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west virginia department of environmental protection

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

Austin Caperton, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Friday, June 28, 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 JOHNSON TFP 40 201  
47-091-01352-00-00

**Extending the lateral due to additional leases acquired. Update to casing plan included.**

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.

A handwritten signature in blue ink, appearing to read 'James A. Martin', is positioned above the printed name and title.

James A. Martin  
Chief

Operator's Well Number: JOHNSON TFP 40 201  
Farm Name: RENEE JOHNSON  
U.S. WELL NUMBER: 47-091-01352-00-00  
Horizontal 6A New Drill  
Date Modification Issued: 06/28/2019

Promoting a healthy environment.



June 10, 2019

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

**RE: Johnson TFP40 201 – Modification due to additional leasing to extend lateral**

Dear Ms. Adkins:

Enclosed please find the modification for the Johnson TFP 40 201, (API# 47-091-01352). This permit is being modified due to acquiring additional leases to extend the lateral. This well was originally permitted to 12,195.1'. We have obtained additional leasing for this site and are requesting to extend the lateral further. We would like to extend the lateral 1,495' for a total of 13,690.1'. Included are the following:

- ✓ Plat
- ✓ WW-6B, Well Work Permit Application/Casing (See changes below made in the WW6B)
- ✓ Well Bore Schematic
- ✓ WW-6A1, Lease Information
- ✓ Roadway Letter
- ✓ Site Safety Plan
- ✓ AOR

The following changes occurred within the WW6B:

- TMD changed from 21,100.3' to 22,595.3'
- Horizontal length was extended from 12,195.1' to 13,690.01'
- Conductor casing size has changed from 26" to 24"
- Conductor weight has changed from 102.7# to 94#
- Changed intermediate casing depth from 2,050' to 2,600'
- Changed production casing weight from 23# to 20#
- Changed production footage for drilling from 21,100' to 22,595'
- Changed the production cement fill-up from TOC @ 1,900 to TOC @ 2,450
- Changed the production wall thickness from 0.415 to 0.361
- Changed the production burst pressure from 14,520 to 15,920

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

Sincerely,

*Kelly Davis*

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

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

1) Well Operator: Arsenal Resources      494519412      Taylor      Fleming      Rosemont  
Operator ID      County      District      Quadrangle

2) Operator's Well Number: Johnson TFP 40 201      Well Pad Name: Johnson TFP 40

3) Farm Name/Surface Owner: Renee Johnson      Public Road Access: CR 17, Oral Lake Road

4) Elevation, current ground: 1338.79'      Elevation, proposed post-construction: 1332.5'

5) Well Type (a) Gas  Oil \_\_\_\_\_ Underground Storage \_\_\_\_\_

Other \_\_\_\_\_

(b) If Gas Shallow  Deep \_\_\_\_\_

Horizontal

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):  
Target Formation- Marcellus Shale, Top- 7,824.5ft, Bottom- 7,916.5ft, Anticipated Thickness- 92ft, Associated Pressure- 0.5 psi/ft

8) Proposed Total Vertical Depth: 7,903.5 ft

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 22,482.4 ft

11) Proposed Horizontal Leg Length: 13,577.2 ft

12) Approximate Fresh Water Strata Depths: 45.5', 132.5', 187.5', 219.5', 817.5', 1102.5'

13) Method to Determine Fresh Water Depths: Offsetting wells reported water depths (091-00116, 091-00117, 091-00118, 091-00120)

14) Approximate Saltwater Depths: 1987.5'

15) Approximate Coal Seam Depths: Elk Lick-322.5', Harlim-388.5', Bakerstown-477.5', Brush Creek-577.5', Upper Freeport-630.5', Lower Freeport-692.5', Upper Kittanning-760.5', Middle Kittanning-825.5', Lower Kittanning-845.5', Clanton-876.5'

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

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine?      Yes \_\_\_\_\_ No None Known

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

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18)

**CASING AND TUBING PROGRAM**

<b>TYPE</b>	<u>Size (in)</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling (ft)</u>	<u>INTERVALS: Left in Well (ft)</u>	<u>CEMENT: Fill-up (Cu. Ft.)/CTS</u>
Conductor	24	Used		94	80	80	CTS
Fresh Water	13.375	New	J-55	54.5	1,175	1,175	CTS
Coal							
Intermediate	9.625	New	J-55	40	2,600	2,600	CTS
Production	5.5	New	P-110	20	22,482	22,482	TOC @ 2,450
Tubing							
Liners							

*Ernest L. Reynolds*  
6-6-19

<b>TYPE</b>	<u>Size (in)</u>	<u>Wellbore Diameter (in)</u>	<u>Wall Thickness (in)</u>	<u>Burst Pressure (psi)</u>	<u>Anticipated Max. Internal Pressure (psi)</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
Conductor	24	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	0.361	15,920	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 24" 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.

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21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 33.56

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22) Area to be disturbed for well pad only, less access road (acres): 6.20

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23) Describe centralizer placement for each casing string:

24" - 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 2,700'; there will be no centralizers from 2,700 to surface.

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

24" 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 2,450' (+/- 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.



## TECHNICAL DATA SHEET

Connection: **VAroughneckAC**  
 Size: 5 1/2 in X 20.00 lb/ft  
 Drift: **standard**  
 Bevel: **standard**

Grade: VA-XP-P110  
 Material:

	US Customary	Metric
Yield Strength Min.	110,000 psi	758 Mpa
Yield Strength Max.	140,000 psi	965 Mpa
Tensile Strength Min.	125,000 psi	862 Mpa

### Pipe:

	US Customary	Metric		US Customary	Metric
Nominal OD:	5.500 in	139.70 mm	Wall Thickness:	0.361 in	9.17 mm
Nominal ID:	4.778 in	121.36 mm	Standard Drift:	4.653 in	118.19 mm
Nominal Weight:	20.00 lb/ft	29.76 kg/m	Pipe Body Yield Strength:	729 klb	3,241 kN
Pipe Cross Section:	5.828 in <sup>2</sup>	3,760.13 mm <sup>2</sup>			

### Connection:

	US Customary	Metric		
OD:	6.300 in	160.02 mm	Threads per inch:	5 Threads
ID:	4.764 in	121.00 mm		
Length:	8.976 in	228.00 mm		

### Connection Performance (Uniaxial Load):

	US Customary	Metric		US Customary	Metric
Joint Strength:	729 klb	3,241 kN	Tension Efficiency:	> 100.0 %	
Collapse Resistance:	13,970 psi	96.30 Mpa	Displacement:	1.240 gal/ft	15.40 l/m
Internal Yield Pressure:	15,920 psi	107.50 Mpa	Production:	0.932 gal/ft	11.57 l/m
Load on Coupling Face:	709 klb	3,160 kN			

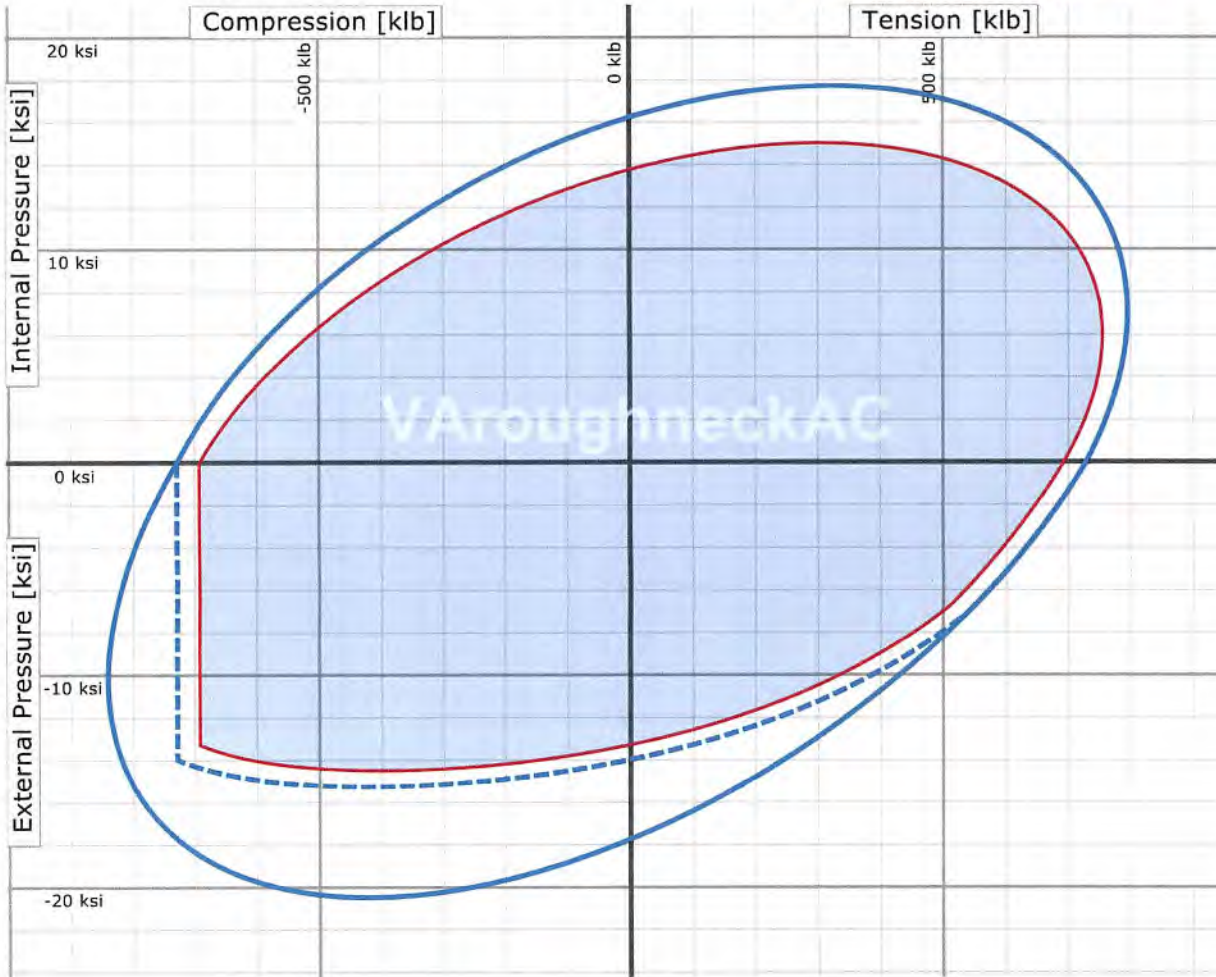
### Field Make Up (Friction Factor = 1.0):

	US Customary	Metric		US Customary	Metric
Minimum Torque:	15,822 ft.lb	21,451 Nm	Make-Up Loss:	4.370 in	111.00 mm
Optimum Torque:	17,580 ft.lb	23,835 Nm	Yield Torque:	22,000 ft.lb	29,800 Nm
Maximum Torque:	19,338 ft.lb	26,218 Nm			
Min. Torque on Shoulder:	%				

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## LOAD ENVELOPE



### Recommended Field of Application

- Pipe Body Envelope
- - - Pipe Body Collapse

#### Efficiency (% Pipe Body) under Uniaxial Loads

Tension:	100.0 %
Compression:	100.0 %
Internal Pressure:	89.3 %
External Pressure:	100.0 %

#### Sealability Rating (% Efficiency) under Combined Loads

Tension:	100.0 %
Compression:	100.0 %
Internal Pressure:	100.0 %
External Pressure:	100.0 %

#### Test Conditions

Test Medium:	Fluid
Von Mises Envelope:	95.0 %
Bending:	20.00 °/100ft

The graph is calculated under consideration of the requirements of EN ISO 13679 and API 5C3. The combined loads are calculated without the consideration of wall thickness tolerances and differ from the values in the data sheet, which are calculated with tolerances determined by API. Any printout is NOT SUBJECT TO REGULAR REVISION. The generated performance envelope shall solely be used as a tool to facilitate the comparison of performance properties under combined loads, of different grades, sizes and connections of voestalpine Tubulars products. Field-specific safety/design factors as well as other loads are not considered. Thus the results shall by no means be used to replace the own string design engineering or to justify any warranty/guaranty cases.

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**TECHNICAL DATA SHEET**Connection: **VAroughneck**

Size: 5 1/2 in X 23.00 lb/ft

Drift: **standard**Bevel: **standard**

Grade: VA-HC-P110

Material:

	US Customary	Metric
Yield Strength Min.	110,000 psi	758 Mpa
Yield Strength Max.	140,000 psi	965 Mpa
Tensile Strength Min.	125,000 psi	862 Mpa

**Pipe:**

	US Customary	Metric		US Customary	Metric
Nominal OD:	5.500 in	139.70 mm	Wall Thickness:	0.415 in	10.54 mm
Nominal ID:	4.670 in	118.62 mm	Standard Drift:	4.545 in	115.44 mm
Nominal Weight:	23.00 lb/ft	34.23 kg/m	Pipe Body Yield Strength:	729 klb	3,242 kN
Pipe Cross Section:	6.630 in <sup>2</sup>	4,276.80 mm <sup>2</sup>			

**Connection:**

	US Customary	Metric		
OD:	6.260 in	159.00 mm	Threads per inch:	5 Threads
ID:	4.669 in	118.60 mm		
Length:	8.976 in	228.00 mm		

**Connection Performance (Uniaxial Load):**

	US Customary	Metric		US Customary	Metric
Joint Strength:	729 klb	3,242 kN	Tension Efficiency:	> 100.0 %	
Collapse Resistance:	16,350 psi	112.73 Mpa	Displacement:	1.242 gal/ft	15.43 l/m
Internal Yield Pressure:	14,518 psi	100.10 Mpa	Production:	0.890 gal/ft	11.05 l/m
Load on Coupling Face:	582 klb	2,590 kN			

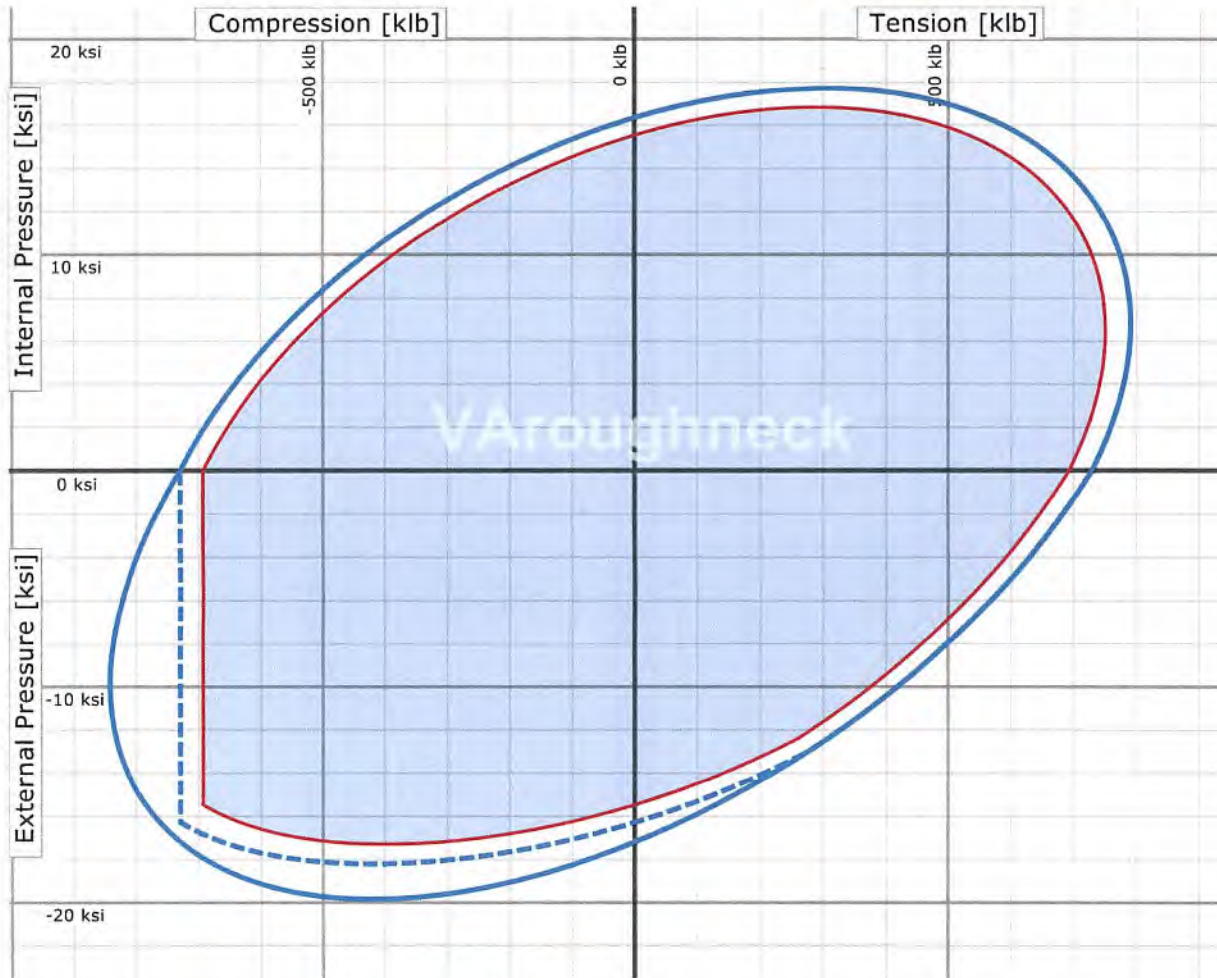
**Field Make Up (Friction Factor = 1.0):**

	US Customary	Metric		US Customary	Metric
Minimum Torque:	17,847 ft.lb	24,197 Nm	Make-Up Loss:	4.370 in	111.00 mm
Optimum Torque:	19,830 ft.lb	26,886 Nm	Yield Torque:	24,800 ft.lb	33,600 Nm
Maximum Torque:	21,813 ft.lb	29,574 Nm			
Min. Torque on Shoulder:	%				

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## LOAD ENVELOPE



### Recommended Field of Application

- Pipe Body Envelope
- - - Pipe Body Collapse

#### Efficiency (% Pipe Body) under Uniaxial Loads

Tension:	100.0 %
Compression:	100.0 %
Internal Pressure:	100.0 %
External Pressure:	100.0 %

#### Sealability Rating (% Efficiency) under Combined Loads

Tension:	100.0 %
Compression:	100.0 %
Internal Pressure:	100.0 %
External Pressure:	100.0 %

#### Test Conditions

Test Medium:	Fluid
Von Mises Envelope:	95.0 %
Bending:	81.00 °/100ft

The graph is calculated under consideration of the requirements of EN ISO 13679 and API 5C3. The combined loads are calculated without the consideration of wall thickness tolerances and differ from the values in the data sheet, which are calculated with tolerances determined by API. Any printout is NOT SUBJECT TO REGULAR REVISION. The generated performance envelope shall solely be used as a tool to facilitate the comparison of performance properties under combined loads, of different grades, sizes and connections of voestalpine Tubulars products. Field-specific safety/design factors as well as other loads are not considered. Thus the results shall by no means be used to replace the own string design engineering or to justify any warranty/guaranty cases.

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SURFACE HOLE SURVEYED 39° 17' 30" (NAD27)  
 BOTTOM HOLE SURVEYED 39° 15' 00" (NAD27)

822'

Latitude: (NAD27)

(NAD83-WVN) US SURVEY FT.

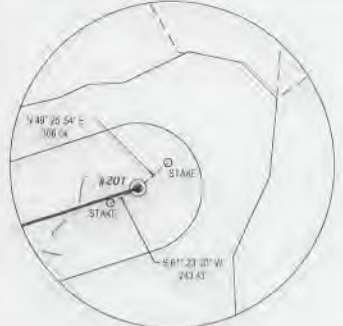
TOP HOLE  
 N) 276971.722  
 E) 1779051.662  
 LANDING POINT  
 N) 275668.913  
 E) 1777137.673  
 BOTTOM HOLE  
 N) 262835.630  
 E) 1781570.126

(NAD83-LAT/LONG) DECIMAL

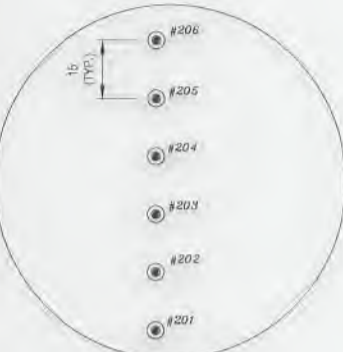
TOP HOLE  
 N) 39.258499232  
 E) 80.169059585  
 LANDING POINT  
 N) 39.254883069  
 E) 80.175784204  
 BOTTOM HOLE  
 N) 39.219740001  
 E) 80.159799000

(UTM, NAD83) METER

TOP HOLE  
 N) 4345792.144  
 E) 571690.548  
 LANDING POINT  
 N) 4345385.524  
 E) 571114.018  
 BOTTOM HOLE  
 N) 4341498.094  
 E) 572529.433



REFERENCES TIES (NTS)



REFERENCES TO PROPOSED HORIZONTAL WELL SURFACE LOCATIONS NTS

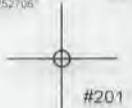
REFERENCE NOTES

- Property lines as shown taken from deeds, tax maps, and field locations. A full boundary survey is not expressed or implied. All bearings are based on grid North. Ownership taken from public records Taylor County, West Virginia, Date 2018.
- State Plane Coordinates & NAD83 Lat/Long by differential submeter mapping grade GPS.
- There are no railroads, dwellings, or agricultural buildings within 825 feet of center of pad.
- No water wells found within 250' of the center of well pad.

LEGEND

- PROPOSED WELL LATERAL
- PROPOSED WELL TIE LINE
- STREAM
- EXISTING ROAD
- BUFFER
- PROPERTY LINE
- MINERAL TRACT BOUNDARY
- COUNTY BOUNDARY LINE
- # # PROPOSED WELL HEAD
- EXISTING WELL HEAD (Active)
- ◆ EXISTING WELL HEAD (Plugged)
- ◇ EXISTING WELL HEAD (Abandoned)
- ⊕ EXISTING WELL HEAD (Meyer Grind)
- EXISTING WELL HEAD (Touche Drill)
- LANDING POINT/BOTTOM HOLE
- ⊙ SURFACE OWNER

REG 1 TOWN HOLE (NAD27)  
 LAT: 39.258499232  
 LONG: 80.159799000



Longitude: (NAD27)



SURFACE HOLE (NAD27)  
 LAT: 39.258499232  
 LONG: 80.159799000

10,951'  
 12,108'

FILE#: 17078-007

SHEET#: 1 of 2

SCALE: 1" = 3000'

TICK SCALE: 1" = 2000'

MINIMUM DEGREE OF ACCURACY: 1/200

PROVEN SOURCE OF ELEVATION: WV-RTN CORS STATION

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: *Herbert L. Parsons* 6-5-2019  
 P.S. #2361: Herbert L. Parsons, III P.S.



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS  
 WVDEP  
 OFFICE OF OIL & GAS  
 601 57TH STREET  
 CHARLESTON, WV 25304



DATE: JUNE 5, 2019 JOHNSON TFP-40

OPERATOR'S WELL #: # 201

API WELL #: 47 091 **01352**  
 STATE COUNTY PERMIT

Well Type:  Oil  Waste Disposal  Production  Deep  
 Gas  Liquid Injection  Storage  Shallow

WATERSHED: SIMPSON CREEK

COUNTY / DISTRICT: TAYLOR CO. FLEMINGTON DISTRICT

SURFACE OWNER: RENEE JOHNSON

OIL & GAS ROYALTY OWNER:

HEIRS & ASSIGNS OF EARL LAWSON, HEIRS & ASSIGNS OF DULCIE STARKEY, HEIRS & ASSIGNS OF MARTHA ROBERTS, HEIRS & ASSIGNS OF VIRGIE BARTLETT, HEIRS & ASSIGNS OF BLANCHE WATSON, HEIRS & ASSIGNS OF DEZZIE BUTTS, AND HEIRS & ASSIGNS OF HASSEL LAWSON

- DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE
- PLUG OFF FORMATION  PERFORATE NEW FORMATION  PLUG & ABANDON
- CLEAN OUT & REPLUG  OTHER CHANGE SPECIFY: \_\_\_\_\_

TARGET FORMATION: MARCELLUS

ESTIMATED DEPTH: TVD: 7,903.5' TMD: 22,482.4'

WELL OPERATOR: ARSENAL RESOURCES  
 ADDRESS: 6031 WALLACE ROAD EXTENSION # 300  
 CITY: WEXFORD STATE: PA ZIP: 15090

DESIGNATED AGENT: WILLIAM VEIGEL  
 ADDRESS: 65 PROFESSIONAL PLACE SUITE 200  
 CITY: BRIDGEPORT STATE: WV ZIP: 26330

BOTTOM HOLE SURVEYED 80° 07' 30" (NAD27)  
 SURFACE HOLE SURVEYED 80° 10' 00" (NAD27)



**SURFACE PARCEL OWNER INFORMATION**

ID#	PARCEL NUMBER	OWNER NAME
1	033-15-331-27	JOHNSON RENEE
57	033-15-351-10	RENEE JOHNSON
4	033-15-351-12	EIP III WEST VIRGINIA LLC
87	033-15-351-11	EIP III WEST VIRGINIA LLC
3	033-15-351-13	EIP III WEST VIRGINIA LLC
86	033-15-351-24	EIP III WEST VIRGINIA LLC
39	001-09-9-1	STEWART FARM LLC
81	001-09-9-19	STEWART FARM LLC
40	001-09-9-20	SEESE ROBERT & BRENDA HWS
80	001-09-10-2	SMITH JO ANN V
42	001-09-11-1	POLINO ENTERPRISES INC
73	001-09-12-42	FOSTER ROGER & ETHEL

**ADJOINER PARCEL OWNER INFORMATION**

ID#	PARCEL NUMBER	OWNER NAME
2	001-09-9-2	STEWART FARM LLC
5	091-04-11-1	CFS FARMS LIMITED LIABILITY CO
6	091-04-8-22	GRIPPIN JAMES S & ELAINE M
29	091-04-8-21	CARLYLE G MILLARD
33	001-09-9-7	CROUSE ORLAN, JR
35	091-09-9-20.1	SMALLWOOD RUSSELL & ANGELA WRS
37	001-09-9-2.1	BOARD OF EDUCATION
38	001-09-9-3	STEWART FARM LLC
41	001-09-12-1	POLINO ENTERPRISES INC
43	001-09-9-22	WOLFE LARRY, ROBERT WOLFE & STANLEY WOLFE ET UXES,
53	091-04-7-9	CEQUEL COMMUNICATIONS LLC
54	091-04-7-27	CEQUEL COMMUNICATIONS LLC
55	091-04-7-8	SHIRLEY A FRUM, CLINTON A FRUM, ET UX
56	033-15-351-9	RENEE JOHNSON
65	001-09-12-27	WOLFE LARRY MICHAEL
71	001-09-12.61	CHARLTON RANDALL L & CAROLYN,
72	001-09-12.60	SCHIMANSKY STEVEN & DEBRA HWS
74	001-09-12C 2	FOSTER ROGER & ETHEL
75	001-09-12-43	SMITH STEVEN & CYNTHIA
76	001-09-12.41	TRADER PAUL & LORETTA
77	001-09-11-1.2	BECKWITH LUMBER CO INC
78	033-15-371-3	EIP III WEST VIRGINIA LLC
79	033-15-371-6	EIP III WEST VIRGINIA LLC
82	001-09-10.1	SMITH JO ANN V
83	033-15-351-31	EIP III WEST VIRGINIA LLC
85	033-15-351-23	EIP III WEST VIRGINIA LLC
88	033-15-351-9	JOHNSON RENEE
89	033-15-351-7	WARDER ORAN LEE & JANICE L
93	001-09-12C-1	LEHMAN DIANA LYNN, COSTELLO ELIZABETH, ARBAUGH RITA

**REFERENCE NOTES**

1. Property lines as shown taken from deeds, tax maps, and field locations. A full boundary survey is not expressed or implied. All bearings are based on grid North. Ownership taken from public records Taylor County, West Virginia Date 2018
2. State Plane Coordinates & NAD83 Lat/Long by differential submeter mapping grade GPS.
3. There are no railroads, dwellings, or agricultural buildings within 825 feet of center of pad.
4. No water wells found within 250' of the center of well pad.

**LEGEND**

	PROPOSED WELL LATERAL
	PROPOSED WELL TIE LINE
	STREAM
	EXISTING ROAD
	BUFFER
	PROPERTY LINE
	MINERAL TRACT BOUNDARY
	COUNTY BOUNDARY LINE
	PROPOSED WELL HEAD
	EXISTING WELL HEAD (Active)
	EXISTING WELL HEAD (Plugged)
	EXISTING WELL HEAD (Abandoned)
	EXISTING WELL HEAD (Never Drilled)
	EXISTING WELL HEAD (Future Drill)
	LANDING POINT/BOTTOM HOLE
	SURFACE OWNER

FILE#: 17078-007  
 SHEET#: 2 of 2  
 SCALE: 1" = 3000'  
 TICK SCALE: 1" = 2000'  
 MINIMUM DEGREE OF ACCURACY: 1/200  
 PROVEN SOURCE OF ELEVATION: WV-RTN CORS STATION

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: *Herbert L. Parsons* 6-5-2019  
 P.S. #2361: Herbert L. Parsons, III P.S.



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS  
 WVDEP  
 OFFICE OF OIL & GAS  
 601 57TH STREET  
 CHARLESTON, WV 25304



DATE: JUNE 5, 2019  
 JOHNSON TFP-40  
 OPERATOR'S WELL #: # 201  
 API WELL #: 47 091 01352  
 STATE COUNTY PERMIT

Well Type:  Oil  Waste Disposal  Production  Deep  
 Gas  Liquid Injection  Storage  Shallow

WATERSHED: SIMPSON CREEK  
 COUNTY / DISTRICT: TAYLOR CO. FLEMINGTON DISTRICT  
 SURFACE OWNER: RENEE JOHNSON

OIL & GAS ROYALTY OWNER: HEIRS & ASSIGNS OF EARL LAWSON, HEIRS & ASSIGNS OF DULCIE STARKEY, HEIRS & ASSIGNS OF MARTHA ROBERTS, HEIRS & ASSIGNS OF VIRGIE BARTLETT, HEIRS & ASSIGNS OF BLANCHE WATSON, HEIRS & ASSIGNS OF DEZZIE BUTTS, AND HEIRS & ASSIGNS OF HASSEL LAWSON

- DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  
 PLUG OFF FORMATION  PERFORATE NEW FORMATION  PLUG & ABANDON  
 CLEAN OUT & REPLUG  OTHER CHANGE SPECIFY: \_\_\_\_\_

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 7,903.5' TMD: 22,482.4'

WELL OPERATOR: ARSENAL RESOURCES  
 ADDRESS: 6031 WALLACE ROAD EXTENSION # 300  
 CITY: WEXFORD STATE: PA ZIP: 15090

DESIGNATED AGENT: WILLIAM VEIGEL  
 ADDRESS: 65 PROFESSIONAL PLACE SUITE 200  
 CITY: BRIDGEPORT STATE: WV ZIP: 26330



WW-6A1  
(5/13)

Operator's Well No. Johnson TFP40 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:

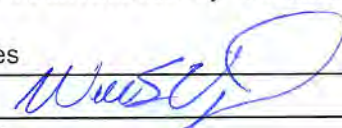
- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

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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, Johnson TFP 40 201**

Letter Designation/Number Designation on Plat	Grantor, Lessor, Assignor, etc.	Grantee, Lessee, Assignee, etc.	Royalty	Book/Page	Acreage
1 (00006031)	Blanch Watson (Widow), Dezzie Butts & Terry H. Butts (Her Husband), Dulcie Starkey (Widow), Martha Roberts (Widow), Gail Wilson (Widow), Mary Bartlett (Widow), James Bartlett & Elsa Bartlett (His Wife), Ernestine White & John White (Her Husband), Leoma Chandler (Widow), and Ellenor Whitman & Paul Whitman (Her Husband)	Union Drilling, Inc.	12.50%	1030/412	284
	Union Drilling, Inc.	Equitable Resources Exploration, Inc.		1189/1209	
	Equitable Resources Exploration, Inc.	Equitable Resources Exploration Company		1199/642	
	Equitable Resources Exploration Company	Enervest East Limited Partnership		22/181 (Taylor County)	
	Enervest East Limited Partnership	The Houston Exploration Company		1359/820	
	The Houston Exploration Company	Seneca-Upshur Petroleum, Incorporated		1367/1084	
	Seneca-Upshur Petroleum, Incorporated	Seneca-Upshur Petroleum, LLC		1467/119	
57 [00006674]	Debra A. Mulneix	Mar Key, LLC	12.50%	1561/464	85
57 [00006675]	Phyllis G. Steele	Mar Key, LLC	12.50%	1561/454	85
57 [00006676]	Alice L. Donley	Mar Key, LLC	12.50%	1561/451	85
57 [00006677]	Rebecca Collins Biser, acting in her capacity as Attorney in Fact for James R. Collins, Jr.	Mar Key, LLC	12.50%	1561/490	85
57 [00006697]	Gale M. Steele, widow	Mar Key, LLC	12.50%	1568/76	85

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**Attachment to WW-6A1, Johnson TFP 40 201**

57 [00007736]	Marlene B. Steele, widow, by David E. Bowen and Cheryl L. Bowen, as Attorney-in-Fact	Mar Key, LLC	12.50%	1585/239	85
57 [00007761]	George F. Jack, Jr., single	Mar Key, LLC	12.50%	1598/842	85.1375
57 [00007766]	Charles H. Roberts, widower	Mar Key, LLC	12.50%	1596/493	85.1375
57 [00007864]	Mike Ross Inc. & Waco Oil and Gas Inc.	Mar Key, LLC	12.50%	1599/315	85.1375
57 [00007990]	Chad W. Johnson	Mar Key, LLC	12.50%	1604/287	85.1375
3, 4 (00008218)	H. Dotson Cather and Diana Cather	NRM Petroleum Corporation	12.50%	1076/548	226
	NRM Petroleum Corporation	NRM 78-2, Ltd.		7/656 (Taylor County)	
	NRM 78-2, Ltd.	Ensource, Inc.		4/16 (Taylor County)	
	Ensource, Inc.	UMC Petroleum Corporation, a Texas Corporation		Unrecorded (Secretary of State)	
	UMC Petroleum Corporation, a Texas Corporation	UMC Petroleum Corporation, a Delaware Corporation		7/656	
	UMC Petroleum Corporation, a Delaware Corporation	Eastern American Energy Company		1248/378	

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**Attachment to WW-6A1, Johnson TFP 40 201**

	Eastern American Energy Company	Energy Corporation of America		16/488	
	Energy Corporation of America	Greylock Production, LLC		1603/1121	
	Greylock Production, LLC	Mar Key, LLC		1607/855	
3, 4 (00008217)	Laura Goff Davis, Harold Dotson Cather and Diane Goff Cather, his wife	NRM Petroleum Corporation	12.50%	1076/550	225
	NRM Petroleum Corporation	NRM 78-2, Ltd.		7/656 (Taylor County)	
	NRM 78-2, Ltd.	Ensource, Inc.		4/16 (Taylor County)	
	Ensource, Inc.	UMC Petroleum Corporation, a Texas Corporation		Unrecorded (Secretary of State)	
	UMC Petroleum Corporation, a Texas Corporation	UMC Petroleum Corporation, a Delaware Corporation		7/656	
	UMC Petroleum Corporation, a Delaware Corporation	Eastern American Energy Company		1248/378	
	Eastern American Energy Company	Energy Corporation of America		16/488	
	Energy Corporation of America	Greylock Production, LLC		1603/1121	
	Greylock Production, LLC	Mar Key, LLC		1607/855	
87 (00004556)	Mark V. Schumacher, unmarried	PDC Mountaineer, LLC	12.50%	1453/290	52.19
	PDC Mountaineer, LLC	River Ridge Energy, LLC		59/1263	
86 (00003555)	Lydia Drainer, widow	Union Carbide Corporation	12.50%	853/91	380

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	Union Carbide Corporation	Creslenn Oil Company		897/286	
	Creslenn Oil Company	Delta Producing Corporation		925/629	
	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	
39 (00003422)	L.L. Moss and Mary Margaret Moss, husband and wife	Petroleum Development Corporation	12.50%	111/88	75
	Petroleum Development Corporation	PDC Mountaineer, LLC		150/444	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		17/228	
39 (00003421)	John E. Lough and Elda D. Lough, husband and wife	Petroleum Development Corporation	12.50%	111/114	75
	Petroleum Development Corporation	PDC Mountaineer, LLC		150/444	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		17/228	
81 (00003868)	Hollie Stewart and Blanche M. Stewart, his wife, Franklin D. Stewart and Shirley P. Sewart, his wife	Petroleum Development Corporation	12.50%	99/252	37.58
	Petroleum Development Corporation	PDC Mountaineer, LLC		150/444	
	PDC Mountaineer, LLC	River Ridge Energy, LLC		17/228	

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**Attachment to WW-6A1, Johnson TFP 40 201**

40 (00005898)	John A. Moscsso and Mary K. Mosesso, his wife	Union Drilling, Inc.	12.50%	79/55	98
	Union Drilling, Inc.	Equitable Resources Exploration, Inc.		325/219	
	Equitable Resources Exploration, Inc.	Equitable Resources Energy Company		328/171	
	Equitable Resources Energy Company	Fuel Resources Production and Development Company		116/81	
	Fuel Resources Production and Development Company	The Houston Exploration Company		383/187 (also 136/162)	
	The Houston Exploration Company	Seneca-Upshur Petroleum, Inc.		404/381	
	Seneca-Upshur Petroleum, Inc.	Seneca-Upshur Petroleum, LLC		16/637 (also 447/129)	
80, 42 (00008219)	Hal S. Raper, jr. and Cathy C. Raper, husband and wife	Mar Key, LLC	12.50%	181/144 181/173	227.563
42 (00005891)	John A. Mosesso, single; Raymond Chess and Kathryn Chess	Allerton Miller	12.50%	DB 49/227	250
	Allerton Miller	Union Drilling, Inc.		98/11	
	Union Drilling, Inc.	Equitable Resources Exploration, Inc.		325/219	
	Equitable Resources Exploration, Inc.	Equitable Resources Energy Company		328/171	
	Equitable Resources Energy Company	Fuel Resources Production and Development Company		116/81	
	Fuel Resources Production and Development Company	The Houston Exploration Company		383/187	
	The Houston Exploration Company	Seneca-Upshur Petroleum, Inc.		404/381 (139/48)	
	Seneca-Upshur Petroleum, Inc.	Seneca-Upshur Petroleum, LLC		16/637	
42 (00008808)	James L. Lee	Mar Key, LLC	12.50%	182/335	57.67

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Attachment to WW-6A1, Johnson TFP 40 201

73 (00008797)	Linda Kaminskie, married and dealing in her sole and separate property	Mar Key, LLC	12.50%	182/338	16
------------------	--	--------------	--------	---------	----

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## West Virginia Secretary of State — Online Data Services

### Business and Licensing

Online Data Services Help

### Business Organization Detail

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

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<b>Authorized Shares</b>

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

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

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<b>Annual Reports</b>	
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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**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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### Business and Licensing

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### Business Organization Detail

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### SENECA-UPSHUR PETROLEUM, LLC

Organization Information								
Org Type	Effective Date	Established Date	Filing Date	Charter	Class	Sec Type	Termination Date	Termination Reason
LLC   Limited Liability Company	2/12/1973		2/12/1973	Domestic	Profit			

Organization Information			
<b>Business Purpose</b>	2111 - Mining, Quarrying, Oil & Gas Extraction - Oil and Gas Extraction - Crude Oil and Natural Gas Extraction		<b>Capital Stock</b>
<b>Charter County</b>		<b>Control Number</b>	0
<b>Charter State</b>	WV	<b>Excess Acres</b>	0
<b>At Will Term</b>	A	<b>Member Managed</b>	MBR
<b>At Will Term Years</b>		<b>Par Value</b>	
<b>Authorized Shares</b>			

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

<b>Officers</b>	
<b>Type</b>	<b>Name/Address</b>
<b>Member</b>	RIVER RIDGE ENERGY, LLC 6031 WALLACE ROAD EXTENSION, SUITE 300 WEXFORD, PA, 15090
<b>Organizer</b>	TAMMY J OWEN 300 SUMMERS STREET, STE 1500 PO BOX 2107 CHARLESTON, WV, 25328 USA
<b>Type</b>	<b>Name/Address</b>

<b>DBA</b>			
<b>DBA Name</b>	<b>Description</b>	<b>Effective Date</b>	<b>Termination Date</b>
KEYSPAN PRODUCTION & DEVELOPMENT COMPANY	TRADENAME	6/11/2004	
NATIONAL GRID	TRADENAME	8/17/2007	
NATIONAL GRID PRODUCTION AND DEVELOPMENT	TRADENAME	12/5/2008	5/9/2012
<b>DBA Name</b>	<b>Description</b>	<b>Effective Date</b>	<b>Termination Date</b>

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<b>Name Changes</b>
---------------------

Date	Old Name
3/28/2011	SENECA-UPSHUR PETROLEUM, INC.
Date	Old Name

Date	Amendment
6/15/2016	AMENDMENT FILED CHANGING FROM A MANAGER-MANAGED CO. TO A MEMBER-MANAGED CO. >> REMOVED ROBERT KOZEL & STEPHEN A. BISHOP AS MANAGERS & ADDED SOLE MEMBER (C IMAGE).
3/28/2011	CONVERSION: FROM SENECA-UPSHUR PETROLEUM, INC. TO SENECA-UPSHUR PETROLEUM, LLC
7/25/1997	MERGER; MERGING LITTLE SWISS DRILLING COMPANY, A QUAL WV CORP AND PALACE VALLEY PETROLEUM COMPANY, A QUAL WV CORP WITH AND INTO SENECA-UPSHUR PETROLEUM, INC., A QUAL WV CORP, THE SURVIVOR.
Date	Amendment

### Annual Reports

**Filed For**

- 2018
- 2017
- 2016
- 2015
- 2014
- 2013
- 2012
- 2011
- 2010
- 2009
- 2008
- 2007
- 2006
- 2005
- 2004
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- 2002
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1999
1998
Date filed

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Wednesday, July 18, 2018 — 1:13 PM

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People Powered. Asset Strong.

May 1, 2019

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; Johnson TFP 40

Dear 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 roadways crossed by the proposed well[s]. 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,

A handwritten signature in blue ink that reads 'Coty Brandon'.

Coty Brandon  
Title Manager

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6031 Wallace Road Ext, Suite 300  
Wexford, PA 15090  
P: 724-940-1100  
F: 800-428-0981  
www.arsenalresources.com



# ARSENAL

R E S O U R C E S

## SITE SAFETY PLAN

### JOHNSON TFP 40 WELL PAD #201

**911 Address:**

4006 Green Valley Rd

Bridgeport, WV 26330

6-6-19

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**JOHNSON TFP40 Well Pad #201 Site Safety Plan  
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- B. Description of Risk – Page 35
- C. Plan Components – (DDC Anti Collision Report) – Page 35-36
- D. Spider Plot and Anti-Collision Plan – Page 37 (Attached Plan)

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## Section 1 – Contacts, Schedules, and Meetings

### A. Emergency Contact Information

This section details the method of notification to the public if an H2S Gas, blowout, or flaring emergency would be encountered. This section also lists the H2S Safety Services and Equipment that will be brought on site in case of an H2S Emergency.

#### Emergency Contact Information

The 24-hour Emergency Contact Information including the name and phone numbers of persons to be notified shall be posted in the production trailer in a common area and in plain sight for reference. The Emergency Contact Information is identified in the following table:

<b>Arsenal Resources – Emergency Contact Information</b>		
<b>Name</b>	<b>Position</b>	<b>24-Hour Phone #</b>
Jon Sheldon	Chief Operating Officer	304-376-0719
Ross Schweitzer	Senior Director of Drilling	724-584-1192
Brandon Wedde	Senior Director of Completions	724-719-1240
Greg McCully	Director of Health and Safety	724-991-9172
<b>West Virginia DEP Office of Oil &amp; Gas – Emergency Contact Information</b>		
<b>Name</b>	<b>Position</b>	<b>24-Hour Phone #</b>
Ken Greynolds	Local WVDEP Inspector, Taylor County	304-201-6613
	Office of Oil & Gas	304-926-0499
	WVDEP Emergency Spill Hotline	1-800-642-3074
<b>Emergency Response Units</b>		
National Response Center for Reporting Chemical or Oil Spills		800-424-8802
WVDEP Emergency Spill Center		800-642-3074
<b>Ambulance, Fire, and Law Enforcement</b>		<b>911</b>
Taylor County EMS		304-265-0904
Taylor County Emergency Service Center		304-265-2524
Taylor County Sheriff Department		304-265-3428

### B. Public Facility Contact Information

According to information provided to Arsenal Resources by D&H, there are six public facilities located within the one-mile radius of the site. These facilities are listed in the table below:

Bailey Memorial UMC	63 Bailey Church Rd	Rosemont	WV	26424	304-842-1174
Flemington Assembly Church of God	1001 West Veterans Memorial HWY	Flemington	WV	26347	304-506-3448
Victory Valley Church	Route 76	Rosemont	WV	26424	304-739-4787
USPS	1791 W Veterans Memorial Hwy	Rosemont	WV	26424	800-275-8777
D&K Custom Cutting	1686 E Veterans Memorial Hwy	Flemington	WV	26347	304-739-2686
Mustangs & Bullets	4041 Green Valley Rd	Bridgeport	WV	26330	304-842-4363

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All landowners within a 1 Mile Radius are listed as part of the Well Safety Plan Map.

\* - *ESRI Aerial Imaging was used to determine the location of Schools/Public Facilities/Houses within one mile of the project site.*

### **C. H2S Gas, Blow Out, and Flaring Emergency Notification and Evacuation Procedures**

This section details the method of notification to the public if an H2S Gas, blowout, or flaring emergency would be encountered. This section also lists the H2S Safety Services and Equipment that will be brought on-site in case of an H2S Emergency.

#### Evacuation Plan

In the event of an emergency that requires evacuation, personnel are to vacate the well pad area in a calm and orderly fashion by exiting the pad via the access road onto CR 17.

The procedure to be used in alerting nearby persons in the event of any occurrence that could pose a threat to life or property will be arranged and completed with public officials in detail, prior to drilling into the hydrogen sulfide formations.

In the event of an actual emergency, the following steps will be immediately taken:

1. Arsenal Resources will immediately notify the appropriate parties from the Emergency Contacts Section of this plan and any other appropriate parties to conduct necessary evacuation notifications. The emergency officials will immediately warn each resident and transient's down-wind within the radius of exposure from the well site, and then warn all residents in the radius of exposure. Additional evacuation zones may be necessary as the situation warrants. Arsenal Resources will provide assistance to emergency authorities.
2. Arsenal Resources will dispatch sufficient personnel to assist with traffic control in the vicinity away from the potentially dangerous area as requested and directed by the emergency authorities in charge of the evacuation procedures. A guard will be stationed at the entrance of the well site to monitor essential and non-essential traffic.
3. General:
  - A. The area included within the radius of exposure is considered to be the zone of maximum potential hazard from a hydrogen sulfide gas escape. Immediate evacuation of public areas, in accordance with the provisions of this contingency plan, is imperative. When it is determined that conditions exist which create an additional area (beyond the initial zone of maximum potential hazard) vulnerable to possible hazard, public areas in the additional hazardous area will be evacuated in accordance

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with the contingency plan.

- B. In the event of a disaster, after the public areas have been evacuated and traffic stopped, it is expected that local civil authorities will have arrived and within a few hours will have assumed direction of and control of the public, including all public areas. Arsenal Resources will cooperate with these authorities to the fullest extent and will exert every effort by careful advice to such authorities to prevent panic or rumors.
- C. Arsenal Resources will dispatch appropriate management personnel at the disaster site as soon as possible. The company's personnel will cooperate with and provide such information to civil authorities as they might require.
- D. One of the products of the combustion of hydrogen sulfide is sulfur dioxide (SO<sub>2</sub>). Under certain conditions this gas may be equally as dangerous as H<sub>2</sub>S. A pump type detector device, which determines the percent of SO<sub>2</sub> in air through concentrations in ppm, will be available. Although normal air movement is sufficient to dissipate this material to safe levels, the SO<sub>2</sub> detector should be utilized to check concentrations in the proximity of the well once every hour, or as necessary and the situation warrants. Also, if any low areas are suspected of having high concentrations, personnel should be made aware of these areas, and steps should be taken to determine whether or not these low areas are hazardous.

This evacuation plan will also be posted in the production trailer in a common area and in plain sight for personnel to reference if there is an emergency that requires evacuation. The evacuation plan will be reviewed in the pre-drill or weekly safety meetings with all personnel.

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#### **D. Pre-Spud Meeting.**

The Pre-Spud Meeting Form included on the next page will be used during the pre-spud meeting to account for all parties that are present. The invited parties shall include Representatives from Arsenal Resources Drilling and HSE Departments, the regional WVDEP Inspector, and representatives from all contractor companies being utilized during the drilling process.

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### **E. Daily Visitor Sign-In Sheets**

Arsenal Resources utilizes a third-party security contractor to monitor the main entry to our sites from the start of the drilling process through the conclusion of flowback. The contractors will be utilizing their forms to document all individuals that access Arsenal Resources' well pad.

### **F. Safety Meetings**

Safety Meetings: Arsenal Resources and selected contractors shall hold a "pre-drill" safety meeting to discuss Well Site Safety during operations at the project location.

Safety Meetings will be held on a daily basis, prior to starting different phases of the operation (e.g., completion or work over operations), or when safety issues arise or need to be addressed.

Attendance logs will be kept for all site safety meetings and maintained on site.

The local WV DEP inspector, Ken Greynolds, or another Office of Oil and Gas representative and emergency responders from the area will be notified of and invited to the pre-drill and subsequent meeting.

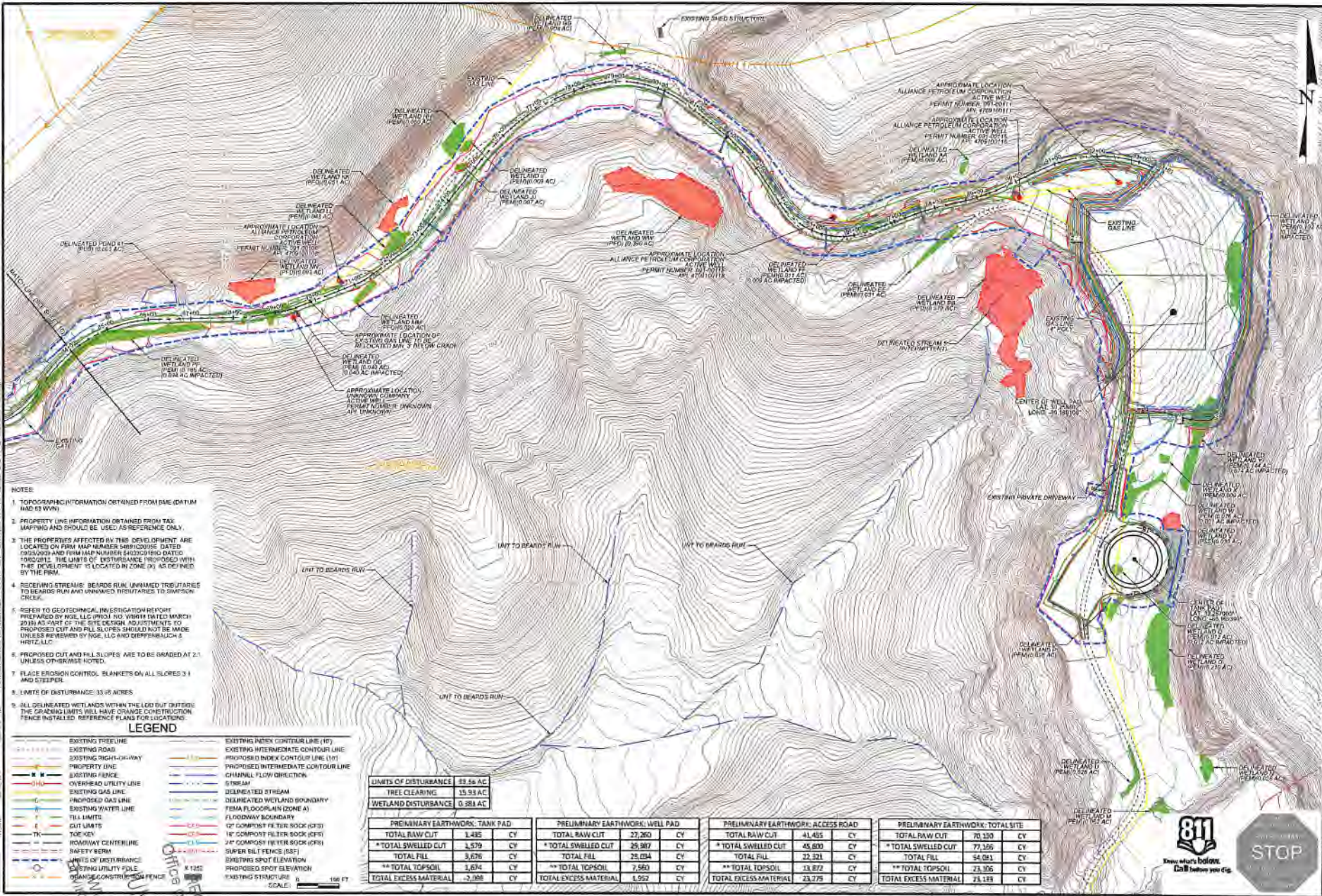
## **Section 2 – Maps and Diagrams**

### **A. Plan View Map**

The following pages include a Plan view map of the location, access road, pit(s), flare lines, nearby dwellings, notation of the north direction and the prevailing wind direction.

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- NOTES:**
1. TOPOGRAPHIC INFORMATION OBTAINED FROM BAC (DATA) MAP #3 W/01
  2. PROPERTY LINE INFORMATION OBTAINED FROM TAX MAPPING AND SHOULD BE USED AS REFERENCE ONLY.
  3. THE PROPERTIES AFFECTED BY THIS DEVELOPMENT ARE LOCATED ON FIRM MAP NUMBER 84932030 (DATED 09/25/09) AND FIRM MAP NUMBER 84932030 (DATED 10/20/12). THE LIMITS OF DISTURBANCE PROPOSED WITH THE DEVELOPMENT IS LOCATED IN ZONE VI AS DEFINED BY THE FIRM.
  4. RECEIVING STREAMS: BEARDS RUN UNIMPAIRED TRIBUTARIES TO BEARDS RUN AND UNIMPAIRED TRIBUTARIES TO SIMPSON CREEK.
  5. REFER TO GEOTECHNICAL INVESTIGATION REPORT PREPARED BY HSE, LLC (PROJ. NO. V0811) DATED MARCH 20 IN AS PART OF THE SITE DESIGN. NO ADJUSTMENTS TO PROPOSED CUT AND FILL SLOPES SHOULD NOT BE MADE UNLESS REVIEWED BY HSE, LLC AND DIFFENBAUGH & HRTZ, LLC.
  6. PROPOSED CUT AND FILL SLOPES ARE TO BE GRADED AT 2:1 UNLESS OTHERWISE NOTED.
  7. PLACE EROSION CONTROL BLANKETS ON ALL SLOPES 3:1 AND STEEPER.
  8. LIMITS OF DISTURBANCE: 33.56 ACRES.
  9. ALL DELINEATED WETLANDS WITHIN THE LOD BUT OUTSIDE THE GRADING LIMITS WILL HAVE ORANGE CONSTRUCTION FENCE INSTALLED. REFERENCE PLANS FOR LOCATIONS.

**LEGEND**

- |                           |                                    |
|---------------------------|------------------------------------|
| EXISTING TREE LINE        | EXISTING INDEX CONTOUR LINE (10')  |
| EXISTING ROAD             | EXISTING INTERMEDIATE CONTOUR LINE |
| EXISTING RIGHT-OF-WAY     | PROPOSED INDEX CONTOUR LINE (10')  |
| PROPERTY LINE             | PROPOSED INTERMEDIATE CONTOUR LINE |
| EXISTING FENCE            | CHANNEL FLOW DIRECTION             |
| OVERHEAD UTILITY LINE     | STREAM                             |
| EXISTING GAS LINE         | DELINEATED STREAM                  |
| PROPOSED GAS LINE         | DELINEATED WETLAND BOUNDARY        |
| EXISTING WATER LINE       | FEMA FLOODPLAIN (ZONE A)           |
| TITLE LIMITS              | FLOODWAY BOUNDARY                  |
| CUT LIMITS                | 18" COMPOST FILTER SOCK (CFS)      |
| KEY                       | 24" COMPOST FILTER SOCK (CFS)      |
| ROWWAY CENTERLINE         | SUPER FILL FENCE (SFF)             |
| RAILWAY BENCH             | EXISTING SPOT ELEVATION            |
| LIMITS OF DISTURBANCE     | PROPOSED SPOT ELEVATION            |
| EXISTING UTILITY POLE     | EXISTING STRUCTURE                 |
| ORANGE CONSTRUCTION FENCE |                                    |

UNITS OF DISTURBANCE	33.56 AC
TREE CLEARING	15.93 AC
WETLAND DISTURBANCE	0.88 AC

PRELIMINARY EARTHWORK: TANK PAD		PRELIMINARY EARTHWORK: WELL PAD		PRELIMINARY EARTHWORK: ACCESS ROAD		PRELIMINARY EARTHWORK: TOTAL SITE	
TOTAL RAW CUT	1,485 CY	TOTAL RAW CUT	27,260 CY	TOTAL RAW CUT	41,435 CY	TOTAL RAW CUT	70,130 CY
* TOTAL SWELLED CUT	1,579 CY	* TOTAL SWELLED CUT	25,987 CY	* TOTAL SWELLED CUT	45,600 CY	* TOTAL SWELLED CUT	77,356 CY
TOTAL FILL	3,676 CY	TOTAL FILL	25,084 CY	TOTAL FILL	22,321 CY	TOTAL FILL	54,081 CY
** TOTAL TOPSOIL	1,634 CY	** TOTAL TOPSOIL	7,580 CY	** TOTAL TOPSOIL	13,872 CY	** TOTAL TOPSOIL	23,306 CY
TOTAL EXCESS MATERIAL	-2,088 CY	TOTAL EXCESS MATERIAL	1,952 CY	TOTAL EXCESS MATERIAL	23,775 CY	TOTAL EXCESS MATERIAL	23,123 CY



PROJECT	JOHNSON TFF40 WELL SITE
CLIENT	ARSENAL
DATE	MAY 2019
SCALE	AS SHOWN
DRAWN BY	ARSENAL
CHECKED BY	ARSENAL
DESIGNED BY	ARSENAL
APPROVED BY	ARSENAL
DATE	MAY 2019
PROJECT NO.	TFF40-01
CLIENT NO.	ARSENAL
PROJECT NO.	ARSENAL
PROJECT NO.	ARSENAL

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## **B. Topographic Map**

This section includes a Topographic map of the well location, including a 1 mile radius of well location, and UTM NAD 83 coordinates of well site entrance, UTM NAD 83 coordinates of the point the access road intersects the public route, and public route numbers and/or route names.

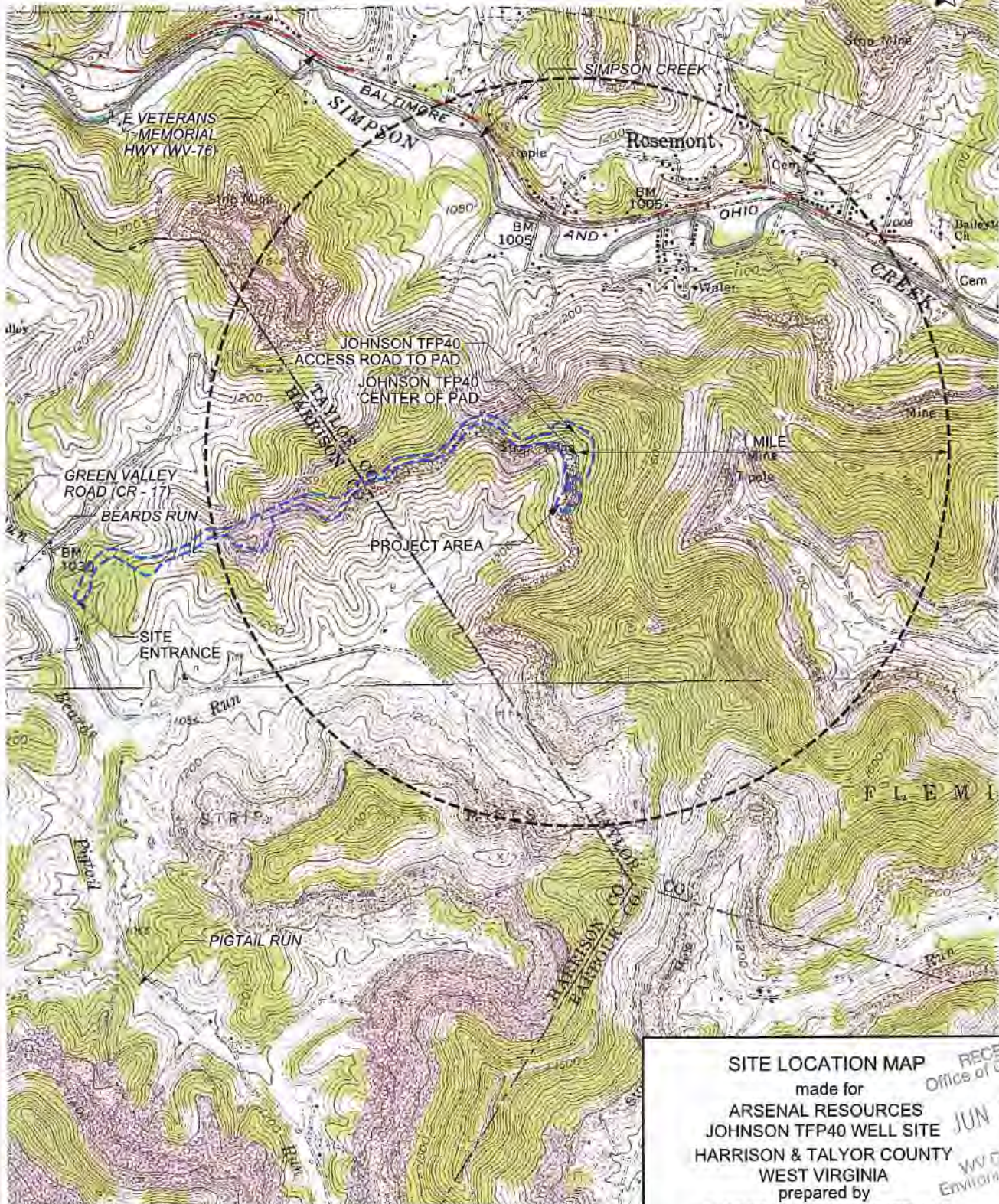
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SITE ACCESS ROAD ENTRANCE (NAD83)  
 UTM (METER)  
 N: 4345150.695  
 E: 569526.425  
 GEOGRAPHIC (DMS)  
 LAT: 39° 15' 10.43"  
 LONG: -80° 11' 3.15"

ACCESS ROAD TO PAD (NAD83)  
 UTM (METER)  
 N: 4345904.476  
 E: 571674.923  
 GEOGRAPHIC (DMS)  
 LAT: 39° 15' 34.25"  
 LONG: -80° 10' 9.22"

CENTER OF PAD (NAD83)  
 UTM (METER)  
 N: 4345803.620  
 E: 571690.367  
 GEOGRAPHIC (DMS)  
 LAT: 39° 15' 30.97"  
 LONG: -80° 10' 8.62"



K:\Mountaintop Keyholes\2017\117079-007 - Johnson TFP40\Common\Site Location Map\_1 (1 MILE).SSM.dgn  
 9/27/2016 3:05:28 PM

REFERENCES: IMAGERY PROVIDED BY USGS;  
 ROSEMONT & BROWNTOWN QUADRANGLES;  
 WEST VIRGINIA 7.5 MINUTE SERIES



**SITE LOCATION MAP**  
 made for  
**ARSENAL RESOURCES**  
**JOHNSON TFP40 WELL SITE**  
**HARRISON & TALYOR COUNTY**  
**WEST VIRGINIA**  
 prepared by  
**DIEFFENBAUCH & HRITZ, LLC**  
 1095 Chaplin Rd Suite 200, Morgantown, WV 26501  
 Phone: 304-985-5555 Fax: 304-985-5557

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### C. Evacuation Plan Procedures

In the event of an H<sub>2</sub>S emergency, the following steps will be immediately taken:

1. Arsenal Resources will immediately notify the appropriate parties from the Emergency Contacts Section of this plan and any other appropriate parties to conduct necessary evacuation notifications. The emergency officials will immediately warn each resident and transient's down-wind within the radius of exposure from the well site, and then warn all residents in the radius of exposure. Additional evacuation zones may be necessary as the situation warrants. Arsenal Resources will provide assistance to emergency authorities.
2. Arsenal Resources will dispatch sufficient personnel to assist with traffic control in the vicinity away from the potentially dangerous area as requested and directed by the emergency authorities in charge of the evacuation procedures. A guard will be stationed at the entrance of the well site to monitor essential and non-essential traffic.

General:

- A. The area included within the radius of exposure is considered to be the zone of maximum potential hazard from a hydrogen sulfide gas escape. Immediate evacuation of public areas, in accordance with the provisions of this contingency plan, is imperative. When it is determined that conditions exist which create an additional area (beyond the initial zone of maximum potential hazard) vulnerable to possible hazard, public areas in the additional hazardous area will be evacuated in accordance with the contingency plan.
- B. In the event of a disaster, after the public areas have been evacuated and traffic stopped, it is expected that local civil authorities will have arrived and within a few hours will have assumed direction of and control of the public, including all public areas. Arsenal Resources will cooperate with these authorities to the fullest extent and will exert every effort by careful advice to such authorities to prevent panic or rumors.
- C. Arsenal Resources will dispatch appropriate management personnel at the disaster site as soon as possible. The company's personnel will cooperate with and provide such information to civil authorities as they might require.
- D. One of the products of the combustion of hydrogen sulfide is sulfur dioxide (SO<sub>2</sub>). Under certain conditions this gas may be equally as dangerous as H<sub>2</sub>S. A pump type detector device, which determines the percent of SO<sub>2</sub> in air through concentrations in ppm, will be available. Although normal air movement is sufficient to dissipate this material to safe levels, the SO<sub>2</sub> detector should be utilized to check concentrations in the proximity of the well once every hour, or as necessary and the situation warrants. Also, if any low areas are suspected of having high concentrations, personnel should be made aware of these areas, and steps should be taken to determine whether or not these low areas are hazardous.

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### Section 3 - Well Work

This section includes written descriptions of well work and procedure to be used during the drilling, completion, and production phases, including schematic plan views of each, as well as casing sheets.

#### **Project Description**

This project includes the construction of several temporary and permanent features including a 8,383 foot long, 16 foot wide gravel access road to a 182,660 square foot gravel well pad with associated erosion and sediment control BMP's. An additional 238 foot long access road is to be constructed from the gravel well pad to a 40,280 square foot gravel AST and Manifold pad. Once the well pad is constructed, the well is to be drilled as a horizontal well for natural gas extraction purposes.

#### **General Drilling Program**

1. Move in and rig up rat hole rig and drill 36" conductor hole and run 26" conductor casing to approximately 80' depth. Cement to surface via pump truck thru swedge and up the backside and drill 16" mouse hole per rig specifications. Rig down move off rat hole rig.
2. Move in and rig up a double or triple drilling rig, rig up flow lines and steel pits, and drill 17 1/2" hole to a depth of 300' – 1000' depending on local fresh water depth. Drilling medium will be on fresh water. Run new, J-55, 54.5#, 13 3/8" casing and hardware to near bottom and cement to surface with Class A, 3% CaCl2 cement. Wait at least 8 hrs. on cement prior to drilling. If no cement circulation, call the inspector, run a CBL to determine cement top, then grout from the top back to surface. Wait on top grout 8hrs if grout is needed prior to drilling. Nipple up casing with annular BOP and test.
3. *Open Mine Contingency Plan:* when an open mine is encountered, Arsenal Resources will run 20" (H-40, 94#) and hardware as a mine string. The mine string will be set between 30 to 50 feet below the base of the open mine encountered. The mine string will have a cement balance job on the bottom (below the open mine), and the top will be surface-grouted to ground level. Then drill down to the proposed surface depth and set 13 -3/8" casing as originally planned.
4. Rig up directional drillers (if they are scheduled to nudge the surface) and trip in hole with 12 1/4" bit and drill on fresh water to the depth of 50 feet below the base of the 5<sup>th</sup> Sand, at approximately 1,500-2,800 feet. Any change from permitted depth will result in immediate notification to the OOG inspector for approval and subsequent modification to other well casing plans on the same pad will be made immediately to the OOG inspector. Run new, J-55 40#, 9 5/8" casing and hardware to near bottom and cement to surface with Class A cement. Wait at least 8 hrs. on cement prior to drilling.
5. Trip in hole with directional tools and 8 3/4" bit, continue drilling on fresh water to KOP. Then switch to a synthetic base mud system, and drill and build angle at 9 degree doglegs and land well at approximately 90 degrees horizontal in the lower Marcellus. Trip for directional issues or bit as needed, and drill 8 3/4" or 8 1/2" hole.
6. Drill 8 3/4" or 8 1/2" hole to planned total depth. Condition and prep the hole for casing run, and trip out of the hole. Lay down drilling assembly, and rig up casing crew and handling equipment. Run 5.5" 20# P-110, production casing the entire

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measured depth of the well. Rig down casing crew and equipment, and rig up cementing crew. Cement production casing in 2 stages, with the lead and tail consisting of various densities of Class A cement slurry. The top of the production cement will be brought to approximately 150' within the intermediate casing shoe.

Once drilling operations have finished, the Johnson TFP40 #201 will be handed over to completions. Arsenal Resources will complete the well, using wireline perforating, and slickwater fracing. The number of stages will be determined once the lateral has been drilled. Each stage will consist of 400,000 lbs. of sand and approximately 350,000 gallons of water.

### **Well Equipment Set Up Procedure**

1. Well set up starts by meeting with completions, flow back, set up contractor, and production supervisor.
2. A discussion is made on where to set surface equipment, GPU's Tanks and lines.
3. Procedure for equipment setup is to level off and gravel GPU and Tank area. Build concrete pad for GPU's and construct tank containment, and then set GPU's and Tanks. Install header pipe and dump lines to tanks. Install Sand traps, Lock-out casing valve and install prefabbed well head fittings, and dig up and install 3" lines to well heads. X-Ray all welds on gas lines; install skillets and block of lines for Hydrostatic test, test pipe. Drain pipe, remove plugs and skillets, bolt piping back up. Finish hooking up ESD Controls.
4. Welding is done in one corner of locations, utilizing flow backs LEL and our Personal LEL Monitors

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## Wellbore Casing and Cement Information

Geology information pertaining to the depths of freshwater, saltwater, coal, voids, etc., as listed on the Well Permit Application have been identified in the table below:

Geologic Information	
Approximate freshwater strata depths	45.5', 132.5', 187.5', 219.5', 817.5', 1102.5'
Approximate saltwater depths	1987.5'
Approximate coal seam depths	322.5', 398.5', 477.5', 577.5', 630.5', 692.5', 760.5', 825.5', 845.5, 876.5'
Approximate void depths (coal, karst, other)	None

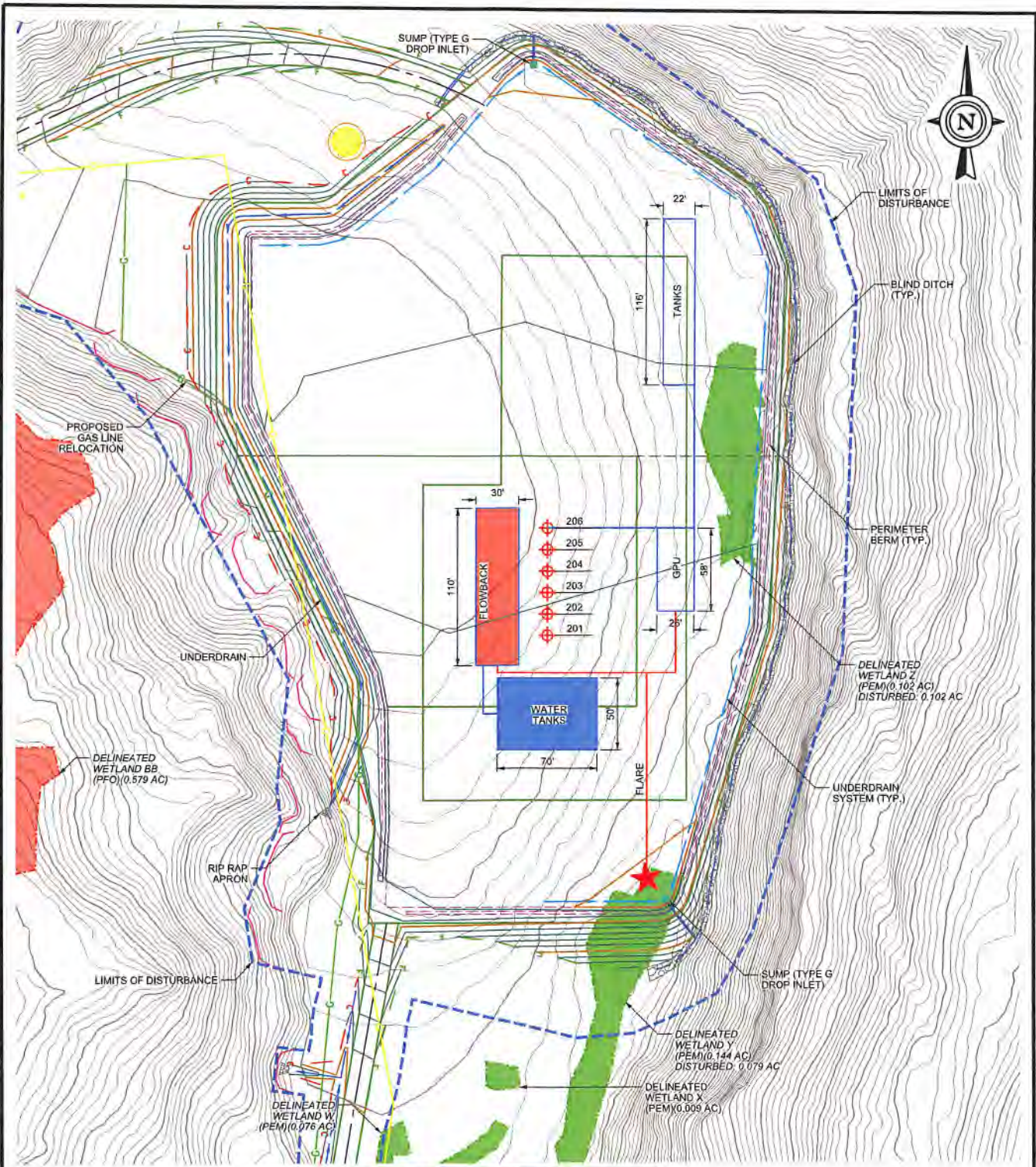
1. Casing and Cementing Standards listed on the Well Work Permit Application Casing and Tubing Program Table have been identified in the table below:

Casing & Tubing Program						
Casing Type	Size	Grade	Weight /FT	For Drilling	Left in Well	Fill Up
Conductor	24"		94#	80'	80'	CTS
Fr. Water	13.375"	J-55	54.5#	1,175'	1,175'	CTS
Intermediate	9.625"	J-55	40#	2,600'	2,600'	CTS
Production	5.5"	P-110	20#	22,482'	22,482'	TOC @ 2,450
Tubing						

All casing and cement will meet current API standards any special conditions required of the permit that were set forth upon approval.

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K:\Mountainliner Keystone\2017\17078-007 - Johnson TFP40\Common\Flowback Schematic Layout.dgn  
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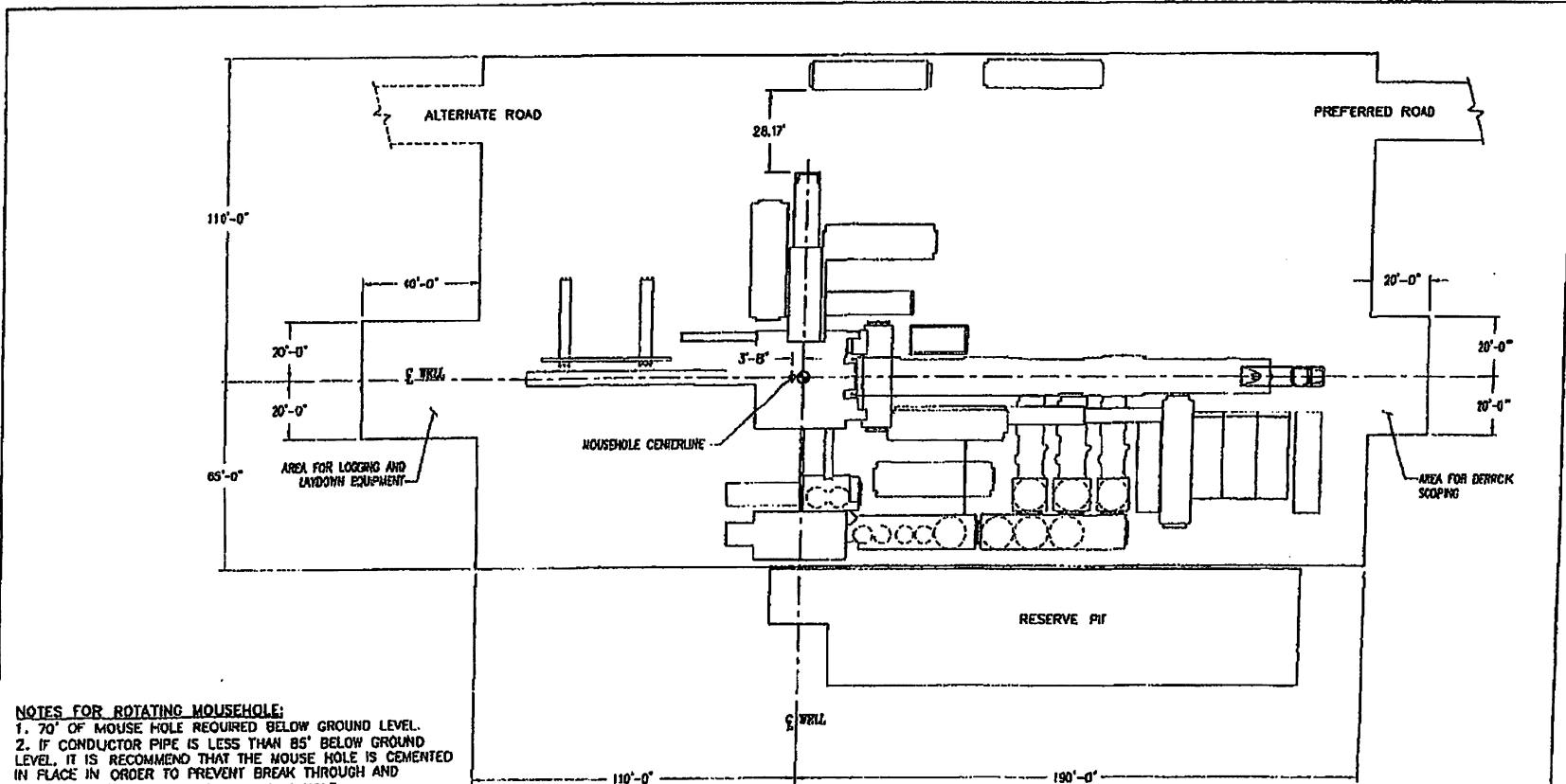
WELL NO.	STATE PLAN COORDINATE (WVN NAD 83)	LAT/LONG COORDINATE	LAT/LONG COORDINATE (NAD 83) (DMS)	UTM COORDINATE (NAD83-ZONE 17-METER)	EXISTING ELEV (NAVD88) (FT)	PROPOSED ELEV. (NAVD88) (FT)
WELL 201	NORTHING 276971.7221	LAT. 39.258499°	LAT. 39°15'30.60"	NORTHING 4345792.144	1335.08'	1333.5'
	EASTING 1779051.6624	LONG. -80.169060°	LONG. -80°10'08.61"	EASTING 571690.548		
WELL 202	NORTHING 276986.7221	LAT. 39.258540°	LAT. 39°15'30.79"	NORTHING 4345796.714	1335.90'	1333.5'
	EASTING 1779051.6624	LONG. -80.169060°	LONG. -80°10'08.62"	EASTING 571690.472		
WELL 203	NORTHING 277001.7221	LAT. 39.258582°	LAT. 39°15'30.89"	NORTHING 4345801.284	1337.01'	1333.5'
	EASTING 1779051.6624	LONG. -80.169060°	LONG. -80°10'08.62"	EASTING 571690.397		
WELL 204	NORTHING 277016.7221	LAT. 39.258623°	LAT. 39°15'31.04"	NORTHING 4345805.854	1337.79'	1333.5'
	EASTING 1779051.6624	LONG. -80.169061°	LONG. -80°10'08.62"	EASTING 571690.321		
WELL 205	NORTHING 277031.7221	LAT. 39.258664°	LAT. 39°15'31.19"	NORTHING 4345810.424	1338.26'	1333.5'
	EASTING 1779051.6624	LONG. -80.169061°	LONG. -80°10'08.62"	EASTING 571690.245		
WELL 206	NORTHING 277046.7221	LAT. 39.258705°	LAT. 39°15'31.34"	NORTHING 4345814.994	1338.79'	1333.5'
	EASTING 1779051.6624	LONG. -80.169062°	LONG. -80°10'08.62"	EASTING 571690.189		



**FLOWBACK SCHEMATIC LAYOUT**  
 made for  
**ARSENAL RESOURCES**  
**JOHNSON TFP40 WELL SITE**  
 Harrison and Taylor County, West Virginia  
 prepared by  
**DIEFFENBAUCH & HRITZ, LLC**  
 1095 Chaplin Rd Suite 200, Morgantown, WV 26501  
 Phone: 304-985-5555 Fax: 304-985-5557

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**NOTES FOR ROTATING MOUSEHOLE:**

1. 70" OF MOUSE HOLE REQUIRED BELOW GROUND LEVEL.
2. IF CONDUCTOR PIPE IS LESS THAN 85' BELOW GROUND LEVEL, IT IS RECOMMEND THAT THE MOUSE HOLE IS CEMENTED IN PLACE IN ORDER TO PREVENT BREAK THROUGH AND CIRCULATION/WASHOUT THROUGH MOUSE HOLE.
3. USE 12" (MINIMUM NOMINAL SIZE) PIPE. THIS CAN BE SPIRAL WELD OR LOW PRESSURE PIPE. 10" IS USED IN SOME APPLICATIONS, BUT DUE TO INACCURACIES IN LOCATION OF MOUSEHOLE AND POTENTIAL OUT OF ALIGNMENT, 12" PIPE IS RECOMMENDED.
4. CEMENT MOUSE HOLE IN 13 1/2" OR 14 3/4" HOLE.

SEE SHIT 1 FOR RIG COMPONENT LAYOUT

**PROPRIETARY**  
 THE DESIGN AND THE WORKING INFORMATION INCLUDED IN THIS DRAWING ARE PROPRIETARY AND ARE THE PROPERTY OF HELMERICH & PAYNE INTERNATIONAL DRILLING CO. ANY REPRODUCTION OR DISSEMINATION OF ANY INFORMATION CONTAINED HEREIN WITHOUT THE WRITTEN CONSENT OF A QUAL AUTHORIZED OFFICER OF HELMERICH & PAYNE INTERNATIONAL DRILLING CO.

**FOR ENGINEERING REVIEW/APPROVAL**  
 June-23-2004  
 DRAFTSMAN  
 ENGINEER

NO.	DATE	DESCRIPTION	BY

**HELMERICH & PAYNE INTERNATIONAL DRILLING CO.**

**SITE LAYOUT**

CLIENT: H&P  
 PROJECT: FlexRig3

DRAWN: B21    DATE: 24-23-04    DWG NO.:  
 SCALE: 1/16"=1'    SHEET: 2 OF 2    210-00-01

**B. LEPC Submission**

The following page contains a Statement detailing that the plan will be provided to the local emergency planning committee or county emergency services office within at least 7 days from land disturbance or well work.

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Arsenal Resources acknowledges that a copy of this Site Safety Plan will be submitted to the Local Emergency Planning Committee or county emergency services office, as listed in the contacts section of this plan, within at least 7 days from land disturbance or well work.

---

Larry E. Carder  
Permitting Manager

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## **Section 4 – Chemical Inventory and Safety Data Sheets (SDS)**

### **A. SDS Availability / Location**

The SDS sheets will be provided and maintained by the selected contractor(s) and for personnel to reference.

The location of the SDS sheets, how they are referenced, and maintained shall be detailed in each of the operations meetings and the pre-drill or weekly safety meetings with all personnel.

### **B. Inventory of Mud Materials**

1. Inventory: At least 70,965 pounds of barite will be kept on location plus additional weight at the warehouse. At least 2,075 bbls of drilling fluid will be onsite and additional fluid will be stored both on location and at the warehouse.
2. The number and type of mixing units for mixing the mud on site shall be provided by the selected contractor and kept in the production trailer in a designated archive area for reference.
3. The selected driller shall use IADC well control methods. These shall include the Driller's Method, Wait and Weight, Dynamic Volumetric, Migration/Bleed, and Lubrication/Bleed. The primary methods are Driller's Method and Wait and Weight.

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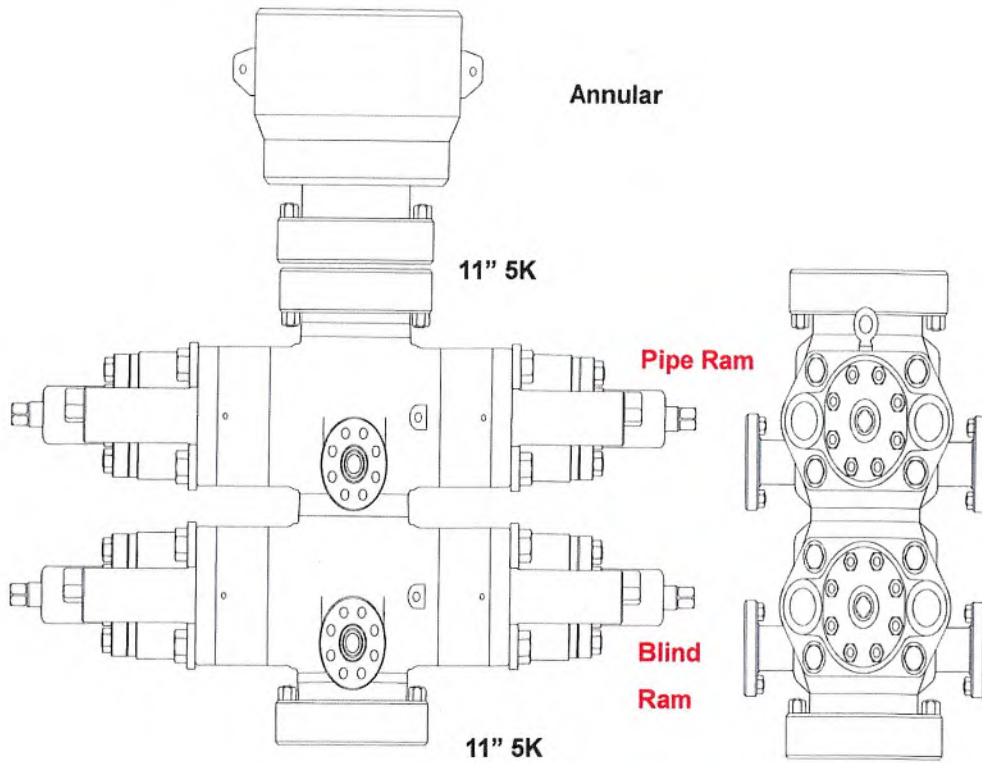
**Section 5 -BOP and Well Control**

**A. BOP Equipment**

The following pages include schematics and information on the BOP equipment.

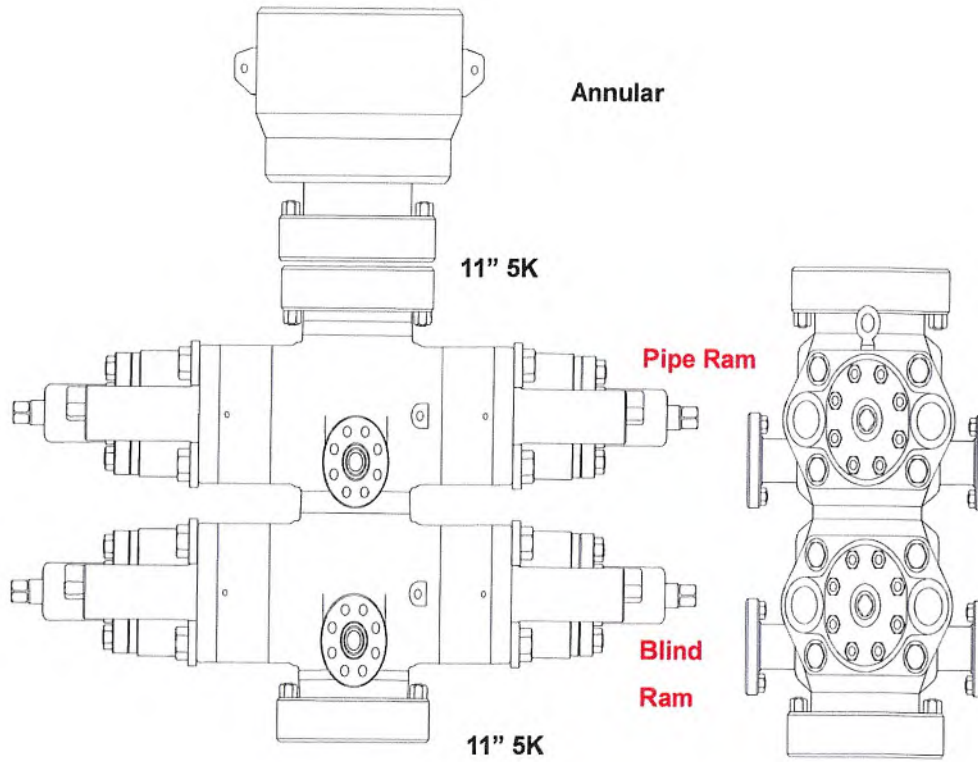
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**11" 5K Double Ram BOP**



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**11" 5K Double Ram BOP**



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# Choke & Kill, BOP



- Choke & Kill, BOP
- Rotary hose
- Hydraulic hose
- Hammer Unions
- Industrial hose
- Fire hose
- Metal hose, Expansion Joints
- Ducting hose
- Automotive hose
- Crimp Fittings & Machines
- Frac Fittings, Notched KCs
- Cam & Groove, Universal, Shank Fittings
- Valves
- Black Pipe
- Quick Couplings
- Gauges
- Belts, Sheaves, & Bushings
- Steel Adapters
- Brass Adapters

## MWH Choke & Kill

Designed as a flexible connection to the choke manifold.

**Tube:** petroleum resistant for oil based drilling fluids

**Cover:** ozone, petroleum, and abrasion resistant

**Reinforcement:** high tensile steel wire spiral layers

**Thermal Blanket:** 1500° continuous ratings,

non-flammable, non-conductive

**Armor Wall:** .144"

**Max Length:** 150 feet



-20° F / +212° F  
-29° C / +100° C



Item	ID inch	OD inch	WP psi	Test psi	Weight lbs./ft
CK-48 Red	3	4.94	5,000	10,000	14.9
CK-56 Red	3½	5.44			17.7
CK-64 Red	4	6.31			26.4
CK-48 Armor	3	6.5			20.8
CK-56 Armor	3½	7			23.1
CK-64 Armor	4	8			26.3
CK-4810K Red	3	5.31	10,000	15,000	22.3
CK-5610K Red	3½	5.81			25.0
CK-6410K Red	4	4.75			36.1
CK-4810K Armor	3	6.5			26.0
CK-5610K Armor	3½	7			29.0
CK-6410K Armor	4	8			32.8

## MWH BOP Control Line

For blowout preventer lines.

**Tube:** for hydraulic BOP actuation

**Thermal Blanket:** 1500°

continuous rating,

non-flammable, non-conductive

**Armor Wall:** .08"

Popular with a larger hex and longer threads for easier installation of hammer unions.



-20° F / +212° F  
-29° C / +100° C



Item	ID inch	OD inch	WP psi	Test psi	Weight lbs./ft
BOP-16 Armor	1	2.06	5,000	10,000	3.9
BOP-32 Armor	2	3.75			11.7
BOP-16	1	1.77			2.1
BOP-32	2	3.09			10.2

Carbon or stainless steel nipples are available and 1/2", 3/4", 1-1/4", and 1-1/2" sizes are available too.



Weld-on Flanges or Hammer Unions



Integral 1002/1502 Hammer Union Fittings



Safety Clamps



Fire Proof Quick Connects



Ring Gaskets

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## **Section 5, continued**

### **B. BOP Testing**

Procedure and Schedule for Testing the BOP Stack: For the bottom and horizontal wellbore drilling phase, the BOP equipment shall be function tested upon initial installation, weekly, and after each bit trip. The BOP equipment shall be pressure tested upon initial installation and every twenty-one (21) days thereafter. All pressure tests shall be performed for thirty (30) minutes. Annular preventers should be tested to seventy percent (70%) of the rated capacity and ram preventers should be tested to eighty percent (80%) of the rated capacity.

BOP Schedule: A schedule of BOP equipment installation and operation shall be kept for each applicable string in the Detailed Daily Reports that are kept in the production trailer in a designated archive location for reference.

Adjustments and variances are only permitted with consent of the area drilling/completion manager and WVDEP Inspector.

The Testing will follow the requirements of 35-8 5.7.c.2.

### **C. BOP Equipment and Assembly Installation Schedule**

1. The 13 3/8" Rotating Head will be installed when nipping up on the 13 3/8" casing. It will divert returns to the pit while air drilling this section.
2. The 9 5/8" BOP stack will be installed when nipping up on the 13 3/8" casing. The BOP will be pressure tested using a test plug. The BOP will be tested to a pressure of 250 psi low and 5,000 psi high and the annular to 250 psi low and 2,500 psi high prior to drilling out 8 5/8" casing.
3. When the 10,000 psi BOP stack is in use, a 10,000 psi upper and lower Kelly cock will be employed. They will be tested when the BOP stack is tested.

### **D. Personnel with Well Control Training**

A list of all personnel with approved well control training and current certification recognized by the International Association of Drilling Contractors (IADC) shall be provided to the Office prior to the pre-spud meeting. Current Arsenal Resources employee with Wild Well Control training is Ross Schweitzer and Jarrett Toms.

### **E. Well Event Record Keeping**

Detailed Log: A detailed daily record of events shall be kept during the drilling operation noting any significant event (e.g., lost circulation, presence of hydrogen sulfide, fluid entry, kicks and abnormal pressures). The daily reports will be kept in the production trailer in a designated archive location for reference.

## **F. Inspector Notification**

A detailed record of significant drilling events will be recorded in Arsenal Resources well log book. The state inspector will be notified upon any significant drilling events including the encounter of Hydrogen Sulfide Gas, lost circulation, fluid entry, abnormal pressures, etc.

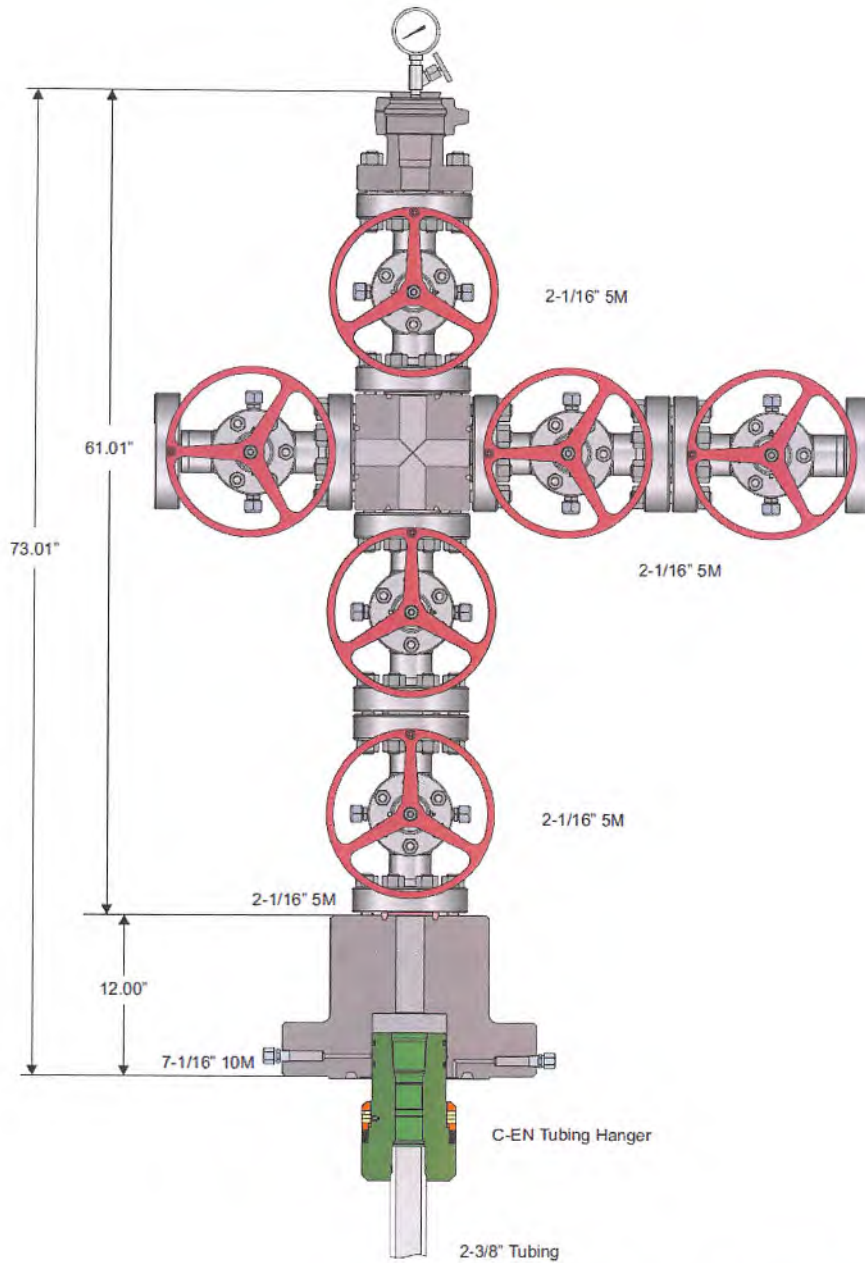
## **G. Wellhead Assembly**

The following pages contain sketches of the anticipated wellhead assemblies that will be used.

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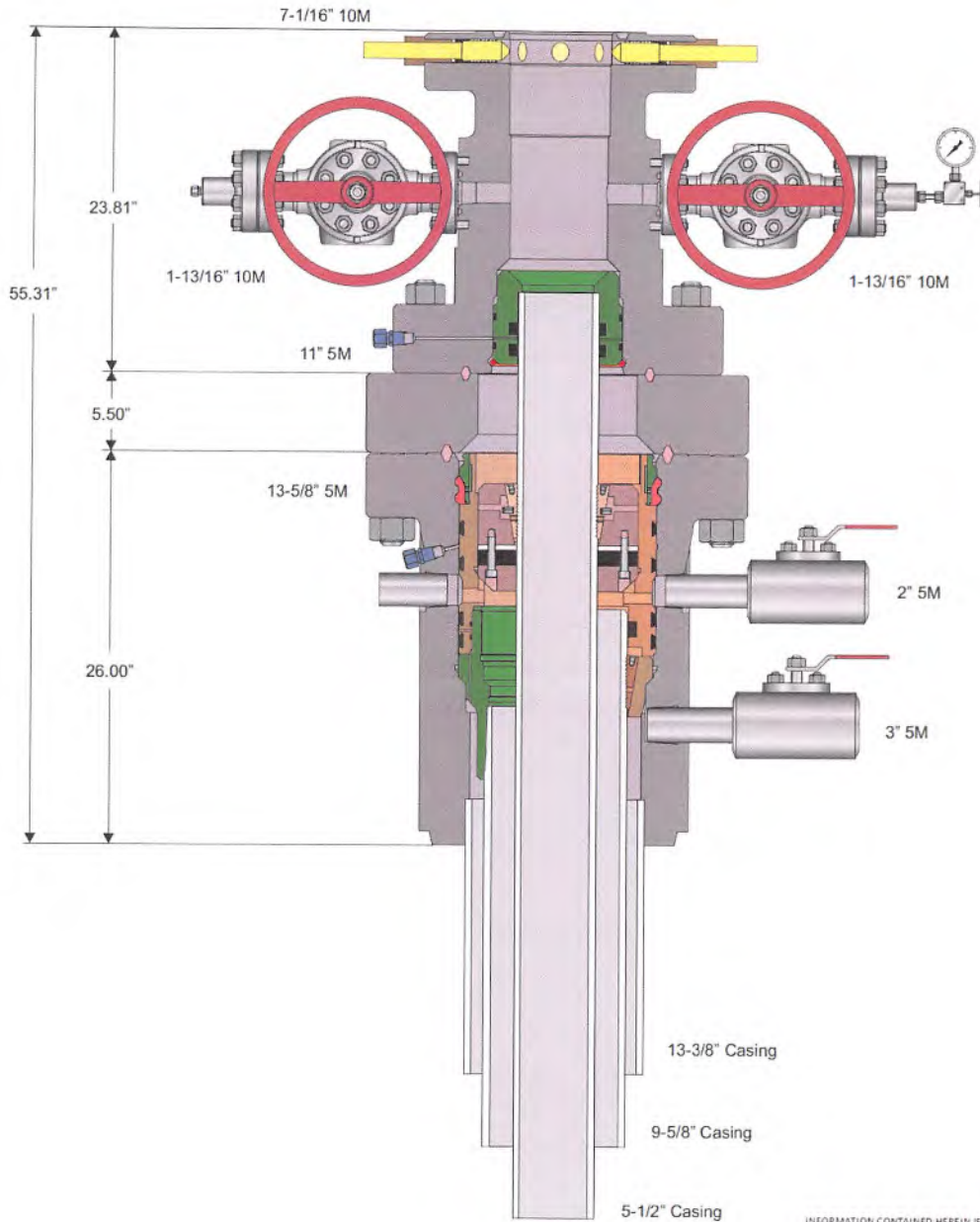
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## H. Well Kill Procedures

1. Inventory: At least 70,965 pounds of barite will be kept on location plus additional weight at the warehouse. At least 2,075 bbls of drilling fluid will be onsite and additional fluid will be stored both on location and at the warehouse.
2. The number and type of mixing units for mixing the mud on site shall be provided by the selected contractor and kept in the production trailer in a designated archive area for reference.
3. The selected driller shall use IADC well control methods. These shall include the Driller's Method, Wait and Weight, Dynamic Volumetric, Migration/Bleed, and Lubrication/Bleed. The primary methods are Driller's Method and Wait and Weight.

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## **Section 6 – Hydrogen Sulfide (H2S)**

### **A. Hydrogen Sulfide (H2S) Detection and Warning Equipment**

Arsenal Resources has a MeshGuard LEL and H2S Monitoring system installed on the rig. The system triggers audio and visual alarms if it detects LEL or H2S at action levels.

The system consists of the following:

- 1 H<sub>2</sub>S Fixed Monitor w/2 relays (relays location in doghouse & company man trailer)
- 4 H<sub>2</sub>S Sensors (sensors located on rig floor, cellar, shakers, and mud tank)
- 2 Explosion Proof Alarms (Light and Siren)

Arsenal Resources employees will utilize MGC multi-gas detectors. The selected contractor foreman shall immediately notify the WV DEP Office of Oil and Gas Inspector and the Office when Hydrogen Sulfide is encountered.

### **B. H2S Personnel Training**

Personnel involved with the monitoring, detection or warning of the presence of Hydrogen Sulfide shall be provided training in a special training session detailing how to use the equipment and issue the necessary warning prior to the operations commencing. This is special Hydrogen Sulfide detection training that will be conducted by the selected contractor.

### **C. Inspector Notification of H2S Presence**

The selected contractor shall immediately contact the WV DEP Office of Oil and Gas Inspector by phone when Hydrogen Sulfide is detected and alert the guard station that no entry to the site shall be granted to unauthorized personnel during that time until the presence of Hydrogen Sulfide is no longer detected and the site is deemed safe by the WV DEP Office of Oil and Gas Inspector or Office Representative.

### **D. Establishment of Protective Zones**

#### **Evacuation and Notification of General Public if an H2S Emergency Occurs:**

In the event of an accident that requires notification to the residents within 2,500 feet of the well site, local emergency responders and the Taylor County Emergency Services shall be notified by phone and coordinate alerting the residents by phone or in person and advise them of the appropriate action.

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The selected contractor shall maintain the 2,500 foot protection zone during all applicable events such as hydrogen sulfide, blow-outs and flaring by alerting the local emergency responders and the Taylor County Emergency Services and having them coordinate notifications and evacuation of the protection zone.

### **E. H2S PPE**

#### Personal Protective Equipment (PPE):

During operations, all personnel shall have on hard hats, safety goggles, fire retardant clothing, steel toe boots and earplugs at all times. Additional PPE may be required for specialized tasks.

Each individual's required PPE will be detailed in the Job Safety Analysis report that is kept in the production trailer in a designated archive area for reference, and shall be reviewed by each individual prior to the start of their shift.

Personnel without the required PPE will not be granted access to the site.

#### H2S Safety Services Equipment List:

In the event of an H2S Emergency, Total Safety or TekSolv will be contacted to provide the following:

#### Hydrogen Sulfide Safety Package

##### **Respiratory Safety Systems**

<u>QTY</u>	<u>DESCRIPTION</u>
8	30-minute pressure demand SCBA with Pigtail.
4	4 supplied Air Respirators with 5 minute escape bottles.

##### **Detection and Alarm Safety System**

1	Personal H <sub>2</sub> S monitors
1	Portable Tri-Gas Hand Held Meter (O <sub>2</sub> , LEL, H <sub>2</sub> S)
1	Gastech Manual Impingement Pump Type Detector
2	Boxes H <sub>2</sub> S Tubes Various Ranges
2	Boxes SO <sub>2</sub> Tubes Various Ranges
1	Calibration Gas
1	Set Paper Work for Records: Training, Cal, Inspection, other

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### **Additional Safety Related Equipment**

<u>QTY</u>	<u>Description</u>
2	Windsocks with Pole and Bracket
1	Set Well Condition Sign w/Green, Yellow, Red Flags
1	Primary Safe Briefing Area Sign
1	Secondary Safe Briefing Area Sign
1	Oxygen Resuscitator

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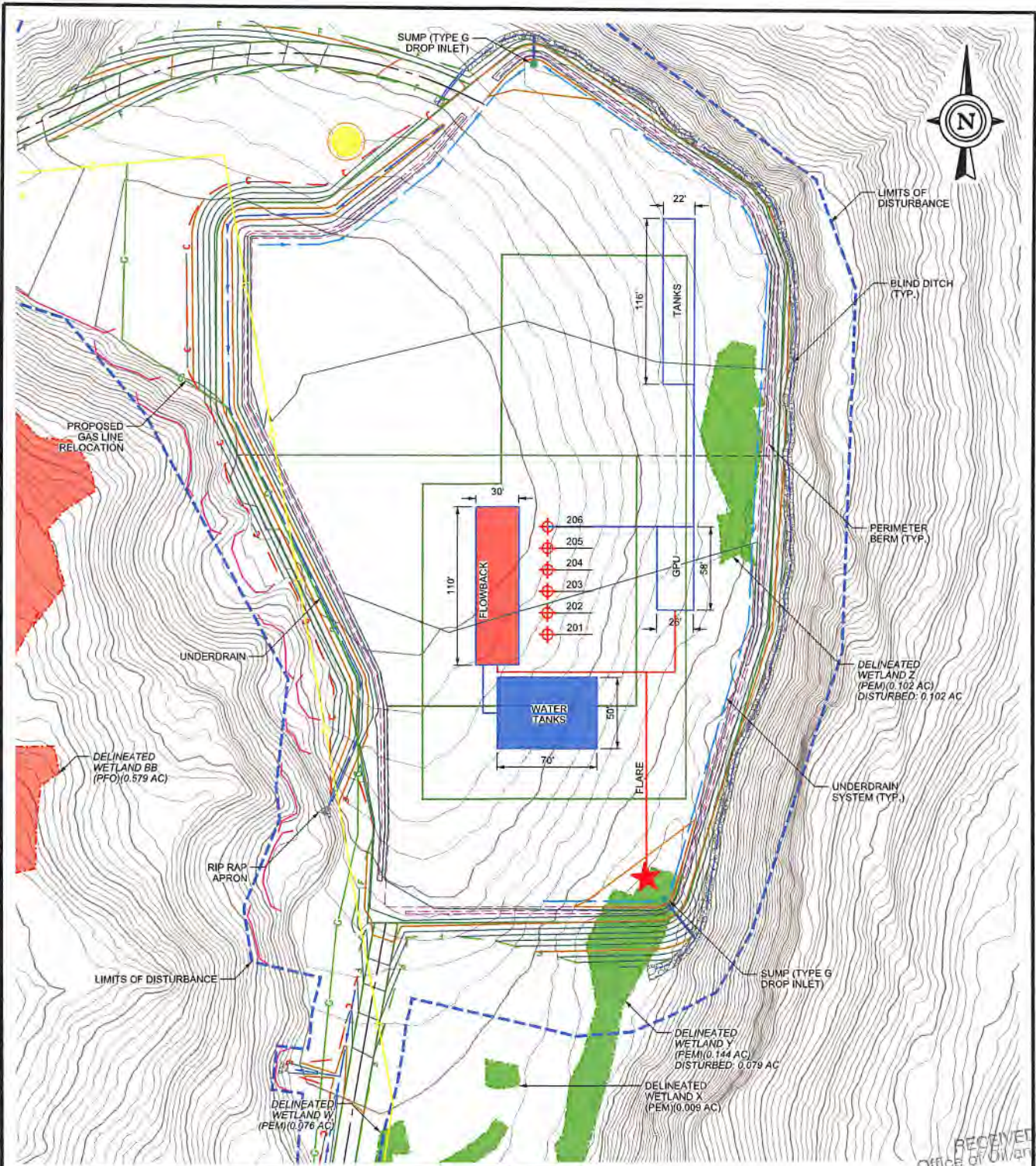


## **Section 7 – Flaring**

- A. Description and Plan including schematic of installation for duration of flaring activities:
1. Flare Line will be constructed using three inch flare line tubing and anchored with cement anchor blocks. The line will have a dual choke assembly manifold with adjustable manual chokes. A detailed Pad Flaring Diagram is located in Section 7.
  2. The selected contractor will designate the system to light the flare and the dedication of the back-up igniters.
  3. The Taylor County Emergency Services and local Volunteer Fire Department shall be notified by the selected contractor foreman prior to lighting the flare when possible, and as soon after lighting the flare as reasonably possible.
  4. A minimum distance of 100 feet will be maintained to the nearest flammable material beyond the end of the flare line. The flare line has been placed in order to avoid any distance less than 100 feet to the nearest wooded area. The flare line minimum distances to the nearest flammable material shall be detailed in each of the operations meetings and the pre-drill or weekly safety meetings with all personnel.
  5. The estimated flaring operations for this site are anticipated to last no longer than two weeks.

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WELL NO.	STATE PLAN COORDINATE (WVN NAD83)	LAT/LONG COORDINATE	LAT/LONG COORDINATE (NAD 83) (DMS)	UTM COORDINATE (NAD83-ZONE 17-METER)	EXISTING ELEV (NAVD88) (FT)	PROPOSED ELEV. (NAVD88) (FT)
WELL 201	NORTHING 276971.7221	LAT. 39.258499°	LAT. 39°15'30.60"	NORTHING 4345792.144	1335.06'	1333.5'
	EASTING 1779051.6624	LONG. -80.159060°	LONG. -80°10'08.61"	EASTING 571690.548		
WELL 202	NORTHING 276986.7221	LAT. 39.258540°	LAT. 39°15'30.75"	NORTHING 4345796.714	1335.90'	1333.5'
	EASTING 1779051.6624	LONG. -80.159060°	LONG. -80°10'08.62"	EASTING 571690.472		
WELL 203	NORTHING 277001.7221	LAT. 39.258882°	LAT. 39°15'30.89"	NORTHING 4345801.284	1337.01'	1333.5'
	EASTING 1779051.6624	LONG. -80.159060°	LONG. -80°10'08.62"	EASTING 571690.397		
WELL 204	NORTHING 277016.7221	LAT. 39.258623°	LAT. 39°15'31.04"	NORTHING 4345805.854	1337.79'	1333.5'
	EASTING 1779051.6624	LONG. -80.159061°	LONG. -80°10'08.62"	EASTING 571690.321		
WELL 205	NORTHING 277031.7221	LAT. 39.258664°	LAT. 39°15'31.19"	NORTHING 4345810.424	1338.26'	1333.5'
	EASTING 1779051.6624	LONG. -80.159061°	LONG. -80°10'08.62"	EASTING 571690.245		
WELL 206	NORTHING 277046.7221	LAT. 39.258705°	LAT. 39°15'31.34"	NORTHING 4345814.994	1338.79'	1333.5'
	EASTING 1779051.6624	LONG. -80.159062°	LONG. -80°10'08.62"	EASTING 571690.169		

**FLOWBACK SCHEMATIC LAYOUT**  
made for Environmental Protection

ARSENAL RESOURCES  
 JOHNSON TFP40 WELL SITE  
 Harrison and Taylor County, West Virginia  
 prepared by  
 DIEFFENBAUCH & HRITZ, LLC  
 1095 Chaplin Rd Suite 200, Morgantown, WV 26501  
 Phone: 304-985-5555 Fax: 304-985-5557





## **Section 8 – Collision Avoidance**

### **A. Established Definitions**

Protocol and established safeguard designed to prevent underground collisions during any drilling on multi-well pads.

### **B. Description of Risk**

Arsenal Resources uses an anti-collision protocol on all wells as a safeguard designed to prevent underground collision during any drilling on multi-well pads.

### **C. Plan Components**

1. All surveys will be MWD/EM survey tools in all hole sections, and surveys will be taken every stand (Around 90'). If the SF < 1 surveys will be taken on a more frequent basis, most likely every 30'. We will discuss with the WVDEP Oil and Gas Inspector.
2. All directional and MWD tools will be visually inspected by directional MWD personnel and Arsenal Resources site representatives at a minimum.
3. Surface nudges will be planned by the directional company as needed to maintain a safe SF.
4. The same survey tools that we use in the vertical section will be used.
5. The directional company uses a AC software to maintain a safe SF. Compass is the current company's software.
6. Arsenal Resources will maintain the state minimum SF factors in all whole sections.
  - a. Minimum SF standards (thresholds) required – SF > 1.5 shall be obtained early as practical and maintained. Survey every stand (90').
  - b. SF > 2 applies when in proximity to any fractured or any producing well that exists on the well pad. Survey every stand (90'). \*\*Additional risk management might be needed as well and will be addressed as needed.
7. Lateral Section
  - a. Arsenal Resources will work with the directional companies to maintain delineation, grid connections, and ensure magnetic interference correction is being followed. The onsite Arsenal Resources representative and the directional company's MWD personnel will be responsible for QC/QA.

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8. For any existing horizontal or vertical well found adjacent to the lateral section Arsenal Resources will maintain over a 2 SF and will review each well on a case by case basis with a pre-drilled AC program along with continually updating the plan while drilling.
9. Arsenal Resources will attach the wall map showing all wells on the pad spaced at 10' - 15' apart. If there is a fractured well, (live) well, Arsenal Resources will note it in the drawing.
10. When there is an existing wellbore on the pad, Arsenal Resources will attach notes and or surveys for the well.
11. If a collision should occur, the wellbores would be shut in immediately and the well would need to be killed with kill mud. If a survey shows imminent risk for a collision, Arsenal Resources will stop drilling and confirm with a gyro, then evaluate the situation on a case by case basis. If Arsenal Resources can steer away with MWD or a gyro we will, or we will plug back if needed.
12. Arsenal Resources will notify the WVDEP Oil and Gas inspector immediately of any underground collision or if the SF level 1 is determined.
13. Arsenal Resources will provide other supportive resources as needed.

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## Arsenal Resources

Taylor County, West Virginia  
Johnson TFP40 #201

## Anti-collision Report (Attached)

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## **Arsenal Resources**

**Taylor County, West Virginia  
Johnson TFP40 Pad  
Johnson TFP40 #201**

**Wellbore #1  
Design #3**

## **QES Anticollision Report**

**04 June, 2019**



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<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

<b>Reference</b>	Design #3
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria
<b>Interpolation Method:</b>	Stations
<b>Depth Range:</b>	Unlimited
<b>Results Limited by:</b>	Maximum center-center distance of 10,000.0 us
<b>Warning Levels Evaluated at:</b>	2.00 Sigma
<b>Error Model:</b>	ISCWSA
<b>Scan Method:</b>	Closest Approach 3D
<b>Error Surface:</b>	Pedal Curve

<b>Survey Tool Program</b>	Date	5/28/2019		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	22,482.4	Design #3 (Wellbore #1)	MWD default	MWD - Standard

Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
<b>Offset Well - Wellbore - Design</b>						
Johnson TFP40 Pad						
Johnson TFP40 #202 - Wellbore #1 - Design #2	3,551.8	3,553.5	12.7	-4.0	0.761	Level 1, CC
Johnson TFP40 #202 - Wellbore #1 - Design #2	3,600.0	3,601.7	12.8	-4.1	0.758	Level 1, ES, SF
Johnson TFP40 #203 - Wellbore #1 - Design #2	3,588.9	3,592.6	18.5	2.1	1.126	Level 2, CC
Johnson TFP40 #203 - Wellbore #1 - Design #2	3,600.0	3,603.7	18.5	2.0	1.125	Level 2, ES, SF
Johnson TFP40 #204 - Pilot Hole - Design #1	2,500.0	2,500.0	45.0	34.0	4.109	CC, ES
Johnson TFP40 #204 - Pilot Hole - Design #1	2,600.0	2,600.0	45.6	34.2	4.004	SF
Johnson TFP40 #204 - Wellbore #1 - Design #1	2,500.0	2,500.0	45.0	34.0	4.109	CC, ES
Johnson TFP40 #204 - Wellbore #1 - Design #1	2,600.0	2,599.7	45.9	34.6	4.038	SF
Johnson TFP40 #205 - Wellbore #1 - Design #1	2,500.0	2,500.0	60.0	49.0	5.478	CC, ES
Johnson TFP40 #205 - Wellbore #1 - Design #1	2,600.0	2,599.3	61.1	49.7	5.371	SF
Johnson TFP40 #206 - Wellbore #1 - Design #1	2,500.0	2,500.0	75.0	64.0	6.848	CC, ES
Johnson TFP40 #206 - Wellbore #1 - Design #1	2,600.0	2,599.2	76.1	64.7	6.691	SF

Offset Design Johnson TFP40 Pad - Johnson TFP40 #202 - Wellbore #1 - Design #2												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	0.00	15.0	0.0	15.0				
100.0	100.0	100.0	100.0	0.1	0.1	0.00	15.0	0.0	15.0	14.8	91.419		
200.0	200.0	200.0	200.0	0.3	0.3	0.00	15.0	0.0	15.0	14.4	24.445		
300.0	300.0	300.0	300.0	0.5	0.5	0.00	15.0	0.0	15.0	13.9	14.109		
321.1	321.1	321.1	321.1	0.6	0.6	0.00	15.0	0.0	15.0	13.8	12.952		
400.0	400.0	400.0	400.0	0.8	0.8	0.00	15.0	0.0	15.0	13.5	9.916		
433.3	433.3	433.3	433.3	0.8	0.8	0.00	15.0	0.0	15.0	13.3	9.022		
500.0	500.0	500.0	500.0	1.0	1.0	0.00	15.0	0.0	15.0	13.0	7.644		
600.0	600.0	600.0	600.0	1.2	1.2	0.00	15.0	0.0	15.0	12.6	6.220		
700.0	700.0	700.0	700.0	1.4	1.4	0.00	15.0	0.0	15.0	12.1	5.242		
800.0	800.0	800.0	800.0	1.7	1.7	0.00	15.0	0.0	15.0	11.7	4.531		
900.0	900.0	900.0	900.0	1.9	1.9	0.00	15.0	0.0	15.0	11.2	3.989		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	0.00	15.0	0.0	15.0	10.8	3.563		
1,100.0	1,100.0	1,100.0	1,100.0	2.3	2.3	0.00	15.0	0.0	15.0	10.3	3.219		
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	0.00	15.0	0.0	15.0	9.9	2.936		
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	0.00	15.0	0.0	15.0	9.4	2.699		

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #202 - Wellbore #1 - Design #2												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	0.00	15.0	0.0	15.0	9.0	2.497		
1,500.0	1,500.0	1,500.0	1,500.0	3.2	3.2	0.00	15.0	0.0	15.0	8.5	2.323		
1,600.0	1,600.0	1,600.0	1,600.0	3.5	3.5	0.00	15.0	0.0	15.0	8.1	2.172		
1,700.0	1,700.0	1,700.0	1,700.0	3.7	3.7	0.00	15.0	0.0	15.0	7.6	2.039		
1,800.0	1,800.0	1,800.0	1,800.0	3.9	3.9	0.00	15.0	0.0	15.0	7.2	1.922		
1,900.0	1,900.0	1,900.0	1,900.0	4.1	4.1	0.00	15.0	0.0	15.0	6.7	1.817		
2,000.0	2,000.0	2,000.0	2,000.0	4.4	4.4	0.00	15.0	0.0	15.0	6.3	1.723		
2,100.0	2,100.0	2,100.0	2,100.0	4.6	4.6	0.00	15.0	0.0	15.0	5.8	1.638		
2,200.0	2,200.0	2,200.0	2,200.0	4.8	4.8	0.00	15.0	0.0	15.0	5.4	1.562		
2,300.0	2,300.0	2,300.0	2,300.0	5.0	5.0	0.00	15.0	0.0	15.0	4.9	1.492	Level 3	
2,400.0	2,400.0	2,400.0	2,400.0	5.3	5.3	0.00	15.0	0.0	15.0	4.5	1.428	Level 3	
2,500.0	2,500.0	2,500.0	2,500.0	5.5	5.5	0.00	15.0	0.0	15.0	4.0	1.370	Level 3	
2,600.0	2,600.0	2,600.2	2,600.2	5.7	5.7	108.30	14.4	-1.7	15.0	3.6	1.318	Level 3	
2,700.0	2,699.8	2,700.3	2,700.2	5.9	5.9	108.35	12.7	-6.6	14.9	3.2	1.269	Level 3	
2,800.0	2,799.5	2,800.5	2,800.0	6.1	6.1	108.44	9.9	-14.9	14.8	2.7	1.219	Level 2	
2,900.0	2,898.7	2,900.7	2,899.4	6.3	6.3	108.56	5.9	-26.4	14.6	2.1	1.166	Level 2	
3,000.0	2,997.5	3,000.8	2,998.3	6.5	6.5	108.73	0.8	-41.3	14.4	1.4	1.110	Level 2	
3,100.0	3,095.6	3,101.0	3,096.6	6.8	6.8	108.93	-5.5	-59.4	14.2	0.7	1.052	Level 2	
3,200.0	3,193.1	3,201.2	3,194.2	7.1	7.1	109.18	-12.8	-80.7	13.9	-0.1	0.990	Level 1	
3,300.0	3,289.6	3,301.3	3,290.9	7.4	7.4	109.48	-21.3	-105.3	13.6	-1.1	0.926	Level 1	
3,400.0	3,385.3	3,401.5	3,386.7	7.8	7.8	109.84	-30.8	-133.0	13.2	-2.2	0.859	Level 1	
3,500.0	3,479.8	3,501.7	3,481.4	8.2	8.2	110.26	-41.5	-163.9	12.8	-3.4	0.791	Level 1	
3,551.8	3,528.3	3,553.5	3,530.0	8.5	8.5	111.37	-47.4	-180.9	12.7	-4.0	0.761	Level 1, CC	
3,600.0	3,573.2	3,601.7	3,575.2	8.7	8.7	115.69	-52.8	-196.8	12.8	-4.1	0.758	Level 1, ES, SF	
3,700.0	3,665.2	3,701.6	3,668.8	9.3	9.2	132.29	-64.2	-229.7	15.1	-2.0	0.880	Level 1	
3,800.0	3,755.8	3,801.2	3,762.2	9.9	9.8	149.47	-75.5	-262.5	21.1	4.2	1.252	Level 3	
3,900.0	3,844.9	3,900.6	3,855.3	10.7	10.4	160.84	-86.8	-295.2	31.4	14.6	1.865		
4,000.0	3,932.4	3,999.4	3,948.0	11.5	10.9	167.47	-98.0	-327.7	45.8	28.6	2.671		
4,100.0	4,018.1	4,097.7	4,040.1	12.4	11.5	171.40	-109.1	-360.1	63.8	46.2	3.632		
4,200.0	4,102.0	4,195.3	4,131.6	13.4	12.2	173.84	-120.2	-392.2	85.4	67.4	4.725		
4,300.0	4,183.9	4,292.1	4,222.3	14.4	12.8	175.43	-131.2	-424.1	110.5	91.9	5.931		
4,400.0	4,263.7	4,387.9	4,312.1	15.6	13.4	176.52	-142.1	-455.6	139.0	119.8	7.234		
4,476.3	4,323.3	4,460.3	4,380.0	16.5	13.9	177.12	-150.3	-479.5	163.1	143.4	8.286		
4,500.0	4,341.5	4,482.7	4,401.0	16.8	14.0	177.29	-152.8	-486.8	170.8	151.0	8.616		
4,600.0	4,418.6	4,577.1	4,489.5	18.1	14.6	177.85	-163.5	-518.0	203.6	183.1	9.957		
4,700.0	4,495.8	4,671.6	4,578.1	19.4	15.3	178.26	-174.3	-549.1	236.3	215.3	11.212		
4,800.0	4,572.9	4,766.1	4,666.6	20.8	15.9	178.57	-185.0	-580.2	269.1	247.4	12.388		
4,900.0	4,650.0	4,860.5	4,755.2	22.1	16.5	178.81	-195.7	-611.3	301.9	279.5	13.489		
5,000.0	4,727.2	4,955.0	4,843.7	23.5	17.2	179.00	-206.4	-642.4	334.7	311.6	14.521		
5,100.0	4,804.3	5,049.5	4,932.3	24.8	17.8	179.16	-217.2	-673.5	367.5	343.7	15.491		
5,200.0	4,881.4	5,143.9	5,020.8	26.2	18.5	179.29	-227.9	-704.6	400.2	375.8	16.401		
5,300.0	4,958.6	5,238.4	5,109.4	27.6	19.1	179.40	-238.6	-735.7	433.0	407.9	17.258		
5,400.0	5,035.7	5,332.9	5,197.9	29.0	19.8	179.50	-249.3	-766.8	465.8	440.0	18.064		
5,500.0	5,112.8	5,427.3	5,286.5	30.3	20.5	179.59	-260.0	-797.9	498.6	472.1	18.824		
5,600.0	5,190.0	5,521.8	5,375.1	31.7	21.1	179.66	-270.8	-829.0	531.4	504.2	19.541		
5,700.0	5,267.1	5,616.3	5,463.6	33.1	21.8	179.72	-281.5	-860.1	564.2	536.3	20.218		
5,800.0	5,344.2	5,710.7	5,552.2	34.5	22.5	179.78	-292.2	-891.2	597.0	568.4	20.858		
5,900.0	5,421.4	5,805.2	5,640.7	35.9	23.1	179.83	-302.9	-922.3	629.8	600.5	21.464		
5,928.9	5,443.6	5,832.5	5,666.3	36.4	23.3	179.85	-306.0	-931.3	639.3	609.7	21.633		
6,000.0	5,489.1	5,900.0	5,729.5	37.3	23.8	179.88	-313.7	-953.5	661.8	631.7	22.014		
6,100.0	5,578.8	5,995.7	5,819.3	38.4	24.5	179.93	-324.6	-985.1	690.5	659.8	22.441		
6,200.0	5,660.6	6,092.4	5,910.0	39.5	25.2	179.96	-335.5	-1,016.9	715.9	684.5	22.742		

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<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #202 - Wellbore #1 - Design #2												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
6,300.0	5,744.4	6,190.0	6,001.4	40.6	25.9	180.00	-346.6	-1,049.0	738.0	705.8	22.927		
6,400.0	5,830.0	6,288.2	6,093.5	41.5	26.6	-179.97	-357.8	-1,081.4	756.6	723.7	23.005		
6,500.0	5,917.4	6,387.1	6,186.1	42.4	27.3	-179.93	-369.0	-1,113.9	771.7	738.1	22.982		
6,600.0	6,006.4	6,484.1	6,277.1	43.3	28.0	-179.90	-380.0	-1,145.9	783.5	749.2	22.872		
6,700.0	6,096.9	6,582.1	6,350.6	44.1	28.4	-179.88	-388.4	-1,170.4	793.3	758.5	22.789		
6,800.0	6,188.9	6,640.0	6,424.8	44.8	28.8	-179.88	-396.2	-1,193.0	802.5	767.1	22.717		
6,900.0	6,282.2	6,717.7	6,499.4	45.5	29.2	-179.84	-403.4	-1,213.7	810.8	775.0	22.657		
7,000.0	6,376.7	6,800.0	6,579.0	46.1	29.5	-179.82	-410.2	-1,233.4	818.4	782.2	22.586		
7,100.0	6,472.3	6,872.9	6,649.9	46.6	29.8	-179.81	-415.6	-1,249.1	825.2	788.6	22.569		
7,200.0	6,568.8	6,950.3	6,725.8	47.1	30.1	-179.80	-420.7	-1,263.9	831.2	794.3	22.540		
7,300.0	6,666.2	7,027.7	6,801.9	47.5	30.3	-179.79	-425.1	-1,276.7	836.4	799.3	22.521		
7,400.0	6,764.3	7,100.0	6,873.4	47.8	30.5	-179.78	-428.6	-1,287.0	840.8	803.5	22.547		
7,500.0	6,863.0	7,182.2	6,955.0	48.1	30.7	-179.77	-431.9	-1,296.6	844.5	806.9	22.512		
7,600.0	6,962.3	7,259.4	7,031.8	48.4	30.9	-179.77	-434.3	-1,303.5	847.3	809.7	22.521		
7,700.0	7,061.9	7,336.5	7,108.8	48.6	31.0	-179.76	-436.1	-1,308.5	849.3	811.6	22.538		
7,800.0	7,161.7	7,413.6	7,185.8	48.7	31.2	-179.76	-437.1	-1,311.6	850.6	812.9	22.564		
7,905.2	7,266.9	7,494.7	7,266.9	48.8	31.2	71.96	-437.5	-1,312.7	851.0	813.4	22.602		
7,950.0	7,311.7	7,538.5	7,310.6	48.8	31.3	-88.99	-438.9	-1,312.2	851.0	813.2	22.531		
8,000.0	7,361.3	7,587.4	7,359.2	48.9	31.3	-89.00	-443.8	-1,310.5	851.0	813.1	22.451		
8,050.0	7,410.4	7,636.2	7,407.2	48.9	31.4	-89.01	-452.3	-1,307.5	851.0	813.0	22.371		
8,100.0	7,458.7	7,685.1	7,454.4	48.9	31.4	-89.03	-464.2	-1,303.4	851.0	812.8	22.289		
8,150.0	7,505.7	7,734.0	7,500.6	48.9	31.5	-89.06	-478.5	-1,298.2	851.0	812.7	22.202		
8,200.0	7,551.3	7,783.0	7,545.4	49.0	31.5	-89.09	-498.1	-1,291.7	851.0	812.5	22.108		
8,250.0	7,595.1	7,831.9	7,588.5	49.0	31.6	-89.13	-519.9	-1,284.2	851.0	812.3	22.003		
8,300.0	7,636.9	7,881.0	7,629.9	49.0	31.6	-89.17	-544.9	-1,275.6	851.0	812.1	21.884		
8,350.0	7,676.4	7,930.0	7,669.1	49.0	31.7	-89.22	-572.8	-1,265.9	851.0	811.8	21.746		
8,400.0	7,713.4	7,979.2	7,705.9	49.1	31.7	-89.27	-603.4	-1,255.3	851.0	811.5	21.587		
8,450.0	7,747.6	8,028.4	7,740.2	49.1	31.8	-89.33	-636.8	-1,243.8	850.9	811.2	21.403		
8,500.0	7,778.9	8,077.6	7,771.7	49.2	31.9	-89.39	-672.6	-1,231.5	850.9	810.8	21.192		
8,550.0	7,807.0	8,126.9	7,800.2	49.2	32.0	-89.46	-710.6	-1,218.3	850.9	810.3	20.953		
8,600.0	7,831.8	8,176.3	7,825.5	49.3	32.1	-89.52	-750.7	-1,204.5	850.9	809.8	20.684		
8,650.0	7,853.0	8,225.8	7,847.6	49.3	32.2	-89.60	-782.5	-1,190.0	850.9	809.2	20.387		
8,700.0	7,870.7	8,275.4	7,866.1	49.4	32.4	-89.67	-836.0	-1,175.0	850.9	808.5	20.063		
8,750.0	7,884.7	8,325.0	7,881.0	49.5	32.5	-89.74	-880.7	-1,159.6	850.9	807.7	19.714		
8,800.0	7,894.8	8,374.8	7,892.2	49.6	32.7	-89.82	-926.5	-1,143.8	850.9	806.9	19.346		
8,850.0	7,901.1	8,424.6	7,899.7	49.7	32.9	-89.90	-973.0	-1,127.7	850.9	806.0	18.961		
8,874.1	7,902.8	8,448.6	7,901.8	49.7	33.1	-89.94	-995.7	-1,119.9	850.9	805.6	18.772		
8,900.0	7,903.5	8,474.5	7,903.2	49.8	33.2	-89.98	-1,020.1	-1,111.4	850.9	805.1	18.566		
8,905.2	7,903.5	8,479.7	7,903.3	49.8	33.2	-89.99	-1,025.0	-1,109.7	850.9	805.0	18.524		
9,000.0	7,903.5	8,574.5	7,903.5	50.0	33.7	-90.00	-1,114.6	-1,078.8	850.9	803.0	17.768		
9,100.0	7,903.5	8,674.5	7,903.5	50.3	34.4	-90.00	-1,209.1	-1,046.1	850.9	800.8	16.968		
9,200.0	7,903.5	8,774.5	7,903.5	50.7	35.1	-90.00	-1,303.6	-1,013.5	850.9	798.3	16.180		
9,300.0	7,903.5	8,874.5	7,903.5	51.1	36.0	-90.00	-1,398.2	-980.8	850.9	795.7	15.417		
9,400.0	7,903.5	8,974.5	7,903.5	51.6	36.9	-90.00	-1,492.7	-948.2	850.9	793.0	14.688		
9,500.0	7,903.5	9,074.5	7,903.5	52.1	37.9	-90.00	-1,587.2	-915.5	850.9	790.1	13.998		
9,600.0	7,903.5	9,174.5	7,903.5	52.7	39.0	-90.00	-1,681.7	-882.9	850.9	787.2	13.347		
9,700.0	7,903.5	9,274.5	7,903.5	53.3	40.2	-90.00	-1,776.2	-850.2	850.9	784.1	12.738		
9,800.0	7,903.5	9,374.5	7,903.5	54.0	41.4	-90.00	-1,870.8	-817.6	850.9	781.0	12.168		
9,900.0	7,903.5	9,474.5	7,903.5	54.8	42.7	-90.00	-1,965.3	-784.9	850.9	777.8	11.635		
10,000.0	7,903.5	9,574.5	7,903.5	55.6	44.0	-90.00	-2,059.8	-752.3	850.9	774.5	11.139		
10,100.0	7,903.5	9,674.5	7,903.5	56.5	45.4	-90.00	-2,154.3	-719.6	850.9	771.2	10.677		
10,200.0	7,903.5	9,774.5	7,903.5	57.4	46.9	-90.00	-2,248.8	-687.0	850.9	767.9	10.246		

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<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
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Offset Design Johnson TFP40 Pad - Johnson TFP40 #202 - Wellbore #1 - Design #2													Offset Site Error:	0.0 usft
Survey Program: 0-MWD default													Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning		
10,300.0	7,903.5	9,874.5	7,903.5	58.4	48.3	-90.00	-2,343.4	-654.3	850.9	764.5	9.843			
10,400.0	7,903.5	9,974.5	7,903.5	59.5	49.9	-90.00	-2,437.9	-621.7	850.9	761.1	9.467			
10,500.0	7,903.5	10,074.5	7,903.5	60.6	51.4	-90.00	-2,532.4	-589.0	850.9	757.6	9.116			
10,600.0	7,903.5	10,174.5	7,903.5	61.7	53.0	-90.00	-2,626.9	-556.4	850.9	754.1	8.787			
10,700.0	7,903.5	10,274.5	7,903.5	63.0	54.6	-90.00	-2,721.4	-523.7	850.9	750.6	8.479			
10,800.0	7,903.5	10,374.5	7,903.5	64.2	56.2	-90.00	-2,816.0	-491.1	850.9	747.0	8.190			
10,900.0	7,903.5	10,474.5	7,903.5	65.5	57.8	-90.00	-2,910.5	-458.4	850.9	743.5	7.919			
11,000.0	7,903.5	10,574.5	7,903.5	66.8	59.5	-90.00	-3,005.0	-425.8	850.9	739.9	7.663			
11,100.0	7,903.5	10,674.5	7,903.5	68.2	61.1	-90.00	-3,099.5	-393.2	850.9	736.3	7.423			
11,200.0	7,903.5	10,774.5	7,903.5	69.6	62.8	-90.00	-3,194.0	-360.5	851.0	732.7	7.196			
11,300.0	7,903.5	10,874.5	7,903.5	71.1	64.5	-90.00	-3,288.5	-327.9	851.0	729.1	6.982			
11,400.0	7,903.5	10,974.5	7,903.5	72.5	66.2	-90.00	-3,383.1	-295.2	851.0	725.4	6.780			
11,500.0	7,903.5	11,074.5	7,903.5	74.0	68.0	-90.00	-3,477.6	-262.6	851.0	721.8	6.588			
11,600.0	7,903.5	11,174.5	7,903.5	75.6	69.7	-90.00	-3,572.1	-229.9	851.0	718.1	6.406			
11,700.0	7,903.5	11,274.5	7,903.5	77.1	71.5	-90.00	-3,666.6	-197.3	851.0	714.5	6.236			
11,800.0	7,903.5	11,374.5	7,903.5	78.7	73.2	-90.00	-3,761.2	-164.6	851.0	710.8	6.071			
11,900.0	7,903.5	11,474.5	7,903.5	80.3	75.0	-90.00	-3,855.7	-132.0	851.0	707.1	5.915			
12,000.0	7,903.5	11,574.5	7,903.5	81.9	76.7	-90.00	-3,950.2	-99.3	851.0	703.4	5.767			
12,100.0	7,903.5	11,674.5	7,903.5	83.5	78.5	-90.00	-4,044.7	-66.7	851.0	699.7	5.625			
12,200.0	7,903.5	11,774.5	7,903.5	85.1	80.3	-90.00	-4,139.2	-34.0	851.0	696.0	5.491			
12,300.0	7,903.5	11,874.5	7,903.5	86.8	82.1	-90.00	-4,233.8	-1.4	851.0	692.3	5.362			
12,400.0	7,903.5	11,974.5	7,903.5	88.5	83.9	-90.00	-4,328.3	31.3	851.0	688.6	5.239			
12,500.0	7,903.5	12,074.5	7,903.5	90.1	85.7	-90.00	-4,422.8	63.9	851.0	684.8	5.122			
12,600.0	7,903.5	12,174.5	7,903.5	91.8	87.5	-90.00	-4,517.3	96.6	851.0	681.1	5.009			
12,700.0	7,903.5	12,274.5	7,903.5	93.5	89.3	-90.00	-4,611.8	129.2	851.0	677.4	4.901			
12,800.0	7,903.5	12,374.5	7,903.5	95.2	91.2	-90.00	-4,706.4	161.9	851.0	673.6	4.798			
12,900.0	7,903.5	12,474.5	7,903.5	97.0	93.0	-90.00	-4,800.9	194.5	851.0	669.9	4.699			
13,000.0	7,903.5	12,574.5	7,903.5	98.7	94.8	-90.00	-4,895.4	227.2	851.0	666.1	4.603			
13,100.0	7,903.5	12,674.5	7,903.5	100.4	96.6	-90.00	-4,989.9	259.8	851.0	662.4	4.512			
13,200.0	7,903.5	12,774.5	7,903.5	102.2	98.5	-90.00	-5,084.4	292.5	851.0	658.6	4.423			
13,300.0	7,903.5	12,874.5	7,903.5	103.9	100.3	-90.00	-5,179.0	325.1	851.0	654.9	4.339			
13,400.0	7,903.5	12,974.5	7,903.5	105.7	102.2	-90.00	-5,273.5	357.8	851.0	651.1	4.257			
13,500.0	7,903.5	13,074.5	7,903.5	107.4	104.0	-90.00	-5,368.0	390.4	851.0	647.3	4.178			
13,600.0	7,903.5	13,174.5	7,903.5	109.2	105.8	-90.00	-5,462.5	423.1	851.0	643.6	4.102			
13,700.0	7,903.5	13,274.5	7,903.5	111.0	107.7	-90.00	-5,557.0	455.7	851.0	639.8	4.029			
13,800.0	7,903.5	13,374.5	7,903.5	112.8	109.6	-90.00	-5,651.6	488.4	851.0	636.0	3.958			
13,900.0	7,903.5	13,474.5	7,903.5	114.6	111.4	-90.00	-5,746.1	521.0	851.0	632.2	3.890			
14,000.0	7,903.5	13,574.5	7,903.5	116.4	113.3	-90.00	-5,840.6	553.7	851.0	628.5	3.824			
14,100.0	7,903.5	13,674.5	7,903.5	118.2	115.1	-90.00	-5,935.1	586.3	851.0	624.7	3.760			
14,200.0	7,903.5	13,774.5	7,903.5	120.0	117.0	-90.00	-6,029.7	619.0	851.0	620.9	3.698			
14,300.0	7,903.5	13,874.5	7,903.5	121.8	118.8	-90.00	-6,124.2	651.6	851.0	617.1	3.638			
14,400.0	7,903.5	13,974.5	7,903.5	123.6	120.7	-90.00	-6,218.7	684.3	851.0	613.3	3.580			
14,500.0	7,903.5	14,074.5	7,903.5	125.4	122.6	-90.00	-6,313.2	716.9	851.0	609.5	3.524			
14,600.0	7,903.5	14,174.5	7,903.5	127.2	124.4	-90.00	-6,407.7	749.6	851.0	605.8	3.470			
14,700.0	7,903.5	14,274.5	7,903.5	129.0	126.3	-90.00	-6,502.3	782.2	851.0	602.0	3.417			
14,800.0	7,903.5	14,374.5	7,903.5	130.9	128.2	-90.00	-6,596.8	814.9	851.0	598.2	3.366			
14,900.0	7,903.5	14,474.5	7,903.5	132.7	130.1	-90.00	-6,691.3	847.5	851.0	594.4	3.316			
15,000.0	7,903.5	14,574.5	7,903.5	134.5	131.9	-90.00	-6,785.8	880.2	851.0	590.6	3.267			
15,100.0	7,903.5	14,674.5	7,903.5	136.4	133.8	-90.00	-6,880.3	912.8	851.1	586.8	3.221			
15,200.0	7,903.5	14,774.5	7,903.5	138.2	135.7	-90.00	-6,974.9	945.4	851.1	583.0	3.175			
15,300.0	7,903.5	14,874.5	7,903.5	140.0	137.6	-90.00	-7,069.4	978.1	851.1	579.2	3.130			
15,400.0	7,903.5	14,974.5	7,903.5	141.9	139.4	-90.00	-7,163.9	1,010.7	851.1	575.4	3.087			

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #202 - Wellbore #1 - Design #2													Offset Site Error:	0.0 usft
Survey Program: 0-MWD default													Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Tooface (")	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning		
15,500.0	7,903.5	15,074.5	7,903.5	143.7	141.3	-90.00	-7,258.4	1,043.4	851.1	571.6	3.045			
15,600.0	7,903.5	15,174.5	7,903.5	145.6	143.2	-90.00	-7,352.9	1,076.0	851.1	567.8	3.004			
15,700.0	7,903.5	15,274.5	7,903.5	147.4	145.1	-90.00	-7,447.5	1,108.7	851.1	564.0	2.965			
15,800.0	7,903.5	15,374.5	7,903.5	149.3	147.0	-90.00	-7,542.0	1,141.3	851.1	560.2	2.926			
15,900.0	7,903.5	15,474.5	7,903.5	151.1	148.9	-90.00	-7,636.5	1,174.0	851.1	556.4	2.888			
16,000.0	7,903.5	15,574.5	7,903.5	153.0	150.7	-90.00	-7,731.0	1,206.6	851.1	552.6	2.851			
16,100.0	7,903.5	15,674.5	7,903.5	154.8	152.6	-90.00	-7,825.5	1,239.3	851.1	548.8	2.815			
16,200.0	7,903.5	15,774.5	7,903.5	156.7	154.5	-90.00	-7,920.1	1,271.9	851.1	545.0	2.780			
16,300.0	7,903.5	15,874.5	7,903.5	158.5	156.4	-90.00	-8,014.6	1,304.6	851.1	541.2	2.746			
16,400.0	7,903.5	15,974.5	7,903.5	160.4	158.3	-90.00	-8,109.1	1,337.2	851.1	537.3	2.713			
16,500.0	7,903.5	16,074.5	7,903.5	162.2	160.2	-90.00	-8,203.6	1,369.9	851.1	533.5	2.680			
16,600.0	7,903.5	16,174.5	7,903.5	164.1	162.1	-90.00	-8,298.1	1,402.5	851.1	529.7	2.648			
16,700.0	7,903.5	16,274.5	7,903.5	166.0	164.0	-90.00	-8,392.7	1,435.2	851.1	525.9	2.617			
16,800.0	7,903.5	16,374.5	7,903.5	167.8	165.9	-90.00	-8,487.2	1,467.8	851.1	522.1	2.587			
16,900.0	7,903.5	16,474.5	7,903.5	169.7	167.8	-90.00	-8,581.7	1,500.5	851.1	518.3	2.557			
17,000.0	7,903.5	16,574.5	7,903.5	171.6	169.6	-90.00	-8,676.2	1,533.1	851.1	514.5	2.528			
17,100.0	7,903.5	16,674.5	7,903.5	173.4	171.5	-90.00	-8,770.7	1,565.8	851.1	510.7	2.500			
17,200.0	7,903.5	16,774.5	7,903.5	175.3	173.4	-90.00	-8,865.3	1,598.4	851.1	506.8	2.472			
17,300.0	7,903.5	16,874.5	7,903.5	177.2	175.3	-90.00	-8,959.8	1,631.1	851.1	503.0	2.445			
17,400.0	7,903.5	16,974.5	7,903.5	179.1	177.2	-90.00	-9,054.3	1,663.7	851.1	499.2	2.419			
17,500.0	7,903.5	17,074.5	7,903.5	180.9	179.1	-90.00	-9,148.8	1,696.4	851.1	495.4	2.393			
17,600.0	7,903.5	17,174.5	7,903.5	182.8	181.0	-90.00	-9,243.3	1,729.0	851.1	491.6	2.367			
17,700.0	7,903.5	17,274.5	7,903.5	184.7	182.9	-90.00	-9,337.9	1,761.7	851.1	487.8	2.342			
17,800.0	7,903.5	17,374.5	7,903.5	186.6	184.8	-90.00	-9,432.4	1,794.3	851.1	483.9	2.318			
17,900.0	7,903.5	17,474.5	7,903.5	188.4	186.7	-90.00	-9,526.9	1,827.0	851.1	480.1	2.294			
18,000.0	7,903.5	17,574.5	7,903.5	190.3	188.6	-90.00	-9,621.4	1,859.6	851.1	476.3	2.271			
18,100.0	7,903.5	17,674.5	7,903.5	192.2	190.5	-90.00	-9,715.9	1,892.3	851.1	472.5	2.248			
18,200.0	7,903.5	17,774.5	7,903.5	194.1	192.4	-90.00	-9,810.5	1,924.9	851.1	468.7	2.225			
18,300.0	7,903.5	17,874.5	7,903.5	196.0	194.3	-90.00	-9,905.0	1,957.6	851.1	464.9	2.203			
18,400.0	7,903.5	17,974.5	7,903.5	197.8	196.2	-90.00	-9,999.5	1,990.2	851.1	461.0	2.182			
18,500.0	7,903.5	18,074.5	7,903.5	199.7	198.1	-90.00	-10,094.0	2,022.9	851.1	457.2	2.161			
18,600.0	7,903.5	18,174.5	7,903.5	201.6	200.0	-90.00	-10,188.5	2,055.5	851.1	453.4	2.140			
18,700.0	7,903.5	18,274.5	7,903.5	203.5	201.9	-90.00	-10,283.1	2,088.2	851.1	449.6	2.120			
18,800.0	7,903.5	18,374.5	7,903.5	205.4	203.8	-90.00	-10,377.6	2,120.8	851.1	445.8	2.100			
18,900.0	7,903.5	18,474.5	7,903.5	207.3	205.7	-90.00	-10,472.1	2,153.5	851.1	441.9	2.080			
19,000.0	7,903.5	18,574.5	7,903.5	209.2	207.6	-90.00	-10,566.6	2,186.1	851.1	438.1	2.061			
19,100.0	7,903.5	18,674.5	7,903.5	211.0	209.5	-90.00	-10,661.1	2,218.7	851.2	434.3	2.042			
19,200.0	7,903.5	18,774.5	7,903.5	212.9	211.4	-90.00	-10,755.7	2,251.4	851.2	430.5	2.023			
19,300.0	7,903.5	18,874.5	7,903.5	214.8	213.3	-90.00	-10,850.2	2,284.0	851.2	426.6	2.005			
19,400.0	7,903.5	18,974.5	7,903.5	216.7	215.2	-90.00	-10,944.7	2,316.7	851.2	422.8	1.987			
19,500.0	7,903.5	19,074.5	7,903.5	218.6	217.1	-90.00	-11,039.2	2,349.3	851.2	419.0	1.970			
19,600.0	7,903.5	19,174.5	7,903.5	220.5	219.0	-90.00	-11,133.7	2,382.0	851.2	415.2	1.952			
19,700.0	7,903.5	19,274.5	7,903.5	222.4	221.0	-90.00	-11,228.3	2,414.6	851.2	411.3	1.935			
19,800.0	7,903.5	19,374.5	7,903.5	224.3	222.9	-90.00	-11,322.8	2,447.3	851.2	407.5	1.919			
19,900.0	7,903.5	19,474.5	7,903.5	226.2	224.8	-90.00	-11,417.3	2,479.9	851.2	403.7	1.902			
20,000.0	7,903.5	19,574.5	7,903.5	228.1	226.7	-90.00	-11,511.8	2,512.6	851.2	399.9	1.886			
20,100.0	7,903.5	19,674.5	7,903.5	229.9	228.6	-90.00	-11,606.3	2,545.2	851.2	396.0	1.870			
20,200.0	7,903.5	19,774.5	7,903.5	231.8	230.5	-90.00	-11,700.9	2,577.9	851.2	392.2	1.855			
20,300.0	7,903.5	19,874.5	7,903.5	233.7	232.4	-90.00	-11,795.4	2,610.5	851.2	388.4	1.839			
20,400.0	7,903.5	19,974.5	7,903.5	235.6	234.3	-90.00	-11,889.9	2,643.2	851.2	384.6	1.824			
20,500.0	7,903.5	20,074.5	7,903.5	237.5	236.2	-90.00	-11,984.4	2,675.8	851.2	380.7	1.809			
20,600.0	7,903.5	20,174.5	7,903.5	239.4	238.1	-90.00	-12,078.9	2,708.5	851.2	376.9	1.795			

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #202 - Wellbore #1 - Design #2												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
20,700.0	7,903.5	20,274.5	7,903.5	241.3	240.0	-90.00	-12,173.5	2,741.1	851.2	373.1	1.780		
20,800.0	7,903.5	20,374.5	7,903.5	243.2	241.9	-90.00	-12,268.0	2,773.8	851.2	369.3	1.766		
20,900.0	7,903.5	20,474.5	7,903.5	245.1	243.8	-90.00	-12,362.5	2,806.4	851.2	365.4	1.752		
21,000.0	7,903.5	20,574.5	7,903.5	247.0	245.7	-90.00	-12,457.0	2,839.1	851.2	361.6	1.739		
21,100.0	7,903.5	20,674.5	7,903.5	248.9	247.7	-90.00	-12,551.5	2,871.7	851.2	357.8	1.725		
21,200.0	7,903.5	20,774.5	7,903.5	250.8	249.6	-90.00	-12,646.1	2,904.4	851.2	353.9	1.712		
21,300.0	7,903.5	20,790.2	7,903.5	252.7	249.9	-90.00	-12,660.9	2,909.5	855.4	363.6	1.739		
21,400.0	7,903.5	20,790.2	7,903.5	254.6	249.9	-90.00	-12,660.9	2,909.5	870.9	392.1	1.819		
21,500.0	7,903.5	20,790.2	7,903.5	256.5	249.9	-90.00	-12,660.9	2,909.5	897.4	436.7	1.948		
21,600.0	7,903.5	20,790.2	7,903.5	258.4	249.9	-90.00	-12,660.9	2,909.5	933.9	494.9	2.127		
21,700.0	7,903.5	20,790.2	7,903.5	260.3	249.9	-90.00	-12,660.9	2,909.5	979.3	564.1	2.358		
21,800.0	7,903.5	20,790.2	7,903.5	262.2	249.9	-90.00	-12,660.9	2,909.5	1,032.5	641.7	2.642		
21,900.0	7,903.5	20,790.2	7,903.5	264.1	249.9	-90.00	-12,660.9	2,909.5	1,092.2	725.6	2.980		
22,000.0	7,903.5	20,790.2	7,903.5	266.0	249.9	-90.00	-12,660.9	2,909.5	1,157.5	814.2	3.372		
22,100.0	7,903.5	20,790.2	7,903.5	267.9	249.9	-90.00	-12,660.9	2,909.5	1,227.4	906.1	3.820		
22,200.0	7,903.5	20,790.2	7,903.5	269.8	249.9	-90.00	-12,660.9	2,909.5	1,301.3	1,000.4	4.324		
22,300.0	7,903.5	20,790.2	7,903.5	271.7	249.9	-90.00	-12,660.9	2,909.5	1,378.5	1,096.4	4.886		
22,400.0	7,903.5	20,790.2	7,903.5	273.6	249.9	-90.00	-12,660.9	2,909.5	1,458.5	1,193.5	5.505		
22,482.4	7,903.5	20,790.2	7,903.5	275.2	249.9	-90.00	-12,660.9	2,909.5	1,526.1	1,274.3	6.059		



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #203 - Wellbore #1 - Design #2												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	0.00	30.0	0.0	30.0				
100.0	100.0	100.0	100.0	0.1	0.1	0.00	30.0	0.0	30.0	29.8	182.838		
200.0	200.0	200.0	200.0	0.3	0.3	0.00	30.0	0.0	30.0	29.4	48.891		
300.0	300.0	300.0	300.0	0.5	0.5	0.00	30.0	0.0	30.0	28.9	28.218		
321.1	321.1	321.1	321.1	0.6	0.6	0.00	30.0	0.0	30.0	28.8	25.904		
400.0	400.0	400.0	400.0	0.8	0.8	0.00	30.0	0.0	30.0	28.5	19.832		
433.3	433.3	433.3	433.3	0.8	0.8	0.00	30.0	0.0	30.0	28.3	18.045		
500.0	500.0	500.0	500.0	1.0	1.0	0.00	30.0	0.0	30.0	28.0	15.289		
600.0	600.0	600.0	600.0	1.2	1.2	0.00	30.0	0.0	30.0	27.6	12.439		
700.0	700.0	700.0	700.0	1.4	1.4	0.00	30.0	0.0	30.0	27.1	10.485		
800.0	800.0	800.0	800.0	1.7	1.7	0.00	30.0	0.0	30.0	26.7	9.061		
900.0	900.0	900.0	900.0	1.9	1.9	0.00	30.0	0.0	30.0	26.2	7.978		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	0.00	30.0	0.0	30.0	25.8	7.126		
1,100.0	1,100.0	1,100.0	1,100.0	2.3	2.3	0.00	30.0	0.0	30.0	25.3	6.439		
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	0.00	30.0	0.0	30.0	24.9	5.872		
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	0.00	30.0	0.0	30.0	24.4	5.397		
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	0.00	30.0	0.0	30.0	24.0	4.993		
1,500.0	1,500.0	1,500.0	1,500.0	3.2	3.2	0.00	30.0	0.0	30.0	23.5	4.646		
1,600.0	1,600.0	1,600.0	1,600.0	3.5	3.5	0.00	30.0	0.0	30.0	23.1	4.343		
1,700.0	1,700.0	1,700.0	1,700.0	3.7	3.7	0.00	30.0	0.0	30.0	22.6	4.078		
1,800.0	1,800.0	1,800.0	1,800.0	3.9	3.9	0.00	30.0	0.0	30.0	22.2	3.843		
1,900.0	1,900.0	1,900.0	1,900.0	4.1	4.1	0.00	30.0	0.0	30.0	21.7	3.634		
2,000.0	2,000.0	2,000.0	2,000.0	4.4	4.4	0.00	30.0	0.0	30.0	21.3	3.446		
2,100.0	2,100.0	2,100.0	2,100.0	4.6	4.6	0.00	30.0	0.0	30.0	20.8	3.277		
2,200.0	2,200.0	2,200.0	2,200.0	4.8	4.8	0.00	30.0	0.0	30.0	20.4	3.124		
2,300.0	2,300.0	2,300.0	2,300.0	5.0	5.0	0.00	30.0	0.0	30.0	19.9	2.984		
2,400.0	2,400.0	2,400.0	2,400.0	5.3	5.3	0.00	30.0	0.0	30.0	19.5	2.856		
2,500.0	2,500.0	2,500.0	2,500.0	5.5	5.5	0.00	30.0	0.0	30.0	19.0	2.739		
2,600.0	2,600.0	2,600.4	2,600.4	5.7	5.7	108.35	29.3	-1.6	29.9	18.5	2.630		
2,700.0	2,699.8	2,700.8	2,700.6	5.9	5.9	108.55	27.4	-6.5	29.5	17.8	2.516		
2,800.0	2,799.5	2,801.2	2,800.6	6.1	6.1	108.89	24.1	-14.7	29.0	16.9	2.390		
2,900.0	2,898.7	2,901.6	2,900.3	6.3	6.3	109.39	19.5	-26.0	28.2	15.7	2.250		
3,000.0	2,997.5	3,001.9	2,999.4	6.5	6.5	110.08	13.5	-40.7	27.3	14.3	2.098		
3,100.0	3,095.6	3,102.3	3,097.9	6.8	6.8	110.98	6.3	-58.5	26.1	12.6	1.935		
3,200.0	3,193.1	3,202.7	3,195.7	7.1	7.1	112.15	-2.2	-79.5	24.7	10.7	1.763		
3,300.0	3,289.6	3,303.0	3,292.6	7.4	7.4	113.67	-12.0	-103.6	23.1	8.5	1.583		
3,400.0	3,385.3	3,403.4	3,388.5	7.8	7.8	115.65	-23.0	-130.9	21.3	6.1	1.401 Level 3		
3,500.0	3,479.8	3,503.7	3,483.3	8.2	8.2	118.28	-35.3	-161.3	19.4	3.5	1.219 Level 2		
3,588.9	3,562.9	3,592.6	3,566.8	8.7	8.7	125.19	-46.7	-189.5	18.5	2.1	1.126 Level 2, CC		
3,600.0	3,573.2	3,603.7	3,577.2	8.7	8.7	126.58	-48.1	-193.0	18.5	2.0	1.125 Level 2, ES, SF		
3,700.0	3,665.2	3,703.5	3,671.1	9.3	9.2	142.27	-60.9	-224.7	20.6	4.2	1.254 Level 3		
3,800.0	3,755.8	3,803.1	3,764.6	9.9	9.8	157.44	-73.7	-256.2	27.2	10.8	1.664		
3,900.0	3,844.9	3,902.3	3,857.9	10.7	10.3	167.57	-86.4	-287.7	38.3	21.7	2.317		
4,000.0	3,932.4	4,001.0	3,950.5	11.5	10.9	173.51	-99.1	-319.0	53.4	36.5	3.156		
4,100.0	4,018.1	4,098.6	4,042.4	12.4	11.5	176.94	-111.6	-349.8	72.4	54.9	4.144		
4,200.0	4,102.0	4,192.7	4,131.5	13.4	11.9	178.89	-122.9	-377.7	97.2	79.1	5.359		
4,300.0	4,183.9	4,284.1	4,219.0	14.4	12.3	179.96	-132.8	-402.2	128.5	109.7	6.843		
4,400.0	4,263.7	4,372.2	4,304.1	15.6	12.7	-179.46	-141.4	-423.3	166.0	146.6	8.565		
4,476.3	4,323.3	4,437.1	4,367.2	16.5	12.9	-179.22	-147.0	-437.3	198.7	178.8	10.023		
4,500.0	4,341.5	4,456.8	4,386.4	16.8	13.0	-179.17	-148.6	-441.3	209.4	189.4	10.494		
4,600.0	4,418.6	4,538.5	4,466.5	18.1	13.3	-179.04	-154.8	-456.6	256.3	235.8	12.505		
4,700.0	4,495.8	4,617.7	4,544.5	19.4	13.6	-178.99	-160.0	-469.3	305.6	284.6	14.551		

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Environmental Protection

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #203 - Wellbore #1 - Design #2													Offset Site Error:	0.0 usft
Survey Program: 0-MWD default													Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning		
4,800.0	4,572.9	4,700.0	4,625.9	20.8	13.8	-178.98	-164.5	-480.4	357.3	335.8	16.610			
4,900.0	4,650.0	4,768.8	4,694.2	22.1	14.0	-179.00	-167.6	-488.1	411.2	389.2	18.752			
5,000.0	4,727.2	4,840.7	4,765.7	23.5	14.2	-179.04	-170.1	-494.4	467.2	444.9	20.907			
5,100.0	4,804.3	4,910.1	4,835.0	24.8	14.4	-179.09	-172.0	-498.9	525.3	502.5	23.098			
5,200.0	4,881.4	4,977.2	4,902.0	26.2	14.5	-179.14	-173.2	-501.9	585.2	562.1	25.328			
5,300.0	4,958.6	5,041.9	4,966.7	27.6	14.6	-179.20	-173.7	-503.3	647.0	623.6	27.598			
5,400.0	5,035.7	5,110.9	5,035.7	29.0	14.7	-179.26	-173.8	-503.5	710.4	686.5	29.812			
5,500.0	5,112.8	5,188.1	5,112.8	30.3	14.8	-179.32	-173.8	-503.5	774.0	749.7	31.837			
5,600.0	5,190.0	5,265.2	5,190.0	31.7	15.0	-179.37	-173.8	-503.5	837.7	812.9	33.778			
5,700.0	5,267.1	5,342.3	5,267.1	33.1	15.1	-179.42	-173.8	-503.5	901.3	876.0	35.639			
5,800.0	5,344.2	5,419.5	5,344.2	34.5	15.2	-179.45	-173.8	-503.5	964.9	939.2	37.424			
5,900.0	5,421.4	5,496.6	5,421.4	35.9	15.3	-179.49	-173.8	-503.5	1,028.6	1,002.3	39.138			
5,928.9	5,443.6	5,518.9	5,443.6	36.4	15.4	-179.50	-173.8	-503.5	1,046.9	1,020.5	39.619			
6,000.0	5,499.1	5,574.3	5,499.1	37.3	15.5	-179.53	-173.8	-503.5	1,091.5	1,064.8	40.760			
6,100.0	5,578.8	5,654.0	5,578.8	38.4	15.6	-179.56	-173.8	-503.5	1,151.9	1,124.6	42.224			
6,200.0	5,660.6	5,735.8	5,660.6	39.5	15.8	-179.59	-173.8	-503.5	1,209.4	1,181.6	43.524			
6,300.0	5,744.4	5,819.6	5,744.4	40.6	15.9	-179.62	-173.8	-503.5	1,264.0	1,235.7	44.667			
6,400.0	5,830.0	5,905.2	5,830.0	41.5	16.0	-179.64	-173.8	-503.5	1,315.6	1,286.8	45.664			
6,500.0	5,917.4	5,992.6	5,917.4	42.4	16.2	-179.66	-173.8	-503.5	1,364.3	1,334.9	46.522			
6,600.0	6,006.4	6,081.6	6,006.4	43.3	16.3	-179.68	-173.8	-503.5	1,409.8	1,380.0	47.248			
6,700.0	6,096.9	6,172.1	6,096.9	44.1	16.5	-179.69	-173.8	-503.5	1,452.2	1,421.9	47.851			
6,800.0	6,188.9	6,264.1	6,188.9	44.8	16.7	-179.71	-173.8	-503.5	1,491.5	1,460.6	48.339			
6,900.0	6,282.2	6,357.4	6,282.2	45.5	16.8	-179.72	-173.8	-503.5	1,527.5	1,496.1	48.717			
7,000.0	6,376.7	6,451.9	6,376.7	46.1	17.0	-179.73	-173.8	-503.5	1,560.2	1,528.4	48.992			
7,100.0	6,472.3	6,547.5	6,472.3	46.6	17.2	-179.73	-173.8	-503.5	1,589.6	1,557.3	49.170			
7,200.0	6,568.8	6,644.0	6,568.8	47.1	17.3	-179.74	-173.8	-503.5	1,615.7	1,582.9	49.257			
7,300.0	6,666.2	6,741.4	6,666.2	47.5	17.5	-179.75	-173.8	-503.5	1,638.3	1,605.1	49.257			
7,400.0	6,764.3	6,839.5	6,764.3	47.8	17.7	-179.75	-173.8	-503.5	1,657.6	1,623.9	49.174			
7,500.0	6,863.0	6,938.3	6,863.0	48.1	17.9	-179.75	-173.8	-503.5	1,673.4	1,639.3	49.012			
7,600.0	6,962.3	7,037.5	6,962.3	48.4	18.1	-179.76	-173.8	-503.5	1,685.8	1,651.2	48.775			
7,700.0	7,061.9	7,137.1	7,061.9	48.6	18.2	-179.76	-173.8	-503.5	1,694.7	1,659.7	48.465			
7,800.0	7,161.7	7,236.9	7,161.7	48.7	18.4	-179.76	-173.8	-503.5	1,700.1	1,664.8	48.086			
7,905.2	7,266.9	7,342.1	7,266.9	48.8	18.6	-179.76	-173.8	-503.5	1,702.0	1,666.3	47.619			
7,950.0	7,311.7	7,384.9	7,309.7	48.8	18.7	-88.99	-175.2	-503.0	1,702.0	1,666.2	47.447			
8,000.0	7,361.3	7,432.7	7,357.2	48.9	18.8	-89.00	-179.9	-501.4	1,702.0	1,666.0	47.258			
8,050.0	7,410.4	7,480.5	7,404.2	48.9	18.8	-89.02	-188.0	-498.6	1,702.0	1,665.9	47.066			
8,100.0	7,458.7	7,528.3	7,450.4	48.9	18.9	-89.04	-199.4	-494.7	1,702.0	1,665.7	46.869			
8,150.0	7,505.7	7,576.2	7,495.7	48.9	19.0	-89.06	-214.0	-489.6	1,702.0	1,665.5	46.661			
8,200.0	7,551.3	7,624.1	7,539.8	49.0	19.1	-89.09	-231.9	-483.5	1,702.0	1,665.3	46.435			
8,250.0	7,595.1	7,672.1	7,582.3	49.0	19.2	-89.13	-252.9	-476.2	1,702.0	1,665.1	46.185			
8,300.0	7,636.9	7,720.2	7,623.2	49.0	19.3	-89.17	-276.9	-467.9	1,701.9	1,664.9	45.902			
8,350.0	7,676.4	7,768.4	7,662.0	49.0	19.4	-89.22	-303.8	-458.6	1,701.9	1,664.6	45.579			
8,400.0	7,713.4	7,816.7	7,698.7	49.1	19.5	-89.27	-333.4	-448.4	1,701.9	1,664.3	45.207			
8,450.0	7,747.6	7,865.1	7,733.0	49.1	19.6	-89.33	-365.7	-437.3	1,701.9	1,663.9	44.780			
8,500.0	7,778.9	7,913.6	7,764.6	49.2	19.8	-89.39	-400.4	-425.3	1,701.9	1,663.4	44.293			
8,550.0	7,807.0	7,962.2	7,793.5	49.2	20.0	-89.45	-437.4	-412.5	1,701.8	1,662.9	43.743			
8,600.0	7,831.8	8,011.0	7,819.3	49.3	20.2	-89.52	-476.5	-399.0	1,701.8	1,662.4	43.130			
8,650.0	7,853.0	8,059.9	7,842.0	49.3	20.4	-89.59	-517.5	-384.8	1,701.8	1,661.7	42.454			
8,700.0	7,870.7	8,109.0	7,861.3	49.4	20.7	-89.66	-560.2	-370.1	1,701.8	1,661.0	41.722			
8,750.0	7,884.7	8,158.3	7,877.2	49.5	21.0	-89.73	-604.2	-354.9	1,701.8	1,660.2	40.939			
8,800.0	7,894.8	8,207.7	7,889.4	49.6	21.4	-89.81	-649.5	-339.3	1,701.7	1,659.3	40.115			
8,850.0	7,901.1	8,257.3	7,897.9	49.7	21.8	-89.89	-695.7	-323.3	1,701.7	1,658.4	39.260			

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation





Anticollision Report



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #203 - Wellbore #1 - Design #2												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
8,900.0	7,903.5	8,307.1	7,902.6	49.8	22.3	-89.97	-742.5	-307.1	1,701.7	1,657.4	38.385		
8,905.2	7,903.5	8,312.3	7,902.8	49.8	22.4	-89.98	-747.4	-305.4	1,701.7	1,657.3	38.292		
9,000.0	7,903.5	8,407.1	7,903.5	50.0	23.3	-90.00	-837.0	-274.5	1,701.7	1,655.3	36.624		
9,100.0	7,903.5	8,507.1	7,903.5	50.3	24.5	-90.00	-931.5	-241.9	1,701.7	1,652.9	34.874		
9,200.0	7,903.5	8,607.1	7,903.5	50.7	25.7	-90.00	-1,026.0	-209.2	1,701.7	1,650.4	33.165		
9,300.0	7,903.5	8,707.1	7,903.5	51.1	27.0	-90.00	-1,120.5	-176.6	1,701.7	1,647.7	31.525		
9,400.0	7,903.5	8,807.1	7,903.5	51.6	28.4	-90.00	-1,215.1	-144.0	1,701.7	1,644.9	29.967		
9,500.0	7,903.5	8,907.1	7,903.5	52.1	29.9	-90.00	-1,309.6	-111.3	1,701.7	1,642.0	28.496		
9,600.0	7,903.5	9,007.1	7,903.5	52.7	31.4	-90.00	-1,404.1	-78.7	1,701.7	1,639.0	27.134		
9,700.0	7,903.5	9,107.1	7,903.5	53.3	33.0	-90.00	-1,498.6	-46.0	1,701.7	1,635.8	25.853		
9,800.0	7,903.5	9,207.1	7,903.5	54.0	34.5	-90.00	-1,593.2	-13.4	1,701.7	1,632.7	24.662		
9,900.0	7,903.5	9,307.1	7,903.5	54.8	36.2	-90.00	-1,687.7	19.2	1,701.7	1,629.4	23.555		
10,000.0	7,903.5	9,407.1	7,903.5	55.6	37.8	-90.00	-1,782.2	51.9	1,701.6	1,626.1	22.527		
10,100.0	7,903.5	9,507.1	7,903.5	56.5	39.5	-90.00	-1,876.7	84.5	1,701.6	1,622.8	21.571		
10,200.0	7,903.5	9,607.1	7,903.5	57.4	41.2	-90.00	-1,971.3	117.2	1,701.6	1,619.4	20.682		
10,300.0	7,903.5	9,707.1	7,903.5	58.4	42.9	-90.00	-2,065.8	149.8	1,701.6	1,615.9	19.854		
10,400.0	7,903.5	9,807.1	7,903.5	59.5	44.6	-90.00	-2,160.3	182.4	1,701.6	1,612.5	19.083		
10,500.0	7,903.5	9,907.1	7,903.5	60.6	46.4	-90.00	-2,254.8	215.1	1,701.6	1,609.0	18.364		
10,600.0	7,903.5	10,007.1	7,903.5	61.7	48.1	-90.00	-2,349.4	247.7	1,701.6	1,605.4	17.692		
10,700.0	7,903.5	10,107.1	7,903.5	63.0	49.9	-90.00	-2,443.9	280.4	1,701.6	1,601.9	17.064		
10,800.0	7,903.5	10,207.1	7,903.5	64.2	51.7	-90.00	-2,538.4	313.0	1,701.6	1,598.3	16.475		
10,900.0	7,903.5	10,307.1	7,903.5	65.5	53.5	-90.00	-2,632.9	345.6	1,701.6	1,594.7	15.922		
11,000.0	7,903.5	10,407.1	7,903.5	66.8	55.3	-90.00	-2,727.4	378.3	1,701.6	1,591.1	15.403		
11,100.0	7,903.5	10,507.1	7,903.5	68.2	57.1	-90.00	-2,822.0	410.9	1,701.6	1,587.5	14.915		
11,200.0	7,903.5	10,607.1	7,903.5	69.6	58.9	-90.00	-2,916.5	443.5	1,701.6	1,583.8	14.455		
11,300.0	7,903.5	10,707.1	7,903.5	71.1	60.7	-90.00	-3,011.0	476.2	1,701.6	1,580.2	14.021		
11,400.0	7,903.5	10,807.1	7,903.5	72.5	62.6	-90.00	-3,105.5	508.8	1,701.5	1,576.5	13.611		
11,500.0	7,903.5	10,907.1	7,903.5	74.0	64.4	-90.00	-3,200.1	541.5	1,701.5	1,572.9	13.223		
11,600.0	7,903.5	11,007.1	7,903.5	75.6	66.2	-90.00	-3,294.6	574.1	1,701.5	1,569.2	12.856		
11,700.0	7,903.5	11,107.1	7,903.5	77.1	68.1	-90.00	-3,389.1	606.7	1,701.5	1,565.5	12.507		
11,800.0	7,903.5	11,207.1	7,903.5	78.7	69.9	-90.00	-3,483.6	639.4	1,701.5	1,561.8	12.177		
11,900.0	7,903.5	11,307.1	7,903.5	80.3	71.8	-90.00	-3,578.2	672.0	1,701.5	1,558.1	11.862		
12,000.0	7,903.5	11,407.1	7,903.5	81.9	73.6	-90.00	-3,672.7	704.7	1,701.5	1,554.4	11.563		
12,100.0	7,903.5	11,507.1	7,903.5	83.5	75.5	-90.00	-3,767.2	737.3	1,701.5	1,550.6	11.278		
12,200.0	7,903.5	11,607.1	7,903.5	85.1	77.4	-90.00	-3,861.7	769.9	1,701.5	1,546.9	11.007		
12,300.0	7,903.5	11,707.1	7,903.5	86.8	79.2	-90.00	-3,956.3	802.6	1,701.5	1,543.2	10.748		
12,400.0	7,903.5	11,807.1	7,903.5	88.5	81.1	-90.00	-4,050.8	835.2	1,701.5	1,539.4	10.500		
12,500.0	7,903.5	11,907.1	7,903.5	90.1	83.0	-90.00	-4,145.3	867.9	1,701.5	1,535.7	10.263		
12,600.0	7,903.5	12,007.1	7,903.5	91.8	84.8	-90.00	-4,239.8	900.5	1,701.5	1,531.9	10.036		
12,700.0	7,903.5	12,107.1	7,903.5	93.5	86.7	-90.00	-4,334.3	933.1	1,701.4	1,528.2	9.819		
12,800.0	7,903.5	12,207.1	7,903.5	95.2	88.6	-90.00	-4,428.9	965.8	1,701.4	1,524.4	9.611		
12,900.0	7,903.5	12,307.1	7,903.5	97.0	90.5	-90.00	-4,523.4	998.4	1,701.4	1,520.7	9.412		
13,000.0	7,903.5	12,407.1	7,903.5	98.7	92.3	-90.00	-4,617.9	1,031.1	1,701.4	1,516.9	9.220		
13,100.0	7,903.5	12,507.1	7,903.5	100.4	94.2	-90.00	-4,712.4	1,063.7	1,701.4	1,513.1	9.036		
13,200.0	7,903.5	12,607.1	7,903.5	102.2	96.1	-90.00	-4,807.0	1,096.3	1,701.4	1,509.3	8.858		
13,300.0	7,903.5	12,707.1	7,903.5	103.9	98.0	-90.00	-4,901.5	1,129.0	1,701.4	1,505.6	8.688		
13,400.0	7,903.5	12,807.1	7,903.5	105.7	99.9	-90.00	-4,996.0	1,161.6	1,701.4	1,501.8	8.524		
13,500.0	7,903.5	12,907.1	7,903.5	107.4	101.8	-90.00	-5,090.5	1,194.3	1,701.4	1,498.0	8.366		
13,600.0	7,903.5	13,007.1	7,903.5	109.2	103.6	-90.00	-5,185.1	1,226.9	1,701.4	1,494.2	8.213		
13,700.0	7,903.5	13,107.1	7,903.5	111.0	105.5	-90.00	-5,279.6	1,259.5	1,701.4	1,490.4	8.066		
13,800.0	7,903.5	13,207.1	7,903.5	112.8	107.4	-90.00	-5,374.1	1,292.2	1,701.4	1,486.6	7.924		
13,900.0	7,903.5	13,307.1	7,903.5	114.6	109.3	-90.00	-5,468.6	1,324.8	1,701.4	1,482.9	7.787		

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #203 - Wellbore #1 - Design #2												Offset Site Error:	0.0 usft
Survey Program: D-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
14,000.0	7,903.5	13,407.1	7,903.5	116.4	111.2	-90.00	-5,563.1	1,357.4	1,701.4	1,479.1	7.654		
14,100.0	7,903.5	13,507.1	7,903.5	118.2	113.1	-90.00	-5,657.7	1,390.1	1,701.3	1,475.3	7.526		
14,200.0	7,903.5	13,607.1	7,903.5	120.0	115.0	-90.00	-5,752.2	1,422.7	1,701.3	1,471.5	7.402		
14,300.0	7,903.5	13,707.1	7,903.5	121.8	116.9	-90.00	-5,846.7	1,455.4	1,701.3	1,467.7	7.281		
14,400.0	7,903.5	13,807.1	7,903.5	123.6	118.8	-90.00	-5,941.2	1,488.0	1,701.3	1,463.9	7.165		
14,500.0	7,903.5	13,907.1	7,903.5	125.4	120.7	-90.00	-6,035.8	1,520.6	1,701.3	1,460.1	7.052		
14,600.0	7,903.5	14,007.1	7,903.5	127.2	122.6	-90.00	-6,130.3	1,553.3	1,701.3	1,456.3	6.943		
14,700.0	7,903.5	14,107.1	7,903.5	129.0	124.5	-90.00	-6,224.8	1,585.9	1,701.3	1,452.5	6.837		
14,800.0	7,903.5	14,207.1	7,903.5	130.9	126.4	-90.00	-6,319.3	1,618.6	1,701.3	1,448.7	6.734		
14,900.0	7,903.5	14,307.1	7,903.5	132.7	128.3	-90.00	-6,413.9	1,651.2	1,701.3	1,444.9	6.635		
15,000.0	7,903.5	14,407.1	7,903.5	134.5	130.2	-90.00	-6,508.4	1,683.8	1,701.3	1,441.0	6.538		
15,100.0	7,903.5	14,507.1	7,903.5	136.4	132.1	-90.00	-6,602.9	1,716.5	1,701.3	1,437.2	6.443		
15,200.0	7,903.5	14,607.1	7,903.5	138.2	134.0	-90.00	-6,697.4	1,749.1	1,701.3	1,433.4	6.352		
15,300.0	7,903.5	14,707.1	7,903.5	140.0	135.9	-90.00	-6,792.0	1,781.8	1,701.3	1,429.6	6.263		
15,400.0	7,903.5	14,807.1	7,903.5	141.9	137.8	-90.00	-6,886.5	1,814.4	1,701.2	1,425.8	6.176		
15,500.0	7,903.5	14,907.1	7,903.5	143.7	139.7	-90.00	-6,981.0	1,847.0	1,701.2	1,422.0	6.092		
15,600.0	7,903.5	15,007.1	7,903.5	145.6	141.6	-90.00	-7,075.5	1,879.7	1,701.2	1,418.2	6.010		
15,700.0	7,903.5	15,107.1	7,903.5	147.4	143.5	-90.00	-7,170.0	1,912.3	1,701.2	1,414.4	5.930		
15,800.0	7,903.5	15,207.1	7,903.5	149.3	145.4	-90.00	-7,264.6	1,945.0	1,701.2	1,410.5	5.853		
15,900.0	7,903.5	15,307.1	7,903.5	151.1	147.3	-90.00	-7,359.1	1,977.6	1,701.2	1,406.7	5.777		
16,000.0	7,903.5	15,407.1	7,903.5	153.0	149.2	-90.00	-7,453.6	2,010.2	1,701.2	1,402.9	5.703		
16,100.0	7,903.5	15,507.1	7,903.5	154.8	151.1	-90.00	-7,548.1	2,042.9	1,701.2	1,399.1	5.631		
16,200.0	7,903.5	15,607.1	7,903.5	156.7	153.0	-90.00	-7,642.7	2,075.5	1,701.2	1,395.3	5.561		
16,300.0	7,903.5	15,707.1	7,903.5	158.5	154.9	-90.00	-7,737.2	2,108.2	1,701.2	1,391.4	5.492		
16,400.0	7,903.5	15,807.1	7,903.5	160.4	156.8	-90.00	-7,831.7	2,140.8	1,701.2	1,387.6	5.426		
16,500.0	7,903.5	15,907.1	7,903.5	162.2	158.8	-90.00	-7,926.2	2,173.4	1,701.2	1,383.8	5.360		
16,600.0	7,903.5	16,007.1	7,903.5	164.1	160.7	-90.00	-8,020.8	2,206.1	1,701.2	1,380.0	5.297		
16,700.0	7,903.5	16,107.1	7,903.5	166.0	162.6	-90.00	-8,115.3	2,238.7	1,701.1	1,376.2	5.234		
16,800.0	7,903.5	16,207.1	7,903.5	167.8	164.5	-90.00	-8,209.8	2,271.3	1,701.1	1,372.3	5.174		
16,900.0	7,903.5	16,307.1	7,903.5	169.7	166.4	-90.00	-8,304.3	2,304.0	1,701.1	1,368.5	5.114		
17,000.0	7,903.5	16,407.1	7,903.5	171.6	168.3	-90.00	-8,398.9	2,336.6	1,701.1	1,364.7	5.056		
17,100.0	7,903.5	16,507.1	7,903.5	173.4	170.2	-90.00	-8,493.4	2,369.3	1,701.1	1,360.9	4.999		
17,200.0	7,903.5	16,607.1	7,903.5	175.3	172.1	-90.00	-8,587.9	2,401.9	1,701.1	1,357.0	4.944		
17,300.0	7,903.5	16,707.1	7,903.5	177.2	174.0	-90.00	-8,682.4	2,434.5	1,701.1	1,353.2	4.890		
17,400.0	7,903.5	16,807.1	7,903.5	179.1	175.9	-90.00	-8,776.9	2,467.2	1,701.1	1,349.4	4.836		
17,500.0	7,903.5	16,907.1	7,903.5	180.9	177.8	-90.00	-8,871.5	2,499.8	1,701.1	1,345.5	4.784		
17,600.0	7,903.5	17,007.1	7,903.5	182.8	179.8	-90.00	-8,966.0	2,532.5	1,701.1	1,341.7	4.734		
17,700.0	7,903.5	17,107.1	7,903.5	184.7	181.7	-90.00	-9,060.5	2,565.1	1,701.1	1,337.9	4.684		
17,800.0	7,903.5	17,207.1	7,903.5	186.6	183.6	-90.00	-9,155.0	2,597.7	1,701.1	1,334.1	4.635		
17,900.0	7,903.5	17,307.1	7,903.5	188.4	185.5	-90.00	-9,249.6	2,630.4	1,701.1	1,330.2	4.587		
18,000.0	7,903.5	17,407.1	7,903.5	190.3	187.4	-90.00	-9,344.1	2,663.0	1,701.1	1,326.4	4.540		
18,100.0	7,903.5	17,507.1	7,903.5	192.2	189.3	-90.00	-9,438.6	2,695.7	1,701.0	1,322.6	4.494		
18,200.0	7,903.5	17,607.1	7,903.5	194.1	191.2	-90.00	-9,533.1	2,728.3	1,701.0	1,318.7	4.449		
18,300.0	7,903.5	17,707.1	7,903.5	196.0	193.1	-90.00	-9,627.7	2,760.9	1,701.0	1,314.9	4.405		
18,400.0	7,903.5	17,807.1	7,903.5	197.8	195.0	-90.00	-9,722.2	2,793.6	1,701.0	1,311.1	4.362		
18,500.0	7,903.5	17,907.1	7,903.5	199.7	197.0	-90.00	-9,816.7	2,826.2	1,701.0	1,307.2	4.320		
18,600.0	7,903.5	18,007.1	7,903.5	201.6	198.9	-90.00	-9,911.2	2,858.9	1,701.0	1,303.4	4.278		
18,700.0	7,903.5	18,107.1	7,903.5	203.5	200.8	-90.00	-10,005.7	2,891.5	1,701.0	1,299.6	4.237		
18,800.0	7,903.5	18,207.1	7,903.5	205.4	202.7	-90.00	-10,100.3	2,924.1	1,701.0	1,295.7	4.197		
18,900.0	7,903.5	18,307.1	7,903.5	207.3	204.6	-90.00	-10,194.8	2,956.8	1,701.0	1,291.9	4.158		
19,000.0	7,903.5	18,407.1	7,903.5	209.2	206.5	-90.00	-10,289.3	2,989.4	1,701.0	1,288.1	4.120		
19,100.0	7,903.5	18,507.1	7,903.5	211.0	208.4	-90.00	-10,383.8	3,022.1	1,701.0	1,284.2	4.082		

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #203 - Wellbore #1 - Design #2													Offset Site Error:	0.0 usft
Survey Program: 0-MWD default													Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning		
19,200.0	7,903.5	18,607.1	7,903.5	212.9	210.4	-90.00	-10,478.4	3,054.7	1,701.0	1,280.4	4.045			
19,300.0	7,903.5	18,707.1	7,903.5	214.8	212.3	-90.00	-10,572.9	3,087.3	1,701.0	1,276.6	4.008			
19,400.0	7,903.5	18,807.1	7,903.5	216.7	214.2	-90.00	-10,667.4	3,120.0	1,700.9	1,272.7	3.972			
19,500.0	7,903.5	18,907.1	7,903.5	218.6	216.1	-90.00	-10,761.9	3,152.6	1,700.9	1,268.9	3.937			
19,600.0	7,903.5	19,007.1	7,903.5	220.5	218.0	-90.00	-10,856.5	3,185.3	1,700.9	1,265.1	3.902			
19,700.0	7,903.5	19,107.1	7,903.5	222.4	219.9	-90.00	-10,951.0	3,217.9	1,700.9	1,261.2	3.868			
19,800.0	7,903.5	19,207.1	7,903.5	224.3	221.8	-90.00	-11,045.5	3,250.5	1,700.9	1,257.4	3.835			
19,900.0	7,903.5	19,307.1	7,903.5	226.2	223.7	-90.00	-11,140.0	3,283.2	1,700.9	1,253.6	3.802			
20,000.0	7,903.5	19,407.1	7,903.5	228.1	225.7	-90.00	-11,234.6	3,315.8	1,700.9	1,249.7	3.770			
20,100.0	7,903.5	19,507.1	7,903.5	229.9	227.6	-90.00	-11,329.1	3,348.4	1,700.9	1,245.9	3.738			
20,200.0	7,903.5	19,607.1	7,903.5	231.8	229.5	-90.00	-11,423.6	3,381.1	1,700.9	1,242.1	3.707			
20,300.0	7,903.5	19,707.1	7,903.5	233.7	231.4	-90.00	-11,518.1	3,413.7	1,700.9	1,238.2	3.676			
20,400.0	7,903.5	19,807.1	7,903.5	235.6	233.3	-90.00	-11,612.6	3,446.4	1,700.9	1,234.4	3.646			
20,500.0	7,903.5	19,907.1	7,903.5	237.5	235.2	-90.00	-11,707.2	3,479.0	1,700.9	1,230.5	3.616			
20,600.0	7,903.5	20,007.1	7,903.5	239.4	237.2	-90.00	-11,801.7	3,511.6	1,700.9	1,226.7	3.587			
20,700.0	7,903.5	20,107.1	7,903.5	241.3	239.1	-90.00	-11,896.2	3,544.3	1,700.9	1,222.9	3.558			
20,800.0	7,903.5	20,207.1	7,903.5	243.2	241.0	-90.00	-11,990.7	3,576.9	1,700.8	1,219.0	3.530			
20,900.0	7,903.5	20,307.1	7,903.5	245.1	242.9	-90.00	-12,085.3	3,609.6	1,700.8	1,215.2	3.502			
21,000.0	7,903.5	20,407.1	7,903.5	247.0	244.8	-90.00	-12,179.8	3,642.2	1,700.8	1,211.3	3.475			
21,100.0	7,903.5	20,507.1	7,903.5	248.9	246.7	-90.00	-12,274.3	3,674.8	1,700.8	1,207.5	3.448			
21,200.0	7,903.5	20,607.1	7,903.5	250.8	248.6	-90.00	-12,368.8	3,707.5	1,700.8	1,203.7	3.421			
21,300.0	7,903.5	20,707.1	7,903.5	252.7	250.6	-90.00	-12,463.4	3,740.1	1,700.8	1,199.8	3.395			
21,400.0	7,903.5	20,807.1	7,903.5	254.6	252.5	-90.00	-12,557.9	3,772.8	1,700.8	1,196.0	3.369			
21,433.2	7,903.5	20,840.3	7,903.5	255.2	253.1	-90.00	-12,589.3	3,783.6	1,700.8	1,194.7	3.361			
21,500.0	7,903.5	20,876.5	7,903.5	256.5	253.8	-90.00	-12,623.4	3,795.7	1,701.4	1,194.2	3.354			
21,600.0	7,903.5	20,929.3	7,903.5	258.4	254.7	-90.00	-12,672.7	3,814.5	1,704.6	1,196.1	3.352			
21,700.0	7,903.5	21,000.0	7,903.5	260.3	255.9	-90.00	-12,737.9	3,841.8	1,710.7	1,200.3	3.352			
21,800.0	7,903.5	21,034.5	7,903.5	262.2	256.5	-90.00	-12,769.4	3,856.0	1,719.2	1,209.4	3.372			
21,900.0	7,903.5	21,100.0	7,903.5	264.1	257.6	-90.00	-12,828.4	3,884.5	1,730.7	1,219.8	3.387			
22,000.0	7,903.5	21,138.5	7,903.5	266.0	258.2	-90.00	-12,862.6	3,902.3	1,744.7	1,235.1	3.423			
22,100.0	7,903.5	21,200.0	7,903.5	267.9	259.3	-90.00	-12,916.4	3,931.9	1,761.5	1,251.6	3.454			
22,200.0	7,903.5	21,579.1	7,903.5	269.8	265.7	-90.00	-13,257.4	4,096.3	1,778.6	1,246.0	3.340			
22,300.0	7,903.5	21,712.4	7,903.5	271.7	268.1	-90.00	-13,383.2	4,140.1	1,778.6	1,240.9	3.308			
22,400.0	7,903.5	21,812.4	7,903.5	273.6	270.0	-90.00	-13,477.7	4,172.8	1,778.6	1,237.1	3.284			
22,482.4	7,903.5	21,894.8	7,903.5	275.2	271.6	-90.00	-13,555.6	4,199.7	1,778.6	1,233.9	3.265			

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<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #204 - Pilot Hole - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD default:													Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning		
0.0	0.0	0.0	0.0	0.0	0.0	0.00	45.0	0.0	45.0					
100.0	100.0	100.0	100.0	0.1	0.1	0.00	45.0	0.0	45.0	44.8	274.257			
200.0	200.0	200.0	200.0	0.3	0.3	0.00	45.0	0.0	45.0	44.4	73.336			
300.0	300.0	300.0	300.0	0.5	0.5	0.00	45.0	0.0	45.0	43.9	42.327			
321.1	321.1	321.1	321.1	0.6	0.6	0.00	45.0	0.0	45.0	43.8	38.855			
400.0	400.0	400.0	400.0	0.8	0.8	0.00	45.0	0.0	45.0	43.5	29.749			
433.3	433.3	433.3	433.3	0.8	0.8	0.00	45.0	0.0	45.0	43.3	27.067			
500.0	500.0	500.0	500.0	1.0	1.0	0.00	45.0	0.0	45.0	43.0	22.933			
600.0	600.0	600.0	600.0	1.2	1.2	0.00	45.0	0.0	45.0	42.6	18.659			
700.0	700.0	700.0	700.0	1.4	1.4	0.00	45.0	0.0	45.0	42.1	15.727			
800.0	800.0	800.0	800.0	1.7	1.7	0.00	45.0	0.0	45.0	41.7	13.592			
900.0	900.0	900.0	900.0	1.9	1.9	0.00	45.0	0.0	45.0	41.2	11.967			
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	0.00	45.0	0.0	45.0	40.8	10.689			
1,100.0	1,100.0	1,100.0	1,100.0	2.3	2.3	0.00	45.0	0.0	45.0	40.3	9.658			
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	0.00	45.0	0.0	45.0	39.9	8.808			
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	0.00	45.0	0.0	45.0	39.4	8.096			
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	0.00	45.0	0.0	45.0	39.0	7.490			
1,500.0	1,500.0	1,500.0	1,500.0	3.2	3.2	0.00	45.0	0.0	45.0	38.5	6.969			
1,600.0	1,600.0	1,600.0	1,600.0	3.5	3.5	0.00	45.0	0.0	45.0	38.1	6.515			
1,700.0	1,700.0	1,700.0	1,700.0	3.7	3.7	0.00	45.0	0.0	45.0	37.6	6.117			
1,800.0	1,800.0	1,800.0	1,800.0	3.9	3.9	0.00	45.0	0.0	45.0	37.2	5.765			
1,900.0	1,900.0	1,900.0	1,900.0	4.1	4.1	0.00	45.0	0.0	45.0	36.7	5.451			
2,000.0	2,000.0	2,000.0	2,000.0	4.4	4.4	0.00	45.0	0.0	45.0	36.3	5.169			
2,100.0	2,100.0	2,100.0	2,100.0	4.6	4.6	0.00	45.0	0.0	45.0	35.8	4.915			
2,200.0	2,200.0	2,200.0	2,200.0	4.8	4.8	0.00	45.0	0.0	45.0	35.4	4.685			
2,300.0	2,300.0	2,300.0	2,300.0	5.0	5.0	0.00	45.0	0.0	45.0	34.9	4.476			
2,400.0	2,400.0	2,400.0	2,400.0	5.3	5.3	0.00	45.0	0.0	45.0	34.5	4.284			
2,500.0	2,500.0	2,500.0	2,500.0	5.5	5.5	0.00	45.0	0.0	45.0	34.0	4.109 CC, ES			
2,600.0	2,600.0	2,600.0	2,600.0	5.7	5.7	110.36	45.0	0.0	45.6	34.2	4.004 SF			
2,700.0	2,699.8	2,699.8	2,699.8	5.9	5.9	116.22	45.0	0.0	47.7	35.9	4.038			
2,800.0	2,799.5	2,799.5	2,799.5	6.1	6.1	124.76	45.0	0.0	52.1	39.9	4.263			
2,900.0	2,898.7	2,898.7	2,898.7	6.3	6.4	134.23	45.0	0.0	59.9	47.3	4.737			
3,000.0	2,997.5	2,997.5	2,997.5	6.5	6.6	143.03	45.0	0.0	71.8	58.7	5.489			
3,100.0	3,095.6	3,095.6	3,095.6	6.8	6.8	150.34	45.0	0.0	87.8	74.3	6.506			
3,200.0	3,193.1	3,193.1	3,193.1	7.1	7.0	156.07	45.0	0.0	108.0	94.1	7.760			
3,300.0	3,289.6	3,289.6	3,289.6	7.4	7.3	160.44	45.0	0.0	132.2	117.8	9.216			
3,400.0	3,385.3	3,385.3	3,385.3	7.8	7.5	163.77	45.0	0.0	160.1	145.4	10.843			
3,500.0	3,479.8	3,479.8	3,479.8	8.2	7.7	166.33	45.0	0.0	191.7	176.5	12.616			
3,600.0	3,573.2	3,573.2	3,573.2	8.7	7.9	168.31	45.0	0.0	226.8	211.2	14.514			
3,700.0	3,665.2	3,665.2	3,665.2	9.3	8.1	169.87	45.0	0.0	265.3	249.2	16.520			
3,800.0	3,755.8	3,755.8	3,755.8	9.9	8.3	171.11	45.0	0.0	307.0	290.5	18.618			
3,900.0	3,844.9	3,844.9	3,844.9	10.7	8.5	172.12	45.0	0.0	352.1	335.1	20.796			
4,000.0	3,932.4	3,932.4	3,932.4	11.5	8.7	172.93	45.0	0.0	400.2	382.8	23.042			
4,100.0	4,018.1	4,018.1	4,018.1	12.4	8.9	173.60	45.0	0.0	451.5	433.6	25.346			
4,200.0	4,102.0	4,102.0	4,102.0	13.4	9.1	174.16	45.0	0.0	505.7	487.4	27.701			
4,300.0	4,183.9	4,183.9	4,183.9	14.4	9.3	174.62	45.0	0.0	562.9	544.2	30.098			
4,400.0	4,263.7	4,263.7	4,263.7	15.6	9.4	175.01	45.0	0.0	622.9	603.7	32.532			
4,476.3	4,323.3	4,323.3	4,323.3	16.5	9.6	175.27	45.0	0.0	670.6	651.1	34.412			
4,500.0	4,341.5	4,341.5	4,341.5	16.8	9.6	175.37	45.0	0.0	685.6	666.0	34.994			
4,600.0	4,418.6	4,418.6	4,418.6	18.1	9.8	175.76	45.0	0.0	749.1	729.1	37.378			
4,700.0	4,495.8	4,495.8	4,495.8	19.4	10.0	176.10	45.0	0.0	812.7	792.2	39.644			
4,800.0	4,572.9	4,572.9	4,572.9	20.8	10.1	176.38	45.0	0.0	876.2	855.3	41.799			

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #204 - Pilot Hole - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD default													Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Tooface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning		
4,900.0	4,650.0	4,650.0	4,650.0	22.1	10.3	176.62	45.0	0.0	939.8	918.4	43.849			
5,000.0	4,727.2	4,727.2	4,727.2	23.5	10.5	176.84	45.0	0.0	1,003.4	981.5	45.801			
5,100.0	4,804.3	4,804.3	4,804.3	24.8	10.7	177.03	45.0	0.0	1,067.0	1,044.6	47.658			
5,200.0	4,881.4	4,881.4	4,881.4	26.2	10.8	177.19	45.0	0.0	1,130.6	1,107.7	49.428			
5,300.0	4,958.6	4,958.6	4,958.6	27.6	11.0	177.34	45.0	0.0	1,194.2	1,170.8	51.115			
5,400.0	5,035.7	5,035.7	5,035.7	29.0	11.2	177.48	45.0	0.0	1,257.8	1,233.9	52.724			
5,500.0	5,112.8	5,112.8	5,112.8	30.3	11.3	177.60	45.0	0.0	1,321.4	1,297.1	54.259			
5,600.0	5,190.0	5,190.0	5,190.0	31.7	11.5	177.71	45.0	0.0	1,385.0	1,360.2	55.726			
5,700.0	5,267.1	5,267.1	5,267.1	33.1	11.7	177.81	45.0	0.0	1,448.6	1,423.3	57.127			
5,800.0	5,344.2	5,344.2	5,344.2	34.5	11.9	177.90	45.0	0.0	1,512.2	1,486.4	58.467			
5,900.0	5,421.4	5,421.4	5,421.4	35.9	12.0	177.99	45.0	0.0	1,575.9	1,549.5	59.750			
5,928.9	5,443.6	5,443.6	5,443.6	36.4	12.1	178.01	45.0	0.0	1,594.2	1,567.7	60.110			
6,000.0	5,499.1	5,499.1	5,499.1	37.3	12.2	178.10	45.0	0.0	1,638.8	1,611.9	60.956			
6,100.0	5,578.8	5,578.8	5,578.8	38.4	12.4	178.22	45.0	0.0	1,699.1	1,671.7	62.017			
6,200.0	5,660.6	5,660.6	5,660.6	39.5	12.6	178.32	45.0	0.0	1,756.6	1,728.7	62.923			
6,300.0	5,744.4	5,744.4	5,744.4	40.6	12.8	178.40	45.0	0.0	1,811.2	1,782.8	63.685			
6,400.0	5,830.0	5,830.0	5,830.0	41.5	13.0	178.48	45.0	0.0	1,862.8	1,833.9	64.312			
6,500.0	5,917.4	5,917.4	5,917.4	42.4	13.2	178.55	45.0	0.0	1,911.5	1,882.0	64.813			
6,600.0	6,006.4	6,006.4	6,006.4	43.3	13.4	178.61	45.0	0.0	1,957.0	1,927.0	65.197			
6,700.0	6,096.9	6,096.9	6,096.9	44.1	13.6	178.66	45.0	0.0	1,999.4	1,968.9	65.471			
6,800.0	6,188.9	6,188.9	6,188.9	44.8	13.8	178.70	45.0	0.0	2,038.7	2,007.6	65.644			
6,900.0	6,282.2	6,282.2	6,282.2	45.5	14.0	178.74	45.0	0.0	2,074.6	2,043.1	65.722			
7,000.0	6,376.7	6,376.7	6,376.7	46.1	14.2	178.78	45.0	0.0	2,107.4	2,075.3	65.712			
7,100.0	6,472.3	6,472.3	6,472.3	46.6	14.4	178.81	45.0	0.0	2,136.8	2,104.2	65.619			
7,200.0	6,568.8	6,568.8	6,568.8	47.1	14.6	178.83	45.0	0.0	2,162.8	2,129.8	65.448			
7,300.0	6,666.2	6,666.2	6,666.2	47.5	14.8	178.85	45.0	0.0	2,185.5	2,152.0	65.205			
7,400.0	6,764.3	6,764.3	6,764.3	47.8	15.1	178.87	45.0	0.0	2,204.7	2,170.8	64.892			
7,500.0	6,863.0	6,863.0	6,863.0	48.1	15.3	178.89	45.0	0.0	2,220.6	2,186.1	64.514			
7,600.0	6,962.3	6,962.3	6,962.3	48.4	15.5	178.90	45.0	0.0	2,232.9	2,198.1	64.074			
7,700.0	7,061.9	7,061.9	7,061.9	48.6	15.7	178.91	45.0	0.0	2,241.8	2,206.6	63.574			
7,800.0	7,161.7	7,161.7	7,161.7	48.7	16.0	178.91	45.0	0.0	2,247.2	2,211.6	63.017			
7,905.2	7,266.9	7,266.9	7,266.9	48.8	16.2	70.63	45.0	0.0	2,249.2	2,213.1	62.377			
7,950.0	7,311.7	7,311.7	7,311.7	48.8	16.3	-90.36	45.0	0.0	2,249.2	2,213.0	62.096			
8,000.0	7,361.3	7,361.3	7,361.3	48.9	16.4	-90.49	45.0	0.0	2,249.2	2,212.8	61.788			
8,050.0	7,410.4	7,410.4	7,410.4	48.9	16.5	-90.72	45.0	0.0	2,249.3	2,212.7	61.487			
8,100.0	7,458.7	7,458.7	7,458.7	48.9	16.6	-91.02	45.0	0.0	2,249.5	2,212.8	61.194			
8,150.0	7,505.7	7,505.7	7,505.7	48.9	16.7	-91.39	45.0	0.0	2,249.9	2,213.0	60.908			
8,200.0	7,551.3	7,551.3	7,551.3	49.0	16.8	-91.81	45.0	0.0	2,250.5	2,213.4	60.631			
8,250.0	7,595.1	7,595.1	7,595.1	49.0	16.9	-92.26	45.0	0.0	2,251.5	2,214.2	60.360			
8,300.0	7,636.9	7,636.9	7,636.9	49.0	17.0	-92.71	45.0	0.0	2,252.9	2,215.5	60.097			
8,350.0	7,676.4	7,676.4	7,676.4	49.0	17.1	-93.15	45.0	0.0	2,254.9	2,217.3	59.841			
8,400.0	7,713.4	7,713.4	7,713.4	49.1	17.2	-93.54	45.0	0.0	2,257.6	2,219.7	59.593			
8,450.0	7,747.6	7,747.6	7,747.6	49.1	17.3	-93.86	45.0	0.0	2,261.0	2,222.9	59.352			
8,500.0	7,778.9	7,778.9	7,778.9	49.2	17.3	-94.09	45.0	0.0	2,265.4	2,227.0	59.119			
8,550.0	7,807.0	7,807.0	7,807.0	49.2	17.4	-94.20	45.0	0.0	2,270.7	2,232.1	58.898			
8,600.0	7,831.8	7,831.8	7,831.8	49.3	17.5	-94.17	45.0	0.0	2,277.0	2,238.3	58.690			
8,650.0	7,853.0	7,853.0	7,853.0	49.3	17.5	-93.98	45.0	0.0	2,284.5	2,245.5	58.499			
8,700.0	7,870.7	7,870.7	7,870.7	49.4	17.5	-93.61	45.0	0.0	2,293.2	2,253.9	58.328			
8,750.0	7,884.7	7,884.7	7,884.7	49.5	17.6	-93.04	45.0	0.0	2,303.1	2,263.5	58.182			
8,800.0	7,894.8	7,894.8	7,894.8	49.6	17.6	-92.28	45.0	0.0	2,314.1	2,274.2	58.065			
8,850.0	7,901.1	7,901.1	7,901.1	49.7	17.6	-91.31	45.0	0.0	2,326.2	2,286.1	57.980			
8,900.0	7,903.5	7,903.5	7,903.5	49.8	17.6	-90.13	45.0	0.0	2,339.5	2,299.1	57.932			

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #204 - Pilot Hole - Design #1												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Tooface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
8,905.2	7,903.5	7,903.5	7,903.5	49.8	17.6	-90.00	45.0	0.0	2,340.9	2,300.5	57.929		
9,000.0	7,903.5	7,903.5	7,903.5	50.0	17.6	-90.00	45.0	0.0	2,369.0	2,328.1	57.902		
9,100.0	7,903.5	7,903.5	7,903.5	50.3	17.6	-90.00	45.0	0.0	2,402.2	2,360.8	57.926		
9,200.0	7,903.5	7,903.5	7,903.5	50.7	17.6	-90.00	45.0	0.0	2,439.2	2,397.1	58.012		
9,300.0	7,903.5	7,903.5	7,903.5	51.1	17.6	-90.00	45.0	0.0	2,479.6	2,437.0	58.165		
9,400.0	7,903.5	7,903.5	7,903.5	51.6	17.6	-90.00	45.0	0.0	2,523.3	2,480.1	58.390		
9,500.0	7,903.5	7,903.5	7,903.5	52.1	17.6	-90.00	45.0	0.0	2,570.2	2,526.4	58.690		
9,600.0	7,903.5	7,903.5	7,903.5	52.7	17.6	-90.00	45.0	0.0	2,620.1	2,575.7	59.063		
9,700.0	7,903.5	7,903.5	7,903.5	53.3	17.6	-90.00	45.0	0.0	2,672.7	2,627.8	59.509		
9,800.0	7,903.5	7,903.5	7,903.5	54.0	17.6	-90.00	45.0	0.0	2,728.0	2,682.6	60.027		
9,900.0	7,903.5	7,903.5	7,903.5	54.8	17.6	-90.00	45.0	0.0	2,785.9	2,739.9	60.615		
10,000.0	7,903.5	7,903.5	7,903.5	55.6	17.6	-90.00	45.0	0.0	2,846.0	2,799.6	61.268		
10,100.0	7,903.5	7,903.5	7,903.5	56.5	17.6	-90.00	45.0	0.0	2,908.4	2,861.4	61.984		
10,200.0	7,903.5	7,903.5	7,903.5	57.4	17.6	-90.00	45.0	0.0	2,972.8	2,925.4	62.759		
10,300.0	7,903.5	7,903.5	7,903.5	58.4	17.6	-90.00	45.0	0.0	3,039.1	2,991.3	63.591		
10,400.0	7,903.5	7,903.5	7,903.5	59.5	17.6	-90.00	45.0	0.0	3,107.2	3,059.0	64.475		
10,500.0	7,903.5	7,903.5	7,903.5	60.6	17.6	-90.00	45.0	0.0	3,177.1	3,128.5	65.409		
10,600.0	7,903.5	7,903.5	7,903.5	61.7	17.6	-90.00	45.0	0.0	3,248.5	3,199.5	66.389		
10,700.0	7,903.5	7,903.5	7,903.5	63.0	17.6	-90.00	45.0	0.0	3,321.3	3,272.1	67.413		
10,800.0	7,903.5	7,903.5	7,903.5	64.2	17.6	-90.00	45.0	0.0	3,395.6	3,346.0	68.477		
10,900.0	7,903.5	7,903.5	7,903.5	65.5	17.6	-90.00	45.0	0.0	3,471.1	3,421.3	69.579		
11,000.0	7,903.5	7,903.5	7,903.5	66.8	17.6	-90.00	45.0	0.0	3,547.9	3,497.7	70.717		
11,100.0	7,903.5	7,903.5	7,903.5	68.2	17.6	-90.00	45.0	0.0	3,625.8	3,575.4	71.887		
11,200.0	7,903.5	7,903.5	7,903.5	69.6	17.6	-90.00	45.0	0.0	3,704.8	3,654.1	73.089		
11,300.0	7,903.5	7,903.5	7,903.5	71.1	17.6	-90.00	45.0	0.0	3,784.7	3,733.8	74.319		
11,400.0	7,903.5	7,903.5	7,903.5	72.5	17.6	-90.00	45.0	0.0	3,865.6	3,814.4	75.576		
11,500.0	7,903.5	7,903.5	7,903.5	74.0	17.6	-90.00	45.0	0.0	3,947.3	3,896.0	76.859		
11,600.0	7,903.5	7,903.5	7,903.5	75.6	17.6	-90.00	45.0	0.0	4,029.9	3,978.4	78.165		
11,700.0	7,903.5	7,903.5	7,903.5	77.1	17.6	-90.00	45.0	0.0	4,113.3	4,061.5	79.493		
11,800.0	7,903.5	7,903.5	7,903.5	78.7	17.6	-90.00	45.0	0.0	4,197.4	4,145.4	80.843		
11,900.0	7,903.5	7,903.5	7,903.5	80.3	17.6	-90.00	45.0	0.0	4,282.1	4,230.0	82.211		
12,000.0	7,903.5	7,903.5	7,903.5	81.9	17.6	-90.00	45.0	0.0	4,367.5	4,315.3	83.598		
12,100.0	7,903.5	7,903.5	7,903.5	83.5	17.6	-90.00	45.0	0.0	4,453.6	4,401.2	85.002		
12,200.0	7,903.5	7,903.5	7,903.5	85.1	17.6	-90.00	45.0	0.0	4,540.2	4,487.6	86.422		
12,300.0	7,903.5	7,903.5	7,903.5	86.8	17.6	-90.00	45.0	0.0	4,627.3	4,574.6	87.857		
12,400.0	7,903.5	7,903.5	7,903.5	88.5	17.6	-90.00	45.0	0.0	4,714.9	4,662.1	89.307		
12,500.0	7,903.5	7,903.5	7,903.5	90.1	17.6	-90.00	45.0	0.0	4,803.1	4,750.1	90.770		
12,600.0	7,903.5	7,903.5	7,903.5	91.8	17.6	-90.00	45.0	0.0	4,891.6	4,838.6	92.245		
12,700.0	7,903.5	7,903.5	7,903.5	93.5	17.6	-90.00	45.0	0.0	4,980.7	4,927.5	93.733		
12,800.0	7,903.5	7,903.5	7,903.5	95.2	17.6	-90.00	45.0	0.0	5,070.1	5,016.8	95.232		
12,900.0	7,903.5	7,903.5	7,903.5	97.0	17.6	-90.00	45.0	0.0	5,159.9	5,106.6	96.741		
13,000.0	7,903.5	7,903.5	7,903.5	98.7	17.6	-90.00	45.0	0.0	5,250.1	5,196.6	98.261		
13,100.0	7,903.5	7,903.5	7,903.5	100.4	17.6	-90.00	45.0	0.0	5,340.6	5,287.1	99.790		
13,200.0	7,903.5	7,903.5	7,903.5	102.2	17.6	-90.00	45.0	0.0	5,431.5	5,377.9	101.328		
13,300.0	7,903.5	7,903.5	7,903.5	103.9	17.6	-90.00	45.0	0.0	5,522.6	5,469.0	102.874		
13,400.0	7,903.5	7,903.5	7,903.5	105.7	17.6	-90.00	45.0	0.0	5,614.1	5,560.4	104.429		
13,500.0	7,903.5	7,903.5	7,903.5	107.4	17.6	-90.00	45.0	0.0	5,705.9	5,652.1	105.991		
13,600.0	7,903.5	7,903.5	7,903.5	109.2	17.6	-90.00	45.0	0.0	5,797.9	5,744.0	107.561		
13,700.0	7,903.5	7,903.5	7,903.5	111.0	17.6	-90.00	45.0	0.0	5,890.2	5,836.3	109.137		
13,800.0	7,903.5	7,903.5	7,903.5	112.8	17.6	-90.00	45.0	0.0	5,982.8	5,928.7	110.720		
13,900.0	7,903.5	7,903.5	7,903.5	114.6	17.6	-90.00	45.0	0.0	6,075.5	6,021.5	112.309		
14,000.0	7,903.5	7,903.5	7,903.5	116.4	17.6	-90.00	45.0	0.0	6,168.6	6,114.4	113.904		

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #204 - Pilot Hole - Design #1												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
14,100.0	7,903.5	7,903.5	7,903.5	118.2	17.6	-90.00	45.0	0.0	6,261.8	6,207.6	115.505		
14,200.0	7,903.5	7,903.5	7,903.5	120.0	17.6	-90.00	45.0	0.0	6,355.2	6,300.9	117.111		
14,300.0	7,903.5	7,903.5	7,903.5	121.8	17.6	-90.00	45.0	0.0	6,448.8	6,394.5	118.722		
14,400.0	7,903.5	7,903.5	7,903.5	123.6	17.6	-90.00	45.0	0.0	6,542.6	6,488.3	120.338		
14,500.0	7,903.5	7,903.5	7,903.5	125.4	17.6	-90.00	45.0	0.0	6,636.6	6,582.2	121.959		
14,600.0	7,903.5	7,903.5	7,903.5	127.2	17.6	-90.00	45.0	0.0	6,730.8	6,676.3	123.584		
14,700.0	7,903.5	7,903.5	7,903.5	129.0	17.6	-90.00	45.0	0.0	6,825.1	6,770.6	125.213		
14,800.0	7,903.5	7,903.5	7,903.5	130.9	17.6	-90.00	45.0	0.0	6,919.6	6,865.1	126.846		
14,900.0	7,903.5	7,903.5	7,903.5	132.7	17.6	-90.00	45.0	0.0	7,014.3	6,959.7	128.483		
15,000.0	7,903.5	7,903.5	7,903.5	134.5	17.6	-90.00	45.0	0.0	7,109.1	7,054.4	130.124		
15,100.0	7,903.5	7,903.5	7,903.5	136.4	17.6	-90.00	45.0	0.0	7,204.0	7,149.3	131.768		
15,200.0	7,903.5	7,903.5	7,903.5	138.2	17.6	-90.00	45.0	0.0	7,299.1	7,244.4	133.416		
15,300.0	7,903.5	7,903.5	7,903.5	140.0	17.6	-90.00	45.0	0.0	7,394.3	7,339.5	135.066		
15,400.0	7,903.5	7,903.5	7,903.5	141.9	17.6	-90.00	45.0	0.0	7,489.6	7,434.8	136.720		
15,500.0	7,903.5	7,903.5	7,903.5	143.7	17.6	-90.00	45.0	0.0	7,585.0	7,530.2	138.376		
15,600.0	7,903.5	7,903.5	7,903.5	145.6	17.6	-90.00	45.0	0.0	7,680.6	7,625.8	140.035		
15,700.0	7,903.5	7,903.5	7,903.5	147.4	17.6	-90.00	45.0	0.0	7,776.3	7,721.4	141.697		
15,800.0	7,903.5	7,903.5	7,903.5	149.3	17.6	-90.00	45.0	0.0	7,872.0	7,817.1	143.362		
15,900.0	7,903.5	7,903.5	7,903.5	151.1	17.6	-90.00	45.0	0.0	7,967.9	7,913.0	145.028		
16,000.0	7,903.5	7,903.5	7,903.5	153.0	17.6	-90.00	45.0	0.0	8,063.9	8,008.9	146.697		
16,100.0	7,903.5	7,903.5	7,903.5	154.8	17.6	-90.00	45.0	0.0	8,160.0	8,105.0	148.368		
16,200.0	7,903.5	7,903.5	7,903.5	156.7	17.6	-90.00	45.0	0.0	8,256.2	8,201.1	150.042		
16,300.0	7,903.5	7,903.5	7,903.5	158.5	17.6	-90.00	45.0	0.0	8,352.4	8,297.4	151.717		
16,400.0	7,903.5	7,903.5	7,903.5	160.4	17.6	-90.00	45.0	0.0	8,448.8	8,393.7	153.394		
16,500.0	7,903.5	7,903.5	7,903.5	162.2	17.6	-90.00	45.0	0.0	8,545.2	8,490.1	155.073		
16,600.0	7,903.5	7,903.5	7,903.5	164.1	17.6	-90.00	45.0	0.0	8,641.7	8,586.6	156.754		
16,700.0	7,903.5	7,903.5	7,903.5	166.0	17.6	-90.00	45.0	0.0	8,738.3	8,683.2	158.436		
16,800.0	7,903.5	7,903.5	7,903.5	167.8	17.6	-90.00	45.0	0.0	8,835.0	8,779.8	160.120		
16,900.0	7,903.5	7,903.5	7,903.5	169.7	17.6	-90.00	45.0	0.0	8,931.7	8,876.5	161.805		
17,000.0	7,903.5	7,903.5	7,903.5	171.6	17.6	-90.00	45.0	0.0	9,028.5	8,973.3	163.492		
17,100.0	7,903.5	7,903.5	7,903.5	173.4	17.6	-90.00	45.0	0.0	9,125.4	9,070.2	165.180		
17,200.0	7,903.5	7,903.5	7,903.5	175.3	17.6	-90.00	45.0	0.0	9,222.4	9,167.1	166.870		
17,300.0	7,903.5	7,903.5	7,903.5	177.2	17.6	-90.00	45.0	0.0	9,319.4	9,264.1	168.560		
17,400.0	7,903.5	7,903.5	7,903.5	179.1	17.6	-90.00	45.0	0.0	9,416.5	9,361.1	170.252		
17,500.0	7,903.5	7,903.5	7,903.5	180.9	17.6	-90.00	45.0	0.0	9,513.6	9,458.3	171.945		
17,600.0	7,903.5	7,903.5	7,903.5	182.8	17.6	-90.00	45.0	0.0	9,610.8	9,555.4	173.639		
17,700.0	7,903.5	7,903.5	7,903.5	184.7	17.6	-90.00	45.0	0.0	9,708.0	9,652.7	175.334		
17,800.0	7,903.5	7,903.5	7,903.5	186.6	17.6	-90.00	45.0	0.0	9,805.3	9,750.0	177.030		
17,900.0	7,903.5	7,903.5	7,903.5	188.4	17.6	-90.00	45.0	0.0	9,902.7	9,847.3	178.727		

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<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #204 - Wellbore #1 - Design #1												Offset Site Error:	0.0 usft
Survey Program:												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	0.00	45.0	0.0	45.0				
100.0	100.0	100.0	100.0	0.1	0.1	0.00	45.0	0.0	45.0	44.8	274.257		
200.0	200.0	200.0	200.0	0.3	0.3	0.00	45.0	0.0	45.0	44.4	73.336		
300.0	300.0	300.0	300.0	0.5	0.5	0.00	45.0	0.0	45.0	43.9	42.327		
321.1	321.1	321.1	321.1	0.6	0.6	0.00	45.0	0.0	45.0	43.8	38.855		
400.0	400.0	400.0	400.0	0.8	0.8	0.00	45.0	0.0	45.0	43.5	29.749		
433.3	433.3	433.3	433.3	0.8	0.8	0.00	45.0	0.0	45.0	43.3	27.067		
500.0	500.0	500.0	500.0	1.0	1.0	0.00	45.0	0.0	45.0	43.0	22.933		
600.0	600.0	600.0	600.0	1.2	1.2	0.00	45.0	0.0	45.0	42.6	18.659		
700.0	700.0	700.0	700.0	1.4	1.4	0.00	45.0	0.0	45.0	42.1	15.727		
800.0	800.0	800.0	800.0	1.7	1.7	0.00	45.0	0.0	45.0	41.7	13.592		
900.0	900.0	900.0	900.0	1.9	1.9	0.00	45.0	0.0	45.0	41.2	11.967		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	0.00	45.0	0.0	45.0	40.8	10.689		
1,100.0	1,100.0	1,100.0	1,100.0	2.3	2.3	0.00	45.0	0.0	45.0	40.3	9.658		
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	0.00	45.0	0.0	45.0	39.9	8.808		
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	0.00	45.0	0.0	45.0	39.4	8.096		
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	0.00	45.0	0.0	45.0	39.0	7.490		
1,500.0	1,500.0	1,500.0	1,500.0	3.2	3.2	0.00	45.0	0.0	45.0	38.5	6.969		
1,600.0	1,600.0	1,600.0	1,600.0	3.5	3.5	0.00	45.0	0.0	45.0	38.1	6.515		
1,700.0	1,700.0	1,700.0	1,700.0	3.7	3.7	0.00	45.0	0.0	45.0	37.6	6.117		
1,800.0	1,800.0	1,800.0	1,800.0	3.9	3.9	0.00	45.0	0.0	45.0	37.2	5.765		
1,900.0	1,900.0	1,900.0	1,900.0	4.1	4.1	0.00	45.0	0.0	45.0	36.7	5.451		
2,000.0	2,000.0	2,000.0	2,000.0	4.4	4.4	0.00	45.0	0.0	45.0	36.3	5.169		
2,100.0	2,100.0	2,100.0	2,100.0	4.6	4.6	0.00	45.0	0.0	45.0	35.8	4.915		
2,200.0	2,200.0	2,200.0	2,200.0	4.8	4.8	0.00	45.0	0.0	45.0	35.4	4.685		
2,300.0	2,300.0	2,300.0	2,300.0	5.0	5.0	0.00	45.0	0.0	45.0	34.9	4.476		
2,400.0	2,400.0	2,400.0	2,400.0	5.3	5.3	0.00	45.0	0.0	45.0	34.5	4.284		
2,500.0	2,500.0	2,500.0	2,500.0	5.5	5.5	0.00	45.0	0.0	45.0	34.0	4.109 CC, ES		
2,600.0	2,600.0	2,599.7	2,599.6	5.7	5.7	112.47	45.3	1.7	45.9	34.6	4.038 SF		
2,700.0	2,699.8	2,698.6	2,698.4	5.9	5.9	123.70	46.0	6.8	50.0	38.3	4.255		
2,800.0	2,799.5	2,796.1	2,795.6	6.1	6.1	137.81	47.2	15.1	60.3	48.2	4.966		
2,900.0	2,898.7	2,891.6	2,890.4	6.3	6.3	150.18	48.9	26.4	78.7	66.2	6.298		
3,000.0	2,997.5	2,984.4	2,982.1	6.5	6.5	159.16	50.9	40.4	105.3	92.5	8.217		
3,100.0	3,095.6	3,074.0	3,070.1	6.8	6.8	165.28	53.3	56.7	139.5	126.4	10.633		
3,200.0	3,193.1	3,159.9	3,154.1	7.1	7.0	169.44	56.0	74.9	180.5	167.1	13.465		
3,300.0	3,289.6	3,241.9	3,233.6	7.4	7.3	172.35	58.9	94.5	227.8	214.1	16.652		
3,400.0	3,385.3	3,326.2	3,315.1	7.8	7.6	174.54	62.0	116.1	279.8	265.8	19.933		
3,500.0	3,479.8	3,409.2	3,395.3	8.2	7.9	176.10	65.1	137.4	335.0	320.6	23.251		
3,600.0	3,573.2	3,490.3	3,473.6	8.7	8.2	177.25	68.2	158.1	393.2	378.5	26.599		
3,700.0	3,665.2	3,569.2	3,549.8	9.3	8.5	178.12	71.2	178.3	454.4	439.2	29.969		
3,800.0	3,755.8	3,646.0	3,624.0	9.9	8.8	178.80	74.0	198.0	518.3	502.7	33.354		
3,900.0	3,844.9	3,728.3	3,703.5	10.7	9.1	179.40	77.1	218.8	584.6	568.7	36.587		
4,000.0	3,932.4	3,822.5	3,795.2	11.5	9.4	179.90	80.2	240.2	651.7	635.2	39.463		
4,100.0	4,018.1	3,919.3	3,890.2	12.4	9.7	-179.73	83.0	259.1	718.8	701.8	42.147		
4,200.0	4,102.0	4,019.2	3,988.6	13.4	10.0	-179.48	85.4	275.2	786.1	768.5	44.653		
4,300.0	4,183.9	4,122.3	4,090.9	14.4	10.3	-179.31	87.3	288.3	853.4	835.2	46.992		
4,400.0	4,263.7	4,228.9	4,197.1	15.6	10.5	-179.22	88.7	298.0	920.6	901.9	49.176		
4,476.3	4,323.3	4,313.0	4,281.0	16.5	10.7	-179.20	89.4	302.9	971.7	952.6	50.744		
4,500.0	4,341.5	4,339.6	4,307.6	16.8	10.8	-179.20	89.6	303.9	987.5	968.2	51.212		
4,600.0	4,418.6	4,450.7	4,418.6	18.1	11.0	-179.25	89.8	305.7	1,052.3	1,032.4	53.057		
4,700.0	4,495.8	4,527.8	4,495.8	19.4	11.1	-179.29	89.8	305.7	1,115.9	1,095.6	55.038		
4,800.0	4,572.9	4,605.0	4,572.9	20.8	11.3	-179.33	89.8	305.7	1,179.5	1,158.8	56.891		

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #204 - Wellbore #1 - Design #1												Offset Site Error:	0.0 usft
Survey Program:												Offset Well Error:	0.0 usft
Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore +N/-S (usft)	Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning	
4,900.0	4,650.0	4,682.1	4,650.0	22.1	11.4	-179.37	89.8	305.7	1,243.2	1,222.0	58.648		
5,000.0	4,727.2	4,759.2	4,727.2	23.5	11.6	-179.40	89.8	305.7	1,306.8	1,285.2	60.313		
5,100.0	4,804.3	4,836.4	4,804.3	24.8	11.7	-179.43	89.8	305.7	1,370.5	1,348.3	61.893		
5,200.0	4,881.4	4,913.5	4,881.4	26.2	11.9	-179.45	89.8	305.7	1,434.1	1,411.5	63.393		
5,300.0	4,958.6	4,990.6	4,958.6	27.6	12.0	-179.47	89.8	305.7	1,497.8	1,474.7	64.818		
5,400.0	5,035.7	5,067.8	5,035.7	29.0	12.2	-179.50	89.8	305.7	1,561.4	1,537.8	66.173		
5,500.0	5,112.8	5,144.9	5,112.8	30.3	12.3	-179.52	89.8	305.7	1,625.0	1,601.0	67.461		
5,600.0	5,190.0	5,222.0	5,190.0	31.7	12.5	-179.53	89.8	305.7	1,688.7	1,664.1	68.689		
5,700.0	5,267.1	5,299.1	5,267.1	33.1	12.6	-179.55	89.8	305.7	1,752.3	1,727.2	69.858		
5,800.0	5,344.2	5,376.3	5,344.2	34.5	12.8	-179.57	89.8	305.7	1,816.0	1,790.4	70.973		
5,900.0	5,421.4	5,453.4	5,421.4	35.9	12.9	-179.58	89.8	305.7	1,879.6	1,853.5	72.037		
5,928.9	5,443.6	5,475.7	5,443.6	36.4	13.0	-179.59	89.8	305.7	1,898.0	1,871.7	72.335		
6,000.0	5,499.1	5,531.1	5,499.1	37.3	13.1	-179.60	89.8	305.7	1,942.6	1,916.0	73.032		
6,100.0	5,578.8	5,610.9	5,578.8	38.4	13.2	-179.62	89.8	305.7	2,002.9	1,975.8	73.889		
6,200.0	5,660.6	5,692.7	5,660.6	39.5	13.4	-179.64	89.8	305.7	2,060.4	2,032.8	74.595		
6,300.0	5,744.4	5,776.4	5,744.4	40.6	13.6	-179.66	89.8	305.7	2,115.0	2,086.9	75.160		
6,400.0	5,830.0	5,862.0	5,830.0	41.5	13.8	-179.68	89.8	305.7	2,166.7	2,138.0	75.596		
6,500.0	5,917.4	5,949.4	5,917.4	42.4	13.9	-179.69	89.8	305.7	2,215.3	2,186.1	75.910		
6,600.0	6,006.4	6,038.4	6,006.4	43.3	14.1	-179.70	89.8	305.7	2,260.9	2,231.2	76.114		
6,700.0	6,096.9	6,129.0	6,096.9	44.1	14.3	-179.71	89.8	305.7	2,303.3	2,273.1	76.214		
6,800.0	6,188.9	6,221.0	6,188.9	44.8	14.5	-179.72	89.8	305.7	2,342.5	2,311.8	76.219		
6,900.0	6,282.2	6,314.2	6,282.2	45.5	14.7	-179.73	89.8	305.7	2,378.5	2,347.3	76.135		
7,000.0	6,376.7	6,408.7	6,376.7	46.1	14.9	-179.74	89.8	305.7	2,411.3	2,379.5	75.970		
7,100.0	6,472.3	6,504.3	6,472.3	46.6	15.1	-179.74	89.8	305.7	2,440.7	2,408.4	75.729		
7,200.0	6,568.8	6,600.8	6,568.8	47.1	15.3	-179.75	89.8	305.7	2,466.7	2,434.0	75.417		
7,300.0	6,666.2	6,698.2	6,666.2	47.5	15.5	-179.75	89.8	305.7	2,489.4	2,456.2	75.039		
7,400.0	6,764.3	6,796.4	6,764.3	47.8	15.7	-179.75	89.8	305.7	2,508.6	2,475.0	74.599		
7,500.0	6,863.0	6,895.1	6,863.0	48.1	15.9	-179.76	89.8	305.7	2,524.5	2,490.4	74.099		
7,600.0	6,962.3	6,994.3	6,962.3	48.4	16.1	-179.76	89.8	305.7	2,536.8	2,502.3	73.544		
7,700.0	7,061.9	7,093.9	7,061.9	48.6	16.3	-179.76	89.8	305.7	2,545.7	2,510.8	72.935		
7,800.0	7,161.7	7,193.8	7,161.7	48.7	16.5	-179.76	89.8	305.7	2,551.1	2,515.8	72.274		
7,905.2	7,266.9	7,298.9	7,266.9	48.8	16.7	71.95	89.8	305.7	2,553.1	2,517.4	71.532		
7,950.0	7,311.7	7,340.8	7,308.7	48.8	16.8	-88.99	88.5	306.1	2,553.1	2,517.3	71.273		
8,000.0	7,361.3	7,387.5	7,355.2	48.9	16.9	-89.00	84.0	307.7	2,553.1	2,517.1	70.983		
8,050.0	7,410.4	7,434.3	7,401.3	48.9	17.0	-89.02	76.3	310.3	2,553.1	2,516.9	70.688		
8,100.0	7,458.7	7,481.1	7,446.6	48.9	17.1	-89.04	65.4	314.1	2,553.0	2,516.8	70.381		
8,150.0	7,505.7	7,528.0	7,491.1	48.9	17.2	-89.06	51.3	319.0	2,553.0	2,516.6	70.052		
8,200.0	7,551.3	7,575.0	7,534.4	49.0	17.3	-89.09	34.1	324.9	2,553.0	2,516.4	69.724		
8,250.0	7,595.1	7,622.1	7,576.3	49.0	17.4	-89.13	14.0	331.8	2,553.0	2,516.1	69.319		
8,300.0	7,636.9	7,669.2	7,616.7	49.0	17.5	-89.17	-9.1	339.8	2,552.9	2,515.9	68.877		
8,350.0	7,676.4	7,716.5	7,655.2	49.0	17.7	-89.22	-35.0	348.6	2,552.9	2,515.6	68.373		
8,400.0	7,713.4	7,764.0	7,691.7	49.1	17.8	-89.27	-63.7	358.7	2,552.9	2,515.2	67.797		
8,450.0	7,747.6	7,811.6	7,725.9	49.1	18.0	-89.32	-94.9	369.5	2,552.8	2,514.8	67.139		
8,500.0	7,778.9	7,859.3	7,757.7	49.2	18.2	-89.38	-128.6	381.1	2,552.8	2,514.4	66.391		
8,550.0	7,807.0	7,907.3	7,786.8	49.2	18.5	-89.44	-164.6	393.5	2,552.8	2,513.8	65.551		
8,600.0	7,831.8	7,955.4	7,813.1	49.3	18.8	-89.51	-202.8	406.7	2,552.7	2,513.2	64.617		
8,650.0	7,853.0	8,003.8	7,836.3	49.3	19.1	-89.58	-242.8	420.5	2,552.7	2,512.6	63.593		
8,700.0	7,870.7	8,052.4	7,856.4	49.4	19.5	-89.65	-284.7	435.0	2,552.7	2,511.8	62.485		
8,750.0	7,884.7	8,101.2	7,873.1	49.5	19.9	-89.72	-328.0	449.9	2,552.7	2,511.0	61.304		
8,800.0	7,894.8	8,150.0	7,886.2	49.6	20.3	-89.80	-372.4	465.3	2,552.6	2,510.1	60.070		
8,850.0	7,901.1	8,199.6	7,895.6	49.7	20.8	-89.88	-418.4	481.1	2,552.6	2,509.2	58.777		
8,900.0	7,903.5	8,249.2	7,901.6	49.8	21.3	-89.96	-465.0	497.2	2,552.6	2,508.2	57.463		

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JUN 11 2019  
WV Department of  
Environmental Protection

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #204 - Wellbore #1 - Design #1												Offset Site Error:	0.0 usft
Survey Program:												Offset Well Error:	0.0 usft
Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore +N/-S (usft)	Centre +E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
8,905.2	7,903.5	8,254.4	7,902.0	49.8	21.4	-89.97	-469.9	498.9	2,552.6	2,508.1	57.324		
9,000.0	7,903.5	8,349.1	7,903.5	50.0	22.5	-90.00	-559.4	529.8	2,552.6	2,506.0	54.805		
9,100.0	7,903.5	8,449.1	7,903.5	50.3	23.7	-90.00	-653.9	562.4	2,552.6	2,503.7	52.180		
9,200.0	7,903.5	8,549.1	7,903.5	50.7	25.0	-90.00	-748.4	595.1	2,552.6	2,501.1	49.620		
9,300.0	7,903.5	8,649.1	7,903.5	51.1	26.4	-90.00	-842.9	627.7	2,552.6	2,498.4	47.165		
9,400.0	7,903.5	8,749.1	7,903.5	51.6	27.8	-90.00	-937.5	660.3	2,552.6	2,495.6	44.837		
9,500.0	7,903.5	8,849.1	7,903.5	52.1	29.3	-90.00	-1,032.0	693.0	2,552.5	2,492.7	42.645		
9,600.0	7,903.5	8,949.1	7,903.5	52.7	30.9	-90.00	-1,126.5	725.6	2,552.5	2,489.7	40.595		
9,700.0	7,903.5	9,049.1	7,903.5	53.3	32.5	-90.00	-1,221.0	758.2	2,552.5	2,486.5	38.683		
9,800.0	7,903.5	9,149.1	7,903.5	54.0	34.1	-90.00	-1,315.5	790.9	2,552.5	2,483.3	36.903		
9,900.0	7,903.5	9,249.1	7,903.5	54.8	35.8	-90.00	-1,410.1	823.5	2,552.5	2,480.1	35.249		
10,000.0	7,903.5	9,349.1	7,903.5	55.6	37.4	-90.00	-1,504.6	856.2	2,552.5	2,476.8	33.712		
10,100.0	7,903.5	9,449.1	7,903.5	56.5	39.1	-90.00	-1,599.1	888.8	2,552.5	2,473.4	32.284		
10,200.0	7,903.5	9,549.1	7,903.5	57.4	40.9	-90.00	-1,693.7	921.4	2,552.5	2,470.0	30.955		
10,300.0	7,903.5	9,649.1	7,903.5	58.4	42.6	-90.00	-1,788.2	954.1	2,552.4	2,466.6	29.719		
10,400.0	7,903.5	9,749.1	7,903.5	59.5	44.4	-90.00	-1,882.7	986.7	2,552.4	2,463.1	28.566		
10,500.0	7,903.5	9,849.1	7,903.5	60.6	46.1	-90.00	-1,977.2	1,019.3	2,552.4	2,459.6	27.491		
10,600.0	7,903.5	9,949.1	7,903.5	61.7	47.9	-90.00	-2,071.8	1,052.0	2,552.4	2,456.0	26.487		
10,700.0	7,903.5	10,049.1	7,903.5	63.0	49.7	-90.00	-2,166.3	1,084.6	2,552.4	2,452.5	25.547		
10,800.0	7,903.5	10,149.1	7,903.5	64.2	51.5	-90.00	-2,260.8	1,117.2	2,552.4	2,448.9	24.667		
10,900.0	7,903.5	10,249.1	7,903.5	65.5	53.3	-90.00	-2,355.3	1,149.9	2,552.4	2,445.3	23.841		
11,000.0	7,903.5	10,349.1	7,903.5	66.8	55.1	-90.00	-2,449.9	1,182.5	2,552.4	2,441.7	23.065		
11,100.0	7,903.5	10,449.1	7,903.5	68.2	56.9	-90.00	-2,544.4	1,215.1	2,552.4	2,438.1	22.335		
11,200.0	7,903.5	10,549.1	7,903.5	69.6	58.8	-90.00	-2,638.9	1,247.8	2,552.3	2,434.4	21.647		
11,300.0	7,903.5	10,649.1	7,903.5	71.1	60.6	-90.00	-2,733.4	1,280.4	2,552.3	2,430.8	20.998		
11,400.0	7,903.5	10,749.1	7,903.5	72.5	62.4	-90.00	-2,828.0	1,313.0	2,552.3	2,427.1	20.384		
11,500.0	7,903.5	10,849.1	7,903.5	74.0	64.3	-90.00	-2,922.5	1,345.7	2,552.3	2,423.4	19.804		
11,600.0	7,903.5	10,949.1	7,903.5	75.6	66.1	-90.00	-3,017.0	1,378.3	2,552.3	2,419.7	19.255		
11,700.0	7,903.5	11,049.1	7,903.5	77.1	68.0	-90.00	-3,111.5	1,410.9	2,552.3	2,416.0	18.734		
11,800.0	7,903.5	11,149.1	7,903.5	78.7	69.8	-90.00	-3,206.1	1,443.6	2,552.3	2,412.3	18.239		
11,900.0	7,903.5	11,249.1	7,903.5	80.3	71.7	-90.00	-3,300.6	1,476.2	2,552.3	2,408.6	17.769		
12,000.0	7,903.5	11,349.1	7,903.5	81.9	73.6	-90.00	-3,395.1	1,508.9	2,552.2	2,404.9	17.321		
12,100.0	7,903.5	11,449.1	7,903.5	83.5	75.4	-90.00	-3,489.6	1,541.5	2,552.2	2,401.2	16.895		
12,200.0	7,903.5	11,549.1	7,903.5	85.1	77.3	-90.00	-3,584.2	1,574.1	2,552.2	2,397.4	16.489		
12,300.0	7,903.5	11,649.1	7,903.5	86.8	79.2	-90.00	-3,678.7	1,606.8	2,552.2	2,393.7	16.101		
12,400.0	7,903.5	11,749.1	7,903.5	88.5	81.0	-90.00	-3,773.2	1,639.4	2,552.2	2,390.0	15.730		
12,500.0	7,903.5	11,849.1	7,903.5	90.1	82.9	-90.00	-3,867.7	1,672.0	2,552.2	2,386.2	15.376		
12,600.0	7,903.5	11,949.1	7,903.5	91.8	84.8	-90.00	-3,962.3	1,704.7	2,552.2	2,382.4	15.037		
12,700.0	7,903.5	12,049.1	7,903.5	93.5	86.7	-90.00	-4,056.8	1,737.3	2,552.2	2,378.7	14.712		
12,800.0	7,903.5	12,149.1	7,903.5	95.2	88.5	-90.00	-4,151.3	1,769.9	2,552.2	2,374.9	14.400		
12,900.0	7,903.5	12,249.1	7,903.5	97.0	90.4	-90.00	-4,245.8	1,802.6	2,552.1	2,371.2	14.102		
13,000.0	7,903.5	12,349.1	7,903.5	98.7	92.3	-90.00	-4,340.4	1,835.2	2,552.1	2,367.4	13.815		
13,100.0	7,903.5	12,449.1	7,903.5	100.4	94.2	-90.00	-4,434.9	1,867.8	2,552.1	2,363.6	13.539		
13,200.0	7,903.5	12,549.1	7,903.5	102.2	96.1	-90.00	-4,529.4	1,900.5	2,552.1	2,359.8	13.274		
13,300.0	7,903.5	12,649.1	7,903.5	103.9	98.0	-90.00	-4,623.9	1,933.1	2,552.1	2,356.1	13.018		
13,400.0	7,903.5	12,749.1	7,903.5	105.7	99.9	-90.00	-4,718.5	1,965.7	2,552.1	2,352.3	12.773		
13,500.0	7,903.5	12,849.1	7,903.5	107.4	101.8	-90.00	-4,813.0	1,998.4	2,552.1	2,348.5	12.536		
13,600.0	7,903.5	12,949.1	7,903.5	109.2	103.7	-90.00	-4,907.5	2,031.0	2,552.1	2,344.7	12.307		
13,700.0	7,903.5	13,049.1	7,903.5	111.0	105.5	-90.00	-5,002.0	2,063.7	2,552.0	2,340.9	12.087		
13,800.0	7,903.5	13,149.1	7,903.5	112.8	107.4	-90.00	-5,096.6	2,096.3	2,552.0	2,337.1	11.874		
13,900.0	7,903.5	13,249.1	7,903.5	114.6	109.3	-90.00	-5,191.1	2,128.9	2,552.0	2,333.3	11.669		
14,000.0	7,903.5	13,349.1	7,903.5	116.4	111.2	-90.00	-5,285.6	2,161.6	2,552.0	2,329.5	11.470		

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<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #204 - Wellbore #1 - Design #1												Offset Site Error:	0.0 usft
Survey Program:												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
14,100.0	7,903.5	13,449.1	7,903.5	118.2	113.1	-90.00	-5,380.1	2,194.2	2,552.0	2,325.7	11.278		
14,200.0	7,903.5	13,549.1	7,903.5	120.0	115.0	-90.00	-5,474.7	2,226.8	2,552.0	2,321.9	11.092		
14,300.0	7,903.5	13,649.1	7,903.5	121.8	116.9	-90.00	-5,569.2	2,259.5	2,552.0	2,318.1	10.913		
14,400.0	7,903.5	13,749.1	7,903.5	123.6	118.8	-90.00	-5,663.7	2,292.1	2,552.0	2,314.3	10.738		
14,500.0	7,903.5	13,849.1	7,903.5	125.4	120.7	-90.00	-5,758.2	2,324.7	2,552.0	2,310.5	10.570		
14,600.0	7,903.5	13,949.1	7,903.5	127.2	122.6	-90.00	-5,852.8	2,357.4	2,551.9	2,306.7	10.406		
14,700.0	7,903.5	14,049.1	7,903.5	129.0	124.5	-90.00	-5,947.3	2,390.0	2,551.9	2,302.9	10.247		
14,800.0	7,903.5	14,149.1	7,903.5	130.9	126.4	-90.00	-6,041.8	2,422.6	2,551.9	2,299.1	10.093		
14,900.0	7,903.5	14,249.1	7,903.5	132.7	128.3	-90.00	-6,136.3	2,455.3	2,551.9	2,295.3	9.944		
15,000.0	7,903.5	14,349.1	7,903.5	134.5	130.2	-90.00	-6,230.9	2,487.9	2,551.9	2,291.5	9.799		
15,100.0	7,903.5	14,449.1	7,903.5	136.4	132.1	-90.00	-6,325.4	2,520.5	2,551.9	2,287.6	9.658		
15,200.0	7,903.5	14,549.1	7,903.5	138.2	134.0	-90.00	-6,419.9	2,553.2	2,551.9	2,283.8	9.520		
15,300.0	7,903.5	14,649.1	7,903.5	140.0	135.9	-90.00	-6,514.4	2,585.8	2,551.9	2,280.0	9.387		
15,400.0	7,903.5	14,749.1	7,903.5	141.9	137.8	-90.00	-6,609.0	2,618.5	2,551.8	2,276.2	9.258		
15,500.0	7,903.5	14,849.1	7,903.5	143.7	139.8	-90.00	-6,703.5	2,651.1	2,551.8	2,272.4	9.131		
15,600.0	7,903.5	14,949.1	7,903.5	145.6	141.7	-90.00	-6,798.0	2,683.7	2,551.8	2,268.6	9.009		
15,700.0	7,903.5	15,049.1	7,903.5	147.4	143.6	-90.00	-6,892.5	2,716.4	2,551.8	2,264.7	8.889		
15,800.0	7,903.5	15,149.1	7,903.5	149.3	145.5	-90.00	-6,987.1	2,749.0	2,551.8	2,260.9	8.773		
15,900.0	7,903.5	15,249.1	7,903.5	151.1	147.4	-90.00	-7,081.6	2,781.6	2,551.8	2,257.1	8.659		
16,000.0	7,903.5	15,349.1	7,903.5	153.0	149.3	-90.00	-7,176.1	2,814.3	2,551.8	2,253.3	8.549		
16,100.0	7,903.5	15,449.1	7,903.5	154.8	151.2	-90.00	-7,270.6	2,846.9	2,551.8	2,249.4	8.441		
16,200.0	7,903.5	15,549.1	7,903.5	156.7	153.1	-90.00	-7,365.2	2,879.5	2,551.7	2,245.6	8.336		
16,300.0	7,903.5	15,649.1	7,903.5	158.5	155.0	-90.00	-7,459.7	2,912.2	2,551.7	2,241.8	8.233		
16,400.0	7,903.5	15,749.1	7,903.5	160.4	156.9	-90.00	-7,554.2	2,944.8	2,551.7	2,238.0	8.133		
16,500.0	7,903.5	15,849.1	7,903.5	162.2	158.8	-90.00	-7,648.7	2,977.4	2,551.7	2,234.1	8.035		
16,600.0	7,903.5	15,949.1	7,903.5	164.1	160.7	-90.00	-7,743.3	3,010.1	2,551.7	2,230.3	7.940		
16,700.0	7,903.5	16,049.1	7,903.5	166.0	162.6	-90.00	-7,837.8	3,042.7	2,551.7	2,226.5	7.846		
16,800.0	7,903.5	16,149.1	7,903.5	167.8	164.6	-90.00	-7,932.3	3,075.3	2,551.7	2,222.7	7.755		
16,900.0	7,903.5	16,249.1	7,903.5	169.7	166.5	-90.00	-8,026.8	3,108.0	2,551.7	2,218.8	7.666		
17,000.0	7,903.5	16,349.1	7,903.5	171.6	168.4	-90.00	-8,121.4	3,140.6	2,551.7	2,215.0	7.579		
17,100.0	7,903.5	16,449.1	7,903.5	173.4	170.3	-90.00	-8,215.9	3,173.2	2,551.6	2,211.2	7.494		
17,200.0	7,903.5	16,549.1	7,903.5	175.3	172.2	-90.00	-8,310.4	3,205.9	2,551.6	2,207.3	7.411		
17,300.0	7,903.5	16,649.1	7,903.5	177.2	174.1	-90.00	-8,404.9	3,238.5	2,551.6	2,203.5	7.330		
17,400.0	7,903.5	16,749.1	7,903.5	179.1	176.0	-90.00	-8,499.4	3,271.2	2,551.6	2,199.7	7.250		
17,500.0	7,903.5	16,849.1	7,903.5	180.9	177.9	-90.00	-8,594.0	3,303.8	2,551.6	2,195.8	7.172		
17,600.0	7,903.5	16,949.1	7,903.5	182.8	179.8	-90.00	-8,688.5	3,336.4	2,551.6	2,192.0	7.096		
17,700.0	7,903.5	17,049.1	7,903.5	184.7	181.8	-90.00	-8,783.0	3,369.1	2,551.6	2,188.2	7.021		
17,800.0	7,903.5	17,149.1	7,903.5	186.6	183.7	-90.00	-8,877.5	3,401.7	2,551.6	2,184.3	6.948		
17,900.0	7,903.5	17,249.1	7,903.5	188.4	185.6	-90.00	-8,972.1	3,434.3	2,551.5	2,180.5	6.877		
18,000.0	7,903.5	17,349.1	7,903.5	190.3	187.5	-90.00	-9,066.6	3,467.0	2,551.5	2,176.7	6.807		
18,100.0	7,903.5	17,449.1	7,903.5	192.2	189.4	-90.00	-9,161.1	3,499.6	2,551.5	2,172.8	6.738		
18,200.0	7,903.5	17,549.1	7,903.5	194.1	191.3	-90.00	-9,255.6	3,532.2	2,551.5	2,169.0	6.670		
18,300.0	7,903.5	17,649.1	7,903.5	196.0	193.2	-90.00	-9,350.2	3,564.9	2,551.5	2,165.2	6.604		
18,400.0	7,903.5	17,749.1	7,903.5	197.8	195.1	-90.00	-9,444.7	3,597.5	2,551.5	2,161.3	6.540		
18,500.0	7,903.5	17,849.1	7,903.5	199.7	197.1	-90.00	-9,539.2	3,630.1	2,551.5	2,157.5	6.476		
18,600.0	7,903.5	17,949.1	7,903.5	201.6	199.0	-90.00	-9,633.7	3,662.8	2,551.5	2,153.7	6.414		
18,700.0	7,903.5	18,049.1	7,903.5	203.5	200.9	-90.00	-9,728.3	3,695.4	2,551.5	2,149.8	6.353		
18,800.0	7,903.5	18,149.1	7,903.5	205.4	202.8	-90.00	-9,822.8	3,728.0	2,551.4	2,146.0	6.293		
18,900.0	7,903.5	18,249.1	7,903.5	207.3	204.7	-90.00	-9,917.3	3,760.7	2,551.4	2,142.1	6.234		
19,000.0	7,903.5	18,349.1	7,903.5	209.2	206.6	-90.00	-10,011.8	3,793.3	2,551.4	2,138.3	6.176		
19,100.0	7,903.5	18,449.1	7,903.5	211.0	208.5	-90.00	-10,106.4	3,826.0	2,551.4	2,134.5	6.119		
19,200.0	7,903.5	18,549.1	7,903.5	212.9	210.5	-90.00	-10,200.9	3,858.6	2,551.4	2,130.6	6.064		

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #204 - Wellbore #1 - Design #1												Offset Site Error:	0.0 usft
Survey Program:												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
19,300.0	7,903.5	18,649.1	7,903.5	214.8	212.4	-90.00	-10,295.4	3,891.2	2,551.4	2,126.8	6,009		
19,400.0	7,903.5	18,749.1	7,903.5	216.7	214.3	-90.00	-10,389.9	3,923.9	2,551.4	2,123.0	5,955		
19,500.0	7,903.5	18,849.1	7,903.5	218.6	216.2	-90.00	-10,484.5	3,956.5	2,551.4	2,119.1	5,903		
19,600.0	7,903.5	18,949.1	7,903.5	220.5	218.1	-90.00	-10,579.0	3,989.1	2,551.3	2,115.3	5,851		
19,700.0	7,903.5	19,049.1	7,903.5	222.4	220.0	-90.00	-10,673.5	4,021.8	2,551.3	2,111.4	5,800		
19,800.0	7,903.5	19,149.1	7,903.5	224.3	221.9	-90.00	-10,768.0	4,054.4	2,551.3	2,107.6	5,750		
19,900.0	7,903.5	19,249.1	7,903.5	226.2	223.9	-90.00	-10,862.6	4,087.0	2,551.3	2,103.8	5,700		
20,000.0	7,903.5	19,349.1	7,903.5	228.1	225.8	-90.00	-10,957.1	4,119.7	2,551.3	2,099.9	5,652		
20,100.0	7,903.5	19,449.1	7,903.5	229.9	227.7	-90.00	-11,051.6	4,152.3	2,551.3	2,096.1	5,605		
20,200.0	7,903.5	19,549.1	7,903.5	231.8	229.6	-90.00	-11,146.1	4,184.9	2,551.3	2,092.2	5,558		
20,300.0	7,903.5	19,649.1	7,903.5	233.7	231.5	-90.00	-11,240.7	4,217.6	2,551.3	2,088.4	5,512		
20,400.0	7,903.5	19,749.1	7,903.5	235.6	233.4	-90.00	-11,335.2	4,250.2	2,551.3	2,084.5	5,466		
20,500.0	7,903.5	19,849.1	7,903.5	237.5	235.4	-90.00	-11,429.7	4,282.8	2,551.2	2,080.7	5,422		
20,600.0	7,903.5	19,949.1	7,903.5	239.4	237.3	-90.00	-11,524.2	4,315.5	2,551.2	2,076.9	5,378		
20,700.0	7,903.5	20,049.1	7,903.5	241.3	239.2	-90.00	-11,618.8	4,348.1	2,551.2	2,073.0	5,335		
20,800.0	7,903.5	20,149.1	7,903.5	243.2	241.1	-90.00	-11,713.3	4,380.7	2,551.2	2,069.2	5,293		
20,900.0	7,903.5	20,249.1	7,903.5	245.1	243.0	-90.00	-11,807.8	4,413.4	2,551.2	2,065.3	5,251		
21,000.0	7,903.5	20,349.1	7,903.5	247.0	244.9	-90.00	-11,902.3	4,446.0	2,551.2	2,061.5	5,210		
21,100.0	7,903.5	20,449.1	7,903.5	248.9	246.9	-90.00	-11,996.9	4,478.7	2,551.2	2,057.6	5,169		
21,200.0	7,903.5	20,549.1	7,903.5	250.8	248.8	-90.00	-12,091.4	4,511.3	2,551.2	2,053.8	5,129		
21,300.0	7,903.5	20,649.1	7,903.5	252.7	250.7	-90.00	-12,185.9	4,543.9	2,551.1	2,050.0	5,090		
21,400.0	7,903.5	20,749.1	7,903.5	254.6	252.6	-90.00	-12,280.4	4,576.6	2,551.1	2,046.1	5,052		
21,500.0	7,903.5	20,849.1	7,903.5	256.5	254.5	-90.00	-12,375.0	4,609.2	2,551.1	2,042.3	5,014		
21,600.0	7,903.5	20,949.1	7,903.5	258.4	256.4	-90.00	-12,469.5	4,641.8	2,551.1	2,038.4	4,976		
21,700.0	7,903.5	21,049.1	7,903.5	260.3	258.4	-90.00	-12,564.0	4,674.5	2,551.1	2,034.6	4,939		
21,800.0	7,903.5	21,149.1	7,903.5	262.2	260.3	-90.00	-12,658.5	4,707.1	2,551.1	2,030.7	4,903		
21,900.0	7,903.5	21,249.1	7,903.5	264.1	262.2	-90.00	-12,753.1	4,739.7	2,551.1	2,026.9	4,867		
22,000.0	7,903.5	21,349.1	7,903.5	266.0	264.1	-90.00	-12,847.6	4,772.4	2,551.1	2,023.1	4,831		
22,019.7	7,903.5	21,368.6	7,903.5	266.4	264.5	-90.00	-12,866.0	4,778.7	2,551.1	2,022.3	4,825		
22,100.0	7,903.5	21,368.6	7,903.5	267.9	264.5	-90.00	-12,866.0	4,778.7	2,552.3	2,023.1	4,823		
22,200.0	7,903.5	21,368.6	7,903.5	269.8	264.5	-90.00	-12,866.0	4,778.7	2,557.4	2,028.4	4,835		
22,300.0	7,903.5	21,368.6	7,903.5	271.7	264.5	-90.00	-12,866.0	4,778.7	2,566.4	2,038.4	4,861		
22,400.0	7,903.5	21,368.6	7,903.5	273.6	264.5	-90.00	-12,866.0	4,778.7	2,579.2	2,053.0	4,901		
22,482.4	7,903.5	21,368.6	7,903.5	275.2	264.5	-90.00	-12,866.0	4,778.7	2,592.7	2,068.5	4,946		

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<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #205 - Wellbore #1 - Design #1												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	0.00	60.0	0.0	60.0				
100.0	100.0	100.0	100.0	0.1	0.1	0.00	60.0	0.0	60.0	59.8	365.677		
200.0	200.0	200.0	200.0	0.3	0.3	0.00	60.0	0.0	60.0	59.4	97.782		
300.0	300.0	300.0	300.0	0.5	0.5	0.00	60.0	0.0	60.0	58.9	56.436		
321.1	321.1	321.1	321.1	0.6	0.6	0.00	60.0	0.0	60.0	58.8	51.807		
400.0	400.0	400.0	400.0	0.8	0.8	0.00	60.0	0.0	60.0	58.5	39.865		
433.3	433.3	433.3	433.3	0.8	0.8	0.00	60.0	0.0	60.0	58.3	36.090		
500.0	500.0	500.0	500.0	1.0	1.0	0.00	60.0	0.0	60.0	58.0	30.578		
600.0	600.0	600.0	600.0	1.2	1.2	0.00	60.0	0.0	60.0	57.6	24.878		
700.0	700.0	700.0	700.0	1.4	1.4	0.00	60.0	0.0	60.0	57.1	20.970		
800.0	800.0	800.0	800.0	1.7	1.7	0.00	60.0	0.0	60.0	56.7	18.122		
900.0	900.0	900.0	900.0	1.9	1.9	0.00	60.0	0.0	60.0	56.2	15.956		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	0.00	60.0	0.0	60.0	55.8	14.252		
1,100.0	1,100.0	1,100.0	1,100.0	2.3	2.3	0.00	60.0	0.0	60.0	55.3	12.877		
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	0.00	60.0	0.0	60.0	54.9	11.744		
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	0.00	60.0	0.0	60.0	54.4	10.794		
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	0.00	60.0	0.0	60.0	54.0	9.987		
1,500.0	1,500.0	1,500.0	1,500.0	3.2	3.2	0.00	60.0	0.0	60.0	53.5	9.291		
1,600.0	1,600.0	1,600.0	1,600.0	3.5	3.5	0.00	60.0	0.0	60.0	53.1	8.687		
1,700.0	1,700.0	1,700.0	1,700.0	3.7	3.7	0.00	60.0	0.0	60.0	52.6	8.156		
1,800.0	1,800.0	1,800.0	1,800.0	3.9	3.9	0.00	60.0	0.0	60.0	52.2	7.686		
1,900.0	1,900.0	1,900.0	1,900.0	4.1	4.1	0.00	60.0	0.0	60.0	51.7	7.268		
2,000.0	2,000.0	2,000.0	2,000.0	4.4	4.4	0.00	60.0	0.0	60.0	51.3	6.892		
2,100.0	2,100.0	2,100.0	2,100.0	4.6	4.6	0.00	60.0	0.0	60.0	50.8	6.554		
2,200.0	2,200.0	2,200.0	2,200.0	4.8	4.8	0.00	60.0	0.0	60.0	50.4	6.247		
2,300.0	2,300.0	2,300.0	2,300.0	5.0	5.0	0.00	60.0	0.0	60.0	49.9	5.968		
2,400.0	2,400.0	2,400.0	2,400.0	5.3	5.3	0.00	60.0	0.0	60.0	49.5	5.712		
2,500.0	2,500.0	2,500.0	2,500.0	5.5	5.5	0.00	60.0	0.0	60.0	49.0	5.478	CC, ES	
2,600.0	2,600.0	2,599.3	2,599.3	5.7	5.7	111.37	60.4	1.7	61.1	49.7	5.371	SF	
2,700.0	2,699.8	2,698.0	2,697.8	5.9	5.9	119.82	61.7	6.6	65.3	53.6	5.552		
2,800.0	2,799.5	2,795.2	2,794.7	6.1	6.1	131.12	63.9	14.7	75.0	62.9	6.176		
2,900.0	2,898.7	2,890.4	2,889.2	6.3	6.3	142.13	66.8	25.7	92.3	79.8	7.375		
3,000.0	2,997.5	2,982.8	2,980.6	6.5	6.5	151.03	70.3	39.3	117.6	104.8	9.159		
3,100.0	3,095.6	3,072.2	3,068.4	6.8	6.8	157.58	74.5	55.1	150.7	137.6	11.463		
3,200.0	3,193.1	3,157.8	3,152.1	7.1	7.0	162.27	79.1	72.7	190.9	177.5	14.209		
3,300.0	3,289.6	3,239.5	3,231.3	7.4	7.3	165.65	84.2	91.8	237.6	223.8	17.330		
3,400.0	3,385.3	3,316.9	3,305.9	7.8	7.6	168.10	89.5	111.9	290.1	276.1	20.774		
3,500.0	3,479.8	3,389.8	3,375.6	8.2	7.8	169.92	94.9	132.6	348.0	333.8	24.496		
3,600.0	3,573.2	3,458.1	3,440.4	8.7	8.1	171.29	100.4	153.5	410.8	396.4	28.458		
3,700.0	3,665.2	3,521.8	3,500.2	9.3	8.4	172.34	105.9	174.3	478.2	463.5	32.635		
3,800.0	3,755.8	3,560.8	3,555.3	9.9	8.7	173.14	111.3	194.8	549.7	534.8	36.998		
3,900.0	3,844.9	3,635.1	3,605.7	10.7	9.0	173.76	116.5	214.6	624.9	609.9	41.522		
4,000.0	3,932.4	3,685.0	3,651.5	11.5	9.3	174.24	121.5	233.6	703.7	688.4	46.193		
4,100.0	4,018.1	3,730.4	3,692.9	12.4	9.6	174.60	126.2	251.6	785.5	770.1	50.991		
4,200.0	4,102.0	3,778.1	3,736.1	13.4	9.9	174.95	131.4	271.0	870.0	854.3	55.634		
4,300.0	4,183.9	3,828.1	3,781.5	14.4	10.2	175.28	136.7	291.5	956.4	940.5	60.049		
4,400.0	4,263.7	3,875.1	3,824.1	15.6	10.5	175.53	141.8	310.7	1,044.6	1,028.4	64.456		
4,476.3	4,323.3	3,908.9	3,854.7	16.5	10.8	175.68	145.4	324.5	1,112.9	1,096.5	67.819		
4,500.0	4,341.5	3,919.1	3,863.9	16.8	10.8	175.79	146.5	328.7	1,134.3	1,117.8	68.854		
4,600.0	4,418.6	3,952.1	3,902.9	18.1	11.2	176.22	151.2	346.3	1,224.5	1,207.7	73.137		
4,700.0	4,495.8	4,005.2	3,942.0	19.4	11.5	176.59	155.8	363.9	1,314.6	1,297.6	77.270		
4,800.0	4,572.9	4,048.2	3,981.0	20.8	11.8	176.91	160.4	381.5	1,404.8	1,387.5	81.245		

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #205 - Wellbore #1 - Design #1												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
4,900.0	4,650.0	4,091.3	4,020.0	22.1	12.1	177.20	165.1	399.1	1,495.0	1,477.5	85.082		
5,000.0	4,727.2	4,134.3	4,059.0	23.5	12.4	177.45	169.7	416.7	1,585.2	1,567.4	88.772		
5,100.0	4,804.3	4,177.4	4,098.0	24.8	12.7	177.68	174.3	434.3	1,675.5	1,657.3	92.331		
5,200.0	4,881.4	4,220.4	4,137.1	26.2	13.1	177.88	179.0	451.9	1,765.7	1,747.2	95.759		
5,300.0	4,958.6	4,263.5	4,176.1	27.6	13.4	178.06	183.6	469.5	1,855.9	1,837.2	99.061		
5,400.0	5,035.7	4,306.6	4,215.1	29.0	13.7	178.23	188.2	487.1	1,946.1	1,927.1	102.246		
5,500.0	5,112.8	4,349.6	4,254.1	30.3	14.1	178.38	192.9	504.6	2,036.4	2,017.0	105.311		
5,600.0	5,190.0	4,392.7	4,293.1	31.7	14.4	178.52	197.5	522.2	2,126.6	2,106.9	108.271		
5,700.0	5,267.1	4,435.7	4,332.2	33.1	14.8	178.65	202.1	539.8	2,216.8	2,196.9	111.119		
5,800.0	5,344.2	4,478.8	4,371.2	34.5	15.1	178.76	206.8	557.4	2,307.1	2,286.8	113.869		
5,900.0	5,421.4	4,521.8	4,410.2	35.9	15.5	178.87	211.4	575.0	2,397.3	2,376.7	116.520		
5,928.9	5,443.6	4,534.3	4,421.5	36.4	15.6	178.90	212.7	580.1	2,423.3	2,402.7	117.268		
6,000.0	5,499.1	4,565.7	4,449.9	37.3	15.8	179.03	216.1	593.0	2,487.1	2,466.2	119.041		
6,100.0	5,578.8	4,612.5	4,492.4	38.4	16.2	179.17	221.2	612.1	2,575.5	2,554.2	121.319		
6,200.0	5,660.6	4,662.4	4,537.6	39.5	16.6	179.30	226.5	632.5	2,662.1	2,640.5	123.332		
6,300.0	5,744.4	4,715.3	4,585.5	40.6	17.0	179.41	232.2	654.1	2,747.0	2,725.0	125.097		
6,400.0	5,830.0	4,771.1	4,636.1	41.5	17.5	179.51	238.2	676.9	2,829.9	2,807.6	126.618		
6,500.0	5,917.4	4,829.7	4,689.2	42.4	18.0	179.60	244.5	700.9	2,910.9	2,888.1	127.912		
6,600.0	6,006.4	4,891.2	4,744.9	43.3	18.5	179.67	251.1	726.0	2,989.7	2,966.6	128.992		
6,700.0	6,096.9	4,955.3	4,803.1	44.1	19.0	179.74	258.0	752.2	3,066.4	3,042.8	129.868		
6,800.0	6,188.9	5,022.1	4,863.6	44.8	19.6	179.81	265.2	779.5	3,140.8	3,116.7	130.560		
6,900.0	6,282.2	5,091.5	4,926.5	45.5	20.2	179.86	272.7	807.9	3,212.8	3,188.3	131.078		
7,000.0	6,376.7	5,161.8	4,992.8	46.1	20.8	179.90	280.5	837.1	3,282.2	3,258.9	131.520		
7,100.0	6,472.3	5,233.9	5,065.3	46.6	21.4	179.93	288.5	867.1	3,349.1	3,325.9	131.892		
7,200.0	6,568.8	5,307.4	5,138.8	47.1	22.0	179.95	296.5	897.5	3,413.1	3,385.5	132.200		
7,300.0	6,666.2	5,381.8	5,213.2	47.5	22.6	179.97	304.5	928.1	3,475.0	3,439.5	132.450		
7,400.0	6,764.3	5,457.3	5,288.7	47.8	23.2	179.98	312.5	958.7	3,534.8	3,492.6	132.650		
7,500.0	6,863.0	5,533.8	5,365.2	48.1	23.8	179.99	320.5	989.1	3,592.6	3,544.4	132.800		
7,600.0	6,962.3	5,611.3	5,442.7	48.4	24.4	179.99	328.5	1,019.1	3,648.4	3,595.2	132.910		
7,700.0	7,061.9	5,689.8	5,521.2	48.6	25.0	179.99	336.5	1,048.7	3,702.2	3,644.0	132.980		
7,800.0	7,161.7	5,769.3	5,601.7	48.7	25.6	179.99	344.5	1,077.7	3,753.9	3,690.7	133.010		
7,905.2	7,266.9	5,850.8	5,683.8	48.8	26.2	179.99	352.5	1,106.1	3,803.6	3,735.4	133.010		
7,950.0	7,311.7	5,933.3	5,767.3	48.8	26.8	179.99	360.5	1,133.9	3,851.2	3,779.0	133.000		
8,000.0	7,361.3	6,017.4	5,852.4	48.9	27.4	179.99	368.5	1,161.1	3,896.8	3,821.6	133.000		
8,050.0	7,410.4	6,103.0	5,943.0	48.9	28.0	179.99	376.5	1,187.7	3,940.4	3,863.2	133.000		
8,100.0	7,458.7	6,190.1	6,035.1	48.9	28.6	179.99	384.5	1,212.8	3,982.0	3,902.8	133.000		
8,150.0	7,505.7	6,278.6	6,128.6	48.9	29.2	179.99	392.5	1,236.7	4,021.6	3,942.4	133.000		
8,200.0	7,551.3	6,368.7	6,228.7	49.0	29.8	179.99	400.5	1,259.5	4,059.2	3,979.0	133.000		
8,250.0	7,595.1	6,460.4	6,330.4	49.0	30.4	179.99	408.5	1,281.1	4,094.8	4,013.6	133.000		
8,300.0	7,636.9	6,553.7	6,433.7	49.0	31.0	179.99	416.5	1,301.5	4,128.4	4,046.2	133.000		
8,350.0	7,676.4	6,648.6	6,538.6	49.0	31.6	179.99	424.5	1,320.5	4,160.0	4,076.8	133.000		
8,400.0	7,713.4	6,745.1	6,645.1	49.1	32.2	179.99	432.5	1,338.1	4,190.6	4,105.4	133.000		
8,450.0	7,747.6	6,843.2	6,753.2	49.1	32.8	179.99	440.5	1,354.3	4,219.2	4,133.0	133.000		
8,500.0	7,778.9	6,942.9	6,862.9	49.2	33.4	179.99	448.5	1,369.1	4,245.8	4,158.6	133.000		
8,550.0	7,807.0	7,044.4	6,974.4	49.2	34.0	179.99	456.5	1,382.5	4,270.4	4,182.2	133.000		
8,600.0	7,831.8	7,147.7	7,088.7	49.3	34.6	179.99	464.5	1,394.5	4,293.0	4,203.8	133.000		
8,650.0	7,853.0	7,252.8	7,205.8	49.3	35.2	179.99	472.5	1,405.1	4,313.6	4,223.4	133.000		
8,700.0	7,870.7	7,359.5	7,314.5	49.4	35.8	179.99	480.5	1,414.3	4,331.2	4,241.0	133.000		
8,750.0	7,884.7	7,467.8	7,424.8	49.5	36.4	179.99	488.5	1,422.1	4,346.8	4,256.6	133.000		
8,800.0	7,894.8	7,577.7	7,536.7	49.6	37.0	179.99	496.5	1,428.5	4,360.4	4,270.2	133.000		
8,850.0	7,901.1	7,689.2	7,650.2	49.7	37.6	179.99	504.5	1,433.5	4,372.0	4,281.8	133.000		
8,900.0	7,903.5	7,802.3	7,765.3	49.8	38.2	179.99	512.5	1,437.1	4,381.6	4,291.4	133.000		

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #205 - Wellbore #1 - Design #1													Offset Site Error:	0.0 usft
Survey Program: Q-MWD default													Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Tooface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning		
8,905.2	7,903.5	8,422.8	7,900.8	49.8	30.2	-89.95	-192.3	1,303.2	3,403.4	3,357.7	74.452			
9,000.0	7,903.5	8,517.4	7,903.5	50.0	31.0	-90.00	-281.7	1,334.0	3,403.4	3,355.7	71.312			
9,100.0	7,903.5	8,617.4	7,903.5	50.3	31.8	-90.00	-376.2	1,366.7	3,403.4	3,353.4	68.013			
9,200.0	7,903.5	8,717.4	7,903.5	50.7	32.8	-90.00	-470.7	1,399.3	3,403.4	3,350.9	64.785			
9,300.0	7,903.5	8,817.4	7,903.5	51.1	33.8	-90.00	-565.3	1,431.9	3,403.4	3,348.2	61.677			
9,400.0	7,903.5	8,917.4	7,903.5	51.6	35.0	-90.00	-659.8	1,464.6	3,403.4	3,345.4	58.717			
9,500.0	7,903.5	9,017.4	7,903.5	52.1	36.1	-90.00	-754.3	1,497.2	3,403.4	3,342.5	55.922			
9,600.0	7,903.5	9,117.4	7,903.5	52.7	37.4	-90.00	-848.8	1,529.8	3,403.3	3,339.5	53.298			
9,700.0	7,903.5	9,217.4	7,903.5	53.3	38.7	-90.00	-943.4	1,562.5	3,403.3	3,336.4	50.844			
9,800.0	7,903.5	9,317.4	7,903.5	54.0	40.1	-90.00	-1,037.9	1,595.1	3,403.3	3,333.2	48.553			
9,900.0	7,903.5	9,417.4	7,903.5	54.8	41.5	-90.00	-1,132.4	1,627.7	3,403.3	3,330.0	46.419			
10,000.0	7,903.5	9,517.4	7,903.5	55.6	43.0	-90.00	-1,226.9	1,660.4	3,403.3	3,326.7	44.431			
10,100.0	7,903.5	9,617.4	7,903.5	56.5	44.5	-90.00	-1,321.5	1,693.0	3,403.3	3,323.4	42.580			
10,200.0	7,903.5	9,717.4	7,903.5	57.4	46.0	-90.00	-1,416.0	1,725.6	3,403.3	3,320.0	40.855			
10,300.0	7,903.5	9,817.4	7,903.5	58.4	47.5	-90.00	-1,510.5	1,758.3	3,403.3	3,316.5	39.247			
10,400.0	7,903.5	9,917.4	7,903.5	59.5	49.1	-90.00	-1,605.0	1,790.9	3,403.2	3,313.1	37.746			
10,500.0	7,903.5	10,017.4	7,903.5	60.6	50.7	-90.00	-1,699.6	1,823.6	3,403.2	3,309.6	36.344			
10,600.0	7,903.5	10,117.4	7,903.5	61.7	52.4	-90.00	-1,794.1	1,856.2	3,403.2	3,306.1	35.032			
10,700.0	7,903.5	10,217.4	7,903.5	63.0	54.0	-90.00	-1,888.6	1,888.8	3,403.2	3,302.5	33.804			
10,800.0	7,903.5	10,317.4	7,903.5	64.2	55.7	-90.00	-1,983.1	1,921.5	3,403.2	3,299.0	32.652			
10,900.0	7,903.5	10,417.4	7,903.5	65.5	57.4	-90.00	-2,077.7	1,954.1	3,403.2	3,295.4	31.569			
11,000.0	7,903.5	10,517.4	7,903.5	66.8	59.1	-90.00	-2,172.2	1,986.7	3,403.2	3,291.8	30.552			
11,100.0	7,903.5	10,617.4	7,903.5	68.2	60.8	-90.00	-2,266.7	2,019.4	3,403.2	3,288.2	29.594			
11,200.0	7,903.5	10,717.4	7,903.5	69.6	62.5	-90.00	-2,361.2	2,052.0	3,403.2	3,284.5	28.690			
11,300.0	7,903.5	10,817.4	7,903.5	71.1	64.2	-90.00	-2,455.8	2,084.6	3,403.1	3,280.9	27.837			
11,400.0	7,903.5	10,917.4	7,903.5	72.5	66.0	-90.00	-2,550.3	2,117.3	3,403.1	3,277.2	27.030			
11,500.0	7,903.5	11,017.4	7,903.5	74.0	67.7	-90.00	-2,644.8	2,149.9	3,403.1	3,273.6	26.267			
11,600.0	7,903.5	11,117.4	7,903.5	75.6	69.5	-90.00	-2,739.3	2,182.5	3,403.1	3,269.9	25.544			
11,700.0	7,903.5	11,217.4	7,903.5	77.1	71.3	-90.00	-2,833.9	2,215.2	3,403.1	3,266.2	24.857			
11,800.0	7,903.5	11,317.4	7,903.5	78.7	73.0	-90.00	-2,928.4	2,247.8	3,403.1	3,262.5	24.205			
11,900.0	7,903.5	11,417.4	7,903.5	80.3	74.8	-90.00	-3,022.9	2,280.5	3,403.1	3,258.8	23.585			
12,000.0	7,903.5	11,517.4	7,903.5	81.9	76.6	-90.00	-3,117.4	2,313.1	3,403.1	3,255.1	22.995			
12,100.0	7,903.5	11,617.4	7,903.5	83.5	78.4	-90.00	-3,212.0	2,345.7	3,403.1	3,251.4	22.433			
12,200.0	7,903.5	11,717.4	7,903.5	85.1	80.2	-90.00	-3,306.5	2,378.4	3,403.0	3,247.6	21.896			
12,300.0	7,903.5	11,817.4	7,903.5	86.8	82.1	-90.00	-3,401.0	2,411.0	3,403.0	3,243.9	21.384			
12,400.0	7,903.5	11,917.4	7,903.5	88.5	83.9	-90.00	-3,495.5	2,443.6	3,403.0	3,240.2	20.894			
12,500.0	7,903.5	12,017.4	7,903.5	90.1	85.7	-90.00	-3,590.1	2,476.3	3,403.0	3,236.4	20.426			
12,600.0	7,903.5	12,117.4	7,903.5	91.8	87.5	-90.00	-3,684.6	2,508.9	3,403.0	3,232.7	19.978			
12,700.0	7,903.5	12,217.4	7,903.5	93.5	89.3	-90.00	-3,779.1	2,541.5	3,403.0	3,228.9	19.548			
12,800.0	7,903.5	12,317.4	7,903.5	95.2	91.2	-90.00	-3,873.6	2,574.2	3,403.0	3,225.1	19.136			
12,900.0	7,903.5	12,417.4	7,903.5	97.0	93.0	-90.00	-3,968.2	2,606.8	3,403.0	3,221.4	18.741			
13,000.0	7,903.5	12,517.4	7,903.5	98.7	94.9	-90.00	-4,062.7	2,639.4	3,402.9	3,217.6	18.361			
13,100.0	7,903.5	12,617.4	7,903.5	100.4	96.7	-90.00	-4,157.2	2,672.1	3,402.9	3,213.8	17.996			
13,200.0	7,903.5	12,717.4	7,903.5	102.2	98.5	-90.00	-4,251.7	2,704.7	3,402.9	3,210.1	17.645			
13,300.0	7,903.5	12,817.4	7,903.5	103.9	100.4	-90.00	-4,346.3	2,737.3	3,402.9	3,206.3	17.307			
13,400.0	7,903.5	12,917.4	7,903.5	105.7	102.2	-90.00	-4,440.8	2,770.0	3,402.9	3,202.5	16.982			
13,500.0	7,903.5	13,017.4	7,903.5	107.4	104.1	-90.00	-4,535.3	2,802.6	3,402.9	3,198.7	16.668			
13,600.0	7,903.5	13,117.4	7,903.5	109.2	106.0	-90.00	-4,629.8	2,835.3	3,402.9	3,195.0	16.366			
13,700.0	7,903.5	13,217.4	7,903.5	111.0	107.8	-90.00	-4,724.4	2,867.9	3,402.9	3,191.2	16.074			
13,800.0	7,903.5	13,317.4	7,903.5	112.8	109.7	-90.00	-4,818.9	2,900.5	3,402.9	3,187.4	15.792			
13,900.0	7,903.5	13,417.4	7,903.5	114.6	111.5	-90.00	-4,913.4	2,933.2	3,402.8	3,183.6	15.520			
14,000.0	7,903.5	13,517.4	7,903.5	116.4	113.4	-90.00	-5,007.9	2,965.8	3,402.8	3,179.8	15.256			

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<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #205 - Wellbore #1 - Design #1												Offset Site Error:	0.0 usft
Survey Program: Q-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Centre +E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
14,100.0	7,903.5	13,617.4	7,903.5	118.2	115.3	-90.00	-5,102.5	2,998.4	3,402.8	3,176.0	15.002		
14,200.0	7,903.5	13,717.4	7,903.5	120.0	117.1	-90.00	-5,197.0	3,031.1	3,402.8	3,172.2	14.755		
14,300.0	7,903.5	13,817.4	7,903.5	121.8	119.0	-90.00	-5,291.5	3,063.7	3,402.8	3,168.4	14.517		
14,400.0	7,903.5	13,917.4	7,903.5	123.6	120.9	-90.00	-5,386.0	3,096.3	3,402.8	3,164.6	14.286		
14,500.0	7,903.5	14,017.4	7,903.5	125.4	122.8	-90.00	-5,480.5	3,129.0	3,402.8	3,160.8	14.062		
14,600.0	7,903.5	14,117.4	7,903.5	127.2	124.6	-90.00	-5,575.1	3,161.6	3,402.8	3,157.0	13.845		
14,700.0	7,903.5	14,217.4	7,903.5	129.0	126.5	-90.00	-5,669.6	3,194.2	3,402.8	3,153.2	13.634		
14,800.0	7,903.5	14,317.4	7,903.5	130.9	128.4	-90.00	-5,764.1	3,226.9	3,402.7	3,149.4	13.430		
14,900.0	7,903.5	14,417.4	7,903.5	132.7	130.3	-90.00	-5,858.6	3,259.5	3,402.7	3,145.6	13.232		
15,000.0	7,903.5	14,517.4	7,903.5	134.5	132.1	-90.00	-5,953.2	3,292.2	3,402.7	3,141.8	13.039		
15,100.0	7,903.5	14,617.4	7,903.5	136.4	134.0	-90.00	-6,047.7	3,324.8	3,402.7	3,137.9	12.852		
15,200.0	7,903.5	14,717.4	7,903.5	138.2	135.9	-90.00	-6,142.2	3,357.4	3,402.7	3,134.1	12.670		
15,300.0	7,903.5	14,817.4	7,903.5	140.0	137.8	-90.00	-6,236.7	3,390.1	3,402.7	3,130.3	12.493		
15,400.0	7,903.5	14,917.4	7,903.5	141.9	139.7	-90.00	-6,331.3	3,422.7	3,402.7	3,126.5	12.321		
15,500.0	7,903.5	15,017.4	7,903.5	143.7	141.6	-90.00	-6,425.8	3,455.3	3,402.7	3,122.7	12.153		
15,600.0	7,903.5	15,117.4	7,903.5	145.6	143.5	-90.00	-6,520.3	3,488.0	3,402.7	3,118.9	11.990		
15,700.0	7,903.5	15,217.4	7,903.5	147.4	145.3	-90.00	-6,614.8	3,520.6	3,402.6	3,115.1	11.832		
15,800.0	7,903.5	15,317.4	7,903.5	149.3	147.2	-90.00	-6,709.4	3,553.2	3,402.6	3,111.2	11.677		
15,900.0	7,903.5	15,417.4	7,903.5	151.1	149.1	-90.00	-6,803.9	3,585.9	3,402.6	3,107.4	11.526		
16,000.0	7,903.5	15,517.4	7,903.5	153.0	151.0	-90.00	-6,898.4	3,618.5	3,402.6	3,103.6	11.379		
16,100.0	7,903.5	15,617.4	7,903.5	154.8	152.9	-90.00	-6,992.9	3,651.1	3,402.6	3,099.8	11.236		
16,200.0	7,903.5	15,717.4	7,903.5	156.7	154.8	-90.00	-7,087.5	3,683.8	3,402.6	3,095.9	11.096		
16,300.0	7,903.5	15,817.4	7,903.5	158.5	156.7	-90.00	-7,182.0	3,716.4	3,402.6	3,092.1	10.960		
16,400.0	7,903.5	15,917.4	7,903.5	160.4	158.6	-90.00	-7,276.5	3,749.0	3,402.6	3,088.3	10.827		
16,500.0	7,903.5	16,017.4	7,903.5	162.2	160.5	-90.00	-7,371.0	3,781.7	3,402.5	3,084.5	10.697		
16,600.0	7,903.5	16,117.4	7,903.5	164.1	162.4	-90.00	-7,465.6	3,814.3	3,402.5	3,080.6	10.571		
16,700.0	7,903.5	16,217.4	7,903.5	166.0	164.3	-90.00	-7,560.1	3,847.0	3,402.5	3,076.8	10.447		
16,800.0	7,903.5	16,317.4	7,903.5	167.8	166.2	-90.00	-7,654.6	3,879.6	3,402.5	3,073.0	10.326		
16,900.0	7,903.5	16,417.4	7,903.5	169.7	168.1	-90.00	-7,749.1	3,912.2	3,402.5	3,069.2	10.207		
17,000.0	7,903.5	16,517.4	7,903.5	171.6	170.0	-90.00	-7,843.7	3,944.9	3,402.5	3,065.3	10.092		
17,100.0	7,903.5	16,617.4	7,903.5	173.4	171.8	-90.00	-7,938.2	3,977.5	3,402.5	3,061.5	9.979		
17,200.0	7,903.5	16,717.4	7,903.5	175.3	173.7	-90.00	-8,032.7	4,010.1	3,402.5	3,057.7	9.868		
17,300.0	7,903.5	16,817.4	7,903.5	177.2	175.6	-90.00	-8,127.2	4,042.8	3,402.5	3,053.9	9.760		
17,400.0	7,903.5	16,917.4	7,903.5	179.1	177.5	-90.00	-8,221.8	4,075.4	3,402.4	3,050.0	9.654		
17,500.0	7,903.5	17,017.4	7,903.5	180.9	179.4	-90.00	-8,316.3	4,108.0	3,402.4	3,046.2	9.551		
17,600.0	7,903.5	17,117.4	7,903.5	182.8	181.3	-90.00	-8,410.8	4,140.7	3,402.4	3,042.4	9.450		
17,700.0	7,903.5	17,217.4	7,903.5	184.7	183.2	-90.00	-8,505.3	4,173.3	3,402.4	3,038.5	9.350		
17,800.0	7,903.5	17,317.4	7,903.5	186.6	185.1	-90.00	-8,599.9	4,205.9	3,402.4	3,034.7	9.253		
17,900.0	7,903.5	17,417.4	7,903.5	188.4	187.0	-90.00	-8,694.4	4,238.6	3,402.4	3,030.9	9.158		
18,000.0	7,903.5	17,517.4	7,903.5	190.3	188.9	-90.00	-8,788.9	4,271.2	3,402.4	3,027.0	9.065		
18,100.0	7,903.5	17,617.4	7,903.5	192.2	190.8	-90.00	-8,883.4	4,303.9	3,402.4	3,023.2	8.973		
18,200.0	7,903.5	17,717.4	7,903.5	194.1	192.8	-90.00	-8,978.0	4,336.5	3,402.4	3,019.4	8.884		
18,300.0	7,903.5	17,817.4	7,903.5	196.0	194.7	-90.00	-9,072.5	4,369.1	3,402.3	3,015.5	8.796		
18,400.0	7,903.5	17,917.4	7,903.5	197.8	196.6	-90.00	-9,167.0	4,401.8	3,402.3	3,011.7	8.710		
18,500.0	7,903.5	18,017.4	7,903.5	199.7	198.5	-90.00	-9,261.5	4,434.4	3,402.3	3,007.9	8.625		
18,600.0	7,903.5	18,117.4	7,903.5	201.6	200.4	-90.00	-9,356.1	4,467.0	3,402.3	3,004.0	8.542		
18,700.0	7,903.5	18,217.4	7,903.5	203.5	202.3	-90.00	-9,450.6	4,499.7	3,402.3	3,000.2	8.461		
18,800.0	7,903.5	18,317.4	7,903.5	205.4	204.2	-90.00	-9,545.1	4,532.3	3,402.3	2,996.4	8.381		
18,900.0	7,903.5	18,417.4	7,903.5	207.3	206.1	-90.00	-9,639.6	4,564.9	3,402.3	2,992.5	8.303		
19,000.0	7,903.5	18,517.4	7,903.5	209.2	208.0	-90.00	-9,734.2	4,597.5	3,402.3	2,988.7	8.226		
19,100.0	7,903.5	18,617.4	7,903.5	211.0	209.9	-90.00	-9,828.7	4,630.2	3,402.2	2,984.8	8.151		
19,200.0	7,903.5	18,717.4	7,903.5	212.9	211.8	-90.00	-9,923.2	4,662.8	3,402.2	2,981.0	8.077		

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<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #205 - Wellbore #1 - Design #1												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+Ei-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
19,300.0	7,903.5	18,817.4	7,903.5	214.8	213.7	-90.00	-10,017.7	4,695.5	3,402.2	2,977.2	8.004		
19,400.0	7,903.5	18,917.4	7,903.5	216.7	215.6	-90.00	-10,112.3	4,728.1	3,402.2	2,973.3	7.933		
19,500.0	7,903.5	19,017.4	7,903.5	218.6	217.5	-90.00	-10,206.8	4,760.7	3,402.2	2,969.5	7.862		
19,600.0	7,903.5	19,117.4	7,903.5	220.5	219.4	-90.00	-10,301.3	4,793.4	3,402.2	2,965.6	7.793		
19,700.0	7,903.5	19,217.4	7,903.5	222.4	221.3	-90.00	-10,395.8	4,826.0	3,402.2	2,961.8	7.726		
19,800.0	7,903.5	19,317.4	7,903.5	224.3	223.2	-90.00	-10,490.4	4,858.7	3,402.2	2,958.0	7.659		
19,900.0	7,903.5	19,417.4	7,903.5	226.2	225.1	-90.00	-10,584.9	4,891.3	3,402.2	2,954.1	7.594		
20,000.0	7,903.5	19,517.4	7,903.5	228.1	227.0	-90.00	-10,679.4	4,923.9	3,402.1	2,950.3	7.529		
20,100.0	7,903.5	19,617.4	7,903.5	229.9	229.0	-90.00	-10,773.9	4,956.6	3,402.1	2,946.5	7.466		
20,200.0	7,903.5	19,717.4	7,903.5	231.8	230.9	-90.00	-10,868.5	4,989.2	3,402.1	2,942.6	7.404		
20,300.0	7,903.5	19,817.4	7,903.5	233.7	232.8	-90.00	-10,963.0	5,021.8	3,402.1	2,938.8	7.343		
20,400.0	7,903.5	19,917.4	7,903.5	235.6	234.7	-90.00	-11,057.5	5,054.5	3,402.1	2,934.9	7.282		
20,500.0	7,903.5	20,017.4	7,903.5	237.5	236.6	-90.00	-11,152.0	5,087.1	3,402.1	2,931.1	7.223		
20,600.0	7,903.5	20,117.4	7,903.5	239.4	238.5	-90.00	-11,246.6	5,119.7	3,402.1	2,927.2	7.165		
20,700.0	7,903.5	20,217.4	7,903.5	241.3	240.4	-90.00	-11,341.1	5,152.4	3,402.1	2,923.4	7.108		
20,800.0	7,903.5	20,317.4	7,903.5	243.2	242.3	-90.00	-11,435.6	5,185.0	3,402.1	2,919.6	7.051		
20,900.0	7,903.5	20,417.4	7,903.5	245.1	244.2	-90.00	-11,530.1	5,217.6	3,402.0	2,915.7	6.996		
21,000.0	7,903.5	20,517.4	7,903.5	247.0	246.1	-90.00	-11,624.7	5,250.3	3,402.0	2,911.9	6.941		
21,100.0	7,903.5	20,617.4	7,903.5	248.9	248.0	-90.00	-11,719.2	5,282.9	3,402.0	2,908.0	6.887		
21,200.0	7,903.5	20,717.4	7,903.5	250.8	250.0	-90.00	-11,813.7	5,315.6	3,402.0	2,904.2	6.834		
21,300.0	7,903.5	20,817.4	7,903.5	252.7	251.9	-90.00	-11,908.2	5,348.2	3,402.0	2,900.4	6.782		
21,400.0	7,903.5	20,917.4	7,903.5	254.6	253.8	-90.00	-12,002.8	5,380.8	3,402.0	2,896.5	6.730		
21,500.0	7,903.5	21,017.4	7,903.5	256.5	255.7	-90.00	-12,097.3	5,413.5	3,402.0	2,892.7	6.680		
21,600.0	7,903.5	21,117.4	7,903.5	258.4	257.6	-90.00	-12,191.8	5,446.1	3,402.0	2,888.8	6.630		
21,700.0	7,903.5	21,217.4	7,903.5	260.3	259.5	-90.00	-12,286.3	5,478.7	3,402.0	2,885.0	6.581		
21,800.0	7,903.5	21,317.4	7,903.5	262.2	261.4	-90.00	-12,380.9	5,511.4	3,401.9	2,881.1	6.532		
21,900.0	7,903.5	21,417.4	7,903.5	264.1	263.3	-90.00	-12,475.4	5,544.0	3,401.9	2,877.3	6.484		
22,000.0	7,903.5	21,517.4	7,903.5	266.0	265.2	-90.00	-12,569.9	5,576.6	3,401.9	2,873.5	6.437		
22,100.0	7,903.5	21,617.4	7,903.5	267.9	267.2	-90.00	-12,664.4	5,609.3	3,401.9	2,869.6	6.391		
22,200.0	7,903.5	21,717.4	7,903.5	269.8	269.1	-90.00	-12,759.0	5,641.9	3,401.9	2,865.8	6.345		
22,300.0	7,903.5	21,817.4	7,903.5	271.7	271.0	-90.00	-12,853.5	5,674.5	3,401.9	2,861.9	6.300		
22,400.0	7,903.5	21,917.4	7,903.5	273.6	272.9	-90.00	-12,948.0	5,707.2	3,401.9	2,858.1	6.256		
22,482.4	7,903.5	21,999.8	7,903.5	275.2	274.5	-90.00	-13,025.9	5,734.1	3,401.9	2,854.9	6.220		

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<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #206 - Wellbore #1 - Design #1												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore +N/-S (usft)	Centre +E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	0.00	75.0	0.0	75.0				
100.0	100.0	100.0	100.0	0.1	0.1	0.00	75.0	0.0	75.0	74.8	457.096		
200.0	200.0	200.0	200.0	0.3	0.3	0.00	75.0	0.0	75.0	74.4	122.227		
300.0	300.0	300.0	300.0	0.5	0.5	0.00	75.0	0.0	75.0	73.9	70.546		
321.1	321.1	321.1	321.1	0.6	0.6	0.00	75.0	0.0	75.0	73.8	64.759		
400.0	400.0	400.0	400.0	0.8	0.8	0.00	75.0	0.0	75.0	73.5	49.581		
433.3	433.3	433.3	433.3	0.8	0.8	0.00	75.0	0.0	75.0	73.3	45.112		
500.0	500.0	500.0	500.0	1.0	1.0	0.00	75.0	0.0	75.0	73.0	38.222		
600.0	600.0	600.0	600.0	1.2	1.2	0.00	75.0	0.0	75.0	72.6	31.098		
700.0	700.0	700.0	700.0	1.4	1.4	0.00	75.0	0.0	75.0	72.1	26.212		
800.0	800.0	800.0	800.0	1.7	1.7	0.00	75.0	0.0	75.0	71.7	22.653		
900.0	900.0	900.0	900.0	1.9	1.9	0.00	75.0	0.0	75.0	71.2	19.945		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	0.00	75.0	0.0	75.0	70.8	17.815		
1,100.0	1,100.0	1,100.0	1,100.0	2.3	2.3	0.00	75.0	0.0	75.0	70.3	16.096		
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	0.00	75.0	0.0	75.0	69.9	14.680		
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	0.00	75.0	0.0	75.0	69.4	13.493		
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	0.00	75.0	0.0	75.0	69.0	12.483		
1,500.0	1,500.0	1,500.0	1,500.0	3.2	3.2	0.00	75.0	0.0	75.0	68.5	11.614		
1,600.0	1,600.0	1,600.0	1,600.0	3.5	3.5	0.00	75.0	0.0	75.0	68.1	10.858		
1,700.0	1,700.0	1,700.0	1,700.0	3.7	3.7	0.00	75.0	0.0	75.0	67.6	10.195		
1,800.0	1,800.0	1,800.0	1,800.0	3.9	3.9	0.00	75.0	0.0	75.0	67.2	9.608		
1,900.0	1,900.0	1,900.0	1,900.0	4.1	4.1	0.00	75.0	0.0	75.0	66.7	9.085		
2,000.0	2,000.0	2,000.0	2,000.0	4.4	4.4	0.00	75.0	0.0	75.0	66.3	8.616		
2,100.0	2,100.0	2,100.0	2,100.0	4.6	4.6	0.00	75.0	0.0	75.0	65.8	8.192		
2,200.0	2,200.0	2,200.0	2,200.0	4.8	4.8	0.00	75.0	0.0	75.0	65.4	7.809		
2,300.0	2,300.0	2,300.0	2,300.0	5.0	5.0	0.00	75.0	0.0	75.0	64.9	7.460		
2,400.0	2,400.0	2,400.0	2,400.0	5.3	5.3	0.00	75.0	0.0	75.0	64.5	7.141		
2,500.0	2,500.0	2,500.0	2,500.0	5.5	5.5	0.00	75.0	0.0	75.0	64.0	6.848	CC, ES	
2,600.0	2,600.0	2,599.2	2,599.2	5.7	5.7	110.74	75.5	1.7	76.1	64.7	6.691	SF	
2,700.0	2,699.8	2,697.6	2,697.6	5.9	5.9	117.59	76.8	6.6	80.2	68.4	6.813		
2,800.0	2,799.5	2,794.7	2,794.2	6.1	6.1	127.18	79.1	14.6	89.2	77.1	7.340		
2,900.0	2,898.7	2,889.7	2,888.5	6.3	6.3	137.21	82.2	25.5	105.2	92.7	8.401		
3,000.0	2,997.5	2,982.0	2,979.8	6.5	6.5	145.96	86.0	38.9	129.2	116.3	10.040		
3,100.0	3,095.6	3,071.2	3,067.4	6.8	6.8	152.83	90.4	54.6	161.0	147.8	12.217		
3,200.0	3,193.1	3,156.7	3,151.0	7.1	7.0	157.98	95.3	72.1	200.1	186.7	14.850		
3,300.0	3,289.6	3,238.3	3,230.1	7.4	7.3	161.79	100.7	91.1	245.9	232.2	17.900		
3,400.0	3,385.3	3,315.6	3,304.6	7.8	7.6	164.62	106.3	111.0	297.8	283.8	21.280		
3,500.0	3,479.8	3,388.4	3,374.2	8.2	7.8	166.75	112.1	131.5	355.2	341.0	24.952		
3,600.0	3,573.2	3,456.6	3,438.9	8.7	8.1	168.36	117.9	152.3	417.6	403.2	28.872		
3,700.0	3,665.2	3,520.2	3,498.8	9.3	8.4	169.59	123.8	173.0	484.7	470.0	33.015		
3,800.0	3,755.8	3,579.1	3,553.8	9.9	8.7	170.53	129.5	193.3	555.9	541.0	37.348		
3,900.0	3,844.9	3,633.4	3,604.1	10.7	9.0	171.25	135.0	213.0	631.0	615.9	41.847		
4,000.0	3,932.4	3,683.2	3,649.9	11.5	9.3	171.80	140.3	231.9	709.5	694.2	46.496		
4,100.0	4,018.1	3,728.6	3,691.3	12.4	9.6	172.20	145.4	249.7	791.2	775.7	51.272		
4,200.0	4,102.0	3,769.8	3,728.6	13.4	9.8	172.47	150.1	266.4	875.6	860.0	56.165		
4,300.0	4,183.9	3,800.0	3,755.8	14.4	10.0	172.52	153.6	279.1	962.7	947.0	61.466		
4,400.0	4,263.7	3,839.9	3,791.6	15.6	10.3	172.69	158.5	296.1	1,051.9	1,036.0	66.251		
4,476.3	4,323.3	3,862.7	3,811.9	16.5	10.5	172.66	161.3	306.1	1,121.4	1,105.4	70.196		
4,500.0	4,341.5	3,869.3	3,817.8	16.8	10.5	172.77	162.1	309.0	1,143.1	1,127.1	71.425		
4,600.0	4,418.6	3,900.0	3,844.9	18.1	10.8	173.27	166.0	322.8	1,235.1	1,219.0	76.446		
4,700.0	4,495.8	3,923.0	3,865.2	19.4	10.9	173.61	168.9	333.2	1,327.5	1,311.3	81.727		
4,800.0	4,572.9	3,948.1	3,887.2	20.8	11.2	173.95	172.2	344.9	1,420.3	1,403.9	86.817		

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #206 - Wellbore #1 - Design #1												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Reference (usft)	Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore +N/-S (usft)	Centre +E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning	
4,900.0	4,650.0	3,972.2	3,908.2	22.1	11.3	174.25	175.4	356.1	1,513.3	1,496.9	91.878		
5,000.0	4,727.2	4,000.0	3,932.4	23.5	11.6	174.58	179.1	369.4	1,606.7	1,590.1	96.637		
5,100.0	4,804.3	4,000.0	3,932.4	24.8	11.6	174.58	179.1	369.4	1,700.5	1,684.0	102.974		
5,200.0	4,881.4	4,038.5	3,965.6	26.2	11.9	174.98	184.4	388.2	1,794.3	1,777.5	106.857		
5,300.0	4,958.6	4,058.8	3,983.1	27.6	12.1	175.17	187.2	398.2	1,888.5	1,871.6	111.790		
5,400.0	5,035.7	4,078.4	3,999.8	29.0	12.3	175.35	190.0	408.0	1,982.9	1,965.9	116.701		
5,500.0	5,112.8	4,100.0	4,018.1	30.3	12.5	175.54	193.1	419.0	2,077.6	2,060.5	121.401		
5,600.0	5,190.0	4,115.3	4,031.1	31.7	12.6	175.66	195.3	426.8	2,172.4	2,155.3	126.441		
5,700.0	5,267.1	4,132.8	4,045.8	33.1	12.8	175.80	197.8	435.9	2,267.5	2,250.2	131.270		
5,800.0	5,344.2	4,156.4	4,065.6	34.5	13.0	175.98	201.3	448.2	2,362.8	2,345.3	135.576		
5,900.0	5,421.4	4,173.8	4,080.2	35.9	13.2	176.10	203.9	457.4	2,458.1	2,440.6	140.247		
5,928.9	5,443.6	4,182.4	4,087.4	36.4	13.3	176.16	205.2	461.9	2,485.7	2,468.1	141.309		
6,000.0	5,499.1	4,204.5	4,105.9	37.3	13.5	176.57	208.4	473.5	2,553.3	2,535.5	143.837		
6,100.0	5,578.8	4,238.4	4,134.3	38.4	13.8	177.05	213.5	491.3	2,647.3	2,629.3	147.101		
6,200.0	5,660.6	4,275.5	4,165.4	39.5	14.2	177.43	219.0	510.8	2,740.1	2,721.9	150.037		
6,300.0	5,744.4	4,315.8	4,199.1	40.6	14.6	177.75	224.9	532.1	2,831.6	2,813.0	152.637		
6,400.0	5,830.0	4,359.3	4,235.6	41.5	15.1	178.02	231.4	554.9	2,921.6	2,902.7	154.899		
6,500.0	5,917.4	4,405.9	4,274.6	42.4	15.6	178.24	238.3	579.5	3,010.0	2,990.8	156.854		
6,600.0	6,006.4	4,455.6	4,316.2	43.3	16.1	178.44	245.7	605.6	3,096.8	3,077.2	158.486		
6,700.0	6,096.9	4,508.3	4,360.3	44.1	16.6	178.60	253.5	633.3	3,181.7	3,161.8	159.841		
6,800.0	6,188.9	4,563.9	4,406.9	44.8	17.2	178.75	261.7	662.5	3,264.8	3,244.5	160.910		
6,900.0	6,282.2	4,622.3	4,455.8	45.5	17.9	178.88	270.4	693.3	3,345.9	3,325.2	161.728		
7,000.0	6,376.7	4,683.6	4,507.1	46.1	18.5	178.99	279.5	725.5	3,424.9	3,403.8	162.307		
7,100.0	6,472.3	4,747.6	4,560.7	46.6	19.3	179.09	289.0	759.2	3,501.7	3,480.2	162.663		
7,200.0	6,568.8	4,814.2	4,616.5	47.1	20.0	179.18	298.8	794.2	3,576.2	3,554.3	162.822		
7,300.0	6,666.2	4,883.4	4,674.4	47.5	20.8	179.27	309.1	830.6	3,648.4	3,626.0	162.793		
7,400.0	6,764.3	4,955.0	4,734.5	47.8	21.6	179.34	319.7	868.3	3,718.1	3,695.2	162.596		
7,500.0	6,863.0	5,029.1	4,796.5	48.1	22.4	179.41	330.7	907.2	3,785.3	3,761.9	162.250		
7,600.0	6,962.3	5,105.4	4,860.4	48.4	23.3	179.47	342.0	947.4	3,849.8	3,826.0	161.768		
7,700.0	7,061.9	5,184.0	4,926.2	48.6	24.2	179.53	353.6	988.7	3,911.6	3,887.4	161.158		
7,800.0	7,161.7	5,264.6	4,993.7	48.7	25.1	179.58	365.6	1,031.2	3,970.7	3,945.9	160.436		
7,905.2	7,266.9	5,351.7	5,066.6	48.8	26.1	71.35	378.5	1,076.9	4,029.7	4,004.5	159.602		
7,950.0	7,311.7	5,389.2	5,098.1	48.8	26.5	-86.98	384.1	1,096.7	4,054.2	4,028.7	159.238		
8,000.0	7,361.3	5,431.0	5,133.0	48.9	27.0	-84.16	390.3	1,118.7	4,081.3	4,055.6	158.824		
8,050.0	7,410.4	5,472.4	5,167.7	48.9	27.5	-81.46	396.4	1,140.4	4,108.0	4,082.1	158.414		
8,100.0	7,458.7	5,513.2	5,201.9	48.9	28.0	-78.91	402.5	1,161.9	4,134.3	4,108.2	158.009		
8,150.0	7,505.7	5,553.1	5,235.3	48.9	28.4	-76.50	408.4	1,182.9	4,160.0	4,133.7	157.604		
8,200.0	7,551.3	5,591.9	5,267.8	49.0	28.9	-74.26	414.1	1,203.3	4,185.0	4,158.4	157.197		
8,250.0	7,595.1	5,629.4	5,299.2	49.0	29.3	-72.19	419.7	1,223.0	4,209.2	4,182.4	156.776		
8,300.0	7,636.9	5,665.3	5,329.2	49.0	29.7	-70.27	425.0	1,241.9	4,232.5	4,205.4	156.333		
8,350.0	7,676.4	5,699.9	5,357.9	49.0	30.0	-68.48	430.0	1,259.0	4,254.7	4,227.6	155.886		
8,400.0	7,713.4	5,732.7	5,385.3	49.1	30.3	-66.81	434.9	1,275.0	4,275.8	4,248.7	155.436		
8,450.0	7,747.6	5,764.6	5,411.4	49.1	30.6	-65.25	439.7	1,289.8	4,295.8	4,268.7	154.982		
8,500.0	7,778.9	5,795.5	5,436.2	49.2	30.9	-63.79	444.4	1,303.5	4,314.8	4,287.7	154.524		
8,550.0	7,807.0	5,825.3	5,459.7	49.2	31.2	-62.42	448.9	1,316.1	4,332.7	4,305.6	154.062		
8,600.0	7,831.8	5,854.1	5,481.9	49.3	31.5	-61.13	453.2	1,327.6	4,349.5	4,322.4	153.596		
8,650.0	7,853.0	5,881.8	5,503.0	49.3	31.8	-59.91	457.3	1,338.0	4,365.2	4,338.0	153.126		
8,700.0	7,870.7	5,908.4	5,523.0	49.4	32.1	-58.75	461.2	1,347.3	4,379.7	4,352.5	152.651		
8,750.0	7,884.7	5,934.0	5,541.8	49.5	32.4	-57.64	464.9	1,355.5	4,393.1	4,365.9	152.171		
8,800.0	7,894.8	5,958.5	5,559.4	49.6	32.7	-56.57	468.3	1,362.6	4,405.3	4,378.2	151.686		
8,850.0	7,901.1	5,981.8	5,575.7	49.7	33.0	-55.54	471.5	1,368.6	4,416.4	4,389.3	151.196		
8,900.0	7,903.5	5,999.9	5,590.8	49.8	33.3	-54.54	474.5	1,373.5	4,426.4	4,399.3	150.701		

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<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #206 - Wellbore #1 - Design #1													Offset Site Error:	0.0 usft
Survey Program: Q-MWD default													Offset Well Error:	0.0 usft
Reference	Vertical	Offset	Semi Major Axis	Highside	Offset Wellbore Centre	Distance	Separation					Warning		
Measured Depth (usft)	Depth (usft)	Measured Depth (usft)	Reference (usft)	Offset (usft)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Factor					
8,905.2	7,903.5	8,692.0	7,899.2	49.8	45.3	-89.94	85.1	2,107.5	4,254.2	4,206.4		88.923		
9,000.0	7,903.5	8,786.4	7,903.5	50.0	45.8	-90.00	-4.0	2,138.2	4,254.2	4,204.4		85.470		
9,100.0	7,903.5	8,886.4	7,903.5	50.3	46.3	-90.00	-98.6	2,170.9	4,254.2	4,202.2		81.847		
9,200.0	7,903.5	8,986.4	7,903.5	50.7	46.9	-90.00	-193.1	2,203.5	4,254.2	4,199.8		78.157		
9,300.0	7,903.5	9,086.4	7,903.5	51.1	47.6	-90.00	-287.6	2,236.1	4,254.2	4,197.2		74.615		
9,400.0	7,903.5	9,186.4	7,903.5	51.6	48.4	-90.00	-382.1	2,268.8	4,254.2	4,194.4		71.221		
9,500.0	7,903.5	9,286.4	7,903.5	52.1	49.2	-90.00	-476.7	2,301.4	4,254.1	4,191.6		67.995		
9,600.0	7,903.5	9,386.4	7,903.5	52.7	50.1	-90.00	-571.2	2,334.0	4,254.1	4,188.6		64.947		
9,700.0	7,903.5	9,486.4	7,903.5	53.3	51.0	-90.00	-665.7	2,366.7	4,254.1	4,185.6		62.079		
9,800.0	7,903.5	9,586.4	7,903.5	54.0	52.0	-90.00	-760.2	2,399.3	4,254.1	4,182.5		59.388		
9,900.0	7,903.5	9,686.4	7,903.5	54.8	53.0	-90.00	-854.8	2,432.0	4,254.1	4,179.3		56.869		
10,000.0	7,903.5	9,786.4	7,903.5	55.6	54.1	-90.00	-949.3	2,464.6	4,254.1	4,176.0		54.513		
10,100.0	7,903.5	9,886.4	7,903.5	56.5	55.2	-90.00	-1,043.8	2,497.2	4,254.1	4,172.8		52.310		
10,200.0	7,903.5	9,986.4	7,903.5	57.4	56.4	-90.00	-1,138.3	2,529.9	4,254.1	4,169.4		50.250		
10,300.0	7,903.5	10,086.4	7,903.5	58.4	57.7	-90.00	-1,232.9	2,562.5	4,254.1	4,166.0		48.324		
10,400.0	7,903.5	10,186.4	7,903.5	59.5	58.9	-90.00	-1,327.4	2,595.1	4,254.0	4,162.6		46.521		
10,500.0	7,903.5	10,286.4	7,903.5	60.6	60.2	-90.00	-1,421.9	2,627.8	4,254.0	4,159.1		44.832		
10,600.0	7,903.5	10,386.4	7,903.5	61.7	61.6	-90.00	-1,516.4	2,660.4	4,254.0	4,155.7		43.248		
10,700.0	7,903.5	10,486.4	7,903.5	63.0	63.0	-90.00	-1,611.0	2,693.0	4,254.0	4,152.1		41.762		
10,800.0	7,903.5	10,586.4	7,903.5	64.2	64.4	-90.00	-1,705.5	2,725.7	4,254.0	4,148.6		40.365		
10,900.0	7,903.5	10,686.4	7,903.5	65.5	65.8	-90.00	-1,800.0	2,758.3	4,254.0	4,145.0		39.051		
11,000.0	7,903.5	10,786.4	7,903.5	66.8	67.3	-90.00	-1,894.5	2,790.9	4,254.0	4,141.5		37.813		
11,100.0	7,903.5	10,886.4	7,903.5	68.2	68.7	-90.00	-1,989.1	2,823.6	4,254.0	4,137.9		36.646		
11,200.0	7,903.5	10,986.4	7,903.5	69.6	70.3	-90.00	-2,083.6	2,856.2	4,253.9	4,134.3		35.544		
11,300.0	7,903.5	11,086.4	7,903.5	71.1	71.8	-90.00	-2,178.1	2,888.8	4,253.9	4,130.6		34.502		
11,400.0	7,903.5	11,186.4	7,903.5	72.5	73.3	-90.00	-2,272.6	2,921.5	4,253.9	4,127.0		33.516		
11,500.0	7,903.5	11,286.4	7,903.5	74.0	74.9	-90.00	-2,367.2	2,954.1	4,253.9	4,123.3		32.581		
11,600.0	7,903.5	11,386.4	7,903.5	75.6	76.5	-90.00	-2,461.7	2,986.8	4,253.9	4,119.7		31.695		
11,700.0	7,903.5	11,486.4	7,903.5	77.1	78.1	-90.00	-2,556.2	3,019.4	4,253.9	4,116.0		30.853		
11,800.0	7,903.5	11,586.4	7,903.5	78.7	79.7	-90.00	-2,650.7	3,052.0	4,253.9	4,112.3		30.053		
11,900.0	7,903.5	11,686.4	7,903.5	80.3	81.4	-90.00	-2,745.3	3,084.7	4,253.9	4,108.6		29.291		
12,000.0	7,903.5	11,786.4	7,903.5	81.9	83.0	-90.00	-2,839.8	3,117.3	4,253.9	4,104.9		28.565		
12,100.0	7,903.5	11,886.4	7,903.5	83.5	84.7	-90.00	-2,934.3	3,149.9	4,253.8	4,101.2		27.873		
12,200.0	7,903.5	11,986.4	7,903.5	85.1	86.3	-90.00	-3,028.8	3,182.6	4,253.8	4,097.5		27.213		
12,300.0	7,903.5	12,086.4	7,903.5	86.8	88.0	-90.00	-3,123.4	3,215.2	4,253.8	4,093.8		26.582		
12,400.0	7,903.5	12,186.4	7,903.5	88.5	89.7	-90.00	-3,217.9	3,247.8	4,253.8	4,090.1		25.979		
12,500.0	7,903.5	12,286.4	7,903.5	90.1	91.4	-90.00	-3,312.4	3,280.5	4,253.8	4,086.3		25.401		
12,600.0	7,903.5	12,386.4	7,903.5	91.8	93.1	-90.00	-3,406.9	3,313.1	4,253.8	4,082.6		24.848		
12,700.0	7,903.5	12,486.4	7,903.5	93.5	94.8	-90.00	-3,501.5	3,345.7	4,253.8	4,078.8		24.318		
12,800.0	7,903.5	12,586.4	7,903.5	95.2	96.6	-90.00	-3,596.0	3,378.4	4,253.8	4,075.1		23.809		
12,900.0	7,903.5	12,686.4	7,903.5	97.0	98.3	-90.00	-3,690.5	3,411.0	4,253.7	4,071.3		23.321		
13,000.0	7,903.5	12,786.4	7,903.5	98.7	100.0	-90.00	-3,785.0	3,443.6	4,253.7	4,067.6		22.852		
13,100.0	7,903.5	12,886.4	7,903.5	100.4	101.8	-90.00	-3,879.6	3,476.3	4,253.7	4,063.8		22.400		
13,200.0	7,903.5	12,986.4	7,903.5	102.2	103.6	-90.00	-3,974.1	3,508.9	4,253.7	4,060.1		21.966		
13,300.0	7,903.5	13,086.4	7,903.5	103.9	105.3	-90.00	-4,068.6	3,541.6	4,253.7	4,056.3		21.548		
13,400.0	7,903.5	13,186.4	7,903.5	105.7	107.1	-90.00	-4,163.1	3,574.2	4,253.7	4,052.5		21.145		
13,500.0	7,903.5	13,286.4	7,903.5	107.4	108.9	-90.00	-4,257.7	3,606.8	4,253.7	4,048.8		20.757		
13,600.0	7,903.5	13,386.4	7,903.5	109.2	110.6	-90.00	-4,352.2	3,639.5	4,253.7	4,045.0		20.383		
13,700.0	7,903.5	13,486.4	7,903.5	111.0	112.4	-90.00	-4,446.7	3,672.1	4,253.7	4,041.2		20.021		
13,800.0	7,903.5	13,586.4	7,903.5	112.8	114.2	-90.00	-4,541.2	3,704.7	4,253.6	4,037.4		19.672		
13,900.0	7,903.5	13,686.4	7,903.5	114.6	116.0	-90.00	-4,635.8	3,737.4	4,253.6	4,033.6		19.334		
14,000.0	7,903.5	13,786.4	7,903.5	116.4	117.8	-90.00	-4,730.3	3,770.0	4,253.6	4,029.8		19.008		

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CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #206 - Wellbore #1 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD default													Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning		
14,100.0	7,903.5	13,886.4	7,903.5	118.2	119.6	-90.00	-4,824.8	3,802.6	4,253.6	4,026.0	18.692			
14,200.0	7,903.5	13,986.4	7,903.5	120.0	121.4	-90.00	-4,919.3	3,835.3	4,253.6	4,022.3	18.387			
14,300.0	7,903.5	14,086.4	7,903.5	121.8	123.2	-90.00	-5,013.9	3,867.9	4,253.6	4,018.5	18.091			
14,400.0	7,903.5	14,186.4	7,903.5	123.6	125.0	-90.00	-5,108.4	3,900.5	4,253.6	4,014.7	17.804			
14,500.0	7,903.5	14,286.4	7,903.5	125.4	126.8	-90.00	-5,202.9	3,933.2	4,253.6	4,010.9	17.527			
14,600.0	7,903.5	14,386.4	7,903.5	127.2	128.7	-90.00	-5,297.4	3,965.8	4,253.5	4,007.1	17.257			
14,700.0	7,903.5	14,486.4	7,903.5	129.0	130.5	-90.00	-5,392.0	3,998.4	4,253.5	4,003.3	16.996			
14,800.0	7,903.5	14,586.4	7,903.5	130.9	132.3	-90.00	-5,486.5	4,031.1	4,253.5	3,999.5	16.742			
14,900.0	7,903.5	14,686.4	7,903.5	132.7	134.1	-90.00	-5,581.0	4,063.7	4,253.5	3,995.7	16.496			
15,000.0	7,903.5	14,786.4	7,903.5	134.5	136.0	-90.00	-5,675.5	4,096.4	4,253.5	3,991.9	16.257			
15,100.0	7,903.5	14,886.4	7,903.5	136.4	137.8	-90.00	-5,770.1	4,129.0	4,253.5	3,988.0	16.024			
15,200.0	7,903.5	14,986.4	7,903.5	138.2	139.6	-90.00	-5,864.6	4,161.6	4,253.5	3,984.2	15.798			
15,300.0	7,903.5	15,086.4	7,903.5	140.0	141.5	-90.00	-5,959.1	4,194.3	4,253.5	3,980.4	15.578			
15,400.0	7,903.5	15,186.4	7,903.5	141.9	143.3	-90.00	-6,053.6	4,226.9	4,253.5	3,976.6	15.365			
15,500.0	7,903.5	15,286.4	7,903.5	143.7	145.1	-90.00	-6,148.1	4,259.5	4,253.4	3,972.8	15.156			
15,600.0	7,903.5	15,386.4	7,903.5	145.6	147.0	-90.00	-6,242.7	4,292.2	4,253.4	3,969.0	14.954			
15,700.0	7,903.5	15,486.4	7,903.5	147.4	148.8	-90.00	-6,337.2	4,324.8	4,253.4	3,965.2	14.756			
15,800.0	7,903.5	15,586.4	7,903.5	149.3	150.7	-90.00	-6,431.7	4,357.4	4,253.4	3,961.4	14.564			
15,900.0	7,903.5	15,686.4	7,903.5	151.1	152.5	-90.00	-6,526.2	4,390.1	4,253.4	3,957.5	14.377			
16,000.0	7,903.5	15,786.4	7,903.5	153.0	154.4	-90.00	-6,620.8	4,422.7	4,253.4	3,953.7	14.194			
16,100.0	7,903.5	15,886.4	7,903.5	154.8	156.2	-90.00	-6,715.3	4,455.3	4,253.4	3,949.9	14.016			
16,200.0	7,903.5	15,986.4	7,903.5	156.7	158.1	-90.00	-6,809.8	4,488.0	4,253.4	3,946.1	13.842			
16,300.0	7,903.5	16,086.4	7,903.5	158.5	160.0	-90.00	-6,904.3	4,520.6	4,253.4	3,942.3	13.673			
16,400.0	7,903.5	16,186.4	7,903.5	160.4	161.8	-90.00	-6,998.9	4,553.2	4,253.3	3,938.4	13.507			
16,500.0	7,903.5	16,286.4	7,903.5	162.2	163.7	-90.00	-7,093.4	4,585.9	4,253.3	3,934.6	13.346			
16,600.0	7,903.5	16,386.4	7,903.5	164.1	165.5	-90.00	-7,187.9	4,618.5	4,253.3	3,930.8	13.188			
16,700.0	7,903.5	16,486.4	7,903.5	166.0	167.4	-90.00	-7,282.4	4,651.2	4,253.3	3,927.0	13.034			
16,800.0	7,903.5	16,586.4	7,903.5	167.8	169.3	-90.00	-7,377.0	4,683.8	4,253.3	3,923.2	12.884			
16,900.0	7,903.5	16,686.4	7,903.5	169.7	171.1	-90.00	-7,471.5	4,716.4	4,253.3	3,919.3	12.736			
17,000.0	7,903.5	16,786.4	7,903.5	171.6	173.0	-90.00	-7,566.0	4,749.1	4,253.3	3,915.5	12.593			
17,100.0	7,903.5	16,886.4	7,903.5	173.4	174.9	-90.00	-7,660.5	4,781.7	4,253.3	3,911.7	12.452			
17,200.0	7,903.5	16,986.4	7,903.5	175.3	176.7	-90.00	-7,755.1	4,814.3	4,253.2	3,907.9	12.314			
17,300.0	7,903.5	17,086.4	7,903.5	177.2	178.6	-90.00	-7,849.6	4,847.0	4,253.2	3,904.0	12.180			
17,400.0	7,903.5	17,186.4	7,903.5	179.1	180.5	-90.00	-7,944.1	4,879.6	4,253.2	3,900.2	12.048			
17,500.0	7,903.5	17,286.4	7,903.5	180.9	182.3	-90.00	-8,038.6	4,912.2	4,253.2	3,896.4	11.919			
17,600.0	7,903.5	17,386.4	7,903.5	182.8	184.2	-90.00	-8,133.2	4,944.9	4,253.2	3,892.5	11.793			
17,700.0	7,903.5	17,486.4	7,903.5	184.7	186.1	-90.00	-8,227.7	4,977.5	4,253.2	3,888.7	11.669			
17,800.0	7,903.5	17,586.4	7,903.5	186.6	188.0	-90.00	-8,322.2	5,010.1	4,253.2	3,884.9	11.548			
17,900.0	7,903.5	17,686.4	7,903.5	188.4	189.8	-90.00	-8,416.7	5,042.8	4,253.2	3,881.1	11.430			
18,000.0	7,903.5	17,786.4	7,903.5	190.3	191.7	-90.00	-8,511.3	5,075.4	4,253.2	3,877.2	11.314			
18,100.0	7,903.5	17,886.4	7,903.5	192.2	193.6	-90.00	-8,605.8	5,108.0	4,253.1	3,873.4	11.200			
18,200.0	7,903.5	17,986.4	7,903.5	194.1	195.5	-90.00	-8,700.3	5,140.7	4,253.1	3,869.6	11.088			
18,300.0	7,903.5	18,086.4	7,903.5	196.0	197.4	-90.00	-8,794.8	5,173.3	4,253.1	3,865.7	10.979			
18,400.0	7,903.5	18,186.4	7,903.5	197.8	199.2	-90.00	-8,889.4	5,206.0	4,253.1	3,861.9	10.872			
18,500.0	7,903.5	18,286.4	7,903.5	199.7	201.1	-90.00	-8,983.9	5,238.6	4,253.1	3,858.1	10.766			
18,600.0	7,903.5	18,386.4	7,903.5	201.6	203.0	-90.00	-9,078.4	5,271.2	4,253.1	3,854.2	10.663			
18,700.0	7,903.5	18,486.4	7,903.5	203.5	204.9	-90.00	-9,172.9	5,303.9	4,253.1	3,850.4	10.562			
18,800.0	7,903.5	18,586.4	7,903.5	205.4	206.8	-90.00	-9,267.5	5,336.5	4,253.1	3,846.6	10.463			
18,900.0	7,903.5	18,686.4	7,903.5	207.3	208.6	-90.00	-9,362.0	5,369.1	4,253.0	3,842.7	10.365			
19,000.0	7,903.5	18,786.4	7,903.5	209.2	210.5	-90.00	-9,456.5	5,401.8	4,253.0	3,838.9	10.269			
19,100.0	7,903.5	18,886.4	7,903.5	211.0	212.4	-90.00	-9,551.0	5,434.4	4,253.0	3,835.0	10.175			
19,200.0	7,903.5	18,986.4	7,903.5	212.9	214.3	-90.00	-9,645.6	5,467.0	4,253.0	3,831.2	10.083			

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<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #206 - Wellbore #1 - Design #1													Offset Site Error:	0.0 usft
Survey Program: 0-MWD default													Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning		
19,300.0	7,903.5	19,086.4	7,903.5	214.8	216.2	-90.00	-9,740.1	5,499.7	4,253.0	3,827.4	9.992			
19,400.0	7,903.5	19,186.4	7,903.5	216.7	218.1	-90.00	-9,834.6	5,532.3	4,253.0	3,823.5	9.903			
19,500.0	7,903.5	19,286.4	7,903.5	218.6	220.0	-90.00	-9,929.1	5,564.9	4,253.0	3,819.7	9.816			
19,600.0	7,903.5	19,386.4	7,903.5	220.5	221.9	-90.00	-10,023.7	5,597.6	4,253.0	3,815.9	9.730			
19,700.0	7,903.5	19,486.4	7,903.5	222.4	223.7	-90.00	-10,118.2	5,630.2	4,253.0	3,812.0	9.645			
19,800.0	7,903.5	19,586.4	7,903.5	224.3	225.6	-90.00	-10,212.7	5,662.8	4,252.9	3,808.2	9.562			
19,900.0	7,903.5	19,686.4	7,903.5	226.2	227.5	-90.00	-10,307.2	5,695.5	4,252.9	3,804.3	9.481			
20,000.0	7,903.5	19,786.4	7,903.5	228.1	229.4	-90.00	-10,401.8	5,728.1	4,252.9	3,800.5	9.401			
20,100.0	7,903.5	19,886.4	7,903.5	229.9	231.3	-90.00	-10,496.3	5,760.8	4,252.9	3,796.7	9.322			
20,200.0	7,903.5	19,986.4	7,903.5	231.8	233.2	-90.00	-10,590.8	5,793.4	4,252.9	3,792.8	9.244			
20,300.0	7,903.5	20,086.4	7,903.5	233.7	235.1	-90.00	-10,685.3	5,826.0	4,252.9	3,789.0	9.168			
20,400.0	7,903.5	20,186.4	7,903.5	235.6	237.0	-90.00	-10,779.9	5,858.7	4,252.9	3,785.2	9.093			
20,500.0	7,903.5	20,286.4	7,903.5	237.5	238.9	-90.00	-10,874.4	5,891.3	4,252.9	3,781.3	9.019			
20,600.0	7,903.5	20,386.4	7,903.5	239.4	240.8	-90.00	-10,968.9	5,923.9	4,252.8	3,777.5	8.946			
20,700.0	7,903.5	20,486.4	7,903.5	241.3	242.7	-90.00	-11,063.4	5,956.6	4,252.8	3,773.6	8.875			
20,800.0	7,903.5	20,586.4	7,903.5	243.2	244.6	-90.00	-11,158.0	5,989.2	4,252.8	3,769.8	8.804			
20,900.0	7,903.5	20,686.4	7,903.5	245.1	246.5	-90.00	-11,252.5	6,021.8	4,252.8	3,766.0	8.735			
21,000.0	7,903.5	20,786.4	7,903.5	247.0	248.3	-90.00	-11,347.0	6,054.5	4,252.8	3,762.1	8.667			
21,100.0	7,903.5	20,886.4	7,903.5	248.9	250.2	-90.00	-11,441.5	6,087.1	4,252.8	3,758.3	8.600			
21,200.0	7,903.5	20,986.4	7,903.5	250.8	252.1	-90.00	-11,536.1	6,119.7	4,252.8	3,754.4	8.534			
21,300.0	7,903.5	21,086.4	7,903.5	252.7	254.0	-90.00	-11,630.6	6,152.4	4,252.8	3,750.6	8.469			
21,400.0	7,903.5	21,186.4	7,903.5	254.6	255.9	-90.00	-11,725.1	6,185.0	4,252.8	3,746.7	8.405			
21,500.0	7,903.5	21,286.4	7,903.5	256.5	257.8	-90.00	-11,819.6	6,217.6	4,252.7	3,742.9	8.341			
21,600.0	7,903.5	21,386.4	7,903.5	258.4	259.7	-90.00	-11,914.2	6,250.3	4,252.7	3,739.1	8.279			
21,700.0	7,903.5	21,486.4	7,903.5	260.3	261.6	-90.00	-12,008.7	6,282.9	4,252.7	3,735.2	8.218			
21,800.0	7,903.5	21,586.4	7,903.5	262.2	263.5	-90.00	-12,103.2	6,315.6	4,252.7	3,731.4	8.157			
21,900.0	7,903.5	21,686.4	7,903.5	264.1	265.4	-90.00	-12,197.7	6,348.2	4,252.7	3,727.5	8.098			
22,000.0	7,903.5	21,786.4	7,903.5	266.0	267.3	-90.00	-12,292.3	6,380.8	4,252.7	3,723.7	8.039			
22,100.0	7,903.5	21,886.4	7,903.5	267.9	269.2	-90.00	-12,386.8	6,413.5	4,252.7	3,719.8	7.981			
22,200.0	7,903.5	21,986.4	7,903.5	269.8	271.1	-90.00	-12,481.3	6,446.1	4,252.7	3,716.0	7.924			
22,300.0	7,903.5	22,086.4	7,903.5	271.7	273.0	-90.00	-12,575.8	6,478.7	4,252.6	3,712.2	7.868			
22,400.0	7,903.5	22,186.4	7,903.5	273.6	274.9	-90.00	-12,670.4	6,511.4	4,252.6	3,708.3	7.813			
22,482.4	7,903.5	22,268.8	7,903.5	275.2	276.5	-90.00	-12,748.2	6,538.3	4,252.6	3,705.2	7.768			

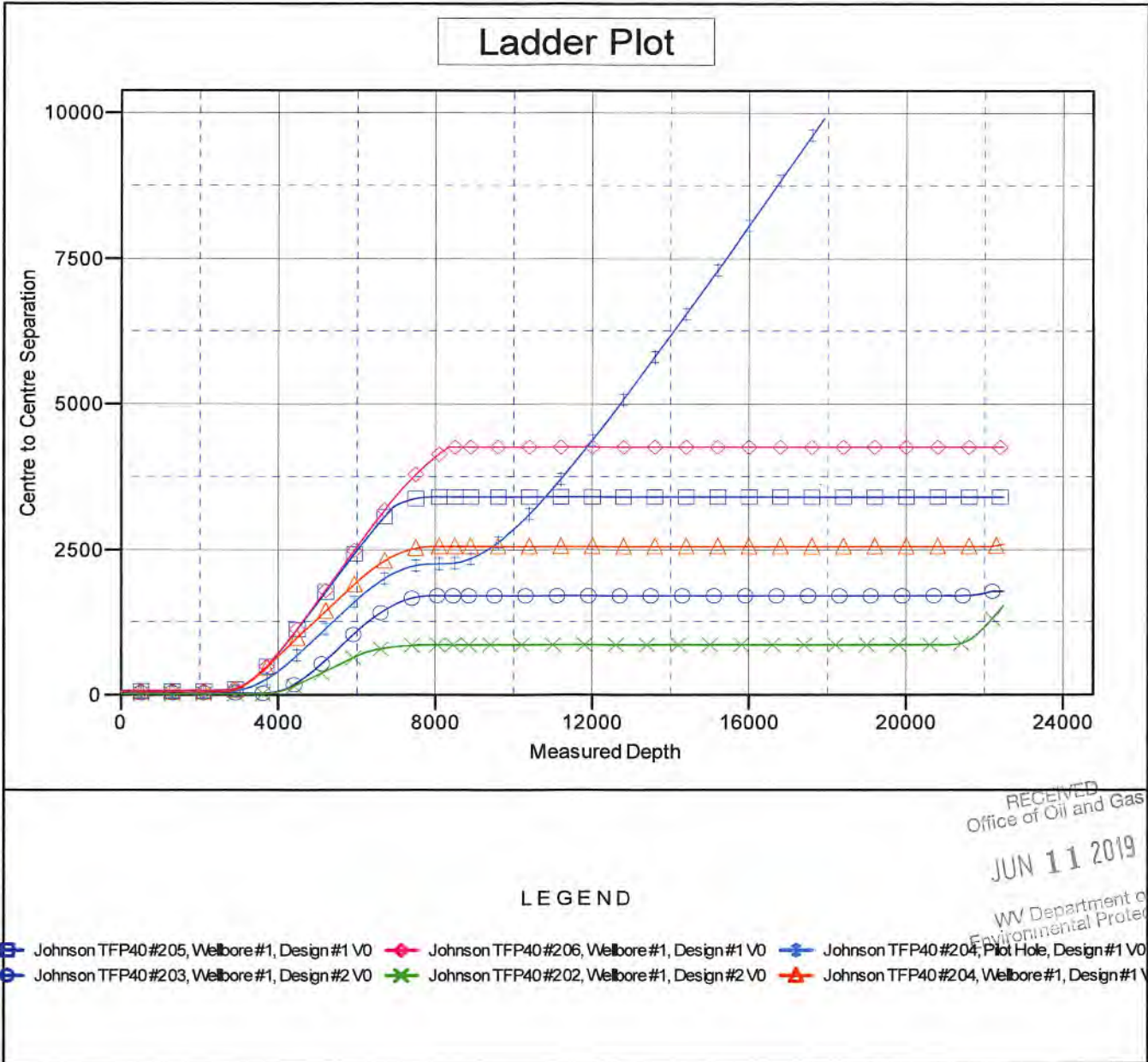
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<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Reference Depths are relative to Well @ 1359.5usft  
 Offset Depths are relative to Offset Datum  
 Central Meridian is 79° 30' 0.000 W

Coordinates are relative to: Johnson TFP40 #201  
 Coordinate System is US State Plane 1983, West Virginia Northern Zone  
 Grid Convergence at Surface is: -0.43°

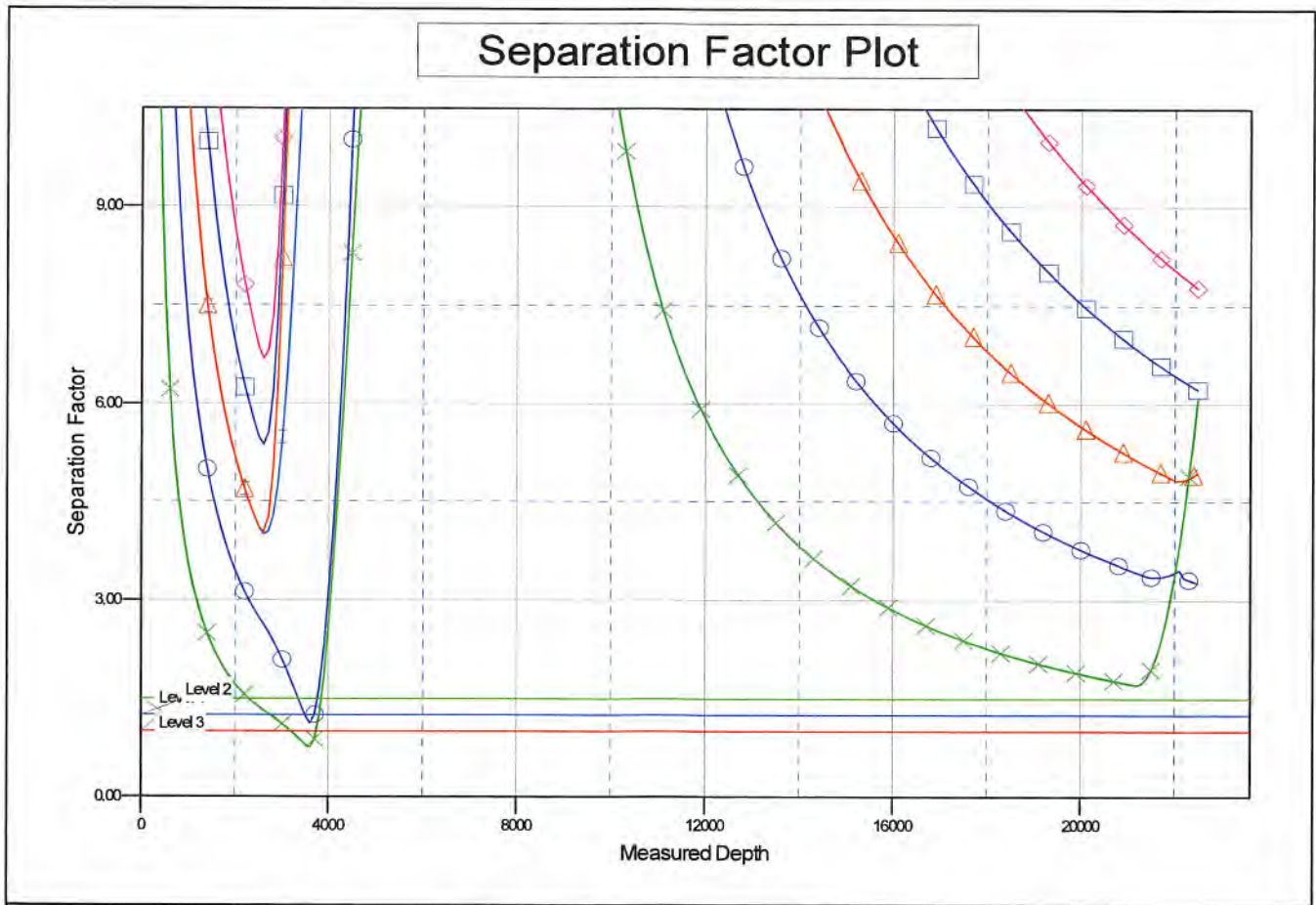




<b>Company:</b>	Arsenal Resources	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Project:</b>	Taylor County, West Virginia	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Reference Site:</b>	Johnson TFP40 Pad	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	Grid
<b>Reference Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	Design #3	<b>Offset TVD Reference:</b>	Reference Datum

Reference Depths are relative to Well @ 1359.5usft  
 Offset Depths are relative to Offset Datum  
 Central Meridian is 79° 30' 0.000 W

Coordinates are relative to: Johnson TFP40 #201  
 Coordinate System is US State Plane 1983, West Virginia Northern Zone  
 Grid Convergence at Surface is: -0.43°



LEGEND

- Johnson TFP40#205, Wellbore #1, Design #1 V0
 ◆ Johnson TFP40#206, Wellbore #1, Design #1 V0
 ● Johnson TFP40#204, Plot Hole, Design #1 V0
- Johnson TFP40#203, Wellbore #1, Design #2 V0
 ✕ Johnson TFP40#202, Wellbore #1, Design #2 V0
 ▲ Johnson TFP40#204, Wellbore #1, Design #1 V0

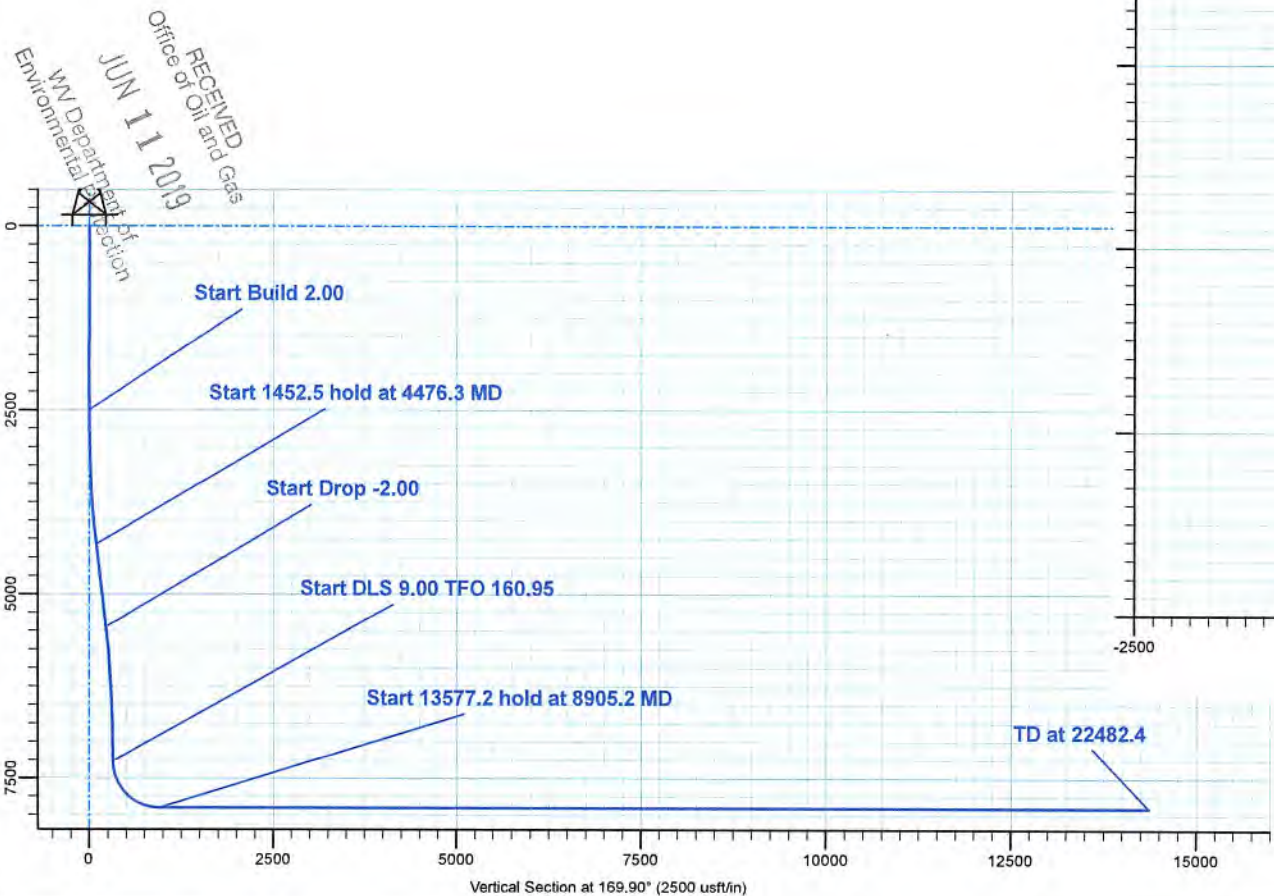
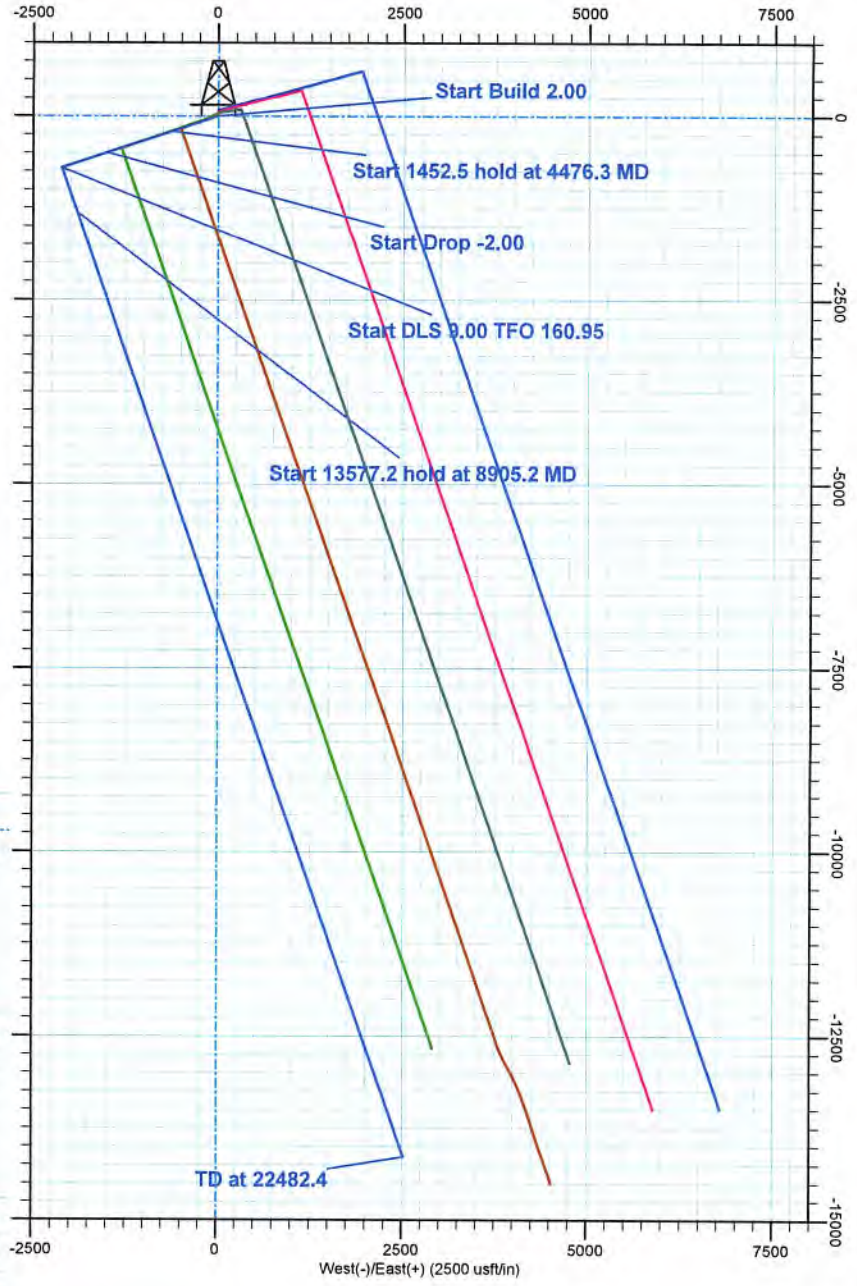
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Arsenal Resources  
 Taylor County, West Virginia  
 Johnson TFP40 Pad  
 Johnson TFP40 #201  
 Design #3

ANNOTATIONS								
MD	Inc	Azi	TVD	+N/-S	+E/-W	V S ed	Departure	Annotation
2500.0	0.00	0.00	2500.0	0.0	0.0	0.0	0.0	Start Build 2.00
4476.3	39.53	251.72	4323.3	-205.5	-622.0	93.2	655.1	Start 1452.5 hold at 4476.3 MD
5928.9	39.53	251.72	5443.6	-495.5	-1499.8	224.8	1579.5	Start Drop -2.00
7905.2	0.00	360.00	7266.9	-701.1	-2121.8	318.0	2234.6	Start DLS 9.00 TFO 160.95
8905.2	90.00	160.95	7903.5	-1302.8	-1914.0	946.9	2871.3	Start 13577.2 hold at 8905.2 MD
22482.4	90.00	160.95	7903.5-14136.1	2518.5	14358.7	16448.4		TD at 22482.4





**ARSENAL**  
R E S O U R C E S

## **Arsenal Resources**

**Taylor County, West Virginia**

**Johnson TFP40 Pad**

**Johnson TFP40 #201**

**Wellbore #1**

**Plan: Design #3**

## **QES Well Planning Report**

**28 May, 2019**

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WV Department of  
Environmental Protection



DIRECTIONAL DRILLING





Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Company:</b>	Arsenal Resources	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Project:</b>	Taylor County, West Virginia	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site:</b>	Johnson TFP40 Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #3		

<b>Project</b>	Taylor County, West Virginia		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	West Virginia Northern Zone		

<b>Site</b>	Johnson TFP40 Pad				
<b>Site Position:</b>		<b>Northing:</b>	277,046.72 usft	<b>Latitude:</b>	39° 15' 31.338 N
<b>From:</b>	Map	<b>Easting:</b>	1,779,051.66 usft	<b>Longitude:</b>	80° 10' 8.622 W
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	-0.43 °

<b>Well</b>	Johnson TFP40 #201					
<b>Well Position</b>	<b>+N/-S</b>	-75.0 usft	<b>Northing:</b>	276,971.72 usft	<b>Latitude:</b>	39° 15' 30.597 N
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b>	1,779,051.66 usft	<b>Longitude:</b>	80° 10' 8.615 W
<b>Position Uncertainty</b>		0.0 usft	<b>Wellhead Elevation:</b>		<b>Ground Level:</b>	1,332.5 usft

<b>Wellbore</b>	Wellbore #1				
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<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	10/16/2018	-8.98	66.35	51,687.80120707

<b>Design</b>	Design #3				
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<b>Audit Notes:</b>					
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.0	

<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	169.90

<b>Plan Sections</b>										
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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	
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.00	0.00	0.00	0.00	
4,476.3	39.53	251.72	4,323.3	-205.5	-622.0	2.00	2.00	0.00	251.72	
5,928.9	39.53	251.72	5,443.6	-495.5	-1,499.8	0.00	0.00	0.00	0.00	
7,905.2	0.00	360.00	7,266.9	-701.1	-2,121.8	2.00	-2.00	0.00	180.00	VP Johnson TFP40
8,905.2	90.00	160.95	7,903.5	-1,302.8	-1,914.0	9.00	9.00	16.09	160.95	
22,482.4	90.00	160.95	7,903.5	-14,136.1	2,518.5	0.00	0.00	0.00	0.00	PBHL Johnson TFF

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Environmental Protection



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Company:</b>	Arsenal Resources	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Project:</b>	Taylor County, West Virginia	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site:</b>	Johnson TFP40 Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	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
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	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>Start Build 2.00</b>									
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	2.00	251.72	2,600.0	-0.5	-1.7	0.2	2.00	2.00	0.00
2,700.0	4.00	251.72	2,699.8	-2.2	-6.6	1.0	2.00	2.00	0.00
2,800.0	6.00	251.72	2,799.5	-4.9	-14.9	2.2	2.00	2.00	0.00
2,900.0	8.00	251.72	2,898.7	-8.7	-26.5	4.0	2.00	2.00	0.00
3,000.0	10.00	251.72	2,997.5	-13.7	-41.3	6.2	2.00	2.00	0.00
3,100.0	12.00	251.72	3,095.6	-19.6	-59.4	8.9	2.00	2.00	0.00
3,200.0	14.00	251.72	3,193.1	-26.7	-80.8	12.1	2.00	2.00	0.00
3,300.0	16.00	251.72	3,289.6	-34.8	-105.4	15.8	2.00	2.00	0.00
3,400.0	18.00	251.72	3,385.3	-44.0	-133.1	20.0	2.00	2.00	0.00
3,500.0	20.00	251.72	3,479.8	-54.2	-164.0	24.6	2.00	2.00	0.00
3,600.0	22.00	251.72	3,573.2	-65.4	-198.1	29.7	2.00	2.00	0.00
3,700.0	24.00	251.72	3,665.2	-77.7	-235.2	35.2	2.00	2.00	0.00
3,800.0	26.00	251.72	3,755.8	-91.0	-275.3	41.3	2.00	2.00	0.00
3,900.0	28.00	251.72	3,844.9	-105.2	-318.4	47.7	2.00	2.00	0.00
4,000.0	30.00	251.72	3,932.4	-120.4	-364.4	54.6	2.00	2.00	0.00
4,100.0	32.00	251.72	4,018.1	-136.6	-413.3	62.0	2.00	2.00	0.00
4,200.0	34.00	251.72	4,102.0	-153.7	-465.0	69.7	2.00	2.00	0.00
4,300.0	36.00	251.72	4,183.9	-171.6	-519.5	77.9	2.00	2.00	0.00
4,400.0	38.00	251.72	4,263.7	-190.5	-576.6	86.4	2.00	2.00	0.00
<b>Start 1452.5 hold at 4476.3 MD</b>									
4,476.3	39.53	251.72	4,323.3	-205.5	-622.0	93.2	2.00	2.00	0.00
4,500.0	39.53	251.72	4,341.5	-210.2	-636.3	95.4	0.00	0.00	0.00
4,600.0	39.53	251.72	4,418.6	-230.2	-696.8	104.4	0.00	0.00	0.00
4,700.0	39.53	251.72	4,495.8	-250.2	-757.2	113.5	0.00	0.00	0.00
4,800.0	39.53	251.72	4,572.9	-270.1	-817.6	122.6	0.00	0.00	0.00
4,900.0	39.53	251.72	4,650.0	-290.1	-878.0	131.6	0.00	0.00	0.00
5,000.0	39.53	251.72	4,727.2	-310.1	-938.5	140.7	0.00	0.00	0.00



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Company:</b>	Arsenal Resources	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Project:</b>	Taylor County, West Virginia	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site:</b>	Johnson TFP40 Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	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	39.53	251.72	4,804.3	-330.0	-998.9	149.7	0.00	0.00	0.00
5,200.0	39.53	251.72	4,881.4	-350.0	-1,059.3	158.8	0.00	0.00	0.00
5,300.0	39.53	251.72	4,958.6	-370.0	-1,119.8	167.8	0.00	0.00	0.00
5,400.0	39.53	251.72	5,035.7	-389.9	-1,180.2	176.9	0.00	0.00	0.00
5,500.0	39.53	251.72	5,112.8	-409.9	-1,240.6	186.0	0.00	0.00	0.00
5,600.0	39.53	251.72	5,190.0	-429.9	-1,301.1	195.0	0.00	0.00	0.00
5,700.0	39.53	251.72	5,267.1	-449.8	-1,361.5	204.1	0.00	0.00	0.00
5,800.0	39.53	251.72	5,344.2	-469.8	-1,421.9	213.1	0.00	0.00	0.00
5,900.0	39.53	251.72	5,421.4	-489.8	-1,482.4	222.2	0.00	0.00	0.00
<b>Start Drop -2.00</b>									
5,928.9	39.53	251.72	5,443.6	-495.5	-1,499.8	224.8	0.00	0.00	0.00
6,000.0	38.10	251.72	5,499.1	-509.5	-1,542.1	231.2	2.00	-2.00	0.00
6,100.0	36.10	251.72	5,578.8	-528.5	-1,599.4	239.7	2.00	-2.00	0.00
6,200.0	34.10	251.72	5,660.6	-546.5	-1,654.0	247.9	2.00	-2.00	0.00
6,300.0	32.10	251.72	5,744.4	-563.6	-1,705.9	255.7	2.00	-2.00	0.00
6,400.0	30.10	251.72	5,830.0	-579.8	-1,754.9	263.0	2.00	-2.00	0.00
6,500.0	28.10	251.72	5,917.4	-595.1	-1,801.1	270.0	2.00	-2.00	0.00
6,600.0	26.10	251.72	6,006.4	-609.4	-1,844.4	276.5	2.00	-2.00	0.00
6,700.0	24.10	251.72	6,096.9	-622.7	-1,884.6	282.5	2.00	-2.00	0.00
6,800.0	22.10	251.72	6,188.9	-635.0	-1,921.9	288.1	2.00	-2.00	0.00
6,900.0	20.10	251.72	6,282.2	-646.3	-1,956.1	293.2	2.00	-2.00	0.00
7,000.0	18.10	251.72	6,376.7	-656.6	-1,987.2	297.9	2.00	-2.00	0.00
7,100.0	16.10	251.72	6,472.3	-665.8	-2,015.1	302.0	2.00	-2.00	0.00
7,200.0	14.10	251.72	6,568.8	-674.0	-2,039.8	305.7	2.00	-2.00	0.00
7,300.0	12.10	251.72	6,666.2	-681.1	-2,061.3	309.0	2.00	-2.00	0.00
7,400.0	10.10	251.72	6,764.3	-687.1	-2,079.6	311.7	2.00	-2.00	0.00
7,500.0	8.10	251.72	6,863.0	-692.1	-2,094.7	314.0	2.00	-2.00	0.00
7,600.0	6.10	251.72	6,962.3	-696.0	-2,106.4	315.7	2.00	-2.00	0.00
7,700.0	4.10	251.72	7,061.9	-698.8	-2,114.8	317.0	2.00	-2.00	0.00
7,800.0	2.10	251.72	7,161.7	-700.5	-2,120.0	317.8	2.00	-2.00	0.00
<b>Start DLS 9.00 TFO 160.95</b>									
7,905.2	0.00	360.00	7,266.9	-701.1	-2,121.8	318.0	2.00	-2.00	0.00
7,950.0	4.03	160.95	7,311.7	-702.6	-2,121.3	319.6	9.00	9.00	0.00
8,000.0	8.53	160.95	7,361.3	-707.7	-2,119.5	325.0	9.00	9.00	0.00
8,050.0	13.03	160.95	7,410.4	-716.6	-2,116.5	334.2	9.00	9.00	0.00
8,100.0	17.53	160.95	7,458.7	-729.0	-2,112.2	347.3	9.00	9.00	0.00
8,150.0	22.03	160.95	7,505.7	-745.0	-2,106.6	364.0	9.00	9.00	0.00
8,200.0	26.53	160.95	7,551.3	-764.4	-2,099.9	384.3	9.00	9.00	0.00
8,250.0	31.03	160.95	7,595.1	-787.2	-2,092.1	408.0	9.00	9.00	0.00
8,300.0	35.53	160.95	7,636.9	-813.1	-2,083.1	435.1	9.00	9.00	0.00
8,350.0	40.03	160.95	7,676.4	-842.1	-2,073.1	465.4	9.00	9.00	0.00
8,400.0	44.53	160.95	7,713.4	-873.8	-2,062.1	498.6	9.00	9.00	0.00
8,450.0	49.03	160.95	7,747.6	-908.3	-2,050.3	534.6	9.00	9.00	0.00
8,500.0	53.53	160.95	7,778.9	-945.1	-2,037.5	573.1	9.00	9.00	0.00
8,550.0	58.03	160.95	7,807.0	-984.2	-2,024.0	614.0	9.00	9.00	0.00
8,600.0	62.53	160.95	7,831.8	-1,025.2	-2,009.9	656.8	9.00	9.00	0.00
8,650.0	67.03	160.95	7,853.0	-1,068.0	-1,995.1	701.5	9.00	9.00	0.00
8,700.0	71.53	160.95	7,870.7	-1,112.2	-1,979.8	747.7	9.00	9.00	0.00
8,750.0	76.03	160.95	7,884.7	-1,157.6	-1,964.2	795.1	9.00	9.00	0.00
8,800.0	80.53	160.95	7,894.8	-1,203.8	-1,948.2	843.5	9.00	9.00	0.00
8,850.0	85.03	160.95	7,901.1	-1,250.7	-1,932.0	892.4	9.00	9.00	0.00
8,900.0	89.53	160.95	7,903.5	-1,297.9	-1,915.7	941.8	9.00	9.00	0.00
<b>Start 13577.2 hold at 8905.2 MD</b>									



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Company:</b>	Arsenal Resources	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Project:</b>	Taylor County, West Virginia	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site:</b>	Johnson TFP40 Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	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)
8,905.2	90.00	160.95	7,903.5	-1,302.8	-1,914.0	946.9	9.00	9.00	0.00
9,000.0	90.00	160.95	7,903.5	-1,392.4	-1,883.0	1,040.5	0.00	0.00	0.00
9,100.0	90.00	160.95	7,903.5	-1,486.9	-1,850.4	1,139.3	0.00	0.00	0.00
9,200.0	90.00	160.95	7,903.5	-1,581.5	-1,817.7	1,238.1	0.00	0.00	0.00
9,300.0	90.00	160.95	7,903.5	-1,676.0	-1,785.1	1,336.9	0.00	0.00	0.00
9,400.0	90.00	160.95	7,903.5	-1,770.5	-1,752.5	1,435.7	0.00	0.00	0.00
9,500.0	90.00	160.95	7,903.5	-1,865.0	-1,719.8	1,534.5	0.00	0.00	0.00
9,600.0	90.00	160.95	7,903.5	-1,959.5	-1,687.2	1,633.2	0.00	0.00	0.00
9,700.0	90.00	160.95	7,903.5	-2,054.1	-1,654.5	1,732.0	0.00	0.00	0.00
9,800.0	90.00	160.95	7,903.5	-2,148.6	-1,621.9	1,830.8	0.00	0.00	0.00
9,900.0	90.00	160.95	7,903.5	-2,243.1	-1,589.2	1,929.6	0.00	0.00	0.00
10,000.0	90.00	160.95	7,903.5	-2,337.6	-1,556.6	2,028.4	0.00	0.00	0.00
10,100.0	90.00	160.95	7,903.5	-2,432.1	-1,523.9	2,127.1	0.00	0.00	0.00
10,200.0	90.00	160.95	7,903.5	-2,526.7	-1,491.3	2,225.9	0.00	0.00	0.00
10,300.0	90.00	160.95	7,903.5	-2,621.2	-1,458.6	2,324.7	0.00	0.00	0.00
10,400.0	90.00	160.95	7,903.5	-2,715.7	-1,426.0	2,423.5	0.00	0.00	0.00
10,500.0	90.00	160.95	7,903.5	-2,810.2	-1,393.3	2,522.3	0.00	0.00	0.00
10,600.0	90.00	160.95	7,903.5	-2,904.7	-1,360.7	2,621.1	0.00	0.00	0.00
10,700.0	90.00	160.95	7,903.5	-2,999.3	-1,328.1	2,719.8	0.00	0.00	0.00
10,800.0	90.00	160.95	7,903.5	-3,093.8	-1,295.4	2,818.6	0.00	0.00	0.00
10,900.0	90.00	160.95	7,903.5	-3,188.3	-1,262.8	2,917.4	0.00	0.00	0.00
11,000.0	90.00	160.95	7,903.5	-3,282.8	-1,230.1	3,016.2	0.00	0.00	0.00
11,100.0	90.00	160.95	7,903.5	-3,377.3	-1,197.5	3,115.0	0.00	0.00	0.00
11,200.0	90.00	160.95	7,903.5	-3,471.9	-1,164.8	3,213.7	0.00	0.00	0.00
11,300.0	90.00	160.95	7,903.5	-3,566.4	-1,132.2	3,312.5	0.00	0.00	0.00
11,400.0	90.00	160.95	7,903.5	-3,660.9	-1,099.5	3,411.3	0.00	0.00	0.00
11,500.0	90.00	160.95	7,903.5	-3,755.4	-1,066.9	3,510.1	0.00	0.00	0.00
11,600.0	90.00	160.95	7,903.5	-3,850.0	-1,034.2	3,608.9	0.00	0.00	0.00
11,700.0	90.00	160.95	7,903.5	-3,944.5	-1,001.6	3,707.7	0.00	0.00	0.00
11,800.0	90.00	160.95	7,903.5	-4,039.0	-968.9	3,806.4	0.00	0.00	0.00
11,900.0	90.00	160.95	7,903.5	-4,133.5	-936.3	3,905.2	0.00	0.00	0.00
12,000.0	90.00	160.95	7,903.5	-4,228.0	-903.7	4,004.0	0.00	0.00	0.00
12,100.0	90.00	160.95	7,903.5	-4,322.6	-871.0	4,102.8	0.00	0.00	0.00
12,200.0	90.00	160.95	7,903.5	-4,417.1	-838.4	4,201.6	0.00	0.00	0.00
12,300.0	90.00	160.95	7,903.5	-4,511.6	-805.7	4,300.3	0.00	0.00	0.00
12,400.0	90.00	160.95	7,903.5	-4,606.1	-773.1	4,399.1	0.00	0.00	0.00
12,500.0	90.00	160.95	7,903.5	-4,700.6	-740.4	4,497.9	0.00	0.00	0.00
12,600.0	90.00	160.95	7,903.5	-4,795.2	-707.8	4,596.7	0.00	0.00	0.00
12,700.0	90.00	160.95	7,903.5	-4,889.7	-675.1	4,695.5	0.00	0.00	0.00
12,800.0	90.00	160.95	7,903.5	-4,984.2	-642.5	4,794.3	0.00	0.00	0.00
12,900.0	90.00	160.95	7,903.5	-5,078.7	-609.8	4,893.0	0.00	0.00	0.00
13,000.0	90.00	160.95	7,903.5	-5,173.2	-577.2	4,991.8	0.00	0.00	0.00
13,100.0	90.00	160.95	7,903.5	-5,267.8	-544.5	5,090.6	0.00	0.00	0.00
13,200.0	90.00	160.95	7,903.5	-5,362.3	-511.9	5,189.4	0.00	0.00	0.00
13,300.0	90.00	160.95	7,903.5	-5,456.8	-479.2	5,288.2	0.00	0.00	0.00
13,400.0	90.00	160.95	7,903.5	-5,551.3	-446.6	5,386.9	0.00	0.00	0.00
13,500.0	90.00	160.95	7,903.5	-5,645.9	-414.0	5,485.7	0.00	0.00	0.00
13,600.0	90.00	160.95	7,903.5	-5,740.4	-381.3	5,584.5	0.00	0.00	0.00
13,700.0	90.00	160.95	7,903.5	-5,834.9	-348.7	5,683.3	0.00	0.00	0.00
13,800.0	90.00	160.95	7,903.5	-5,929.4	-316.0	5,782.1	0.00	0.00	0.00
13,900.0	90.00	160.95	7,903.5	-6,023.9	-283.4	5,880.9	0.00	0.00	0.00
14,000.0	90.00	160.95	7,903.5	-6,118.5	-250.7	5,979.6	0.00	0.00	0.00
14,100.0	90.00	160.95	7,903.5	-6,213.0	-218.1	6,078.4	0.00	0.00	0.00
14,200.0	90.00	160.95	7,903.5	-6,307.5	-185.4	6,177.2	0.00	0.00	0.00





Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Company:</b>	Arsenal Resources	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Project:</b>	Taylor County, West Virginia	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site:</b>	Johnson TFP40 Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	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)
14,300.0	90.00	160.95	7,903.5	-6,402.0	-152.8	6,276.0	0.00	0.00	0.00
14,400.0	90.00	160.95	7,903.5	-6,496.5	-120.1	6,374.8	0.00	0.00	0.00
14,500.0	90.00	160.95	7,903.5	-6,591.1	-87.5	6,473.5	0.00	0.00	0.00
14,600.0	90.00	160.95	7,903.5	-6,685.6	-54.8	6,572.3	0.00	0.00	0.00
14,700.0	90.00	160.95	7,903.5	-6,780.1	-22.2	6,671.1	0.00	0.00	0.00
14,800.0	90.00	160.95	7,903.5	-6,874.6	10.4	6,769.9	0.00	0.00	0.00
14,900.0	90.00	160.95	7,903.5	-6,969.1	43.1	6,868.7	0.00	0.00	0.00
15,000.0	90.00	160.95	7,903.5	-7,063.7	75.7	6,967.5	0.00	0.00	0.00
15,100.0	90.00	160.95	7,903.5	-7,158.2	108.4	7,066.2	0.00	0.00	0.00
15,200.0	90.00	160.95	7,903.5	-7,252.7	141.0	7,165.0	0.00	0.00	0.00
15,300.0	90.00	160.95	7,903.5	-7,347.2	173.7	7,263.8	0.00	0.00	0.00
15,400.0	90.00	160.95	7,903.5	-7,441.8	206.3	7,362.6	0.00	0.00	0.00
15,500.0	90.00	160.95	7,903.5	-7,536.3	239.0	7,461.4	0.00	0.00	0.00
15,600.0	90.00	160.95	7,903.5	-7,630.8	271.6	7,560.1	0.00	0.00	0.00
15,700.0	90.00	160.95	7,903.5	-7,725.3	304.3	7,658.9	0.00	0.00	0.00
15,800.0	90.00	160.95	7,903.5	-7,819.8	336.9	7,757.7	0.00	0.00	0.00
15,900.0	90.00	160.95	7,903.5	-7,914.4	369.6	7,856.5	0.00	0.00	0.00
16,000.0	90.00	160.95	7,903.5	-8,008.9	402.2	7,955.3	0.00	0.00	0.00
16,100.0	90.00	160.95	7,903.5	-8,103.4	434.8	8,054.0	0.00	0.00	0.00
16,200.0	90.00	160.95	7,903.5	-8,197.9	467.5	8,152.8	0.00	0.00	0.00
16,300.0	90.00	160.95	7,903.5	-8,292.4	500.1	8,251.6	0.00	0.00	0.00
16,400.0	90.00	160.95	7,903.5	-8,387.0	532.8	8,350.4	0.00	0.00	0.00
16,500.0	90.00	160.95	7,903.5	-8,481.5	565.4	8,449.2	0.00	0.00	0.00
16,600.0	90.00	160.95	7,903.5	-8,576.0	598.1	8,548.0	0.00	0.00	0.00
16,700.0	90.00	160.95	7,903.5	-8,670.5	630.7	8,646.7	0.00	0.00	0.00
16,800.0	90.00	160.95	7,903.5	-8,765.0	663.4	8,745.5	0.00	0.00	0.00
16,900.0	90.00	160.95	7,903.5	-8,859.6	696.0	8,844.3	0.00	0.00	0.00
17,000.0	90.00	160.95	7,903.5	-8,954.1	728.7	8,943.1	0.00	0.00	0.00
17,100.0	90.00	160.95	7,903.5	-9,048.6	761.3	9,041.9	0.00	0.00	0.00
17,200.0	90.00	160.95	7,903.5	-9,143.1	794.0	9,140.6	0.00	0.00	0.00
17,300.0	90.00	160.95	7,903.5	-9,237.7	826.6	9,239.4	0.00	0.00	0.00
17,400.0	90.00	160.95	7,903.5	-9,332.2	859.3	9,338.2	0.00	0.00	0.00
17,500.0	90.00	160.95	7,903.5	-9,426.7	891.9	9,437.0	0.00	0.00	0.00
17,600.0	90.00	160.95	7,903.5	-9,521.2	924.5	9,535.8	0.00	0.00	0.00
17,700.0	90.00	160.95	7,903.5	-9,615.7	957.2	9,634.6	0.00	0.00	0.00
17,800.0	90.00	160.95	7,903.5	-9,710.3	989.8	9,733.3	0.00	0.00	0.00
17,900.0	90.00	160.95	7,903.5	-9,804.8	1,022.5	9,832.1	0.00	0.00	0.00
18,000.0	90.00	160.95	7,903.5	-9,899.3	1,055.1	9,930.9	0.00	0.00	0.00
18,100.0	90.00	160.95	7,903.5	-9,993.8	1,087.8	10,029.7	0.00	0.00	0.00
18,200.0	90.00	160.95	7,903.5	-10,088.3	1,120.4	10,128.5	0.00	0.00	0.00
18,300.0	90.00	160.95	7,903.5	-10,182.9	1,153.1	10,227.2	0.00	0.00	0.00
18,400.0	90.00	160.95	7,903.5	-10,277.4	1,185.7	10,326.0	0.00	0.00	0.00
18,500.0	90.00	160.95	7,903.5	-10,371.9	1,218.4	10,424.8	0.00	0.00	0.00
18,600.0	90.00	160.95	7,903.5	-10,466.4	1,251.0	10,523.6	0.00	0.00	0.00
18,700.0	90.00	160.95	7,903.5	-10,560.9	1,283.7	10,622.4	0.00	0.00	0.00
18,800.0	90.00	160.95	7,903.5	-10,655.5	1,316.3	10,721.2	0.00	0.00	0.00
18,900.0	90.00	160.95	7,903.5	-10,750.0	1,348.9	10,819.9	0.00	0.00	0.00
19,000.0	90.00	160.95	7,903.5	-10,844.5	1,381.6	10,918.7	0.00	0.00	0.00
19,100.0	90.00	160.95	7,903.5	-10,939.0	1,414.2	11,017.5	0.00	0.00	0.00
19,200.0	90.00	160.95	7,903.5	-11,033.5	1,446.9	11,116.3	0.00	0.00	0.00
19,300.0	90.00	160.95	7,903.5	-11,128.1	1,479.5	11,215.1	0.00	0.00	0.00
19,400.0	90.00	160.95	7,903.5	-11,222.6	1,512.2	11,313.8	0.00	0.00	0.00
19,500.0	90.00	160.95	7,903.5	-11,317.1	1,544.8	11,412.6	0.00	0.00	0.00
19,600.0	90.00	160.95	7,903.5	-11,411.6	1,577.5	11,511.4	0.00	0.00	0.00



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Company:</b>	Arsenal Resources	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Project:</b>	Taylor County, West Virginia	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site:</b>	Johnson TFP40 Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	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)	
19,700.0	90.00	160.95	7,903.5	-11,506.2	1,610.1	11,610.2	0.00	0.00	0.00	
19,800.0	90.00	160.95	7,903.5	-11,600.7	1,642.8	11,709.0	0.00	0.00	0.00	
19,900.0	90.00	160.95	7,903.5	-11,695.2	1,675.4	11,807.8	0.00	0.00	0.00	
20,000.0	90.00	160.95	7,903.5	-11,789.7	1,708.1	11,906.5	0.00	0.00	0.00	
20,100.0	90.00	160.95	7,903.5	-11,884.2	1,740.7	12,005.3	0.00	0.00	0.00	
20,200.0	90.00	160.95	7,903.5	-11,978.8	1,773.3	12,104.1	0.00	0.00	0.00	
20,300.0	90.00	160.95	7,903.5	-12,073.3	1,806.0	12,202.9	0.00	0.00	0.00	
20,400.0	90.00	160.95	7,903.5	-12,167.8	1,838.6	12,301.7	0.00	0.00	0.00	
20,500.0	90.00	160.95	7,903.5	-12,262.3	1,871.3	12,400.4	0.00	0.00	0.00	
20,600.0	90.00	160.95	7,903.5	-12,356.8	1,903.9	12,499.2	0.00	0.00	0.00	
20,700.0	90.00	160.95	7,903.5	-12,451.4	1,936.6	12,598.0	0.00	0.00	0.00	
20,800.0	90.00	160.95	7,903.5	-12,545.9	1,969.2	12,696.8	0.00	0.00	0.00	
20,900.0	90.00	160.95	7,903.5	-12,640.4	2,001.9	12,795.6	0.00	0.00	0.00	
21,000.0	90.00	160.95	7,903.5	-12,734.9	2,034.5	12,894.4	0.00	0.00	0.00	
21,100.0	90.00	160.95	7,903.5	-12,829.4	2,067.2	12,993.1	0.00	0.00	0.00	
21,200.0	90.00	160.95	7,903.5	-12,924.0	2,099.8	13,091.9	0.00	0.00	0.00	
21,300.0	90.00	160.95	7,903.5	-13,018.5	2,132.5	13,190.7	0.00	0.00	0.00	
21,400.0	90.00	160.95	7,903.5	-13,113.0	2,165.1	13,289.5	0.00	0.00	0.00	
21,500.0	90.00	160.95	7,903.5	-13,207.5	2,197.8	13,388.3	0.00	0.00	0.00	
21,600.0	90.00	160.95	7,903.5	-13,302.1	2,230.4	13,487.0	0.00	0.00	0.00	
21,700.0	90.00	160.95	7,903.5	-13,396.6	2,263.0	13,585.8	0.00	0.00	0.00	
21,800.0	90.00	160.95	7,903.5	-13,491.1	2,295.7	13,684.6	0.00	0.00	0.00	
21,900.0	90.00	160.95	7,903.5	-13,585.6	2,328.3	13,783.4	0.00	0.00	0.00	
22,000.0	90.00	160.95	7,903.5	-13,680.1	2,361.0	13,882.2	0.00	0.00	0.00	
22,100.0	90.00	160.95	7,903.5	-13,774.7	2,393.6	13,981.0	0.00	0.00	0.00	
22,200.0	90.00	160.95	7,903.5	-13,869.2	2,426.3	14,079.7	0.00	0.00	0.00	
22,300.0	90.00	160.95	7,903.5	-13,963.7	2,458.9	14,178.5	0.00	0.00	0.00	
22,400.0	90.00	160.95	7,903.5	-14,058.2	2,491.6	14,277.3	0.00	0.00	0.00	
<b>TD at 22482.4</b>										
22,482.4	90.00	160.95	7,903.5	-14,136.1	2,518.5	14,358.7	0.00	0.00	0.00	

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
PBHL Johnson TFP40 - hit/miss target - Shape - Point	0.00	360.00	7,903.5	-14,136.1	2,518.5	262,835.63	1,781,570.13	39° 13' 11.064 N	80° 9' 35.276 W	
LP Johnson TFP40 #2 - plan misses target center by 0.1usft at 8905.2usft MD (7903.5 TVD, -1302.8 N, -1914.0 E) - Point	0.00	0.00	7,903.5	-1,302.8	-1,914.1	275,668.89	1,777,137.61	39° 15' 17.579 N	80° 10' 32.824 W	

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<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Johnson TFP40 #201
<b>Company:</b>	Arsenal Resources	<b>TVD Reference:</b>	Well @ 1359.5usft
<b>Project:</b>	Taylor County, West Virginia	<b>MD Reference:</b>	Well @ 1359.5usft
<b>Site:</b>	Johnson TFP40 Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	Johnson TFP40 #201	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #3		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,500.0	2,500.0	0.0	0.0	Start Build 2.00
4,476.3	4,323.3	-205.5	-622.0	Start 1452.5 hold at 4476.3 MD
5,928.9	5,443.6	-495.5	-1,499.8	Start Drop -2.00
7,905.2	7,266.9	-701.1	-2,121.8	Start DLS 9.00 TFO 160.95
8,905.2	7,903.5	-1,302.8	-1,914.0	Start 13577.2 hold at 8905.2 MD
22,482.4	7,903.5	-14,136.1	2,518.5	TD at 22482.4

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Environmental Protection



## **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 Taylor County, WV prior to hydraulic fracturing at Johnson TFP40 and Well Number 201.

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 7,910' TVD) and existing conventional natural gas wells in the partially-depleted, relatively high permeability Benson formations (approximately 4,900' 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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Area of Review Report - **Johnson TFP40** Pad, **201** Lateral, **Taylor** County, WV

Well Name	API Number	Operator Name / Address	Well Type	Latitude	Longitude	Total Depth	Perforated Formation(s)	Producing Zones not Perforated
Goodwin 2	091-00116	Alliance Petroleum Corporation	Existing	39.25858	-80.169849	4560	Benson	NA
Goodwin 4	091-00118	Alliance Petroleum Corporation	Existing	39.256779	-80.173388	2480	Big Injun(Grnbr), Fifth	NA
Goff-Arnold 1	091-00181	Greylock Conventional, LLC	Existing	39.249118	-80.171944	4600	Benson	NA
Compton 3	001-02134	Alliance Petroleum Corporation	Existing	39.239652	-80.168152	4829	Keener, Big Injun(Grnbr), Fourth, Benson	NA
Mosessp 2/438-CH	001-00969	Alliance Petroleum Corporation	Existing	39.230265	-80.164906	4722	Big Injun(Grnbr), Riley, Benson	NA
Coalquest 13	001-02876	ARP MOUNTAINEER PRODUCTION, LLC	Existing	39.226745	-80.161163	1186	Lo Kittanning Coal	NA
Coalquest 11A	001-02879	ARP MOUNTAINEER PRODUCTION, LLC	Existing	39.225875	-80.160416	1014	Lo Kittanning Coal	NA
Coalquest 12	001-02875	ARP MOUNTAINEER PRODUCTION, LLC	Existing	39.22486	-80.160975	960	Lo Kittanning Coal	NA

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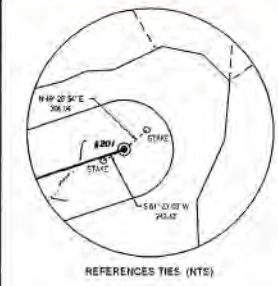


SURFACE HOLE SURVEYED 39° 17' 30" (NAD27)  
 BOTTOM HOLE SURVEYED 39° 15' 00" (NAD27)

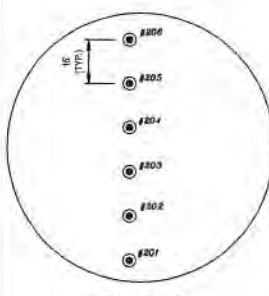
9,636'

822'

Latitude: (NAD27)



REFERENCES TIES (NTS)



REFERENCES TO PROPOSED HORIZONTAL WELL SURFACE LOCATIONS NTS

REFERENCE NOTES

1. Property lines as shown taken from deeds, tax maps, and field locations. A full boundary survey is not expressed or implied. All bearings are based on grid North. Ownership taken from public records Taylor County, West Virginia Date 2018
2. State Plane Coordinates & NAD83 Lat/Long by differential submeter mapping grade GPS.
3. There are no railroads, dwellings, or agricultural buildings within 825 feet of center of pad.
4. No water wells found within 250' of the center of well pad.

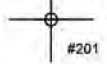
LEGEND

- PROPOSED WELL LATERAL
- - - - PROPOSED WELL TIE LINE
- STREAM
- EXISTING ROAD
- BUFFER
- PROPERTY LINE
- - - - MINERAL TRACT BOUNDARY
- - - - COUNTY BOUNDARY LINE
- ⊙ #H PROPOSED WELL HEAD
- ⊙ EXISTING WELL HEAD (Active)
- ⊙ EXISTING WELL HEAD (Tagged)
- ⊙ EXISTING WELL HEAD (Abandoned)
- ⊙ EXISTING WELL HEAD (Water Drilled)
- ⊙ EXISTING WELL HEAD (Future Drill)
- ⊙ LANDING POINT/BOTTOM HOLE
- ⊙ SURFACE OWNER

BOTTOM HOLE (NAD27)  
 LAT. 39.25948502°  
 LONG. -80.15982297°

SURFACE HOLE NAD27  
 LAT. 39.25948792°  
 LONG. -80.15982297°

Longitude: (NAD27)



FILE#: 17078-007  
 SHEET#: 1 of 2  
 SCALE: 1" = 3000'  
 TICK SCALE: 1" = 2000'  
 MINIMUM DEGREE OF ACCURACY: 1/200  
 PROVEN SOURCE OF ELEVATION: WW-RTN CORS STATION

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: *Herbert L. Parsons, III* 6-5-2019  
 P.S. #2361: Herbert L. Parsons, III P.S.



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS  
 WWDEP  
 OFFICE OF OIL & GAS  
 601 57TH STREET  
 CHARLESTON, WV 25304



DATE: JUNE 5, 2019  
 JOHNSON TFP-40  
 OPERATOR'S WELL #: # 201  
 API WELL #: 47 091 01352  
 STATE COUNTY PERMIT

Well Type:  Oil  Waste Disposal  Production  Deep  
 Gas  Liquid Injection  Storage  Shallow  
 WATERSHED: SIMPSON CREEK  
 COUNTY / DISTRICT: TAYLOR CO. FLEMINGTON DISTRICT  
 SURFACE OWNER: RENEE JOHNSON  
 OIL & GAS ROYALTY OWNER: HEIRS & ASSIGNS OF EARL LAWSON, HEIRS & ASSIGNS OF DULCIE STARKEY, HEIRS & ASSIGNS OF MARTHA ROBERTS, HEIRS & ASSIGNS OF VIRGIE BARTLETT, HEIRS & ASSIGNS OF BLANCHE WATSON, HEIRS & ASSIGNS OF DEZZIE BUTTS, AND HEIRS & ASSIGNS OF HASSEL LAWSON  
 DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  
 PLUG OFF FORMATION  PERFORATE NEW FORMATION  PLUG & ABANDON  
 CLEAN OUT & REPLUG  OTHER CHANGE SPECIFY: \_\_\_\_\_

ELEVATION: 1,332.5  
 QUADRANGLE: ROSEMOND, WV  
 ACREAGE: 284 ±  
 ACREAGE: 284 ±

TARGET FORMATION: MARCELLUS  
 WELL OPERATOR: ARSENAL RESOURCES  
 ADDRESS: 6031 WALLACE ROAD EXTENSION # 300  
 CITY: WEXFORD STATE: PA ZIP: 15090

ESTIMATED DEPTH: TVD: 7,903.5' TMD: 22,482.4'  
 DESIGNATED AGENT: WILLIAM VEIGEL  
 ADDRESS: 65 PROFESSIONAL PLACE SUITE 200  
 CITY: BRIDGEPORT STATE: WV ZIP: 26330

BOTTOM HOLE SURVEYED 80° 07' 30" (NAD27)  
 SURFACE HOLE SURVEYED 80° 10' 00" (NAD27)

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AOR - Attachment "A"



SURFACE PARCEL OWNER INFORMATION			ADJOINER PARCEL OWNER INFORMATION		
ID#	PARCEL NUMBER	OWNER NAME	ID#	PARCEL NUMBER	OWNER NAME
1	033-15-331-27	JOHNSON RENEE	2	001-09-9-2	STEWART FARM LLC
57	033-15-351-10	RENEE JOHNSON	5	091-04-11-1	CFS FARMS LIMITED LIABILITY CO
4	033-15-351-12	EIP III WEST VIRGINIA LLC	6	091-04-8-22	GRIPPIN JAMES S & ELAINE M
87	033-15-351-11	EIP III WEST VIRGINIA LLC	29	091-04-6-21	CARLYLE G MILLARD
3	033-15-351-13	EIP III WEST VIRGINIA LLC	33	001-09-9-7	CROUSE ORLAN, JR
86	033-15-351-24	EIP III WEST VIRGINIA LLC	35	091-09-9-20.1	SMALLWOOD RUSSELL & ANGELA WRS
39	001-09-9-1	STEWART FARM LLC	37	001-09-9-2.1	BOARD OF EDUCATION
81	001-09-9-19	STEWART FARM LLC	38	001-09-9-3	STEWART FARM LLC
40	001-09-9-20	SEESE ROBERT & BRENDA HWS	41	001-09-12-1	POLINO ENTERPRISES INC
80	001-09-10-2	SMITH JO ANN V	43	001-09-9-22	WOLFE LARRY, ROBERT WOLFE & STANLEY WOLFE ET UXES,
42	001-09-11-1	POUND ENTERPRISES INC	53	091-04-7-9	CEQUEL COMMUNICATIONS LLC
73	001-09-12-42	FOSTER ROGER & ETHEL	54	091-04-7-27	CEQUEL COMMUNICATIONS LLC
			55	091-04-7-8	SHIRLEY A FRUM, CLINTON A FRUM, ET UX
			56	033-15-351-9	RENEE JOHNSON
			65	001-09-12-27	WOLFE LARRY MICHAEL
			71	001-09-12.61	CHARLTON RANDALL L & CAROLYN,
			72	001-09-12.60	SCHIMANSKY STEVEN & DEBRA HWS
			74	001-09-12C-2	FOSTER ROGER & ETHEL
			75	001-09-12-43	SMITH STEVEN & CYNTHIA
			76	001-09-12.41	TRADER PAUL & LORETTA
			77	001-09-11-1.2	BECKWITH LUMBER CO INC
			78	033-15-371-3	EIP III WEST VIRGINIA LLC
			79	033-15-371-6	EIP III WEST VIRGINIA LLC
			82	001-09-10.1	SMITH JO ANN V
			83	033-15-351-31	EIP III WEST VIRGINIA LLC
			85	033-15-351-23	EIP III WEST VIRGINIA LLC
			88	033-15-351-9	JOHNSON RENEE
			89	033-15-351-7	WARDER ORAN LEE & JANICE L
			93	001-09-12C-1	LEHMAN DIANA LYNN, COSTELLO ELIZABETH, ARBAUGH RITA

**REFERENCE NOTES**

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- State Plane Coordinates & NAD83 Lat/Long by differential submeter mapping grade GPS.
- There are no railroads, dwellings, or agricultural buildings within 525 feet of center of pad.
- No water wells found within 250' of the center of well pad.

**LEGEND**

-----	PROPOSED WELL LATERAL
-----	PROPOSED WELL TIE LINE
-----	STREAM
-----	EXISTING ROAD
-----	BUFFER
-----	PROPERTY LINE
-----	MINERAL TRACT BOUNDARY
-----	COUNTY BOUNDARY LINE
⊙ #H	PROPOSED WELL HEAD
X	EXISTING WELL HEAD (Active)
+	EXISTING WELL HEAD (Plugged)
+	EXISTING WELL HEAD (Abandoned)
⊙	EXISTING WELL HEAD (Never Drilled)
⊙	EXISTING WELL HEAD (Future Drill)
⊙	LANDING POINT@BOTTOM HOLE
⊙	SURFACE OWNER

FILE#: 17078-007  
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 TICK SCALE: 1" = 2000'  
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 QUADRANGLE: ROSEMONT, WV  
 ACREAGE: 284 ±  
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DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  
 PLUG OFF FORMATION  PERFORATE NEW FORMATION  PLUG & ABANDON  
 CLEAN OUT & REPLUG  OTHER CHANGE SPECIFY: \_\_\_\_\_

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 7,903.5' TMD: 22,482.4'

WELL OPERATOR: ARSENAL RESOURCES DESIGNATED AGENT: WILLIAM VEIGEL  
 ADDRESS: 6031 WALLACE ROAD EXTENSION # 300 ADDRESS: 65 PROFESSIONAL PLACE SUITE 200  
 CITY: WEXFORD STATE: PA ZIP: 15090 CITY: BRIDGEPORT STATE: WV ZIP: 26330

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 WV Department of Environmental Protection

AOR - Attachment "A"





Click or tap to enter a date.

Alliance Petroleum Corporation  
4150 Belden Village Ave. NW Ste 410  
Canton, OH 44718-2553

RE: Johnson TFP40 Well Pad

Dear Sir/Madam,

Arsenal Resources has developed a Marcellus pad, Johnson TFP40 201, 202, 203, 204, 205, and 206 well located in Taylor 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 7,910 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 Johnson TFP40 201, 202, 203, 204, 205, and 206 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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