hot Chos not filled out

Customer Remarks / Special Conditions / Possible Hazards:
DO 2.44 mg/L temp 18.5°C
Cond > 150 mS
pH 5.62

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N NA

Lab Tracking #: 2959226

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: 20
Cooler 1 Temp Upon Receipt: 1.4 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 1.4 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Ed J. Kirk	10/31/24 1530	10-31-24	1548
Relinquished by/Company: (Signature) Nicely's Del. Service	Date/Time: 11-1-24 23:00	Received by/Company: (Signature) Greg Pace	Date/Time: 11-1-24 23:00
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: _____ of: _____

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Pace Analytical®

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-In Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: Kirk Environmental

Address:

Report To: Ed Kirk

Copy To: Crystal Bennett

Customer Project Name/Number: Kaufman Sites

Billing Information:

Email To:

Site Collection Info/Address:

State: / County/City: Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET

Phone:
Email:

Site/Facility ID #:

Compliance Monitoring? [X] Yes [ ] No

Collected By (print): Ed J. Kirk

Purchase Order #:
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature): Ed J Kirk

Turnaround Date Required: normal

Immediately Packed on Ice: [X] Yes [ ] No

Sample Disposal:
[X] Dispose as appropriate [ ] Return
[ ] Archive: _____
[ ] Hold: _____

Rush:
[ ] Same Day [ ] Next Day
[ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day
(Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [X] No

Analysis: _____

Lab Project Manager:

Lab Profile/Line:

Container Preservative Type **: 1 | 2 | 3

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Calcium, Boron, Iron, Barium, Fe	Mn, Al, As, Na, Ca, Sulfate	TPH-GRO, DRO, & ORO	BETX	TDS, TSS, TOC.
UKS	GW	grab	10/31/24	1120					X	X	X	X	X
LKS	GW	grab	10/31/24	1220					X	X	X	X	X
☒ Trip Blank								6			X	X	

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y	N	NA
Custody Signatures Present	Y	N	NA
Collector Signature Present	Y	N	NA
Bottles Intact	Y	N	NA
Correct Bottles	Y	N	NA
Sufficient Volume	Y	N	NA
Samples Received on Ice	Y	N	NA
VOA - Headspace Acceptable	Y	N	NA
USDA Regulated Soils	Y	N	NA
Samples In Holding Time	Y	N	NA
Residual Chlorine Present	Y	N	NA
Cl Strips:			
Sample pH Acceptable	Y	N	NA
pH Strips:			
Sulfide Present	Y	N	NA
Lead Acetate Strips: _____			

LAB USE ONLY:
Lab Sample # / Comments:

NON CONFORMANCE
Res Cl > 0.5 AT 7:120 out.

Customer Remarks / Special Conditions / Possible Hazards:
UKS: DO 6.16; pH 7.32; cond 632.4 temp 13.0 flow < 1 gpm
LKS: DO 2.24; pH 6.54; cond 351.5 temp 12.8 flow 0.0

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #: 2959227

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: 7C
Cooler 1 Temp Upon Receipt: 1.6 oC
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 1.6 oC
Comments: Resent 2C 11/1/24

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: _____ of: _____

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Ed J. Kirk	10/31/24 1530	10-31-24	1530
Nicely's Del. Service	11-1-24 23:00	Pace	11-1-24 23:00

MTJL LAB USE ONLY
Table #:
Account:
Template:
Prelogin:
PM:
PB:

Pace Analytical Services	DC#_Title: ENV-FRM-GBUR-0088 v07_Sample Condition Upon Receipt-Greensburg
	Effective Date: 01/04/2024

Client Name: Kirk Env. **Project #:** 50703051

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☒ Other Nicely's

Tracking Number: Drop off

Initial / Date	
Examined By:	UB 11-4-24
Labeled By:	
Temped By:	UB 11-4-24

Custody Seal on Cooler/Box Present: ☒ Yes ☐No **Seals Intact:** ☒ Yes ☐No

Thermometer Used: 14 **Type of Ice:** (Wet) Blue None

Cooler Temperature: Observed Temp 2.9 °C Correction Factor: -0.5 °C Final Temp: 2.4 °C

Temp should be above freezing to 6°C

Comments:	Yes	No	NA	pH paper Lot# 160044	D.P.D. Residual Chlorine Lot #
Chain of Custody Present	X			1.	
Chain of Custody Filled Out:	X			2.	
-Were client corrections present on COC		X			
Chain of Custody Relinquished	X			3.	
Sampler Name & Signature on COC:	X			4.	
Sample Labels match COC:	X			5.	
-Includes date/time/ID					
Matrix: WT					
Samples Arrived within Hold Time:	X			6.	
Short Hold Time Analysis (<72hr remaining):		X		7.	
Rush Turn Around Time Requested:		X		8.	
Sufficient Volume:	X			9.	
Correct Containers Used:	X			10.	
-Pace Containers Used		X			
Containers Intact:	X			11.	
Orthophosphate field filtered:			X	12.	
Hex Cr Aqueous samples field filtered:			X	13.	
Organic Samples checked for dichlorination			X	14:	
Filtered volume received for dissolved tests:			X	15:	
All containers checked for preservation:	X			16.	
exceptions: VOA, coliform, TOC, O&G, Phenolics, Radon, non-aqueous matrix					
All containers meet method preservation requirements:	X			pH<2 Initial when completed UB / Lot# of added Preservative	Date/Time of Preservation
8260C/D: Headspace in VOA Vials (> 6mm)			X	17.	
624.1: Headspace in VOA Vials (0mm)			X	18.	
Radon: Headspace in RAD Vials (0mm)			X	19.	
Trip Blank Present:			X	Trip blank custody seal present? YES or NO	
Rad Samples Screened <.05 mrem/hr.	X			Initial when completed UB	Date: 11-4-24 / Survey Meter SN: 2204382

Comments:

Note: For NC compliance samples with discrepancies, a copy of this form must be sent to the DEHNR Certification office.
PM Review is documented electronically in LIMS through the SRF Review schedule in the Workorder Edit Screen.

Qualtrax ID: 55680

WO#: 30730511
PM: BHJ Due Date: 12/13/24
CLIENT: BV-KIRKENV

LIMS30 Lab Sample Condition Upon Receipt (West Virgini

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ 3rd Party Courier ☐ Pace ☐ Other _____

Tracking #: _____

Custody Seal on Cooler/Box/Containers Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Thermometer Used 26 Type of Ice: (Wet) Blue None

Cooler Temperature Observed Temp 0.4 °C Correction Factor: 0 °C Final Temp: 0.4 °C

Thermal Preservation Requirement Met Yes ☑ No ☐

pH paper Lot# 204524 | Date and Initials of person examining contents: 10/31/24 (J-NP)

	Yes	No	N/A	
Chain of Custody Present:	✓			1.
Chain of Custody Filled Out:	✓	✓		2. # of ctns missing on 2 COCs
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: -Pace Containers Used:	✓ ✓			10.
Containers Intact:	✓			11.
Orthophosphate field filtered:			✓	12.
Hex Cr Aqueous sample field filtered: -pH adjusted within 24 hours? (If yes, indicate acid lot #)			✓ ✓	13.
Filtered volume received for Dissolved tests:			✓	14.
All containers have been checked for chemical preservation: exceptions: VOA, coliform, O&G, LLMercury, Non-aqueous matrix	✓			15.
All containers meet method/chemical preservation requirements:	✓			Initial when completed: ZC Date: 11/1/24
				Tests not preserved:
Headspace in VOA Vials:		✓		16.
Trip Blank Present:	✓			17.
				Initial when completed: ZC Date: 11/1/24

Comments: _____

*PM review is documented electronically in LIMS, when the Project Manager closes the SRF Review schedule in LIMS. The status may be reviewed in the Status section of the Workorder Edit Screen.

Pace Analytical Services, LLC
P.O. Box 907
Madisonville, KY 42431
270.821.7375
www.pacelabs.com

Certificate of Analysis
4113738

Beth Johnson
Pace Analytical Services LLC Beaver
225 Industrial Park Rd
Beaver, WV 25813

Customer ID: 44-102122
Report Printed: 11/20/2024 15:12

Project Name: WV SDWA Beth Johnson | Workorder: 4113738

Dear Beth Johnson

Enclosed are the analytical results for samples received by the laboratory 11/12/2024 10:58.

The results relate 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 LLC Kentucky - Madisonville

If you have any questions concerning this report, please feel free to contact me.

#460210 Madisonville, KY
#460291 Pikeville, KY
#E871136 Englewood, OH

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

Melissia Brown, Project Coordinator

Pace Analytical Services, LLC
P.O. Box 907
Madisonville, KY 42431
270.821.7375
www.pacelabs.com

SAMPLE SUMMARY

Lab ID	Client Sample ID/Alias	Matrix	Date Collected	Date Received	Sampled By
4113738-01	DBP Sample/30732801001 48 Union Camp Rd	Drinking Water	11/08/2024 10:03	11/12/2024 10:58	Julia Childers
4113738-02	DBP Sample/30732801002 48 Union Camp Rd	Drinking Water	11/08/2024 10:03	11/12/2024 10:58	Julia Childers
4113738-03	DBP Sample/30732801003 292 Koons Run Rd	Drinking Water	11/08/2024 10:53	11/12/2024 10:58	Julia Childers
4113738-04	DBP Sample/30732801004 292 Koons Run Rd	Drinking Water	11/08/2024 10:53	11/12/2024 10:58	Julia Childers
4113738-05	DBP Sample/30732801005 Trip Blank	Drinking Water	11/08/2024 10:03	11/12/2024 10:58	Julia Childers

Work Order Comments:

The individual THM / HAA components are rounded then reported.

The total THM / HAA values are calculated from the sum of actual values for the individual analytes. This value is then rounded. It is possible for the total value not to match the sum of the individual components.
If this data is used for regulatory purposes, the total values will be the actual sum of the individual analytes.

Pace Analytical Services, LLC
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Madisonville, KY 42431
270.821.7375
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ANALYTICAL RESULTS

Lab Sample ID: **4113738-01**
Description: **DBP Sample 30732801001 48 Union Camp Rd**

Sample Collection Date Time: 11/08/2024 10:03
Sample Received Date Time: 11/12/2024 10:58

Matrix: Drinking Water
Discharge/Site No:
Regulatory ID: WV3301706

Volatile Organic Compounds Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Total Trihalomethanes	**0.071**		mg/L	0.001	0.0005	EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 09:45	CLM
Bromodichloromethane	**0.012**		mg/L	0.001	0.0005	EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 09:45	CLM
Bromoform	ND	U	mg/L	0.001		EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 09:45	CLM
Chloroform	**0.058**		mg/L	0.001	0.0005	EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 09:45	CLM
Dibromochloromethane	**0.002**		mg/L	0.001	0.0005	EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 09:45	CLM

ANALYTICAL RESULTS

Lab Sample ID: **4113738-02**
Description: **DBP Sample 30732801002 48 Union Camp Rd**

Sample Collection Date Time: 11/08/2024 10:03
Sample Received Date Time: 11/12/2024 10:58

Matrix: Drinking Water
Discharge/Site No:
Regulatory ID: WV3301706

Gas Chromatography Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bromoacetic Acid	ND	U	mg/L	0.001		EPA 552.3	11/14/2024 08:45	11/14/2024 22:55	CDD
Dibromoacetic Acid	ND	U	mg/L	0.001		EPA 552.3	11/14/2024 08:45	11/14/2024 22:55	CDD
Dichloroacetic Acid	**0.006**		mg/L	0.001	0.0005	EPA 552.3	11/14/2024 08:45	11/14/2024 22:55	CDD
Monochloroacetic Acid	ND	U	mg/L	0.001		EPA 552.3	11/14/2024 08:45	11/14/2024 22:55	CDD
Trichloroacetic Acid	**0.018**		mg/L	0.001	0.0005	EPA 552.3	11/14/2024 08:45	11/14/2024 22:55	CDD
Total HAA5	**0.024**		mg/L	0.001	0.0005	EPA 552.3	11/14/2024 08:45	11/14/2024 22:55	CDD

Surrogate: 2,3-Dibromopropionic acid *107 %* *70-130* *11/14/2024 08:45* *11/14/2024 22:55* *CDD* *EPA 552.3*

Pace Analytical Services, LLC
P.O. Box 907
Madisonville, KY 42431
270.821.7375
www.pacelabs.com

ANALYTICAL RESULTS

Lab Sample ID: **4113738-03**
Description: **DBP Sample 30732801003 292 Koons Run Rd**

Sample Collection Date Time: 11/08/2024 10:53
Sample Received Date Time: 11/12/2024 10:58

Matrix: Drinking Water Discharge/Site No: Regulatory ID: WV3301706

Volatile Organic Compounds Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Total Trihalomethanes	**0.048**		mg/L	0.001	0.0005	EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 10:17	CLM
Bromodichloromethane	**0.010**		mg/L	0.001	0.0005	EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 10:17	CLM
Bromoform	ND	U	mg/L	0.001		EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 10:17	CLM
Chloroform	**0.037**		mg/L	0.001	0.0005	EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 10:17	CLM
Dibromochloromethane	**0.001**		mg/L	0.001	0.0005	EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 10:17	CLM

ANALYTICAL RESULTS

Lab Sample ID: **4113738-04**
Description: **DBP Sample 30732801004 292 Koons Run Rd**

Sample Collection Date Time: 11/08/2024 10:53
Sample Received Date Time: 11/12/2024 10:58

Matrix: Drinking Water Discharge/Site No: Regulatory ID: WV3301706

Gas Chromatography Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Bromoacetic Acid	ND	U	mg/L	0.001		EPA 552.3	11/14/2024 08:45	11/14/2024 23:13	CDD
Dibromoacetic Acid	ND	U	mg/L	0.001		EPA 552.3	11/14/2024 08:45	11/14/2024 23:13	CDD
Dichloroacetic Acid	**0.012**		mg/L	0.001	0.0005	EPA 552.3	11/14/2024 08:45	11/14/2024 23:13	CDD
Monochloroacetic Acid	ND	U	mg/L	0.001		EPA 552.3	11/14/2024 08:45	11/14/2024 23:13	CDD
Trichloroacetic Acid	**0.015**		mg/L	0.001	0.0005	EPA 552.3	11/14/2024 08:45	11/14/2024 23:13	CDD
Total HAA5	**0.027**		mg/L	0.001	0.0005	EPA 552.3	11/14/2024 08:45	11/14/2024 23:13	CDD

Surrogate: 2,3-Dibromopropionic aci 104 % 70-130 11/14/2024 08:45 11/14/2024 23:13 CDD EPA 552.3

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ANALYTICAL RESULTS

Lab Sample ID: **4113738-05**
Description: **DBP Sample 30732801005 Trip Blank**

Sample Collection Date Time: 11/08/2024 10:03
Sample Received Date Time: 11/12/2024 10:58

Matrix: Drinking Water

Discharge/Site No:

Regulatory ID: WV3301706

Volatile Organic Compounds Madisonville

Analyte	Result	Flag	Units	MRL	MDL	Method	Prepared	Analyzed	Analyst
Total Trihalomethanes	ND	U	mg/L	0.001		EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 10:49	CLM
Bromodichloromethane	ND	U	mg/L	0.001		EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 10:49	CLM
Bromoform	ND	U	mg/L	0.001		EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 10:49	CLM
Chloroform	ND	U	mg/L	0.001		EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 10:49	CLM
Dibromochloromethane	ND	U	mg/L	0.001		EPA 524.2 REV 4.1	11/14/2024 11:15	11/15/2024 10:49	CLM

Notes for work order 4113738

- Samples collected by PACE personnel are done so in accordance with procedures set forth in PACE field services SOPs.
- Results contained in this report are only representative of the samples received.
- PACE does not provide interpretation of these results unless otherwise stated.
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identification based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.

Qualifiers

M1	Matrix spike recovery was high; the method control sample recovery was acceptable.
U	Target analyte was analyzed for, but was below detection limit (the value associated with the qualifier is the laboratory method detection limit in our LIMS system).
Y5	MS/MSD RPD exceeded the method control limit.

Standard Qualifiers/Acronyms

MDL	Method Detection Limit
MRL	Minimum Reporting Limit
ND	Not Detected
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
% Rec	Percent Recovery
RPD	Relative Percent Difference
>	Greater than
<	Less than

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Volatile Organic Compounds Madisonville - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch BDK1449 - VOC - Prep										
Blank (BDK1449-BLK1)										
Prepared: 11/14/2024 11:15, Analyzed: 11/15/2024 7:38										
Total Trihalomethanes	ND	0.001	mg/L							U
Total Trihalomethanes	ND	0.001	mg/L							U
Bromodichloromethane	ND	0.001	mg/L							U
Bromodichloromethane	ND	0.001	mg/L							U
Bromoform	ND	0.001	mg/L							U
Bromoform	ND	0.001	mg/L							U
Chloroform	ND	0.001	mg/L							U
Chloroform	ND	0.001	mg/L							U
Dibromochloromethane	ND	0.001	mg/L							U
Dibromochloromethane	ND	0.001	mg/L							U
Surrogate: Bromofluorobenzene	*0.0251*		mg/L	*0.0250*		*101*	*70-130*			
Surrogate: Bromofluorobenzene	*0.0251*		mg/L	*0.0250*		*101*	*70-130*			
Surrogate: Toluene-d8	*0.0254*		mg/L	*0.0250*		*102*	*70-130*			
Surrogate: Toluene-d8	*0.0254*		mg/L	*0.0250*		*102*	*70-130*			
Surrogate: 1,2-Dichlorobenzene-d4	*0.0254*		mg/L	*0.0250*		*102*	*70-130*			
Surrogate: 1,2-Dichlorobenzene-d4	*0.0254*		mg/L	*0.0250*		*102*	*70-130*			
LCS (BDK1449-BS1)										
Prepared: 11/14/2024 11:15, Analyzed: 11/15/2024 7:06										
Bromodichloromethane	0.025	0.001	mg/L	0.0250		100	70-130			
Bromodichloromethane	0.025	0.001	mg/L	0.0250		100	70-130			
Bromoform	0.025	0.001	mg/L	0.0250		98.1	70-130			
Bromoform	0.025	0.001	mg/L	0.0250		98.1	70-130			
Chloroform	0.024	0.001	mg/L	0.0250		97.7	70-130			
Chloroform	0.024	0.001	mg/L	0.0250		97.7	70-130			
Dibromochloromethane	0.024	0.001	mg/L	0.0250		96.0	70-130			
Dibromochloromethane	0.024	0.001	mg/L	0.0250		96.0	70-130			
Surrogate: Bromofluorobenzene	*0.0255*		mg/L	*0.0250*		*102*	*70-130*			
Surrogate: Bromofluorobenzene	*0.0255*		mg/L	*0.0250*		*102*	*70-130*			
Surrogate: Toluene-d8	*0.0256*		mg/L	*0.0250*		*102*	*70-130*			
Surrogate: Toluene-d8	*0.0256*		mg/L	*0.0250*		*102*	*70-130*			
Surrogate: 1,2-Dichlorobenzene-d4	*0.0250*		mg/L	*0.0250*		*99.8*	*70-130*			
Surrogate: 1,2-Dichlorobenzene-d4	*0.0250*		mg/L	*0.0250*		*99.8*	*70-130*			

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Volatile Organic Compounds Madisonville - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch BDK1449 - VOC - Prep										
Matrix Spike (BDK1449-MS1)	**Source: 4113747-01**									
Prepared: 11/14/2024 11:15, Analyzed: 11/15/2024 18:18										
Bromodichloromethane	0.032	0.001	mg/L	0.0250	0.006	106	65-135			
Bromodichloromethane	0.032	0.001	mg/L	0.0250	0.006	106	65-135			
Bromoform	0.025	0.001	mg/L	0.0250	ND	98.8	65-135			
Bromoform	0.025	0.001	mg/L	0.0250	ND	98.8	65-135			
Chloroform	0.060	0.001	mg/L	0.0250	0.033	105	65-135			
Chloroform	0.060	0.001	mg/L	0.0250	0.033	105	65-135			
Dibromochloromethane	0.026	0.001	mg/L	0.0250	ND	102	65-135			
Dibromochloromethane	0.026	0.001	mg/L	0.0250	0.0006	99.8	65-135			
Surrogate: Bromofluorobenzene	*0.0257*		mg/L	*0.0250*		*103*	*65-135*			
Surrogate: Bromofluorobenzene	*0.0257*		mg/L	*0.0250*		*103*	*65-135*			
Surrogate: Toluene-d8	*0.0255*		mg/L	*0.0250*		*102*	*65-135*			
Surrogate: Toluene-d8	*0.0255*		mg/L	*0.0250*		*102*	*65-135*			
Surrogate: 1,2-Dichlorobenzene-d4	*0.0254*		mg/L	*0.0250*		*102*	*70-130*			
Surrogate: 1,2-Dichlorobenzene-d4	*0.0254*		mg/L	*0.0250*		*102*	*70-130*			
Matrix Spike Dup (BDK1449-MSD1)	**Source: 4113747-01**									
Prepared: 11/14/2024 11:15, Analyzed: 11/15/2024 18:50										
Bromodichloromethane	0.033	0.001	mg/L	0.0250	0.006	109	65-135	2.48	30	
Bromodichloromethane	0.033	0.001	mg/L	0.0250	0.006	109	65-135	2.48	30	
Bromoform	0.024	0.001	mg/L	0.0250	ND	97.8	65-135	1.02	30	
Bromoform	0.024	0.001	mg/L	0.0250	ND	97.8	65-135	1.02	30	
Chloroform	0.061	0.001	mg/L	0.0250	0.033	108	65-135	1.53	30	
Chloroform	0.061	0.001	mg/L	0.0250	0.033	108	65-135	1.53	30	
Dibromochloromethane	0.026	0.001	mg/L	0.0250	ND	104	65-135	1.40	30	
Dibromochloromethane	0.026	0.001	mg/L	0.0250	0.0006	101	65-135	1.40	30	
Surrogate: Bromofluorobenzene	*0.0259*		mg/L	*0.0250*		*104*	*65-135*			
Surrogate: Bromofluorobenzene	*0.0259*		mg/L	*0.0250*		*104*	*65-135*			
Surrogate: Toluene-d8	*0.0257*		mg/L	*0.0250*		*103*	*65-135*			
Surrogate: Toluene-d8	*0.0257*		mg/L	*0.0250*		*103*	*65-135*			
Surrogate: 1,2-Dichlorobenzene-d4	*0.0251*		mg/L	*0.0250*		*100*	*70-130*			
Surrogate: 1,2-Dichlorobenzene-d4	*0.0251*		mg/L	*0.0250*		*100*	*70-130*			

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch BDK1272 - 552.3 Extraction HAA										
Blank (BDK1272-BLK1)										
Prepared: 11/14/2024 8:45, Analyzed: 11/14/2024 18:26										
Bromoacetic Acid	ND	0.001	mg/L							U
Dibromoacetic Acid	ND	0.001	mg/L							U
Dichloroacetic Acid	ND	0.001	mg/L							U
Monochloroacetic Acid	ND	0.001	mg/L							U
Trichloroacetic Acid	ND	0.001	mg/L							U
Total HAA5	ND	0.001	mg/L							U
Surrogate: 2,3-Dibromopropionic acid	*0.00973*		mg/L	*0.0100*		*97.3*	*70-130*			
LCS (BDK1272-BS1)										
Prepared: 11/14/2024 8:45, Analyzed: 11/14/2024 19:02										
Bromoacetic Acid	0.023	0.001	mg/L	0.0250		92.2	70-130			
Dibromoacetic Acid	0.025	0.001	mg/L	0.0250		98.1	70-130			
Dichloroacetic Acid	0.023	0.001	mg/L	0.0250		92.0	70-130			
Monochloroacetic Acid	0.023	0.001	mg/L	0.0250		93.8	70-130			
Trichloroacetic Acid	0.024	0.001	mg/L	0.0250		97.6	70-130			
Total HAA5	0.118	0.001	mg/L	0.125		94.7	70-130			
Surrogate: 2,3-Dibromopropionic acid	*0.0100*		mg/L	*0.0100*		*100*	*70-130*			
Matrix Spike (BDK1272-MS1)	**Source: 4113713-01**									
Prepared: 11/14/2024 8:45, Analyzed: 11/15/2024 1:53										
Bromoacetic Acid	0.064	0.001	mg/L	0.0250	ND	255	70-130			M1, Y5
Dibromoacetic Acid	0.024	0.001	mg/L	0.0250	ND	96.6	70-130			
Dichloroacetic Acid	0.059	0.001	mg/L	0.0250	0.035	98.9	70-130			
Monochloroacetic Acid	0.029	0.001	mg/L	0.0250	0.001	113	70-130			
Trichloroacetic Acid	0.079	0.001	mg/L	0.0250	0.053	106	70-130			
Total HAA5	0.256	0.001	mg/L	0.125	0.089	134	70-130			M1
Surrogate: 2,3-Dibromopropionic acid	*0.00995*		mg/L	*0.0100*		*99.5*	*70-130*			
Matrix Spike (BDK1272-MS2)	**Source: 4113714-01**									
Prepared: 11/14/2024 8:45, Analyzed: 11/15/2024 2:29										
Bromoacetic Acid	0.032	0.001	mg/L	0.0250	ND	126	70-130			
Dibromoacetic Acid	0.025	0.001	mg/L	0.0250	ND	98.6	70-130			
Dichloroacetic Acid	0.042	0.001	mg/L	0.0250	0.017	97.5	70-130			
Monochloroacetic Acid	0.030	0.001	mg/L	0.0250	ND	122	70-130			
Trichloroacetic Acid	0.045	0.001	mg/L	0.0250	0.021	98.4	70-130			
Total HAA5	0.174	0.001	mg/L	0.125	0.038	108	70-130			
Surrogate: 2,3-Dibromopropionic acid	*0.0103*		mg/L	*0.0100*		*103*	*70-130*			

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch BDK1272 - 552.3 Extraction HAA										
Matrix Spike Dup (BDK1272-MSD1) **Source: 4113713-01**										
Prepared: 11/14/2024 8:45, Analyzed: 11/15/2024 2:11										
Bromoacetic Acid	0.023	0.001	mg/L	0.0250	ND	93.7	70-130	92.5	30	Y5
Dibromoacetic Acid	0.026	0.001	mg/L	0.0250	ND	104	70-130	7.69	30	
Dichloroacetic Acid	0.061	0.001	mg/L	0.0250	0.035	106	70-130	2.91	30	
Monochloroacetic Acid	0.030	0.001	mg/L	0.0250	0.001	117	70-130	3.14	30	
Trichloroacetic Acid	0.082	0.001	mg/L	0.0250	0.053	118	70-130	3.91	30	
Total HAA5	0.223	0.001	mg/L	0.125	0.089	108	70-130	13.6	30	
Surrogate: 2,3-Dibromopropionic acid	*0.0107*		mg/L	*0.0100*		*107*	*70-130*			
Matrix Spike Dup (BDK1272-MSD2) **Source: 4113714-01**										
Prepared: 11/14/2024 8:45, Analyzed: 11/15/2024 2:47										
Bromoacetic Acid	0.033	0.001	mg/L	0.0250	ND	131	70-130	4.07	30	M1
Dibromoacetic Acid	0.025	0.001	mg/L	0.0250	ND	98.5	70-130	0.0406	30	
Dichloroacetic Acid	0.042	0.001	mg/L	0.0250	0.017	99.8	70-130	1.40	30	
Monochloroacetic Acid	0.032	0.001	mg/L	0.0250	ND	127	70-130	4.46	30	
Trichloroacetic Acid	0.045	0.001	mg/L	0.0250	0.021	99.1	70-130	0.398	30	
Total HAA5	0.177	0.001	mg/L	0.125	0.038	111	70-130	1.97	30	
Surrogate: 2,3-Dibromopropionic acid	*0.0106*		mg/L	*0.0100*		*106*	*70-130*			

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Certified Analyses included in this Report

Analyte	Certifications
EPA 524.2 REV 4.1 in Water	
Total Trihalomethanes	KY Drinking Water Mdv (00030) IN Drinking Water Mdv (C-KY-02) VA NELAC MDV (460210) WV Drinking Water Mdv (9959 M) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880)
Total Trihalomethanes	KY Drinking Water Mdv (00030) IN Drinking Water Mdv (C-KY-02) VA NELAC MDV (460210) WV Drinking Water Mdv (9959 M) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880)
Bromodichloromethane	KY Drinking Water Mdv (00030) IN Drinking Water Mdv (C-KY-02) VA NELAC MDV (460210) WV Drinking Water Mdv (9959 M) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880)
Bromodichloromethane	KY Drinking Water Mdv (00030) IN Drinking Water Mdv (C-KY-02) VA NELAC MDV (460210) WV Drinking Water Mdv (9959 M) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880)
Bromoform	KY Drinking Water Mdv (00030) IN Drinking Water Mdv (C-KY-02) VA NELAC MDV (460210) WV Drinking Water Mdv (9959 M) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880)
Bromoform	KY Drinking Water Mdv (00030) IN Drinking Water Mdv (C-KY-02) VA NELAC MDV (460210) WV Drinking Water Mdv (9959 M) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880)
Chloroform	KY Drinking Water Mdv (00030) IN Drinking Water Mdv (C-KY-02) VA NELAC MDV (460210) WV Drinking Water Mdv (9959 M) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880)
Chloroform	KY Drinking Water Mdv (00030) IN Drinking Water Mdv (C-KY-02) VA NELAC MDV (460210) WV Drinking Water Mdv (9959 M) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880)
Dibromochloromethane	KY Drinking Water Mdv (00030) IN Drinking Water Mdv (C-KY-02) VA NELAC MDV (460210) WV Drinking Water Mdv (9959 M) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880)
Dibromochloromethane	KY Drinking Water Mdv (00030) IN Drinking Water Mdv (C-KY-02) VA NELAC MDV (460210) WV Drinking Water Mdv (9959 M) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880)
EPA 552.3 in Water	
Bromoacetic Acid	KY Drinking Water Mdv (00030) VA NELAC MDV (460210) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880) NC Drinking Water (21706) IN Drinking Water Mdv (C-KY-02) FL Drinking Water Mdv (E871159) WV Drinking Water Mdv (9959 M) MS Drinking Water MADV
Bromoacetic Acid [2C]	KY Drinking Water Mdv (00030) VA NELAC MDV (460210) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880) NC Drinking Water (21706) IN Drinking Water Mdv (C-KY-02) FL Drinking Water Mdv (E871159) WV Drinking Water Mdv (9959 M) MS Drinking Water MADV
Dibromoacetic Acid	KY Drinking Water Mdv (00030) VA NELAC MDV (460210) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880) NC Drinking Water (21706) IN Drinking Water Mdv (C-KY-02) FL Drinking Water Mdv (E871159) WV Drinking Water Mdv (9959 M) MS Drinking Water MADV
Dibromoacetic Acid [2C]	KY Drinking Water Mdv (00030) VA NELAC MDV (460210) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880) NC Drinking Water (21706) IN Drinking Water Mdv (C-KY-02) FL Drinking Water Mdv (E871159) WV Drinking Water Mdv (9959 M) MS Drinking Water MADV
Dichloroacetic Acid	KY Drinking Water Mdv (00030) VA NELAC MDV (460210) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880) NC Drinking Water (21706) IN Drinking Water Mdv (C-KY-02) FL Drinking Water Mdv (E871159) WV Drinking Water Mdv (9959 M) MS Drinking Water MADV
Dichloroacetic Acid [2C]	KY Drinking Water Mdv (00030) VA NELAC MDV (460210) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880) NC Drinking Water (21706) IN Drinking Water Mdv (C-KY-02) FL Drinking Water Mdv (E871159) WV Drinking Water Mdv (9959 M) MS Drinking Water MADV
Monochloroacetic Acid	KY Drinking Water Mdv (00030) VA NELAC MDV (460210) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880) NC Drinking Water (21706) IN Drinking Water Mdv (C-KY-02) FL Drinking Water Mdv (E871159) WV Drinking Water Mdv (9959 M) MS Drinking Water MADV
Monochloroacetic Acid [2C]	KY Drinking Water Mdv (00030) VA NELAC MDV (460210) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880) NC Drinking Water (21706) IN Drinking Water Mdv (C-KY-02) FL Drinking Water Mdv (E871159) WV Drinking Water Mdv (9959 M) MS Drinking Water MADV
Trichloroacetic Acid	KY Drinking Water Mdv (00030) VA NELAC MDV (460210) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880) NC Drinking Water (21706) IN Drinking Water Mdv (C-KY-02) FL Drinking Water Mdv (E871159) WV Drinking Water Mdv (9959 M) MS Drinking Water MADV
Trichloroacetic Acid [2C]	KY Drinking Water Mdv (00030) VA NELAC MDV (460210) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880) NC Drinking Water (21706) IN Drinking Water Mdv (C-KY-02) FL Drinking Water Mdv (E871159) WV Drinking Water Mdv (9959 M) MS Drinking Water MADV
Total HAA5	KY Drinking Water Mdv (00030) VA NELAC MDV (460210) TN Drinking Water (02819) ADEM Drinking Water Mdv (41880) NC Drinking Water (21706) IN Drinking Water Mdv (C-KY-02) FL Drinking Water Mdv (E871159) WV Drinking Water Mdv (9959 M) MS Drinking Water MADV
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Pace Analytical Services, LLC
P.O. Box 907
Madisonville, KY 42431
270.821.7375
www.pacelabs.com

Sample Acceptance Checklist for Work Order 4113738

Shipped By: UPS

Temperature: 2.80° Celcius

Condition	
Check if Custody Seals are Present/Intact	☐
Check if Custody Signatures are Present	☑
Check if Collector Signature Present	☑
Check if bottles are intact	☑
Check if bottles are correct	☑
Check if bottles have sufficient volume	☑
Check if samples received on ice	☑
Check if VOA headspace is acceptable	☑
Check if samples received in holding time.	☑
Check if samples are preserved properly	☑

Internal Transfer Chain of Custody

4113738

☐ Rush Multiplier_____X
☐ Samples Pre-Logged into eCOC

State Of Origin: WV
Cert. Needed: ☒ Yes ☐ No

Pace

Workorder: 30732801 Workorder Name: WV3301706

Owner Received Date: 11/8/2024 Results Requested By: 11/25/2024

Report To

Beth Johnson
Pace Beaver West Virginia
225 Industrial Park RD
Beaver, WV 25813
Phone (800)999-0105

Subcontract To

Pace Analytical Madisonville
825 Industrial Rd
Madisonville, KY 42431
Phone (270)824-2211

Requested Analysis

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Other	Preserved Containers: MeOH	Trip Blank	WV DW HAA5	WV DW TTHM	LAB USE ONLY
1	48 UNION CAMP RD	PS	11/8/2024 10:03	30732801001	Drinking		3			X	S2THM1
2	48 UNION CAMP RD	PS	11/8/2024 10:03	30732801002	Drinking	3			X		S2HAA1
3	292 KOONS RUN RD	PS	11/8/2024 10:53	30732801003	Drinking		3			X	S2THM2
4	292 KOONS RUN RD	PS	11/8/2024 10:53	30732801004	Drinking	3			X		S2HAA2
5	TRIP BLANK	PS	11/8/2024 00:00	30732801005	Water		1	X			

Transfers	Released By	Date/Time	Received By	Date/Time
1	11-11-24	1431		11-12-24
2				1058
3				

Comments

WV3301706
RT
DS001
EM

Cooler Temperature on Receipt °C | Custody Seal Y or N | Received on Ice Y or N | Samples Intact Y or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.*

Thermometer Serial Number
230753815
240381205
Temperature 1.0 °C

INTER_LABORATORY WORK ORDER # 30732801

(To be completed by sending lab)

Ship To:
Pace Analytical Madisonville
825 Industrial Rd
Madisonville, KY 42431
Phone (270)824-2211

Sending Project No:	30732801
Receiving Project No:	
Check Box for Consolidated Invoice:	☐
Date Prepared:	11/11/24
REQUESTED COMPLETION DATE:	**11/25/2024**

Sending Region	IR30-Pittsburgh	Sending Project Mgr.	Beth Johnson
Receiving Region	IR44-Madisonville	External Client	GREATER HARRISON COUNTY PSD
State of Sample Origin	WV	QC Deliverable	PACKAGEEDD

All questions should be addressed to sending project manager.

Requested Reportable Units _____ Report Wet or Dry Weight? Wet Cert. Needed _____

WORK REQUESTED

Method Description	Container Type	Quantity of containers	Preservative	Quantity of Samples	Acode	Acode Desc
WV DW HAA5	DG74		Other	2	SI-30MSSV	SUB PASI MSS
Trip Blank	VG9C		MeCl	1	SI-34MSV	SUB PASI MSV
WV DW TTHM	VG9C		MeCl	2	SI-34MSV	SUB PASI MSV

Special Requirements: Report F,QC Lmts,MDLs,Req Lmts (F),West Virginia CMDP (1667)

FOR ANALYTICAL WORK COMPLETED THIS SECTION ALSO

Return Samples to Sending Region: ☐ Yes ☒ No

DISPOSITION of FORM

Original sent to the receiving lab - Copy kept at the sending lab.

When work completed: Original sent to the ABM at the receiving laboratory. Copies are made to corporate as needed.

Pace Analytical

CHAIN-OF-CUSTODY Analytical Request Document

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf
Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-In Number Here

WO#: 30732801

30732801

ALL BO

Container Pre

** Preservative Types: (1) nitric ac (5) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (10) sodium bisulfate, (11) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

Company: Greater Harrison Co. PSD
Address: PO BOX 190 West Milford WV 26451
Report To: Julia Childers jchilders@ghpsd.com
Copy To: Brenda Louk brenda.ghpsd@gmail.com
Customer Project Name/Number:

Billing Information: 151 Peninsula Park Ave West Milford WV 26451
Email To: jchilders@ghpsd.com
Site Collection Info/Address:
State: County/City: Time Zone Collected: [ ]PT [ ]MT [ ]CT [X]ET

Phone: 304-745-3463
Email: jchilders@ghpsd.com
Julia Childers

Site/Facility ID #:
Purchase Order #:
Quote #:
Turnaround Date Required: November 12, 2024

Compliance Monitoring? [X] Yes [ ] No
DW PWS ID #: 3301706
DW Location Code:
Immediately Packed on Ice: [X] Yes [ ] No
Field Filtered (if applicable): [ ] Yes [X] No
Analysis: _____

Collected By (signature): Julia Childers

Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold:

Rush: (Expedite Charges Apply) [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [X] 5 Day

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Time	Composite End Date	Time	Res Cl	# of Ctns	Container Type: Plastic (P) or Glass (G)	TTHM &HAA5
48 Union Camp Rd	DW	Grab	11/8/2024	1003A	11/8/2024	1003A		1	G	X
292 Koons Run Rd	DW	Grab	11/8/2024	1053A	11/8/2024	1053A		1	G	X
* Trip Blank								1		

Analyses

Lab Profile/Line:

Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N NA
Custody Signatures Present Y N NA
Collector Signature Present Y N NA
Bottles Intact Y N NA
Correct Bottles Y N NA
Sufficient Volume Y N NA
Samples Received on Ice Y N NA
VOA - Headspace Acceptable Y N NA
USDA Regulated Soils Y N NA
Samples in Holding Time Y N NA
Residual Chlorine Present Y N NA
Cl Strips: _____
Sample pH Acceptable Y N NA
pH Strips: _____
Sulfide Present Y N NA
Lead Acetate Strips: _____

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None
Packing Material Used:
Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A
Lab Tracking #:
Samples received via: FEDEX UPS Client Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: _____
Cooler 1 Temp Upon Receipt: 1.0 °C
Cooler 1 Therm Corr. Factor: 0.1 °C
Cooler 1 Corrected Temp: 1.1 °C
Comments:
Pr Recept. JC 11/8/24

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Julia Childers GHCPSD	11-8-24 1:22pm	BMM / PACE	11/8/24 13:22
BMM / PACE	11/8/24 14:00		11-8-24 1400
	11-8-24 1600	TB TB 11 8 24 1603 / 11 8 24 1800	

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO
Page: ____ of: ____

11-8-24 1800

MSDS Sheets

for additives

Fig No 11

Baker Hughes

SAFETY DATA SHEET

Packer Fluid

Section 1. Identification

Product name : CRW132 CORROSION INHIBITOR
Product code : CRW132

Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Corrosion Inhibitor.

Print date : 1/16/2020
Validation date : 1/16/2020
Version : 4.01

Supplier's details : Baker Petrolite LLC
12645 W. Airport Blvd.
Sugar Land, TX 77478
For Product Information/SDSs Call: 800-231-3606
(8:00 a.m. - 5:00 p.m. CST, Monday - Friday) 281-276-5400

Emergency telephone number (with hours of operation) : CHEMTREC: 800-424-9300 (U.S. 24 hour)
Baker Petrolite: 800-231-3606
(001)281-276-5400
CHEMTREC Int'l 01-703-527-3887 (International 24 hour)

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 3
ACUTE TOXICITY (oral) - Category 4
ACUTE TOXICITY (dermal) - Category 4
ACUTE TOXICITY (inhalation) - Category 4
SKIN IRRITATION - Category 2
SERIOUS EYE DAMAGE - Category 1
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (optic nerve) - Category 1
AQUATIC HAZARD (ACUTE) - Category 2

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Flammable liquid and vapor.
Harmful if swallowed, in contact with skin or if inhaled.
Causes serious eye damage.
Causes skin irritation.
Causes damage to organs. (optic nerve)
Toxic to aquatic life.

Precautionary statements

Section 2. Hazards identification

Prevention : Wear protective gloves: > 8 hours (breakthrough time): Nitrile or Neoprene gloves. 4H gloves.. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

Response : IF exposed: Call a POISON CENTER or physician. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or physician if you feel unwell. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

Storage : Store locked up. Store in a well-ventilated place. Keep cool.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental label elements : Avoid contact with skin and clothing. Wash thoroughly after handling.

Hazards not otherwise classified : Prolonged or repeated contact may dry skin and cause irritation.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	%	CAS number
Methanol	20 - 30	67-56-1
Quaternary ammonium compounds	5 - 10	Trade secret.
Alkylpyridine salts	5 - 10	Trade secret.
Ammonium bisulfite	1 - 5	10192-30-0

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Get medical attention immediately. Call a poison center or physician. Immediately flush the eye(s) continuously with lukewarm, gently flowing water for at least 20-60 minutes while holding the eyelid(s) open. Check for and remove any contact lenses. Chemical burns must be treated promptly by a physician.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Get medical attention immediately. Call a poison center or physician. Wash affected area with soap and mild detergent for at least 20 - 60 minutes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Section 4. First aid measures

Ingestion : Wash out mouth with water. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye damage.

Inhalation : Harmful if inhaled.

Skin contact : Harmful in contact with skin. Causes skin irritation. Defatting to the skin.

Ingestion : Harmful if swallowed.

Over-exposure signs/symptoms

Eye contact : pain,watering,redness

Inhalation : No specific data.

Skin contact : pain or irritation,redness,dryness,cracking,blistering may occur

Ingestion : stomach pains

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical, CO_2, alcohol-resistant foam or water spray (fog).

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Flammable liquid and vapor. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. This material is toxic to aquatic life. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products : carbon dioxide,carbon monoxide,nitrogen oxides,sulfur oxides,halogenated compounds

Section 5. Fire-fighting measures

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

If RQ (Reportable Quantity) is exceeded, report to National Spill Response Office at 1-800-424-8802.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

Section 7. Handling and storage

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Methanol	**ACGIH TLV (United States, 3/2018). Absorbed through skin.** STEL: 328 mg/m³, 0 times per shift, 15 minutes. STEL: 250 ppm, 0 times per shift, 15 minutes. TWA: 262 mg/m³, 0 times per shift, 8 hours. TWA: 200 ppm, 0 times per shift, 8 hours. **NIOSH REL (United States, 10/2016). Absorbed through skin.** STEL: 325 mg/m³, 0 times per shift, 15 minutes. STEL: 250 ppm, 0 times per shift, 15 minutes. TWA: 260 mg/m³, 0 times per shift, 10 hours. TWA: 200 ppm, 0 times per shift, 10 hours. **OSHA PEL (United States, 5/2018).** TWA: 260 mg/m³, 0 times per shift, 8 hours. TWA: 200 ppm, 0 times per shift, 8 hours. **OSHA PEL 1989 (United States, 3/1989). Absorbed through skin.** STEL: 325 mg/m³, 0 times per shift, 15 minutes. STEL: 250 ppm, 0 times per shift, 15 minutes. TWA: 260 mg/m³, 0 times per shift, 8 hours. TWA: 200 ppm, 0 times per shift, 8 hours.
Quaternary ammonium compounds	None.
Alkylpyridine salts	None.
Ammonium bisulfite	None.

Consult local authorities for acceptable exposure limits.

If OSHA permissible exposure levels are shown above they are the OSHA 1989 levels or are from subsequent OSHA regulatory actions. Although the 1989 levels have been vacated the 11th Circuit Court of Appeals, Baker Hughes recommends that these lower exposure levels be observed as reasonable worker protection.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Section 8. Exposure controls/personal protection

Individual protection measures

Hygiene measures	: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
Eye/face protection	: Wear chemical safety goggles. When transferring material wear face-shield in addition to chemical safety goggles. If inhalation hazards exist, a full-face respirator may be required instead.
Hand protection	: Chemical-resistant gloves: Nitrile or Neoprene gloves. 4H gloves.
Skin protection	: Wear long sleeves and chemical resistant apron to prevent repeated or prolonged skin contact.
Respiratory protection	: If a risk assessment indicates it is necessary, use a properly fitted supplied air respirator complying with an approved standard. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state	: Liquid.
Color	: Amber. [Dark]
Odor	: Pungent. Amine-like.
Odor threshold	: Not available.
pH	: 4 to 5
	: Neat - without dilution.
Melting/freezing point	: Not available.
Boiling point	: Not available.
Initial Boiling Point	: Not available.
Flash point	: Closed cup: 31.1°C (88°F) [PMCC]
Burning time	: Not applicable.
Burning rate	: Not applicable.
Evaporation rate	: Not available.
Flammability (solid, gas)	: Highly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
Lower and upper explosive (flammable) limits	: Not available.
Vapor pressure	: 45.5 kPa (341.3 mm Hg, 6.6 psig) @ 54.4°C, 130 F (Reid)
Vapor density	: >1 [Air = 1]
Relative density	: 0.97 (15.6°C)
Density	: 8.08 (lbs/gal)
Solubility in water	: Soluble
Partition coefficient: n-octanol/water	: Not available.
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
Viscosity	: Dynamic (15.6°C): 8 cP
VOC	: Not available.
Pour Point	: -40°C (-40°F)

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.

Incompatible materials : Reactive or incompatible with the following materials: oxidizing materials and reducing materials.
Methanol is incompatible and may react with acetyl bromide, alkyl aluminum solutions, beryllium hydride, boron trichloride, nitric acid, cyanuric chloride, dichloromethane, diethylzinc, metals (granulated forms of aluminum and magnesium – including aluminum and zinc salts), phosphorus III oxide, and potassium tert-butoxide.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Methanol	LC50 Inhalation Gas. LC50 Inhalation Gas. LD50 Dermal LD50 Oral LD50 Oral	Rat Rat Rabbit Human Rat	145000 ppm 64000 ppm 15800 mg/kg 500 mg/kg 5600 mg/kg	1 hours 4 hours - - -

Irritation/Corrosion

No applicable toxicity data

Sensitization

No applicable toxicity data

Mutagenicity

No applicable toxicity data

Carcinogenicity

No applicable toxicity data

Reproductive toxicity

No applicable toxicity data

Teratogenicity

No applicable toxicity data

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Methanol	Category 1	Oral	optic nerve

Section 11. Toxicological information

Specific target organ toxicity (repeated exposure)

Not applicable.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Dermal, Inhalation.

Potential acute health effects

Eye contact : Causes serious eye damage.

Inhalation : Harmful if inhaled.

Skin contact : Harmful in contact with skin. Causes skin irritation. Defatting to the skin.

Ingestion : Harmful if swallowed.

Potential chronic health effects

General : Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral	321.6 mg/kg
Dermal	1003.3 mg/kg
Inhalation (vapors)	10.03 mg/l

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Methanol	Acute EC50 16.912 mg/l Marine water	Algae - Ulva pertusa	96 hours
	Acute EC50 10000000 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 2500000 µg/l Marine water	Crustaceans - Crangon crangon	48 hours
	Acute LC50 100 mg/l Fresh water	Fish - Pimephales promelas	96 hours
	Chronic NOEC 9.96 mg/l Marine water	Algae - Ulva pertusa	96 hours
CRW132 CORROSION INHIBITOR	Acute LC50 2.61 mg/l	Daphnia	48 hours
	Acute LC50 3 ppm	Daphnia	48 hours
	Acute LC50 2.3 mg/l	Fish - Fathead minnow	96 hours
	Acute LC50 2.3 mg/l	Fish - Sheepshead minnow	96 hours

Persistence and degradability

Not available.

Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	IMDG	IATA
UN number	UN1992	UN1992	UN1992	UN1992
UN proper shipping name	FLAMMABLE LIQUID, TOXIC, N.O.S. (Contains: Methanol)	FLAMMABLE LIQUID, TOXIC, N.O.S. (Contains: Methanol)	FLAMMABLE LIQUID, TOXIC, N.O.S. (Contains: Methanol)	FLAMMABLE LIQUID, TOXIC, N.O.S. (Contains: Methanol)
Transport hazard class(es)	3 (6.1) 	3 (6.1) 	3 (6.1) 	3 (6.1) 
Packing group	III	III	III	III
Environmental hazards	No.	No.	No.	No.

Additional information

DOT Classification : **Reportable quantity** 16722.2 lbs / 7591.9 kg [2067.6 gal / 7826.7 L]. Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.18-2.19 (Class 3), 2.26-2.36 (Class 6).

IMDG : **Emergency schedules** F-E S-D

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

DOT Reportable Quantity Methanol, 2070 gal of this product.
Ammonium bisulfite, 24752 gal of this product.

Marine pollutant Not available.

Section 14. Transport information

North-America NAERG : 131

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 12(b) one-time export:** No products were found.
TSCA 12(b) annual export notification: No products were found.
United States inventory (TSCA 8b): All components are listed or exempted.
Clean Water Act (CWA) 307: No products were found.
Clean Water Act (CWA) 311: ammonium hydrogensulphite

United States - Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs):

List name	Status	Ingredient name	Name on list	Conc.
United States - Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)	Listed	Methanol	Methanol	20 - 30

SARA 302/304 : No products were found.

SARA 311/312

Classification : Fire hazard
Immediate (acute) health hazard

SARA 313

	Product name	CAS number	%
Supplier notification	Methanol Ammonium bisulfite	67-56-1 10192-30-0	20 - 30 1 - 5

California Prop. 65

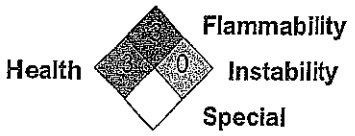
⚠ **WARNING:** This product can expose you to methanol, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Canada

Canada (CEPA DSL): : All components are listed or exempted.

Section 16. Other information

National Fire Protection Association (U.S.A.)



History

Date of printing : 1/16/2020

Indicates information that has changed from previously issued version.

Notice to reader

NOTE: The information on this SDS is based on data which is considered to be accurate. Baker Hughes, however, makes no guarantees or warranty, either expressed or implied of the accuracy or completeness of this information.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

This SDS was prepared and is to be used for this product. If the product is used as a component in another product, this SDS information may not be applicable.

Section 10

Monitoring

Section No. 10

Pressure and injection volumes are monitored daily for this injection well. These volumes and pressure are recorded by the well tender and reported to his supervisor weekly. In the event the well tender discovers an issue with the injection well or any of the associated facilities he will contact his supervisor immediately to get the issue resolved. The injection information is reported to the WVDEP monthly on Form WR-40. This process has worked successfully for the 30 years this well has been utilized as a disposal well.

Currently the vast majority of the fluid injected at this well is transported by pipeline to the storage tank that serves this injection well. A small portion of the fluid is transported by a small truck with a 500 gal tank from some of the more remote producing wells in this field to the storage tank that serves this injection well. The volumes are recorded and reported weekly. The only fluids injected at this well are those transported via pipeline or small truck from Company operated wells in this field.

Section 11

Groundwater Protection Plan

Section No. 11

Please see APPENDIX H for Ground Water Protection Plan for this facility.

4708700985

APPENDIX H

GROUNDWATER PROTECTION PLAN

Facility Name: Clover Produced Water Disposal

County: Roane

Facility Location:

Postal Service Address:	Kaufman Rd. Spencer, WV 25276		
Latitude :	38 Degrees 45' 32"	Longitude:	81 Degrees 15'45"

Contact Information:

Person:	Brad Morris
Phone Number:	681-229-1558
E-mail Address:	bmorris@topdrilling.com

Date: 12/15/24

1. A list of all operations that may contaminate the groundwater.

Tank failure / leak
Pipeline failure / leak
Fluids (bactericide, corrosion inhibitor, etc) transfer
Stuffing box failure
well completion / work over activities

2. A description of procedures and facilities used to protect groundwater quality from the list of potential contaminant sources above.

Secondary containment is installed around tanks adequate to hold the volume of the largest tank. Pipelines are routinely monitored and patrolled for leaks. Pipelines are registered with the WV 811 to minimize possibility of being damaged by others. Pressure monitoring - Shut down controls on pump. Work over fluids are properly contained and disposed of. The injection well is monitored for mechanical integrity failures and pressure tested ever five years.

3. List procedures to be used when designing and adding new equipment or operations.

Non corrosive materials are utilized as much as possible. Shut down controls installed on injection pump.

4. Summarize all activities at your facility that are already regulated for groundwater protection.

This facility is currently covered by an existing UIC permit No. 2D0871056. Storage tanks are registered under WV Tank regulations. Any Spills or leaks are reported to WVDEP / EPA.

5. Discuss any existing groundwater quality data for your facility or an adjacent property.

There are no known ground water quality issues in this area. Only two of the residences with in the AOR utilize water wells for domestic use. The analytical results from these two wells are enclosed with this application.

6. Provide a statement that no waste material will be used for deicing or fill material on the property unless allowed by another rule.

No waste material is or will be used for deicing or fill material.

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.

The operators of this facility are instructed to routinely monitor tank conditions, secondary containment conditions, and patrol injection lines. They are trained yearly regarding ground water protection. Part of this training involves prevention of oil & chemical spills and the prompt clean up / remediation of any spills. Prior to the release of any storm water from secondary containment it is tested t assure that it meets guidelines for discharge.

8. Include provisions for inspections of all GPP elements and equipment. Inspections must be made quarterly at a minimum.

Secondary containment, pipelines, and injection equipment are inspected and documented a minimum of every 90 days. The injection well and producing wells are visited several times weekly. The wellheads are inspected for any indication of mechanical integrity. Any issues are addressed when discovered. The majority of the production piplines and the injection lines are located parallel to roadways which are traveled several times weekly.

Signature: Brad A Moore

Date: 12/15/24

Section 12

Plugging and Abandonment

Section No. 12

This injection well has surface casing set at 174' and cemented to surface. The 4 ½" casing is set at 2219' and cemented to approximately 1933'. See schematic – Fig No. 4. The well will be plugged to the standards set by WVDEP at the time it is plugged. If this well was to be plugged today it would be plugged as follows:

Plug No. 1- 2150'-2050'

Free point, cut, & POH w/ 4 1/2" casing – est 1875'

Plug No. 2 -1925'-1825' (adjusted for casing cut above)

Plug No. 3 -1060'-960'

Plug No. 4 – 225'-125' (base of surface casing)

Plug No. 5 – 100'-0'

6 % gel between cement plugs.

Section 13

Additional Bonding

Section No. 13

An additional $5000 bond was posted at the time Delta Helix Energy LLC purchased these assets, and the bond will remain in place.

Section 14

Financial Responsibility

Section No. 14

See APPENDIX I

4708700985

APPENDIX I

Requirement for Financial Responsibility to Plug/Abandon an Injection Well

In accordance with WV Code 47CSR13.13.7.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. For a corporation: by a principle corporate officer of at least the level of vice-president;
2. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively;
3. For a municipality, State, Federal, or other public agency: by either a principle executive officer or ranking elected official;
4. Or a duly authorized representative in accordance with 47CSR13.13.11.b.
   (A person may be duly authorized by one of the primary entities (1-3) 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.)

Delta Helix Energy, LLC

(Company Name)

2D08700985002

(UIC Permit Number)

I certify in accordance with 47CSR13.13.7.g., that 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.

B Douglas Haught

(Print Name)

CEO

(Print Title)

(Signature)

12-16-24

(Date)

Section 15

Site Security Plan

Section No. 15

This injection facility is remotely located and accessed via a roadway shared with a few residences. When unattended a locked gate blocks access to this facility. Please see APPENDIX J

4708700985

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.

This is not a commercial facility

Section 16

Additional Information

Section No. 16

See APPENDIX K

4708700985

APPENDIX K

Identify permit or construction approvals received or applied for under the following programs:

Permit/approvals	ID Number
Hazardous Waste Management Program under RCRA	
NPDES Program	
Prevention of Significant Deterioration (PSD)	
Nonattainment Program	
Dredge or Fill	
NPDES/NPDES – Stormwater	
WVDEP – Office of Waste Management (OWM) – Solid Waste Facility	
WVDEP – OWM – RCRA (Hazardous Waste TSD or Transporter)	
WVDEP – OWM – UST	
CERCLA – Superfund	
WV Voluntary Remediation – Brownfields	
FIFRA – Federal Insecticide, Fungicide and Rodenticide Act	
Well Head Protection Program (WHPP)	
Underground Injection Control (UIC)	2D08700985002
Toxic Substances Control Act (TSCA)	
Best Management Plans	
Management of Used Oil	
Other Relevant Permits (Specify):	
WV DEP Tank Registrations	See Appendix B

2D08700985

Delta Helix Energy, LLC

Wells in the Area of Review

4708700985

APPENDIX C

Wells within the Area of Review

	API No.	Well No.	Well Type	Well Status	Northing	Easting	Penetrate Injection Zone	Penetrate Confining Zone	Total Vertical Depth	Surface Elevation
1	4708700878	Wines 1	Oil Prod	Active	4289856.6	476352.3	Y	Y	2273	1076
2	4708700894	Kaufman 5	Oil Prod	Active	4289879.0	476728.0	Y	Y	2281	1109
3	4708700954	Wines 3	Gas Prod	Active	4290082.6	476637.5	Y	Y	2180	1092
4	4708700984	W-5	Oil Prod	Active	4299499.9	476642.1	Y	Y	2270	1040
5	4708700985	W-7	Injector	Active	4289738.0	476780.0	Y	Y	2219	1003
6	4708700987	W-6	Gas Prod	Active	4289588.2	476357.8	Y	Y	2335	1132
7	4708700988	W-8	Oil Prod	Active	4289673.2	477190.2	Y	Y	2430	1225
8	4708701053	W-17	Oil Prod	Active	4289888.7	477092.4	Y	Y	2190	971
9	4708730190	?	Plugged	Abandonded	4289635.7	476521.2	Y	Y	2245	1052
10	4708770398	?	Unknown	Abandonded	4289564.9	476487.5	?	?	?	?
11	4708791143	?	Unknown	Abandonded	4289549.2	476326.3	?	?	?	?
12	4708791144	?	Unknown	Abandonded	4289645.6	476423.3	?	?	?	?
13	4708791145	?	Unknown	Abandonded	4289758.0	476520.2	?	?	?	?

4708700878

Wines 1

WVGES GEOLOGY UNDERLIES IT ALL "Pipeline"

Select County: (087) Roane
Enter Permit #: 878
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 = 87 Permit = 878 Link to all digital records for well

Report Time: Thursday, April 03, 2025 1:33:27 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4708700878	Roane	878	Spencer	Spencer	Spencer	38.757093	-81.272166	476352.3	4289856.6

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
4708700878	4/4/1962	Original Loc	Completed	Cora & C H Wine	4					J & B Oil Co.			

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_
4708700878	4/4/1962	2/16/1962	1076	Ground Level	Ctvr-Rsh Rn	Price Fm & equivs	Price Fm & equivs	Development Well	Development Well	Oil and Gas	unknown	Fractured	2273		2273		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
4708700878	4/4/1962	Water	Fresh Water	Vertical			115						0
4708700878	4/4/1962	Water	Salt Water	Vertical			1870						0
4708700878	4/4/1962	Pay	Oil & Gas	Vertical			2208	Big Injun (Price&eq)	0	0			

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
4708700878	J & B Drilling Operation	1983	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700878	McKown Farm	1987	198	0	0	0	0	0	0	0	30	49	46	41	32
4708700878	McKown Farm	1988	445	37	64	52	45	11	0	0	53	48	49	46	40
4708700878	McKown Farm	1989	496	44	32	44	46	47	0	38	58	55	52	51	29
4708700878	McKown Farm	1990	527	50	46	50	46	44	30	19	51	48	48	49	46
4708700878	McKown Farm	1991	466	45	40	47	44	49	33	1	38	42	41	43	43
4708700878	McKown Farm	1992	487	41	36	39	43	44	39	41	46	44	40	31	43
4708700878	McKown Farm	1993	2,007	168	181	173	111	186	136	248	134	169	161	164	176
4708700878	McKown, C. I. & Son, Inc.	1994	467	19	38	48	42	44	30	35	49	38	46	41	37
4708700878	McKown, C. I. & Son, Inc.	1995	517	46	44	48	40	46	44	43	36	41	45	38	46
4708700878	McKown, C. I. & Son, Inc.	1996	487	34	24	24	36	43	104	45	21	44	41	41	30
4708700878	McKown, C. I. & Son, Inc.	1997	450	34	33	31	43	34	44	38	38	25	37	45	48
4708700878	McKown, C. I. & Son, Inc.	1998	459	30	36	34	47	24	68	36	33	42	38	31	40
4708700878	McKown, C. I. & Son, Inc.	1999	502	24	32	35	33	33	15	40	81	69	73	35	32
4708700878	McKown, C. I. & Son, Inc.	2002	330	31	28	26	30	30	28	29	28	25	27	21	27
4708700878	McKown, C. I. & Son, Inc.	2004	363	30	28	29	37	33	31	30	28	28	31	29	29
4708700878	McKown, C. I. & Son, Inc.	2005	362	27	23	28	33	35	34	28	34	32	32	30	26
4708700878	McKown, C. I. & Son, Inc.	2006	318	27	23	28	24	30	29	28	27	26	28	24	24
4708700878	McKown, C. I. & Son, Inc.	2007	286	20	18	25	26	24	24	24	21	27	30	24	23
4708700878	McKown, C. I. & Son, Inc.	2008	222	21	19	21	18	24	20	21	15	11	10	21	21
4708700878	McKown, C. I. & Son, Inc.	2009	254	17	17	19	20	26	23	22	20	24	23	23	20
4708700878	McKown, C. I. & Son, Inc.	2010	229	18	16	21	23	24	20	19	19	17	20	17	15
4708700878	McKown, C. I. & Son, Inc.	2011	225	12	14	21	21	21	24	21	16	21	21	19	14
4708700878	McKown, C. I. & Son, Inc.	2013	170	10	15	19	19	18	15	10	13	15	14	17	5
4708700878	McKown, C. I. & Son, Inc.	2014	153	13	11	11	14	15	12	13	13	12	12	11	16
4708700878	McKown, C. I. & Son, Inc.	2015	186	14	13	13	13	18	19	17	18	16	16	17	12
4708700878	McKown, C. I. & Son, Inc.	2016	108	13	12	13	13	16	12	7	4	3	2	7	6
4708700878	McKown, C. I. & Son, Inc.	2017	193	13	13	19	62	12	11	12	10	8	11	11	11
4708700878	McKown, C. I. & Son, Inc.	2018	94	3	15	11	12	8	8	9	1	3	6	8	10
4708700878	McKown, C. I. & Son, Inc.	2019	75	8	8	10	8	10	6	7	6	3	1	3	5
4708700878	McKown, C. I. & Son, Inc.	2020	57	6	5	12	13	10	5	2	4	0	0	0	0
4708700878	McKown, C. I. & Son, Inc.	2021	104	0	2	15	15	13	12	11	7	7	7	8	7
4708700878	McKown, C. I. & Son, Inc.	2022	105	6	15	12	6	8	12	10	7	9	6	7	7
4708700878	McKown, C. I. & Son, Inc.	2023	40	7	4	3	3	3	4	3	3	2	3	3	2

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
4708700878	J & B Drilling Operation	1983	236	0	57	0	62	0	0	0	0	62	0	55	0
4708700878	McKown Farm	1987	158	0	0	0	0	0	0	0	23	43	32	36	24
4708700878	McKown Farm	1988	246	21	21	21	20	20	20	22	22	22	19	19	19
4708700878	McKown Farm	1989	216	18	18	18	18	18	18	18	18	18	18	18	18
4708700878	McKown Farm	1990	180	15	15	15	15	15	15	15	15	15	15	15	15
4708700878	McKown Farm	1991	180	15	15	15	15	15	15	15	15	15	15	15	15
4708700878	McKown Farm	1992	180	15	15	15	15	15	15	15	15	15	15	15	15
4708700878	McKown Farm	1993	2,180	182	182	182	182	182	182	182	182	181	181	181	181
4708700878	McKown, C. I. & Son, Inc.	1994	168	14	14	14	14	14	14	14	14	14	14	14	14
4708700878	McKown, C. I. & Son, Inc.	1995	132	11	11	11	11	11	11	11	11	11	11	11	11
4708700878	McKown, C. I. & Son, Inc.	1996	170	15	15	14	14	14	14	14	14	14	14	14	14
4708700878	McKown, C. I. & Son, Inc.	1997	179	15	15	15	15	15	15	15	15	15	15	15	14
4708700878	McKown, C. I. & Son, Inc.	1998	82	7	7	7	7	7	7	7	7	7	7	6	6
4708700878	McKown, C. I. & Son, Inc.	1999	148	13	13	13	13	12	12	12	12	12	12	12	12
4708700878	McKown, C. I. & Son, Inc.	2002	209	17	17	17	17	17	17	17	18	18	18	18	18
4708700878	McKown, C. I. & Son, Inc.	2004	200	17	17	17	17	17	17	17	17	16	16	16	16
4708700878	McKown, C. I. & Son, Inc.	2005	190	15	15	16	16	16	16	16	16	16	16	16	16
4708700878	McKown, C. I. & Son, Inc.	2006	133	12	11	11	11	11	11	11	11	11	11	11	11
4708700878	McKown, C. I. & Son, Inc.	2007	236	19	19	19	19	20	20	20	20	20	20	20	20
4708700878	McKown, C. I. & Son, Inc.	2008	138	12	12	12	12	12	12	11	11	11	11	11	11
4708700878	McKown, C. I. & Son, Inc.	2009	283	23	23	23	23	23	24	24	24	24	24	24	24
4708700878	McKown, C. I. & Son, Inc.	2010	209	18	18	18	18	18	17	17	17	17	17	17	17
4708700878	McKown, C. I. & Son, Inc.	2011	198	16	16	16	16	16	16	17	17	17	17	17	17
4708700878	McKown, C. I. & Son, Inc.	2013	156	13	13	13	13	13	13	13	13	13	13	13	13
4708700878	McKown, C. I. & Son, Inc.	2014	254	22	22	21	21	21	21	21	21	21	21	21	21
4708700878	McKown, C. I. & Son, Inc.	2015	217	18	18	18	18	18	18	18	18	18	18	18	19
4708700878	McKown, C. I. & Son, Inc.	2016	100	9	9	9	9	8	8	8	8	8	8	8	8
4708700878	McKown, C. I. & Son, Inc.	2017	301	25	25	25	25	25	25	25	25	25	25	25	26
4708700878	McKown, C. I. & Son, Inc.	2018	31	2	2	2	2	2	3	3	3	3	3	3	3
4708700878	McKown, C. I. & Son, Inc.	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700878	McKown, C. I. & Son, Inc.	2020	182	15	15	15	15	15	15	15	15	15	15	16	16
4708700878	McKown, C. I. & Son, Inc.	2021	311	25	26	26	26	26	26	26	26	26	26	26	26
4708700878	McKown, C. I. & Son, Inc.	2022	162	14	14	14	14	14	14	13	13	13	13	13	13
4708700878	McKown, C. I. & Son, Inc.	2023	285	24	24	24	24	24	24	24	24	24	23	23	23

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
4708700878	McKown, C. I. & Son, Inc.	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700878	McKown, C. I. & Son, Inc.	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700878	McKown, C. I. & Son, Inc.	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700878	McKown, C. I. & Son, Inc.	2016	0												
4708700878	McKown, C. I. & Son, Inc.	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700878	McKown, C. I. & Son, Inc.	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700878	McKown, C. I. & Son, Inc.	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700878	McKown, C. I. & Son, Inc.	2021	0	0	0	0	0	0	0	0	0	0	0	0	0

4708700878

4708700878	McKown, C. I. & Son, Inc.	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700878	McKown, C. I. & Son, Inc.	2023	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
4708700878	McKown, C. I. & Son, Inc.	2016	0												
4708700878	McKown, C. I. & Son, Inc.	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700878	McKown, C. I. & Son, Inc.	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700878	McKown, C. I. & Son, Inc.	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700878	McKown, C. I. & Son, Inc.	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700878	McKown, C. I. & Son, Inc.	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700878	McKown, C. I. & Son, Inc.	2023	0	0	0	0	0	0	0	0	0	0	0	0	0

There is no Stratigraphy data for this well

Wireline (E-Log) Information:
* There is no Scanned/Raster Log data for this well

* There is no Digitized/LAS Log data for this well

* There is no Scanned or Digital Logs available for download

There is no Plugging data for this well

There is no Sample data for this well

OG-10

4708700878

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION 34

Quadrangle Spencer

Permit No. ROA 878

WELL RECORD

Oil or Gas Well Com (KIND)

Company J & B Oil Co. Inc.
Address 615½ Market St. Parkersburg, W Va.
Farm Cora A. & C. H. Wine Acres 90.33
Location (Waters) Formerly Frank Simmons Boggs Fork
Well No. 4 Elev. 1076.408
District Spencer County Roane
The surface of tract is owned in fee by C. H. Wine
Address Spencer
Mineral rights are owned by
Address
Drilling commenced Feb. 16, 1962
Drilling completed April 4, 1962
Date Shot From To
With
Open Flow /10ths Water in Inch
/10ths Merc. in Inch
Volume 5,000 Cu. Ft.
Rock Pressure 120 lbs. 24 hrs.
Oil 5 gal. bbls., 1st 24 hrs.
WELL ACIDIZED
WELL FRACTURED 1700 bbls. water 80,000 lb. sand

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer
13	8	8	
10	472	none	Size of
8¼	1043	"	
6⅝	2118	"	Depth set
5 3/16			
3 4½	2273	2273	Perf. top
2			Perf. bottom
Liners Used			Perf. top
			Perf. bottom

CASING CEMENTED 2273 SIZE 4½ No. Ft. 3-30-68 Date
76 sks. cement, 2 sks. aquagel DOWELL
COAL WAS ENCOUNTERED AT FEET INCHES
FEET INCHES FEET INCHES
FEET INCHES FEET INCHES

RESULT AFTER TREATMENT 2 bbls. oil 75,000 gas
ROCK PRESSURE AFTER TREATMENT 150 lb. 24 hrs.
Fresh Water 115 Feet Salt Water 1870 Feet

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth	Remarks
RED			0	62			
Sand			62	87			
Slate			87	111			
Sand			111	144	water	115	
Slate			144	153			
Sand			153	176			
Slate			176	210			
Red			210	220			
Slate			220	230			
Red			230	254			
Slate			254	261			
Sand			261	269			
Slate			269	290			
Sand			290	315			
Red			315	345			
Slate			345	364			
Red			364	389			
Sand			389	392			
Slate			392	466			
Red			466	470			
Slate			470	475			
Red			475	497			
Slate			497	532			
Sand			532	583			
Slate			583	629			
RED			629	634			
Slate			634	657			
Red			657	669			

(over)

4708700878

Formation	Color	Hard or Soft	Top 34	Bottom	Oil, Gas or Water	Depth Found	Remarks
Slate			669	681			
Red			681	702			
Slate			702	715			
Sand			715	754			
Red			754	780			
Slate			780	795			
Red			795	810			
Sand			810	822			
Red			822	870			
Slate			870	905			
Red			905	955			
Slate			955	965			
Red			965	1000			
Slate			1000	1028			
Red			1028	1036			
Slate			1036	1090			
Sand			1090	1187			
Slate			1187	1230			
Sand			1230	1247			
Slate			1247	1254			
Sand			1254	1382			
Slate			1382	1444			
Sand			1444	1460			
Slate			1460	1467			
Sand			1467	1485			
Slate			1485	1544			
Sand			1544	1590			
Slate			1590	1620			
Sand			1620	1661			
Slate			1661	1695			
Sand			1695	1910			
Slate			1910	1912			
Sand			1912	1928			
Slate			1928	1931			
Sand			1931	1999			
Slate			1999	2003			
Lime			2003	2036			
Slate			2036	2038			
Lime			2038	2155			
Sand	Keener		2155	2182			
Sand	Injun		2182	2208			
Slate			2208	2210			
Sand			2210	2215			
Slate			2215	2273			
Total depth 2273							

Date April 9, 1962

APPROVED J. L. B. Oil Co. Inc., Owner

By Jae Altey Prod. Supt.
(Title)

4708700894

WVGES
GEOLOGY UNDERLIES IT ALL
"Pipeline"

Select County: (087) Roane
Enter Permit #: 894
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

Kaufman 5

WV Geological & Economic Survey:

Well: County = 87 Permit = 894 Link to all digital records for well

Report Time: Thursday, April 03, 2025 1:10:22 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4708700894	Roane	894	Smithfield	Spencer	Spencer	38.757304	-81.267843	476728	4289879

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_
4708700894	7/25/1962	Original Loc	Completed	William Kaufman	5					South Penn Oil (S. Penn Nat. Gas)			
4708700894	-/-/-	Plugging	Permitted	Ricky W Jarvis/Brad S Hilyer	5		WM Kaufman		HG Energy LLC et al	HG Energy, LLC			

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
4708700894	7/25/1962	7/15/1962	1118	Ground Level	Clvr-Rsh Rn	Price Fm & equivs	Big Injun (Price&eq)	Development Well	Development Well	Oil and Gas	unknown	Fractured	2281		2281		0
4708700894	-/-/-	-/-/-	1109	Ground Level													

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
4708700894	7/25/1962	Water	Fresh Water	Vertical			124						0
4708700894	7/25/1962	Water	Fresh Water	Vertical			825						1
4708700894	7/25/1962	Water	Salt Water	Vertical			1900						0
4708700894	7/25/1962	Pay	Oil & Gas	Vertical			2282	Big Injun (Price&eq)	0	0			

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
4708700894	Pennzoil Company	1981	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	Pennzoil Company	1982	999	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	Pennzoil Company	1983	1,492	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	Pennzoil Products Company	1987	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	Pennzoil Products Company	1989	936	93	63	64	71	91	56	92	70	82	98	85	71
4708700894	Pennzoil Products Company	1990	971	82	64	94	72	74	66	89	82	74	103	88	83
4708700894	Pennzoil Products Company	1991	963	73	61	71	58	82	84	98	80	80	104	79	93
4708700894	Pennzoil Products Company	1992	912	93	70	63	66	81	84	80	87	60	87	74	67
4708700894	Pennzoil Products Company	1993	697	52	69	69	38	50	63	60	54	59	66	56	61
4708700894	Pennzoil Products Company	1994	610	63	52	29	51	54	57	56	59	58	38	44	49
4708700894	Pennzoil Products Company	1995	503	39	42	44	41	51	46	46	36	44	38	35	41
4708700894	Pennzoil Products Company	1996	384	21	1	55	36	36	34	37	22	33	27	41	41
4708700894	Pennzoil Products Company	1997	399	28	28	35	30	28	31	34	36	36	32	44	37
4708700894	Pennzoil Products Company	1998	378	37	52	34	40	40	46	20	24	21	22	20	22
4708700894	Pennzoil Products Company	1999	197	46	13	20	22	15	0	0	12	12	21	22	14
4708700894	East Resources, Inc.	2000	150	13	14	10	0	17	8	0	20	14	16	16	22
4708700894	East Resources, Inc.	2001	275	7	17	24	24	26	26	26	27	29	31	31	7
4708700894	East Resources, Inc.	2002	314	29	26	26	23	28	27	29	30	25	27	13	31
4708700894	East Resources, Inc.	2003	192	20	12	0	0	34	21	21	24	17	25	0	18
4708700894	East Resources, Inc.	2004	276	26	19	17	20	17	21	25	15	19	29	27	41
4708700894	East Resources, Inc.	2005	383	22	22	21	24	40	34	29	39	41	40	33	38
4708700894	East Resources, Inc.	2006	509	38	37	41	41	45	44	48	33	36	43	50	53
4708700894	East Resources, Inc.	2007	430	51	38	42	30	27	23	27	34	31	32	49	46
4708700894	East Resources, Inc.	2008	479	40	39	40	37	41	39	40	41	41	45	38	38
4708700894	East Resources, Inc.	2010	506	49	35	40	42	43	40	41	41	40	46	47	42
4708700894	East Resources, Inc.	2011	547	44	41	47	47	47	43	47	48	46	48	44	45
4708700894	HG Energy, LLC	2012	525	40	35	39	40	44	40	28	52	57	57	47	46
4708700894	HG Energy, LLC	2013	533	48	35	38	39	51	47	42	48	45	50	44	46
4708700894	HG Energy, LLC	2014	383	42	37	42	36	1	9	15	35	42	42	39	43
4708700894	HG Energy, LLC	2015	464	37	32	33	37	42	41	42	40	40	40	37	43
4708700894	HG Energy, LLC	2016	467	39	38	39	39	41	38	40	38	39	39	39	38
4708700894	HG Energy, LLC	2017	404	37	32	33	31	34	30	32	32	34	36	37	36
4708700894	HG Energy, LLC	2018	426	36	33	38	36	38	37	39	36	34	33	32	34
4708700894	HG Energy, LLC	2019	365	35	32	34	31	24	24	26	32	30	33	34	30
4708700894	HG Energy, LLC	2020	358	35	31	35	17	29	32	33	32	28	28	29	29
4708700894	HG Energy, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	HG Energy, LLC	2022	339	28	21	29	27	29	28	31	31	29	29	29	28
4708700894	Delta Helix Energy, LLC	2023	58	0	0	0	0	0	0	0	0	0	0	30	28
4708700894	HG Energy, LLC	2023	313	30	27	31	32	32	30	32	32	34	33	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
4708700894	Pennzoil Company	1981	440	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	Pennzoil Company	1982	307	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	Pennzoil Company	1983	444	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	Pennzoil Products Company	1987	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	Pennzoil Products Company	1989	197	16	16	18	13	17	15	18	17	18	17	16	16
4708700894	Pennzoil Products Company	1990	197	19	15	18	17	17	17	16	17	17	18	14	12
4708700894	Pennzoil Products Company	1991	190	16	12	17	16	17	15	14	18	15	18	17	15
4708700894	Pennzoil Products Company	1992	169	15	16	14	16	14	15	11	17	14	14	10	13
4708700894	Pennzoil Products Company	1993	148	14	11	10	14	13	12	13	14	12	12	12	11
4708700894	Pennzoil Products Company	1994	125	6	12	13	13	11	12	13	8	9	11	8	9
4708700894	Pennzoil Products Company	1995	89	9	8	11	10	10	7	9	8	8	9	0	0
4708700894	Pennzoil Products Company	1996	102	15	10	9	8	8	4	7	9	9	9	7	7
4708700894	Pennzoil Products Company	1997	89	8	8	8	8	9	9	6	7	7	6	6	7
4708700894	Pennzoil Products Company	1998	66	7	8	8	9	2	0	0	0	0	0	19	13
4708700894	Pennzoil Products Company	1999	31	14	14	3	0	0	0	0	0	0	0	0	0
4708700894	East Resources, Inc.	2000	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	East Resources, Inc.	2001	97	0	11	10	8	10	8	9	7	8	10	8	8
4708700894	East Resources, Inc.	2002	96	8	10	8	7	9	9	12	8	7	7	3	8
4708700894	East Resources, Inc.	2003	57	9	0	0	0	12	7	5	5	5	6	0	8
4708700894	East Resources, Inc.	2004	55	4	6	6	6	4	5	6	4	5	3	3	3
4708700894	East Resources, Inc.	2005	49	2	4	4	4	5	4	5	5	4	3	5	4
4708700894	East Resources, Inc.	2006	74	5	6	10	6	9	7	6	0	2	9	8	6
4708700894	East Resources, Inc.	2007	81	8	6	8	7	7	5	5	9	7	5	7	7
4708700894	East Resources, Inc.	2008	54	1	6	6	7	5	4	6	4	4	3	4	4
4708700894	East Resources, Inc.	2010	110	6	10	12	13	0	8	14	12	12	10	8	5
4708700894	East Resources, Inc.	2011	92	6	6	10	10	8	9	8	10	7	4	6	8
4708700894	HG Energy, LLC	2012	94	7	10	8	8	10	10	4	10	8	9	4	6
4708700894	HG Energy, LLC	2013	124	8	13	12	12	14	8	10	9	11	11	8	8
4708700894	HG Energy, LLC	2014	127	10	11	15	11	16	13	11	11	10	6	5	8
4708700894	HG Energy, LLC	2015	98	7	4	5	7	14	10	10	8	8	10	7	8
4708700894	HG Energy, LLC	2016	85	6	4	6	8	6	10	8	10	8	8	4	7
4708700894	HG Energy, LLC	2017	61	6	7	6	6	6	4	4	5	4	4	5	4
4708700894	HG Energy, LLC	2018	58	6	4	4	4	5	5	5	5	4	6	3	7
4708700894	HG Energy, LLC	2019	71	11	4	5	7	10	5	5	4	5	6	5	4
4708700894	HG Energy, LLC	2020	60	5	4	4	7	5	4	7	5	5	4	5	5
4708700894	HG Energy, LLC	2021	66	6	3	3	9	6	9	4	6	5	5	4	6
4708700894	HG Energy, LLC	2022	47	7	5	7	6	5	4	6	6	1	0	0	0
4708700894	Delta Helix Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0

4708700894

4708700894	HG Energy, LLC	2023	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
4708700894	HG Energy, LLC	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	HG Energy, LLC	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	HG Energy, LLC	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	HG Energy, LLC	2016	0												
4708700894	HG Energy, LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	HG Energy, LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	HG Energy, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	HG Energy, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	Delta Helix Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	HG Energy, LLC	2023	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
4708700894	HG Energy, LLC	2016	0												
4708700894	HG Energy, LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	HG Energy, LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	HG Energy, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	HG Energy, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	Delta Helix Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700894	HG Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0

There is no Stratigraphy data for this well

Wireline (E-Log) Information:
* Scanned/Raster Log Information:

API	STATUS	LOG_TOP	LOG_BOT	DEEPEST_FML	LOGS_AVAIL	SCAN	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	IN(
4708700894	Regular Entry	2195	2323		G,D,C	Y	2195	2323	2195	2323									2218	2323	N	Y

Scanned/Raster Comment: *logs: caliper

* There is no Digitized/LAS Log data for this well

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/Raster Logs

FILENAME
4708700894gcd.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, 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

There is no Plugging data for this well

There is no Sample data for this well

Form OG-10

4708700894

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION 46

Quadrangle SPENCER

WELL RECORD

Permit No. ROA-894

Oil or Gas Well Oil & Gas (KIND)

Company SOUTH PENN OIL COMPANY
Address P. O. Box 1588, Parkersburg, W. Va.
Farm Wm. Kaufman Acres 800
Location (waters) Millstone Run
Well No. 5 Elev. 1117.84
District Smithfield County Roane
The surface of tract is owned in fee by Roy H. Rhodes c/o Bernard Burgess
Spencer Auto Route Address Spencer, W. Va.
Mineral rights are owned by Olive O. Oberdorf, et al.
1635 Hyde Park Blvd. 1-B Address Chicago 15, Illinois
Drilling commenced June 15, 1962
Drilling completed July 25, 1962
Date Shot From To
With
Open Flow /10ths Water in Inch
/10ths Merc. in Inch
Volume Insufficient to Test Cu. Ft.
Rock Pressure None lbs. hrs.
Oil 3 Gallons bbls. 1st 24 hrs.
WELL ACIDIZED
WELL FRACTURED 7/30/62 by Halliburton Company

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer
13			Steel Shoe
10"	522'	NONE	Size of
8¼	1088'	NONE	5½" x 14#
7"	45'	45'	Depth set 2247'
5½"	2270'	2270'	on 7/19/62
3			Perf. top
2" Tbg.	2280'	2280'	Perf. bottom
Liners Used			Perf. top
			Perf. bottom

CASING CEMENTED 5½" SIZE 2247 No. Ft. 7/19/62 Date

COAL WAS ENCOUNTERED AT - FEET - INCHES
FEET INCHES FEET INCHES
FEET INCHES FEET INCHES

RESULT AFTER TREATMENT Gas - 30,000 Cu. Ft. Daily
Oil - 6 Bbls. Daily
ROCK PRESSURE AFTER TREATMENT 350 Lbs.
Fresh Water Feet Salt Water Feet

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth	Remarks
Soil			0	15			
Conductor			15	60			
Sand			60	105			
Red Rock			105	124			
Slate			124	154			
Sand			154	185	Water, Fresh	124-154	3 Bailer/24 Hr.
Slate			185	236			
Sand			236	242			
Red Rock			242	277			
Slate			277	318			
Red Rock			318	394			
Sand			394	422			
Red Rock			422	446			
Slate			446	514			
Red Rock			514	543			
Slate			543	555			
Red Rock			555	570			
Sand			570	585			
Red Rock			585	664			
Sand			664	762			
Slate			762	784			
Red Rock			784	792			
Slate			792	832			
Sand			832	861	Water, Fresh	825	1/4 Bbl./Hr.
Red Rock			861	879			
Sand			879	924			
Red Rock							

(over)

4708700894

Formation	Color	Hard or Soft	Top 46	Bottom	Oil, Gas or Water	Depth Found	Remarks
Slate			924	940			
Red Rock			940	955			
Slate			955	1001			
Red Rock			1001	1048			
Slate			1048	1071			
Pink Rock			1071	1081			
Slate			1081	1167			
Sand			1167	1276			
Slate			1276	1352			
Sand			1352	1480			
Slate			1480	1518			
Sand			1518	1583			
Slate			1583	1622			
Sand			1622	1687			
Slate & Shells			1687	1851			
Sand			1851	1989			
					Water, Salt	1900	Hole Full
Slate & Shells			1989	2039			
Sand			2039	2091			
Little Lime			2091	2115			
Slate			2115	2118			
Sand			2118	2120			
Pencil Cave			2120	2131			
Big Lime			2131	2247			
5½" Casing				2247			
					Oil	2175-2181	Show Only
Keener Sand			2247	2261			
Big Injun			2261	2288			
					Oil & Gas	2261-2282	Ins. to Test
Blue Lime & Slate			2288	2314			
TOTAL DEPTH				2314			
FILLED BACK WITH STONE & MUD			2314	2281			
TOTAL DEPTH				2281			Final

Date August 15, 1962

APPROVED SOUTH PENN OIL COMPANY, Owner

By George W. Wilsman

George W. Wilsman (Title) Land Agent

4708700954

WVGES
GEOLOGY UNDERLIES IT ALL
"Pipeline"

Select County: (087) Roane
Enter Permit #: 954
Get Data | Reset

Select datatypes: (Check All)
Location | Production | Plugging
Owner/Completion | Stratigraphy | Sample
Pay/Show/Water | Logs | Blm Hole Loc

Table Descriptions
County Code Translations
Permit-Numbering Series
Usage Notes
Contact Information
Disclaimer
WVGES Main
"Pipeline-Plus" New

Wines 3

WV Geological & Economic Survey:

Well: County = 87 Permit = 954 Link to all digital records for well

Report Time: Thursday, April 03, 2025 2:19:46 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4708700954	Roane	954	Spencer	Spencer	Spencer	38.759137	-81.268891	476637.5	4290082.6

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
4708700954	8/8/1963	Original Loc	Completed	Cora & C H Wine	6					J & B Oil Co.			

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
4708700954	8/8/1963	6/13/1963	1092	Ground Level	Clvr-Rsh Rn	Big Injun (Price&eq)	Big Injun (Price&eq)	Development Well	Development Well	Oil and Gas	unknown	Acid+Frac	2180		2180		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
4708700954	8/8/1963	Water	Fresh Water	Vertical			120						0
4708700954	8/8/1963	Water	Salt Water	Vertical			1830						0
4708700954	8/8/1963	Pay	Oil & Gas	Vertical			2180	Big Injun (Price&eq)	0	0			

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
4708700954	J & B Drilling Operation	1983	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown Farm	1987	34	0	0	0	0	0	0	0	8	8	6	7	5
4708700954	McKown Farm	1988	445	37	64	52	45	11	0	0	53	48	49	46	40
4708700954	McKown Farm	1989	495	43	32	44	46	47	0	38	58	55	52	51	29
4708700954	McKown Farm	1990	527	50	46	50	46	44	30	19	51	48	48	49	46
4708700954	McKown Farm	1991	466	45	40	47	44	49	33	1	38	42	41	43	43
4708700954	McKown Farm	1992	487	41	36	39	43	44	39	41	46	44	40	31	43
4708700954	McKown Farm	1993	480	39	42	44	25	39	37	65	35	37	41	39	37
4708700954	McKown, C. I. & Son, Inc.	1994	467	19	38	48	42	44	30	35	49	38	46	41	37
4708700954	McKown, C. I. & Son, Inc.	1995	517	46	44	48	40	46	44	43	36	41	45	38	46
4708700954	McKown, C. I. & Son, Inc.	1996	487	34	24	24	36	43	104	45	21	44	41	41	30
4708700954	McKown, C. I. & Son, Inc.	1997	450	34	33	31	43	34	44	39	38	25	37	44	48
4708700954	McKown, C. I. & Son, Inc.	1998	458	30	36	34	46	24	67	36	33	43	38	31	40
4708700954	McKown, C. I. & Son, Inc.	1999	502	24	32	35	33	33	15	40	81	69	73	35	32
4708700954	McKown, C. I. & Son, Inc.	2002	331	31	28	27	30	30	28	29	28	25	27	21	27
4708700954	McKown, C. I. & Son, Inc.	2004	365	29	28	30	38	33	31	30	28	28	32	29	29
4708700954	McKown, C. I. & Son, Inc.	2005	364	27	23	28	34	35	35	28	34	32	32	30	26
4708700954	McKown, C. I. & Son, Inc.	2006	319	27	23	29	24	30	29	28	27	26	28	24	24
4708700954	McKown, C. I. & Son, Inc.	2007	287	20	18	25	26	24	24	24	21	27	30	24	24
4708700954	McKown, C. I. & Son, Inc.	2008	223	21	19	21	18	24	20	21	16	11	10	21	21
4708700954	McKown, C. I. & Son, Inc.	2009	254	17	17	19	20	26	24	21	20	24	23	23	20
4708700954	McKown, C. I. & Son, Inc.	2010	229	18	16	21	23	24	20	19	19	17	20	17	15
4708700954	McKown, C. I. & Son, Inc.	2011	224	12	14	21	21	21	23	21	16	21	21	19	14
4708700954	McKown, C. I. & Son, Inc.	2013	170	10	15	19	19	18	15	10	13	15	14	17	5
4708700954	McKown, C. I. & Son, Inc.	2014	153	13	11	11	14	15	12	13	13	12	12	11	16
4708700954	McKown, C. I. & Son, Inc.	2015	187	14	13	13	13	18	19	17	18	17	16	17	12
4708700954	McKown, C. I. & Son, Inc.	2016	107	12	12	13	13	16	12	7	4	3	2	7	6
4708700954	McKown, C. I. & Son, Inc.	2017	194	13	14	18	62	12	11	12	10	8	11	12	11
4708700954	McKown, C. I. & Son, Inc.	2018	94	3	15	11	11	8	8	9	1	3	7	8	10
4708700954	McKown, C. I. & Son, Inc.	2019	75	8	8	10	9	10	5	7	6	3	1	3	5
4708700954	McKown, C. I. & Son, Inc.	2020	55	6	5	12	13	10	5	2	2	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2021	105	0	3	15	15	13	12	11	7	7	7	8	7
4708700954	McKown, C. I. & Son, Inc.	2022	105	6	15	12	6	8	12	10	7	9	6	7	7
4708700954	McKown, C. I. & Son, Inc.	2023	40	7	4	3	3	3	4	3	3	2	3	3	2

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
4708700954	J & B Drilling Operation	1983	104	53	0	0	0	0	0	0	51	0	0	0	0
4708700954	McKown Farm	1987	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown Farm	1988	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown Farm	1989	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown Farm	1990	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown Farm	1991													
4708700954	McKown Farm	1992	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown Farm	1993	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	1994													
4708700954	McKown, C. I. & Son, Inc.	1995													
4708700954	McKown, C. I. & Son, Inc.	1996	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	1997	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	1998													
4708700954	McKown, C. I. & Son, Inc.	1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2002	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2004	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2005	7	1	1	1	1	1	1	1	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2006	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2007	23	1	2	2	2	2	2	2	2	2	2	2	2
4708700954	McKown, C. I. & Son, Inc.	2008	13	2	1	1	1	1	1	1	1	1	1	1	1
4708700954	McKown, C. I. & Son, Inc.	2009	34	2	2	3	3	3	3	3	3	3	3	3	3
4708700954	McKown, C. I. & Son, Inc.	2010	14	2	2	1	1	1	1	1	1	1	1	1	1
4708700954	McKown, C. I. & Son, Inc.	2011	13	1	1	1	1	1	1	1	1	1	1	1	2
4708700954	McKown, C. I. & Son, Inc.	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2016	0												
4708700954	McKown, C. I. & Son, Inc.	2017	0												
4708700954	McKown, C. I. & Son, Inc.	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2023	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
4708700954	McKown, C. I. & Son, Inc.	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2016	0												
4708700954	McKown, C. I. & Son, Inc.	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2021	0	0	0	0	0	0	0	0	0	0	0	0	0

4708700954	McKown, C. I. & Son, Inc.	2022	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2023	0	0	0	0	0	0	0	0	0	0	0	0

4708700954

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
4708700954	McKown, C. I. & Son, Inc.	2016	0												
4708700954	McKown, C. I. & Son, Inc.	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700954	McKown, C. I. & Son, Inc.	2023	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
4708700954	Original Loc	Greenbrier Group	Past WVGES Staff Geologst	2002	Reasonable	168	Reasonable	1092	Ground Level
4708700954	Original Loc	Keener	Well Record	2165	Reasonable	5	Reasonable	1092	Ground Level
4708700954	Original Loc	Big Injun (Price&eq)	Past WVGES Staff Geologst	2170	Reasonable	0	Reasonable	1092	Ground Level

Wireline (E-Log) Information:

* There is no Scanned/Raster Log data for this well

* There is no Digitized/LAS Log data for this well

* There is no Scanned or Digital Logs available for download

There is no Plugging data for this well

There is no Sample data for this well

Form OG-10

4708700954

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION 20

Rotary ☐
Spudder ☐
Cable Tools ☒
Storage ☐

Quadrangle Spencer

Permit No. ROA-954

WELL RECORD

Oil or Gas Well Comb. (KIND)

Company J & B Oil Company, Inc.
Address 339½ Market Street, Spencer, W. Va.
Farm Cora A. & C. H. Wines Acres 90.33
Location (waters) Boggs Fork
Well No. 6 Elev. 1091.81
District Spencer County Roane
The surface of tract is owned in fee by C. H. Wine, Spencer, W. Va. Address
Mineral rights are owned by
Address
Drilling commenced June 13, 1963
Drilling completed August 8, 1963
Date Shot 8/2/63 From To
With
Open Flow /10ths Water in Inch
/10ths Merc. in Inch
Volume Cu. Ft.
Rock Pressure 300 lbs. 24 hrs.
Oil 15 bbls., 1st 24 hrs.
WELL ACIDIZED No

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer None
13	18		
10 3/8	241		Size of
8 5/8			
6 3/8			Depth set
5 1/2	2180	2180	
3			Perf. top
2			Perf. bottom
Liners Used	None		Perf. top
			Perf. bottom

CASING CEMENTED 2182 SIZE 5½" No. Ft. 7/13/63 Date
50 sks. cement-Dowell
COAL WAS ENCOUNTERED AT FEET INCHES
FEET INCHES FEET INCHES
FEET INCHES FEET INCHES

WELL FRACTURED 42,000 Gal. Water - 55,000 lbs. sand
500 Gals. Mud Acid - 120 lbs. J-100
RESULT AFTER TREATMENT 30 bbls. oil - 40,000 cu. ft. gas
ROCK PRESSURE AFTER TREATMENT 300# 24 hours
Fresh Water 120 Feet Salt Water 1830 Feet

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth	Remarks
Red Mud			0	25			
Red Rock			25	70			
Slate & Shells			70	100			
Sand			100	190			
Red Rock			190	230			
Slate & Shells			230	262			
Sand			262	312			
Red Rock			312	340			
Slate & Shells			340	350			
Red Rock			350	385			
Slate & Shells			385	420			
Red Rock			420	480			
Slate & Shells			480	540			
Sand			540	580			
Slate & Shells			580	595			
Sand			595	618			
Red Rock			618	640			
Slate & Shells			640	675			
Red Rock			675	700			
Sand			700	745			
Red Rock			745	828			
Slate & Shells			828	905			
Red Rock			905	940			
Slate & Shells			940	996			
Sand			996	1012			
Slate & Shells			1012	1090			
Sand			1090	1170			
Slate & Shells			1170	1250			
Sand			1250	1345			
Slate & Shells			1345	1477			

(over)

4708700954

Formation	Color	Hard or Soft	Top 20	Bottom	Oil, Gas or Water	Depth Found	Remarks
Sand			1477	1500			
Slate & Shells			1500	1570			
Lime			1570	1605			
Slate & Shells			1605	1650			
Sand			1650	1670			
Slate & Shells			1670	1783			
Sand			1783	1915			
Lime			1915	1945			
Sand			1945	1957			
Lime			1957	1990			
Sand			1990	2002			
Lime			2002	2165			
Keener Sand			2165	2170			
Sand			2170	2180			

Date August 19, 19 63

APPROVED Allen Beard, Owner

Allen Beard

By President

(Title)

4708700984

W-5

WVGES
GEOLOGY UNDERLIES IT ALL
"Pipeline"

Select County: (087) Roane
Enter Permit #: 984
Get Data | Reset

Select datatypes: (Check All)
Location | Production | Plugging
Owner/Completion | Stratigraphy | Sample
Pay/Show/Water | Logs | Btm Hole Loc

Table Definitions
County Code Translations
Permit-Numbering Series
Usage Notes
Contact Information
Disclaimer
WVGES Main
"Pipeline-Plus" New

WV Geological & Economic Survey:

Well: County = 087 Permit = 984 Link to all digital records for well

Report Time: Thursday, April 03, 2025 2:18:40 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4708700984	Roane	984	Smithfield	Spencer	Spencer	38.753886	-81.268819	476642.1	4289499.9

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
4708700984	10/27/1963	Original Loc	Completed	W Kaufman, E Walbrown		W-5			Alfred M Oppenheimer II	Wolf's Head Oil Refining Co., Inc.			
4708700984	12/20/1972	Worked Over	Completed	W Kaufman, H Rhodes		W-5			Alfred M Oppenheimer II	Pennzoil Company			

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_E
4708700984	10/27/1963	10/19/1963	1040	Ground Level	Clvr-Rsh Rn	Undf PRICE blw INJN	Big Injun (Price&eq)	Development Well	Development Well	Oil and Gas	Rotary	Fractured	2270		2270		
4708700984	12/20/1972	-/-/-	1040	Ground Level	Clvr-Rsh Rn	Undf PRICE blw INJN	Big Injun (Price&eq)	Development Well	Development Well	Oil	unknown	Acid+Frac	2270		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
4708700984	12/20/1972	Pay	Oil	Vertical	2098	Big Lime	2115	Big Lime	0	7			
4708700984	10/27/1963	Show	Gas	Vertical	2102	Big Lime	2118	Big Lime	0	0			
4708700984	10/27/1963	Pay	Gas	Vertical	2190	Big Injun (Price&eq)	2210	Big Injun (Price&eq)	0	35			
4708700984	10/27/1963	Pay	Oil	Vertical	2190	Big Injun (Price&eq)	2210	Big Injun (Price&eq)	0	30			

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
4708700984	Pennzoil Company	1981	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	Pennzoil Company	1982	999	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	Pennzoil Company	1983	1,493	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	Pennzoil Company	1984	1,470	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	Pennzoil Products Company	1989	1,118	146	90	91	66	131	61	65	103	105	75	94	91
4708700984	Pennzoil Products Company	1990	672	103	77	109	91	58	70	52	24	19	30	21	18
4708700984	Pennzoil Products Company	1991	247	26	20	13	10	19	21	23	21	29	23	16	26
4708700984	Pennzoil Products Company	1992	168	22	42	25	17	20	16	0	0	16	10	0	0
4708700984	Pennzoil Products Company	1993	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	Pennzoil Products Company	1994	17	0	0	0	13	4	0	0	0	0	0	0	0
4708700984	Pennzoil Products Company	1995	277	0	0	0	0	0	41	37	41	44	38	35	41
4708700984	Pennzoil Products Company	1996	343	21	1	37	44	32	38	33	0	28	27	41	41
4708700984	Pennzoil Products Company	1997	352	28	28	31	30	25	8	34	36	6	32	50	44
4708700984	Pennzoil Products Company	1998	396	37	52	43	40	40	46	29	24	21	22	20	22
4708700984	Pennzoil Products Company	1999	124	6	0	0	22	15	0	0	12	12	21	22	14
4708700984	East Resources, Inc.	2000	150	13	14	10	0	17	8	0	20	14	16	16	22
4708700984	East Resources, Inc.	2001	276	7	30	22	24	26	26	20	23	29	31	31	7
4708700984	East Resources, Inc.	2002	326	29	26	23	23	28	27	29	30	32	27	18	34
4708700984	East Resources, Inc.	2003	79	20	12	0	0	23	6	0	0	0	0	0	18
4708700984	East Resources, Inc.	2004	56	0	0	0	0	0	0	0	0	0	29	27	0
4708700984	East Resources, Inc.	2005	383	22	22	21	24	40	34	29	39	41	40	33	38
4708700984	East Resources, Inc.	2006	509	38	37	41	41	45	44	48	33	36	43	50	53
4708700984	East Resources, Inc.	2007	430	51	38	42	30	27	23	27	34	31	32	49	46
4708700984	East Resources, Inc.	2008	479	40	39	40	37	41	39	40	41	41	45	38	38
4708700984	East Resources, Inc.	2010	506	49	35	40	42	43	40	41	41	40	46	47	42
4708700984	East Resources, Inc.	2011	547	44	41	47	47	47	43	47	48	46	48	44	45
4708700984	HG Energy, LLC	2012	525	40	35	39	40	44	40	28	52	57	57	47	46
4708700984	HG Energy, LLC	2013	533	48	35	38	39	51	47	42	48	45	50	44	46
4708700984	HG Energy, LLC	2014	383	42	37	42	36	1	9	15	35	42	42	39	43
4708700984	HG Energy, LLC	2015	464	37	32	33	37	42	41	42	40	40	40	37	43
4708700984	HG Energy, LLC	2016	467	39	38	39	39	41	38	40	38	39	39	39	38
4708700984	HG Energy, LLC	2017	404	37	32	33	31	34	30	32	32	34	36	37	36
4708700984	HG Energy, LLC	2018	426	36	33	38	36	38	37	39	36	34	33	32	34
4708700984	HG Energy, LLC	2019	365	35	32	34	31	24	24	26	32	30	33	34	30
4708700984	HG Energy, LLC	2020	358	35	31	35	17	29	32	33	32	28	28	29	29
4708700984	HG Energy, LLC	2021	228	10	8	9	13	15	18	26	26	25	25	22	31
4708700984	HG Energy, LLC	2022	339	28	21	29	27	29	28	31	31	29	29	29	28
4708700984	Delta Helix Energy, LLC	2023	58	0	0	0	0	0	0	0	0	0	0	30	28
4708700984	HG Energy, LLC	2023	313	30	27	31	32	32	30	32	32	34	33	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
4708700984	Pennzoil Company	1981	440	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	Pennzoil Company	1982	307	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	Pennzoil Company	1983	445	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	Pennzoil Company	1984	382	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	Pennzoil Products Company	1989	229	23	15	26	14	12	22	23	13	20	22	20	19
4708700984	Pennzoil Products Company	1990	114	22	19	14	18	10	5	4	5	4	4	5	4
4708700984	Pennzoil Products Company	1991	51	3	2	4	4	4	4	5	4	3	5	4	9
4708700984	Pennzoil Products Company	1992	18	6	4	0	3	0	0	3	2	0	0	0	0
4708700984	Pennzoil Products Company	1993	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	Pennzoil Products Company	1994	4	0	3	1	0	0	0	0	0	0	0	0	0
4708700984	Pennzoil Products Company	1995	59	0	0	0	9	8	8	9	8	8	9	0	0
4708700984	Pennzoil Products Company	1996	93	10	12	8	9	7	0	6	9	9	9	7	7
4708700984	Pennzoil Products Company	1997	78	7	8	7	2	9	9	1	7	8	7	6	7
4708700984	Pennzoil Products Company	1998	64	9	8	8	9	3	0	0	0	0	0	19	8
4708700984	Pennzoil Products Company	1999	2	2	0	0	0	0	0	0	0	0	0	0	0
4708700984	East Resources, Inc.	2000	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	East Resources, Inc.	2001	102	0	19	9	8	10	8	7	6	8	10	8	9
4708700984	East Resources, Inc.	2002	98	8	10	7	7	9	9	12	8	9	7	4	8
4708700984	East Resources, Inc.	2003	23	9	4	0	0	8	2	0	0	0	0	0	0
4708700984	East Resources, Inc.	2004	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	East Resources, Inc.	2005	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	East Resources, Inc.	2006	2	0	0	0	0	0	0	0	0	2	0	0	0
4708700984	East Resources, Inc.	2007	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	East Resources, Inc.	2008	54	0	0	8	8	6	5	5	5	4	5	4	4
4708700984	East Resources, Inc.	2010	111	15	12	12	12	0	9	12	7	4	10	10	8
4708700984	East Resources, Inc.	2011	31	6	0	0	0	0	0	0	0	0	0	10	15
4708700984	HG Energy, LLC	2012	113	8	15	12	9	10	7	3	9	6	22	12	0
4708700984	HG Energy, LLC	2013	144	17	22	17	16	10	2	13	10	10	11	8	8
4708700984	HG Energy, LLC	2014	111	8	11	12	12	12	11	9	11	9	8	4	4
4708700984	HG Energy, LLC	2015	56	5	3	4	5	8	4	5	4	4	5	4	5
4708700984	HG Energy, LLC	2016	51	4	4	5	4	4	5	4	5	4	4	3	5
4708700984	HG Energy, LLC	2017	49	4	3	3	5	5	3	4	5	4	4	5	4
4708700984	HG Energy, LLC	2018	50	5	4	4	4	5	4	4	5	4	5	2	4
4708700984	HG Energy, LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	Delta Helix Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0

4708700984

4708700984	HG Energy, LLC	2023	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
4708700984	HG Energy, LLC	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2016	0												
4708700984	HG Energy, LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	Delta Helix Energy, LLC	2023	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
4708700984	HG Energy, LLC	2016	0												
4708700984	HG Energy, LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	HG Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700984	Delta Helix Energy, LLC	2023	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
4708700984	Original Loc	Greenbrier Group	Past WVGES Staff Geologst	2060	Reasonable	130	Reasonable	1040	Ground Level
4708700984	Original Loc	Big Lime	Well Record	2060	Reasonable	110	Reasonable	1040	Ground Level
4708700984	Original Loc	Keener	Well Record	2170	Reasonable	20	Reasonable	1040	Ground Level
4708700984	Original Loc	Big Injun (Price&eq)	Past WVGES Staff Geologst	2190	Reasonable	20	Reasonable	1040	Ground Level
4708700984	Original Loc	Undf PRICE blw INJN	Well Record	2210	Reasonable	0	Reasonable	1040	Ground Level

Wireline (E-Log) Information:

* There is no Scanned/Raster Log data for this well

* There is no Digitized/LAS Log data for this well

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/Raster Logs

FILENAME
4708700984gdc.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, 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

There is no Plugging data for this well

There is no Sample data for this well

Form OG-10

4708700984

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION

Quadrangle SPENCER

Permit No. ROA-984

WELL RECORD

Oil or Gas Well O & G (KIND)

Company WOLF'S HEAD OIL REFINING COMPANY, INC.
Address P. O. Box 1588, Parkersburg, W. Va.
Farm Wm. Kaufman Acres 800
Location (waters) Millstone Run
Well No. W-5 Elev. 1040.47
District Smithfield County Roane
The surface of tract is owned in fee by Eugene Walbrown
Otto Route Address Spencer, W. Va.
Mineral rights are owned by Alfred M. Oppenheimer II, et al.
300 South Lang Avenue Address Pittsburgh 8, Pa.
Drilling commenced October 19, 1963
Drilling completed October 27, 1963
Date Shot — From — To —
With
Open Flow /10ths Water in Inch
/10ths Merc. in Inch
Volume Show Oil & Gas (Drilled w/Rotary) Cu. Ft.
Rock Pressure lbs. hrs.
Oil bbls., 1st 24 hrs.
WELL ACIDIZED
WELL FRACTURED 11/8/63

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer Steel Shoe Float Collar Guide Shoe
13			
10			Size of 8 5/8" OD. 4½" 4½"
8 5/8"	262'	262'	
6⅝			Depth set 260' 2238' 2270'
4½"	2276' 1"	2276' 1'	
3			Perf. top
2 3/8" Tbg.	2294'	2294'	Perf. bottom
Liners Used			Perf. top
			Perf. bottom

CASING CEMENTED 8 5/8" 260 10/20/63
4 1/2 SIZE 2270 No. Ft. 10/27/63 Date

COAL WAS ENCOUNTERED AT — FEET INCHES
FEET INCHES FEET INCHES
FEET INCHES FEET INCHES

RESULT AFTER TREATMENT Gas - 35,000 Cu. Ft. Oil - 30 Bbls.
ROCK PRESSURE AFTER TREATMENT 480 Lbs.
Fresh Water — Feet Salt Water Feet

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth	Remarks
Shale & Shell			0	65			
Red Rock			65	155			
Sand			155	260			
Sand & Shale			260	365			
Shale & Red Rock			365	535			
Sand & Shale			535	1325			
Sand			1325	1370			
Shale			1370	1405			
Sand & Shale			1405	1996			
Sand & Lime			1996	2060			
Big Lime			2060	2170	Oil	2102-2118	Show Only
Keener Sand			2170	2190			
Big Injun			2190	2210	Oil & Gas	2190-2210	
Sand & Lime			2210	2233			
Shale & Lime			2233	2270			
4½" Casing				2270			
TOTAL DEPTH				2270			

(over)

4708700984

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth Found	Remarks

Date November 22, 1963

APPROVED WOLF'S HEAD OIL REFINING COMPANY, INC Owner

By George W. Wilsman

George W. Wilsman, (Title) Agent

Form No. 989 1M 2/60 M-E, 920EA

WOLF'S HEAD OIL REFINING COMPANY, INCORPORATED

~~SOUTHWESTERN OIL COMPANY~~

NEW WELL REPORT

4708700984
W-5

LEASE NO. 81219 — 600 ACRES — WORKING DISTRICT Spencer # 4

Wm. Kaufman FARM — WELL NO. W-5 N. ____ S. 47 E. ____ W. 38

Smithfield DISTRICT OR TOWNSHIP — Roane COUNTY — ____ QUAD.

LOCATION MADE September 20, 19 63 — DRILLING COMMENCED October 19, 19 63

RIG COMMENCED October 16, 19 63 — DRILLING COMPLETED October 27, 19 63

RIG COMPLETED October 19, 19 63 — DEPTH 2270' — SAND Big Injun

RIG CONTRACTOR Denning Drilling Co., Inc. — DRILLING CONTRACTOR Denning Drilling Co., Inc.

ELEVATION: FLOOR ____ GROUND 1010.47 — WORK ORDER NO. AFE # WH-8-W.Va.

FORMATION RECORD

KIND	TOP	BOTTOM	STEEL LINE MEAS.	TEST	KIND	TOP	BOTTOM	STEEL LINE MEAS.	TEST
Shale & Shell	0	65							
Red Rock	65	155							
Sand	155	260	260						
Sand & Shale	260	365							
Shale & RedRock	365	535							
Sand & Shale	535	1325							
Sand	1325	1370							
Shale	1370	1405							
Sand & Shale	1405	1996							
Sand & Lime	1996	2060							
Big Lime	2060	2170							
Mi[illegible]	2102	2118		Show Only					
[illegible] Sand	2170	2190							
[illegible]ejun	2190	2210							
Oil & Gas	2190	2210							
Sand & Lime	2210	2233							
Shale & Lime	2233	2270							
6⅝" Casing		2270	2270						
Total Depth		2270	2270						

(OVER)

4708700984
W-5

NEW WELL REPORT — CONT'D.

INITIAL TORPEDO RECORD	
Date of Shot	
Name of Torpedo Co.	
No. of Quarts	
Length of Shell	
Diameter of Shell	
Length of Anchor	
Top of Shot	
Bottom of Shot	
Feet of Fluid in Hole When Shot	
Results:	

CASING AND TUBING RECORD

SIZE	PUT IN WELL TRANSFER NO.	PUT IN WELL FEET	PUT IN WELL INCH	PULLED OUT TRANSFER NO.	PULLED OUT FEET	PULLED OUT INCH
8-5/8"	Tally	262	—			
4-1/2"	Tally	2276'	1			
2-3/8"						
Tubing	Tally	2284	—			

INITIAL PRODUCTION FIRST 24 HOURS

Open Flow /10ths Water in _____ Inch
_____ /10ths Merc. in _____ Inch
Volume Show Oil & Gas (Drilled w/Rotary) Cu. Ft.
Rock Pressure _____ lbs. _____ hrs.
Oil See Electric Log bbls., First 24 hrs.

PACKER RECORD

KIND	SIZE	DEPTH SET	DATE SET
Steel Shoe	8-5/8"OD	260	10-20-63
Float Collar	4½" 9.5#	2238	10-27-63
Guide Shoe	4½" 9.5#	2270	10-27-63

ACIDIZATION OR FRACTURING RECORD

DATE WELL ACIDIZED _____
DATE WELL FRACTURED 11- 8-63
NAME OF COMPANY Dowell
(List below materials used in Acidizing or Fracturing, i.e., Sand, Crude Oil, Gasoline, Water, Kerosene, Mothballs, Acid, etc., giving gallons, barrels and pounds).

Used: 670 Bbls. Oil
Used: 43,000# Sand
Used: 300 Gals. Dowell X-Service
Used: 300 Gals. Mud Acid
Used: 40 Gals. Freflo

BREAKDOWN PRESSURE 1300#
PUMPING PRESSURE 2600 to 3190#
AVERAGE PUMPING RATE/MINUTE 20.5 Bbls.
PUMPING TIME 43 Minutes
RESULT AFTER TREATMENT } GAS 35,000 CU. FT.
OIL 30 BBLS.
ROCK PRESSURE AFTER TREATMENT 450 LBS.

CASING CEMENTED

From Surface to:
8-5/8" SIZE 260 FT. 10-20-63 DATE
4-1/2" SIZE 2270 FT. 10-27-63 DATE
SIZE _____ FT. _____ DATE

USED IN CEMENTING 8-5/8" CASING
30 Sacks - Cement
Cemented by: Gerald D. Jones

USED IN CEMENTING 4-1/2" CASING:
65 Sacks - Portland Cement
500 Gals - Mud Flush
1 Lb. - Halliburton Weld-A
3 - Baker Centralizers
18 - 5' Sections of Roto-Wall Cleaners
Cemented by: Halliburton Co.

REMARKS: Drilled 10-3/8" Hole from Surface to 260'
Drilled 7-7/8" Hole from 260' to 2270'

Note: Rotary Tools Used

Note: This well was logged by McCullough Tool Company on October 26, 1963.

Note: This well was drilled according to Rule 11, under Section 13, of Article 4, Chapter 22, of the Code of the Department of Mines, Oil and Gas Division.

S-M

APPROVED

C. C. Crawford
SUPERINTENDENT

4708700985

W-7

WVGES GEOLOGY UNDERLIES IT ALL "Pipeline"

Select County: (087) Roane
Enter Permit #: 985
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 = 087 Permit = 985 Link to all digital records for well

Report Time: Thursday, April 03, 2025 1:09:14 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4708700985	Roane	985	Smithfield	Spencer	Spencer	38.755755	-81.267503	476757	4289707

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
4708700985	11/27/1963	Original Loc	Completed	Harold Rhodes	W-7		William Kaufman	81219	Alfred M Oppenheimer II et al	Wolf's Head Oil Refining Co., Inc.		
4708700985	-/-/-	Worked Over	Completed	Terry A Samples	W-7		W M Kaufman			Pennzoil Company		Big Injun (Price&eq)

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_E
4708700985	11/27/1963	11/20/1963	1003	Ground Level	Clvr-Rsh Rn	Price Fm & equivs	Price Fm & equivs	Development Well	Development Well	Oil and Gas	unknown	Fractured	2219		2219		
4708700985	-/-/-	-/-/-	1003	Ground Level	Clvr-Rsh Rn	Price Fm & equivs	Big Injun (Price&eq)	Service Well	Unsuccessful	Salt Water Disp	unknown	unknown	2219		0		

Comment: -/-/- Injection zone footage proposed.

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
4708700985	-/-/-	Horizon	Injection	Vertical	2163	Big Injun (Price&eq)	2166	Big Injun (Price&eq)					
4708700985	11/27/1963	Pay	Oil & Gas	Vertical			2170	Big Injun (Price&eq)	0	0			

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
4708700985	Pennzoil Company	1981	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Pennzoil Company	1982	999	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Pennzoil Company	1983	1,492	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Pennzoil Company	1984	1,470	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Delta Helix Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	HG Energy, LLC	2023	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
4708700985	Pennzoil Company	1981	440	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Pennzoil Company	1982	307	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Pennzoil Company	1983	445	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Pennzoil Company	1984	382	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Delta Helix Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	HG Energy, LLC	2023	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
4708700985	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	HG Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Delta Helix Energy, LLC	2023	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
4708700985	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	HG Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700985	Delta Helix Energy, LLC	2023	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
4708700985	Original Loc	Little Lime	Well Record	1955	Reasonable	15	Reasonable	1003	Ground Level
4708700985	Original Loc	Big Lime	Well Record	1975	Reasonable	155	Reasonable	1003	Ground Level
4708700985	Original Loc	Greenbrier Group	Past WVGES Staff Geologst	1975	Reasonable	155	Reasonable	1003	Ground Level
4708700985	Original Loc	Big Injun (Price&eq)	Past WVGES Staff Geologst	2130	Reasonable	11	Reasonable	1003	Ground Level
4708700985	Original Loc	Keener	Well Record	2130	Reasonable	11	Reasonable	1003	Ground Level

Wireline (E-Log) Information:

* There is no Scanned/Raster Log data for this well

* There is no Digitized/LAS Log data for this well

* There is no Scanned or Digital Logs available for download

There is no Plugging data for this well

There is no Sample data for this well

Form OG-10

4708700985

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION

Quadrangle SPENCER

Permit No. ROA-985

WELL RECORD

Oil or Gas Well (KIND)

Company WOLF'S HEAD OIL REFINING COMPANY, INC.
Address P. O. Box 1588, Parkersburg, W. Va.
Farm Wm. Kaufman Acres 800
Location (waters) Slab Camp Run
Well No. W-7 Elev. 1003.40
District Smithfield County Roane
The surface of tract is owned in fee by Harold Rhodes
Otto Route Address Spencer, W. Va.
Mineral rights are owned by Alfred M. Oppenheimer II, et al.
300 South Lang Avenue Address Pittsburgh 8, Pa.
Drilling commenced November 20, 1963
Drilling completed November 27, 1963
Date Shot - From To
With
Open Flow /10ths Water in Inch
/10ths Merc. in Inch
Volume Show Oil & Gas (Drilled w/Rotary) Cu. Ft.
Rock Pressure lbs. hrs.
Oil bbls., 1st 24 hrs.
WELL ACIDIZED
WELL FRACTURED December 12, 1963

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer Steel Shoe
13			Float Collar
10			Guide Shoe
8 5/8"	174'2"	174'2"	Size of 8 5/8" OD
6¼			4 1/2" OD
4½"OD	2230' 7"	2230' 7"	4 1/2" OD
3			Depth set 2188
2 3/8" Tbg.	2230'	2230'	2219
Liners Used			Perf. top
			Perf. bottom
			Perf. top
			Perf. bottom

CASING CEMENTED 8 5/8" SIZE 172 No. Ft. 11/21/63 Date
4½" 2219 11/29/63

COAL WAS ENCOUNTERED AT - FEET INCHES
FEET INCHES FEET INCHES
FEET INCHES FEET INCHES

RESULT AFTER TREATMENT Gas - 42,000 Cu. Ft.
Oil - 33 Bbls.
ROCK PRESSURE AFTER TREATMENT 508 Lbs.
Fresh Water - Feet - Salt Water Feet

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth	Remarks
Clay			0	10			
Sand			10	70			
Red Rock			70	110			
Shale			110	130			
Sand			130	172			
Shale			172	200			
Sand			200	240			
Red Rock			240	295			
Sand			295	375			
Sandy Shale			375	575			
Shale			575	600			
Red Rock			600	610			
Shale			610	630			
Sand			630	635			
Shale			635	670			
Sand			670	705			
Sand & Shale			705	935			
Sand			935	1020			
Shale			1020	1040			
Sand			1040	1150			
Shale			1150	1300			
Sand			1300	1350			
Sand & Shale			1350	1435			
Sand			1435	1500			
Shale			1500	1530			
Sandy Shale			1530	1600			
Sand			1600	1665			
Lime			1665	1770			
Sand			1770	1925			
Shale			1925	1955			

(over)

4708700985

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth Found	Remarks
Little Lime			1955	1970			
Sandy Shale			1970	1975			
Big Lime			1975	2130			
Keener Sand			2130	2141			
Big Injun			2141	2170			
					Oil & Gas	2141-2170	Show
Shale			2170	2219			
4½" Casing				2219			
TOTAL DEPTH				2219			

Date December 23, 1963

APPROVED WOLF'S HEAD OIL REFINING COMPANY, INC. Owner

By George W. Wilsman

George W. Wilsman, (Title) Agent

4708700987

W-6

WVGES GEOLOGY UNDERLIES IT ALL "Pipeline"

Select County: (087) Roane
Enter Permit #: 987
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 = 87 Permit = 987 Link to all digital records for well

Report Time: Thursday, April 03, 2025 1:11:04 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4708700987	Roane	987	Smithfield	Spencer	Spencer	38.754674	-81.272094	476357.8	4289588.2

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
4708700987	12/-/1963	Original Loc	Completed	William Kaufman		W-6				Wolf's Head Oil Refining Co., Inc.			

Completion Information:

API	CMP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTG	KOD	G_BEF	G_
4708700987	12/-/1963	-/-/-	1132	Ground Level	Clvr-Rsh Rn	Price Fm & equivs	Price Fm & equivs	Development Well	Development Well	Oil and Gas	unknown	Acid+Frac	2335		2335		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
4708700987	12/-/1963	Pay	Oil & Gas	Vertical			2295	Big Injun (Price&eq)	0	0			

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
4708700987	Pennzoil Company	1981	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	Pennzoil Company	1982	999	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	Pennzoil Company	1983	1,492	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	Pennzoil Company	1984	1,470	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	Pennzoil Products Company	1989	1,281	146	94	99	106	136	91	129	75	101	127	90	87
4708700987	Pennzoil Products Company	1990	1,448	108	77	104	91	99	129	178	135	139	145	124	119
4708700987	Pennzoil Products Company	1991	1,213	114	86	93	91	92	152	115	90	97	110	85	88
4708700987	Pennzoil Products Company	1992	423	82	70	67	54	66	84	0	0	0	0	0	0
4708700987	Pennzoil Products Company	1993	1,401	0	115	158	127	102	80	210	140	138	134	94	103
4708700987	Pennzoil Products Company	1994	1,313	111	153	47	139	107	95	102	94	104	126	95	140
4708700987	Pennzoil Products Company	1995	1,389	127	130	109	133	141	119	147	93	107	66	127	90
4708700987	Pennzoil Products Company	1996	1,239	0	0	176	122	166	90	92	39	127	176	127	124
4708700987	Pennzoil Products Company	1997	1,101	12	122	0	134	67	108	53	107	93	52	144	209
4708700987	Pennzoil Products Company	1998	1,832	235	157	245	269	370	251	156	0	18	45	47	39
4708700987	Pennzoil Products Company	1999	295	0	0	0	34	74	8	52	50	28	23	10	16
4708700987	East Resources, Inc.	2000	114	0	12	3	14	14	21	24	11	1	0	4	10
4708700987	East Resources, Inc.	2001	1,763	0	103	33	399	266	228	371	250	113	0	0	0
4708700987	East Resources, Inc.	2002	531	0	400	93	0	0	0	38	0	0	0	0	0
4708700987	East Resources, Inc.	2003	106	0	0	3	25	15	19	12	0	12	20	0	0
4708700987	East Resources, Inc.	2004	82	14	13	0	0	0	0	0	23	0	13	16	3
4708700987	East Resources, Inc.	2005	264	23	33	17	22	15	37	17	25	25	14	24	12
4708700987	East Resources, Inc.	2006	191	5	4	2	2	28	31	25	21	25	14	30	4
4708700987	East Resources, Inc.	2007	253	16	0	10	30	20	29	14	9	31	33	43	18
4708700987	East Resources, Inc.	2008	152	14	17	10	31	36	6	29	9	0	0	0	0
4708700987	East Resources, Inc.	2010	92	26	8	3	18	1	3	14	14	5	0	0	0
4708700987	East Resources, Inc.	2011	199	5	5	5	17	24	18	18	20	0	25	45	17
4708700987	HG Energy, LLC	2012	42	7	6	0	6	5	0	0	6	0	12	0	0
4708700987	HG Energy, LLC	2013	8	0	0	8	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2014	81	0	0	0	0	0	0	0	13	0	0	7	61
4708700987	HG Energy, LLC	2015	385	141	75	0	50	0	17	0	12	0	0	41	49
4708700987	HG Energy, LLC	2016	110	79	0	31	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2017	78	53	2	0	0	0	0	0	0	0	1	22	0
4708700987	HG Energy, LLC	2018	459	0	89	136	41	4	6	0	0	0	0	36	147
4708700987	HG Energy, LLC	2019	355	11	0	42	0	29	21	35	0	105	20	28	64
4708700987	HG Energy, LLC	2020	1,405	128	120	131	94	121	125	127	116	108	110	111	114
4708700987	HG Energy, LLC	2021	228	10	8	9	13	15	18	26	26	25	25	22	31
4708700987	HG Energy, LLC	2022	1,142	103	85	101	95	103	93	97	93	90	91	95	96
4708700987	HG Energy, LLC	2023	1,020	104	91	104	102	101	103	104	101	105	105	0	0
4708700987	Delta Helix Energy, LLC	2023	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
4708700987	Pennzoil Company	1981	440	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	Pennzoil Company	1982	307	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	Pennzoil Company	1983	445	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	Pennzoil Company	1984	382	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	Pennzoil Products Company	1989	261	25	24	27	21	24	16	22	22	19	21	21	19
4708700987	Pennzoil Products Company	1990	302	21	19	24	33	34	28	30	24	24	26	22	17
4708700987	Pennzoil Products Company	1991	224	21	19	19	29	20	17	17	19	16	17	15	15
4708700987	Pennzoil Products Company	1992	75	16	13	14	16	0	0	0	0	0	0	0	16
4708700987	Pennzoil Products Company	1993	229	24	15	16	21	21	20	20	21	17	17	18	19
4708700987	Pennzoil Products Company	1994	206	9	19	18	18	15	16	17	20	17	20	18	19
4708700987	Pennzoil Products Company	1995	173	14	17	19	17	19	17	18	13	21	18	0	0
4708700987	Pennzoil Products Company	1996	222	23	16	21	19	14	8	20	23	19	20	21	18
4708700987	Pennzoil Products Company	1997	190	15	20	16	21	18	17	9	11	14	18	17	14
4708700987	Pennzoil Products Company	1998	67	18	14	16	12	5	0	0	0	0	0	0	0
4708700987	Pennzoil Products Company	1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	East Resources, Inc.	2000	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	East Resources, Inc.	2001	146	0	17	22	19	21	12	11	9	8	10	8	9
4708700987	East Resources, Inc.	2002	21	9	10	2	0	0	0	0	0	0	0	0	0
4708700987	East Resources, Inc.	2003	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	East Resources, Inc.	2004	5	0	0	0	0	0	0	0	0	0	0	0	5
4708700987	East Resources, Inc.	2005	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	East Resources, Inc.	2006	59	0	0	0	0	59	0	0	0	0	0	0	0
4708700987	East Resources, Inc.	2007	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	East Resources, Inc.	2008	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	East Resources, Inc.	2010	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	East Resources, Inc.	2011	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2012	18	0	0	0	0	0	0	0	0	5	13	0	0
4708700987	HG Energy, LLC	2013	24	0	0	0	0	9	11	0	4	0	0	0	0
4708700987	HG Energy, LLC	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2016	0												
4708700987	HG Energy, LLC	2017	0												
4708700987	HG Energy, LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	Delta Helix Energy, LLC	2023	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

4708700987

4708700987	HG Energy, LLC	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2016	0												
4708700987	HG Energy, LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	Delta Helix Energy, LLC	2023	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
4708700987	HG Energy, LLC	2016	0												
4708700987	HG Energy, LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	HG Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700987	Delta Helix Energy, LLC	2023	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
4708700987	Original Loc	Little Lime	Well Record	2104	Reasonable	46	Reasonable	1132	Ground Level
4708700987	Original Loc	Greenbrier Group	Past WVGES Staff Geologst	2150	Reasonable	120	Reasonable	1132	Ground Level
4708700987	Original Loc	Big Lime	Well Record	2150	Reasonable	105	Reasonable	1132	Ground Level
4708700987	Original Loc	Keener	Well Record	2255	Reasonable	15	Reasonable	1132	Ground Level
4708700987	Original Loc	Big Injun (Price&eq)	Past WVGES Staff Geologst	2270	Reasonable	25	Reasonable	1132	Ground Level

Wireline (E-Log) Information:

* There is no Scanned/Raster Log data for this well

* There is no Digitized/LAS Log data for this well

* There is no Scanned or Digital Logs available for download

There is no Plugging data for this well

There is no Sample data for this well

Form OG-10

4708700987

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION

Quadrangle SPENCER

Permit No. ROA-987- Revised Location

WELL RECORD

Oil or Gas Well (KIND)

Company WOLF'S HEAD OIL REFINING COMPANY, INC.
Address P. O. Box 1588, Parkersburg, W. Va.
Farm Wm. Kaufman Acres 800
Location (waters) Millstone Run
Well No. W-6 - Revised Location Elev. 1132.36
District Smithfield County Roane
The surface of tract is owned in fee by Roy Rhodes
Otto Route Address Spencer, W. Va.
Mineral rights are owned by Alfred M. Oppenheimer II, et al.
300 South Lang Avenue Address Pittsburgh 8, Pa.
Drilling commenced December 4, 1963
Drilling completed December 12, 1963
Date Shot - From To
With
Open Flow /10ths Water in Inch
/10ths Merc. in Inch
Volume Show Oil & Gas (Drilled w/Rotary) Cu. Ft.
Rock Pressure Not Taken lbs. hrs.
Oil bbls., 1st 24 hrs.
WELL ACIDIZED -

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer Steel Shoe
13			Float Collar
10			Guide Shoe
8 5/8"	410'	410'	Size of 8 5/8" OD
6¾			4½" OD
4½"	2379' 6"	2379' 6"	4½" OD
3			Depth set 407'
2 3/8" Tbg.	2345'	2345'	2304'
Liners Used			2335'
			Perf. top
			Perf. bottom
			Perf. top
			Perf. bottom

CASING CEMENTED 8 5/8" SIZE 407 No. Ft. 12/6/63 Date
4 1/2" 2335 12/13/63

COAL WAS ENCOUNTERED AT - FEET INCHES
FEET INCHES FEET INCHES
FEET INCHES FEET INCHES

WELL FRACTURED 12/26/63 - Used 37500 Gals. Water, 58,000 Lbs. Sand, 300 Gal. Mud Acid, 40 Gal. Freflo, 35 Gal. Deterger, 400 Lbs. J-84 and 200 Lbs. J-98.
RESULT AFTER TREATMENT Gas - 38,000 Cu. Ft.
Oil - 32 Bbls.
ROCK PRESSURE AFTER TREATMENT 495 Lbs.
Fresh Water - Feet - Salt Water Feet

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth	Remarks
Shale			0	407			
Red Rock			407	575			
Sand			575	735			
Shale			735	750			
Red Rock			750	790			
Shale			790	820			
Sand			820	830			
Shale			830	1425			
Sandy Shale			1425	1640			
Sand			1640	1665			
Shale			1665	1725			
Sand			1725	1805			
Red Rock			1805	1840			
Sandy Shale			1840	1855			
Sand			1855	2015			
Sand & Shale			2015	2104			
Little Lime			2104	2150			
Big Lime			2150	2255			
Keener Sand			2255	2270			
Big Injun			2270	2295			
					Oil & Gas	2270-2295	Show
Lime & Shale			2295	2335			
4½" Casing				2335			
TOTAL DEPTH				2335			

JAN 1964
RECEIVED
West Virginia
Dept. of Mines

(over)

7

Form No. 989 1M 2/60 M'G. 9212A

WOLF'S HEAD OIL REFINING COMPANY, INCORPORATED
SOUTHERN PENN OIL COMPANY

Rec

4708700987
W-6

NEW WELL REPORT

No. 61219 — 600 Acres — Working District: Spencer #4

Farm: Wm. Kaufman — Well No. W-6 N. ____ S. 47 E. ____ W. 38

District or Township: Smithfield — County: Roane — Quad.

Location Made: November 12, 19 63 — Drilling Commenced: December 4, 19 63

Rig Commenced: November 29, 19 63 — Drilling Completed: December 12, 19 63

Rig Completed: December 4, 19 63 — Depth: 2335' — Sand: Big Injun

Rig Contractor: Denning Drilling Co., Inc. — Drilling Contractor: Denning Drilling Co., Inc.

Elevation: Floor ____ Ground 1132.36 — Work Order No. AFE #MH-10-W.V.

FORMATION RECORD

Kind	Top	Bottom	Steel Line Meas.	Test	Kind	Top	Bottom	Steel Line Meas.	Test
Shale	0	407	407						
Red Rock	407	575							
Sand	575	735							
Shale	735	750							
Red Rock	750	790							
Shale	790	820							
Sand	820	830							
Shale	830	1425							
Sandy Shale	1425	1640							
Sand	1640	1665							
Shale	1665	1725							
[illegible]	1725	1805							
[illegible] Rock	1805	1840							
[illegible] Shale	1840	1855							
Sand	1855	2015							
Sand & Shale	2015	2104							
Little Lime	2104	2150							
Big Lime	2150	2255							
Keener Sand	2255	2270							
Big Injun	2270	2295							
Oil & Gas	2270	2295		Show					
Lime & Shale	2295	2335							
4½" Casing		2335	2335						
Total Depth		2335	2335						

(OVER)

4708700987
W-6

NEW WELL REPORT – CONT'D.

INITIAL TORPEDO RECORD	CASING AND TUBING RECORD						
	SIZE	PUT IN WELL			PULLED OUT		
Date of Shot		TRANSFER NO.	FEET	INCH	TRANSFER NO.	FEET	INC
	8-5/8"	Tally	410	—			
Name of Torpedo Co.	4½" OD	Tally	2379	6			
No. of Quarts	2-3/8"						
Length of Shell	Tbg.	Tally	2365	—			
Diameter of Shell							
Length of Anchor							
Top of Shot							
Bottom of Shot							
Feet of Fluid in Hole When Shot							
Results:							

INITIAL PRODUCTION FIRST 24 HOURS

Open Flow /10ths Water in Inch

/10ths Merc. in Inch

Volume Show Oil & Gas (Drilled w/Rotary) Cu. Ft.

Rock Pressure None Taken lbs. hrs.

Oil #See Electric Log bbls., First 24 hrs.

PACKER RECORD

KIND	SIZE	DEPTH SET	DATE SET
Steel Shoe	8-5/8" OD	407'	12-6-63
Float Collar	4½" OD	2304'	12-13-63
Guide Shoe	4½" OD	2335'	12-13-63

ACIDIZATION OR FRACTURING RECORD

DATE WELL ACIDIZED

DATE WELL FRACTURED 12-26-63

NAME OF COMPANY Dowell

(List below materials used in Acidizing or Fracturing, i.e., Sand, Crude Oil, Gasoline, Water, Kerosene, Mothballs, Acid, etc., giving gallons, barrels and pounds).

Used: 37500 Gals. Water
Used: 58,000 Lbs. Sand
Used: 300 Gal. Mud Acid
Used: 40 Gal. Freflo
Used: 35 Gal. Detergar
Used: 400 lbs. J-54
Used: 200 lbs. J-98

BREAKDOWN PRESSURE 1200#

PUMPING PRESSURE 1300 - 1700 Lbs.

AVERAGE PUMPING RATE/MINUTE 32 Bbls.

PUMPING TIME 27 minutes

RESULT AFTER TREATMENT | GAS 38000 CU. FT.
OIL 32 BBLS.

ROCK PRESSURE AFTER TREATMENT 495 LBS.

CASING CEMENTED

Surface to:

8-5/8" SIZE 407 FT. 12-6-63 DATE

4½" SIZE 2335 FT. 12-13-63 DATE

SIZE FT. DATE

USED IN CEMENTING 8-5/8" CASING:

50 Bags - Cement

1 Bag - Calcium Chloride

Cemented by: Well Service, Inc

USED IN CEMENTING 4½" CASING:

65 cu. ft. Pozmix Cement (Consisting of 33 cu. ft. of Columbia Cement and 32 cu. ft. fo Pozmix -A and 1-Hall. Cel. blended 2% with 65 cu. of Pozmix Cement.

500 Gals. - Mud Flush

Cemented by: Halliburton Company

REMARKS: Drilled 10-5/8" Hole from Surface to 407'.
Drilled 7-7/8" Hole from 407' to 2335'.

Note: Rotary Tools Used.

Note: Used 18 - 5' Sections of Roto-Va Cleaners & 39 B-I Ish Limits & 1# Halliburton Weld-A.

Note: This well was logged by McCullough Tool Company on December 13, 1963.

Note: This well was drilled according to Rule 11, under Section 13, of Article 4, Chapter 22 of the Code of the Department of Mines, Oil and Gas Division.

APPROVED

C. C. Crawford
SUPERINTENDENT

4708700988

W-8

WVGES
GEOLOGY UNDERLIES IT ALL
"Pipeline"

Select County: (087) Roane
Enter Permit #: 988
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 = 87 Permit = 988 Link to all digital records for well

Report Time: Thursday, April 03, 2025 1:09:49 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4708700988	Roane	988	Smithfield	Spencer	Spencer	38.755462	-81.262517	477190.2	4289673.2

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_
4708700988	1/13/1964	Original Loc	Completed	W Kaufman, E Walbrown		W-8			Alfred M Oppenheimer II	Wolf's Head Oil Refining Co., Inc.			
4708700988	10/26/1972	Worked Over	Completed	W Kaufman, K Miller		W-8			Alfred M Oppenheimer II	Pennzoil Company			

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_E
4708700988	1/13/1964	12/17/1963	1225	Ground Level	Clvr-Rsh Rn	Undf PRICE blw INJN	Big Injun (Price&eq)	Development Well	Development Well	Oil and Gas	Rotary	Fractured	2430		2430		
4708700988	10/26/1972	-/-/-	1225	Ground Level	Clvr-Rsh Rn	Undf PRICE blw INJN	Big Injun (Price&eq)	Development Well	Development Well	Oil	unknown	Acid+Frac	2430		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
4708700988	10/26/1972	Pay	Oil	Vertical	2276	Big Lime	2282	Big Lime	0	4			
4708700988	1/13/1964	Pay	Oil	Vertical	2362	Big Injun (Price&eq)	2379	Big Injun (Price&eq)	0	38			
4708700988	1/13/1964	Pay	Gas	Vertical	2362	Big Injun (Price&eq)	2379	Big Injun (Price&eq)	0	38			

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
4708700988	Pennzoil Company	1981	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	Pennzoil Company	1982	999	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	Pennzoil Company	1983	1,492	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	Pennzoil Company	1984	1,470	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	Pennzoil Products Company	1989	1,299	134	94	99	106	136	91	119	94	105	127	99	95
4708700988	Pennzoil Products Company	1990	1,398	103	68	114	91	99	117	157	140	139	145	124	101
4708700988	Pennzoil Products Company	1991	1,046	114	76	62	19	101	100	115	85	80	116	85	93
4708700988	Pennzoil Products Company	1992	918	93	46	67	66	81	78	97	87	70	87	74	72
4708700988	Pennzoil Products Company	1993	696	52	69	69	34	66	68	65	49	46	61	56	61
4708700988	Pennzoil Products Company	1994	645	63	66	49	51	62	57	66	49	32	57	44	49
4708700988	Pennzoil Products Company	1995	514	44	61	49	41	46	41	42	36	44	29	40	41
4708700988	Pennzoil Products Company	1996	413	21	1	52	44	36	38	33	33	43	30	41	41
4708700988	Pennzoil Products Company	1997	446	49	37	35	30	32	31	34	36	30	32	44	56
4708700988	Pennzoil Products Company	1998	410	55	44	43	40	44	46	29	24	21	22	20	22
4708700988	Pennzoil Products Company	1999	239	46	48	27	22	15	0	0	12	12	21	22	14
4708700988	East Resources, Inc.	2000	150	13	14	10	0	17	8	0	20	14	16	16	22
4708700988	East Resources, Inc.	2001	370	7	0	0	0	55	64	66	35	11	62	63	7
4708700988	East Resources, Inc.	2002	590	51	47	49	47	47	50	53	55	57	46	27	61
4708700988	East Resources, Inc.	2003	1,000	33	21	116	295	94	92	82	71	76	86	0	34
4708700988	East Resources, Inc.	2004	936	98	81	56	66	98	122	88	101	113	29	27	57
4708700988	East Resources, Inc.	2005	383	22	22	21	24	40	34	29	39	41	40	33	38
4708700988	East Resources, Inc.	2006	509	38	37	41	41	45	44	48	33	36	43	50	53
4708700988	East Resources, Inc.	2007	430	51	38	42	30	27	23	27	34	31	32	49	46
4708700988	East Resources, Inc.	2008	479	40	39	40	37	41	39	40	41	41	45	38	38
4708700988	East Resources, Inc.	2010	506	49	35	40	42	43	40	41	41	40	46	47	42
4708700988	East Resources, Inc.	2011	547	44	41	47	47	47	43	47	48	46	48	44	45
4708700988	HG Energy, LLC	2012	525	40	35	39	40	44	40	28	52	57	57	47	46
4708700988	HG Energy, LLC	2013	533	48	35	38	39	51	47	42	48	45	50	44	46
4708700988	HG Energy, LLC	2014	383	42	37	42	36	1	9	15	35	42	42	39	43
4708700988	HG Energy, LLC	2015	464	37	32	33	37	42	41	42	40	40	40	37	43
4708700988	HG Energy, LLC	2016	467	39	38	39	39	41	38	40	38	39	39	39	38
4708700988	HG Energy, LLC	2017	404	37	32	33	31	34	30	32	32	34	36	37	36
4708700988	HG Energy, LLC	2018	426	36	33	38	36	38	37	39	36	34	33	32	34
4708700988	HG Energy, LLC	2019	365	35	32	34	31	24	24	26	32	30	33	34	30
4708700988	HG Energy, LLC	2020	358	35	31	35	17	29	32	33	32	28	28	29	29
4708700988	HG Energy, LLC	2021	583	54	41	54	56	57	56	59	0	52	51	48	55
4708700988	HG Energy, LLC	2022	339	28	21	29	27	29	28	31	31	29	29	29	28
4708700988	Delta Helix Energy, LLC	2023	58	0	0	0	0	0	0	0	0	0	0	30	28
4708700988	HG Energy, LLC	2023	313	30	27	31	32	32	30	32	32	34	33	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
4708700988	Pennzoil Company	1981	440	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	Pennzoil Company	1982	307	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	Pennzoil Company	1983	445	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	Pennzoil Company	1984	382	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	Pennzoil Products Company	1989	265	25	24	27	21	22	20	23	22	21	23	20	17
4708700988	Pennzoil Products Company	1990	292	23	19	24	30	30	29	30	24	24	22	22	15
4708700988	Pennzoil Products Company	1991	189	14	4	21	19	20	16	14	20	16	18	17	10
4708700988	Pennzoil Products Company	1992	177	16	16	16	15	17	15	13	17	14	15	10	13
4708700988	Pennzoil Products Company	1993	150	14	10	13	15	14	11	10	13	12	12	12	14
4708700988	Pennzoil Products Company	1994	134	10	12	15	13	13	10	7	12	9	11	9	13
4708700988	Pennzoil Products Company	1995	86	10	8	10	9	9	7	9	6	9	9	0	0
4708700988	Pennzoil Products Company	1996	115	14	12	9	9	7	6	9	10	9	9	12	9
4708700988	Pennzoil Products Company	1997	94	8	8	9	8	9	9	5	7	7	9	9	6
4708700988	Pennzoil Products Company	1998	79	9	8	9	9	3	0	0	0	0	0	25	16
4708700988	Pennzoil Products Company	1999	33	14	15	4	0	0	0	0	0	0	0	0	0
4708700988	East Resources, Inc.	2000	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	East Resources, Inc.	2001	128	0	0	0	0	21	20	23	9	3	20	16	16
4708700988	East Resources, Inc.	2002	179	14	18	15	14	15	17	22	15	16	12	6	15
4708700988	East Resources, Inc.	2003	220	15	7	7	38	33	30	20	15	23	21	0	11
4708700988	East Resources, Inc.	2004	277	15	26	20	20	23	29	21	27	29	19	24	24
4708700988	East Resources, Inc.	2005	311	18	31	37	30	32	30	24	32	33	24	10	10
4708700988	East Resources, Inc.	2006	81	9	5	5	9	8	7	7	0	6	9	8	8
4708700988	East Resources, Inc.	2007	131	8	7	10	11	21	16	12	12	8	10	9	7
4708700988	East Resources, Inc.	2008	86	6	8	9	9	8	8	9	8	4	7	5	5
4708700988	East Resources, Inc.	2010	148	11	15	14	18	0	12	19	13	11	16	10	9
4708700988	East Resources, Inc.	2011	113	7	11	12	8	8	10	8	11	8	9	11	10
4708700988	HG Energy, LLC	2012	151	8	11	14	16	16	7	2	10	4	27	20	16
4708700988	HG Energy, LLC	2013	194	20	24	11	9	15	13	13	22	17	21	16	13
4708700988	HG Energy, LLC	2014	152	13	18	14	16	17	14	13	14	9	8	6	10
4708700988	HG Energy, LLC	2015	142	11	9	14	17	11	13	13	11	8	10	11	14
4708700988	HG Energy, LLC	2016	123	9	12	12	10	11	14	9	15	8	7	6	10
4708700988	HG Energy, LLC	2017	33	7								6	5	9	6
4708700988	HG Energy, LLC	2018	76	8	8	7	4	6	8	6	5	4	7	5	8
4708700988	HG Energy, LLC	2019	88	11	5	7	8	10	6	8	4	5	10	7	7
4708700988	HG Energy, LLC	2020	91	8	8	6	10	8	7	10	7	8	5	5	9
4708700988	HG Energy, LLC	2021	93	8	6	7	8	6	10	7	9	8	7	7	10
4708700988	HG Energy, LLC	2022	89	8	6	10	7	9	7	8	8	8	8	5	5
4708700988	Delta Helix Energy, LLC	2023	8	0	0	0	0	0	0	0	0	0	0	4	4
4708700988	HG Energy, LLC	2023	64	6	6	6	7	9	7	7	5	4	7	0	0

4708700988

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
4708700988	HG Energy, LLC	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	HG Energy, LLC	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	HG Energy, LLC	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	HG Energy, LLC	2016	0												
4708700988	HG Energy, LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	HG Energy, LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	HG Energy, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	HG Energy, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	HG Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	Delta Helix Energy, LLC	2023	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
4708700988	HG Energy, LLC	2016	0												
4708700988	HG Energy, LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	HG Energy, LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	HG Energy, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	HG Energy, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	HG Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708700988	Delta Helix Energy, LLC	2023	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
4708700988	Original Loc	Little Lime	Well Record	2166	Reasonable	49	Reasonable	1225	Ground Level
4708700988	Original Loc	Greenbrier Group	Past WVGES Staff Geologst	2215	Reasonable	147	Reasonable	1225	Ground Level
4708700988	Original Loc	Big Lime	Well Record	2215	Reasonable	133	Reasonable	1225	Ground Level
4708700988	Original Loc	Keener	Well Record	2348	Reasonable	14	Reasonable	1225	Ground Level
4708700988	Original Loc	Big Injun (Price&eq)	Past WVGES Staff Geologst	2362	Reasonable	17	Reasonable	1225	Ground Level
4708700988	Original Loc	Undf PRICE blw INJN	Well Record	2379	Reasonable	0	Reasonable	1225	Ground Level

Wireline (E-Log) Information:

* There is no Scanned/Raster Log data for this well

* There is no Digitized/LAS Log data for this well

* There is no Scanned or Digital Logs available for download

There is no Plugging data for this well

There is no Sample data for this well

Form OG-10

4708700988

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION

Quadrangle SPENCER

Permit No. ROA-988

WELL RECORD

Oil or Gas Well Comb. (KIND)

Company WOLF'S HEAD OIL REFINING COMPANY, INC.
Address P. O. Box 1588, Parkersburg, W. Va.
Farm Wm. Kaufman Acres > 800
Location (waters) Millstone Run
Well No. W-8 Elev. 1,224.85
District Smithfield County Roane
The surface of tract is owned in fee by Eugene Walbrown
Otto Route Address Spencer, W. Va.
Mineral rights are owned by Alfred M. Oppenheimer, II, et al.
300 South Lang Avenue Address Pittsburgh 8, Pa.
Drilling commenced December 17, 1963
Drilling completed January 13, 1964
Date Shot - From To
With
Open Flow /10ths Water in Inch
/10ths Merc. in Inch
Volume Show Oil & Gas (Drilled w/Rotary) Cu. Ft.
Rock Pressure None Taken lbs. hrs.
Oil bbls. 1st 24 hrs.
WELL ACIDIZED

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer Steel Shoe-Float Collar Guide Shoe
13			Size of 8 5/8"OD 4½"OD
10			Depth set 2397' 2427'
8 5/8"	266'	266'	Perf. top
6⅝			Perf. bottom
4½"	2427'	2427'	Perf. top
3			Perf. bottom
2 3/8"Tbg.	2379'	2379'	
Liners Used			

CASING CEMENTED 8 5/8" SIZE 266 No. Ft. 12/20/63 Date
4½" 2427 1/14/64

COAL WAS ENCOUNTERED AT - FEET INCHES
FEET INCHES FEET INCHES
FEET INCHES FEET INCHES

WELL FRACTURED 1/22/64 Used: 40,000 Gals. Water, 45,000 Lbs. Sand, 40 Gals. Morflo, 30 Gals. Suds, 300 Gals. Acid 15% MCA and 350 Lbs. WAC-8
RESULT AFTER TREATMENT Gas - 38,000 Cu. Ft. Oil - 38 Bbls.
ROCK PRESSURE AFTER TREATMENT 500 Lbs.
Fresh Water - Feet Salt Water Feet

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth	Remarks
Shale			0	850			
Red Rock			850	949			
Shale			949	1400			
Sand			1400	1480			
Shale			1480	1485			
Sand			1485	1525			
Sandy Shale			1525	1540			
Sand			1540	1685			
Shale			1685	1725			
Sand			1725	1765			
Shale			1765	1775			
Sand			1775	1875			
Sand & Lime			1875	1910			
Shale			1910	1925			
Lime-Shale			1925	1975			
Sand			1975	2005			
Sand & Chert			2005	2040			
Lime & Sand			2040	2100			
Sandy Shale			2100	2125			
Shale			2125	2166			
Little Lime			2166	2215			
Big Lime			2215	2348			
Keener Sand			2348	2362			
Big Injun			2362	2379	Oil & Gas	2362-2379	Show Only
Shale			2379	2430			
4½" Casing				2427			
TOTAL DEPTH				2430			

(over)

7

4708700988

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth Found	Remarks

Date February 4, 1964

APPROVED WOLF'S HEAD OIL REFINING COMPANY, INC. Owner

By George W. Wilsman

George W. Wilsman, (Title) Agent

4708701053

W-17

WVGES GEOLOGY UNDERLIES IT ALL "Pipeline"

Select County: (087) Roane
Enter Permit #: 1053
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 = 87 Permit = 1053 Link to all digital records for well

Report Time: Thursday, April 03, 2025 1:33:47 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4708701053	Roane	1053	Smithfield	Spencer	Spencer	38.757402	-81.263649	477092.4	4289888.7

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
4708701053	5/-/1964	Original Loc	Completed	William Kaufman	24	W17				Wolf's Head Oil Refining Co., Inc.			

Completion Information:

API	CMP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTG	KOD	G_BEF	G_
4708701053	5/-/1964	-/-/-	971	Ground Level	Clvr-Rsh Rn	Price Fm & equivs	Price Fm & equivs	Development Well	Development Well	Oil and Gas	unknown	Fractured	2190		2190		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
4708701053	5/-/1964	Water	Unknown Water	Vertical			190						1
4708701053	5/-/1964	Pay	Oil & Gas	Vertical			2136	Big Injun (Price&eq)	0	0			

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
4708701053	Pennzoil Company	1981	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	Pennzoil Company	1982	999	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	Pennzoil Company	1983	1,492	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	Pennzoil Company	1984	1,470	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	Pennzoil Products Company	1989	2,378	210	153	175	176	212	165	232	183	215	272	198	187
4708701053	Pennzoil Products Company	1990	2,919	195	141	218	87	214	250	325	261	260	364	320	284
4708701053	Pennzoil Products Company	1991	3,736	306	293	267	216	357	315	379	340	314	336	302	311
4708701053	Pennzoil Products Company	1992	3,463	324	297	267	257	314	319	298	303	287	282	299	216
4708701053	Pennzoil Products Company	1993	3,350	336	369	331	144	257	240	296	260	260	282	266	309
4708701053	Pennzoil Products Company	1994	3,015	288	265	131	228	261	243	254	296	256	270	252	271
4708701053	Pennzoil Products Company	1995	2,772	260	233	230	200	253	244	241	249	226	233	198	205
4708701053	Pennzoil Products Company	1996	2,115	21	1	199	153	210	191	200	242	242	161	243	252
4708701053	Pennzoil Products Company	1997	2,366	223	223	175	176	148	201	150	172	225	236	207	230
4708701053	Pennzoil Products Company	1998	1,299	227	155	172	171	183	155	127	24	21	22	20	22
4708701053	Pennzoil Products Company	1999	513	144	141	122	22	15	0	0	0	12	21	22	14
4708701053	East Resources, Inc.	2000	150	13	14	10	0	17	8	0	20	14	16	16	22
4708701053	East Resources, Inc.	2001	1,148	7	95	124	147	111	112	118	104	115	114	94	7
4708701053	East Resources, Inc.	2002	846	83	71	78	77	69	71	65	59	75	54	45	99
4708701053	East Resources, Inc.	2003	403	0	9	0	23	60	61	49	42	56	53	0	50
4708701053	East Resources, Inc.	2004	274	39	50	34	13	30	21	0	0	0	29	27	31
4708701053	East Resources, Inc.	2005	383	22	22	21	24	40	34	29	39	41	40	33	38
4708701053	East Resources, Inc.	2006	509	38	37	41	41	45	44	48	33	36	43	50	53
4708701053	East Resources, Inc.	2007	430	51	38	42	30	27	23	27	34	31	32	49	46
4708701053	East Resources, Inc.	2008	479	40	39	40	37	41	39	40	41	41	45	38	38
4708701053	East Resources, Inc.	2010	506	49	35	40	42	43	40	41	41	40	46	47	42
4708701053	East Resources, Inc.	2011	547	44	41	47	47	47	43	47	48	46	48	44	45
4708701053	HG Energy, LLC	2012	525	40	35	39	40	44	40	28	52	57	57	47	46
4708701053	HG Energy, LLC	2013	533	48	35	38	39	51	47	42	48	45	50	44	46
4708701053	HG Energy, LLC	2014	383	42	37	42	36	1	9	15	35	42	42	39	43
4708701053	HG Energy, LLC	2015	464	37	32	33	37	42	41	42	40	40	40	37	43
4708701053	HG Energy, LLC	2016	467	39	38	39	39	41	38	40	38	39	39	39	38
4708701053	HG Energy, LLC	2017	404	37	32	33	31	34	30	32	32	34	36	37	36
4708701053	HG Energy, LLC	2018	426	36	33	38	36	38	37	39	36	34	33	32	34
4708701053	HG Energy, LLC	2019	365	35	32	34	31	24	24	26	32	30	33	34	30
4708701053	HG Energy, LLC	2020	358	35	31	35	17	29	32	33	32	28	28	29	29
4708701053	HG Energy, LLC	2021	99	10	7	6	9	10	9	10	9	8	8	7	6
4708701053	HG Energy, LLC	2022	339	28	21	29	27	29	28	31	31	29	29	29	28
4708701053	Delta Helix Energy, LLC	2023	58	0	0	0	0	0	0	0	0	0	0	30	28
4708701053	HG Energy, LLC	2023	313	30	27	31	32	32	30	32	32	34	33	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
4708701053	Pennzoil Company	1981	440	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	Pennzoil Company	1982	307	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	Pennzoil Company	1983	444	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	Pennzoil Company	1984	382	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	Pennzoil Products Company	1989	500	44	40	42	38	43	39	47	47	42	45	38	35
4708701053	Pennzoil Products Company	1990	651	44	18	52	64	62	54	56	60	62	62	59	58
4708701053	Pennzoil Products Company	1991	722	60	45	74	60	66	64	55	58	57	60	59	64
4708701053	Pennzoil Products Company	1992	701	64	62	66	61	52	52	53	55	57	45	65	69
4708701053	Pennzoil Products Company	1993	681	67	42	51	53	64	58	57	60	57	61	55	56
4708701053	Pennzoil Products Company	1994	639	27	54	63	55	50	60	57	57	52	61	53	50
4708701053	Pennzoil Products Company	1995	480	47	39	55	53	52	49	46	49	45	45	0	0
4708701053	Pennzoil Products Company	1996	604	54	42	53	45	43	44	51	53	53	56	55	55
4708701053	Pennzoil Products Company	1997	480	40	47	42	52	40	43	37	51	33	37	37	21
4708701053	Pennzoil Products Company	1998	268	36	34	37	30	13	0	0	0	0	0	68	50
4708701053	Pennzoil Products Company	1999	106	44	44	18	0	0	0	0	0	0	0	0	0
4708701053	East Resources, Inc.	2000	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	East Resources, Inc.	2001	392	0	61	51	48	42	35	41	27	0	37	24	26
4708701053	East Resources, Inc.	2002	253	23	27	24	23	22	24	27	16	21	14	10	22
4708701053	East Resources, Inc.	2003	104	0	3	0	3	21	20	12	9	17	13	0	6
4708701053	East Resources, Inc.	2004	50	6	16	12	4	7	5	0	0	0	0	0	0
4708701053	East Resources, Inc.	2005	267	0	0	0	3	37	31	24	38	37	24	41	32
4708701053	East Resources, Inc.	2006	479	40	32	52	34	52	50	45	0	43	41	41	49
4708701053	East Resources, Inc.	2007	474	56	47	52	51	39	25	39	36	32	30	36	31
4708701053	East Resources, Inc.	2008	397	30	25	31	34	29	34	32	38	41	41	30	32
4708701053	East Resources, Inc.	2010	209	20	17	19	24	0	15	23	18	15	22	20	16
4708701053	East Resources, Inc.	2011	131	8	9	12	11	8	11	11	11	10	10	16	14
4708701053	HG Energy, LLC	2012	178	13	17	13	12	17	20	5	21	16	18	12	14
4708701053	HG Energy, LLC	2013	209	18	19	16	16	18	17	22	15	16	19	17	16
4708701053	HG Energy, LLC	2014	176	16	8	7	16	19	14	14	17	14	13	15	23
4708701053	HG Energy, LLC	2015	176	20	15	16	20	19	12	15	12	12	13	9	13
4708701053	HG Energy, LLC	2016	130	9	12	12	9	7	12	12	15	11	12	9	10
4708701053	HG Energy, LLC	2017	85	11	7	9	7	8	6	6	7	4	4	8	8
4708701053	HG Energy, LLC	2018	106	8	8	10	12	10	10	9	7	6	10	6	10
4708701053	HG Energy, LLC	2019	122	15	10	8	11	13	10	10	8	9	13	8	7
4708701053	HG Energy, LLC	2020	108	10	8	7	12	8	8	11	8	10	9	8	9
4708701053	HG Energy, LLC	2021	65	8	5	4	10	8	9	7	10	0	0	0	4
4708701053	HG Energy, LLC	2022	93	9	8	9	8	10	8	7	7	7	9	7	4
4708701053	Delta Helix Energy, LLC	2023	8	0	0	0	0	0	0	0	0	0	0	4	4
4708701053	HG Energy, LLC	2023	73	8	7	9	6	6	6	7	7	7	10	0	0

Production NGL Information: (Volumes in Bbl) ** some operators may have reported NGL under Oil

4708701053

API	PRODUCING_OPERATOR	PRD_YEAR	ANN_NGL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4708701053	HG Energy, LLC	2013	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	HG Energy, LLC	2014	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	HG Energy, LLC	2015	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	HG Energy, LLC	2016	0												
4708701053	HG Energy, LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	HG Energy, LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	HG Energy, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	HG Energy, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	Delta Helix Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	HG Energy, LLC	2023	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
4708701053	HG Energy, LLC	2016	0												
4708701053	HG Energy, LLC	2018	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	HG Energy, LLC	2019	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	HG Energy, LLC	2020	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	HG Energy, LLC	2021	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	HG Energy, LLC	2022	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	Delta Helix Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0
4708701053	HG Energy, LLC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0

There is no Stratigraphy data for this well

Wireline (E-Log) Information:
* There is no Scanned/Raster Log data for this well

* There is no Digitized/LAS Log data for this well

* There is no Scanned or Digital Logs available for download

There is no Plugging data for this well

There is no Sample data for this well

Form OG-10

4708701053

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES
OIL AND GAS DIVISION 12

Quadrangle SPENCER

Permit No. ROA-1053

WELL RECORD

Oil or Gas Well Gas-Oil (KIND)

Company WOLF'S HEAD OIL REFINING COMPANY, INC.
Address P. O. Box 1588, Parkersburg, W. Va.
Farm Wm. Kaufman Acres 800
Location (waters) Millstone Run
Well No. W-17 Elev. 971.38
District Smithfield County Roane
The surface of tract is owned in fee by Romie Smith
Otto Route Address Spencer, W. Va.
Mineral rights are owned by Alfred M. Oppenheimer, II
300 South Lang Avenue Address Pittsburgh 8, Pa.
Drilling commenced May 14, 1964
Drilling completed May 21, 1964
Date Shot ____ From ____ To ____
Wit'l ____
Open Flow ____ /10ths Water in ____ Inch
____ /10ths Merc. in ____ Inch
Volume Drilled w/Rotary Cu. Ft.
Rock Pressure None lbs. ____ hrs.
Oil ____ bbls., 1st 24 hrs.
WELL ACIDIZED ____

Casing and Tubing	Used in Drilling	Left in Well	Packers
Size			
16			Kind of Packer Steel Shoe Float Collar Guide Shoe
13			Size of 8 5/8" 4½" 4½"
10 3/4"OD	10.00'	10.00'	Depth set 470' 2159' 2190'
8 5/8"OD	470.00'	470.00'	Perf. top
6⅝			Perf. bottom
4½"OD	2204.00'	2204.00'	Perf. top
3			Perf. bottom
2			
Liners Used			

CASING CEMENTED Surface to: 8 5/8" SIZE 470 No. Ft. 5/16/64 Date
4½" 2190 5/22/64

COAL WAS ENCOUNTERED AT - FEET - INCHES
____ FEET ____ INCHES ____ FEET ____ INCHES
____ FEET ____ INCHES ____ FEET ____ INCHES

WELL FRACTURED 6/2/64 - Used: 1,050 Bbls. Water, 50,000 # Sand 20-40, 300 Gal. M. C. A., 350 # WAC-8, 25 Gal. Aqua Frac and 40 Gal. Morflo

RESULT AFTER TREATMENT Gas - 30,000 Cu. Ft. Oil - 30 Bbls.

ROCK PRESSURE AFTER TREATMENT 450 Lbs.

Fresh Water ____ Feet ____ Salt Water ____ Feet ____

Formation	Color	Hard or Soft	Top	Bottom	Oil, Gas or Water	Depth	Remarks
Top Soil			0	5			
10" Casing				10			
Sand			5	80			
Red Rock			80	90			
Sand			90	120			
Red Rock			120	130			
Slate			130	180			
Sand			180	250			
					Water	- 190	½ Bailer Hr.
Red Rock			250	275			
Slate			275	300			
Red Rock			300	325			
Slate			325	340			
Sand			340	375			
Red Rock			375	395			
Slate			395	400			
Red Rock			400	420			
Slate			420	460			
8" Casing				470			
Sand			460	500			
Slate			500	600			
Red Rock			600	640			
Slate			640	780			
Red Rock			780	800			
Slate & Shells			800	860			
Red Rock			860	890			
Slate			890	900			
Red Rock			900	915			
Slate			915	920			

(over)

4708701053

Formation	Color	Hard or Soft	Top 12	Bottom	Oil, Gas or Water	Depth Found	Remarks
Red Rock			920	930			
Slate			930	1035			
Sand			1035	1115			
Slate			1115	1195			
Sand			1195	1285			
Slate			1285	1335			
Red Rock			1335	1355			
Slate			1355	1400			
Sand			1400	1440			
Red Rock			1440	1465			
Sand			1465	1500			
Slate			1500	1580			
Sand			1580	1675			
Slate			1675	1700			
Sand			1700	1875			
Black Sand			1875	1905			
Sand			1905	1965			
Little Lime			1965	1970			
Slate			1970	1980			
					Oil & Gas	2020-2035	Show
Big Lime			1980	2100			
Keener			2100	2110			
					Oil & Gas	2110-2122	
Big Injun			2110	2136			
					Oil & Gas	2125-2136	Show
Slate			2136	2190			
4½" Casing				2190			
TOTAL DEPTH				2190			

Date June 12, 19 64

APPROVED WOLF'S HEAD OIL REFINING COMPANY, INC. Owner

By

George W. Wilsman, (Title) Agent

WVGES GEOLOGY UNDERLIES IT ALL "Pipeline"

Select County: (087) Roane
Enter Permit #: 30190
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 = 87 Permit = 30190 Link to all digital records for well

Report Time: Thursday, April 03, 2025 1:11:25 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4708730190	Roane	30190	Smithfield	Spencer	Spencer	38.755106	-81.270214	476521.2	4289635.7

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
4708730190	10/18/1918	Original Loc	Completed	William Kaufman		1725		5922	unknown	Hope Construction & Refining			

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
4708730190	10/18/1918	8/30/1918	1052	Ground Level	Clvr-Rsh Rn	Undf PRICE blw INJN	Big Injun (Price&eq)	Development Well	Development Well	Oil w/ Gas Show	Cable Tool	Shot	2245		2245	

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
4708730190	10/18/1918	Pay	Oil	Vertical	2190	Big Injun (Price&eq)	0		0	0			
4708730190	10/18/1918	Water	Salt Water	Vertical			1845	Salt Sands (undiff)					
4708730190	10/18/1918	Show	Gas	Vertical			2200	Big Injun (Price&eq)	0	0			

There is no Production Gas data for this well

There is no Production Oil data for this well ** some operators may have reported NGL under Oil

There is no Production NGL data for this well ** some operators may have reported NGL under Oil

There is no Production Water data for this well

Stratigraphy Information:

API	SUFFIX	FM	FM_QUALITY	DEPTH_TOP	DEPTH_QUALITY	THICKNESS	THICKNESS_QUALITY	ELEV	DATUM
4708730190	Original Loc	Buffio Ss/1st Cow Rn	Well Record	590	Reasonable	430	Reasonable	1052	Ground Level
4708730190	Original Loc	Homewd Ss/2n Cow Run	Well Record	1020	Reasonable	25	Reasonable	1052	Ground Level
4708730190	Original Loc	Salt Sands (undiff)	Well Record	1800	Reasonable	150	Reasonable	1052	Ground Level
4708730190	Original Loc	Maxton	Well Record	1990	Reasonable	30	Reasonable	1052	Ground Level
4708730190	Original Loc	Little Lime	Well Record	2031	Reasonable	20	Reasonable	1052	Ground Level
4708730190	Original Loc	Pencil Cave	Well Record	2051	Reasonable	12	Reasonable	1052	Ground Level
4708730190	Original Loc	Big Lime	Well Record	2063	Reasonable	113	Reasonable	1052	Ground Level
4708730190	Original Loc	Keener	Well Record	2176	Reasonable	14	Reasonable	1052	Ground Level
4708730190	Original Loc	Big Injun (Price&eq)	Well Record	2190	Reasonable	26	Reasonable	1052	Ground Level

Wireline (E-Log) Information:
* There is no Scanned/Raster Log data for this well

* There is no Digitized/LAS Log data for this well

* There is no Scanned or Digital Logs available for download

Plugging Information:

API	PLG_DT	DEPTH_PBT
4708730190	-/-/1938	0

There is no Sample data for this well

4708770398

WVGES GEOLOGY UNDERLIES IT ALL "Pipeline"

Select County: (087) Roane
Enter Permit #: 70398
Get Data Reset

Select datatypes: (Check All)
Location, Production, Plugging, Owner/Completion, Stratigraphy, Sample, Pay/Show/Water, Logs, Btm Hole Loc

Table Descriptions
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WVGES Main
"Pipeline-Plus" New

WV Geological & Economic Survey:

Well: County = 087 Permit = 70398 Link to all digital records for well

Report Time: Thursday, April 03, 2025 1:27:32 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4708770398	Roane	70398	Smithfield	Spencer	Spencer	38.754468	-81.2706	476487.5	4289564.9

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
4708770398	-/-/-	Original Loc	Completed	Oppenheimer & Kaufman	1				OP=Carnahan & Smith	Oper in Min.owner fld,no code assgn(Orphan well prof)		

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	O_AF
4708770398	-/-/-	-/-/-						unclassified	unclassified	not available	unknown	unknown								

There is no Pay data for this well

There is no Production Gas data for this well

There is no Production Oil data for this well ** some operators may have reported NGL under Oil

There is no Production NGL data for this well ** some operators may have reported NGL under Oil

There is no Production Water data for this well

There is no Stratigraphy data for this well

Wireline (E-Log) Information:
* There is no Scanned/Raster Log data for this well

* There is no Digitized/LAS Log data for this well

* There is no Scanned or Digital Logs available for download

There is no Plugging data for this well

There is no Sample data for this well

WVGES
GEOLOGY UNDERLIES IT ALL
"Pipeline"

Select County: (087) Roane
Enter Permit #: 91143
Get Data Reset

Select datatypes: (Check All)
Location Production Plugging
Owner/Completion Stratigraphy Sample
Pay/Show/Water Logs Btm Hole Loc

Table Descriptions
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"Pipeline-Plus" New

WV Geological & Economic Survey:

Well: County = 087 Permit = 91143 Link to all digital records for well

Report Time: Thursday, April 03, 2025 3:26:25 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4708791143	Roane	91143	Smithfield	Spencer	Spencer	38.754322	-81.272455	476326.3	4289549.2

There is no Bottom Hole Location data for this well

There is no Owner/Completion data for this well

There is no Owner/Completion data for this well

There is no Pay data for this well

There is no Production Gas data for this well

There is no Production Oil data for this well ** some operators may have reported NGL under Oil

There is no Production NGL data for this well ** some operators may have reported NGL under Oil

There is no Production Water data for this well

There is no Stratigraphy data for this well

Wireline (E-Log) Information:
* There is no Scanned/Raster Log data for this well

* There is no Digitized/LAS Log data for this well

* There is no Scanned or Digital Logs available for download

There is no Plugging data for this well

There is no Sample data for this well

4708791144

WVGES GEOLOGY UNDERLIES IT ALL

"Pipeline"

Select County: (087) Roane

Enter Permit #: 91144

Get Data Reset

Select datatypes: (Check All)

- Location
- Production
- Plugging
- Owner/Completion
- Stratigraphy
- Sample
- Pay/Show/Water
- Logs
- Btm Hole Loc

Code Descriptions
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WVGES Main
"Pipeline-Plus" New

WV Geological & Economic Survey:

Well: County = 87 Permit = 91144 Link to all digital records for well

Report Time: Thursday, April 03, 2025 3:26:52 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4708791144	Roane	91144	Smithfield	Spencer	Spencer	38.755193	-81.271342	476423.3	4289645.6

There is no Bottom Hole Location data for this well

There is no Owner/Completion data for this well

There is no Owner/Completion data for this well

There is no Pay data for this well

There is no Production Gas data for this well

There is no Production Oil data for this well ** some operators may have reported NGL under Oil

There is no Production NGL data for this well ** some operators may have reported NGL under Oil

There is no Production Water data for this well

There is no Stratigraphy data for this well

Wireline (E-Log) Information:
* There is no Scanned/Raster Log data for this well

* There is no Digitized/LAS Log data for this well

* There is no Scanned or Digital Logs available for download

There is no Plugging data for this well

There is no Sample data for this well

WVGES
GEOLOGY UNDERLIES IT ALL
"Pipeline"

Select County: (087) Roane
Enter Permit #: 91145
Get Data Reset

Select datatypes: (Check All)
Location Production Plugging
Owner/Completion Stratigraphy Sample
Pay/Show/Water Logs Btm Hole Loc

Table Descriptions
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"Pipeline-Plus" New

WV Geological & Economic Survey:

Well: County = 87 Permit = 91145 Link to all digital records for well

Report Time: Thursday, April 03, 2025 3:27:07 PM

Location Information: View Map

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4708791145	Roane	91145	Smithfield	Spencer	Spencer	38.756209	-81.27023	476520.2	4289758

There is no Bottom Hole Location data for this well

There is no Owner/Completion data for this well

There is no Owner/Completion data for this well

There is no Pay data for this well

There is no Production Gas data for this well

There is no Production Oil data for this well ** some operators may have reported NGL under Oil

There is no Production NGL data for this well ** some operators may have reported NGL under Oil

There is no Production Water data for this well

There is no Stratigraphy data for this well

Wireline (E-Log) Information:
* There is no Scanned/Raster Log data for this well

* There is no Digitized/LAS Log data for this well

* There is no Scanned or Digital Logs available for download

There is no Plugging data for this well

There is no Sample data for this well

Well Records for:

4708730190

4708779114

4708791143

4708791144

4708791145

NOT AVAILABLE