

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

API 47 - 103 - 02983 County WETZEL District MAGNOLIA
Quad PORTERS FALLS Pad Name LACKAWANNA Field/Pool Name _____
Farm name M. B. INVESTMENTS Well Number LACKAWANNA No. 2H
Operator (as registered with the OOG) GASTAR EXPLORATION USA, INC.
Address 229 W MAIN STREET - STE 301 City CLARKSBURG State WV Zip 26301

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4,384,055.36 Easting 512,301.90
Landing Point of Curve Northing N/A Easting N/A
Bottom Hole Northing 4,384,253.95 Easting 512,400.64

Elevation (ft) 1,306' 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 N/A
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 6/10/2014 Date drilling commenced 09/23/2014 Date drilling ceased 11/3/2014
Date completion activities began N/A Date completion activities ceased N/A
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 1,125' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1,777' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 1,022'-1,026' & 1,117'-1,125' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

RECEIVED
Office of Oil and Gas
DEC 5 2017
WV Department of
Environmental Protection

Reviewed by: DMH

02/16/2018

API 47- 103 - 02983 Farm name M. B. INVESTMENTS Well number LACKAWANNA No. 2H

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	26"	20"	40'	New	PE, 54.5 #/ft.		Yes
Surface	17-1/2"	13-3/8"	1,256'	New	H-40, 48 #/ft.		Yes
Coal	17-1/2"	13-3/8"	1,256'	New	H-40, 48 #/ft.		Yes
Intermediate 1	12-1/4"	9-5/8"	2,704'	New	J-55, 36 #/ft.		Yes
Intermediate 2							
Intermediate 3							
Production	N/A						
Tubing							
Packer type and depth set		N/A					

Comment Details **See attached

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	Class A	65	15.6	1.21	78	Surface	12
Surface	Class A	937	15.6	1.21	1,134	Surface	8
Coal	Class A	937	15.6	1.21	1,134	Surface	8
Intermediate 1	Class A	1040	15.6	1.19	1,238	Surface	8
Intermediate 2							
Intermediate 3							
Production	N/A						
Tubing							

Drillers TD (ft) 5,530' Loggers TD (ft) N/A
 Deepest formation penetrated Undifferentiated Formation (Below Benson) Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) N/A

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 _____
Surface/Coal - 3 Centralizers at 300' Spacing
Intermediate - 7 Centralizers at 300' Spacing

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 _____

RECEIVED
Office of Oil and Gas
DEC 5 2017
WV Department of
Environmental Protection

Lackawanna 2H Cement Additives

Surface: Class A + 3% CaCl + ¼ #per sack flake

Coal: Class A + 3% CaCl + ¼ #per sack flake

Intermediate: Class A + 1% EC-1 + ¼ per sack flake + .5% SMS + .55% BA-10A

RECEIVED
Office of Oil and Gas
DEC 5 2017
WV Department of
Environmental Protection

Lackawanna 2H Drilling & Casing Summary

The Lackawanna 2H well was initially drilled to a depth of 40' feet utilizing a 30 inch bit. 20 inch conductor pipe was installed and cemented to surface. The well was then drilled to 1300' MD utilizing a 17 ½" bit. 13 3/8" casing was installed to 1256' MD and cemented to surface. The well was then drilled to 2784' MD utilizing a 12 ¼" bit. 9 5/8" casing was then installed to 2704' MD and cemented to surface. The well was then drilled to a total depth of 5530' MD utilizing a 8 7/8" bit. The well was subsequently filled with 9.5 lb/gal brine water and capped to await additional drilling.

RECEIVED
Office of Oil and Gas
DEC 5 2017
WV Department of
Environmental Protection

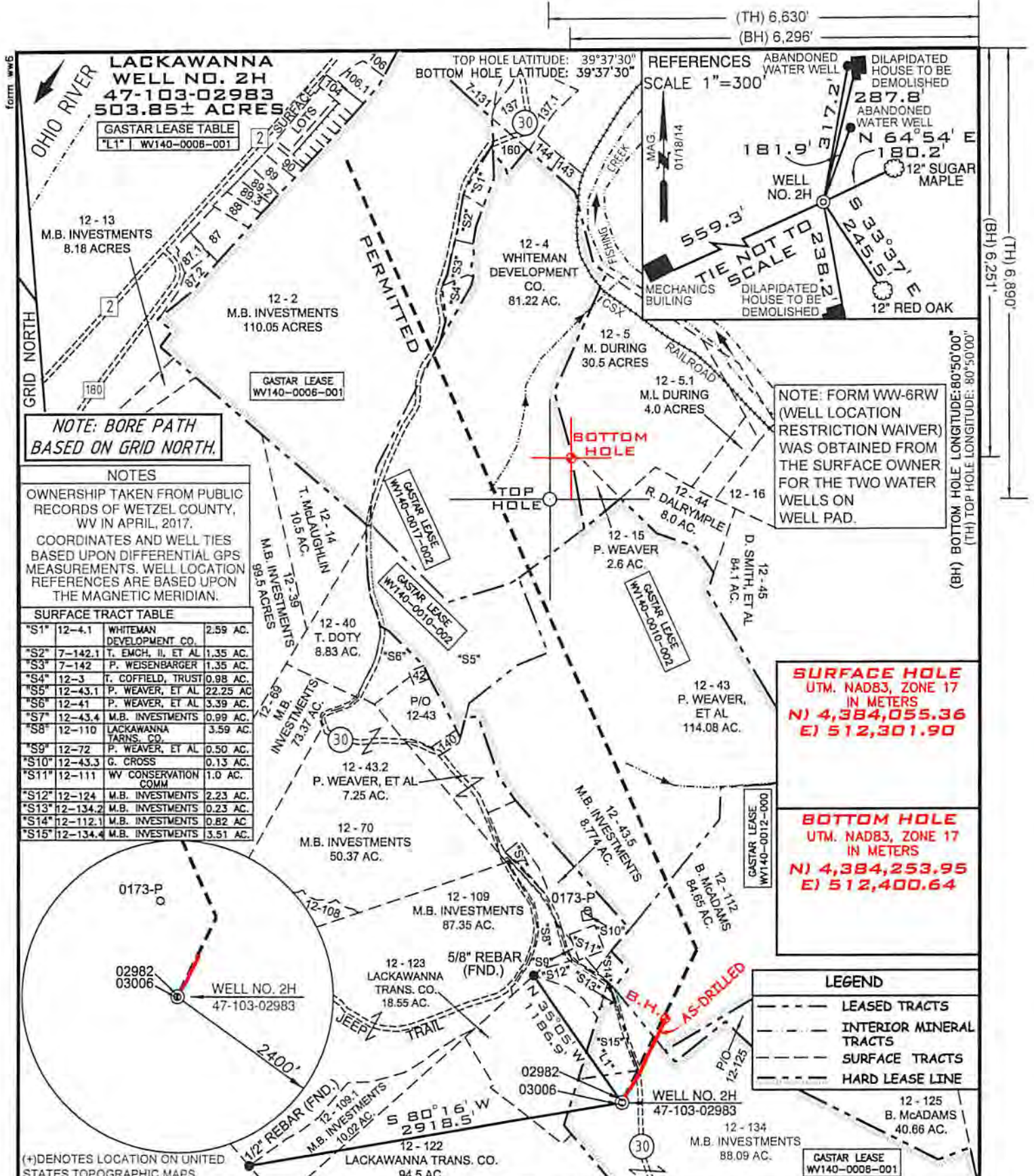
LITHOLOGY/FORMATION	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL , GAS, H ₂ S, ETC)
Undifferentiated Fm	0	1022	0	1022	Interbedded sandstone, siltstone, limestone and shale
Sewickley Coal	1022	1026	1022	1026	Coal
Undifferentiated Fm	1026	1117	1026	1117	Interbedded sandstone, siltstone, limestone and shale
Pittsburgh Coal	1117	1122	1117	1122	Coal
Undifferentiated Fm	1122	1777	1122	1777	Interbedded sandstone, siltstone, limestone and shale
Salt Sand	1777	1807	1777	1807	Sandstone
Undifferentiated Fm	1807	2159	1807	2159	Interbedded sandstone, siltstone and shale
Maxton Sandstone	2159	2194	2159	2194	Sandstone
Undifferentiated Fm	2194	2294	2194	2294	Interbedded sandstone, siltstone and shale
Big Lime	2294	2410	2294	2410	Limestone
Big Injun	2410	2494	2410	2494	Sandstone
Undifferentiated Fm	2494	2753	2494	2753	Interbedded sandstone, siltstone and shale
Weir Sandstone	2753	2798	2753	2798	Sandstone
Undifferentiated Fm	2798	2946	2798	2946	Interbedded sandstone, siltstone and shale
Berea Sandstone	2946	2951	2946	2951	Sandstone
Undifferentiated Fm	2951	3328	2951	3329	Interbedded sandstone, siltstone and shale
Gordon Sandstone	3328	3338	3329	3339	Sandstone
Undifferentiated Fm	3338	3388	3339	3391	Interbedded sandstone, siltstone and shale
Fifty Foot Sandstone	3388	3408	3391	3411	Sandstone
Undifferentiated Fm	3408	3889	3411	3907	Interbedded sandstone, siltstone and shale
Speechley Sandstone	3889	3939	3907	3957	Sandstone
Undifferentiated Fm	3939	5282	3957	5339	Interbedded sandstone, siltstone and shale
Benson Sandstone	5282	5312	5339	5369	Sandstone
Undifferentiated Fm	5312	5404	5369	5530	Interbedded sandstone, siltstone and shale

RECEIVED
Office of Oil and Gas

DEC 5 2017

WV Department of
Environmental Protection

02/16/2018



FILE NUMBER W0110309
 DRAWING NUMBER LACKAWANNA_WP_2H-AD
 SCALE 1" = 1000'
 MINIMUM DEGREE OF ACCURACY 1/200
 PROVEN SOURCE SUBMETER MAPPING
 OF ELEVATION GRADE GPS

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

P.S. 2122 Jonathan N. White

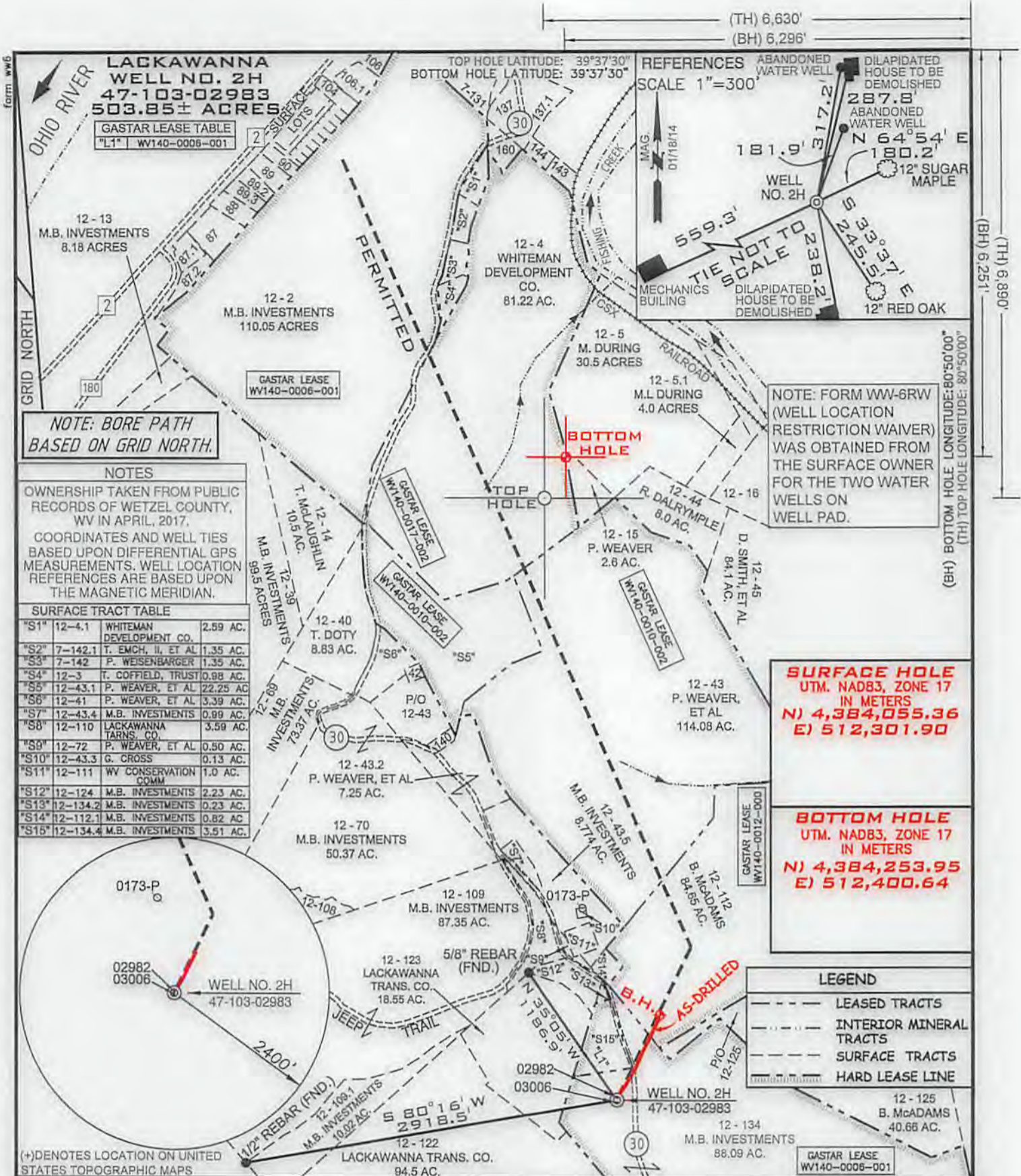


WVDEP
 OFFICE OF OIL & GAS
 601 57TH STREET
 CHARLESTON, WV 25304



DATE: APRIL 30, 2017
 OPERATORS WELL NO. LACKAWANNA NO. 2H AS-DRILLED
 API WELL NO. 47-103-02983
 STATE COUNTY PERMIT
 LOCATION ELEVATION 1306' WATERSHED (HUC 10) OUTLET MIDDLE ISLAND CREEK (UNDEFINED)
 DISTRICT MAGNOLIA COUNTY WETZEL
 QUADRANGLE PORTERS FALLS 7.5' LEASE NUMBER WV140-0017-002
WV140-0006-001, WV140-0010-002, WV140-0012-000
 SURFACE OWNER M.B. INVESTMENTS ACREAGE 88.09
 OIL & GAS ROYALTY OWNER M.B. INVESTMENTS, ET AL LEASE ACREAGE 503.85
 PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE (SPECIFY) _____
 TARGET FORMATION Undifferentiated Formation (Below Benson) ESTIMATED DEPTH TVD: 5,404' TMD: 5,530'
 WELL OPERATOR GASTAR EXPLORATION USA, INC. DESIGNATED AGENT MICHAEL McCOWN
 ADDRESS 229 W MAIN STREET, SUITE 301 ADDRESS 229 W MAIN STREET, SUITE 301
CLARKSBURG WV, 26301 CLARKSBURG WV, 26301

02/16/2018



SURFACE TRACT TABLE

"S1"	12-4.1	WHITEMAN DEVELOPMENT CO.	2.59 AC.
"S2"	7-142.1	T. ENCH, II, ET AL	1.35 AC.
"S3"	7-142	P. WEISENBARGER	1.35 AC.
"S4"	12-3	T. COFFIELD, TRUST	0.98 AC.
"S5"	12-43.1	P. WEAVER, ET AL	22.25 AC.
"S6"	12-41	P. WEAVER, ET AL	3.39 AC.
"S7"	12-43.4	M.B. INVESTMENTS	0.99 AC.
"S8"	12-110	LACKAWANNA TARNs. CO.	3.59 AC.
"S9"	12-72	P. WEAVER, ET AL	0.50 AC.
"S10"	12-43.3	G. CROSS	0.13 AC.
"S11"	12-111	WV CONSERVATION COMM	1.0 AC.
"S12"	12-124	M.B. INVESTMENTS	2.23 AC.
"S13"	12-134.2	M.B. INVESTMENTS	0.23 AC.
"S14"	12-112.1	M.B. INVESTMENTS	0.82 AC.
"S15"	12-134.4	M.B. INVESTMENTS	3.51 AC.

SURFACE HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,384,055.36
E) 512,301.90

BOTTOM HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,384,253.95
E) 512,400.64

LEGEND

- LEASED TRACTS
- - - INTERIOR MINERAL TRACTS
- SURFACE TRACTS
- HARD LEASE LINE

FILE NUMBER W0110309
DRAWING NUMBER LACKAWANNA_WP_2H-AD
SCALE 1" = 1000'
MINIMUM DEGREE OF ACCURACY 1/200
PROVEN SOURCE SUBMETER MAPPING
OF ELEVATION GRADE GPS

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

P.S. Jonathan N. White
2122



WVDEP
OFFICE OF OIL & GAS
801 57TH STREET
CHARLESTON, WV 25304

DATE: APRIL 30, 2017

OPERATORS WELL NO. LACKAWANNA NO. 2H AS-DRILLED

API WELL NO. 47-103-02983

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

LOCATION ELEVATION 1306' WATERSHED (HUC 10) OUTLET MIDDLE ISLAND CREEK (UNDEFINED)

DISTRICT MAGNOLIA COUNTY WETZEL

QUADRANGLE PORTERS FALLS 7.5' LEASE NUMBER WV140-0017-002, WV140-0006-001, WV140-0010-002, WV140-0012-000

SURFACE OWNER M.B. INVESTMENTS ACREAGE 88.09

OIL & GAS ROYALTY OWNER M.B. INVESTMENTS, ET AL LEASE ACREAGE 503.85

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

TARGET FORMATION Undifferentiated Formation (Below Benson) ESTIMATED DEPTH TVD: 5,404' TMD: 5,530'

WELL OPERATOR GASTAR EXPLORATION USA, INC. DESIGNATED AGENT MICHAEL McCOWN

ADDRESS 229 W MAIN STREET, SUITE 301 CLARKSBURG WV, 26301 ADDRESS 229 W MAIN STREET, SUITE 301 CLARKSBURG WV, 26301

02/16/2018

COUNTY NAME
PERMIT