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	Base Petroleum, Inc.		
Existing UIC Permit ID Number	UIC2D0394202	UIC Well API Number	47-039-04202

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

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

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

Reviewed by (Print Name): _____

Reviewed by (Sign): _____

Date Reviewed: _____

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 # UIC2D0394202 API # 47-039-04202 WELL # Parsons #1-A

Section I. Facility Information

Facility Name: Base Petroleum inc. Hively #1 SWD

Address: 100 Wilcox Farm Lane

City: South Charleston State: WV Zip: 25309

County: Kanawha

Location description:

Jakes Fork area of the Big Fork of the Little Sandy Watershed in the Big Sandy District of Kanawha County

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

Northing: 4262389.28 Easting: 463556.95

Environmental Contact Information:

Name: John Wilcox Title: Designated Agent

Phone: (304) 549-5861 Email: jhnwilcox@aol.com

Section 2. Operator Information

Operator Name: Base Petroleum, Inc.

Operator ID: 305961

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JUN 25 2014
WV Department of
Environmental Protection

Address: 100 Wilcox Farm Lane

City: South Charleston State: WV Zip: 25309

County: Kanawha

Contact Name: John Wilcox Contact Title: Designated Agent

Contact Phone: (304) 549-5861 Contact Email: jhnwilcox@aol.com

Section 3. Applicant Information

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

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

Section 4. Applicant / Activity Request and Type:

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

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

Base Petroleum, Inc. operates the Hively #1 disposal well in Kanawha County, WV as a limited use commercial disposal facility for a few established operators in the central West Virginia area. he facility receives produced brine water and pit fluids from these limited operator by truck. All trucking operations are hauled by Kermit Tyree Contracting who also operates the disposal facility for Base Petroleum. Kermit Tyree Contracting will maintain the facility as well as keep the facility secured against public access. Safety training and groundwater protection measures will also be provided for all employees by Kermit Tyree Contracting

CERTIFICATION

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

A. Name and title of person applying for permit:

Print Name: John Wilcox

Print Title: Designated Agent

B. Signature and Date.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature: John P Wilcox

Date: 6/23/14

[1] A person is a duly authorized representative if:

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

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

The written authorization is submitted to the Director.

(4/25)

APPENDIX A
Injection Well Form

1) GEOLOGIC TARGET FORMATION: Big Injun

Depth: 2022 Feet (top) 2074 Feet (bottom)

2) Estimated Depth of Completed Well, (or actual depth of existing well): 2125 Feet

3) Approximate water strata depths: Fresh 40 Feet Salt 850 Feet

4) Approximate coal seam depths: N/A

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

6) Virgin reservoir pressure in target formation 325 psig Source Original SIP of well

7) Estimated reservoir fracture pressure 3875 psig (BHFP)

8) MAXIMUM PROPOSED INJECTION OPERATIONS:

- Injection rate (bbl/hour): 60 Bbls
- Injection volume (bbl/day): 1440 Bbls
- Injection pressure (psig): 1100 psi
- Bottom hole pressure (psig): 2046 psi

9) DETAILED IDENTIFICATION OF MATERIALS TO BE INJECTED, INCLUDING ADDITIVES:
Injection fluids will consist of produced water and pit fluids from oil and gas wells. No additives will be used.

Temperature of injected fluid: (°F) 70 Degrees Fahrenheit

10) FILTERS (IF ANY)
50 Micron

11) SPECIFICATIONS FOR CATHODIC PROTECTION AND OTHER CORROSION CONTROL
N/A

APPENDIX A (cont.)

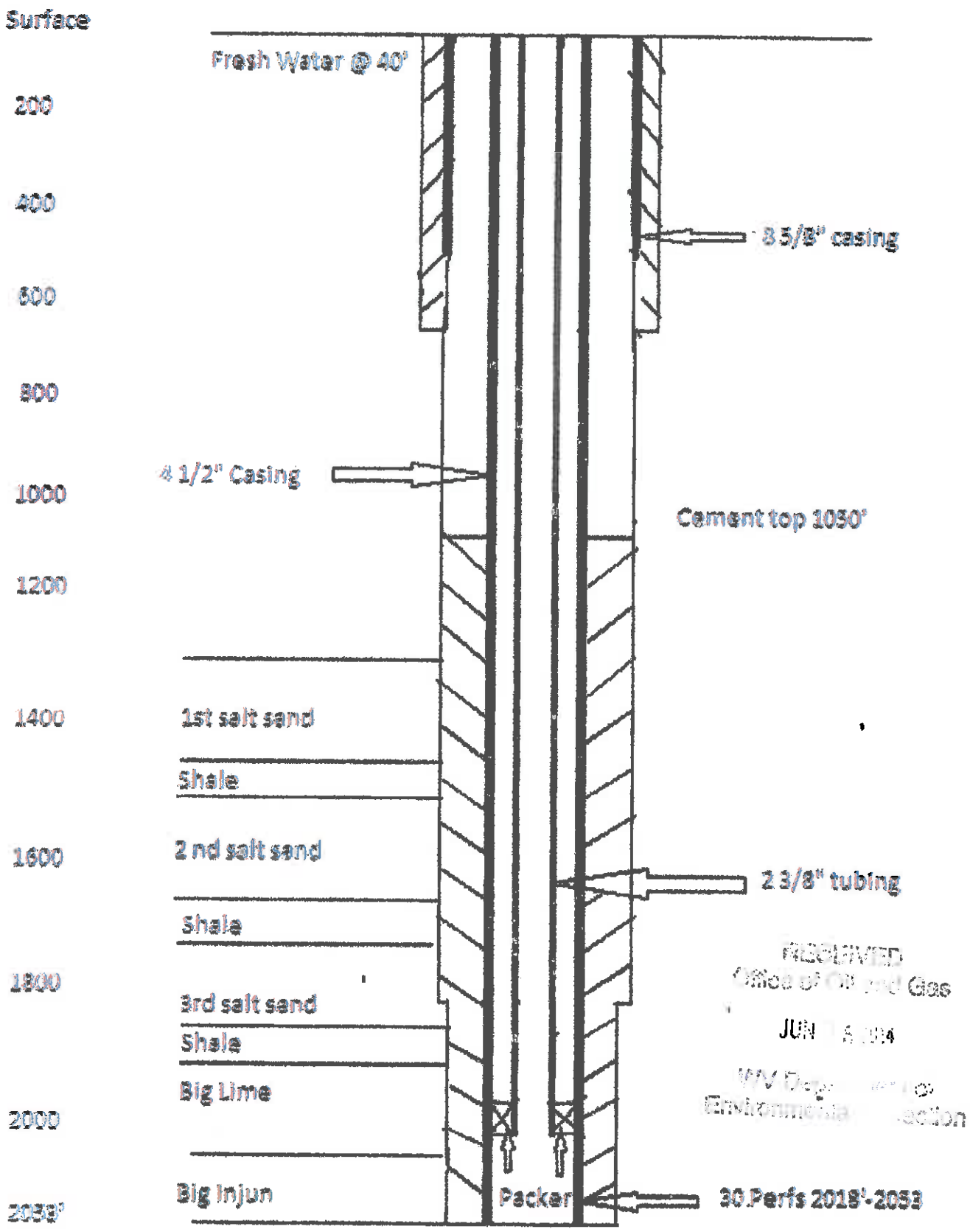
12. Casing and Tubing Program

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	J-55	20 lb.	469'	469'	119 sks
Coal							
Intermediate 1							
Intermediate 2							
Production	4 1/2"	New	J-55	9.5 lb.	2125'	2125'	212 sks
Tubing	2 3/8"	New	J-55	4.6 lb.	1992'	1992'	
Liners							

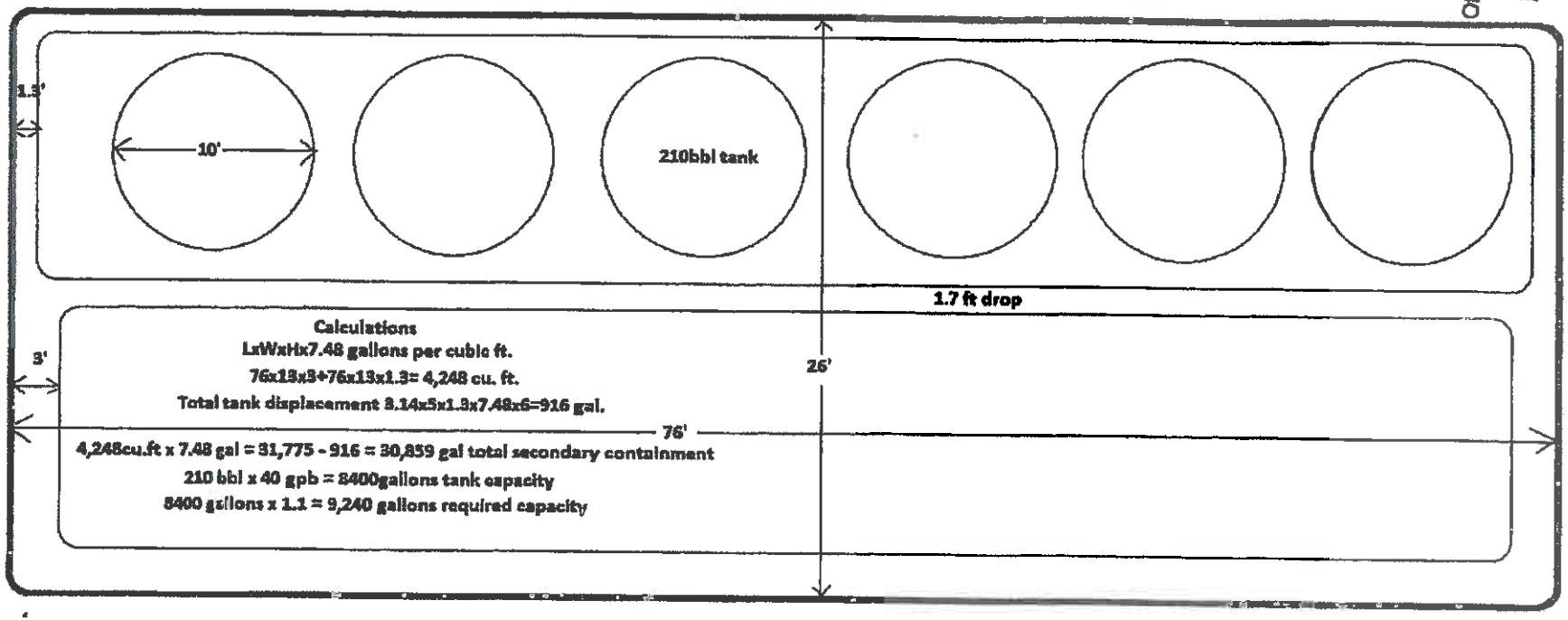
TYPE	Wellbore Diameter	Casing Size	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./sk)	Cement to Surface ? (Y or N)
Conductor							
Fresh Water	11"	8 5/8"	.40"	4460 psi	Class A	1.18	Y
Coal							
Intermediate 1							
Intermediate 2							
Production	6 1/4"	4 1/2"	.205	4380 psi	Class A	1.18	N
Tubing							
Liners							

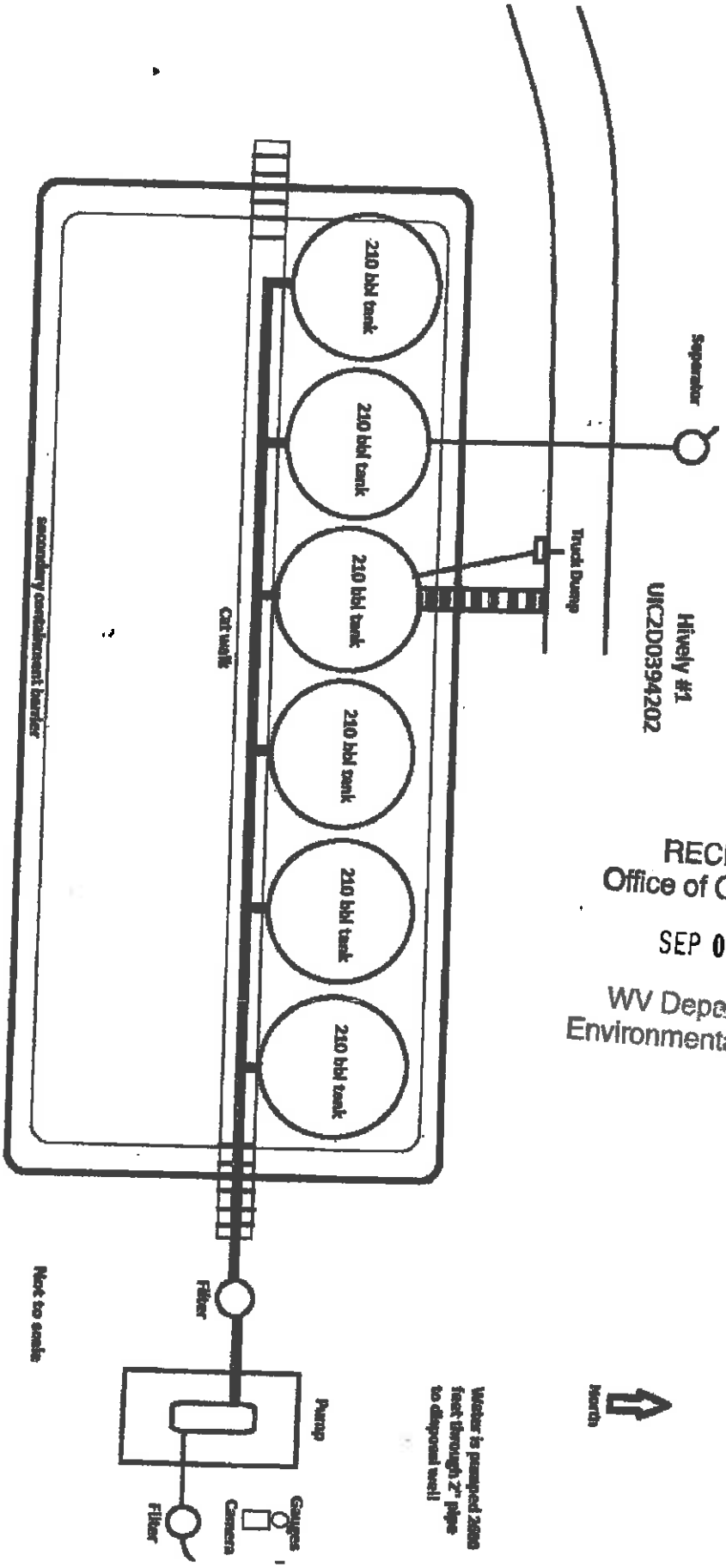
PACKERS	Packer #1	Packer #2	Packer #3	Packer #4
Kind:	Tension			
Sizes:	2 3/8" x 4 1/2"			
Depths Set:	1992'-1996'			

HIVELY #1

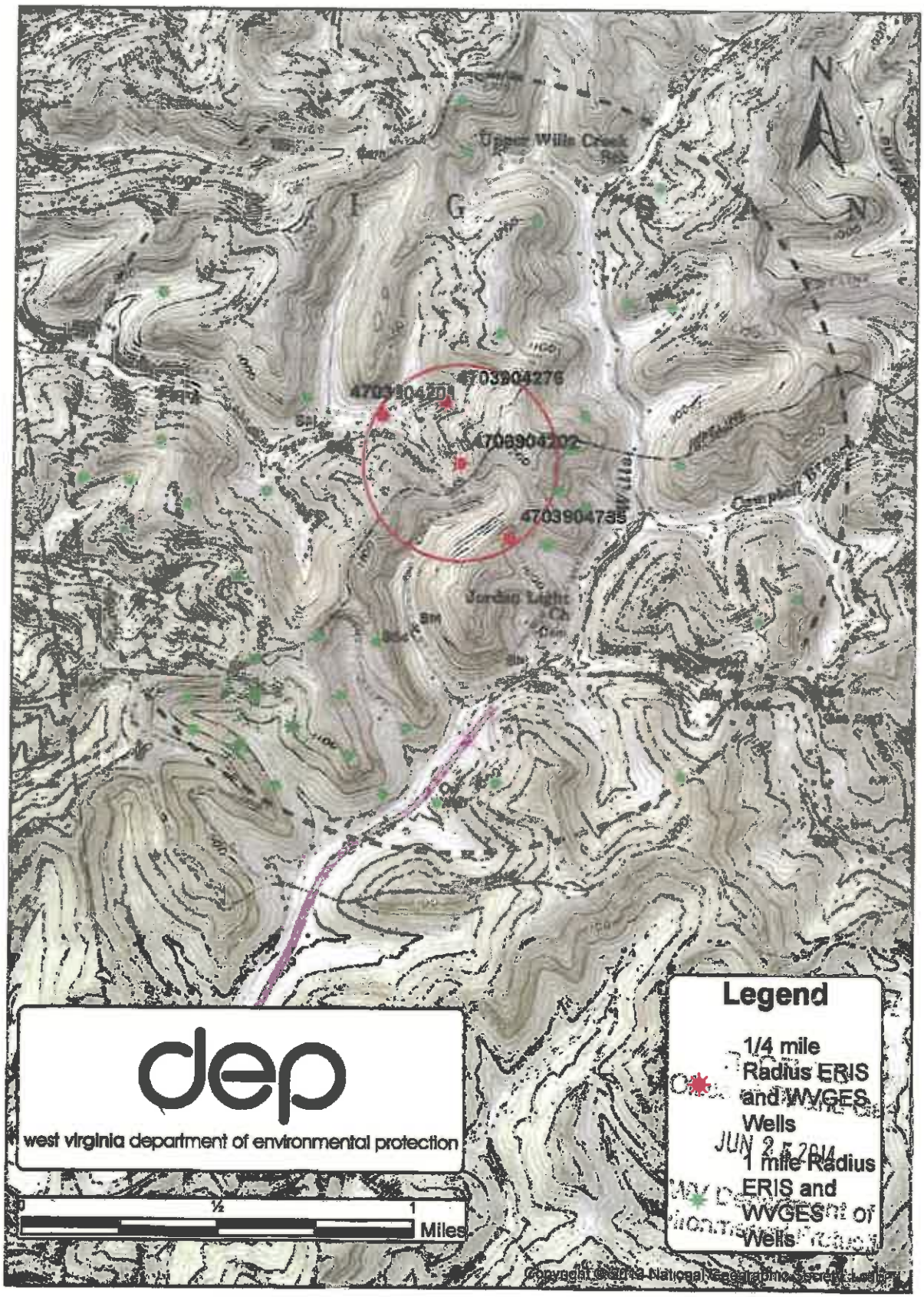


Hively #1 Secondary containment





UIC2D0394202



APPENDIX C

Wells within the Area of Review

API #	Well Type	Well Status (Active, Abandoned, Shut-in, Plugged)	Northing (UTM NAD 83 Meters)	Easting (UTM NAD 83 Meters)	Penetrate Injection Zone (Y or N)	Penetrate Confining Zone (Y or N)	Total Vertical Depth	Surface Elevation
4703904202	Injection	Active	4262389.28	46356.95	Y	Y	2022	1063
4703904735	Gas	Active	4262082.5	433760.7	Y	Y	2065	1068
4703904201	Gas	Plugged	4262583.8	463236	Y	Y	1843	872
4703904276	Gas	Plugged	4262647	463496.8	Y	Y	1898	932
4703904317	Gas	Plugged	4262919.6	463715.9	Y	Y	2243	1225
4703902108	Gas	Plugged	4262648.4	462920.2	Y	Y	1860	875

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

FORM WR-38
(Affidavit of Plugging)

STATE OF WEST VIRGINIA
DEPARTMENT OF ENERGY
OIL AND GAS WELLS DIVISION

RECEIVED
AUG 30 1990
DEPT OF OIL & GAS

AFFIDAVIT OF PLUGGING AND FILLING WELL

AFFIDAVIT SHOULD BE MADE IN TRIPLICATE, one copy mailed to the Division, one copy to be retained by the Well Operator and the third copy (and extra copies if required) should be mailed to each coal operator at their respective addresses.

N/A
Coal Operator or Owner

Address

N/A
Coal Operator or Owner

Address

Irene Runyon
Lease or Property Owner

2743 Penn Ave., Charleston, WV
Address

Quaker State Corporation
Name of Well Operator
P.O. Box 189 Belpre, OH 45714
Complete Address

August 28 19 90
WELL AND LOCATION

Big Sandy District

Kanawha County

WELL NO. 1

Irene Runyon Farm

STATE INSPECTOR SUPERVISING PLUGGING Carols Hively

AFFIDAVIT

STATE OF OHIO
County of Athens ss:

Timothy S. Knobloch and Timothy R. Clever being first duly sworn according to law depose and say that they are experienced in the work of plugging and filling oil and gas wells and were employed by Quaker State Corporation, well operator, and participated in the work of plugging and filling the above well, that said work was commenced on the 23rd day of August, 19 90, and that the well was plugged and filled in the following manner:

Sand or Zone Record Formation	Filling Material	Plugs Used Size & Kind	Casing CSG IN/FT	CSG IN
0 - 100	Class A Cement	31 sx.		
100 - 165	6% Gel			
165 - 248	Class A Cement	31 sx.	168'	8 5/8"
248 - 580	6% Gel			
580 - 680	Class A Cement	31 sx.	680'	4 1/2"
680 - 1760	6% Gel		1276'	4 1/2"
1760 - 1860	Class A Cement	10 sx.		
Coal Seams		Description of Monument		
(Name) N/A		47-039-2108P		
(Name)		PSA 8723790		
(Name)				
(Name)				

9-4-90

KAN 2108

and that the work of plugging and filling said well was completed on the 23rd day of August, 19 90.

And further deponents saith not.

Timothy S Knobloch

Timothy R Clever

Sworn to and subscribed before me this 28th day of August, 19 90

Tina J. Russell
Notary Public, State Of Ohio
My Commission Expires June 23, 1995

Tina J. Russell
Notary Public

My commission expires:

Permit No. 47-039-2108

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WV Department of Environmental Protection

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WR-38
12-Jul-96

API # 47- 39-04317-P

STATE OF WEST VIRGINIA
DIVISION OF ENVIRONMENTAL PROTECTION
SECTION OF OIL AND GAS

Permitting
OIL & GAS AFFIDAVIT OF PLUGGING AND FILLING WELL

AFFIDAVIT SHOULD BE IN TRIPLICATE, one copy mailed to the Division, one copy to be retained by the Well Operator and the third copy (and extra copies if required) should be mailed to each coal operator at their respective addresses.

Farm name: WITHROW, NORMA ETAL. Operator Well No.: J. GEARY #2

LOCATION: Elevation: 1,225.00 Quadrangle: KETTLE
District: BIG SANDY County: KANAWHA
Latitude: 10100 Feet South of 38 Deg. 22 Min. 30 Sec.
Longitude 11900 Feet West of 81 Deg. 22 Min. 30 Sec.

Well Type: OIL x GAS ____

Company: Eagle Energy, Inc.
P.O.Box 8
Buffalocreek WV 26164

Coal Operator or Owner

Agent: Thomas E. Liberatore

Coal Operator or Owner

Permit Issued: 07/12/96

AFFIDAVIT

STATE OF WEST VIRGINIA,
County of Upshur ss:

John Smith and Alvis Surma being first duly sworn according to law depose and say that they are experienced in the work of plugging and filling oil and gas wells and were employed by the above named well operator, and participated in the work of plugging and filling the above well, and Carlos Rively Oil and Gas Inspector representing the Director, say that said work was commenced on the 28 day of February, 1997, and that the well was plugged and filled in the following manner:

TYPE	FROM	TO	PIPE REMOVED	LEFT
			4½" 886'	1056'
mulled hole 6 sks				
bridge plug 2 sks	2210	2195		
cement 8 sks	2185	2073		
cement 30 sks	930	826		
cement 30 sks	740	636		
cement 30 sks	100	surface		

Description of monument: 7" casing 3 feet out of the ground with API
and that the work of plugging and filling said well was completed on
the 7 day of March, 19 97.

And further deponents saith not.

Sworn and subscribe before me this 10 day of March 19 97

My commission expires: August 4, 2003

Notary Public

Oil and Gas Inspector: Carlos W. Rively

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Office of Oil and Gas
OCT 24 2014
WV Department of
Environmental Protection

WR-38
02-Dec-88

API # 47- 39-04201-P

STATE OF WEST VIRGINIA
DEPARTMENT OF ENERGY
DIVISION OF OIL AND GAS

AFFIDAVIT OF PLUGGING AND FILLING WELL

AFFIDAVITS SHOULD BE IN TRIPLICATE, one copy mailed to the Division, one copy to be retained by the Well Operator and the third copy (and extra copies if required) should be mailed to each coal operator at their respective addresses.

Farm name: HIVELY, ROY Operator Well No.: HIVELY 2

LOCATION: Elevation: 872.00 Quadrangle: KETTLE
District: BIG SANDY County: KANAWHA
Latitude: 11250 Feet South of 38 Deg. 23 Min. 30 Sec.
Longitude 1420 Feet West of 81 Deg. 25 Min. 0 Sec.

Well Type: OIL X GAS ____

Company: Kay Oil Company
6 Gorton Plaza
Weston, WV 26452

Coal Operator or Owner: None

Agent: Jan Chapman

Coal Operator or Owner

Inspector: Carlos Hively

Permit Issued: 12/02/88

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APR 06 1989
DIVISION OF OIL & GAS
DEPARTMENT OF ENERGY

AFFIDAVIT

STATE OF WEST VIRGINIA,
County of Roane ss:

Charles D. Starcher and Frank Simons being first duly sworn according to law depose and say that they are experienced in the work of plugging and filling oil and gas wells and were employed by Kay Oil Company, well operator, and participated in the work of plugging and filling the above well, that said work was commenced on the 8th day of March, 19 89 and that the well was plugged and filled in the following manner:

TYPE	FROM	TO	PIPE REMOVED	LEFT
Cement	1929	1752	2 3/8" 1900	
Gel	1752	1340	4 1/2" 1340	589
Cement	1340	1265		
Gel	1265	1180		
Cement	1180	1080		
Gel	1080	420		
Cement	420	320		
Gel	320	80		
Cement	80	0	8 5/8"	367

Description of monument: 7" casing with API # attached.

and that the work of plugging and filling said well was completed on the 10th day of March, 19 89.

And furthur deponents saith not.

Charles D Starcher
Frank E. Simons

Sworn and subscribed before me this 4th day of April, 19 89

Judy L. Farrell
Notary Public

My commission expires: 4-20-98

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Office of Oil and Gas
OCT 27 2014
WV Department of
Environmental Protection

WR-38
02-Dec-38

API # 47- 39-04276-P

STATE OF WEST VIRGINIA
DEPARTMENT OF ENERGY
DIVISION OF OIL AND GAS

AFFIDAVIT OF PLUGGING AND FILLING WELL

AFFIDAVITS SHOULD BE IN TRIPLICATE, one copy mailed to the Division, one copy to be retained by the Well Operator and the third copy (and extra copies if required) should be mailed to each coal operator at their respective addresses.

Farm name: HIVELY, ROY & HAZEL Operator Well No.: HIVELY 3

LOCATION: Elevation: 932.00 Quadrangle: KETTLE
District: BIG SANDY County: KANAWHA
Latitude: 10930 Feet South of 38 Deg. 32 Min. 30 Sec.
Longitude 650 Feet West of 81 Deg. 25 Min. 0 Sec.

Well Type: OIL X GAS ____

Company: KEY OIL COMPANY
6 Barton Plaza
Weston, WV 26452

Coal Operator or Owner: None

Agent: Ian Chapman
Inspector: Carlos Rivels
Permit Issued: 12/02/98

Coal Operator or Owner

AFFIDAVIT

STATE OF WEST VIRGINIA,
County of Roane ss:

Charles D. Starcher and Frank Simmons being first duly sworn according to law depose and say that they are experienced in the work of plugging and filling oil and gas wells and were employed by Key Oil Company, well operator, and participated in the work of plugging and filling the above well, that said work was commenced on the 2nd day of March, 1999, and that the well was plugged and filled in the following manner:

TYPE	FROM	TO	PIPE REMOVED	LEFT
Cement	1995	1820	2 3/8" 1995	
Gel	1820	1200	4 1/2" 1980	993.
Cement	1200	1100		
Gel	1100	420		
Cement	420	320		
Gel	320	50		
Cement	50	0	8 5/8"	345

Description of monument: 7" casing with API # attached.

and that the work of plugging and filling said well was completed on the 4th day of March, 1999.

And further deponents saith not.

Sworn and subscribed before me this 4th day of April

Notary Public

My commission expires 4-20-08

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OCT 27 2014
WV Department of
Environmental Protection

WR-35

21-Mar-90
API # 47- 39-04735

State of West Virginia
DEPARTMENT OF ENERGY
Division of Oil and Gas

Well Operator's Report of Well Work

Farm name: ESTEP, MARCIE & DELBERT Operator Well No.: P.J. BLOSS #2

LOCATION: Elevation: 1068.00 Quadrangle: KETTLE

District: BIG SANDY County: KANAWHA
Latitude: 12920 Feet South of 38 Deg. 32Min. 30 Sec.
Longitude 11700 Feet West of 81 Deg. 22 Min. 30 Sec.

Company: QUAKER STATE CORPORATION
P.O. BOX 189/1226 PUTNAM HOWE
BELPRE, OH 45714-0189

Agent: FRANK R. ROTUNDA

Inspector: CARLOS W. HIVELY
Permit Issued: 03/23/90
Well work Commenced: 04/26/90
Well work Completed: 04/29/90
Verbal Plugging
Permission granted on: N/A
Rotary X Cable Rig
Total Depth (feet) 2133
Fresh water depths (ft) 50

Salt water depths (ft) 1350

Is coal being mined in area (Y/N)? N
Coal Depths (ft): N/A

Casing & Tubing	Used in Drilling	Left in Well	Cement Fill Up Cu. Ft.
Size			
8 5/8"	428	428	C.T.S.
4 1/2"	2103	2103	200 sx.

Z65

approximate TOC = 1067' (7 7/8" hole, 1.18 yield)

OPEN FLOW DATA

Producing formation Big Injun Pay zone depth (ft) 2031-65
Gas: Initial open flow -- MCF/d Oil: Initial open flow show Bbl/d
Final open flow 15 MCF/d Final open flow 6 Bbl/d
Time of open flow between initial and final tests Hours
Static rock Pressure psig (surface pressure) after Hours

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

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

KAN 4735

RECEIVED
AUG 14 1990
DEPT. OF ENERGY

For: QUAKER STATE CORPORATION
Frank Rotunda Frank Rotunda

By:
Date: 8-6-90

PERF: 2031 - 2065' with 35 shots

FRAC: 411 Bbl. fluid, 160 sx. sand, BD at 1500 PSI, average rate: 30.7 BPM

LOG:

surface	0 - 20
sand	20 - 140
shale	140 - 280
sand	280 - 360
shale	360 - 375
sand	375 - 402
shale	402 - 440
sand	440 - 470
shale	470 - 550
sand	550 - 737
silt/shale	737 - 790
sand	790 - 835
shale	835 - 870
sand	870 - 893
shale	893 - 935
sand	935 - 980
shale	980 - 1143
sand	1143 - 1208
shale	1208 - 1350
Salt Sands	1350 - 1719
shale	1719 - 1780
Maxton Sand	1780 - 1830
Little Lime	1830 - 1871
Pencil Cave	1871 - 1886
Big Injun	2023 - 2062
shale/silt	2062 - 2133

10298

The following is information on the general faulting trends in the Jakes Fork area of Kanawha County WV, as it relates to the re-permitting of the Hively No.1 disposal well by Base Petroleum Inc.

The formation being utilized for disposal in the Hively No. 1 well is the Big Injun Formation which is at an average depth of 2050' in the area. The well was originally drilled in 1985 to a total depth of 2160. A review of well records for a number of wells drilled in the general area does not give any indication of faults in the area as the formation depths throughout the area are very consistent with no significant deviations noted, a fact further supported by a review of the structure and isopach maps submitted with the original UIC permit application. Research of geologic maps and reports was also conducted in order to determine the presence of any faults in the area that may have been identified by such data in the Big Injun or any other formations for which data existed. Mapping of the Big Injun Sandstone in West Virginia by the West Virginia Geological Survey does not show the presence of any known faults which have been mapped in the state. As no faults were identified in the Big Injun, research was conducted to look at faults in other formations which could be used to identify faulting trends in the area.

A structure map of the Ordovician Section for the Appalachian Basin is provided on the following page in which faults are identified and mapped. This map does not indicate the presence of faults anywhere in the Kanawha County and surrounding areas. The faults identified on this map represent a general southwest/northeast trend with all mapped faults being well north of the Kanawha County area. The second map provided is for the Marcellus Shale with faults in the Onondaga Limestone mapped and showing a similar southwest/northeast trend in the northern part of the state in the same general locations of the Ordovician mapped faults. Finally in an effort to locate mapping information and data from a formation shallower than the Ordovician and Marcellus, the report from the Appalachian Tight Gas Reservoirs Project conducted by the WVGES was researched. This project evaluated well logs and data to extensively map a number of shallow gas plays in the state creating an interactive mapping system which was used to create the final two maps provided. These maps show folds and faults throughout the state with the same general fault trends and locations as previously noted.

In summary, a variety of data in the form of well records, maps and reports were researched to determine the presence of or the absence thereof any faults in the area which could be possibly affected by the injection operations of the Hively No. 1 disposal well. Data was found indicating the presence of faults in the state and that mapping efforts had been undertaken but that all faults identified are at significant distance from the Kanawha County area and should have no impacts on continued injection operations at the Hively No. 1 disposal well.

This memo is being provided in response to your request to provide calculations for estimating the extent of fluid migration in the Big Injun formation from injection into the zone in the Hively disposal well.

To make this estimation I used the volumetric method of determining reservoir fill up from injection operations. This method requires the number of barrels of fluid injected over time so I have therefore supplied the calculations and extent of fluid movement estimates for a few different total fluid volumes that may be expected over the wells life. As you are aware, this well had been previously operated for injection purposes several years ago and I do not have that volume information available. The calculations are based upon total volumes over the life of the well and therefore take into account any previous volumes.

Calculations are as follows:

$$R = \sqrt{\frac{\left(Q \times 5.625 \left(\frac{ft3}{bbl}\right)\right)}{(\pi \, x \, \theta \, x \, h \, x \, Sd}}$$

Where: R = Lateral Distance of Fluid Bank From Wellbore
Q = Cumulative Volume (bbls)
θ = Porosity Average (%)
h = Reservoir Height (ft)
Sd= Saturation Displacement (%)

Values used for calculations are:

Cumulative Volume = variable
Porosity Average = 19%
Reservoir Height = 35 ft
Saturation Displacement = 50%

The calculation is provided below for a cumulative injection volume of 100,000 bbls only with other volumes and the respective R values listed below the calculation:

$$R = \sqrt{\frac{100{,}000\ bbls\ x\ 5.615\ ft3/bbl}{3.14\ x\ .19\ x\ 35\ x\ .50}}$$

R = 232 ft.

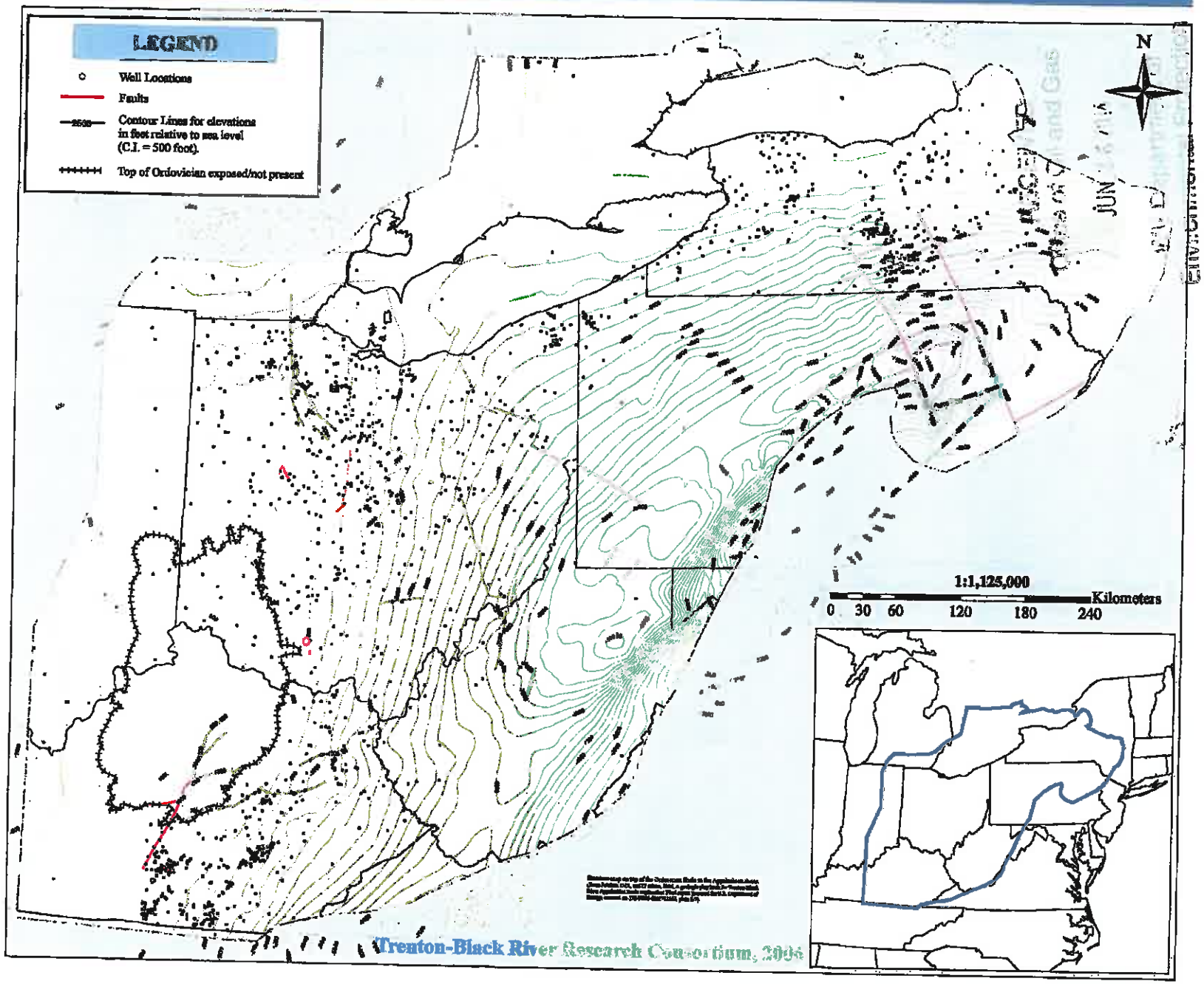
Q = 250,000 bbls *R = 367 ft.*

Q = 500,000 bbls *R = 519 ft.*

Q = 1,000,000 bbls *R = 733 ft.*

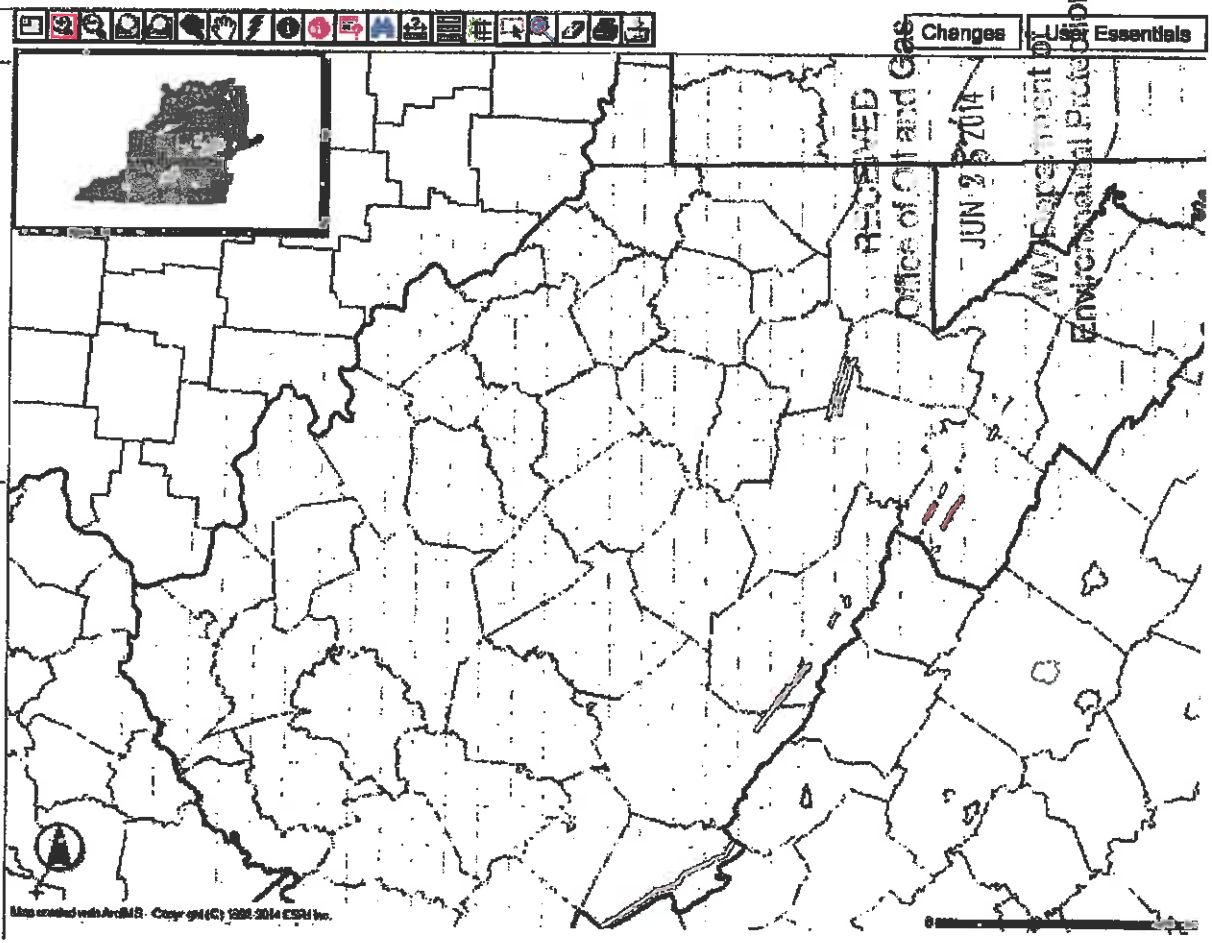
As you can see, the lateral distance of the fluid bank from the wellbore is fairly minimal for a large volume of water being injected in the well. While these calculations provide an estimate only, I believe this type of estimation is most likely the best that can be made with the information which is available.

Plate 2-7 : Structure of the Top of the Ordovician Section



Appalachian Tight Gas

Refresh Map ☐ Auto Refresh



LAYERS

- General Geography Layers
- General Geology Layers
  - All Gas and Oil Wells
  - Folds (WV Only)
  - Faults (WV Only)
  - Aeromagnetic Data (WV Only)
  - Gravity Data (WV Only)
  - Basic Stratigraphy
- Play-Specific Layers and Documents
  - Berea/Murrysville (BERE)
  - Venango (VNNG)
  - Bradford (BDFD)
  - Elk (ELK)
  - Medina/"Clinton" (MDIN)
  - Tuscarora (TCRR)

Refresh Map ☐ Auto Refresh

Help:

- A closed group, click to open.
- An open group, click to close.
- A map layer.
- A hidden group/layer, click to make visible.
- A visible group/layer, click to hide.
- A visible layer, but not at this scale.
- A partially visible group, click to make visible.
- An inactive layer, click to make active.
- The active layer.
- Indicates a hyperlink to further information.

This project has been partially funded by
DOE Contract, DE-FC26-05NT42661,
through the
Appalachian Oil and Natural Gas Research Consortium (AONGRC).
The support of DOE is appreciated.

Zoom In

Appalachian Tight Gas

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LAYERS

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- General Geology Layers
  - All Gas and Oil Wells
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  - Elk (ELK)
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  - Tuscarora (TCRR)

Refresh Map ☐ Auto Refresh

Help:

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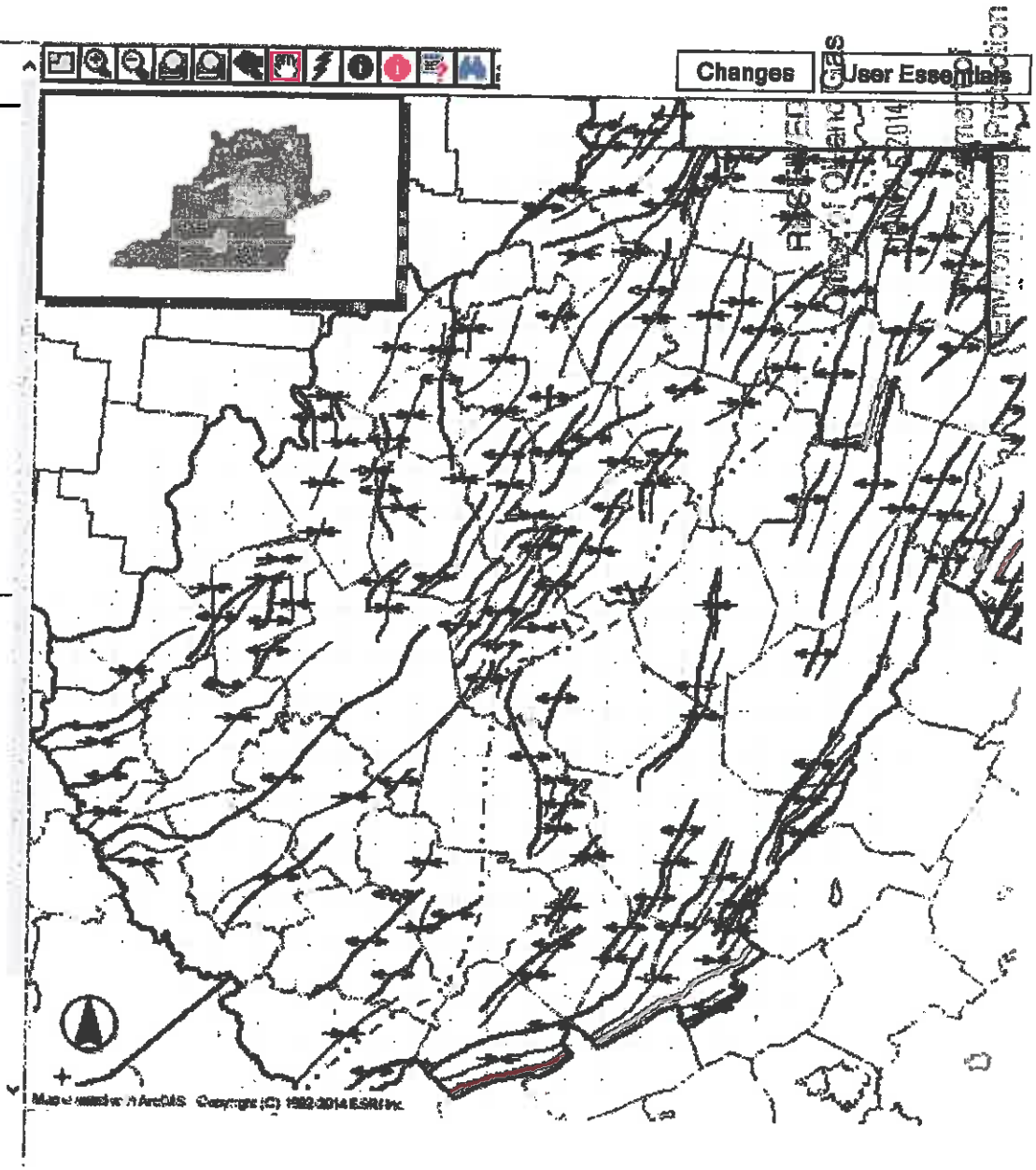
- The active layer.
- Indicates a hyperlink to further information.

Pan



SECTION 2 ADDITIONAL INFORMATION

At this time Key Oil Company has no access to either lithologic logs or coring information in the immediate area.

SECTION 3 ADDITIONAL INFORMATION

A section of the geophysical logs of the Hively #1 are attached as Exhibit C and Exhibit D. In addition to these sections a set of complete logs accompany this application.

Exhibit C is a section of the Nuclear combination log, going from left to right, this log shows:

1. The Caliper log, which shows hole size
2. A Gamma Ray log, which is a lithology survey
3. A Margin, which shows depth
4. A Density Correction Curve
5. A curve with small dashes, which is the Density Porosity Curve
6. A curve with large dashes, which is the Nuetron Porosity Curve
7. A solid curve, which shows the Bulk Density, the scales for each curve can be seen on both the top and bottom of the complete log.

The Big Injun formation begins at 2022 feet and ends at 2074 feet. The Big Injun is confined on top by 19 feet of Keener Sand

from 2003 feet to 2022 feet and by 89 feet of Big Lime from 1914 feet to 2003 feet. These two sections should be more than adequate to prevent the migration of fluids upward. The Big Injun is confined on the bottom by at least 86 feet of shale, which is all the Hively #1 well penetrated.

Exhibit D is a section of the electric logs from the Hively #1, going from left to right, this log shows:

1. A large dash curve, which is the Spontaneous Potential log.
2. A solid curve, which is a Gamma Ray log as in Exhibit C.
3. A Margin, which shows depth.
4. A light, small dashed curve, showing the Guard log which is a Shallow Focus Resistivity log.
5. A dark, small dashed curve, showing the Medium Focus Induction log.
6. A dark, large dashed curve, showing the deep induction.
7. The remaining two curves are the Medium and Deep Focus Conductivity logs.

Again, the scale for each curve can be seen on both the top and bottom of the complete log.

SECTION FOUR ADDITIONAL INFORMATION

The Big Injun is comprised of intermittant layers of Calcareous and Dolomitic Sandstone. The formation body consists of 52 feet of sand, of which 44 feet has an average porosity of over 19%. Also from the Guard log separation the reservoir fluid has good moveability. The estimated permeability falls in the range of 10 to 12 millidarcies. Exhibit E is a water analysis from the Hively #1 which should be very similar to the injected fluids.

SECTION 6 ADDITIONAL INFORMATION

The stimulation information used in Exhibits F and G are copies of the treatment of the Hively #1. Exhibit F is a copy of Halliburton Services Job Log, which is a table presentation of Exhibit G. Exhibit G is a copy of Halliburton Services Fracometer Log which shows surface treating pressure and flow rate versus time. From Exhibit G the surface breakdown pressure is equal to 3000 psi. The Bottom Hole Pressure (BHP) was calculated as follows:

BHP = Pws + 0.05195 e H

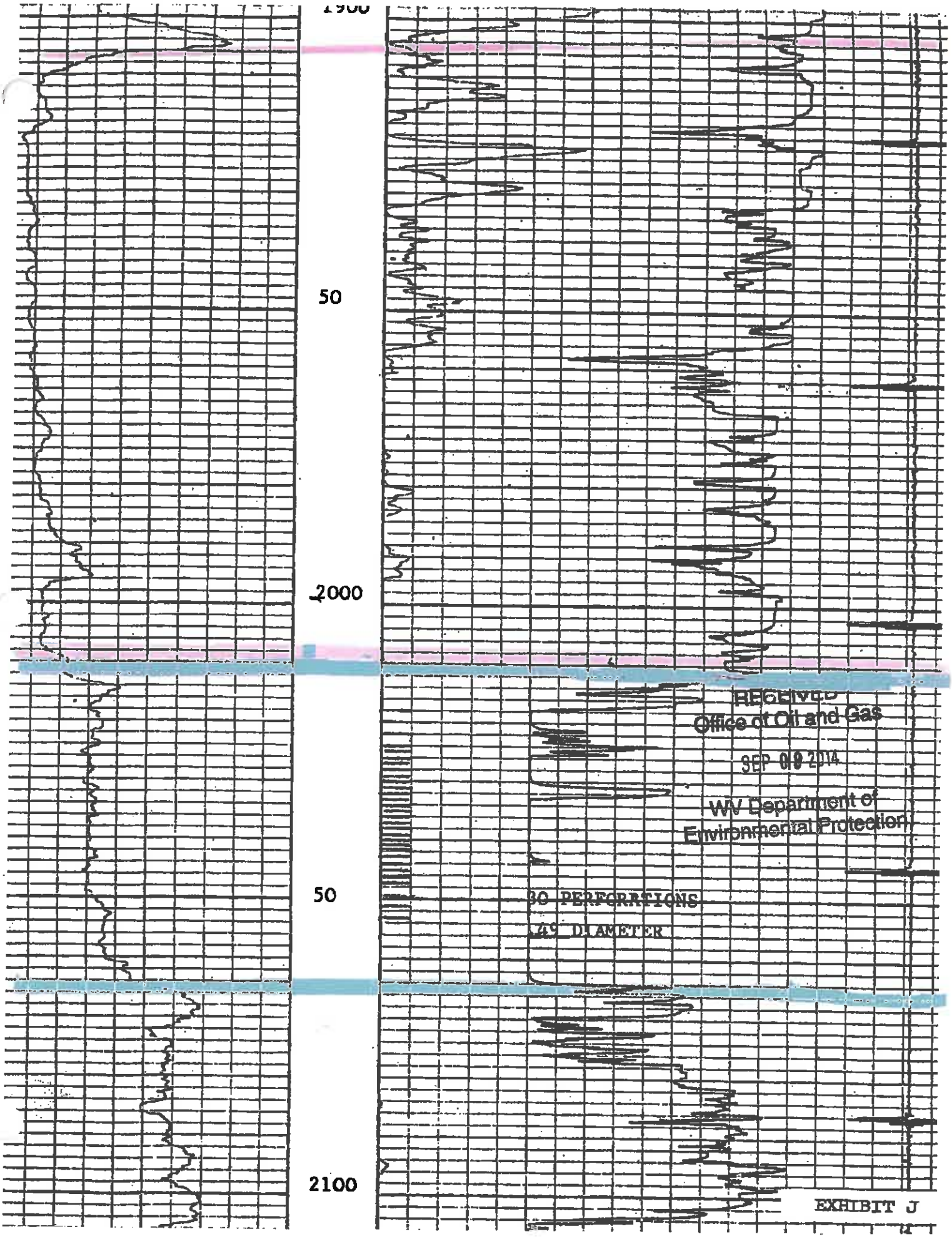
where BHP = Bottom Hole Pressure

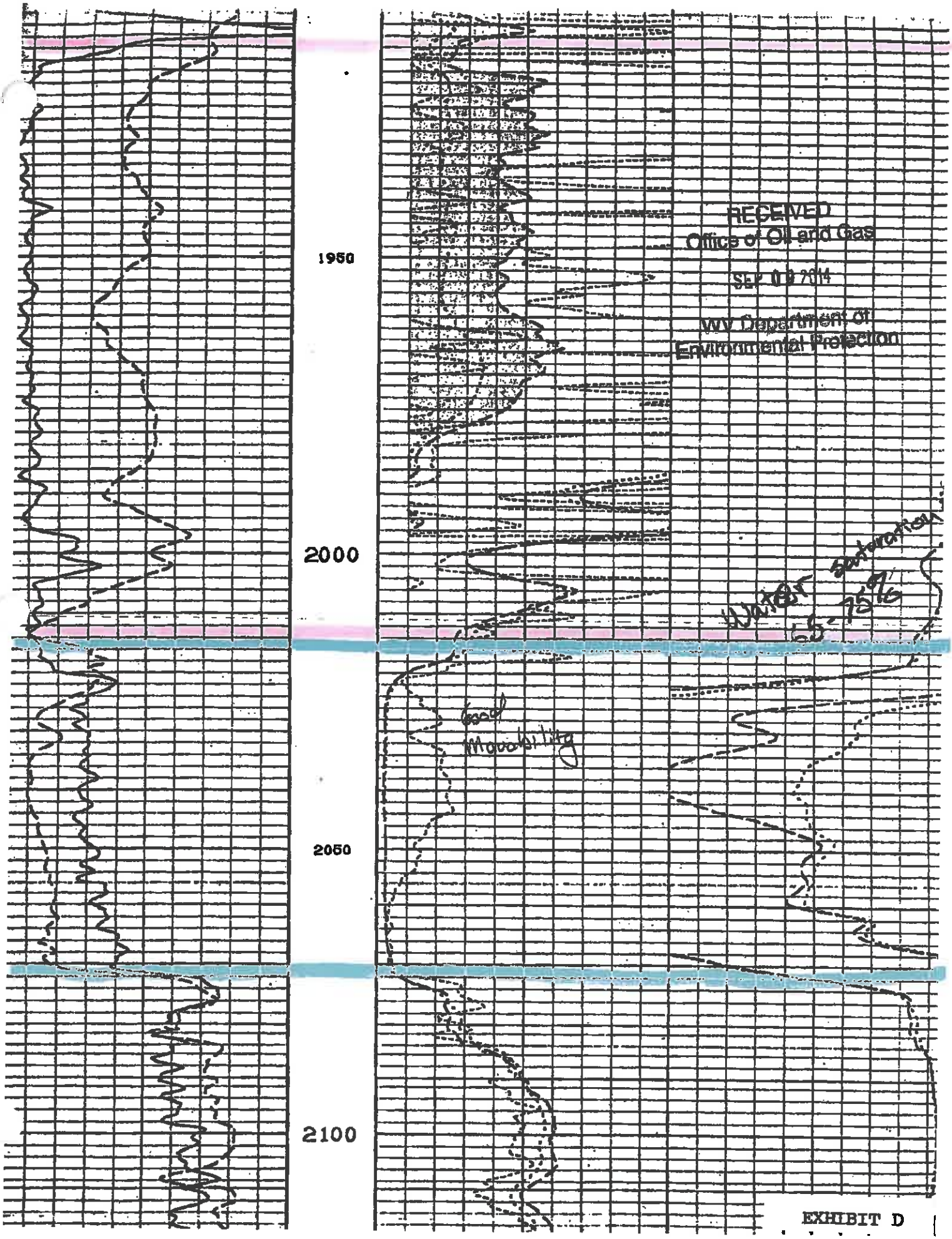
Pws = Static surface well pressure

e = Density of the fluid 9.34

H = Well depth to the top perforation

BHP = 3878 psi

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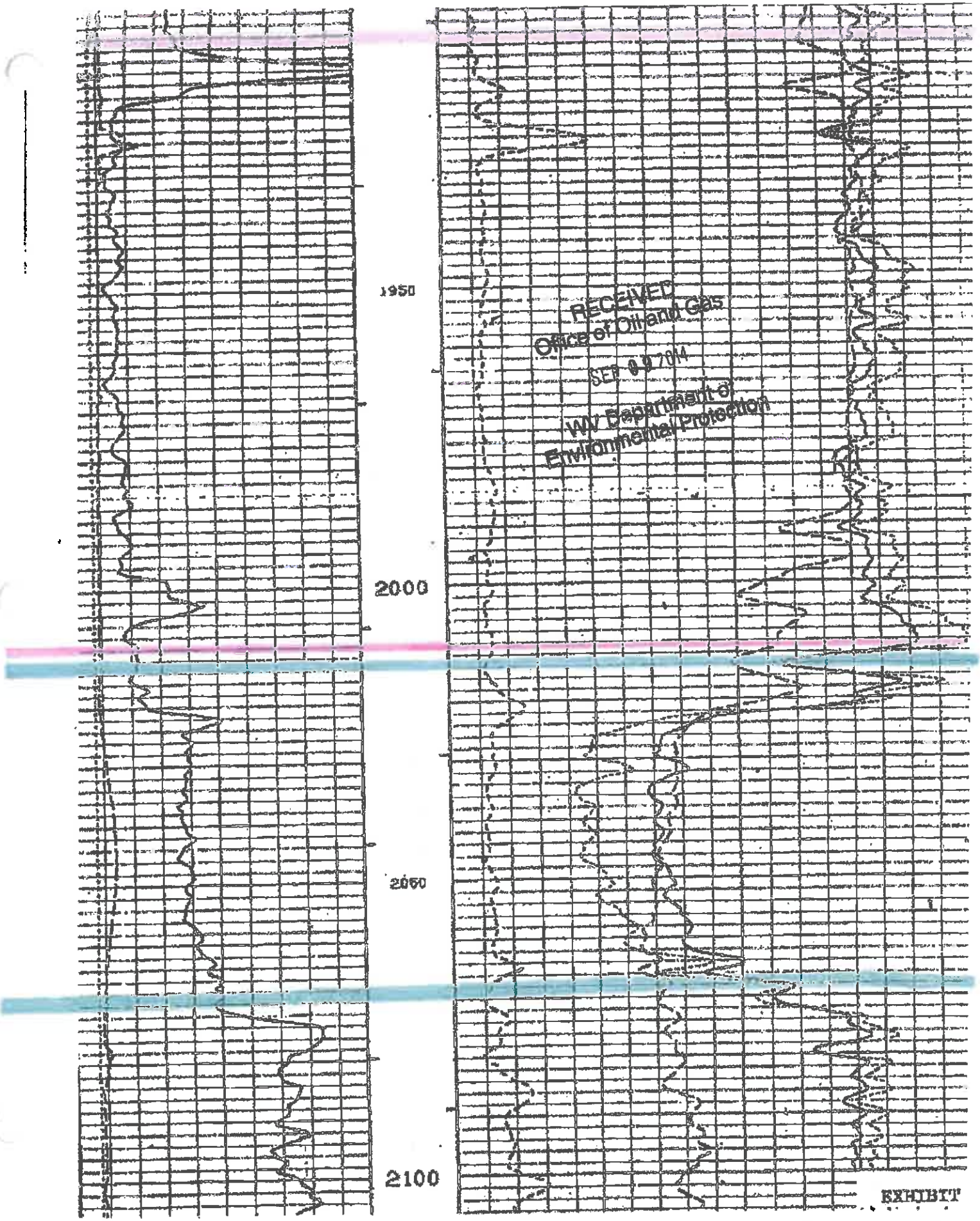
Office of Oil and Gas
SEP 09 2014
WV Department of
Environmental Protection
Good
Moderating
EXHIBIT D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Office of Oil and Gas
SEP 09 2014
WV Department of
Environmental Protection
EXHIBIT

Sturm Environmental Services

JOHN W. STURM, PRESIDENT

COMPANY: MICHAEL LEWIS

DATE/TIME SAMPLED:* 10-15-13 1200

SAMPLE ID: BASE PETROLEUM

DATE/TIME RECEIVED: 10-18-13 1535

SAMPLED BY: M. LEWIS

SAMPLE ID	pH units	TDS mg/L	Cl mg/L	SPEC GRAV calc.	TOC mg/L	Fe mg/L	Mn mg/L	Al mg/L	Ba mg/L	Na mg/L
HIVELY PF	4.8	71710	47400.	1.0490	342.	40.7	2.54	.05	184.	12020.

*Client Provided

**See Attached. The following results meet or exceed requirements and standards set forth by the certifying authority except where noted.

RECEIVED
Office of Oil and Gas

JUN 25 2014

APPROVED

WV Department of
Environmental Protection

MAIN OFFICE—POST OFFICE BOX 650 • BRIDGEPORT, WEST VIRGINIA 26330 • (304) 623-6549
CHARLESTON BRANCH—POST OFFICE BOX 8337 • SOUTH CHARLESTON, WEST VIRGINIA 25303-0337 • (304) 744-9864

Base Petroleum
47-039-04202
Hively # 1
Static Fluid level Check
Disposal Well

On 9/20/2014 the Hively #1 disposal well was shut in. On 9/21/2014 our swab rig was moved in, rigged up, and ran down hole to check the fluid level. The fluid level was found at 902'.

Kermit Tyree

Kermit Tyree

Daniels & Hurley

APPENDIX G

Wells Serviced by Injection Wells

API #	Operator	Producing Formation
039-00016	Jackson Resources CO.	Weir
039-00016	Jackson Resources Co.	Weir
039-00046	Jackson Resources Co.	Weir
039-00046	Jackson Resources Co.	Weir
039-00047	Jackson Resources Co	Salt Sand
039-00047	Jackson Resources Co.	Salt Sand
019-00672	Harper, Hayden Energy KA, LLC	Weir
019-00660	Harper, Hayden Energy KA, LLC	Weir
019-00692	Harper, Hayden Energy KA, LLC	Big injun
019-00693	Harper, Hayden Energy KA, LLC	Weir
019-00707	Harper, Hayden Energy KA, LLC	Big injun
019-00716	Harper, Hayden Energy KA, LLC	Big injun
019-00717	Harper, Hayden Energy KA, LLC	Weir
019-00725	Harper, Hayden Energy KA, LLC	Weir
019-00726	Harper, Hayden Energy KA, LLC	Big injun
019-00727	Harper, Hayden Energy KA, LLC	Big injun
019-00728	Harper, Hayden Energy KA, LLC	Big injun
019-00729	Harper, Hayden Energy KA, LLC	Big injun
019-00732	Harper, Hayden Energy KA, LLC	Big injun
019-00733	Harper, Hayden Energy KA, LLC	Big injun
019-00738	Harper, Hayden Energy KA, LLC	Weir
019-00740	Harper, Hayden Energy KA, LLC	Weir
019-00741	Harper, Hayden Energy KA, LLC	Weir
019-00742	Harper, Hayden Energy KA, LLC	Big injun
019-00745	Harper, Hayden Energy KA, LLC	Big injun
019-00746	Harper, Hayden Energy KA, LLC	Big injun
019-00747	Harper, Hayden Energy KA, LLC	Big injun

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

APPENDIX G

Wells Serviced by Injection Wells

API #	Operator	Producing Formation
019-00748	Harper, Hayden Energy KA, LLC	Weir
019-00749	Harper, Hayden Energy KA, LLC	Weir
019-00750	Harper, Hayden Energy KA, LLC	Weir
019-00762	Harper, Hayden Energy KA, LLC	Weir
019-00770	Harper, Hayden Energy KA, LLC	Big injun
019-00771	Harper, Hayden Energy KA, LLC	Weir
019-00772	Harper, Hayden Energy KA, LLC	Big injun
019-00773	Harper, Hayden Energy KA, LLC	Big injun
019-00774	Harper, Hayden Energy KA, LLC	Big injun
019-00775	XTO Energy, INC	Weir
019-00776	Harper, Hayden Energy KA, LLC	Weir
019-00777	Harper, Hayden Energy KA, LLC	Weir
019-00778	Harper, Hayden Energy KA, LLC	Big injun
039-01040	Exco Resources (PA), LLC	Weir
039-01064	Exco Resources (PA), LLC	Weir
039-01080	Exco Resources (PA) LLC	Keener
039-01090	Exco Resources (PA). LLC	Shale
039-01136	Exco Resources (PA) LLC	Shale
039-02046	Exco Resources (PA) LLC	Big injun
039-02103	Exco Resources (PA) LLC	Big injun
039-02104	Exco Resources (PA) LLC	Big injun
039-02124	Exco Resources (PA) LLC	Big injun
039-02138	Exco Resources (PA) LLC	Big injun
039-02150	Exco Resources (PA) LLC	Big injun
039-02158	Exco Resources (PA) LLC	Big injun
039-02168	Exco Resources (PA) LLC	Big injun
039-02170	Exco Resources (PA) LLC	Big injun

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APPENDIX G

Wells Serviced by Injection Wells

API #	Operator	Producing Formation
039-02238	Exco Resources (PA) LLC	Big injun
039-02288	Exco Resources (PA) LLC	Big injun
039-02312	Exco Resources (PA) LLC	Big injun
039-02327	Exco Resources (PA) LLC	Big injun
039-02329	Exco Resources (PA) LLC	Big injun
039-02350	Exco Resources (PA) LLC	Big injun
039-02353	Exco Resources (PA) LLC	Big injun
039-02365	Exco Resources (PA) LLC	Big injun
039-02367	Exco Resources (PA) LLC	Big injun
039-02368	Exco Resources (PA) LLC	Big injun
039-02383	Exco Resources (PA) LLC	Big injun
039-02406	Exco Resources (PA) LLC	Big injun
039-02419	Exco Resources (PA) LLC	Big injun
039-02432	Exco Resources (PA) LLC	Big injun
039-02435	Exco Resources (PA) LLC	Big injun
039-02436	Exco Resources (PA) LLC	Big injun
039-02471	Exco Resources (PA) LLC	Big injun
039-02479	Exco Resources (PA) LLC	Big injun
039-02494	Exco Resources (PA) LLC	Big injun
039-02497	Exco Resources (PA) LLC	Big injun
039-02503	Exco Resources (PA) LLC	Big injun
039-02507	Exco Resources (PA) LLC	Weir
039-02514	Exco Resources (PA) LLC	Big injun
039-02642	Exco Resources (PA) LLC	Big injun
039-02648	Exco Resources (PA) LLC	Big injun
039-02766	Exco Resources (PA) LLC	Big injun
039-02820	Exco Resources (PA) LLC	Big injun

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APPENDIX G

Wells Serviced by Injection Wells

API #	Operator	Producing Formation
039-02823	Exco Resources (PA) LLC	Big injun
039-02825	Exco Resources (PA) LLC	Big injun
039-02827	Exco Resources (PA) LLC	Big injun
039-03381	Exco Resources (PA) LLC	Big injun
039-03391	Exco Resources (PA) LLC	Big injun
039-03394	Exco Resources (PA) LLC	Big injun
039-03395	Exco Resources (PA) LLC	Big injun
039-03396	Exco Resources (PA) LLC	Big injun
039-03478	Exco Resources (PA) LLC	Big injun
039-03606	Exco Resources (PA) LLC	Big injun
039-03607	Exco Resources (PA) LLC	Big injun
039-03811	Exco Resources (PA) LLC	Weir
039-03821	Exco Resources (PA) LLC	Big injun
039-03847	Exco Resources (PA) LLC	Big injun
039-03863	Exco Resources (PA) LLC	Big injun
039-03864	Exco Resources (PA) LLC	Shale
039-03881	Exco Resources (PA) LLC	Shale
039-03892	Exco Resources (PA) LLC	Shale
039-03897	Exco Resources (PA) LLC	Shale
039-03907	Exco Resources (PA) LLC	Shale
039-03945	Exco Resources (PA) LLC	Big injun
039-04014	Exco Resources (PA) LLC	Big injun
039-04044	Exco Resources (PA) LLC	Shale
039-04138	Exco Resources (PA) LLC	Big injun
039-04147	Exco Resources (PA) LLC	Big injun
039-04150	Exco Resources (PA) LLC	Big injun
039-04178	Exco Resources (PA) LLC	Big injun

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

APPENDIX G

Wells Serviced by Injection Wells

API #	Operator	Producing Formation
039-04206	Exco Resources (PA) LLC	Big injun
039-04219	Exco Resources (PA) LLC	Big injun
039-04257	Exco Resources (PA) LLC	Big injun
039-04514	Exco Resources (PA) LLC	Big injun
039-04596	Exco Resources (PA) LLC	Big injun
039-04646	Exco Resources (PA) LLC	Big injun
039-04648	Exco Resources (PA) LLC	Big injun
039-04662	Exco Resources (PA) LLC	Big injun
039-04804	Exco Resources (PA) LLC	Big injun
039-04806	Exco Resources (PA) LLC	Big injun
039-04862	Exco Resources (PA) LLC	Big injun
039-04863	Exco Resources (PA) LLC	Big injun
039-04865	Exco Resources (PA) LLC	Big injun
039-04868	Exco Resources (PA) LLC	Big injun
039-04892	Exco Resources (PA) LLC	Big injun
039-04984	Exco Resources (PA) LLC	Big injun
039-04986	Exco Resources (PA) LLC	Big injun
039-05003	Exco Resources (PA) LLC	Big injun
039-05073	Exco Resources (PA) LLC	Big injun
039-05074	Exco Resources (PA) LLC	Big injun
039-05075	Exco Resources (PA) LLC	Big injun
039-05250	Exco Resources (PA) LLC	Shale
039-05467	Exco Resources (PA) LLC	Shale
039-05616	Exco Resources (PA) LLC	Oriskany
039-05666	Exco Resources (PA) LLC	Shale
039-05720	Exco Resources (PA) LLC	Shale
039-05826	Exco Resources (PA) LLC	Big injun

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Wells Serviced by Injection Wells

API #	Operator	Producing Formation
039-05827	Exco Resources (PA) LLC	Big injun
039-05828	Exco Resources (PA) LLC	Big injun
039-05829	Exco Resources (PA) LLC	Big injun
039-05861	Exco Resources (PA) LLC	Shale
039-06063	Exco Resources (PA) LLC	Shale
005-00206	Base Petroleum, Inc.	Berea Ss
011-00644	Base Petroleum, Inc.	Big White Slate
011-00811	Base Petroleum, Inc.	Shale
019-00469	Base Petroleum, Inc.	Weir
019-00470	Base Petroleum, Inc.	Weir
019-00476	Base Petroleum, Inc.	Weir
035-01224	Base Petroleum, Inc.	Newburg
039-00927	Base Petroleum, Inc.	Big Lime
039-00939	Base Petroleum, Inc.	Big Lime
039-00954	Base Petroleum, Inc.	Big Lime
039-00977	Base Petroleum, Inc.	Big Lime
039-01287	Base Petroleum, Inc.	Big Lime
039-01386	Base Petroleum, Inc.	Big Lime
039-01419	Base Petroleum, Inc.	Big Lime
039-01803	Base Petroleum, Inc.	Big Lime
039-02917	Base Petroleum, Inc	Berea Ss
039-02919	Base Petroleum, Inc.	Weir
039-02921	Base Petroleum, Inc.	Weir
039-04748	Base Petroleum, Inc.	Weir
039-04843	Base Petroleum, Inc.	Big Lime
039-04898	Base Petroleum, Inc	Weir
039-04898	Base Petroleum, Inc.	Weir

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Wells Serviced by Injection Wells

API #	Operator	Producing Formation
039-04912	Base Petroleum, Inc.	Weir
039-04957	Base Petroleum, Inc.	Weir
039-04962	Base Petroleum, Inc.	Weir
039-06017	Base Petroleum, Inc.	Shale
039-06021	Base Petroleum, Inc.	Shale
039-06040	Base Petroleum, Inc.	Shale
039-06041	Base Petroleum, Inc.	Shale
039-06042	Base Petroleum, Inc.	Shale
039-06044	Base Petroleum, Inc.	Shale
039-06191	Base Petroleum, Inc.	Shale
039-06192	Base Petroleum, Inc.	Shale
039-06194	Base Petroleum, Inc.	Shale
039-06197	Base Petroleum, Inc.	Shale
039-06213	Base Petroleum, Inc.	Shale
039-06217	Base Petroleum, Inc.	Shale
047-00562	Base Petroleum, Inc.	Berea ss
053-00092	Base Petroleum, Inc.	2nd Berea
053-00102	Base Petroleum, Inc.	2nd Berea
053-00103	Base Petroleum, Inc.	2nd Berea
053-00128	Base Petroleum, Inc.	2nd Berea
053-00141	Base Petroleum, Inc.	Shale
053-00142	Base Petroleum, Inc.	2nd Berea
053-00160	Base Petroleum, Inc.	Shale
053-00192	Base Petroleum, Inc.	Java : Hanover
053-00228	Base Petroleum, Inc.	Sonyea Group
053-00230	Base Petroleum, Inc.	2nd Berea
053-00245	Base Petroleum, Inc.	Shale

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APPENDIX G

Wells Serviced by Injection Wells

API #	Operator	Producing Formation
053-00253	Base Petroleum, Inc.	Shale
053-00254	Base Petroleum, Inc.	Shale
053-00273	Base Petroleum, Inc.	Shale
053-00275	Base Petroleum, Inc.	Sonyea Group
053-00278	Base Petroleum, Inc.	Shale
053-00284	Base Petroleum, Inc.	Shale
053-00286	Base Petroleum, Inc.	Shale
053-00364	Base Petroleum, Inc.	2nd Berea
053-00394	Base Petroleum, Inc.	2nd Berea
053-00395	Base Petroleum, Inc.	2nd Berea
053-00400	Base Petroleum, Inc.	2nd Berea
053-00403	Base Petroleum, Inc.	2nd Berea
053-00404	Base Petroleum, Inc.	2nd Berea
053-00405	Base Petroleum, Inc.	2nd Berea
053-00408	Base Petroleum, Inc.	2nd Berea
053-00409	Base Petroleum, Inc.	2nd Berea
053-00413	Base Petroleum, Inc.	2nd Berea
053-00414	Base Petroleum, Inc.	2nd Berea
053-00473	Base Petroleum, Inc.	Rhinestreet Sh
053-00474	Base Petroleum, Inc.	Shale
053-00476	Base Petroleum, Inc.	Shale
053-00479	Base Petroleum, Inc.	Shale
053-00481	Base Petroleum, Inc.	Rhinestreet Sh
053-00486	Base Petroleum, Inc.	Rhinestreet Sh
053-00493	Base Petroleum, Inc.	Shale
053-00495	Base Petroleum, Inc.	Shale
053-00496	Base Petroleum, Inc.	Shale

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Wells Serviced by Injection Wells

API #	Operator	Producing Formation
053-00500	Base Petroleum, Inc.	Pennsylvanian System
053-00501	Base Petroleum, Inc.	Shale
067-00867	Base Petroleum, Inc.	Fifth
067-00875	Base Petroleum, Inc.	Big Lime
07a-01044	Base Petroleum, Inc.	Rhinestreet Sh
07a-01173	Base Petroleum, Inc.	Shale
081-00281	Base Petroleum, Inc.	Weir
005-01557	Simcon Oil and Gas Corporation	Weir
011-00052	Simcon Oil and Gas Corp.	Shale
011-00053	Simcon Oil and Gas Corp.	Shale
011-00071	Simcon Oil & Gas Corp.	Weir
011-00348	Simcon Oil & Gas Corp.	Shale
011-00417	Simcon Oil + Gas Corp.	Shale
011-00545	Simcon Oil + Gas Corp.	Salt Sand
011-00548	Simcon Oil + Gas Corp.	Shale
011-00631	Simcon Oil + Gas Corp.	Berea Ss
011-00637	Simcon Oil & Gas Corp.	Greenbrier Group
011-00638	Simcon Oil + Gas Corp.	Berea Ss
011-00652	Simcon Oil & Gas Corp.	Berea Ss
011-00653	Simcon Oil + Gas Corp.	Shale
011-00655	Simcon Oil + Gas Corp.	Weir
011-00658	Simcon Oil + Gas Corp.	Weir
011-00667	Simcon Oil + Gas Corp.	Berea Ss
011-00850	Simcon Oil & Gas Corp.	Weir
011-00873	Simcon Oil + Gas Corp.	Berea Ss
011-00874	Simcon Oil + Gas Corp.	Shale
011-00875	Simcon Oil & Gas Corp.	Berea Ss

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

APPENDIX G

Wells Serviced by Injection Wells

API #	Operator	Producing Formation
011-00876	Simcon Oil + Gas Corp.	Berea Ss
011-00878	Simcon Oil + Gas Corp.	Berea Ss
011-00879	Simcon Oil + Gas Corp.	Shale
011-00880	Simcon Oil + Gas Corp.	Shale
011-00881	Simcon Oil + Gas Corp.	Shale
011-00883	Simcon Oil + Gas Corp.	Berea Ss
011-00885	Simcon Oil + Gas Corp.	Berea Ss
011-00886	Simcon Oil + Gas Corp.	Berea Ss
035-01206	Simcon Oil + Gas Corp.	Newburg
035-01206	Simcon Oil + Gas Corp.	Newburg
035-01206	Simcon Oil + Gas Corp.	Newburg
035-01215	Simcon Oil + Gas Corp.	Newburg
035-01223	Simcon Oil + Gas Corp.	Newburg
035-01226	Simcon Oil + Gas Corp.	Newburg
039-00234	Simcon Oil + Gas Corp.	Oriskany
039-00248	Simcon Oil + Gas Corp.	Big injun
039-03708	Simcon Oil + Gas Corp.	Weir
043-02382	Simcon Oil + Gas Corp.	Berea Ss
043-02398	Simcon Oil + Gas Corp.	Berea Ss
043-02405	Simcon Oil + Gas Corp.	Berea Ss
043-02406	Simcon Oil + Gas Corp.	Berea Ss
043-02410	Simcon Oil + Gas Corp.	Berea Ss
043-02411	Simcon Oil + Gas Corp.	Berea Ss
043-02412	Simcon Oil + Gas Corp.	Berea Ss
079-00403	Simcon Oil + Gas Corp.	Berea Ss
079-01003	Simcon Oil + Gas Corp.	Berea Ss
079-01172	Simcon Oil + Gas Corp.	Berea Ss

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

dep

APPENDIX G

Wells Serviced by Injection Wells

API #	Operator	Producing Formation
079-01216	Simcon Oil & Gas Corp.	Berea S_S
079-01217	Simcon Oil & Gas Corp.	Berea S_S
079-01218	Simcon Oil & Gas Corp.	Berea S_S
079-01219	Simcon Oil & Gas Corp.	Berea S_S
079-01220	Simcon Oil & Gas Corp.	Berea S_S
099-00209	Simcon Oil & Gas Corp.	Keefer S_S
105-00416	Simcon Oil & Gas Corp.	Java Fm
039-03238	McKown Cl. & Son, Inc.	Weir
039-03239	McKown Cl. & Son, Inc.	Weir
039-03240	McKown Cl. & Son, Inc.	Weir
039-03241	McKown Cl. & Son, Inc.	Weir
039-03241	McKown Cl. & Son, Inc.	Weir
039-03242	McKown Cl. & Son, Inc.	Weir
039-03242	McKown Cl. & Son, Inc.	Weir
039-03243	McKown Cl. & Son, Inc.	Weir
039-03243	McKown Cl. & Son, Inc.	Weir
039-03245	McKown Cl. & Son, Inc.	Weir
039-03245	McKown Cl. & Son, Inc.	Weir
039-03246	McKown Cl. & Son, Inc.	Weir
039-03246	McKown Cl. & Son, Inc.	Weir
039-03250	McKown Cl. & Son, Inc.	Weir
039-03252	McKown Cl. & Son, Inc.	Weir
039-03253	McKown Cl. & Son, Inc.	Weir
039-03254	McKown Cl. & Son, Inc.	Weir
039-03258	McKown Cl. & Son, Inc.	Weir
039-03261	McKown Cl. & Son, Inc.	Weir
039-03262	McKown Cl. & Son, Inc.	Weir

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

APPENDIX G

Wells Serviced by Injection Wells

API #	Operator	Producing Formation
039-03264	Mckown Cl. + Son, Inc	Weir
039-03268	Mckown Cl. + Son, Inc	Weir
039-03315	Mckown Cl. + Son, Inc	Weir
039-03327	Mckown Cl. + Son, Inc	Weir
039-03330	Mckown Cl + Son, Inc	Weir
039-03332	Mckown Cl. + Son, Inc	Weir
039-03409	Mckown Cl. + Son, Inc	Weir
039-04087	Mckown Cl. + Son, Inc	Weir
039-04087	Mckown Cl. + Son, Inc	Weir
039-04090	Mckown Cl. + Son, Inc	Weir
039-04090	Mckown Cl. + Son, Inc	Weir

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

Michael W. Lewis, LLC
Independent Petroleum, Regulatory and Environmental Consultants
12 Jonsen Drive, Charleston WV 25312
304-382-5804
mikelewis@michaelwlewisllc.com

October 25, 2014

Mr. Zachary Stevison, ERS
WVDEP
Office of Oil and Gas
602 57th Street. SE
Charleston, WV 25304

Dear Mr. Stevison:

This letter is in response to your request to address the deficiencies for the Hively #1 permit # UIC2D0394202 renewal application.

1. An aerial map has been submitted to show the pipeline between the tank battery and the injection well. The drawing of the tank battery also shows the pipeline leaving the site and direction to the wellhead.
2. There is one water well within the AOR and the lab results are provided along with the chain of custody. No affidavit is required.
3. The laboratory quality control data reports and the chain of custody have been provided.
4. Appendix C has been corrected and the plugging affidavits have been provided.
5. A signature page for the GPP has been provided.
6. All well log headers have been provided as available. A check with the WVGES revealed that copies of the original logs for the Hively No. 1 well were not available and continuing efforts are being made to get copies of the original logs from the operator who drilled the wells.
7. The only water well within the AOR is the Hively water well which was sampled and submitted. This is the primary supply of water for this residence. No other uses of groundwater were identified. The Clay-Roane PSD is located approximately 11 miles from the disposal facility and ould not be effected by the disposal well.
8. The annulus of the Hively #1 well consists of 2 3/8" tubing with the backside being 4.5" casing which is enclosed at the surface with gauges to monitor any pressure buildup the annulus. The tubing backside is filled with freshwater to surface and monitored during injection operations at which time the annulus maintains a zero pressure with varying positive pressures

on the tubing. Any leakage in the injection tubing will result in a change in the annulus conditions.

9. A letter from operator Kermit Tyree is provided addressing the hydrostatic fluid level.

Sincerely,

Michael W. Lewis

Michael W. Lewis

Section 10 - MONITORING

Monitoring of all injection parameters shall be reported and logged daily consisting of startup/shutdown pressures, total injection volumes, injection rates, average injection pressures and annulus pressures along with the integrity of all tanks, containments, equipment and manifolds/lines. WR-40's shall be completed and filed in accordance with state regulations and kept on file at the facility office and be made available upon request. Fluid manifests shall be completed documenting every load of fluid delivered to the facility for disposal. These manifests shall report the following; Operator, Well Name, Number and API Number, Amount of Fluid, Type of Fluid, Contractor Hauling Fluid, Name of Driver / Truck Number and Fluid Sampling / Testing if required. Records of this information shall be kept at the facilities office and shall be made available upon request.

APPENDIX H

GROUNDWATER PROTECTION PLAN

Facility Name: Base Petroleum Hively #1 SWD

County: Kanawha

Facility Location:

Postal Service Address:	Jakes Fork area of the Little Sandy Watershed	
Latitude and Longitude:	38.50913 / -81.417987	

Contact Information:

Person:	John Wilcox
Phone Number:	304-756-2827
E-mail Address:	jhnwilcox@aol.com

Date: 8/23/4

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

There is one transfer point where tanker trucks operated by Kermit Tyree Contracting are able to dump produced fluids from various wells as indicated in Appendix G into a series of six 210 bbl. storage tanks. Fluids are then pumped approximately 2600 feet to the salt water disposal well.

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

Tanker trucks are backed onto the site to the transfer point which is located directly above the tank battery and the secondary containment. The transfer point has a plastic tub lined with absorbent pads to collect any drippings from the transfer. Any line breaks in the transfer would be contained in the secondary containment. The secondary containment provides 30,859 gallons of storage capacity which is significantly more than the 9,240 gallons of required capacity by law. An illustration of the secondary containment is provided. Mechanical integrity tests were conducted on the facility on 4/24/14 and approved on 4/29/14.

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

No new equipment or operations are anticipated for this facility at this time.

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

UIC regulations are applicable to the disposal well and oil and gas laws and regulations are applicable to all associated operations.

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

Little information exists for the general area due to the lack of water supply wells. Historical information and limited water samples from the area indicate fair water quality due to typical higher iron concentrations that exist throughout many areas of the state.

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

No waste material will be used for deicing or fill material on the property.

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.

Kermit Tyree Contracting currently operates this well for Base Petroleum Inc. and will provide employees instruction and training in the recognition and prevention of groundwater contamination and the potential sources of contamination on quarterly basis. Employees will be trained on proper procedures for filling tanker trucks at the producing well locations in order to eliminate contamination at other sites as well as transportation of those fluids. Once the tanker truck enters the disposal facility, employees will be given instruction as to the proper procedures for connecting to the transfer station and pumping of the fluids into the storage tanks. Employees will be instructed on measures to be taken in the event of a spill and will be provided with materials in order to begin clean up of any spills. The proper procedures and contacts for the reporting of any spills will be provided to all employees. Instruction and training for employees will be updated as conditions and requirements change.

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

Representatives for Base Petroleum will conduct quarterly inspections using the attached form. Employees will visually inspect the tank for any signs of material damage or leakage. Any pipelines will be walked and checked for leaks. All transfer points and hoses associated with the disposal well will be checked for flaws or areas of weakness. Secondary containment berms will be checked for any signs of weakness and any standing water will be removed. The filter will be checked and cleaned if necessary. Any findings of possible contamination will be noted on the inspection form and the remedial measures to address these concerns will be documented on the inspection form. All inspection forms will be maintained at Base Petroleum's office for a minimum of three years. Mechanical integrity test will be conducted every five years.

Signature: John B Wilson

Date: 10/25/14

Base Petroleum
Plugging Procedure
47-039-04202 Hively # 1 Disposal Well

Rig up the rig

Run the tubing down the hole to 2,100'

Gel the hole

Cement from 2,100' to 1,900'

Pull the tubing from the hole

Free point and cut the 4 ½" casing at 1,500'

Pull the 4 ½" casing from the hole

Run tubing in the hole to 1,550'

Gel the hole

Cement from 1,550' to 1,450'

Cement from 1,100' to 1,000'

Cement from 550' to 450'

Cement from 100' to the surface

Erect a monument with the API number attached

(4/25)

APPENDIX I

Requirement for Financial Responsibility to Plug/Abandon an Injection Well

To: WV Department of Environmental Protection
Office of Oil and Gas
601 57th Street, SE
Charleston, West Virginia 25304-2345
ATTN: Underground Injection Control Program

From: John B. Wilcox
Base Petroleum, Inc.
100 Wilcox Farm Lane
South Charleston, WV 25309

Date: _____

Subject: Underground Injection Control (UIC) Permit Application
UIC2D0394202
Requirement for Financial Responsibility

I, John B. Wilcox, verify in accordance with 47CSR13-13.7.g., that I will maintain financial responsibility and resources to close, plug, and abandon underground injection wells(s) in a manner prescribed by the Chief of the Office of Oil and Gas.

Name: John B. Wilcox

Signature: John B Wilcox

Date: 6/23/14

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.

Base Petroleum Inc. will maintain site security at the disposal facility starting at the main haulroad entrance with a locked metal gate with tamper proof lock access. The disposal facility and all holding tanks are secured with a fully enclosed chain link fence with the entrance being locked with heavy metal chain and padlock. All tanks and valves will be secured with padlocks as well as any groundwater protection supply containers. Cameras may also be used to deter vandalism.