



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

Wednesday, January 9, 2019
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ARSENAL RESOURCES LLC
6031 WALLACE ROAD EXTENSION
SUITE 603
WEXFORD, PA 15090

Re: Permit Modification Approval for GAMELLI HSOG 201
47-033-05922-00-00

Modified lateral bore spacing and bottom hole

ARSENAL RESOURCES LLC

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before 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, is placed over the printed name and title.

Operator's Well Number: GAMELLI HSOG 201
Farm Name: JAMES T. GAMELLIE ET AL.
U.S. WELL NUMBER: 47-033-05922-00-00
Horizontal 6A New Drill
Date Modification Issued: January 9, 2019

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Arsenal Resources 494519412 Harrison Simpson Rosemont
Operator ID County District Quadrangle

2) Operator's Well Number: Gamelli HSOG 201 Well Pad Name: Gamelli HSOG

3) Farm Name/Surface Owner: James T. Gamelli et al Public Road Access: CR 17

4) Elevation, current ground: 1,132.10' Elevation, proposed post-construction: 1,140.50'

5) Well Type (a) Gas X Oil _____ Underground Storage _____

Other _____

(b) If Gas Shallow X Deep _____

Horizontal X _____

*SOW
10/15/2018*

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus Shale, 7,238' (TVD Top) - 7,338' (Bottom), 100 ft, 0.5 psi/ft ✓

8) Proposed Total Vertical Depth: 7,317' ✓

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 22,198' ✓

11) Proposed Horizontal Leg Length: 14,116.72' ✓

12) Approximate Fresh Water Strata Depths: 96', 246', 366', 671'

13) Method to Determine Fresh Water Depths: Offsetting wells water depths (033-02428, 033-02986)

14) Approximate Saltwater Depths: 1400'

15) Approximate Coal Seam Depths: Elk Lick- 99', Harlem- 175', Bakerstown- 253', Brush Creek- 355', Upper Freeport- 422', Lower Freeport- 475', Upper Kittanning- 538', Middle Kittanning- 617', Lower Kittanning- 641', Clarion- 662'

16) Approximate Depth to Possible Void (coal mine, karst, other): None expected

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes _____ No X

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

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18)

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	26	New	H-40	102.7	80	80	CTS ✓
Fresh Water	13.375	New	J-55	54.5	750	750	CTS ✓
Coal							
Intermediate	9.625	New	J-55	40	2,450	2,450	CTS
Production	5.5	New	P-110	23	22,198	22,198	TOC @ 2,300
Tubing							
Liners							

*SDW
10/13/2018*

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	26	36			0	Class A, 3% CaCl2	✓ 1.2
Fresh Water	13.375	17.5	0.38	2,730	900	Class A, 3% CaCl2	✓ 1.2
Coal							
Intermediate	9.625	12.25	0.395	3,950	1,500	Class A, 3% CaCl2	✓ 1.29
Production	5.5	8.5-8.75	0.415	14,520	9,500	Class A/50.50 Poz	✓ 1.29/1.34
Tubing					5,000		
Liners					N/A		

PACKERS

Kind:				
Sizes:				
Depths Set:				

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19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

The well will be started with a conductor rig drilling a 36" hole to Conductor programmed depth then running 26" casing and circulate cement back to surface. The conductor rig will move out and the drilling rig will move in and rig up. The drilling rig will then spud a 17 1/2" hole and drill to fresh water casing (Surface) to the programmed depth, Run 13- 3/8" casing and cement to surface. The rig will continue drilling a 12- 1/4" intermediate hole to the programmed depth, run 9- 5/8" casing and cement to surface. The rig will then continue to drill an 8- 3/4" hole to a designed KOP. We will then start drilling the curve and lateral section to the programmed total measured depth, run 5 1/2" casing and cement according to the program.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

The well will be completed using a plug and perforation method and stimulated with a slickwater and sand slurry. The anticipated maximum rate will be 90 bpm and the maximum pressure will be 9,500 psi.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 19.4

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22) Area to be disturbed for well pad only, less access road (acres): 7.3

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23) Describe centralizer placement for each casing string:

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26" - No centralizers 13 3/8" - one bow spring centralizer on every other joint 9 5/8" - one bow spring centralizer every third joint from TD to surface 5 1/2" - one semi rigid centralizer on every joint from TD of casing to end of curve. Then every other joint to KOP. Every third joint from KOP to 2,550'; there will be no centralizers from 2,550 to surface.

24) Describe all cement additives associated with each cement type:

26" will be circulated to surface. The 13 3/8" casing will be cemented to surface with Class A cement and no greater than 3% CaCl (calcium chloride). The 9 5/8" casing will be cemented to surface with Class A cement, & no greater than 3% calcium chloride. The 5 1/2" production string will be cemented back to 2,300' (+/- 150' above the casing shoe for the 9 5/8") with Class A and 50/50 Poz cement retarded (to extend pumpability) cellophane flaked for fluid loss, Bentonite gel as an extender (increased pumpability and fluid loss), a defoaming agent to decrease cement foaming during mixing to insure the cement is of proper weight to placement and possibly gypsum gas blocking additive to aid in blocking/gas migration (in combination with other additive mentioned here, helps cement achieve a "right angle" set) during the plastic phase of the cement set-up.

25) Proposed borehole conditioning procedures:

Top holes will be drilled with fresh water KOP. At KOP, the wellbore will be loaded with synthetic oil based mud, barite-weighted mud system with such properties as to build a filter-cake on the face of the bore-hole. This will provide lubricity as well as stabilizing the well bore. We will begin rotating the drill string and mud will be circulated upon reaching TD until no further cuttings are observed coming across the shaker screens. Once clean mud is circulated back to surface, we will pull three stands of drill pipe, load the hole, pull three strands and load the hole. The weight indicator on the rig will be monitored for any occurrences of drag and if any are noticed, we will re-run the previous stand of pipe pulled across and circulate 2x bottoms up while watching shakers for signs of cuttings. Once at the base curve, the string will be continuously rotated while pumping 2x bottoms up. We will pull three stands and fill the hole until we reach the vertical section of the well.

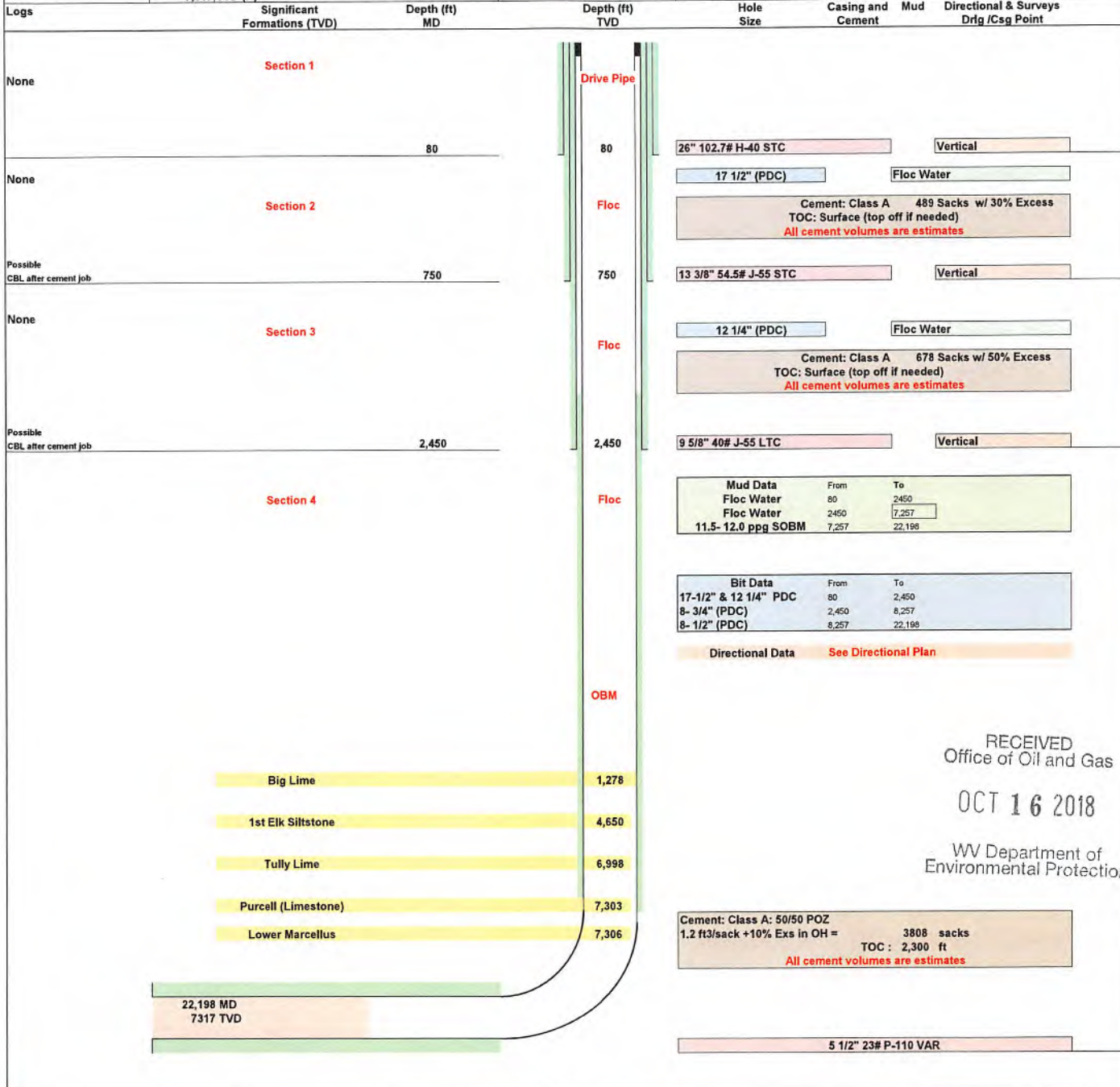
*Note: Attach additional sheets as needed.



33-03162-019 01/11/2019

Other Names:	N/A
Surface Location:	TBD
Bottom Hole Location:	TBD
Total Depth:	22,198 MD (ft) 7,317 TVD (ft)

County:	Harrison
State:	West Virginia
AFE #:	XX API #: XX
RKB:	27
Ground Level:	1,141



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Purpose

The purpose of this pad-specific Hydraulic Fracturing Monitoring Plan is to identify and notify conventional well operators near Arsenal Resources hydraulic fracturing in Harrison County, WV prior to hydraulic fracturing at the Gamelli HSOG pad 201 well.

Due to the apparent presence of unique geological conditions, the potential for communication between deep geologic zones exists in this area. This potential communication, via natural gas, water, or both, may occur between hydraulically fractured wells in the Marcellus formation (approximately 7,400' TVD) and existing conventional natural gas wells in the partially-depleted, relatively high permeability Benson formations (approximately 5,200' TVD).

The plan is being implemented as an additional safety measure to be utilized in conjunction with best management practices and emergency action plans for this site. These additional measures include pre-notification of conventional well operators of the timing and location of the hydraulic fracturing, establishment of measures conventional well operators should implement, and assurance that the Division of Oil and Gas is notified of the timeline, as well as any issues that may arise during fracturing.

1. Communications with Conventional Operators.

Arsenal Resources, using available data (WV Geological Survey, WVDEP Website, and IHS data service), has identified all known conventional wells and well operators within 500 feet of this pad and the lateral sections. A map showing these wells along with a list of the wells and operators is included in Attachment A.

Upon approval of this plan, Arsenal Resources will notify these operators, via letter, of the hydraulic fracturing schedule for these wells. A copy of this letter is included in Attachment B.

The letter provides recommendations to these conventional operators to 1) increase their monitoring of their wells during that time period, 2) ensure that their well head equipment is sound, and 3) provide immediate notification to Arsenal Resources and the OOG in the event of any changes in their well conditions.

Specifically, the letter recommends that conventional well operators conduct the following activities during and after fracturing operations:

1. Inspect their surface equipment prior to fracturing to establish integrity and establish pre-frac well conditions.
2. Observe wells closely during and after fracturing and monitor for abnormal increases in water, gas or pressure.
3. Inspect or install master valves rated to 3,000 psi or other necessary equipment for wellhead integrity.
4. Notify the OOG and ARSENAL RESOURCES if any changes in water, gas production, pressure or other anomalies are identified.

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2. Reporting

Arsenal Resources will provide information relating to the hydraulic fracturing schedule, communication with conventional operators, and ongoing monitoring of the work upon request of OOG or immediately after any event of any noted abnormalities.

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33-0592-1000

01/11/2019

FORM WW 6

10,660' T.H.

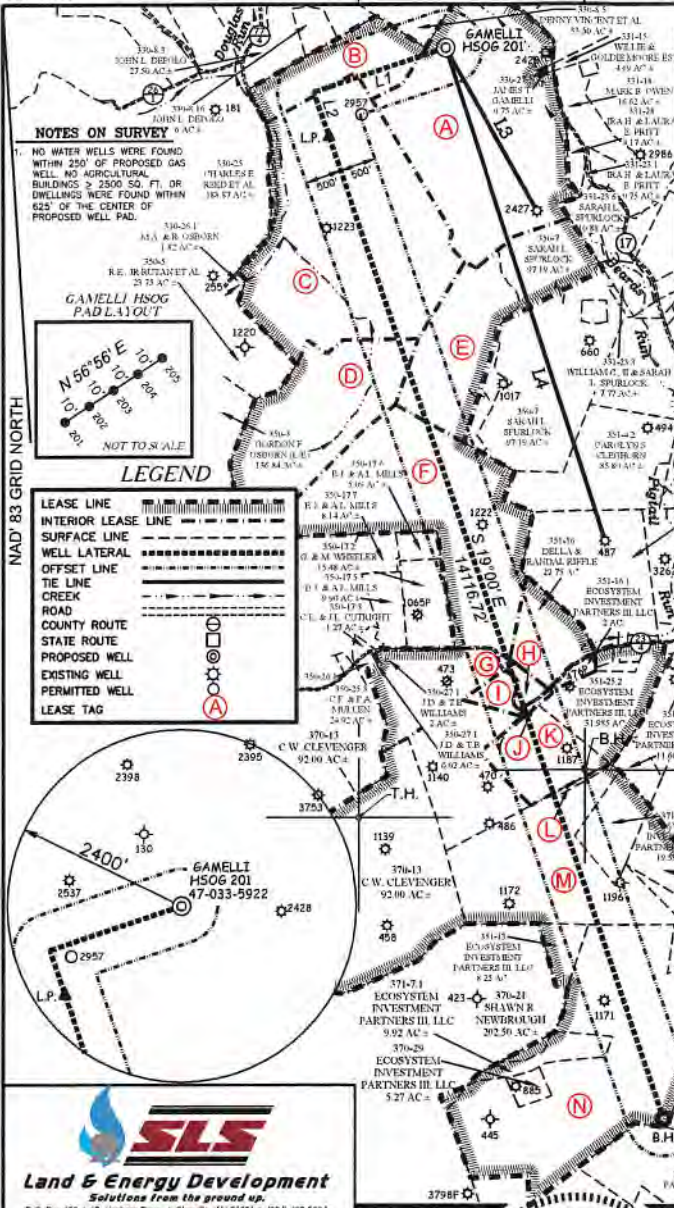
7,561' B.H.

T.H. LATITUDE 39°17'30"

B.H. LATITUDE 39°15'00"

T.H. LONGITUDE 80°10'00"

B.H. LONGITUDE 80°10'00"



ARSENAL RESOURCES GAMELLI HSOG 201

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD'83 S.P.C.(FT)	N. 278,083.4	E. 1,769,076.9
NAD'83 GEO.	LAT-(N) 39.261342	LONG-(W) 80.204316
NAD'83 UTM (M)	N. 4,346,080.3	E. 568,645.9

LANDING POINT

NAD'83 S.P.C.(FT)	N. 276,879.2	E. 1,767,472.8
NAD'83 GEO.	LAT-(N) 39.258001	LONG-(W) 80.209948
NAD'83 UTM (M)	N. 4,345,705.3	E. 568,163.3

BOTTOM HOLE

NAD'83 S.P.C.(FT)	N. 263,591.4	E. 1,772,067.8
NAD'83 GEO.	LAT-(N) 39.221454	LONG-(W) 80.193357
NAD'83 UTM (M)	N. 4,341,661.9	E. 569,630.9

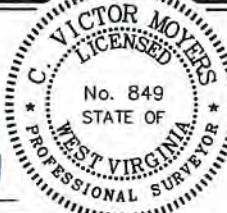
GAMELLI HSOG 201 WELL TIES

LINE	BEARING	DISTANCE
L1	S 71°41' W	1969.07'
L2	S 19°00' E	638.91'
L3	S 29°25' E	2549.08'
L4	S 18°01' E	7045.33'

TAG	SURFACE OWNER	TAX MAP PARCEL	ACREAGE
A	JAMES T. GAMELLI ET AL.	330-28	151.20±
B	DEPOLO FAMILY TRUST	330-8-6	33.50±
C	SCOT S. DIERINGER ET AL.	330-26	172.93±
D	BRUCE, MICHAEL & JASHO OSBORN	350-6	86±
E	SCOT S. & LYNN B. DIERINGER	350-7-1	57.45±
F	R. MARK & DIANA L. HACKETT	350-18	127.84±
G	LEWIN FRANKLIN & PAMELA WILLEN	350-27	30.05±
H	JASON A. THOMPSON ET AL.	350-30	4.00±
I	ECOSYSTEM INVESTMENT PARTNERS III, LLC	370-14	49.90±
J	ECOSYSTEM INVESTMENT PARTNERS III, LLC	350-31	1.25±
K	ECOSYSTEM INVESTMENT PARTNERS III, LLC	351-25-1	27.30±
L	ECOSYSTEM INVESTMENT PARTNERS III, LLC	351-25-4	1.03±
M	ECOSYSTEM INVESTMENT PARTNERS III, LLC	371-1	94.91±
N	ECOSYSTEM INVESTMENT PARTNERS III, LLC	371-7	162.57±



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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 DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. C. Victor Moyers
849

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE APRIL 9, 20 18
REVISED OCTOBER 9, 2018
OPERATORS WELL NO. GAMELLI HSOG 201
API WELL NO. 47 - 033 - 05922
STATE PA COUNTY WV PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8597P201R4.dwg
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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

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

LOCATION: ELEVATION EXISTING: 1,132.00' / PROPOSED: 1,140.50' WATERSHED BEARDS RUN
DISTRICT SIMPSON COUNTY HARRISON QUADRANGLE ROSEMONT 7.5'

SURFACE OWNER JAMES T. GAMELLI ET AL. ACREAGE 151.20±
ROYALTY OWNER JAMES T. GAMELLI ET AL. ACREAGE 151.20±

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION PERFORATE NEW FORMATION PLUG AND ABANDON CLEAN OUT AND REPLUG OTHER

PHYSICAL CHANGE IN WELL (SPECIFY) _____ TARGET FORMATION MARCELLUS
ESTIMATED DEPTH 22,198.1' TMD / 7,317' TVD

WELL OPERATOR ARSENAL RESOURCES DESIGNATED AGENT WILLIAM VEIGEL
ADDRESS 6031 WALLACE RD. EXT. SUITE 300 ADDRESS 65 PROFESSIONAL PLACE
WEXFORD, PA 15090 BRIDGEPORT, WV 26330

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AOR- Attachment "A"

33-05922 MOD

01/11/2019

Area of Review Report - **Gamelli HSOG** Pad, **201** Lateral, **Harrison** County, WV

Well Name	API Number	Operator Name / Address	Well Type	Latitude	Longitude	Total Depth	Perforated Formation(s)	Producing Zones not Perforated
MA Hafer et al 1	033-01223	Alliance Petroleum Corp	Existing	39.253442	-80.210755	4560	Speechley, Benson	NA
Courtney 2	033-02957	Petroleum Development Corp.	Permitted	Unknown	Unknown	NA	NA	NA
Costlow 1	033-01222	Lippizan Petroleum, Inc.	Existing	39.243557	-80.202118	4928	Fifth	NA
Post 2	033-01187	Rifle, Della R. or Charles I.	Existing	39.235723	-80.19871	4720	Fifth, Benson	NA
Patton-Steele 3	033-01196	Oil Discoveries, Inc.	Plugged - 1/13/1978	39.231515	-80.191444	4654	NA	NA
JJ Horner 2	033-01171	Alliance Petroleum Corp	Existing	39.225848	-80.196331	5194	Big Injun, Fifth, Benson	NA
J-527	033-02656	Braxton Oil & Gas Corp	Existing	39.221645	-80.193121	4775	Fourth Benson	NA

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AOR- Attachment "A"



Click or tap to enter a date.

Braxton Oil & Gas Corp.

Address

State

RE: Click or tap here to enter text.

Dear Sir/Madam,

Arsenal Resources has developed a Marcellus pad Gamelli HSOG, well 201, located in Harrison County, WV. As an owner or operator of conventional natural gas wells in this area, we are requesting your assistance in this matter.

Due to the apparent presence of unique geological conditions, the potential for communication between deep geologic zones exists in this area. This potential communication, via natural gas, water, or both, may occur between hydraulically fractured wells in the Marcellus formation (approximately 7,400 TVD) and existing conventional natural gas wells included in the attached well list for which you are believed to be the operator.

Arsenal Resources anticipates conducting hydraulic fracturing at the Gamelli HSOG pad 201 well during the Quarter of 2019. We have identified conventional natural gas wells operated by your company within 500' (lateral distance) of our newly planned wells. Plats for each well on this pad are attached.

We recommend that conventional well operators conduct the following activities before, during and after fracturing operations:

1. Inspect surface equipment, prior to fracturing, to establish integrity and establish well conditions.
2. Observe wells closely during and after fracturing and monitor for abnormal increases in water, gas, or pressure.
3. Inspect or install master valves rated to 3,000 psi or other necessary equipment for wellhead integrity.
4. Notify the OOG and Arsenal Resources if any changes in water, gas production, pressure or other anomalies are identified.

Please feel free to contact me at 724-940-1218 with any questions or comments. You may also contact the WV Office of Oil and Gas at 304-926-0499.

Sincerely,

Kelly Davis
Permitting Specialist

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AOR- Attachment "B"

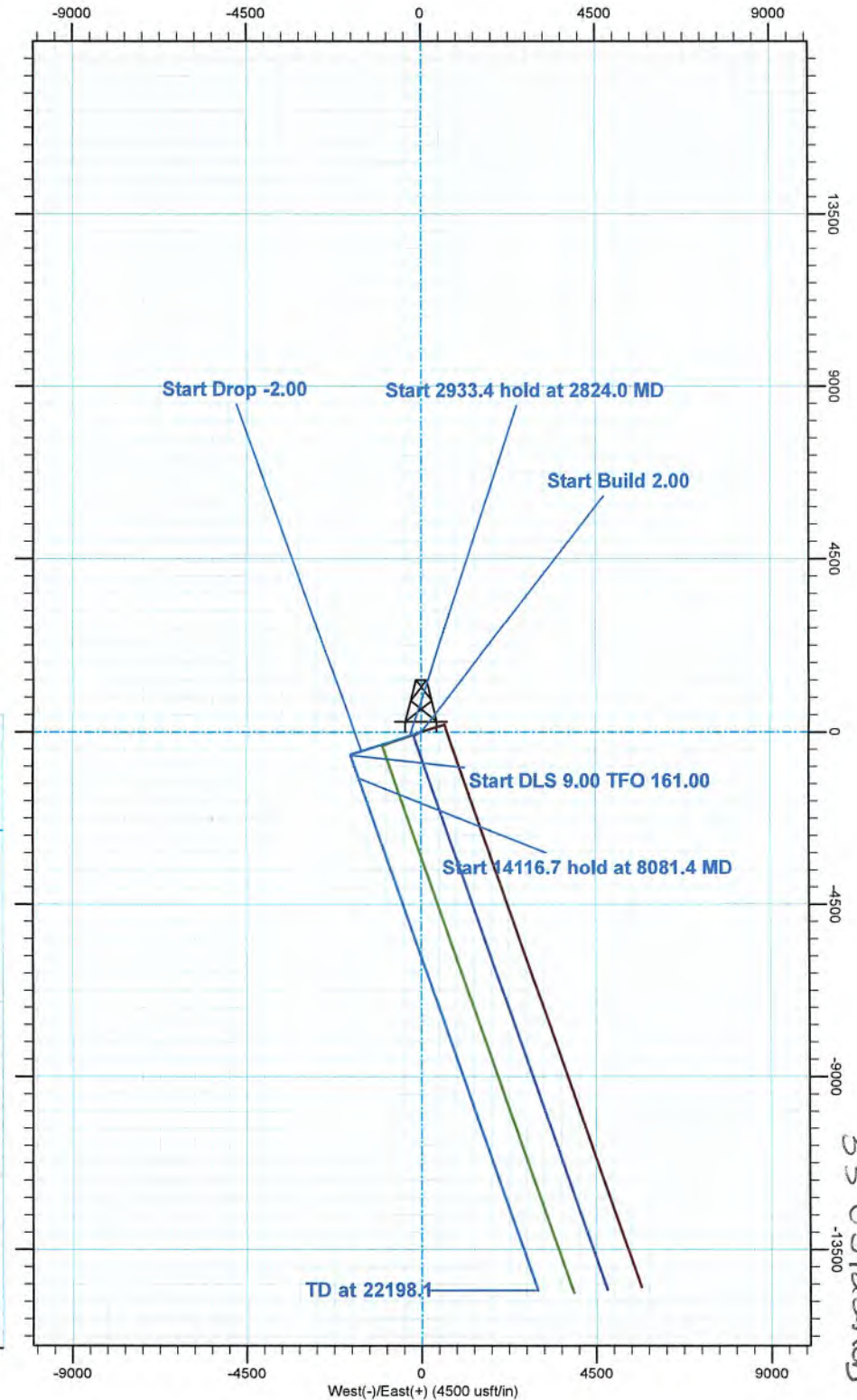
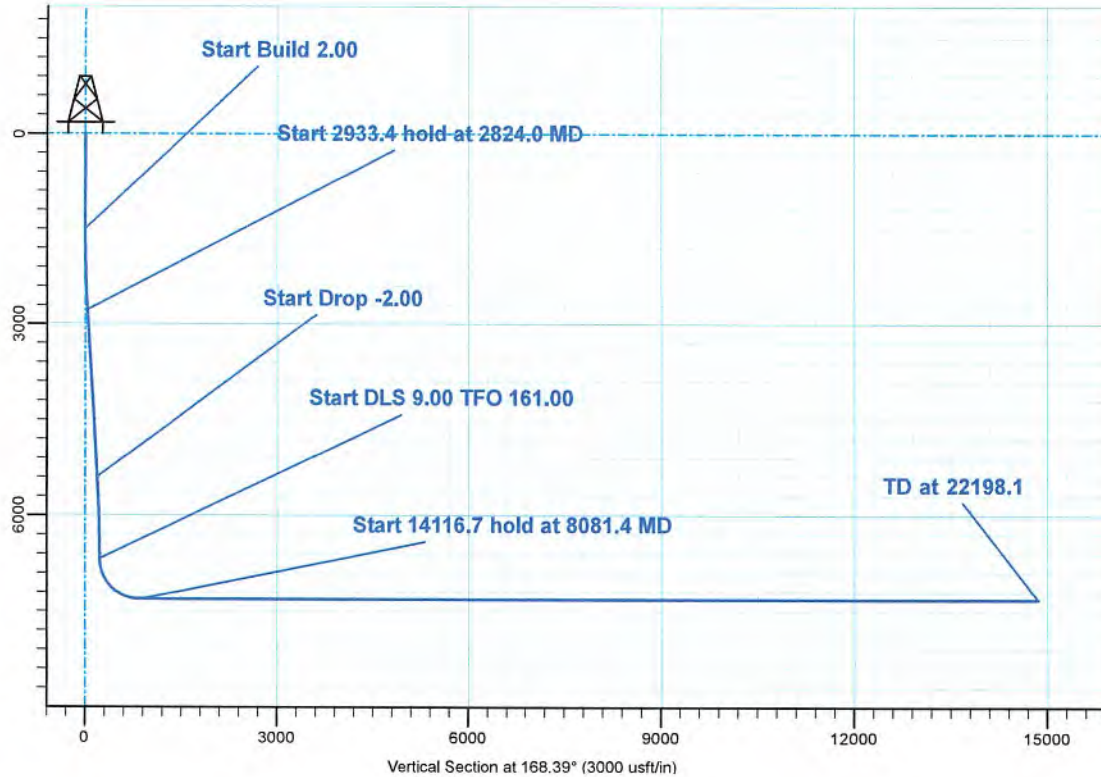


Arsenal Resources
 Harrison County, West Virginia NAD 83
 Gamelli PAD
 Gamelli #201
 Design #3
 Original Well Elev

ANNOTATIONS

MD	Inc	Azi	TVD	+N-S	+E-W	VSed	Departure	Annotation
1500.0	0.00	0.00	1500.0	0.0	0.0	0.0	0.0	Start Build 2.00
2824.0	26.48	251.61	2777.4	-94.8	-285.2	35.4	300.5	Start 2933.4 hold at 2824.0 MD
5757.4	26.48	251.61	5403.0	-507.4	-1526.4	189.7	1608.5	Start Drop -2.00
7081.4	0.00	360.00	6680.4	-602.2	-1811.6	225.1	1909.0	Start DLS 9.00 TFO 161.00
8081.4	90.00	161.00	7317.0	-1204.1	-1604.3	856.5	2545.7	Start 14116.7 hold at 8081.4 MD
22198.1	90.00	161.00	7317.0-14552.0	2990.9	14856.2	16662.4		TD at 22198.1

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33-05922000

33-05922 MOD
01/11/2019



Arsenal Resources

Harrison County, West Virginia NAD 83

Gamelli PAD

Gamelli #201

Wellbore #1

Plan: Design #3

QES Well Planning Report

26 June, 2018

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Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gamelli #201
Company:	Arsenal Resources	TVD Reference:	WELL @ 1168.0usft (Original Well Elev)
Project:	Harrison County, West Virginia NAD 83	MD Reference:	WELL @ 1168.0usft (Original Well Elev)
Site:	Gamelli PAD	North Reference:	Grid
Well:	Gamelli #201	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

Project	Harrison County, West Virginia NAD 83		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	West Virginia Northern Zone		

Site	Gamelli PAD				
Site Position:		Northing:	277,132.53 usft	Latitude:	39° 15' 31.389 N
From:	Map	Easting:	1,768,505.80 usft	Longitude:	80° 12' 22.703 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.45 °

Well	Gamelli #201					
Well Position	+N/-S	950.8 usft	Northing:	278,083.35 usft	Latitude:	39° 15' 40.831 N
	+E/-W	571.1 usft	Easting:	1,769,076.91 usft	Longitude:	80° 12' 15.538 W
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	1,141.0 usft

Wellbore	Wellbore #1				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	9/20/2017	-8.93	66.45	51,818.55019214

Design	Design #3				
---------------	-----------	--	--	--	--

Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	0.0	

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	168.39

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,824.0	26.48	251.61	2,777.4	-94.8	-285.2	2.00	2.00	0.00	251.61	
5,757.4	26.48	251.61	5,403.0	-507.4	-1,526.4	0.00	0.00	0.00	0.00	
7,081.4	0.00	360.00	6,680.4	-602.2	-1,811.6	2.00	-2.00	0.00	180.00	VP Gamelli #201 D:
8,081.4	90.00	161.00	7,317.0	-1,204.1	-1,604.3	9.00	9.00	16.10	161.00	
22,198.1	90.00	161.00	7,317.0	-14,552.0	2,990.9	0.00	0.00	0.00	0.00	PBHL Gamelli #201

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Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gamelli #201
Company:	Arsenal Resources	TVD Reference:	WELL @ 1168.0usft (Original Well Elev)
Project:	Harrison County, West Virginia NAD 83	MD Reference:	WELL @ 1168.0usft (Original Well Elev)
Site:	Gamelli PAD	North Reference:	Grid
Well:	Gamelli #201	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
Start Build 2.00									
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	2.00	251.61	1,600.0	-0.6	-1.7	0.2	2.00	2.00	0.00
1,700.0	4.00	251.61	1,699.8	-2.2	-6.6	0.8	2.00	2.00	0.00
1,800.0	6.00	251.61	1,799.5	-5.0	-14.9	1.9	2.00	2.00	0.00
1,900.0	8.00	251.61	1,898.7	-8.8	-26.5	3.3	2.00	2.00	0.00
2,000.0	10.00	251.61	1,997.5	-13.7	-41.3	5.1	2.00	2.00	0.00
2,100.0	12.00	251.61	2,095.6	-19.7	-59.4	7.4	2.00	2.00	0.00
2,200.0	14.00	251.61	2,193.1	-26.8	-80.8	10.0	2.00	2.00	0.00
2,300.0	16.00	251.61	2,289.6	-35.0	-105.3	13.1	2.00	2.00	0.00
2,400.0	18.00	251.61	2,385.3	-44.2	-133.1	16.5	2.00	2.00	0.00
2,500.0	20.00	251.61	2,479.8	-54.5	-163.9	20.4	2.00	2.00	0.00
2,600.0	22.00	251.61	2,573.2	-65.8	-198.0	24.6	2.00	2.00	0.00
2,700.0	24.00	251.61	2,665.2	-78.1	-235.0	29.2	2.00	2.00	0.00
2,800.0	26.00	251.61	2,755.8	-91.5	-275.1	34.2	2.00	2.00	0.00
Start 2933.4 hold at 2824.0 MD									
2,824.0	26.48	251.61	2,777.4	-94.8	-285.2	35.4	2.00	2.00	0.00
2,900.0	26.48	251.61	2,845.4	-105.5	-317.4	39.4	0.00	0.00	0.00
3,000.0	26.48	251.61	2,934.9	-119.6	-359.7	44.7	0.00	0.00	0.00
3,100.0	26.48	251.61	3,024.4	-133.6	-402.0	50.0	0.00	0.00	0.00
3,200.0	26.48	251.61	3,113.9	-147.7	-444.3	55.2	0.00	0.00	0.00
3,300.0	26.48	251.61	3,203.4	-161.8	-486.6	60.5	0.00	0.00	0.00
3,400.0	26.48	251.61	3,292.9	-175.8	-528.9	65.7	0.00	0.00	0.00
3,500.0	26.48	251.61	3,382.5	-189.9	-571.2	71.0	0.00	0.00	0.00
3,600.0	26.48	251.61	3,472.0	-203.9	-613.5	76.2	0.00	0.00	0.00
3,700.0	26.48	251.61	3,561.5	-218.0	-655.9	81.5	0.00	0.00	0.00
3,800.0	26.48	251.61	3,651.0	-232.1	-698.2	86.8	0.00	0.00	0.00
3,900.0	26.48	251.61	3,740.5	-246.1	-740.5	92.0	0.00	0.00	0.00
4,000.0	26.48	251.61	3,830.0	-260.2	-782.8	97.3	0.00	0.00	0.00
4,100.0	26.48	251.61	3,919.5	-274.3	-825.1	102.5	0.00	0.00	0.00
4,200.0	26.48	251.61	4,009.0	-288.3	-867.4	107.8	0.00	0.00	0.00
4,300.0	26.48	251.61	4,098.5	-302.4	-909.7	113.1	0.00	0.00	0.00
4,400.0	26.48	251.61	4,188.0	-316.5	-952.0	118.3	0.00	0.00	0.00
4,500.0	26.48	251.61	4,277.5	-330.5	-994.3	123.6	0.00	0.00	0.00
4,600.0	26.48	251.61	4,367.1	-344.6	-1,036.7	128.8	0.00	0.00	0.00
4,700.0	26.48	251.61	4,456.6	-358.7	-1,079.0	134.1	0.00	0.00	0.00
4,800.0	26.48	251.61	4,546.1	-372.7	-1,121.3	139.3	0.00	0.00	0.00
4,900.0	26.48	251.61	4,635.6	-386.8	-1,163.6	144.6	0.00	0.00	0.00
5,000.0	26.48	251.61	4,725.1	-400.8	-1,205.9	149.9	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gamelli #201
Company:	Arsenal Resources	TVD Reference:	WELL @ 1168.0usft (Original Well Elev)
Project:	Harrison County, West Virginia NAD 83	MD Reference:	WELL @ 1168.0usft (Original Well Elev)
Site:	Gamelli PAD	North Reference:	Grid
Well:	Gamelli #201	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,100.0	26.48	251.61	4,814.6	-414.9	-1,248.2	155.1	0.00	0.00	0.00
5,200.0	26.48	251.61	4,904.1	-429.0	-1,290.5	160.4	0.00	0.00	0.00
5,300.0	26.48	251.61	4,993.6	-443.0	-1,332.8	165.6	0.00	0.00	0.00
5,400.0	26.48	251.61	5,083.1	-457.1	-1,375.1	170.9	0.00	0.00	0.00
5,500.0	26.48	251.61	5,172.6	-471.2	-1,417.5	176.2	0.00	0.00	0.00
5,600.0	26.48	251.61	5,262.1	-485.2	-1,459.8	181.4	0.00	0.00	0.00
5,700.0	26.48	251.61	5,351.7	-499.3	-1,502.1	186.7	0.00	0.00	0.00
Start Drop -2.00									
5,757.4	26.48	251.61	5,403.0	-507.4	-1,526.4	189.7	0.00	0.00	0.00
5,800.0	25.63	251.61	5,441.3	-513.3	-1,544.1	191.9	2.00	-2.00	0.00
5,900.0	23.63	251.61	5,532.2	-526.4	-1,583.7	196.8	2.00	-2.00	0.00
6,000.0	21.63	251.61	5,624.5	-538.6	-1,620.2	201.3	2.00	-2.00	0.00
6,100.0	19.63	251.61	5,718.1	-549.7	-1,653.6	205.5	2.00	-2.00	0.00
6,200.0	17.63	251.61	5,812.8	-559.7	-1,683.9	209.3	2.00	-2.00	0.00
6,300.0	15.63	251.61	5,908.7	-568.8	-1,711.1	212.6	2.00	-2.00	0.00
6,400.0	13.63	251.61	6,005.4	-576.7	-1,735.0	215.6	2.00	-2.00	0.00
6,500.0	11.63	251.61	6,103.0	-583.6	-1,755.8	218.2	2.00	-2.00	0.00
6,600.0	9.63	251.61	6,201.3	-589.4	-1,773.3	220.4	2.00	-2.00	0.00
6,700.0	7.63	251.61	6,300.1	-594.2	-1,787.5	222.1	2.00	-2.00	0.00
6,800.0	5.63	251.61	6,399.5	-597.8	-1,798.5	223.5	2.00	-2.00	0.00
6,900.0	3.63	251.61	6,499.1	-600.4	-1,806.1	224.5	2.00	-2.00	0.00
7,000.0	1.63	251.61	6,599.0	-601.8	-1,810.5	225.0	2.00	-2.00	0.00
Start DLS 9.00 TFO 161.00									
7,081.4	0.00	360.00	6,680.4	-602.2	-1,811.6	225.1	2.00	-2.00	0.00
7,100.0	1.67	161.00	6,699.0	-602.4	-1,811.5	225.4	9.00	9.00	0.00
7,150.0	6.17	161.00	6,748.9	-605.7	-1,810.4	228.8	9.00	9.00	0.00
7,200.0	10.67	161.00	6,798.3	-612.6	-1,808.0	236.1	9.00	9.00	0.00
7,250.0	15.17	161.00	6,847.0	-623.2	-1,804.3	247.1	9.00	9.00	0.00
7,300.0	19.67	161.00	6,894.7	-637.3	-1,799.5	262.0	9.00	9.00	0.00
7,350.0	24.17	161.00	6,941.1	-655.0	-1,793.4	280.5	9.00	9.00	0.00
7,400.0	28.67	161.00	6,985.9	-676.0	-1,786.2	302.6	9.00	9.00	0.00
7,450.0	33.17	161.00	7,028.7	-700.3	-1,777.8	328.0	9.00	9.00	0.00
7,500.0	37.67	161.00	7,069.5	-727.7	-1,768.4	356.8	9.00	9.00	0.00
7,550.0	42.17	161.00	7,107.8	-758.0	-1,757.9	388.6	9.00	9.00	0.00
7,600.0	46.67	161.00	7,143.5	-791.1	-1,746.5	423.3	9.00	9.00	0.00
7,650.0	51.17	161.00	7,176.4	-826.7	-1,734.3	460.7	9.00	9.00	0.00
7,700.0	55.67	161.00	7,206.1	-864.7	-1,721.2	500.5	9.00	9.00	0.00
7,750.0	60.17	161.00	7,232.7	-904.7	-1,707.4	542.5	9.00	9.00	0.00
7,800.0	64.67	161.00	7,255.8	-946.6	-1,693.0	586.4	9.00	9.00	0.00
7,850.0	69.17	161.00	7,275.4	-990.1	-1,678.0	632.0	9.00	9.00	0.00
7,900.0	73.67	161.00	7,291.3	-1,034.9	-1,662.6	679.0	9.00	9.00	0.00
7,950.0	78.17	161.00	7,303.5	-1,080.8	-1,646.8	727.1	9.00	9.00	0.00
8,000.0	82.67	161.00	7,311.8	-1,127.4	-1,630.8	776.0	9.00	9.00	0.00
8,050.0	87.17	161.00	7,316.2	-1,174.4	-1,614.6	825.4	9.00	9.00	0.00
Start 14116.7 hold at 8081.4 MD									
8,081.4	90.00	161.00	7,317.0	-1,204.1	-1,604.3	856.5	9.00	9.00	0.00
8,100.0	90.00	161.00	7,317.0	-1,221.7	-1,598.3	874.9	0.00	0.00	0.00
8,200.0	90.00	161.00	7,317.0	-1,316.3	-1,565.7	974.1	0.00	0.00	0.00
8,300.0	90.00	161.00	7,317.0	-1,410.8	-1,533.2	1,073.3	0.00	0.00	0.00
8,400.0	90.00	161.00	7,317.0	-1,505.4	-1,500.6	1,172.4	0.00	0.00	0.00
8,500.0	90.00	161.00	7,317.0	-1,599.9	-1,468.1	1,271.6	0.00	0.00	0.00
8,600.0	90.00	161.00	7,317.0	-1,694.5	-1,435.5	1,370.8	0.00	0.00	0.00
8,700.0	90.00	161.00	7,317.0	-1,789.0	-1,403.0	1,470.0	0.00	0.00	0.00

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 Office of Oil and Gas

OCT 16 2018

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gamelli #201
Company:	Arsenal Resources	TVD Reference:	WELL @ 1168.0usft (Original Well Elev)
Project:	Harrison County, West Virginia NAD 83	MD Reference:	WELL @ 1168.0usft (Original Well Elev)
Site:	Gamelli PAD	North Reference:	Grid
Well:	Gamelli #201	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,800.0	90.00	161.00	7,317.0	-1,883.6	-1,370.4	1,569.1	0.00	0.00	0.00
8,900.0	90.00	161.00	7,317.0	-1,978.1	-1,337.9	1,668.3	0.00	0.00	0.00
9,000.0	90.00	161.00	7,317.0	-2,072.7	-1,305.3	1,767.5	0.00	0.00	0.00
9,100.0	90.00	161.00	7,317.0	-2,167.2	-1,272.8	1,866.6	0.00	0.00	0.00
9,200.0	90.00	161.00	7,317.0	-2,261.8	-1,240.2	1,965.8	0.00	0.00	0.00
9,300.0	90.00	161.00	7,317.0	-2,356.4	-1,207.7	2,065.0	0.00	0.00	0.00
9,400.0	90.00	161.00	7,317.0	-2,450.9	-1,175.1	2,164.1	0.00	0.00	0.00
9,500.0	90.00	161.00	7,317.0	-2,545.5	-1,142.6	2,263.3	0.00	0.00	0.00
9,600.0	90.00	161.00	7,317.0	-2,640.0	-1,110.0	2,362.5	0.00	0.00	0.00
9,700.0	90.00	161.00	7,317.0	-2,734.6	-1,077.5	2,461.7	0.00	0.00	0.00
9,800.0	90.00	161.00	7,317.0	-2,829.1	-1,044.9	2,560.8	0.00	0.00	0.00
9,900.0	90.00	161.00	7,317.0	-2,923.7	-1,012.4	2,660.0	0.00	0.00	0.00
10,000.0	90.00	161.00	7,317.0	-3,018.2	-979.8	2,759.2	0.00	0.00	0.00
10,100.0	90.00	161.00	7,317.0	-3,112.8	-947.2	2,858.3	0.00	0.00	0.00
10,200.0	90.00	161.00	7,317.0	-3,207.3	-914.7	2,957.5	0.00	0.00	0.00
10,300.0	90.00	161.00	7,317.0	-3,301.9	-882.1	3,056.7	0.00	0.00	0.00
10,400.0	90.00	161.00	7,317.0	-3,396.4	-849.6	3,155.9	0.00	0.00	0.00
10,500.0	90.00	161.00	7,317.0	-3,491.0	-817.0	3,255.0	0.00	0.00	0.00
10,600.0	90.00	161.00	7,317.0	-3,585.6	-784.5	3,354.2	0.00	0.00	0.00
10,700.0	90.00	161.00	7,317.0	-3,680.1	-751.9	3,453.4	0.00	0.00	0.00
10,800.0	90.00	161.00	7,317.0	-3,774.7	-719.4	3,552.5	0.00	0.00	0.00
10,900.0	90.00	161.00	7,317.0	-3,869.2	-686.8	3,651.7	0.00	0.00	0.00
11,000.0	90.00	161.00	7,317.0	-3,963.8	-654.3	3,750.9	0.00	0.00	0.00
11,100.0	90.00	161.00	7,317.0	-4,058.3	-621.7	3,850.1	0.00	0.00	0.00
11,200.0	90.00	161.00	7,317.0	-4,152.9	-589.2	3,949.2	0.00	0.00	0.00
11,300.0	90.00	161.00	7,317.0	-4,247.4	-556.6	4,048.4	0.00	0.00	0.00
11,400.0	90.00	161.00	7,317.0	-4,342.0	-524.1	4,147.6	0.00	0.00	0.00
11,500.0	90.00	161.00	7,317.0	-4,436.5	-491.5	4,246.7	0.00	0.00	0.00
11,600.0	90.00	161.00	7,317.0	-4,531.1	-459.0	4,345.9	0.00	0.00	0.00
11,700.0	90.00	161.00	7,317.0	-4,625.6	-426.4	4,445.1	0.00	0.00	0.00
11,800.0	90.00	161.00	7,317.0	-4,720.2	-393.9	4,544.3	0.00	0.00	0.00
11,900.0	90.00	161.00	7,317.0	-4,814.7	-361.3	4,643.4	0.00	0.00	0.00
12,000.0	90.00	161.00	7,317.0	-4,909.3	-328.8	4,742.6	0.00	0.00	0.00
12,100.0	90.00	161.00	7,317.0	-5,003.9	-296.2	4,841.8	0.00	0.00	0.00
12,200.0	90.00	161.00	7,317.0	-5,098.4	-263.7	4,940.9	0.00	0.00	0.00
12,300.0	90.00	161.00	7,317.0	-5,193.0	-231.1	5,040.1	0.00	0.00	0.00
12,400.0	90.00	161.00	7,317.0	-5,287.5	-198.6	5,139.3	0.00	0.00	0.00
12,500.0	90.00	161.00	7,317.0	-5,382.1	-166.0	5,238.4	0.00	0.00	0.00
12,600.0	90.00	161.00	7,317.0	-5,476.6	-133.5	5,337.6	0.00	0.00	0.00
12,700.0	90.00	161.00	7,317.0	-5,571.2	-100.9	5,436.8	0.00	0.00	0.00
12,800.0	90.00	161.00	7,317.0	-5,665.7	-68.4	5,536.0	0.00	0.00	0.00
12,900.0	90.00	161.00	7,317.0	-5,760.3	-35.8	5,635.1	0.00	0.00	0.00
13,000.0	90.00	161.00	7,317.0	-5,854.8	-3.2	5,734.3	0.00	0.00	0.00
13,100.0	90.00	161.00	7,317.0	-5,949.4	29.3	5,833.5	0.00	0.00	0.00
13,200.0	90.00	161.00	7,317.0	-6,043.9	61.9	5,932.6	0.00	0.00	0.00
13,300.0	90.00	161.00	7,317.0	-6,138.5	94.4	6,031.8	0.00	0.00	0.00
13,400.0	90.00	161.00	7,317.0	-6,233.1	127.0	6,131.0	0.00	0.00	0.00
13,500.0	90.00	161.00	7,317.0	-6,327.6	159.5	6,230.2	0.00	0.00	0.00
13,600.0	90.00	161.00	7,317.0	-6,422.2	192.1	6,329.3	0.00	0.00	0.00
13,700.0	90.00	161.00	7,317.0	-6,516.7	224.6	6,428.5	0.00	0.00	0.00
13,800.0	90.00	161.00	7,317.0	-6,611.3	257.2	6,527.7	0.00	0.00	0.00
13,900.0	90.00	161.00	7,317.0	-6,705.8	289.7	6,626.8	0.00	0.00	0.00
14,000.0	90.00	161.00	7,317.0	-6,800.4	322.3	6,726.0	0.00	0.00	0.00
14,100.0	90.00	161.00	7,317.0	-6,894.9	354.8	6,825.2	0.00	0.00	0.00

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Company:	Arsenal Resources	TVD Reference:	WELL @ 1168.0usft (Original Well Elev)
Project:	Harrison County, West Virginia NAD 83	MD Reference:	WELL @ 1168.0usft (Original Well Elev)
Site:	Gamelli PAD	North Reference:	Grid
Well:	Gamelli #201	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
14,200.0	90.00	161.00	7,317.0	-6,989.5	387.4	6,924.4	0.00	0.00	0.00
14,300.0	90.00	161.00	7,317.0	-7,084.0	419.9	7,023.5	0.00	0.00	0.00
14,400.0	90.00	161.00	7,317.0	-7,178.6	452.5	7,122.7	0.00	0.00	0.00
14,500.0	90.00	161.00	7,317.0	-7,273.1	485.0	7,221.9	0.00	0.00	0.00
14,600.0	90.00	161.00	7,317.0	-7,367.7	517.6	7,321.0	0.00	0.00	0.00
14,700.0	90.00	161.00	7,317.0	-7,462.2	550.1	7,420.2	0.00	0.00	0.00
14,800.0	90.00	161.00	7,317.0	-7,556.8	582.7	7,519.4	0.00	0.00	0.00
14,900.0	90.00	161.00	7,317.0	-7,651.4	615.2	7,618.6	0.00	0.00	0.00
15,000.0	90.00	161.00	7,317.0	-7,745.9	647.8	7,717.7	0.00	0.00	0.00
15,100.0	90.00	161.00	7,317.0	-7,840.5	680.3	7,816.9	0.00	0.00	0.00
15,200.0	90.00	161.00	7,317.0	-7,935.0	712.9	7,916.1	0.00	0.00	0.00
15,300.0	90.00	161.00	7,317.0	-8,029.6	745.4	8,015.2	0.00	0.00	0.00
15,400.0	90.00	161.00	7,317.0	-8,124.1	778.0	8,114.4	0.00	0.00	0.00
15,500.0	90.00	161.00	7,317.0	-8,218.7	810.5	8,213.6	0.00	0.00	0.00
15,600.0	90.00	161.00	7,317.0	-8,313.2	843.1	8,312.8	0.00	0.00	0.00
15,700.0	90.00	161.00	7,317.0	-8,407.8	875.7	8,411.9	0.00	0.00	0.00
15,800.0	90.00	161.00	7,317.0	-8,502.3	908.2	8,511.1	0.00	0.00	0.00
15,900.0	90.00	161.00	7,317.0	-8,596.9	940.8	8,610.3	0.00	0.00	0.00
16,000.0	90.00	161.00	7,317.0	-8,691.4	973.3	8,709.4	0.00	0.00	0.00
16,100.0	90.00	161.00	7,317.0	-8,786.0	1,005.9	8,808.6	0.00	0.00	0.00
16,200.0	90.00	161.00	7,317.0	-8,880.6	1,038.4	8,907.8	0.00	0.00	0.00
16,300.0	90.00	161.00	7,317.0	-8,975.1	1,071.0	9,006.9	0.00	0.00	0.00
16,400.0	90.00	161.00	7,317.0	-9,069.7	1,103.5	9,106.1	0.00	0.00	0.00
16,500.0	90.00	161.00	7,317.0	-9,164.2	1,136.1	9,205.3	0.00	0.00	0.00
16,600.0	90.00	161.00	7,317.0	-9,258.8	1,168.6	9,304.5	0.00	0.00	0.00
16,700.0	90.00	161.00	7,317.0	-9,353.3	1,201.2	9,403.6	0.00	0.00	0.00
16,800.0	90.00	161.00	7,317.0	-9,447.9	1,233.7	9,502.8	0.00	0.00	0.00
16,900.0	90.00	161.00	7,317.0	-9,542.4	1,266.3	9,602.0	0.00	0.00	0.00
17,000.0	90.00	161.00	7,317.0	-9,637.0	1,298.8	9,701.1	0.00	0.00	0.00
17,100.0	90.00	161.00	7,317.0	-9,731.5	1,331.4	9,800.3	0.00	0.00	0.00
17,200.0	90.00	161.00	7,317.0	-9,826.1	1,363.9	9,899.5	0.00	0.00	0.00
17,300.0	90.00	161.00	7,317.0	-9,920.6	1,396.5	9,998.7	0.00	0.00	0.00
17,400.0	90.00	161.00	7,317.0	-10,015.2	1,429.0	10,097.8	0.00	0.00	0.00
17,500.0	90.00	161.00	7,317.0	-10,109.7	1,461.6	10,197.0	0.00	0.00	0.00
17,600.0	90.00	161.00	7,317.0	-10,204.3	1,494.1	10,296.2	0.00	0.00	0.00
17,700.0	90.00	161.00	7,317.0	-10,298.9	1,526.7	10,395.3	0.00	0.00	0.00
17,800.0	90.00	161.00	7,317.0	-10,393.4	1,559.2	10,494.5	0.00	0.00	0.00
17,900.0	90.00	161.00	7,317.0	-10,488.0	1,591.8	10,593.7	0.00	0.00	0.00
18,000.0	90.00	161.00	7,317.0	-10,582.5	1,624.3	10,692.9	0.00	0.00	0.00
18,100.0	90.00	161.00	7,317.0	-10,677.1	1,656.9	10,792.0	0.00	0.00	0.00
18,200.0	90.00	161.00	7,317.0	-10,771.6	1,689.4	10,891.2	0.00	0.00	0.00
18,300.0	90.00	161.00	7,317.0	-10,866.2	1,722.0	10,990.4	0.00	0.00	0.00
18,400.0	90.00	161.00	7,317.0	-10,960.7	1,754.6	11,089.5	0.00	0.00	0.00
18,500.0	90.00	161.00	7,317.0	-11,055.3	1,787.1	11,188.7	0.00	0.00	0.00
18,600.0	90.00	161.00	7,317.0	-11,149.8	1,819.7	11,287.9	0.00	0.00	0.00
18,700.0	90.00	161.00	7,317.0	-11,244.4	1,852.2	11,387.1	0.00	0.00	0.00
18,800.0	90.00	161.00	7,317.0	-11,338.9	1,884.8	11,486.2	0.00	0.00	0.00
18,900.0	90.00	161.00	7,317.0	-11,433.5	1,917.3	11,585.4	0.00	0.00	0.00
19,000.0	90.00	161.00	7,317.0	-11,528.1	1,949.9	11,684.6	0.00	0.00	0.00
19,100.0	90.00	161.00	7,317.0	-11,622.6	1,982.4	11,783.7	0.00	0.00	0.00
19,200.0	90.00	161.00	7,317.0	-11,717.2	2,015.0	11,882.9	0.00	0.00	0.00
19,300.0	90.00	161.00	7,317.0	-11,811.7	2,047.5	11,982.1	0.00	0.00	0.00
19,400.0	90.00	161.00	7,317.0	-11,906.3	2,080.1	12,081.3	0.00	0.00	0.00
19,500.0	90.00	161.00	7,317.0	-12,000.8	2,112.6	12,180.5	0.00	0.00	0.00

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Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Gamelli #201
Company:	Arsenal Resources	TVD Reference:	WELL @ 1168.0usft (Original Well Elev)
Project:	Harrison County, West Virginia NAD 83	MD Reference:	WELL @ 1168.0usft (Original Well Elev)
Site:	Gamelli PAD	North Reference:	Grid
Well:	Gamelli #201	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
19,600.0	90.00	161.00	7,317.0	-12,095.4	2,145.2	12,279.6	0.00	0.00	0.00
19,700.0	90.00	161.00	7,317.0	-12,189.9	2,177.7	12,378.8	0.00	0.00	0.00
19,800.0	90.00	161.00	7,317.0	-12,284.5	2,210.3	12,477.9	0.00	0.00	0.00
19,900.0	90.00	161.00	7,317.0	-12,379.0	2,242.8	12,577.1	0.00	0.00	0.00
20,000.0	90.00	161.00	7,317.0	-12,473.6	2,275.4	12,676.3	0.00	0.00	0.00
20,100.0	90.00	161.00	7,317.0	-12,568.1	2,307.9	12,775.4	0.00	0.00	0.00
20,200.0	90.00	161.00	7,317.0	-12,662.7	2,340.5	12,874.6	0.00	0.00	0.00
20,300.0	90.00	161.00	7,317.0	-12,757.2	2,373.0	12,973.8	0.00	0.00	0.00
20,400.0	90.00	161.00	7,317.0	-12,851.8	2,405.6	13,073.0	0.00	0.00	0.00
20,500.0	90.00	161.00	7,317.0	-12,946.4	2,438.1	13,172.1	0.00	0.00	0.00
20,600.0	90.00	161.00	7,317.0	-13,040.9	2,470.7	13,271.3	0.00	0.00	0.00
20,700.0	90.00	161.00	7,317.0	-13,135.5	2,503.2	13,370.5	0.00	0.00	0.00
20,800.0	90.00	161.00	7,317.0	-13,230.0	2,535.8	13,469.6	0.00	0.00	0.00
20,900.0	90.00	161.00	7,317.0	-13,324.6	2,568.3	13,568.8	0.00	0.00	0.00
21,000.0	90.00	161.00	7,317.0	-13,419.1	2,600.9	13,668.0	0.00	0.00	0.00
21,100.0	90.00	161.00	7,317.0	-13,513.7	2,633.4	13,767.2	0.00	0.00	0.00
21,200.0	90.00	161.00	7,317.0	-13,608.2	2,666.0	13,866.3	0.00	0.00	0.00
21,300.0	90.00	161.00	7,317.0	-13,702.8	2,698.6	13,965.5	0.00	0.00	0.00
21,400.0	90.00	161.00	7,317.0	-13,797.3	2,731.1	14,064.7	0.00	0.00	0.00
21,500.0	90.00	161.00	7,317.0	-13,891.9	2,763.7	14,163.8	0.00	0.00	0.00
21,600.0	90.00	161.00	7,317.0	-13,986.4	2,796.2	14,263.0	0.00	0.00	0.00
21,700.0	90.00	161.00	7,317.0	-14,081.0	2,828.8	14,362.2	0.00	0.00	0.00
21,800.0	90.00	161.00	7,317.0	-14,175.6	2,861.3	14,461.4	0.00	0.00	0.00
21,900.0	90.00	161.00	7,317.0	-14,270.1	2,893.9	14,560.5	0.00	0.00	0.00
22,000.0	90.00	161.00	7,317.0	-14,364.7	2,926.4	14,659.7	0.00	0.00	0.00
22,100.0	90.00	161.00	7,317.0	-14,459.2	2,959.0	14,758.9	0.00	0.00	0.00
TD at 22198.1									
22,198.1	90.00	161.00	7,317.0	-14,552.0	2,990.9	14,856.2	0.00	0.00	0.00

Design Targets

Target Name	- hit/miss target	- Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL Gamelli #201 D			0.00	360.00	7,317.0	-14,552.0	2,990.9	263,531.36	1,772,067.82	39° 13' 17.233 N	80° 11' 36.084 W
- plan hits target center											
- Point											
LP Gamelli #201 D#3			0.00	0.00	7,317.0	-1,204.1	-1,604.3	276,879.22	1,767,472.57	39° 15' 28.805 N	80° 12' 35.814 W
- plan hits target center											
- Point											

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,500.0	1,500.0	0.0	0.0	Start Build 2.00
2,824.0	2,777.4	-94.8	-285.2	Start 2933.4 hold at 2824.0 MD
5,757.4	5,403.0	-507.4	-1,526.4	Start Drop -2.00
7,081.4	6,680.4	-602.2	-1,811.6	Start DLS 9.00 TFO 161.00
8,081.4	7,317.0	-1,204.1	-1,604.3	Start 14116.7 hold at 8081.4 MD
22,198.1	7,317.0	-14,552.0	2,990.9	TD at 22198.1

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SITE SAFETY PLAN

Gamelli HSOG #201 WELL PAD

SPW

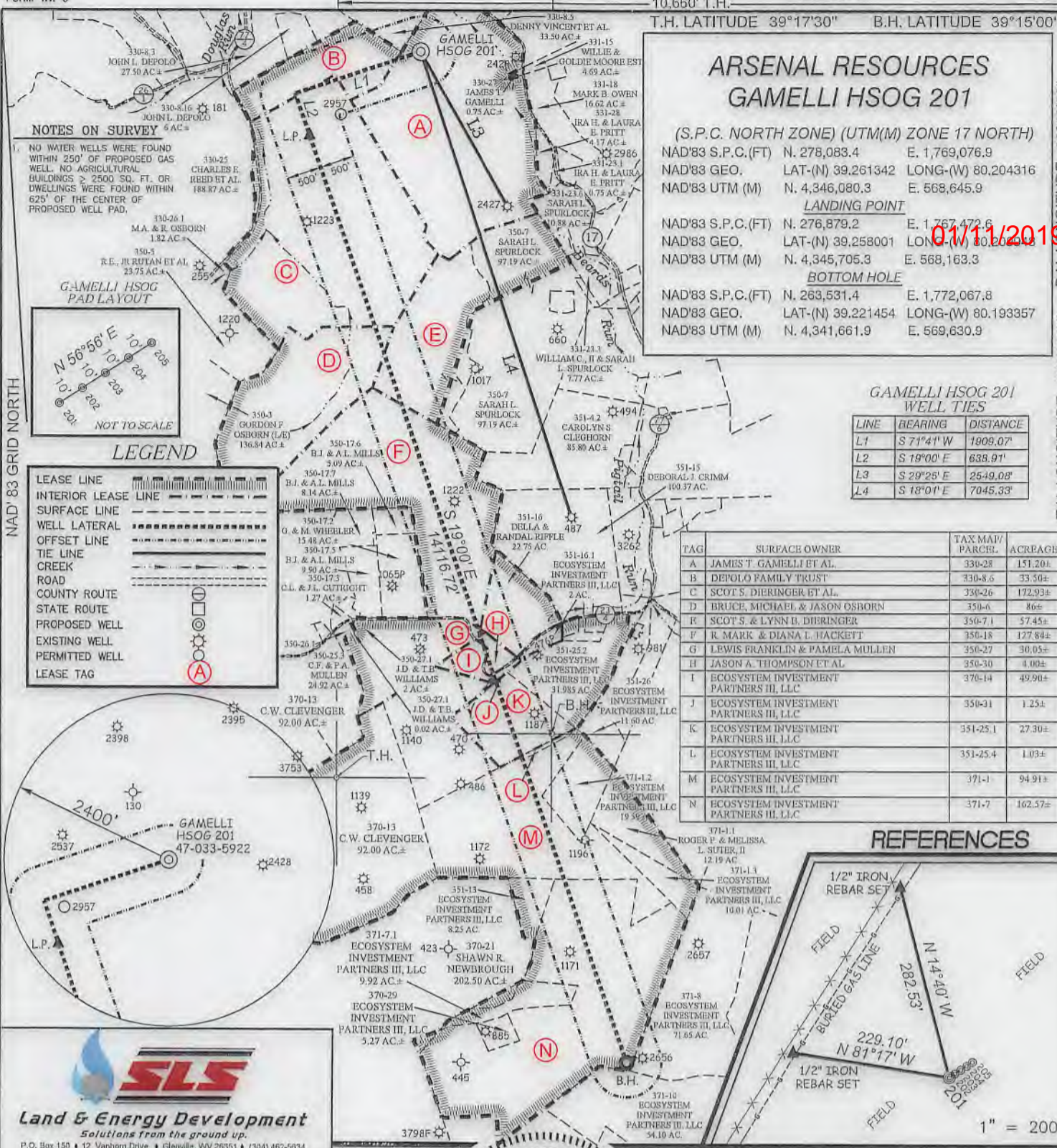
911 Address:

10/15/2018

4423 Green Valley Rd

Bridgeport, WV 26330

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ARSENAL RESOURCES GAMELLI HSOG 201

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD'83 S.P.C.(FT) N. 278,083.4 E. 1,769,076.9
 NAD'83 GEO. LAT-(N) 39.261342 LONG-(W) 80.204316
 NAD'83 UTM (M) N. 4,346,080.3 E. 568,645.9

LANDING POINT
 NAD'83 S.P.C.(FT) N. 276,879.2 E. 1,767,472.6
 NAD'83 GEO. LAT-(N) 39.258001 LONG-(W) 80.204316
 NAD'83 UTM (M) N. 4,345,705.3 E. 568,163.3

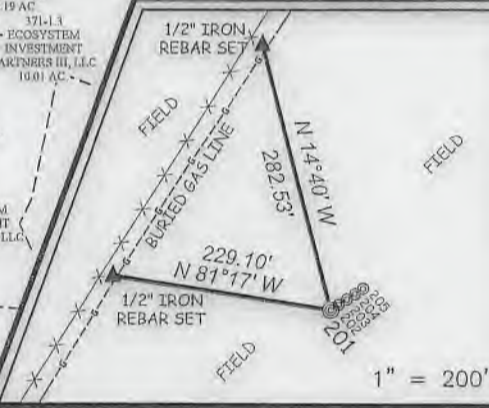
BOTTOM HOLE
 NAD'83 S.P.C.(FT) N. 263,531.4 E. 1,772,067.8
 NAD'83 GEO. LAT-(N) 39.221454 LONG-(W) 80.193357
 NAD'83 UTM (M) N. 4,341,661.9 E. 569,630.9

GAMELLI HSOG 201 WELL TIES

LINE	BEARING	DISTANCE
L1	S 71°41' W	1909.07'
L2	S 19°00' E	638.91'
L3	S 29°26' E	2549.08'
L4	S 18°01' E	7045.33'

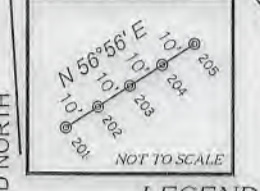
TAG	SURFACE OWNER	TAX MAP/PARCEL	ACREAGE
A	JAMES T. GAMELLI ET AL.	330-28	151.20±
B	DEPOLO FAMILY TRUST	330-8-6	33.50±
C	SCOT S. DIERINGER ET AL.	330-26	172.93±
D	BRUCE, MICHAEL & JASON OSBORN	350-6	86±
E	SCOT S. & LYNN B. DIERINGER	350-7-1	57.45±
F	R. MARK & DIANA L. HACKETT	350-18	127.84±
G	LEWIS FRANKLIN & PAMELA MULLEN	350-27	30.05±
H	JASON A. THOMPSON ET AL.	350-30	4.00±
I	ECOSYSTEM INVESTMENT PARTNERS III, LLC	370-14	49.90±
J	ECOSYSTEM INVESTMENT PARTNERS III, LLC	350-31	1.25±
K	ECOSYSTEM INVESTMENT PARTNERS III, LLC	351-25.1	27.30±
L	ECOSYSTEM INVESTMENT PARTNERS III, LLC	351-25.4	1.03±
M	ECOSYSTEM INVESTMENT PARTNERS III, LLC	371-1	94.91±
N	ECOSYSTEM INVESTMENT PARTNERS III, LLC	371-7	162.57±

REFERENCES



NOTES ON SURVEY

NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.

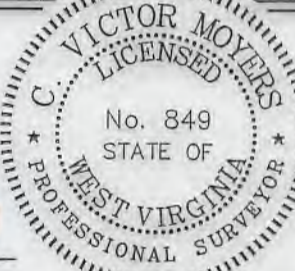


LEGEND

- LEASE LINE
- INTERIOR LEASE LINE
- SURFACE LINE
- WELL LATERAL
- OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- STATE ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- LEASE TAG



SLS
Land & Energy Development
Solutions from the ground up.
P.O. Box 150 • 12 Vanhorn Drive • Glenville, WV 26031 • (304) 462-5034
www.slsurveys.com



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 DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. 849 *C. Victor Moyers*

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
 DATE APRIL 9, 20 18
 REVISED OCTOBER 9, 2018
 OPERATORS WELL NO. GAMELLI HSOG 201
 API WELL NO. 47 - 033 - 05922 MOD
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8597P201R4.dwg
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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

WELL TYPE: OIL ___ GAS LIQUID WASTE IF "GAS" PRODUCTION STORAGE DEEP SHALLOW

LOCATION: ELEVATION EXISTING: 1,132.00' / PROPOSED: 1,140.50' WATERSHED BEARDS RUN
 DISTRICT SIMPSON COUNTY HARRISON QUADRANGLE ROSEMONT 7.5'

SURFACE OWNER JAMES T. GAMELLI ET AL. ACREAGE 151.20±
 ROYALTY OWNER JAMES T. GAMELLI ET AL. ACREAGE 151.20±

PROPOSED WORK: DRILL CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION ___ PLUG AND ABANDON ___ CLEAN OUT AND REPLUG ___ OTHER ___
 PHYSICAL CHANGE IN WELL (SPECIFY) TARGET FORMATION MARCELLUS ESTIMATED DEPTH 22,198.1' TMD / 7,317' TVD

WELL OPERATOR ARSENAL RESOURCES DESIGNATED AGENT WILLIAM VEIGEL
 ADDRESS 6031 WALLACE RD. EXT. SUITE 300 WEXFORD, PA 15090 ADDRESS 65 PROFESSIONAL PLACE BRIDGEPORT, WV 26330

COUNTY NAME PERMIT

33-05922

01/11/2019

WW-6A1
(5/13)

Operator's Well No. Gamelli HSOG 201

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
----------------------	-----------------------	-----------------------	---------	-----------

See Attached

**Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

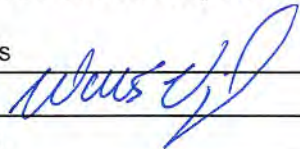
- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

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WV Department of
Environmental Protection

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: Arsenal Resources
 By: William Veigel 
 Its: Designated Agent

Attachment to WW-6A1, Gamelli 201

Letter Designation/Number Designation on Plat	Grantor, Lessor, Assignor, etc.	Grantee, Lessee, Assignee, etc.	Royalty	Book/Page	Acreage
A (00007225) ✓	Edwin L. King	Mar Key, LLC	15.00%	1576/507	149.44
A (00007205) ✓	James T. Gamelli	Mar Key, LLC	15.00%	1576/220	149.44
B (00007888) ✓	Opal Katharine Husted, unmarried, Opal Katharine Husted, as Attorney in-fact for Dallas J. Husted and Mary F. Husted, husband and wife, and Harold F. Husted and Janette J. Husted, husband and wife	NRM Petroleum Corporation	12.50%	1098/198	148
	NRM Petroleum Corporation	Natural Resources Management Corporation		Unrecorded, Secretary of State	
	Natural Resources Management Corporation	Edisto Resources Corporation		Unrecorded, Secretary of State	<i>Name Change</i>
	NRM Operating Company, L.P., a Delaware limited partnership, Edisto Resources Corporation, a Delaware corporation, NRM 1984-B Income Ltd., a Texas limited partnership, and NRM 1984-D Income Ltd.	Eastern American Energy Corporation		1216/558	
	Eastern American Energy Corporation	Energy Corporation of America		59/879	
	Energy Corporation of America	Mar Key, LLC		1596/1233	
B (00007971) ✓	Catherine M. Depolo Revocable Trust	Mar Key, LLC	13.00%	1600/579	33.5
C (00004022) ✓	Mary Alice Hafer	Petroleum Development Corp.	12.50%	1048/294	125
	Petroleum Development Corp.	PDC Mountaineer, LLC		1457/703	

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Attachment to WW-6A1, Gamelli 201

	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
C ✓ (00004023)	William D. Courtney, a married man and Margaret D. Courtney, widow	Petroleum Development Corp.	12.50%	1064/1090	167
	Petroleum Development Corp.	PDC Mountaineer, LLC		1457/703	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
D ✓ (00006680)	DWG Oil and Gas Acquisitions, LLC	Mar Key, LLC	12.00%	1561/493	86
D ✓ (00008356)	Trustees of Alderson Broaddus University, f/k/a Alderson Broaddus College, a West Virginia charitable corporation	Mar Key, LLC	13.00%	1616/1169	86
E ✓ (00004022)	Mary Alice Hafer	Petroleum Development Corp.	12.50%	1048/294	125
	Petroleum Development Corp.	PDC Mountaineer, LLC		1457/703	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
F ✓ (00004366)	John Lancaster Heirs, Mary Lancaster Costilow, widow Lena L. Winters, widow	Petroleum Development Corp.	12.50%	1060/292	136
	Petroleum Development Corp.	PDC Mountaineer, LLC		1457/703	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
G ✓ (00007203)	Lewis Franklin Mullen, widower	Mar Key, LLC	15.00%	1576/217	35.5
H ✓ (00006691)	Frederick W. Layton, a married man dealing in his own right	Mar Key, LLC	15.00%	1568/79	28.75

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H (00006694) ✓	Peter Paulson	Mar Key, LLC	15.00%	1564/1027	28.75
H (00006689) ✓	James L. Layton, a married man dealing in his own right	Mar Key, LLC	15.00%	1564/1021	28.75
H (00006692) ✓	William L. Peters, a single man	Mar Key, LLC	15.00%	1564/1023	28.75
H (00006693) ✓	John Peters	Mar Key, LLC	15.00%	1564/1025	28.75
H, I, J (00008445) ✓	Kathryn M. Otwell	Mar Key, LLC	12.50%	1622/713	19.9
H, I, J (00008439) ✓	Samuel Arnett Cleavenger, single	Mar Key, LLC	12.50%	1622/696	19.9
H, I, J (00008447) ✓	William B. Pennington and Beverly Pennington, husband and wife	Mar Key, LLC	12.50%	1622/719	19.9
H, I, J (00008442) ✓	James Ellis Fredrick III and Tricia Lee Fredrick	Mar Key, LLC	12.50%	1622/704	19.9
H, I, J (00008443) ✓	James Noel Holden and Anna M. Holden, husband and wife	Mar Key, LLC	12.50%	1622/707	19.9
H, I, J (00008437) ✓	Gerald W. Burner and Marilyn J. Burner, husband and wife	Mar Key, LLC	12.50%	1622/693	19.9
H, I, J (00008446) ✓	Howard Kim Warder	Mar Key, LLC	12.50%	1622/716	19.9
H, I, J (00008441) ✓	Beverly Ann Dodd	Mar Key, LLC	12.50%	1622/701	19.9
H, I, J (00008444) ✓	Wade V. Myers and Deborah B. Myers, husband and wife	Mar Key, LLC	12.50%	1622/710	19.9
H, I, J (00008450) ✓	Stephen J. Cullen	Mar Key, LLC	12.50%	1622/632	19.9
H, I, J (00008449) ✓	Wilma Darlene Goodwin, widow	Mar Key, LLC	12.50%	1622/722	19.9

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H, I, J (00008451) ✓	Charles E. Holden	Mar Key, LLC	12.50%	1622/635	19.9
H, I, J (00008454) ✓	Mary Paula Lusk, widow	Mar Key, LLC	12.50%	1622/642	19.9
H, I, J (00008455) ✓	Stacey M. Rapp	Mar Key, LLC	12.50%	1622/645	19.9
H, I, J (00008456) ✓	Anna Blair Reed	Mar Key, LLC	12.50%	1622/648	19.9
H, I, J (00008475) ✓	Stuart Carl Anderson and Joyce C. Anderson	Mar Key, LLC	12.50%	1623/264	19.9
H, I, J (00008481) ✓	Ruth Ann Robinson	Mar Key, LLC	12.50%	1623/202	19.9
H, I, J (00008484) ✓	Clyde K. Walter, Jr.	Mar Key, LLC	12.50%	1623/211	19.9
H, I, J (00008483) ✓	John Troy Snider and Cynthia Lynn Snider, husband and wife	Mar Key, LLC	12.50%	1623/208	19.9
H, I, J (00008482) ✓	Cynthia R. Snider	Mar Key, LLC	12.50%	1623/205	19.9
H, I, J (00008485) ✓	Sue E. Snyder	Mar Key, LLC	12.50%	1623/214	19.9
H, I, J (00008478) ✓	Ellen W. Coll	Mar Key, LLC	12.50%	1623/267	19.9
H, I, J (00008479) ✓	Mary Beth Danley	Mar Key, LLC	12.50%	1623/270	19.9
H, I, J (00008496) ✓	Davyd Booth	Mar Key, LLC	12.50%	1623/655	19.9
H, I, J (00008465) ✓	Katie Brielle Flores	Mar Key, LLC	12.50%	1623/259	19.9
H, I, J (00008493) ✓	Christina Newman	Mar Key, LLC	12.50%	1623/221	19.9

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H, I, J ✓ (00008480)	Cheryl Lynn Richards	Mar Key, LLC	12.50%	1623/199	19.9
H, I, J ✓ (00008494)	Kenneth M. Moffett	Mar Key, LLC	12.50%	1623/224	19.9
J, K ✓ (00007991)	Chad W. Johnson	Mar Key, LLC	14.00%	1604/289	68.475
L, M, N ✓ (00004238)	W.R. Johnson and Andra Johnson, his wife and Hursey R. Lang and Hazel M. Lang, his wife	Union Carbide Corporation	12.50%	852/587	466
	Union Carbide Corporation	Creslenn Oil Company		897/286	
	Creslenn Oil Company	Delta Producing Corporation		925/522	
	Delta Producing Corporation	Petroleum Corporation of America		967/575 977/168	
	Petroleum Corporation of America	Petroleum Development Corporation		977/153	
	Petroleum Development Corporation	PDC Mountaineer, LLC		1440/364	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	

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33-05922 W610

Agreement to Drill, Complete and Operate Oil & Gas Wells

This Agreement to Drill, Complete and Operate Oil & Gas Wells (this "Agreement"), by and among Arsenal Resources LLC, a West Virginia limited liability company ("Arsenal"), River Ridge Energy, LLC, a Delaware limited liability company ("River Ridge"), and River Ridge Energy, Holdings, LLC, a Delaware limited liability company ("River Ridge Holdings"), is effective as of March 1, 2017. (the "Effective Date") and sets forth the terms pursuant to which Arsenal will drill, complete and operate the Wells (as defined below) on behalf of River Ridge and River Ridge Holdings. Arsenal, River Ridge, and River Ridge Holdings are each a "Party" and are collectively the "Parties". In consideration of the foregoing and the respective agreements hereinafter set forth and the mutual benefits to be derived therefrom, the Parties, intending to be legally bound, hereby agree as follows:

1. **Term:** This Agreement is effective from the Effective Date until terminated by Arsenal on the one hand or River Ridge and River Ridge Holdings on the other hand with 30 days' written notice to the other Party or Parties, as applicable (the "Term").
2. **Authorization to Operate:** River Ridge and River Holdings authorize Arsenal to undertake and perform, on River Ridge and River Ridge Holdings behalf, all operations, including without limitation permit applications, well pad preparation, drilling and completing wells, and marketing gas, oil and other hydrocarbons therefrom with respect to all oil and gas wells to be drilled on oil and gas leasehold acreage held by River Ridge or River Ridge Holdings. River Ridge, River Ridge Holdings and Arsenal are affiliates with a common parent. Arsenal was formed to operate oil and gas leasehold acreage held by River Ridge, River Ridge Holdings and certain other affiliates. Arsenal agrees that it shall, in a good and workmanlike manner and in accordance with industry standards as they prevail in the area, drill, complete and operate oil and gas wells on leasehold acreage owned by River Ridge or River Ridge Holdings from time to time as directed by River Ridge or River Ridge Holdings (collectively, the "Wells").
3. **No Third Party Beneficiary:** This Agreement is for the benefit of the Parties and is not for the benefit of any third party.
4. **Counterparts:** This Agreement may be simultaneously executed in several counterparts and via facsimile or similar electronic transmittal, each of which shall be deemed to be an original and taken together shall constitute one and the same instrument.

[Signature Page Follows]

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IN WITNESS WHEREOF, Arsenal, River Ridge, and River Ridge Holdings have caused their duly authorized representatives to execute this Agreement as of the Effective Date.

ARSENAL RESOURCES LLC

By: Joel E. Symonds
Name: Joel E. Symonds
Title: Vice President - Land

RIVER RIDGE ENERGY, LLC

By: Joel E. Symonds
Name: Joel E. Symonds
Title: Vice President - Land

RIVER RIDGE HOLDINGS, LLC

By: Joel E. Symonds
Name: Joel E. Symonds
Title: Vice President - Land

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West Virginia Secretary of State — Online Data Services

Business and Licensing

Online Data Services Help

Business Organization Detail

NOTICE: The West Virginia Secretary of State's Office makes every reasonable effort to ensure the accuracy of information. However, we make no representation or warranty as to the correctness or completeness of the information. If information is missing from this page, it is not in the The West Virginia Secretary of State's database.

MAR KEY LLC

Organization Information								
Org Type	Effective Date	Established Date	Filing Date	Charter	Class	Sec Type	Termination Date	Termination Reason
LLC Limited Liability Company	7/11/2011		7/11/2011	Domestic	Profit			

Organization Information			
Business Purpose	2111 - Mining, Quarrying, Oil & Gas Extraction - Oil and Gas Extraction - Crude Oil and Natural Gas Extraction		Capital Stock
Charter County		Control Number	99Q1F
Charter State	WV	Excess Acres	
At Will Term	A	Member Managed	MBR
At Will Term Years		Par Value	

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Authorized Shares

Addresses	
Type	Address
Designated Office Address	65 PROFESSIONAL PLACE SUITE 200 BRIDGEPORT, WV, 26330
Mailing Address	6031 WALLACE ROAD EXTENSION SUITE 300 WEXFORD, PA, 15090 USA
Notice of Process Address	CORPORATION SERVICE COMPANY 209 WEST WASHINGTON STREET CHARLESTON, WV, 25302
Principal Office Address	6031 WALLACE ROAD EXTENSION SUITE 300 WEXFORD, PA, 15090 USA
Type	Address

Officers	
Type	Name/Address
Member	ARSENAL RESOURCES ENERGY LLC 6031 WALLACE ROAD EXTENSION SUITE 300 WEXFORD, PA, 15090
Organizer	PAUL M HERZING 560 EPSILON DR. PITTSBURGH, PA, 15238 USA
Type	Name/Address

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Annual Reports
Date filed

3/30/2017
6/20/2016
6/30/2015
4/28/2014
6/28/2013
5/8/2012
Date filed

For more information, please contact the Secretary of State's Office at 304-558-8000.

Tuesday, November 28, 2017 — 9:44 AM

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People Powered. Asset Strong.

October 11, 2018

Mr. James Martin, Chief of Oil and Gas
West Virginia Department of Environmental Protection
601 57th Street, SE
Charleston, WV 25304

RE: Ownership of Roadways – Gamelli HSOG Unit (Well 201)

Mr. Martin:

In preparation of filing a permit application for the above referenced well, the Title Department of Arsenal Resources has conducted a thorough title examination in order to determine the ownership of the oil and gas underlying all roadways crossed by wells in the proposed unit. The findings of the title examination show that some of the roadways crossed by the proposed wells are owned in fee by the West Virginia Department of Transportation, Division of Highways and that some are only rights-of-way. If owned in fee by the West Virginia Department of Transportation, Division of Highways, a lease covering its interest in the roadway or roadways has been properly obtained and provided in the application materials. If a right-of-way only, the oil and gas underlying such roadway or roadways is owned by the adjoining landowners and is also covered by the leaseholds provided in the application materials.

If you have any questions, concerns or need further information, please do not hesitate to contact me at the address listed below.

Sincerely,

Jonathan B. Bompiani
Senior Title Attorney

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October 15, 2018

WVDEP
Office of Oil and Gas
ATTN: Laura Adkins
601 57th Street SE
Charleston, WV 25304

RE: Gamelli HSOG 201, API# 47-033-05922 – Modification to spacing changes and extending lateral

Dear Laura:

Enclosed please find the modification for the Gamelli HSOG 201, (API# 47-033-05922). This permit is being modified due to adjusting the well bore spacing and moving it to the west. The well head locations remained the same. This well was originally permitted to 7,567'. We have obtained additional leasing for this site during this modification and request to extend the lateral 6,549.72' for a total of 14,116.72'. Included are the following:

- Plat
- WW-6B, Well Work Permit Application/Casing
- Well Bore Schematic
- WW-6A1, Lease Information
- Roadway Letter
- Site Safety Plan → Deviation prog. OK
- AOR

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Should you have any questions or need any additional information, please feel free to contact me by phone or email. Thank you!

Sincerely,

A handwritten signature in blue ink that reads 'Kelly Davis'.

Kelly Davis
Permitting Specialist
1-304-517-8743 mobile
1-724-940-1218 office
kdavis@arsenalresources.com