



west virginia department of environmental protection

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

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Tuesday, July 10, 2018
WELL WORK PERMIT
Vertical / Re-Work

HG ENERGY, LLC
5260 DUPONT ROAD

PARKERSBURG, WV 26101

Re: Permit approval for CB FERRELL 110
47-087-04754-00-00

This well work permit is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to any additional specific conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas Inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days of completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

Per 35 CSR 4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

A blue ink signature of James A. Martin, written in a cursive style.

Operator's Well Number: CB Ferrell 110
Farm Name: MAY, TIMOTHY D.
U.S. WELL NUMBER: 47-087-04754-00-00
Vertical Re-Work
Date Issued: 7/10/2018

PERMIT CONDITIONS

West Virginia Code §22-6-11 allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code §22-6-20, which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
2. Pursuant to 35 CSR 4-19.1.a, at the request of the surface owner all water wells or springs within 1000 feet of the proposed well that are actually utilized for human consumption, domestic animals or other general use shall be sampled and analyzed.
3. Pursuant to 35 CSR 4-19.1.c, if the operator is unable to sample and analyze any water well or spring with one thousand (1,000) feet of the permitted well location, the Office of Oil and Gas requires the operator to sample, at a minimum, one water well or spring located between one thousand (1,000) feet and two thousand (2,000) feet of the permitted well location.
4. All pits must be lined with a minimum of 20 mil thickness synthetic liner.
5. In the event of an accident or explosion causing loss of life or serious personal injury in or about the well or while working on the well, the well operator or its contractor shall give notice, stating the particulars of the accident or explosion, to the oil and gas inspector and the Chief within twenty-four (24) hours.
6. During the surface casing and cementing process, in the event cement does not return to the surface, or any other casing string that is permitted to circulate cement to the surface and does not return to the surface, the oil and gas inspector shall be notified within twenty-four (24) hours.
7. Well work activities shall not constitute a hazard to the safety of persons.
8. Operator shall provide the Office of Oil & Gas notification of the date that drilling commenced on this well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov within 30 days of commencement of drilling.

CK# 3698
\$550⁰⁰

87-04754 W

FORM WW-3 (B)
1/12



1) Date: 06/07/2018
2) Operator's Well No. C B Ferrell 110
3) API Well No.: 47 - 087 - 04754
State County Permit
4) UIC Permit No. 2R08704AP

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

5) WELL TYPE: Liquid Injection / Gas Injection (not storage) / Waste Disposal
6) LOCATION: Elevation: 1110' Watershed: Rush Run
District: Smithfield County Roane Quadrangle Looneyville 7.5'
7) WELL OPERATOR: H G Energy LLC 8) DESIGNATED AGENT Diane White
Address 5260 Dupont Rd Address 5260 Dupont Rd
Parkersburg, WV 26101 Parkersburg, WV 26101
9) OIL & GAS INSPECTOR TO BE NOTIFIED 10) DRILLING CONTRACTOR
Name Joe Taylor Name NA
Address 1478 Claylick Road Address
Ripley, WV 25271

11) PROPOSED WELL WORK Drill / Drill deeper / Redrill / Stimulate
Plug off old formation / Perforate new formation / Convert
Other physical change in well (specify) Reperforate Big Injun (2406-2416 MD) 6 SPF & acidize w/ 2000 gal HCL
12) GEOLOGIC TARGET FORMATION Big Injun Depth 2122 (TVD) Feet (top) to 2150 (TVD) Feet (bottom)
13) Estimated Depth of Completed Well, (or actual depth of existing well): 2660 (MD) 2333 (TVD) Feet
14) Approximate water strata depths: Fresh none Feet Salt 1700 Feet
15) Approximate coal seam depths: NA
16) Is coal being mined in the area? Yes No
17) Virgin reservoir pressure in target formation 1250 psig Source Estimated
18) Estimated reservoir fracture pressure 2650 psig (BHFP)
19) MAXIMUM PROPOSED INJECTION OPERATIONS: Volume per hour 25 Bottom hole pressure 2400
20) DETAILED IDENTIFICATION OF MATERIALS TO BE INJECTED, INCLUDING ADDITIVES Fresh water, Produced water,
bactericides, and other chemicals as needed to maintain water quality and improve oil recovery
21) FILTERS (IF ANY) Cartridge filters
22) SPECIFICATIONS FOR CATHODIC PROTECTION AND OTHER CORROSION CONTROL

23) CASING AND TUBING PROGRAM

CASING OR TUBING TYPE	SPECIFICATIONS					FOOTAGE INTERVALS		CEMENT FILL -UP OR SACKS (CU. FT.)	PACKERS	
	Size	Grade	Weight per ft.	New	Used	For Drilling	Left In Well			
Conductor	11 5/8"	LS	NA		X	30'	30'		Kinds	
Fresh Water	7"	LS	17	X		506'	506'	CTS		
Coal									Sizes	
Intermediate									2 3/8" x 4"	
Production	4 1/2"	J-55	10.5	X		2361.35	2631.5	383 cu ft	Depths set	
Tubing	2 3/8"	J-55	4.7	X		2306	2306		2306	
Liners									Perforations	
									Top	Bottom
									2406	2416

24) APPLICANT'S OPERATING RIGHTS were acquired from C B Ferrell, et al
by deed / lease x / other contract / dated 11/06/2014 of record in the
Roane County Clerk's office in Lease Book 16 Page 440

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WV Department of
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87-04754w

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

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API 47 - 087 - 04754 County ROANE District SMITHFIELD
Quad LOONEYVILLE 7.5' Pad Name FERRELL, C.B. Field/Pool Name CLOVER
Farm name MAY, TIMOTHY D. Well Number 110
Operator (as registered with the OOG) H.G. ENERGY LLC
Address 5260 DuPONT ROAD City PARKERSBURG State WV Zip 26101

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4,285,443 M Easting 475,638 M
Landing Point of Curve Northing _____ Easting _____
Bottom Hole Northing 4,285,234 M Easting 475,776 M

Elevation (ft) 1,110' GL Type of Well New Existing Type of Report Interim Final
Permit Type Deviated Horizontal Horizontal 6A Vertical Depth Type Deep Shallow
Type of Operation Convert Deepen Drill Plug Back Redrilling Rework Stimulate
Well Type Brine Disposal CBM Gas Oil Secondary Recovery Solution Mining Storage Other _____
Type of Completion Single Multiple Fluids Produced Brine Gas NGL Oil Other _____
Drilled with Cable Rotary

Drilling Media Surface hole Air Mud Fresh Water Intermediate hole Air Mud Fresh Water Brine
Production hole Air Mud Fresh Water Brine
Mud Type(s) and Additive(s)
N/A

Date permit issued 1/8/15 Date drilling commenced 2/4/15 Date drilling ceased 2/7/15
Date completion activities began 3/23/15 Date completion activities ceased 3/26/15
Verbal plugging (Y/N) N Date permission granted _____ Granted by _____

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft None Open mine(s) (Y/N) depths None
Salt water depth(s) ft 1700' Void(s) encountered (Y/N) depths None
Coal depth(s) ft None Cavern(s) encountered (Y/N) depths None
Is coal being mined in area (Y/N) N

Reviewed by:

WR-35
Rev. 8/23/13

API 47-087 - 04754 Farm name MAY, TIMOTHY D. Well number 110

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	12 1/4"	11 5/8"	30'	Used	LS		Sand In
Surface	8 3/4"	7"	506'	New	LS	64'	Y
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production	6 1/4"	4 1/2"	2631.35'	New	J-55		Y
Tubing							
Packer type and depth set							

Comment Details Circulated Est. 25 sks to surface on 7" surface cement job. Circulated Est. 20 sks to surface on 4 1/2" cement job.

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	Reg Neat	130	15.6	1.18	153	Surface	8
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production	50:50 Pozmix	120/125	13.2/14.2	1.64/1.27	197/186	50'	8
Tubing							

Drillers TD (ft) 2660' Loggers TD (ft) 2653'
 Deepest formation penetrated Big Injun Plug back to (ft) N/A
 Plug back procedure N/A

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Kick off depth (ft) 600'

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Check all wireline logs run
 caliper density deviated/directional induction
 neutron resistivity gamma ray temperature sonic

Well cored Yes No Conventional Sidewall Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING
20 Centralizers every 88 from bottom on 4 1/2", Centralizer placed mid string on 7"

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____

API 47- 087 - 04754 Farm name MAY, TIMOTHY D. Well number 110

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
1	3/23/15	2406'	2416'	40	Big Injun

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
1	3/26/15	5	1800	2241	675	2,500	151	

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Please insert additional pages as applicable.

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API 47- 087 - 04754 Farm name MAY, TIMOTHY D. Well number 110

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
Big Injun	2122'- 2150'	TVD 2382'- 2422' MD
_____	_____	_____
_____	_____	_____
_____	_____	_____

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Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface _____ psi Bottom Hole _____ psi DURATION OF TEST _____ hrs

OPEN FLOW Gas _____ mcfpd Oil _____ bpd NGL _____ bpd Water _____ bpd
GAS MEASURED BY Estimated Orifice Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
Sand/Shale	0	1402	0	1432	
Sand	1402	1618	1432	1692	
Shale	1618	1656	1692	1738	
Sand	1656	1824	1738	1738	
Shale	1824	1842	1954	1954	
Sand	1842	1976	1977	2168	
Little Lime	1976	2036	2168	2236	
Pencil Cave	2032	2036	2236	2240	
Big Lime	2036	2104	2240	2356	
Keener	2104	2122	2356	2382	
Big Injun	2122	2150	2382	2422	Drilled directional S 39° E a distance of 797'
Shale	2150	2333	2422	2660	
TD	2333		2660		

Please insert additional pages as applicable.

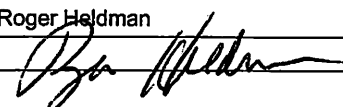
Drilling Contractor Decker Drilling
Address 11565 State Route 676 City Vincent State OH Zip 45784

Logging Company Weatherford International
Address 777 North River Avenue City Weston State WV Zip 26452

Cementing Company Universal Services
Address Hall Rd City Buckhannon State WV Zip 26201

Stimulating Company Producers Service Corp.
Address 109 South Graham Street City Zanesville State OH Zip 43701

Please insert additional pages as applicable.

Completed by Roger Heldman Telephone 304-420-1107
Signature  Title Operations Manager Date 4/10/15

WW-9
(2/15)

API Number 47 - 087 - 04754
Operator's Well No. CB Ferrell 110

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name HG Energy, LLC OP Code 494497948
Watershed (HUC 10) Rush Run Quadrangle Looneyville 7.5'

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

Will a pit be used? Yes No

If so, please describe anticipated pit waste: No fluids are anticipated

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

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number _____)
- Reuse (at API Number _____)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain _____)

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

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

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

Additives to be used in drilling medium? Water, Soap, KCl

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

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

-Landfill or offsite name/permit number? _____

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

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

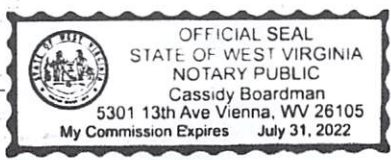
I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is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

Company Official Signature Diane White
Company Official (Typed Name) Diane White
Company Official Title Agent

Subscribed and sworn before me this 7th day of June, 20 18

Cassidy Boardman Notary Public

My commission expires 7/31/2022



HG Energy, LLC

Proposed Revegetation Treatment: Acres Disturbed .5 Prevegetation pH _____

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch Straw 2 Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Tall Fescue	40	Tall Fescue	40
Ladino Clover	5	Ladino Clover	5

****Sediment Control and Protection Per E&S Regulations Will Be Maintained at all Times****

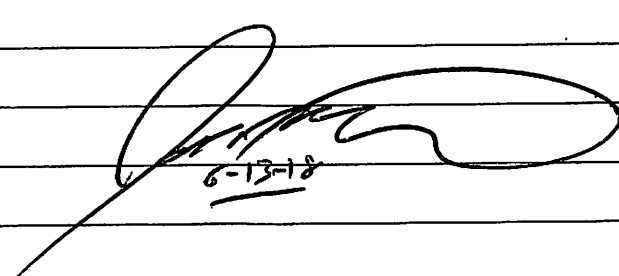
Attach:

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: _____

Comments: _____


6-13-18

Title: COG Inspector Date: 6-13-18

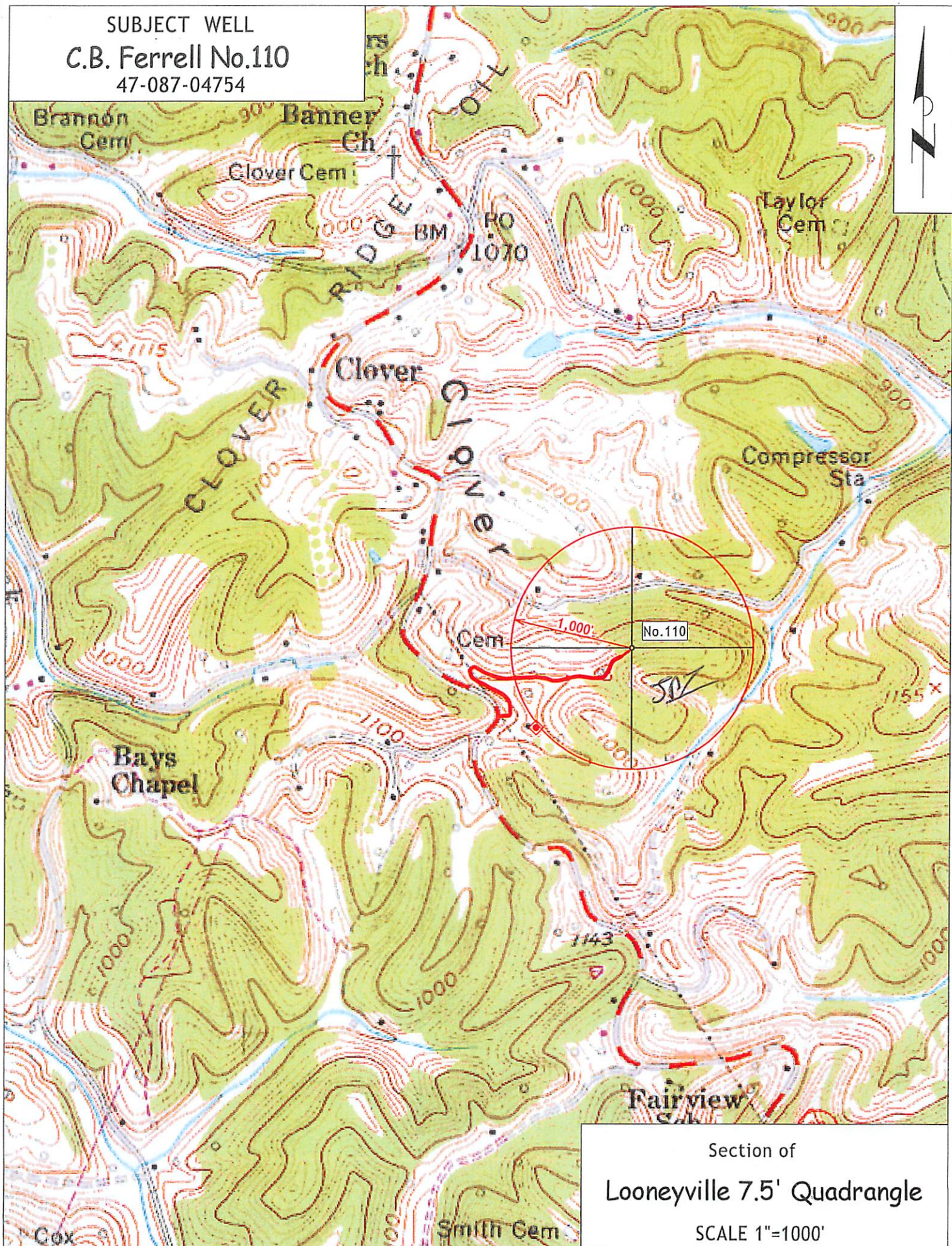
Field Reviewed? Yes No

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Environmental Protection

SUBJECT WELL
C.B. Ferrell No.110
47-087-04754



Section of
Looneyville 7.5' Quadrangle
SCALE 1"=1000'

SURVEY NOTES

1 - Well ties and Latitude and Longitude were measured by DGPS (Sub-meter Mapping Grade). Bearings are referenced to UTM Grid North (Zone 17 North - NAD 1927).

2 - Surface owners and adjoiners information obtained from the Roane County Assessor's tax records.

3 - No Title Opinion was provided to the Surveyor during this survey. This survey is subject to a complete title Opinion.

THERE POTENTIALLY APPROXIMATELY 9 POTABLE WATER SOURCES WITHIN 1000' OF THE PROPOSED WELL. FURTHER INVESTIGATION DURING THE WATER SAMPLING PROCESS SHOULD BE DONE TO ENSURE ALL WATER SOURCES ARE ACCOUNTED FOR.

SURVEY NOTES

UTM Coordinates (Zone 17N-NAD 1983)

Surface N-4,285,443m. E-475,638m.
 Bottom Hole N-4,285,244m. E-475,800m.

LOCATION REFERENCES

MAGNETIC BEARING
 S 55° W 110.0' 24" MAPLE
 S 84° W 129.7' 12" SASSAFRAS

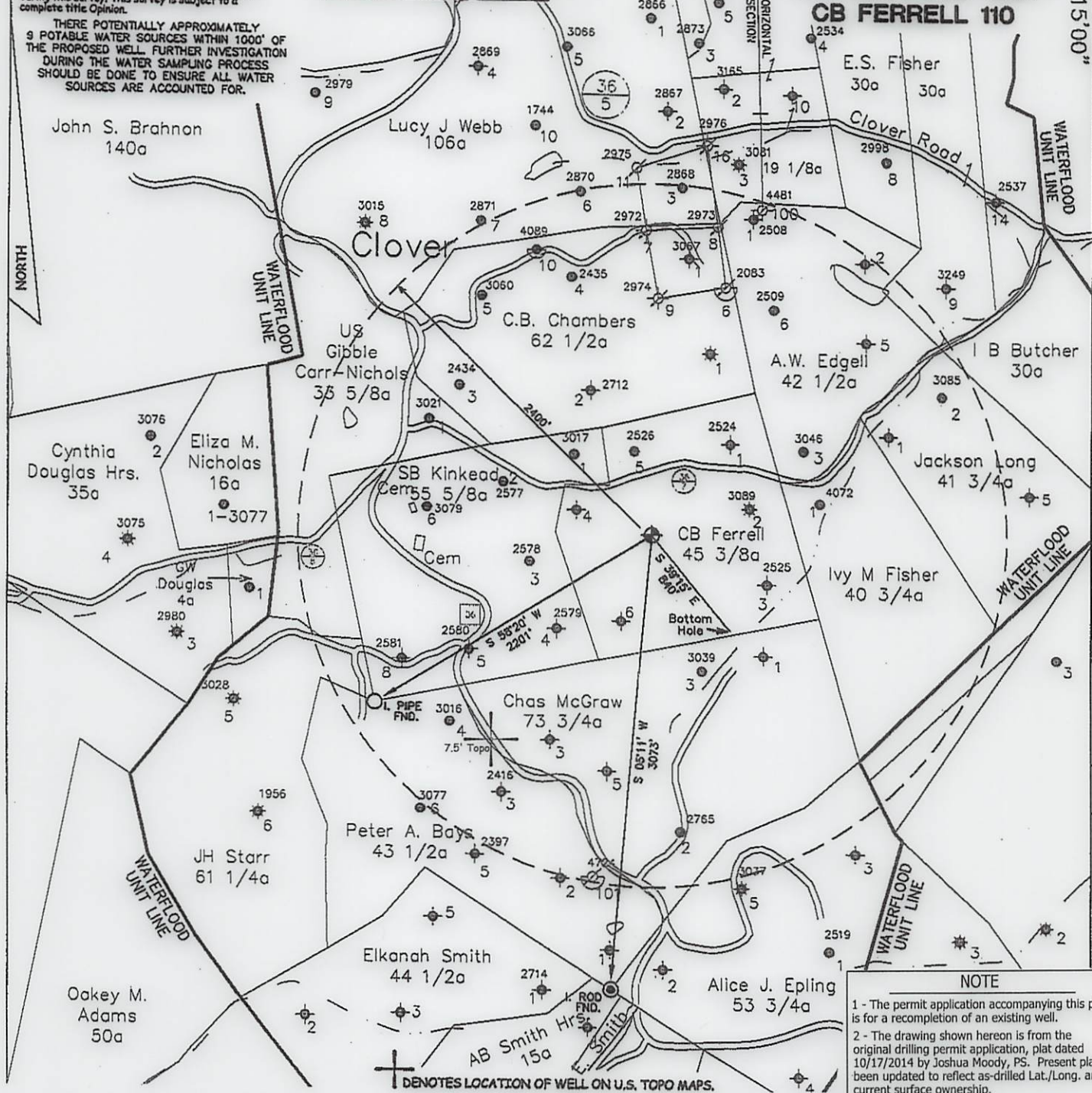
LAT: 38°45'00"

**MAP OF
 H.G. ENERGY, LLC
 -WATERFLOOD UNIT-
 CB FERRELL 110**

LONG: 81°15'00"

LONGITUDE 81° 15' 00"

As Drilled Latitude = 38° 43' 01.90"



NOTE

1 - The permit application accompanying this plat is for a recompletion of an existing well.
 2 - The drawing shown hereon is from the original drilling permit application, plat dated 10/17/2014 by Joshua Moody, PS. Present plat has been updated to reflect as-drilled Lat./Long. and current surface ownership.

⊕ DENOTES LOCATION OF WELL ON U.S. TOPO MAPS.

FILE NO. _____

SCALE 1" = 1000'

MINIMUM DEGREE OF ACCURACY _____

PROVEN SOURCE OF ELEVATION DGPS Survey (Sub-Meter Mapping Grade)

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

(SIGNED) *[Signature]*
 TIMOTHY P. ROUSH PS 793



WEST VIRGINIA
 Division of Environmental Protection
 Office of Oil and Gas
 601 57th Street
 Charleston, West Virginia 25301

WELL TYPE: OIL ___ GAS ___ LIQUID INJECTION WASTE DISPOSAL ___
 (IF "GAS") PRODUCTION ___ STORAGE ___ DEEP ___ SHALLOW ___

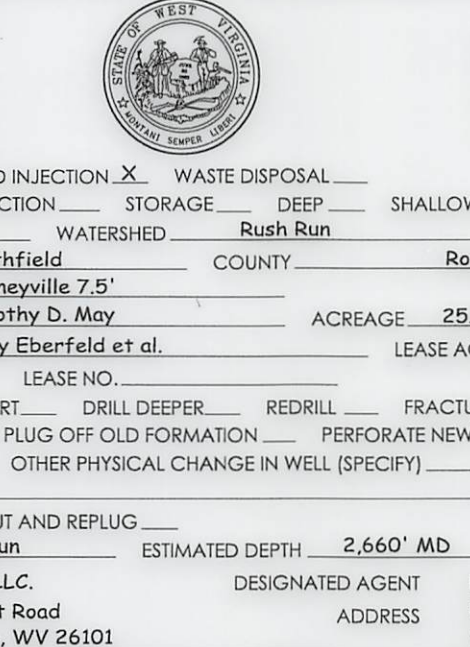
LOCATION: ELEVATION 1,110' WATERSHED Rush Run
 DISTRICT Smithfield COUNTY Roane
 QUADRANGLE Looneyville 7.5'

SURFACE OWNER Timothy D. May ACREAGE 25.51 Ac.
 OIL & GAS ROYALTY OWNER Beverly Eberfeld et al. LEASE ACREAGE 45 Ac.
 LEASE NO. _____

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

PLUG AND ABANDON ___ CLEAN OUT AND REPLUG ___
 TARGET FORMATION Big Injun ESTIMATED DEPTH 2,660' MD

WELL OPERATOR HG Energy LLC. DESIGNATED AGENT Diane White
 ADDRESS 5260 DuPont Road ADDRESS 5260 DuPont Road
 Parkersburg, WV 26101 Parkersburg, WV 26101



DATE April 18, 2018
 FARM C.B. Ferrell No.110
 API WELL NO. 47 - 087 - 04754 W