

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

API 47 - 103 - 02982 County WETZEL District MAGNOLIA
Quad PORTERS FALLS 7.5' Pad Name LACKAWANNA Field/Pool Name _____
Farm name M. B. INVESTMENTS Well Number LACKAWANNA No. 1H
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 4,384,061.53 Easting 512,302.15
Landing Point of Curve Northing N/A Easting N/A
Bottom Hole Northing 4,384,231.42 Easting 512,362.50

Elevation (ft) 1306' 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

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Date permit issued 6/10/2014 Date drilling commenced 10/09/2014 Date drilling ceased 10/23/14
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

Reviewed

Reviewed by:

DH

02/16/2018

API 47- 103 - 02982 Farm name M. B. INVESTMENTS Well number LACKAWANNA No. 1H

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"	1,287'	New	H-40, 48 #/ft.		Yes
Coal	17-1/2"	13-3/8"	1,287'	New	H-40, 48 #/ft.		Yes
Intermediate 1	12-1/4"	9-5/8"	2,755'	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	933	15.6	1.21	1128	Surface	8
Coal	Class A	933	15.6	1.21	1128	Surface	8
Intermediate 1	Class A	954	15.6	1.19	1135	Surface	8
Intermediate 2							
Intermediate 3							
Production	N/A						
Tubing							

Drillers TD (ft) 5,685' 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

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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 _____

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PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
	N/A				

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)
	N/A							

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Please insert additional pages as applicable.

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<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>
N/A	TVD MD
_____	_____
_____	_____
_____	_____

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)
**See Attached	0		0		

Please insert additional pages as applicable.

Drilling Contractor Noah Horn
 Address 1070 Sandy Valley Lane City Oakwood State VA Zip 24631
 Logging Company N/A
 Address _____ City _____ State _____ Zip _____
 Cementing Company Baker Hughes
 Address 17021 Aldine Westfield City Houston State TX Zip 77073
 Stimulating Company N/A
 Address _____ City _____ State _____ Zip _____

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Please insert additional pages as applicable.

Completed by Jonathan White Telephone 724-749-8388
 Signature *Jonathan White* Title Regulatory Analyst Date 05/01/2017

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

Lackawanna 1H Cement Additives

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

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

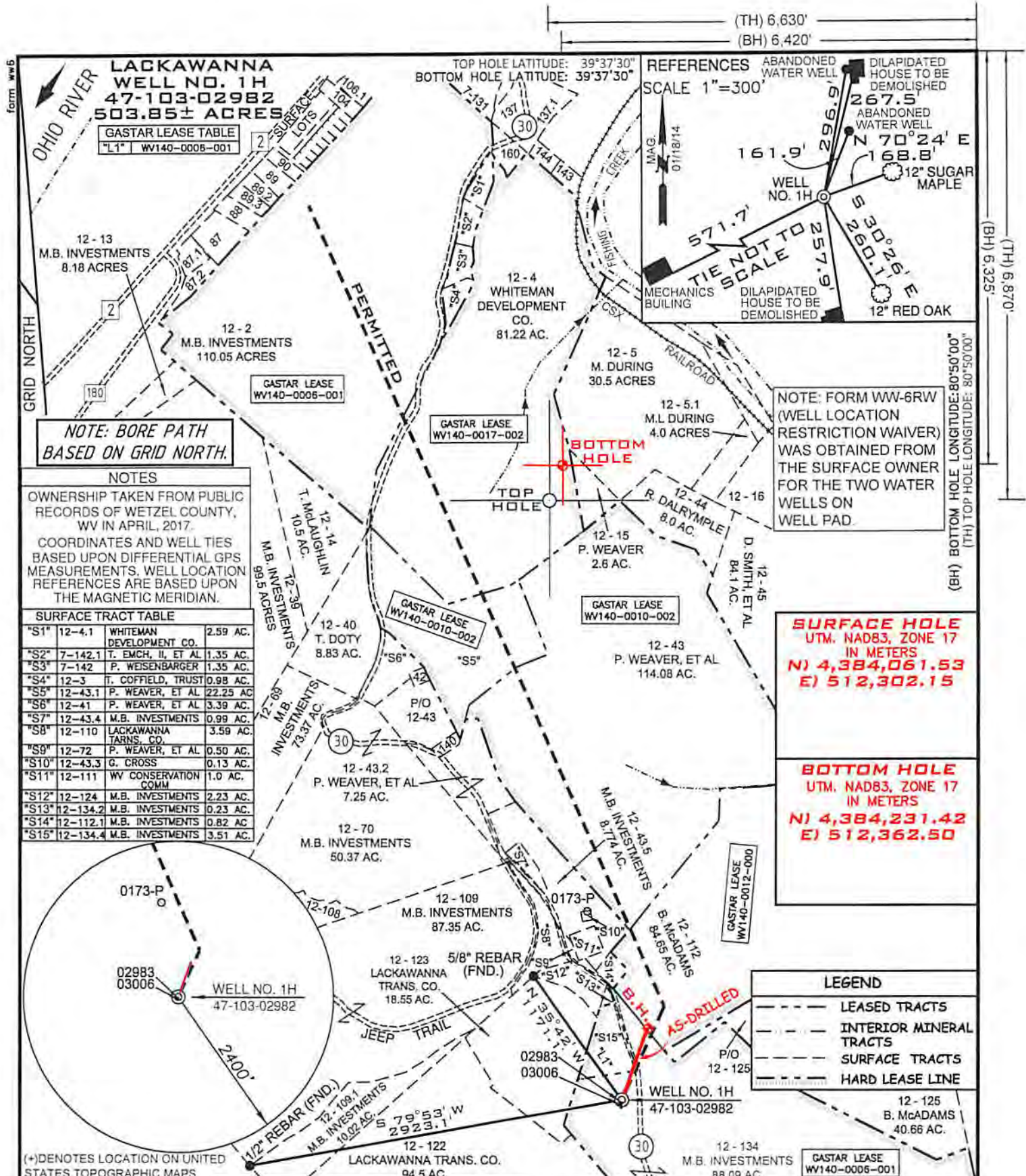
Intermediate: Class A + 1% EC-1 + ¼ per sack flake + .5% SMS + .55% BA-10A

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Lackawanna 1H Drilling & Casing Summary

The Lackawanna 1H 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 1330' MD utilizing a 17 ½" bit. 13 3/8" casing was installed to 1286' MD and cemented to surface. The well was then drilled to 2754' MD utilizing a 12 ¼" bit. 9 5/8" casing was then installed to 2747' MD and cemented to surface. The well was then drilled to a total depth of 5685' 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.

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NOTE: BORE PATH BASED ON GRID NORTH.

NOTES

OWNERSHIP TAKEN FROM PUBLIC RECORDS OF WETZEL COUNTY, WV IN APRIL, 2017.
 COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS. WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.

SURFACE TRACT TABLE			
S1	12-4.1	WHITEMAN DEVELOPMENT CO.	2.59 AC.
S2	7-142.1	T. EMCH, 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 TRANS. 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.

NOTE: FORM WW-6RW (WELL LOCATION RESTRICTION WAIVER) WAS OBTAINED FROM THE SURFACE OWNER FOR THE TWO WATER WELLS ON WELL PAD.

SURFACE HOLE
 UTM, NAD83, ZONE 17
 IN METERS
 N) 4,384,061.53
 E) 512,302.15

BOTTOM HOLE
 UTM, NAD83, ZONE 17
 IN METERS
 N) 4,384,231.42
 E) 512,362.50

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

(*) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

FILE NUMBER W0110309
 DRAWING NUMBER LACKAWANNA_WP_1H-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
 601 57TH STREET
 CHARLESTON, WV 25304

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 WV Department of Environmental Protection
 Office of Oil and Gas

Jonathan N. White
 LICENSED PROFESSIONAL SURVEYOR
 SEAL

DATE: APRIL 30, 2017

OPERATORS WELL NO. LACKAWANNA NO. 1H AS-DRILLED
 API WELL NO. 47-103-02982
 STATE WV COUNTY WETZEL PERMIT 021679018

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
 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: 5,615' TMD: 5,685'
 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

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 W140-0017-002, W140-0010-002, W140-0012-000

SURFACE OWNER M.B. INVESTMENTS

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

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION

PERFORMATE NEW FORMATION OTHER PHYSICAL CHANGE (SPECIFY) _____

PLUG & ABANDON CLEAN OUT & REPLUG _____

TARGET FORMATION Undifferentiated Formation (Below Benson)

DESIGNATED AGENT MICHAEL McCOWN

WELL OPERATOR GASTAR EXPLORATION USA, INC.

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

FILE NUMBER W0110309

DRAWING NUMBER LACKAWANNA WP_1H-AD

SCALE 1" = 1000'

MINIMUM DEGREE 1/200

PROVEN SOURCE SUBMETER MAPPING

OF ELEVATION GRADE GPS

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



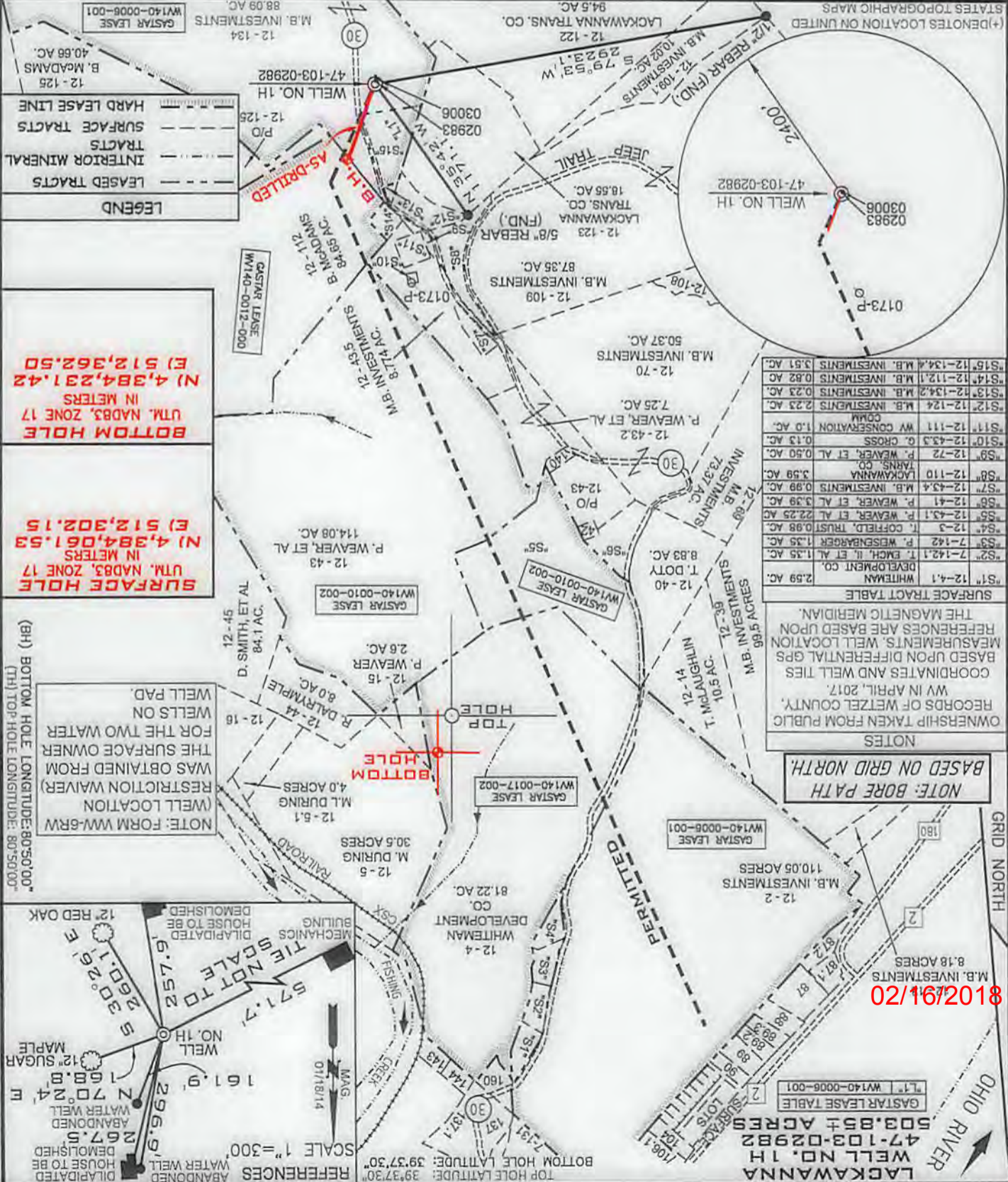
I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

P.S. *Jonathan N. White*

DATE: APRIL 30, 2017

OPERATORS WELL NO. LACKAWANNA NO. 1H AS-DRILLED

API WELL NO. 47-103-02982



TH 6.870' (BH) 6.325'

TH 6.630' (BH) 6.420'