



west virginia department of environmental protection

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

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

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 40 202
47-091-01353-00-00

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".

James A. Martin
Chief

Operator's Well Number: JOHNSON TFP 40 202
Farm Name: RENEE JOHNSON
U.S. WELL NUMBER: 47-091-01353-00-00
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 57th Street SE
Charleston, WV 25304

RE: Johnson TFP40 202 – Modification due to additional leasing to extend lateral

Dear Ms. Adkins:

Enclosed please find the modification for the Johnson TFP 40 202, (API# 47-091-01353). This permit is being modified due to acquiring additional leases to extend the lateral. This well was originally permitted to 12,295.5'. We have obtained additional leasing for this site and are requesting to extend the lateral further. We would like to extend the lateral 1,346.7' for a total of 13,642.2'. 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 20,790.2' to 22,136.9'
- Horizontal length was extended from 12,295.5' to 13,642.2'
- 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 20,790' to 22,136'
- 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

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

Sincerely,

Kelly Davis

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

WW-6B
(04/15)

API NO. 47-091 - 01353
OPERATOR WELL NO. Johnson TFP 40 202
Well Pad Name: Johnson TFP 40

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 40 202 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: 22,136.9 ft

11) Proposed Horizontal Leg Length: 13,642.2 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: Fik Lick-322.5', Haran-398.5', 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-945.5', Clarion-878.5'

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

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	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	22,136	22,136	TOC @ 2,450
Tubing							
Liners							

Kenneth J. Grayson
5-9-19

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	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.

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

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

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.

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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 muds, 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.

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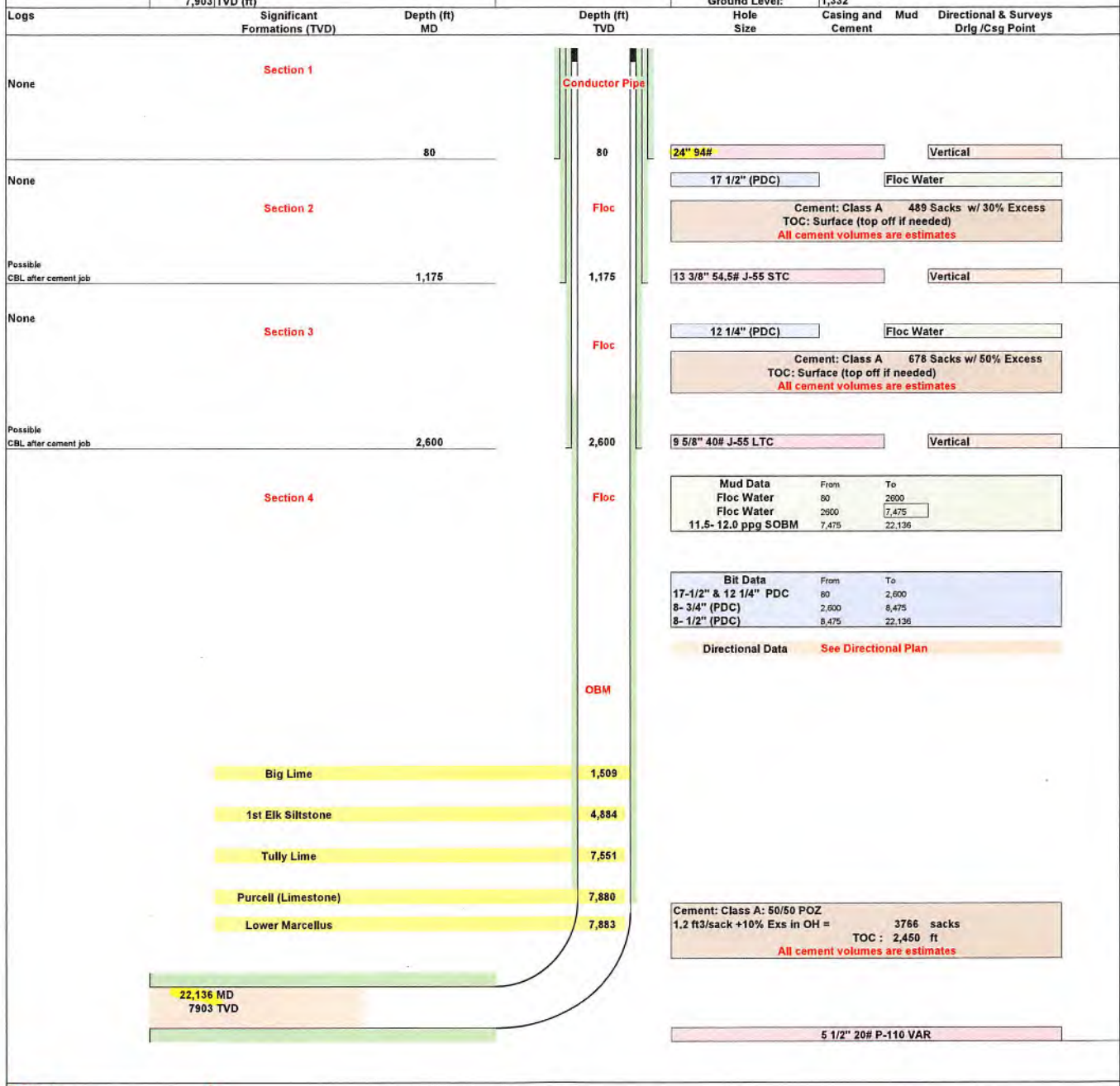
*Note: Attach additional sheets as needed.



Arsenal Resources
Johnson TFP 40 202
Casing Design
Directional Plan # 1 QES

Other Names:	N/A
Surface Location:	TBD
Bottom Hole Location:	TBD
Total Depth:	22,136 MD (ft) 7,903 TVD (ft)

County:	Taylor		
State:	West Virginia		
AFE #:	XX	API #:	XX
RKB:	27		
Ground Level:	1,332		



Revision 1

Note: Not drawn to scale

Date Last Revised: 6-May-19
Ross Schweitzer

Cement Outside Casing Seal Assembly in Annulus

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TECHNICAL DATA SHEETConnection: **VAroughneckAC**Size: **5 1/2 in X 20.00 lb/ft**Drift: **standard**Bevel: **standard**Grade: **VA-XP-P110**

Material:

	<u>US Customary</u>	<u>Metric</u>
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:

	<u>US Customary</u>	<u>Metric</u>		<u>US Customary</u>	<u>Metric</u>
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 ²	3,760.13 mm ²			

Connection:

	<u>US Customary</u>	<u>Metric</u>		
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):

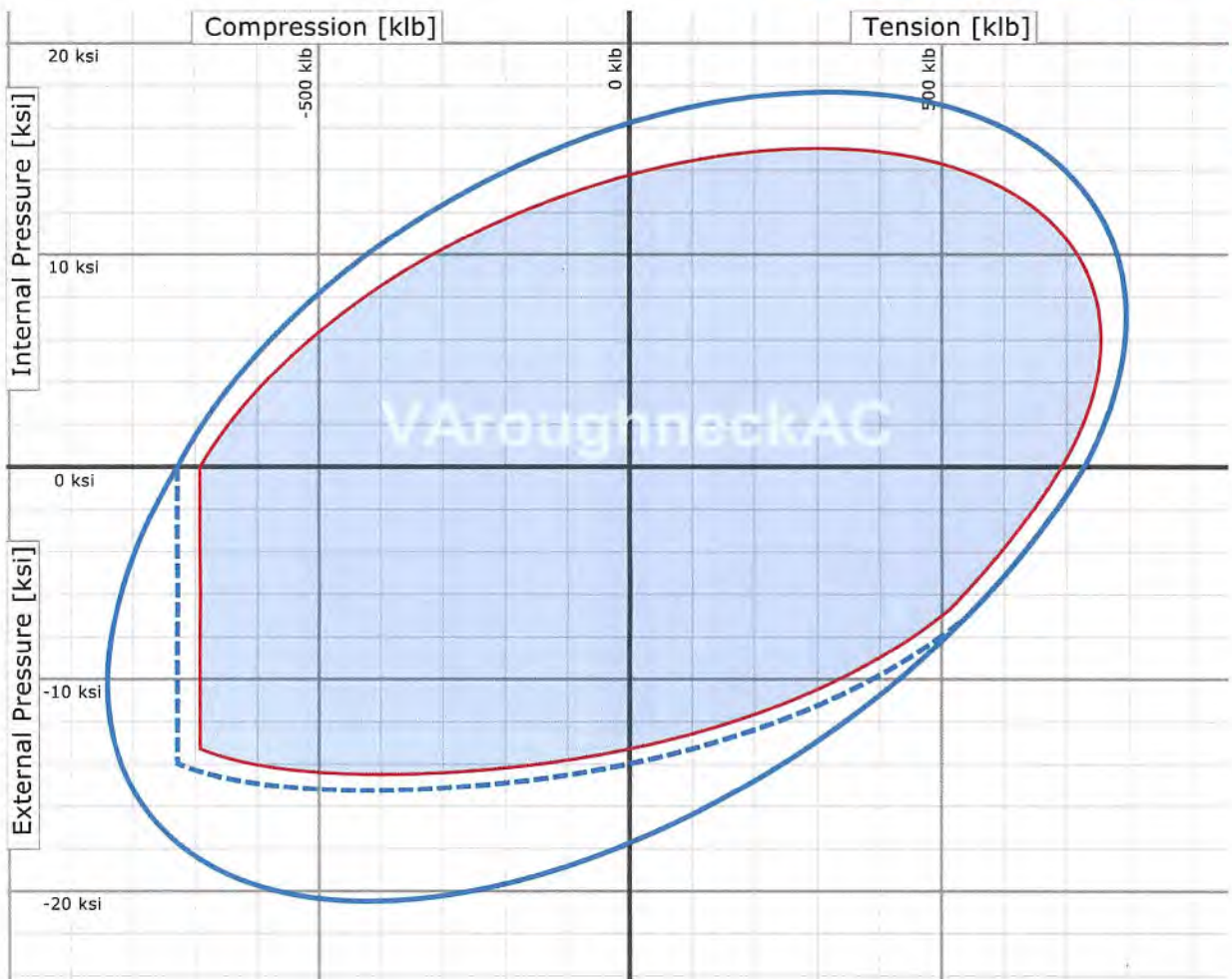
	<u>US Customary</u>	<u>Metric</u>		<u>US Customary</u>	<u>Metric</u>
Joint Strength:	729 klb	3,241 kN	Tension Efficiency:	> 100.0 %	
Collapse Resistance:	13,970 psi	96.30 Mpa	Displacement:	1.240 gal/ft	15.40 l/m
Internal Yield Pressure:	15,920 psi	107.50 Mpa	Production:	0.932 gal/ft	11.57 l/m
Load on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

Field Make Up (Friction Factor = 1.0):

	<u>US Customary</u>	<u>Metric</u>		<u>US Customary</u>	<u>Metric</u>
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 SHEETConnection: **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 ²	4,276.80 mm ²			

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):

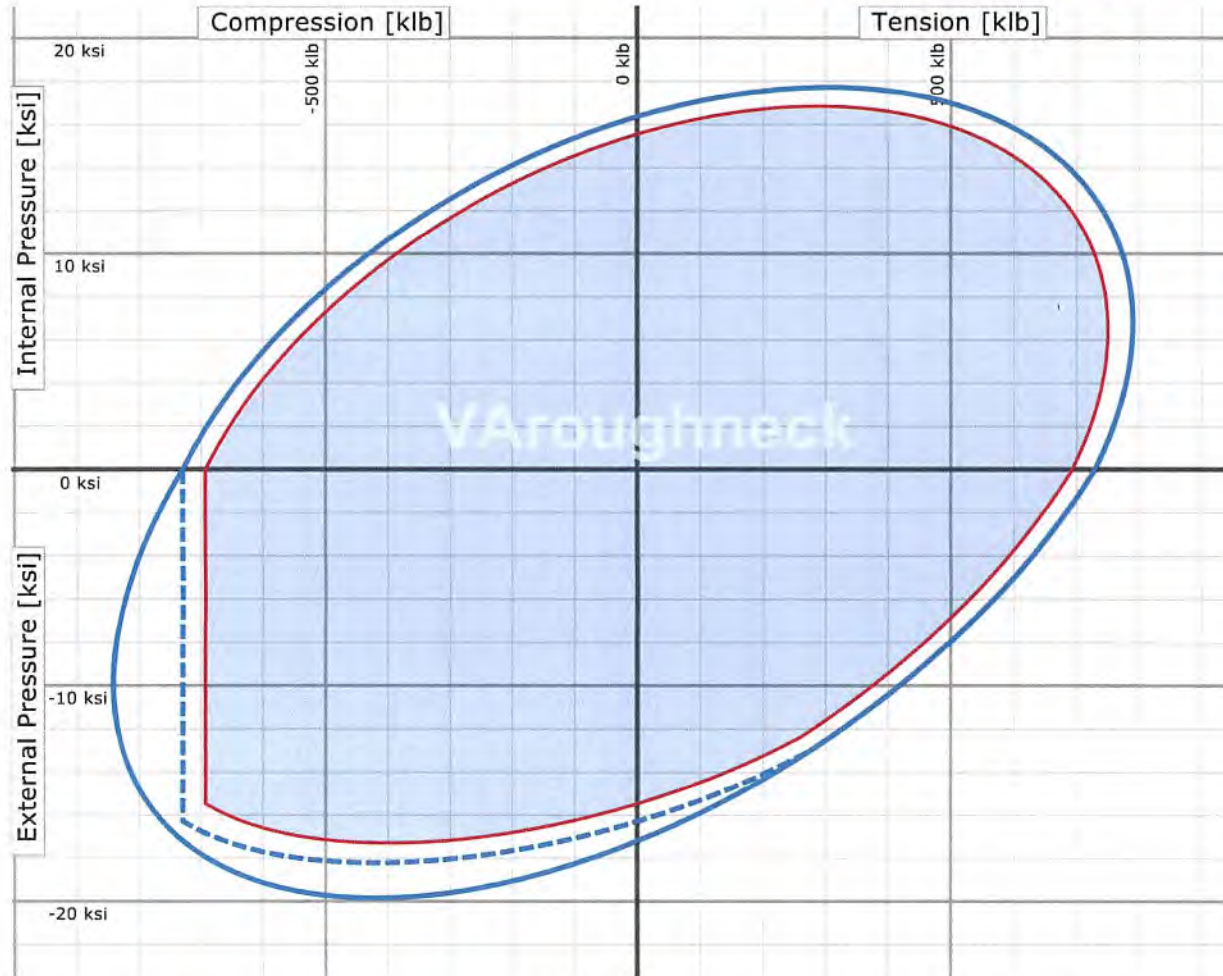
	US Customary	Metric		US Customary	Metric
Joint Strength:	729 klb	3,242 kN	Tension Efficiency:	> 100.0 %	
Collapse Resistance:	16,350 psi	112.73 Mpa	Displacement:	1.242 gal/ft	15.43 l/m
Internal Yield Pressure:	14,518 psi	100.10 Mpa	Production:	0.890 gal/ft	11.05 l/m
Load on Coupling Face:	582 klb	2,590 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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WW-6A1
(5/13)

Operator's Well No. Johnson TFP40 202

**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
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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

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

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

9,107'

822'

Latitude: (NAD27)



(NAD83-WVN) US SURVEY FT.

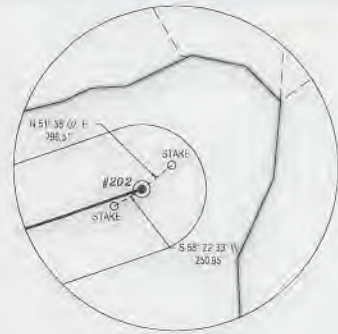
TOP HOLE
 N) 276986.722
 E) 1779051.662
 LANDING POINT
 N) 275932.474
 E) 1777946.764
 BOTTOM HOLE
 N) 263037.230
 E) 1782398.951

(NAD83-LAT/LONG) DECIMAL

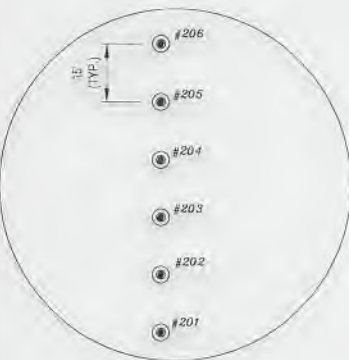
TOP HOLE
 N) 39.258540414
 E) -80.169059980
 LANDING POINT
 N) 39.255623344
 E) -80.172934028
 BOTTOM HOLE
 N) 39.220310166
 E) -80.156878836

(UTM, NAD83) METER

TOP HOLE
 N) 4345796.714
 E) 571690.472
 LANDING POINT
 N) 4345469.921
 E) 571359.186
 BOTTOM HOLE
 N) 4341563.711
 E) 572780.928



REFERENCES TIES (NTS)



REFERENCES TO PROPOSED HORIZONTAL WELL SURFACE LOCATIONS NTS

REFERENCE NOTES

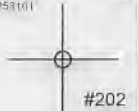
- Property lines as shown taken from deeds, tax maps, and field locations. A full boundary survey is not expressed or implied. All bearings are based on grid North. Ownership taken from public records Taylor County, West Virginia Date 2018
- State Plane Coordinates & NAD83 Lat/Long by differential submeter 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
- #H 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

BOTTOM HOLE NALET
 LAT 39.220310166
 LONG -80.156878836

SURFACE HOLE NAD27
 LAT 39.258540414
 LONG -80.169059980



Longitude: (NAD27)

10,749'
12,093'

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, III* 6-3-2019
 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 3, 2019
 JOHNSON TFP-40
 OPERATOR'S WELL #: # 202
 API WELL #: 47 091 01353
 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

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

- 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: 22,136.9'

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" (NAD83)
 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
3	033-15-351-13	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
42	001-09-12-2	POLINO ENTERPRISES INC
71	001-09-12.61	CHARLTON RANDALL L & CAROLYN,

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	091-04-11-4	SEESE BRENDA K & SMITH JOANN V & SURV
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
70		BROWNTON PLAN OF LOTS
72	001-09-12.60	SCHIMANSKY STEVEN & DEBRA HWS
73	001-09-12.42	FOSTER ROGER & ETHEL
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
80	001-09-10.2	SMITH JO ANN V
82	001-09-10.1	SMITH JO ANN V
84	033-15-351-22	EIP III WEST VIRGINIA LLC
85	033-15-351-23	EIP III WEST VIRGINIA LLC
86	033-15-351-24	EIP III WEST VIRGINIA LLC
87	033-15-351-11	EIP III WEST VIRGINIA LLC
88	033-15-351-9	JOHNSON RENEE
89	033-15-351-7	WARDER ORAN LEE & JANICE L

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 (Figure 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* 6-3-2019
 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 3, 2019
 JOHNSON TFP-40
 OPERATOR'S WELL #: # 202
 API WELL #: 47 091 01353
 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

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

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: 22,136.9'
 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

Attachment to WW-6A1, Johnson TFP 40 202

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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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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	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	
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 (00003422)	John E. Lough and Elda D. Lough, husband and wife	Petroleum Development Corporation	12.50%	111/114	75

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	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	
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)	
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	

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	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)	
42, 71 (00008808)	James L. Lee	Mar Key, LLC	12.50%	182/335	57.67

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

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Authorized Shares

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

Officers	
Type	Name/Address
Member	ARSENAL RESOURCES ENERGY LLC 6031 WALLACE ROAD EXTENSION SUITE 300 WEXFORD, PA, 15090
Organizer	PAUL M HERZING 580 EPSILON DR. PITTSBURGH, PA, 15238 USA
Type	Name/Address

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Annual Reports	
Date filed	

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

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

Tuesday, November 28, 2017 — 9:44 AM

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

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

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

DBA			
DBA Name	Description	Effective Date	Termination Date
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
DBA Name	Description	Effective Date	Termination Date

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Name Changes

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
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1999
1998
Date filed

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

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 #202

911 Address:

4006 Green Valley Rd

Bridgeport, WV 26330

Samuel L. Reynolds

5-9-19

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**JOHNSON TFP40 Well Pad #202 Site Safety 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:

Arsenal Resources – Emergency Contact Information		
Name	Position	24-Hour Phone #
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
West Virginia DEP Office of Oil & Gas – Emergency Contact Information		
Name	Position	24-Hour Phone #
Ken Greynolds	Local WVDEP Inspector, Taylor County	304-202-6613
	Office of Oil & Gas	304-926-0499
	WVDEP Emergency Spill Hotline	1-800-642-3074
Emergency Response Units		
National Response Center for Reporting Chemical or Oil Spills		800-424-8802
WVDEP Emergency Spill Center		800-642-3074
Ambulance, Fire, and Law Enforcement		911
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	304-842-1141
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 (SO₂). Under certain conditions this gas may be equally as dangerous as H₂S. A pump type detector device, which determines the percent of SO₂ in air through concentrations in ppm, will be available. Although normal air movement is sufficient to dissipate this material to safe levels, the SO₂ 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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Meeting Date: _____

Pre-Spud Meeting

JOHNSON TFP40 Well Pad #202

NAME

TITLE

NAME	TITLE
	Arsenal Resources DRILLING REPRESENTATIVE
	Arsenal Resources SITE SUPERVISOR/REPRESENTATIVE
	STATE INSPECTOR
	DRILLING CONTRACTOR REPRESENTATIVE

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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.

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Section 2 – Maps and Diagrams

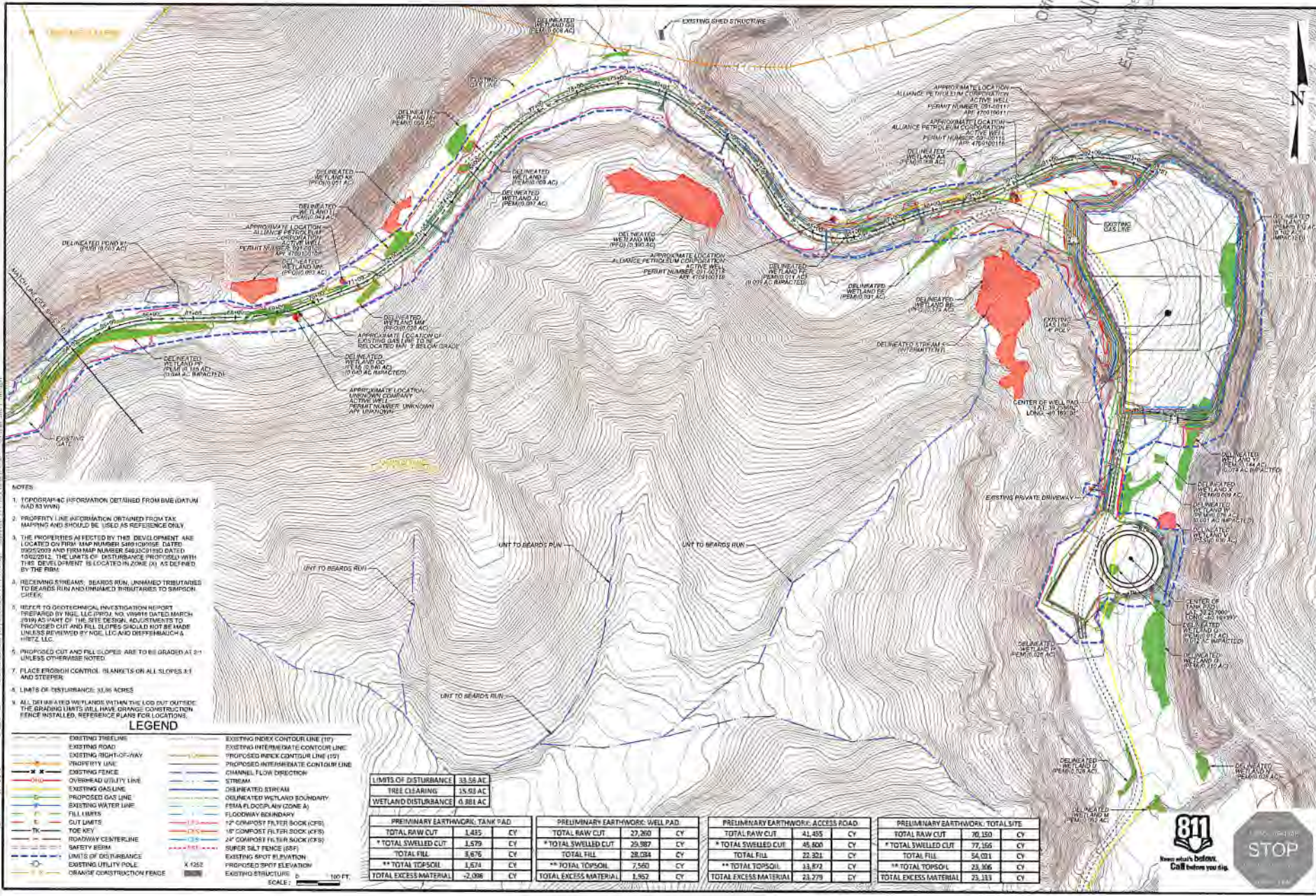
A. Plan View Map

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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NO-TOUCH ZONING FOR OIL AND GAS

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- NOTES:**
1. TOPOGRAPHIC INFORMATION OBTAINED FROM BME DATUM (NAD 83 VVW)
 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 TAX MAP NUMBERS 58003000E, DATED 09/25/2009 AND FIRM MAP NUMBER 5402001180 DATED 10/22/2012. THE LIMITS OF DISTURBANCE PROPOSED WITH THIS DEVELOPMENT IS LOCATED IN ZONE (X) AS DEFINED BY THE BLM.
 4. RECEIVING STREAMS, BEARDS RUN, (NAMED TRIBUTARIES TO BEARDS RUN AND UNNAMED TRIBUTARIES TO SIMPSON CREEK).
 5. REFER TO GEOTECHNICAL INVESTIGATION REPORT PREPARED BY HGL LLC (PRJ) NO. 108911 DATED MARCH 2019 AS PART OF THE SITE DESIGN. ADJUSTMENTS TO PROPOSED CUT AND FILL SLOPES SHOULD NOT BE MADE UNLESS REVIEWED BY HGL LLC AND DIEFFENBAUGH & HIRTZ, LLC.
 6. PROPOSED CUT AND FILL SLOPES ARE TO BE GRADED AT 2:1 UNLESS OTHERWISE NOTED.
 7. PLACE EROSION CONTROL BARRIERS ON ALL SLOPES 1:1 AND STEEPER.
 8. LIMITS OF DISTURBANCE: 32.86 ACRES
 9. ALL DELIMITED WETLANDS WITHIN THE LOD OUT OUTLINE THE GRADING LIMITS WILL HAVE ORANGE CONSTRUCTION FENCE INSTALLED. REFERENCE PLANS FOR LOCATIONS.

LEGEND

- | | | | |
|---|---------------------------|---|------------------------------------|
| — | EXISTING THREELINE | — | 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 | — | DELIMITED STREAM |
| — | PROPOSED GAS LINE | — | DELIMITED WETLAND BOUNDARY |
| — | EXISTING WATER LINE | — | FEMA FLOODPLAIN (ZONE A) |
| — | FILL LIMITS | — | FLOODWAY BOUNDARY |
| — | CUT LIMITS | — | 18" COMPOST FILTER SOCK (CFS) |
| — | TOE KEY | — | 24" COMPOST FILTER SOCK (CFS) |
| — | ROADWAY CENTERLINE | — | SUPER SALT FENCE (SSF) |
| — | SAFETY BERM | — | EXISTING SPOT ELEVATION |
| — | LIMITS OF DISTURBANCE | — | PROPOSED SPOT ELEVATION |
| — | EXISTING UTILITY POLE | — | EXISTING STRUCTURE |
| — | ORANGE CONSTRUCTION FENCE | — | |

LIMITS OF DISTURBANCE	32.86 AC
TREE CLEARING	15.92 AC
WETLAND DISTURBANCE	0.88 AC

PRELIMINARY EARTHWORK: TANK PAD	
TOTAL RAW CUT	1,485 CY
* TOTAL SWELLED CUT	1,579 CY
TOTAL FILL	3,676 CY
** TOTAL TOPSOIL	1,674 CY
TOTAL EXCESS MATERIAL	-2,008 CY

PRELIMINARY EARTHWORK: WELL PAD	
TOTAL RAW CUT	27,360 CY
* TOTAL SWELLED CUT	29,987 CY
TOTAL FILL	28,034 CY
** TOTAL TOPSOIL	7,560 CY
TOTAL EXCESS MATERIAL	1,952 CY

PRELIMINARY EARTHWORK: ACCESS ROAD	
TOTAL RAW CUT	41,455 CY
* TOTAL SWELLED CUT	45,800 CY
TOTAL FILL	22,321 CY
** TOTAL TOPSOIL	13,872 CY
TOTAL EXCESS MATERIAL	23,279 CY

PRELIMINARY EARTHWORK: TOTAL SITE	
TOTAL RAW CUT	70,150 CY
* TOTAL SWELLED CUT	77,156 CY
TOTAL FILL	54,031 CY
** TOTAL TOPSOIL	23,306 CY
TOTAL EXCESS MATERIAL	23,133 CY

811
Know what's Below.
Call before you dig.

STOP
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CLIENT: JOHNSON TFPAD WELL SITE
PROJECT: OVERALL SITE PLAN
DATE: 05/14/2019
SCALE: 1" = 100 FT.

DIEFFENBAUGH & HIRTZ, LLC
1000 CHERRY ROAD, SUITE 200
WARRIOR, ALABAMA 36946
P: 334.686.2200
F: 334.686.2201
WWW.DHENGINEERING.COM

ARSENAL

DATE: 05/14/2019
SCALE: 1" = 100 FT.

11

B. Topographic Map

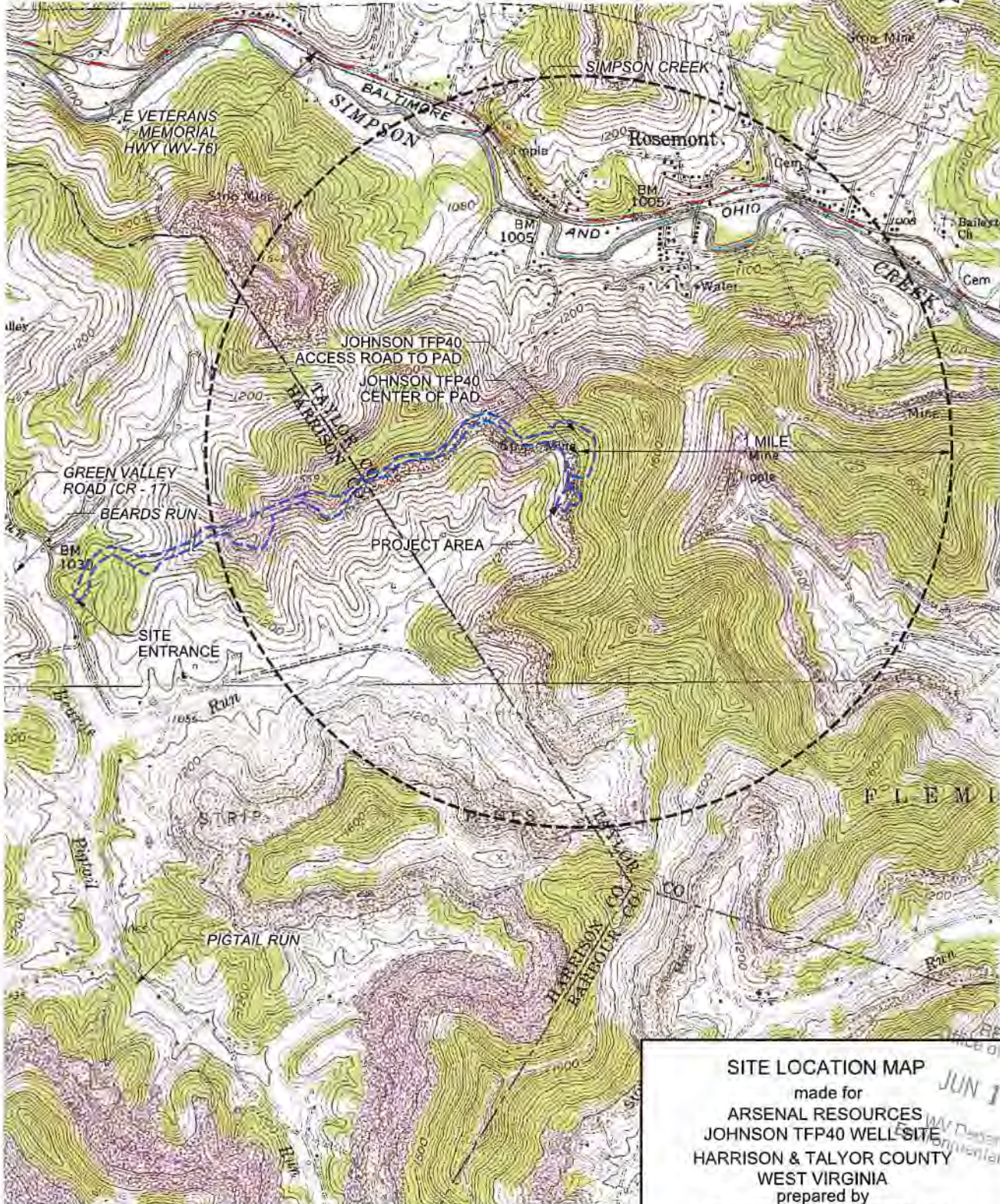
This section includes a Topographic map of the well location, including a 1 mile radius of well location, and UTM NAD 83 coordinates of well site entrance, UTM NAD 83 coordinates of the point the access road intersects the public route, and public route numbers and/or route names.

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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:\Munialain\Keystone\2017\117078-007 - Johnson TFP40\Common\Site Location Map_1 MILE_SSM.dgn
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REFERENCES: IMAGERY PROVIDED BY USGS:
 ROSEMONT & BROWNTOWN QUADRANGLES;
 WEST VIRGINIA 7.5 MINUTE SERIES



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SITE LOCATION MAP
 made for
 ARSENAL RESOURCES
 JOHNSON TFP40 WELL SITE
 HARRISON & 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

C. Evacuation Plan Procedures

In the event of an H₂S 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 (SO₂). Under certain conditions this gas may be equally as dangerous as H₂S. A pump type detector device, which determines the percent of SO₂ in air through concentrations in ppm, will be available. Although normal air movement is sufficient to dissipate this material to safe levels, the SO₂ 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 5th 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 #202 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:

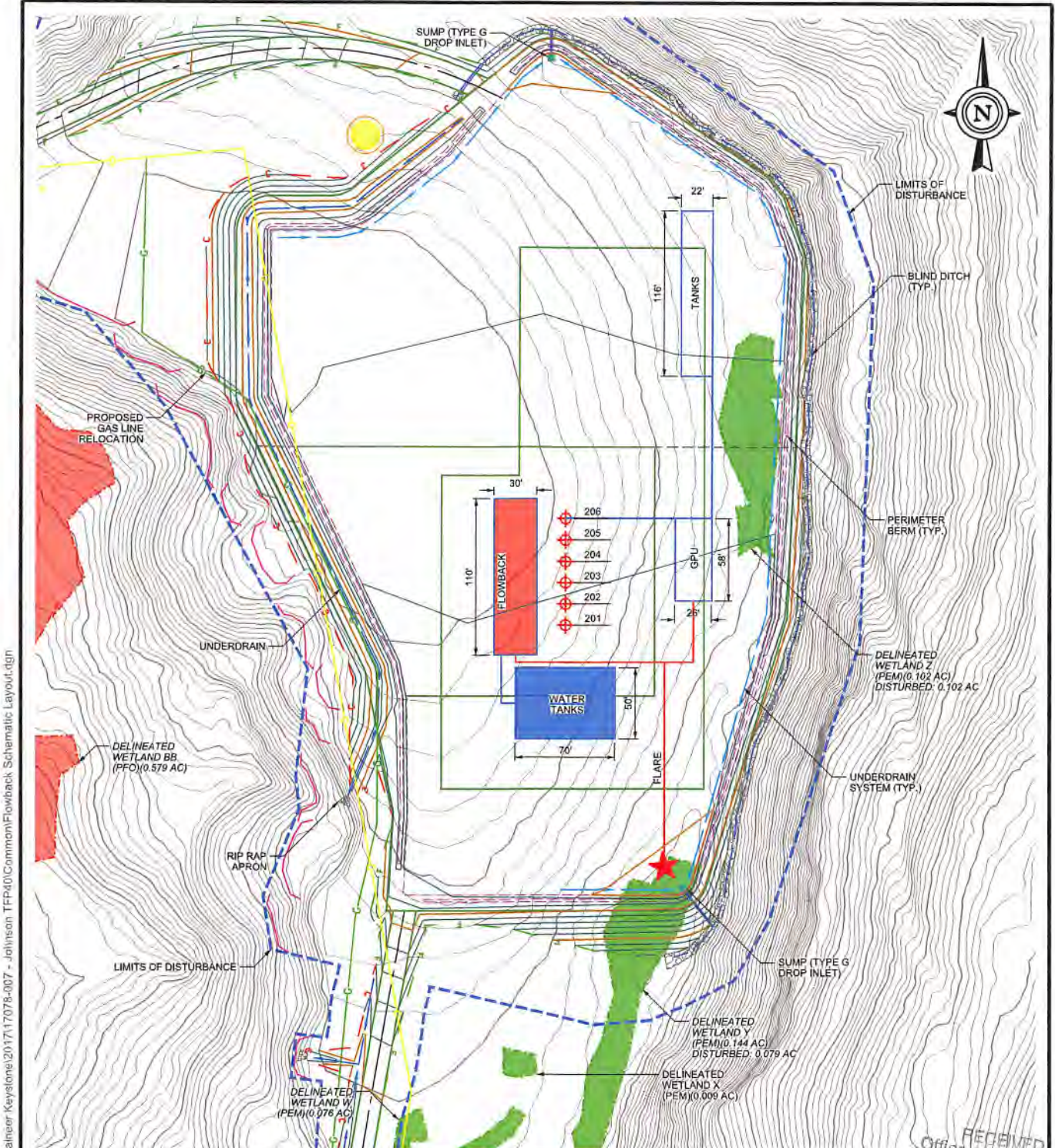
Geologic Information	
Approximate freshwater strata depths	45.5', 132.5', 187.5', 219.5', 817.5', 1102.5'
Approximate saltwater depths	1987.5'
Approximate coal seam depths	322.5', 398.5', 477.5', 577.5', 630.5', 692.5', 760.5', 825.5', 845.5', 876.5'
Approximate void depths (coal, karst, other)	None

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#	22,136'	22,136'	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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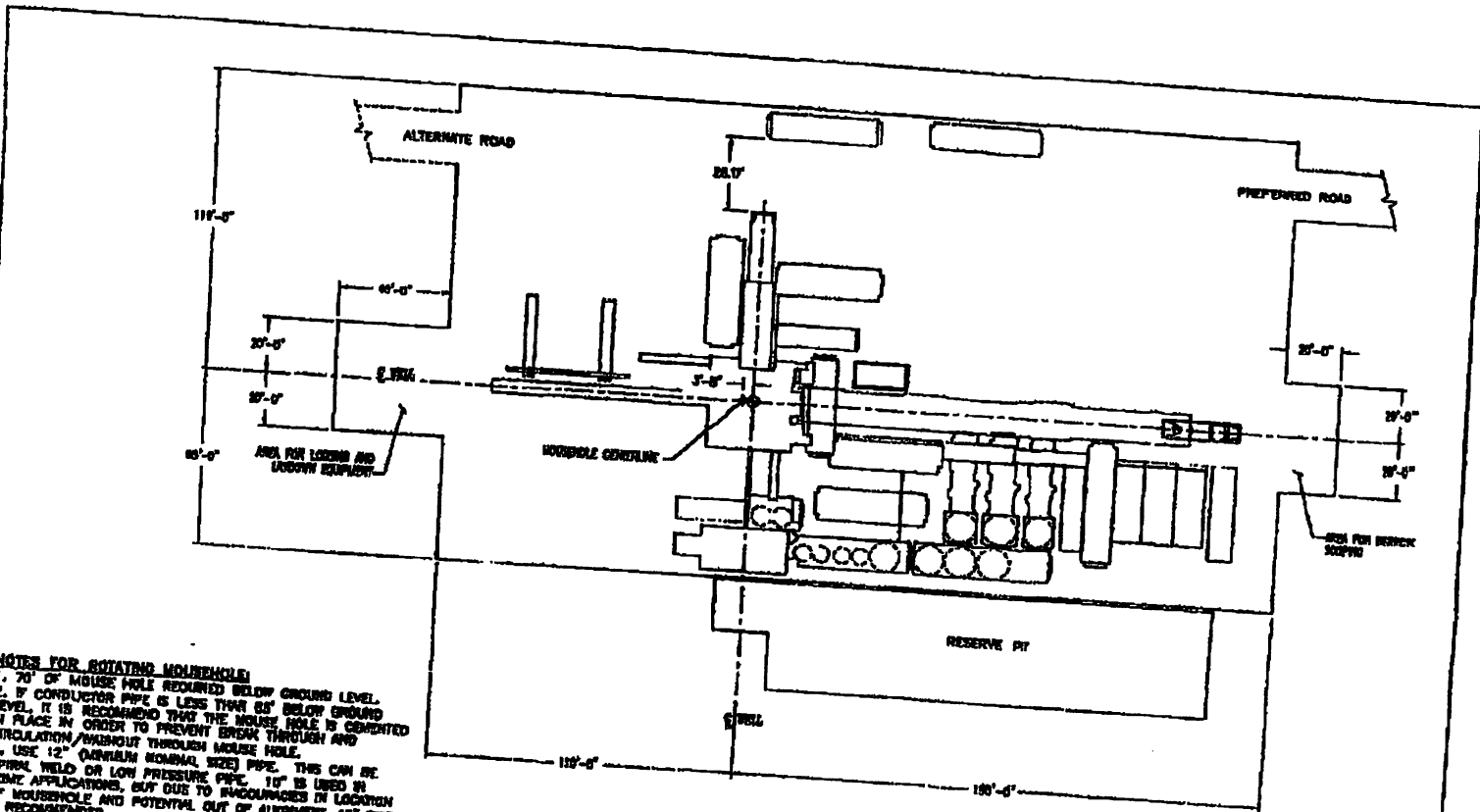
K:\Mountaineer Keystone\2017\17078-007 - Johnson TFP40\Common\Flowback Schematic Layout.dgn
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WELL NO.	STATE PLAN COORDINATE (WV/NAD83)	LAT/LONG COORDINATE	LAT/LONG COORDINATE (NAD 83) (DMS)	UTM COORDINATE (NAD83-ZONE 17-METER)	EXISTING ELEV (NAVD83) (FT)	PROPOSED ELEV. (NAVD83) (FT)
WELL 201	NORTHING	276971.7221	LAT: 39.258499°	LAT: 39°15'30.60"	NORTHING	4345792.144
	EASTING	1779051.6624	LONG: -80.169060°	LONG: -80°10'08.61"	EASTING	571690.548
WELL 202	NORTHING	276986.7221	LAT: 39.258540°	LAT: 39°15'30.75"	NORTHING	4345796.714
	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
	EASTING	1779051.6624	LONG: -80.169060°	LONG: -80°10'08.62"	EASTING	571690.897
WELL 204	NORTHING	277016.7221	LAT: 39.258623°	LAT: 39°15'31.04"	NORTHING	4345805.854
	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
	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
	EASTING	1779051.6624	LONG: -80.169062°	LONG: -80°10'08.62"	EASTING	571690.169



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



NOTES FOR ROTATING MOUNTING:

1. 20" OF MOUSE HOLE REQUIRED BELOW GROUND LEVEL.
2. IF CONDUCTOR PIPE IS LESS THAN 65' BELOW GROUND LEVEL, IT IS RECOMMENDED 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 IRREGULARITIES IN LOCATION OF MOUSEHOLE AND POTENTIAL OUT OF ALIGNMENT, 12" PIPE IS RECOMMENDED.
4. CEMENT MOUSE HOLE IN 1 1/2" OR 1 3/4" HOLE.

SEE SHEET 1 FOR RIG COMPONENT LAYOUT

PROPRIETARY
 HELMERICH & PAYNE
 INTERNATIONAL DRILLING CO.

FOR APPROVAL
 HELMERICH & PAYNE
 INTERNATIONAL DRILLING CO.

NO.	DESCRIPTION	DATE

HELMERICH & PAYNE INTERNATIONAL DRILLING CO.

SITE LAYOUT

FLANGES

DATE: 06-01-2019
 SHEET: 2 OF 2
 210-00-01

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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
R E S O U R C E S

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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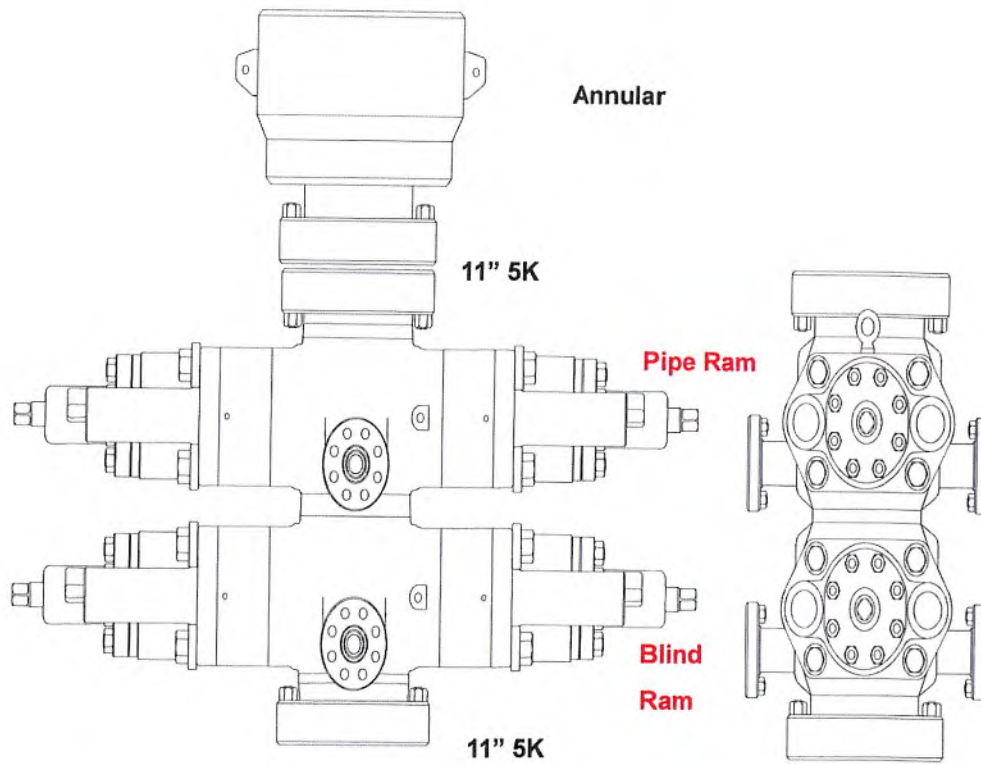
Section 5 -BOP and Well Control

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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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

MW 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

MW 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.

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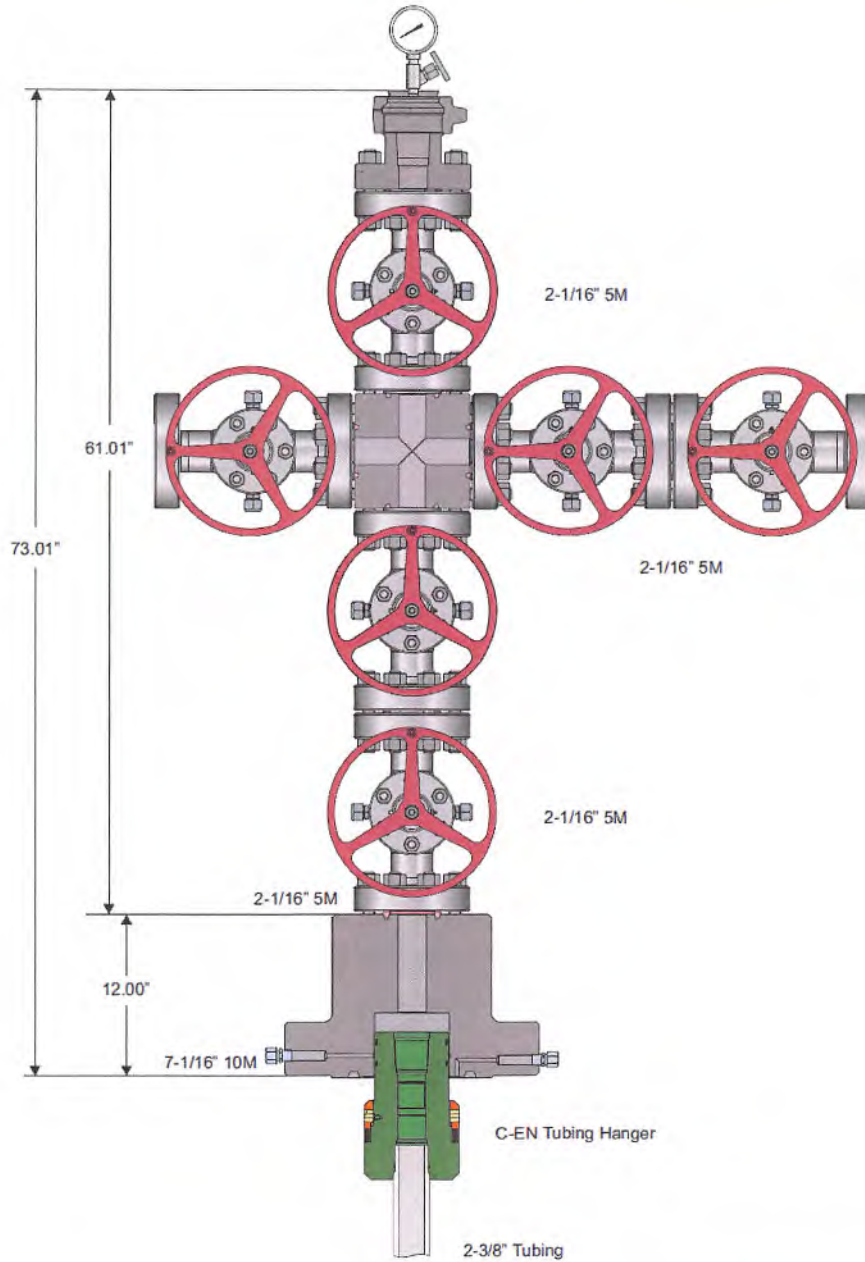
F. Inspector Notification

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

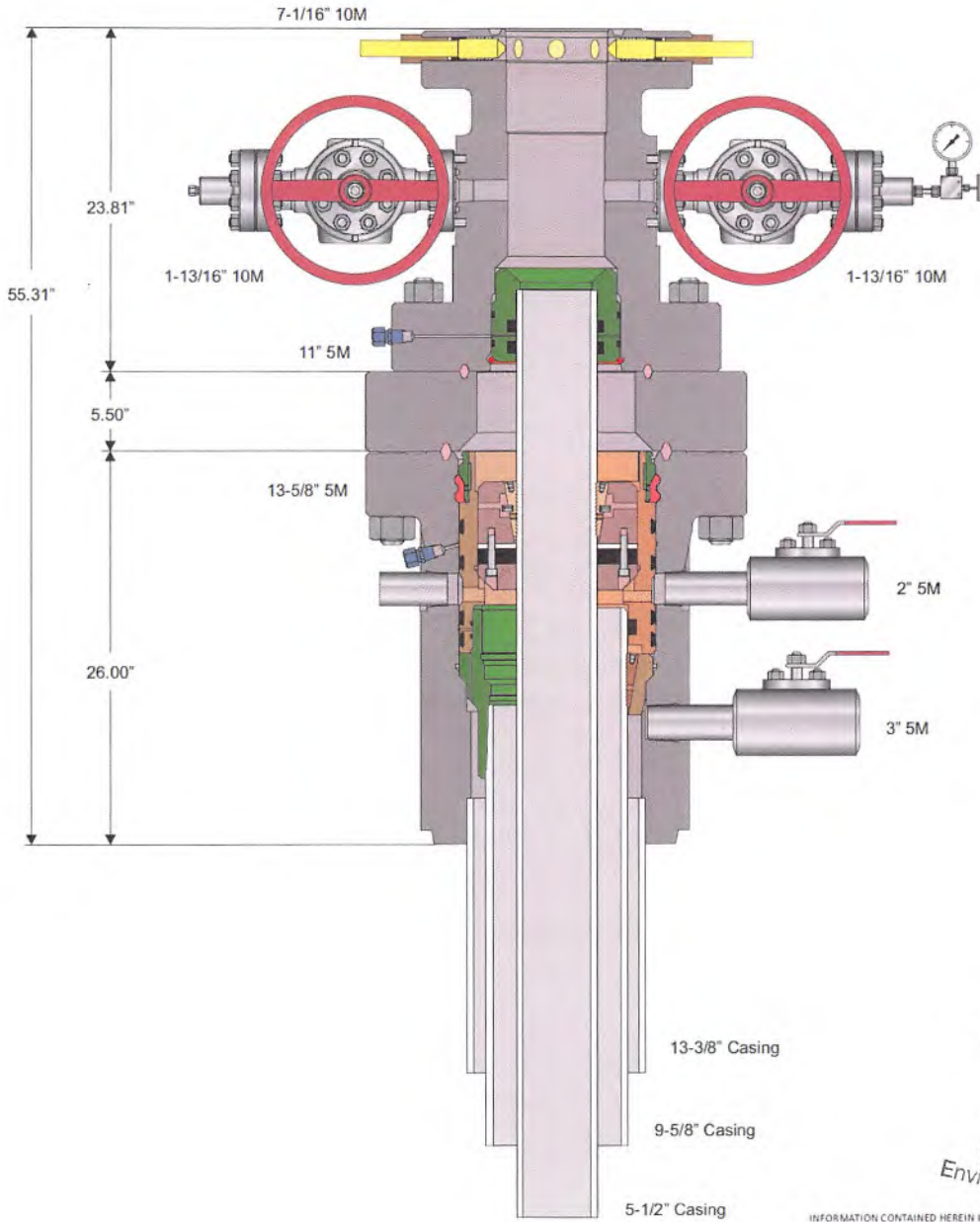
The following pages contain sketches of the anticipated wellhead assemblies that will be used.

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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 H₂S Fixed Monitor w/2 relays (relays location in doghouse & company man trailer)
- 4 H₂S 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 ₂ S monitors
1	Portable Tri-Gas Hand Held Meter (O ₂ , LEL, H ₂ S)
1	Gastech Manual Impingement Pump Type Detector
2	Boxes H ₂ S Tubes Various Ranges
2	Boxes SO ₂ Tubes Various Ranges
1	Calibration Gas
1	Set Paper Work for Records: Training, Cal, Inspection, other

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Additional Safety Related Equipment

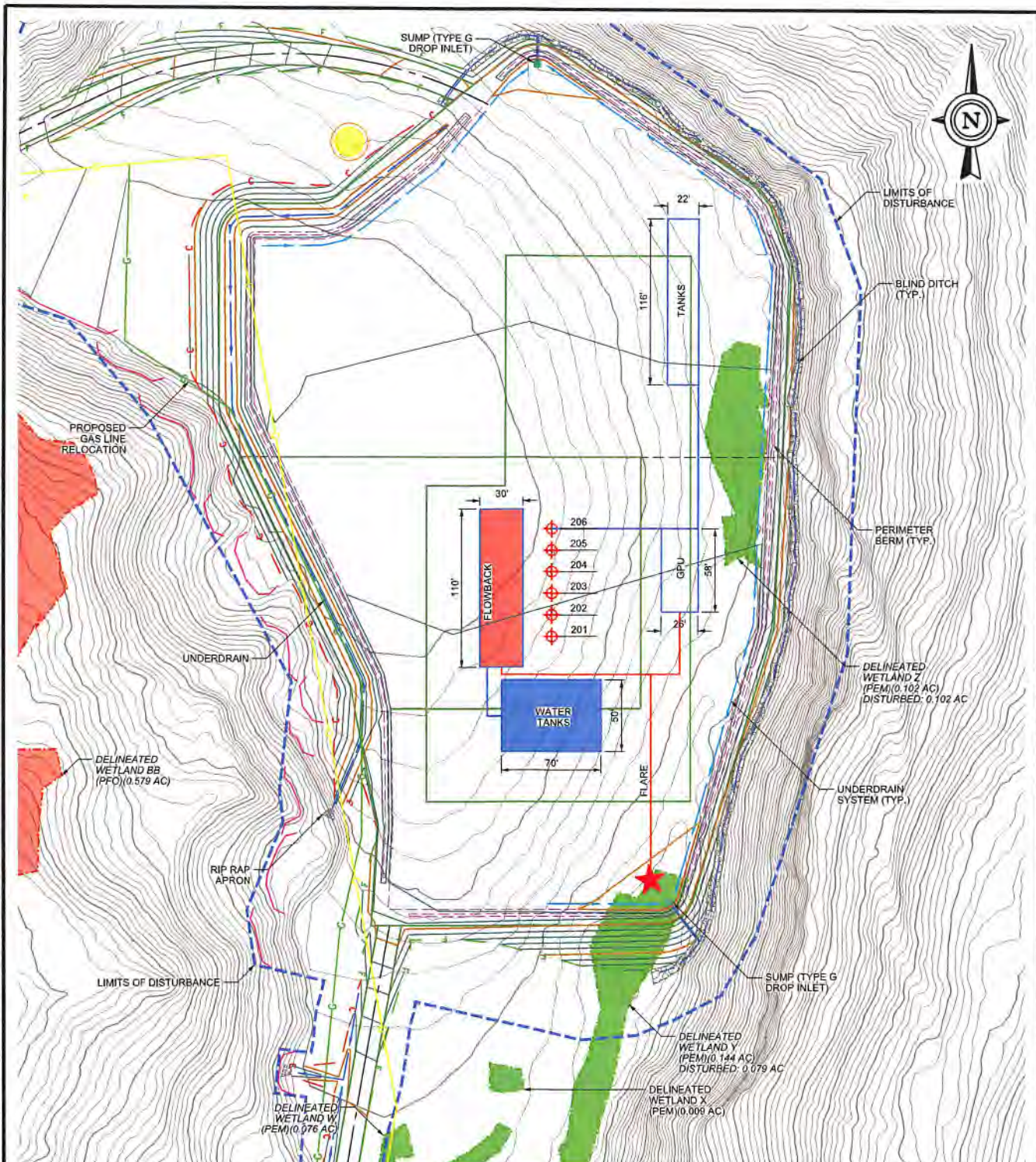
<u>QTY</u>	<u>Description</u>
2	Windssocks with Pole and Bracket
1	Set Well Condition Sign w/Green, Yellow, Red Flags
1	Primary Safe Briefing Area Sign
1	Secondary Safe Briefing Area Sign
1	Oxygen Resuscitator

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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.

I:\Mountaineer\keystone\2017\17078-007 - Johnson TFP40\Common\Flowback Schematic Layout.dgm 8:51:13 AM 9/21/2018



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 278971.7221	LAT. 39.258499°	LAT. 39°15'30.60"	NORTHING 4345792.144	1335.06'	1333.5'
	EASTING 1779051.6624	LONG. -80.169060°	LONG. -80°10'08.61"	EASTING 571690.548		
WELL 202	NORTHING 278986.7221	LAT. 39.258540°	LAT. 39°15'30.75"	NORTHING 4345795.714	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 571690.169		



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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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 #202

Anti-collision Report (Attached)

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ARSENAL
R E S O U R C E S

Arsenal Resources

**Taylor County, West Virginia
Johnson TFP40 Pad
Johnson TFP40 #202**

**Wellbore #1
Design #1**

QES Anticollision Report

17 October, 2018



Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference	Design #1
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	Stations
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 10,000.0 us
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Pedal Curve

Survey Tool Program	Date	10/17/2018
From (usft)	To (usft)	Survey (Wellbore)
0.0	22,136.9	Design #1 (Wellbore #1)
		Tool Name
		MWD default
		Description
		MWD - Standard

Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Johnson TFP40 Pad						
Johnson TFP40 #201 - Wellbore #1 - Design #1	3,553.5	3,551.8	12.7	-4.0	0.760	Level 1, CC
Johnson TFP40 #201 - Wellbore #1 - Design #1	3,600.0	3,598.2	12.8	-4.1	0.758	Level 1, ES, SF
Johnson TFP40 #203 - Wellbore #1 - Design #1	3,650.9	3,652.7	6.3	-9.1	0.408	Level 1, CC, ES, SF
Johnson TFP40 #204 - Wellbore #1 - Design #1	2,500.0	2,500.0	30.0	19.0	2.739	CC, ES
Johnson TFP40 #204 - Wellbore #1 - Design #1	2,600.0	2,599.7	31.0	19.6	2.726	SF
Johnson TFP40 #205 - Wellbore #1 - Design #1	2,500.0	2,500.0	45.0	34.0	4.109	CC, ES
Johnson TFP40 #205 - Wellbore #1 - Design #1	2,600.0	2,599.5	46.1	34.8	4.056	SF
Johnson TFP40 #206 - Wellbore #1 - Design #1	2,500.0	2,500.0	60.0	49.0	5.478	CC, ES
Johnson TFP40 #206 - Wellbore #1 - Design #1	2,600.0	2,599.3	61.1	49.8	5.375	SF

Offset Design Johnson TFP40 Pad - Johnson TFP40 #201 - 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)	Measured Depth (usft)	Offset 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	180.00	-15.0	0.0	15.0					
100.0	100.0	100.0	100.0	0.1	0.1	180.00	-15.0	0.0	15.0	14.8	91.419			
200.0	200.0	200.0	200.0	0.3	0.3	180.00	-15.0	0.0	15.0	14.4	24.445			
300.0	300.0	300.0	300.0	0.5	0.5	180.00	-15.0	0.0	15.0	13.9	14.109			
400.0	400.0	400.0	400.0	0.8	0.8	180.00	-15.0	0.0	15.0	13.5	9.916			
500.0	500.0	500.0	500.0	1.0	1.0	180.00	-15.0	0.0	15.0	13.0	7.644			
600.0	600.0	600.0	600.0	1.2	1.2	180.00	-15.0	0.0	15.0	12.6	6.220			
700.0	700.0	700.0	700.0	1.4	1.4	180.00	-15.0	0.0	15.0	12.1	5.242			
800.0	800.0	800.0	800.0	1.7	1.7	180.00	-15.0	0.0	15.0	11.7	4.531			
900.0	900.0	900.0	900.0	1.9	1.9	180.00	-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	180.00	-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	180.00	-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	180.00	-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	180.00	-15.0	0.0	15.0	9.4	2.699			
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	180.00	-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	180.00	-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	180.00	-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	180.00	-15.0	0.0	15.0	7.6	2.039			

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #201 - Wellbore #1 - Design #1												Offset Site Error:	0.0 usft
Survey Program: O-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	
1,800.0	1,800.0	1,800.0	1,800.0	3.9	3.9	180.00	-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	180.00	-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	180.00	-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	180.00	-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	180.00	-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	180.00	-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	180.00	-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	180.00	-15.0	0.0	15.0	4.0	1.370	Level 3	
2,600.0	2,600.0	2,599.8	2,599.8	5.7	5.7	-70.96	-15.5	-1.7	15.0	3.6	1.318	Level 3	
2,700.0	2,699.8	2,699.7	2,699.5	5.9	5.9	-70.91	-17.2	-6.6	14.9	3.2	1.269	Level 3	
2,800.0	2,799.5	2,799.5	2,799.0	6.1	6.1	-70.83	-19.9	-14.9	14.8	2.7	1.219	Level 2	
2,900.0	2,898.7	2,899.3	2,898.1	6.3	6.3	-70.71	-23.7	-26.4	14.6	2.1	1.166	Level 2	
3,000.0	2,997.5	2,999.2	2,996.7	6.5	6.5	-70.55	-28.6	-41.2	14.4	1.4	1.110	Level 2	
3,100.0	3,095.6	3,099.0	3,094.7	6.8	6.8	-70.35	-34.6	-59.2	14.2	0.7	1.052	Level 2	
3,200.0	3,193.1	3,198.9	3,192.0	7.1	7.1	-70.11	-41.6	-80.5	13.9	-0.1	0.991	Level 1	
3,300.0	3,289.6	3,298.7	3,288.4	7.4	7.4	-69.82	-49.7	-105.0	13.6	-1.1	0.927	Level 1	
3,400.0	3,385.3	3,398.5	3,383.9	7.8	7.8	-69.47	-58.8	-132.7	13.2	-2.2	0.860	Level 1	
3,500.0	3,479.8	3,498.4	3,478.3	8.2	8.2	-69.06	-69.0	-163.5	12.8	-3.4	0.792	Level 1	
3,519.1	3,497.8	3,517.5	3,496.2	8.3	8.3	-68.97	-71.1	-169.8	12.7	-3.6	0.779	Level 1	
3,553.5	3,530.0	3,551.8	3,528.3	8.5	8.5	-67.94	-74.9	-181.3	12.7	-4.0	0.760	Level 1, CC	
3,600.0	3,573.6	3,598.2	3,571.5	8.7	8.7	-63.83	-80.2	-197.4	12.8	-4.1	0.758	Level 1, ES, SF	
3,700.0	3,667.3	3,697.8	3,663.2	9.2	9.3	-47.38	-92.4	-234.3	15.0	-2.0	0.882	Level 1	
3,800.0	3,761.1	3,797.0	3,753.2	9.8	9.9	-30.16	-105.6	-274.1	20.9	4.4	1.265	Level 3	
3,900.0	3,854.8	3,895.6	3,841.0	10.4	10.6	-18.70	-119.6	-316.4	31.1	14.8	1.913		
4,000.0	3,948.5	3,993.2	3,926.5	11.0	11.4	-12.01	-134.4	-361.2	45.3	29.0	2.776		
4,100.0	4,042.3	4,089.8	4,009.4	11.6	12.3	-8.06	-149.9	-408.2	63.0	46.5	3.823		
4,200.0	4,136.0	4,185.0	4,089.5	12.2	13.2	-5.60	-166.0	-457.1	84.2	67.5	5.030		
4,300.0	4,229.7	4,278.8	4,166.7	12.8	14.2	-4.00	-182.8	-507.7	108.7	91.7	6.381		
4,400.0	4,323.5	4,371.0	4,240.8	13.5	15.3	-2.91	-200.0	-559.8	136.4	119.0	7.863		
4,500.0	4,417.2	4,461.3	4,311.7	14.1	16.4	-2.14	-217.5	-613.0	167.1	149.5	9.463		
4,600.0	4,511.0	4,554.9	4,383.9	14.8	17.5	-1.56	-236.2	-669.5	199.8	181.6	10.954		
4,700.0	4,604.7	4,649.4	4,456.7	15.5	18.8	-1.14	-255.1	-726.6	232.6	213.7	12.312		
4,800.0	4,698.4	4,743.8	4,529.6	16.1	20.0	-0.82	-273.9	-783.7	265.4	245.8	13.572		
4,900.0	4,792.2	4,838.3	4,602.5	16.8	21.3	-0.57	-292.8	-840.8	298.1	277.9	14.741		
5,000.0	4,885.9	4,932.8	4,675.3	17.5	22.5	-0.37	-311.7	-897.9	330.9	310.0	15.828		
5,100.0	4,979.7	5,027.3	4,748.2	18.2	23.8	-0.21	-330.5	-954.9	363.7	342.1	16.841		
5,200.0	5,073.4	5,121.7	4,821.1	18.9	25.1	-0.08	-349.4	-1,012.0	396.5	374.2	17.785		
5,300.0	5,167.1	5,216.2	4,893.9	19.6	26.4	0.04	-368.2	-1,069.1	429.3	406.3	18.666		
5,400.0	5,260.9	5,310.7	4,966.8	20.3	27.7	0.14	-387.1	-1,126.2	462.1	438.4	19.490		
5,500.0	5,354.6	5,405.1	5,039.7	21.0	29.0	0.22	-406.0	-1,183.3	494.9	470.4	20.261		
5,600.0	5,448.3	5,499.6	5,112.5	21.7	30.3	0.30	-424.8	-1,240.4	527.7	502.5	20.985		
5,700.0	5,542.1	5,594.1	5,185.4	22.4	31.7	0.36	-443.7	-1,297.5	560.5	534.6	21.665		
5,800.0	5,635.8	5,688.5	5,258.3	23.1	33.0	0.42	-462.6	-1,354.6	593.3	566.7	22.304		
5,900.0	5,729.6	5,783.0	5,331.1	23.8	34.3	0.47	-481.4	-1,411.6	626.0	598.7	22.906		
6,000.0	5,823.3	5,877.5	5,404.0	24.5	35.6	0.52	-500.3	-1,468.7	658.8	630.8	23.473		
6,100.0	5,917.0	5,965.6	5,487.8	25.2	37.1	0.57	-521.7	-1,533.7	691.2	662.2	23.789		
6,200.0	6,010.8	6,112.7	5,589.1	25.9	38.6	0.62	-545.8	-1,606.5	720.0	689.7	23.757		
6,300.0	6,104.5	6,243.0	5,696.4	26.7	40.0	0.67	-569.0	-1,676.6	744.5	713.0	23.627		
6,400.0	6,198.3	6,376.0	5,809.3	27.4	41.3	0.71	-591.0	-1,743.4	764.5	731.8	23.413		
6,475.6	6,269.1	6,478.1	5,898.1	27.9	42.2	0.75	-606.8	-1,791.2	776.6	743.1	23.204		
6,500.0	6,292.0	6,511.2	5,927.3	28.1	42.5	0.76	-611.8	-1,806.1	780.0	746.3	23.134		
6,600.0	6,386.6	6,647.9	6,049.6	28.6	43.7	0.80	-630.9	-1,864.0	793.3	758.6	22.887		

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #201 - 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	
6,700.0	6,482.3	6,785.6	6,175.6	29.1	44.7	0.84	-648.3	-1,916.7	805.2	769.7	22.686		
6,800.0	6,579.0	6,924.3	6,305.0	29.5	45.6	0.87	-663.9	-1,963.9	815.9	779.7	22.531		
6,900.0	6,676.4	7,063.8	6,437.5	29.9	46.4	0.90	-677.6	-2,005.3	825.2	788.4	22.419		
7,000.0	6,774.6	7,204.1	6,572.8	30.2	47.1	0.92	-689.3	-2,040.8	833.1	795.8	22.348		
7,100.0	6,873.4	7,345.0	6,710.3	30.5	47.6	0.94	-698.9	-2,070.0	839.6	802.0	22.320		
7,200.0	6,972.7	7,486.5	6,849.7	30.8	48.1	0.96	-706.5	-2,092.8	844.6	806.8	22.331		
7,300.0	7,072.3	7,628.3	6,990.5	31.0	48.4	0.97	-711.9	-2,109.1	848.2	810.3	22.384		
7,400.0	7,172.2	7,770.5	7,132.2	31.1	48.7	0.97	-715.1	-2,118.8	850.3	812.5	22.476		
7,494.7	7,266.9	7,905.2	7,266.9	31.2	48.8	-108.04	-716.1	-2,121.8	851.0	813.4	22.602		
7,500.0	7,272.2	7,912.7	7,274.4	31.3	48.8	91.01	-716.1	-2,121.8	851.0	813.4	22.610		
7,507.2	7,279.4	7,923.0	7,284.7	31.3	48.8	91.02	-716.1	-2,121.8	851.0	813.4	22.620		
7,550.0	7,322.1	7,961.8	7,323.4	31.3	48.8	91.00	-718.4	-2,121.0	851.0	813.2	22.512		
7,600.0	7,371.7	8,013.0	7,374.2	31.3	48.9	90.99	-724.7	-2,118.9	851.0	813.1	22.431		
7,650.0	7,420.6	8,064.2	7,424.2	31.4	48.9	90.97	-734.7	-2,115.4	851.0	812.9	22.349		
7,700.0	7,468.6	8,115.3	7,473.2	31.4	48.9	90.95	-748.5	-2,110.6	851.0	812.8	22.264		
7,750.0	7,515.4	8,166.4	7,520.8	31.5	48.9	90.92	-766.0	-2,104.6	851.0	812.6	22.173		
7,800.0	7,560.6	8,217.5	7,566.8	31.5	49.0	90.89	-787.0	-2,097.3	851.0	812.4	22.074		
7,850.0	7,604.0	8,268.5	7,610.8	31.6	49.0	90.85	-811.4	-2,088.9	851.0	812.2	21.962		
7,900.0	7,645.3	8,319.5	7,652.6	31.6	49.0	90.80	-839.1	-2,079.4	851.0	812.0	21.833		
7,950.0	7,684.3	8,370.4	7,691.8	31.7	49.1	90.75	-869.7	-2,068.8	851.0	811.7	21.685		
8,000.0	7,720.8	8,421.3	7,728.3	31.8	49.1	90.70	-903.2	-2,057.2	850.9	811.4	21.513		
8,050.0	7,754.4	8,472.1	7,761.8	31.8	49.1	90.64	-939.3	-2,044.8	850.9	811.0	21.315		
8,100.0	7,785.0	8,522.8	7,792.1	31.9	49.2	90.58	-977.7	-2,031.5	850.9	810.6	21.088		
8,150.0	7,812.4	8,573.4	7,819.0	32.0	49.2	90.51	-1,018.2	-2,017.5	850.9	810.1	20.831		
8,200.0	7,836.5	8,624.0	7,842.4	32.2	49.3	90.44	-1,060.5	-2,002.9	850.9	809.5	20.546		
8,250.0	7,857.1	8,674.4	7,862.1	32.3	49.4	90.37	-1,104.4	-1,987.7	850.9	808.8	20.232		
8,300.0	7,874.0	8,724.8	7,878.1	32.5	49.4	90.29	-1,149.6	-1,972.1	850.9	808.1	19.892		
8,350.0	7,887.1	8,775.1	7,890.3	32.6	49.5	90.22	-1,195.7	-1,956.2	850.9	807.3	19.531		
8,400.0	7,896.5	8,825.3	7,898.5	32.8	49.6	90.14	-1,242.5	-1,940.1	850.9	806.5	19.152		
8,450.0	7,901.9	8,875.4	7,902.8	33.1	49.7	90.06	-1,289.6	-1,923.8	850.9	805.5	18.760		
8,494.7	7,903.5	8,920.1	7,903.5	33.3	49.8	90.00	-1,331.9	-1,909.2	850.9	804.6	18.402		
8,500.0	7,903.5	8,925.4	7,903.5	33.3	49.8	90.00	-1,336.9	-1,907.5	850.9	804.5	18.360		
8,600.0	7,903.5	9,025.4	7,903.5	33.9	50.1	90.00	-1,431.4	-1,874.8	850.9	802.4	17.562		
8,700.0	7,903.5	9,125.4	7,903.5	34.6	50.4	90.00	-1,526.0	-1,842.2	850.9	800.1	16.764		
8,800.0	7,903.5	9,225.4	7,903.5	35.3	50.8	90.00	-1,620.5	-1,809.6	850.9	797.6	15.981		
8,900.0	7,903.5	9,325.4	7,903.5	36.2	51.2	90.00	-1,715.0	-1,776.9	850.9	795.0	15.227		
9,000.0	7,903.5	9,425.4	7,903.5	37.2	51.7	90.00	-1,809.5	-1,744.3	850.9	792.2	14.507		
9,100.0	7,903.5	9,525.4	7,903.5	38.2	52.2	90.00	-1,904.1	-1,711.7	850.9	789.3	13.827		
9,200.0	7,903.5	9,625.4	7,903.5	39.3	52.8	90.00	-1,998.6	-1,679.0	850.9	786.3	13.187		
9,300.0	7,903.5	9,725.4	7,903.5	40.5	53.5	90.00	-2,093.1	-1,646.4	850.9	783.3	12.587		
9,400.0	7,903.5	9,825.4	7,903.5	41.7	54.2	90.00	-2,187.6	-1,613.7	850.9	780.1	12.027		
9,500.0	7,903.5	9,925.4	7,903.5	43.0	55.0	90.00	-2,282.2	-1,581.1	850.9	776.9	11.504		
9,600.0	7,903.5	10,025.4	7,903.5	44.4	55.8	90.00	-2,376.7	-1,548.5	850.9	773.6	11.017		
9,700.0	7,903.5	10,125.4	7,903.5	45.8	56.7	90.00	-2,471.2	-1,515.8	850.9	770.3	10.563		
9,800.0	7,903.5	10,225.4	7,903.5	47.2	57.7	90.00	-2,565.7	-1,483.2	850.9	766.9	10.139		
9,900.0	7,903.5	10,325.4	7,903.5	48.7	58.7	90.00	-2,660.3	-1,450.6	850.9	763.5	9.744		
10,000.0	7,903.5	10,425.4	7,903.5	50.3	59.8	90.00	-2,754.8	-1,417.9	850.9	760.1	9.374		
10,100.0	7,903.5	10,525.4	7,903.5	51.8	60.9	90.00	-2,849.3	-1,385.3	850.9	756.6	9.029		
10,200.0	7,903.5	10,625.4	7,903.5	53.4	62.1	90.00	-2,943.8	-1,352.7	850.9	753.1	8.706		
10,300.0	7,903.5	10,725.4	7,903.5	55.0	63.3	90.00	-3,038.4	-1,320.0	850.9	749.6	8.403		
10,400.0	7,903.5	10,825.4	7,903.5	56.6	64.5	90.00	-3,132.9	-1,287.4	850.9	746.1	8.118		
10,500.0	7,903.5	10,925.4	7,903.5	58.2	65.9	90.00	-3,227.4	-1,254.7	850.9	742.5	7.851		

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #201 - 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)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis 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		
10,600.0	7,903.5	11,025.4	7,903.5	59.9	67.2	90.00	-3,321.9	-1,222.1	850.9	738.9	7.600			
10,700.0	7,903.5	11,125.4	7,903.5	61.6	68.6	90.00	-3,416.5	-1,189.5	850.9	735.3	7.363			
10,800.0	7,903.5	11,225.4	7,903.5	63.3	70.0	90.00	-3,511.0	-1,156.8	850.9	731.7	7.140			
10,900.0	7,903.5	11,325.4	7,903.5	65.0	71.4	90.00	-3,605.5	-1,124.2	850.9	728.1	6.929			
11,000.0	7,903.5	11,425.4	7,903.5	66.7	72.9	90.00	-3,700.0	-1,091.6	850.9	724.4	6.729			
11,100.0	7,903.5	11,525.4	7,903.5	68.4	74.4	90.00	-3,794.6	-1,058.9	850.9	720.8	6.540			
11,200.0	7,903.5	11,625.4	7,903.5	70.2	76.0	90.00	-3,889.1	-1,026.3	850.9	717.1	6.361			
11,300.0	7,903.5	11,725.4	7,903.5	71.9	77.5	90.00	-3,983.6	-993.7	850.9	713.4	6.191			
11,400.0	7,903.5	11,825.4	7,903.5	73.7	79.1	90.00	-4,078.1	-961.0	850.9	709.7	6.029			
11,500.0	7,903.5	11,925.4	7,903.5	75.4	80.7	90.00	-4,172.6	-928.4	850.9	706.0	5.875			
11,600.0	7,903.5	12,025.4	7,903.5	77.2	82.3	90.00	-4,267.2	-895.8	850.9	702.3	5.729			
11,700.0	7,903.5	12,125.4	7,903.5	79.0	83.9	90.00	-4,361.7	-863.1	850.9	698.6	5.590			
11,800.0	7,903.5	12,225.4	7,903.5	80.8	85.6	90.00	-4,456.2	-830.5	850.9	694.9	5.456			
11,900.0	7,903.5	12,325.4	7,903.5	82.6	87.2	90.00	-4,550.7	-797.8	850.9	691.2	5.329			
12,000.0	7,903.5	12,425.4	7,903.5	84.4	88.9	90.00	-4,645.3	-765.2	850.9	687.5	5.208			
12,100.0	7,903.5	12,525.4	7,903.5	86.2	90.6	90.00	-4,739.8	-732.6	850.9	683.7	5.092			
12,200.0	7,903.5	12,625.4	7,903.5	88.0	92.3	90.00	-4,834.3	-699.9	850.9	680.0	4.980			
12,300.0	7,903.5	12,725.4	7,903.5	89.8	94.0	90.00	-4,928.8	-667.3	850.9	676.3	4.874			
12,400.0	7,903.5	12,825.4	7,903.5	91.6	95.7	90.00	-5,023.4	-634.7	850.9	672.5	4.771			
12,500.0	7,903.5	12,925.4	7,903.5	93.5	97.4	90.00	-5,117.9	-602.0	850.9	668.8	4.673			
12,600.0	7,903.5	13,025.4	7,903.5	95.3	99.1	90.00	-5,212.4	-569.4	850.9	665.0	4.579			
12,700.0	7,903.5	13,125.4	7,903.5	97.1	100.9	90.00	-5,306.9	-536.8	850.9	661.3	4.488			
12,800.0	7,903.5	13,225.4	7,903.5	98.9	102.6	90.00	-5,401.5	-504.1	850.9	657.5	4.401			
12,900.0	7,903.5	13,325.4	7,903.5	100.8	104.4	90.00	-5,496.0	-471.5	850.9	653.7	4.317			
13,000.0	7,903.5	13,425.4	7,903.5	102.6	106.1	90.00	-5,590.5	-438.8	850.9	650.0	4.236			
13,100.0	7,903.5	13,525.4	7,903.5	104.5	107.9	90.00	-5,685.0	-406.2	850.9	646.2	4.157			
13,200.0	7,903.5	13,625.4	7,903.5	106.3	109.7	90.00	-5,779.6	-373.6	850.8	642.4	4.083			
13,300.0	7,903.5	13,725.4	7,903.5	108.2	111.5	90.00	-5,874.1	-340.9	850.8	638.7	4.010			
13,400.0	7,903.5	13,825.4	7,903.5	110.0	113.2	90.00	-5,968.6	-308.3	850.8	634.9	3.940			
13,500.0	7,903.5	13,925.4	7,903.5	111.9	115.0	90.00	-6,063.1	-275.7	850.8	631.1	3.872			
13,600.0	7,903.5	14,025.4	7,903.5	113.7	116.8	90.00	-6,157.7	-243.0	850.8	627.3	3.807			
13,700.0	7,903.5	14,125.4	7,903.5	115.6	118.6	90.00	-6,252.2	-210.4	850.8	623.5	3.743			
13,800.0	7,903.5	14,225.4	7,903.5	117.5	120.4	90.00	-6,346.7	-177.8	850.8	619.8	3.682			
13,900.0	7,903.5	14,325.4	7,903.5	119.3	122.2	90.00	-6,441.2	-145.1	850.8	616.0	3.623			
14,000.0	7,903.5	14,425.4	7,903.5	121.2	124.0	90.00	-6,535.8	-112.5	850.8	612.2	3.565			
14,100.0	7,903.5	14,525.4	7,903.5	123.1	125.9	90.00	-6,630.3	-79.9	850.8	608.4	3.509			
14,200.0	7,903.5	14,625.4	7,903.5	124.9	127.7	90.00	-6,724.8	-47.2	850.8	604.6	3.455			
14,300.0	7,903.5	14,725.4	7,903.5	126.8	129.5	90.00	-6,819.3	-14.6	850.8	600.8	3.403			
14,400.0	7,903.5	14,825.4	7,903.5	128.7	131.3	90.00	-6,913.9	18.1	850.8	597.0	3.352			
14,500.0	7,903.5	14,925.4	7,903.5	130.5	133.2	90.00	-7,008.4	50.7	850.8	593.2	3.303			
14,600.0	7,903.5	15,025.4	7,903.5	132.4	135.0	90.00	-7,102.9	83.3	850.8	589.4	3.255			
14,700.0	7,903.5	15,125.4	7,903.5	134.3	136.8	90.00	-7,197.4	116.0	850.8	585.6	3.208			
14,800.0	7,903.5	15,225.4	7,903.5	136.2	138.7	90.00	-7,292.0	148.6	850.8	581.8	3.163			
14,900.0	7,903.5	15,325.4	7,903.5	138.0	140.5	90.00	-7,386.5	181.2	850.8	578.0	3.119			
15,000.0	7,903.5	15,425.4	7,903.5	139.9	142.3	90.00	-7,481.0	213.9	850.8	574.2	3.076			
15,100.0	7,903.5	15,525.4	7,903.5	141.8	144.2	90.00	-7,575.5	246.5	850.8	570.4	3.034			
15,200.0	7,903.5	15,625.4	7,903.5	143.7	146.0	90.00	-7,670.1	279.1	850.8	566.6	2.993			
15,300.0	7,903.5	15,725.4	7,903.5	145.6	147.9	90.00	-7,764.6	311.8	850.8	562.8	2.954			
15,400.0	7,903.5	15,825.4	7,903.5	147.5	149.7	90.00	-7,859.1	344.4	850.8	559.0	2.915			
15,500.0	7,903.5	15,925.4	7,903.5	149.3	151.6	90.00	-7,953.6	377.0	850.8	555.2	2.878			
15,600.0	7,903.5	16,025.4	7,903.5	151.2	153.4	90.00	-8,048.2	409.7	850.8	551.4	2.841			
15,700.0	7,903.5	16,125.4	7,903.5	153.1	155.3	90.00	-8,142.7	442.3	850.8	547.6	2.805			

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #201 - Wellbore #1 - Design #1											Offset Site Error:	0.0 usft
Survey Program: 0-MWD default											Offset Well Error:	0.0 usft
Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset 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
15,800.0	7,903.5	16,225.4	7,903.5	155.0	157.1	90.00	-8,237.2	475.0	850.8	543.7	2.771	
15,900.0	7,903.5	16,325.4	7,903.5	156.9	159.0	90.00	-8,331.7	507.5	850.8	539.9	2.737	
16,000.0	7,903.5	16,425.4	7,903.5	158.8	160.9	90.00	-8,426.3	540.2	850.8	536.1	2.704	
16,100.0	7,903.5	16,525.4	7,903.5	160.7	162.7	90.00	-8,520.8	572.9	850.8	532.3	2.671	
16,200.0	7,903.5	16,625.4	7,903.5	162.6	164.6	90.00	-8,615.3	605.5	850.8	528.5	2.640	
16,300.0	7,903.5	16,725.4	7,903.5	164.5	166.5	90.00	-8,709.8	638.1	850.8	524.7	2.609	
16,400.0	7,903.5	16,825.4	7,903.5	166.3	168.3	90.00	-8,804.4	670.8	850.8	520.9	2.579	
16,500.0	7,903.5	16,925.4	7,903.5	168.2	170.2	90.00	-8,898.9	703.4	850.8	517.1	2.549	
16,600.0	7,903.5	17,025.4	7,903.5	170.1	172.1	90.00	-8,993.4	736.0	850.8	513.2	2.520	
16,700.0	7,903.5	17,125.4	7,903.5	172.0	173.9	90.00	-9,087.9	768.7	850.8	509.4	2.492	
16,800.0	7,903.5	17,225.4	7,903.5	173.9	175.8	90.00	-9,182.5	801.3	850.8	505.6	2.465	
16,900.0	7,903.5	17,325.4	7,903.5	175.8	177.7	90.00	-9,277.0	834.0	850.8	501.8	2.438	
17,000.0	7,903.5	17,425.4	7,903.5	177.7	179.5	90.00	-9,371.5	866.6	850.8	498.0	2.411	
17,100.0	7,903.5	17,525.4	7,903.5	179.6	181.4	90.00	-9,466.0	899.2	850.8	494.1	2.385	
17,200.0	7,903.5	17,625.4	7,903.5	181.5	183.3	90.00	-9,560.6	931.9	850.8	490.3	2.360	
17,300.0	7,903.5	17,725.4	7,903.5	183.4	185.2	90.00	-9,655.1	964.5	850.8	486.5	2.335	
17,400.0	7,903.5	17,825.4	7,903.5	185.3	187.0	90.00	-9,749.6	997.1	850.8	482.7	2.311	
17,500.0	7,903.5	17,925.4	7,903.5	187.2	188.9	90.00	-9,844.1	1,029.8	850.8	478.9	2.287	
17,600.0	7,903.5	18,025.4	7,903.5	189.1	190.8	90.00	-9,938.6	1,062.4	850.8	475.0	2.264	
17,700.0	7,903.5	18,125.4	7,903.5	191.0	192.7	90.00	-10,033.2	1,095.0	850.8	471.2	2.241	
17,800.0	7,903.5	18,225.4	7,903.5	192.9	194.6	90.00	-10,127.7	1,127.7	850.8	467.4	2.219	
17,900.0	7,903.5	18,325.4	7,903.5	194.8	196.4	90.00	-10,222.2	1,160.3	850.8	463.6	2.197	
18,000.0	7,903.5	18,425.4	7,903.5	196.7	198.3	90.00	-10,316.7	1,192.9	850.8	459.8	2.176	
18,100.0	7,903.5	18,525.4	7,903.5	198.6	200.2	90.00	-10,411.3	1,225.6	850.8	455.9	2.155	
18,200.0	7,903.5	18,625.4	7,903.5	200.5	202.1	90.00	-10,505.8	1,258.2	850.8	452.1	2.134	
18,300.0	7,903.5	18,725.4	7,903.5	202.4	204.0	90.00	-10,600.3	1,290.9	850.8	448.3	2.114	
18,400.0	7,903.5	18,825.4	7,903.5	204.3	205.9	90.00	-10,694.8	1,323.5	850.8	444.5	2.094	
18,500.0	7,903.5	18,925.4	7,903.5	206.2	207.7	90.00	-10,789.4	1,356.1	850.8	440.6	2.074	
18,600.0	7,903.5	19,025.4	7,903.5	208.1	209.6	90.00	-10,883.9	1,388.8	850.8	436.8	2.055	
18,700.0	7,903.5	19,125.4	7,903.5	210.0	211.5	90.00	-10,978.4	1,421.4	850.8	433.0	2.036	
18,800.0	7,903.5	19,225.4	7,903.5	211.9	213.4	90.00	-11,072.9	1,454.0	850.8	429.2	2.018	
18,900.0	7,903.5	19,325.4	7,903.5	213.8	215.3	90.00	-11,167.5	1,486.7	850.8	425.3	2.000	
19,000.0	7,903.5	19,425.4	7,903.5	215.7	217.2	90.00	-11,262.0	1,519.3	850.8	421.5	1.982	
19,100.0	7,903.5	19,525.4	7,903.5	217.6	219.1	90.00	-11,356.5	1,551.9	850.8	417.7	1.964	
19,200.0	7,903.5	19,625.4	7,903.5	219.5	221.0	90.00	-11,451.0	1,584.6	850.8	413.8	1.947	
19,300.0	7,903.5	19,725.4	7,903.5	221.4	222.9	90.00	-11,545.6	1,617.2	850.8	410.0	1.930	
19,400.0	7,903.5	19,825.4	7,903.5	223.3	224.7	90.00	-11,640.1	1,649.9	850.8	406.2	1.914	
19,500.0	7,903.5	19,925.4	7,903.5	225.2	226.6	90.00	-11,734.6	1,682.5	850.8	402.4	1.897	
19,600.0	7,903.5	20,025.4	7,903.5	227.2	228.5	90.00	-11,829.1	1,715.1	850.8	398.5	1.881	
19,700.0	7,903.5	20,125.4	7,903.5	229.1	230.4	90.00	-11,923.7	1,747.8	850.8	394.7	1.865	
19,800.0	7,903.5	20,225.4	7,903.5	231.0	232.3	90.00	-12,018.2	1,780.4	850.8	390.9	1.850	
19,900.0	7,903.5	20,325.4	7,903.5	232.9	234.2	90.00	-12,112.7	1,813.0	850.8	387.0	1.835	
20,000.0	7,903.5	20,425.4	7,903.5	234.8	236.1	90.00	-12,207.2	1,845.7	850.8	383.2	1.820	
20,100.0	7,903.5	20,525.4	7,903.5	236.7	238.0	90.00	-12,301.8	1,878.3	850.8	379.4	1.805	
20,200.0	7,903.5	20,625.4	7,903.5	238.6	239.9	90.00	-12,396.3	1,910.9	850.8	375.6	1.790	
20,300.0	7,903.5	20,725.4	7,903.5	240.5	241.8	90.00	-12,490.8	1,943.6	850.8	371.7	1.776	
20,400.0	7,903.5	20,825.4	7,903.5	242.4	243.7	90.00	-12,585.3	1,976.2	850.8	367.9	1.762	
20,500.0	7,903.5	20,925.4	7,903.5	244.3	245.6	90.00	-12,679.9	2,008.8	850.8	364.1	1.748	
20,600.0	7,903.5	21,025.4	7,903.5	246.2	247.5	90.00	-12,774.4	2,041.5	850.8	360.2	1.734	
20,700.0	7,903.5	21,125.4	7,903.5	248.1	249.4	90.00	-12,868.9	2,074.1	850.8	356.4	1.721	
20,800.0	7,903.5	21,225.4	7,903.5	250.0	251.3	90.00	-12,963.4	2,106.8	850.8	352.6	1.708	
20,900.0	7,903.5	21,325.4	7,903.5	252.0	253.2	90.00	-13,058.0	2,139.4	850.8	348.7	1.695	

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #201 - 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		
21,000.0	7,903.5	21,425.4	7,903.5	253.9	255.1	90.00	-13,152.5	2,172.0	850.8	344.9	1.682			
21,100.0	7,903.5	21,525.4	7,903.5	255.8	257.0	90.00	-13,247.0	2,204.7	850.8	341.1	1.669			
21,200.0	7,903.5	21,625.4	7,903.5	257.7	258.9	90.00	-13,341.5	2,237.3	850.8	337.2	1.657			
21,300.0	7,903.5	21,725.4	7,903.5	259.6	260.8	90.00	-13,436.1	2,269.9	850.8	333.4	1.644			
21,400.0	7,903.5	21,825.4	7,903.5	261.5	262.7	90.00	-13,530.6	2,302.6	850.8	329.6	1.632			
21,500.0	7,903.5	21,925.4	7,903.5	263.4	264.6	90.00	-13,625.1	2,335.2	850.8	325.8	1.620			
21,600.0	7,903.5	22,025.4	7,903.5	265.3	266.5	90.00	-13,719.6	2,367.8	850.8	321.9	1.609			
21,700.0	7,903.5	22,125.4	7,903.5	267.2	268.4	90.00	-13,814.2	2,400.5	850.8	318.1	1.597			
21,800.0	7,903.5	22,225.4	7,903.5	269.1	270.3	90.00	-13,908.7	2,433.1	850.8	314.3	1.586			
21,900.0	7,903.5	22,325.4	7,903.5	271.1	272.2	90.00	-14,003.2	2,465.8	850.8	310.4	1.574			
22,000.0	7,903.5	22,425.4	7,903.5	273.0	274.1	90.00	-14,097.7	2,498.4	850.8	306.6	1.563			
22,100.0	7,903.5	22,525.4	7,903.5	274.9	276.0	90.00	-14,192.3	2,531.0	850.8	302.8	1.552			
22,136.9	7,903.5	22,562.3	7,903.5	275.6	276.7	90.00	-14,227.2	2,543.1	850.8	301.3	1.548			

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Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #203 - 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	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		
400.0	400.0	400.0	400.0	0.8	0.8	0.00	15.0	0.0	15.0	13.5	9.916		
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		
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	109.13	14.3	-1.6	14.9	3.5	1.312 Level 3		
2,700.0	2,699.8	2,700.4	2,700.2	5.9	5.9	109.48	12.4	-6.5	14.7	2.9	1.247 Level 2		
2,800.0	2,799.5	2,800.6	2,800.0	6.1	6.1	110.09	9.1	-14.6	14.2	2.1	1.171 Level 2		
2,900.0	2,898.7	2,900.8	2,899.5	6.3	6.3	111.01	4.5	-25.9	13.6	1.1	1.084 Level 2		
3,000.0	2,997.5	3,001.0	2,998.4	6.5	6.5	112.31	-1.4	-40.5	12.8	-0.1	0.989 Level 1		
3,100.0	3,095.6	3,101.2	3,096.8	6.8	6.8	114.12	-6.6	-58.3	11.9	-1.5	0.885 Level 1		
3,200.0	3,193.1	3,201.3	3,194.4	7.1	7.1	116.64	-17.1	-79.2	10.8	-3.1	0.776 Level 1		
3,300.0	3,289.6	3,301.5	3,291.1	7.4	7.4	120.24	-26.8	-103.3	9.6	-4.9	0.664 Level 1		
3,400.0	3,385.3	3,401.7	3,386.9	7.8	7.8	125.54	-37.8	-130.4	8.3	-6.7	0.555 Level 1		
3,500.0	3,479.8	3,501.8	3,481.5	8.2	8.2	133.67	-50.1	-160.7	7.0	-8.4	0.453 Level 1		
3,519.1	3,497.8	3,521.0	3,499.5	8.3	8.3	136.14	-52.5	-166.8	6.8	-8.7	0.440 Level 1		
3,600.0	3,573.6	3,601.8	3,575.5	8.7	8.7	149.33	-62.9	-192.4	6.4	-9.1	0.412 Level 1		
3,650.9	3,621.3	3,652.7	3,623.3	9.0	9.0	158.25	-69.4	-208.6	6.3	-9.1	0.408 Level 1, CC, ES, SF		
3,700.0	3,667.3	3,701.8	3,669.5	9.2	9.2	166.85	-75.7	-224.1	6.4	-9.1	0.412 Level 1		
3,800.0	3,761.1	3,801.8	3,763.4	9.8	9.8	-177.07	-88.6	-255.8	6.9	-8.9	0.437 Level 1		
3,900.0	3,854.8	3,901.8	3,857.4	10.4	10.3	-164.23	-101.4	-287.5	7.9	-8.8	0.473 Level 1		
4,000.0	3,948.5	4,001.7	3,951.3	11.0	10.9	-154.65	-114.2	-319.2	9.2	-8.8	0.513 Level 1		
4,100.0	4,042.3	4,101.7	4,045.2	11.6	11.5	-147.89	-127.0	-350.8	10.8	-8.5	0.559 Level 1		
4,200.0	4,136.0	4,201.2	4,139.6	12.2	12.0	-149.16	-138.9	-380.1	14.5	-5.5	0.723 Level 1		
4,300.0	4,229.7	4,300.5	4,234.8	12.8	12.4	-155.01	-149.5	-406.3	21.1	-1.0	1.048 Level 2		
4,400.0	4,323.5	4,399.1	4,330.2	13.5	12.8	-160.68	-158.8	-429.3	31.1	10.8	1.530		
4,500.0	4,417.2	4,497.0	4,425.7	14.1	13.2	-165.04	-166.8	-449.1	44.4	23.8	2.160		
4,600.0	4,511.0	4,593.8	4,520.9	14.8	13.5	-168.21	-173.5	-465.7	61.1	40.2	2.926		
4,700.0	4,604.7	4,689.5	4,615.4	15.5	13.8	-170.52	-179.0	-479.1	81.2	59.9	3.817		
4,800.0	4,698.4	4,783.7	4,709.0	16.1	14.1	-172.25	-183.2	-489.5	104.5	82.8	4.826		
4,900.0	4,792.2	4,876.3	4,801.3	16.8	14.3	-173.58	-186.2	-496.9	130.9	108.9	5.946		

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #203 - 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)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
5,000.0	4,885.9	4,967.2	4,892.1	17.5	14.5	-174.61	-188.0	-501.5	160.5	138.1	7.171	
5,100.0	4,979.7	5,056.3	4,981.1	18.2	14.6	-175.44	-188.8	-503.4	193.0	170.3	8.499	
5,200.0	5,073.4	5,148.6	5,073.4	18.9	14.8	-176.12	-188.8	-503.5	227.7	204.6	9.846	
5,300.0	5,167.1	5,242.3	5,167.1	19.6	14.9	-176.64	-188.8	-503.5	262.5	238.9	11.129	
5,400.0	5,260.9	5,336.1	5,260.9	20.3	15.1	-177.03	-188.8	-503.5	297.3	273.2	12.360	
5,500.0	5,354.6	5,429.8	5,354.6	21.0	15.2	-177.34	-188.8	-503.5	332.1	307.5	13.543	
5,600.0	5,448.3	5,523.6	5,448.3	21.7	15.4	-177.60	-188.8	-503.5	366.9	341.9	14.679	
5,700.0	5,542.1	5,617.3	5,542.1	22.4	15.6	-177.80	-188.8	-503.5	401.7	376.2	15.770	
5,800.0	5,635.8	5,711.0	5,635.8	23.1	15.7	-177.98	-188.8	-503.5	436.5	410.5	16.820	
5,900.0	5,729.6	5,804.8	5,729.6	23.8	15.9	-178.13	-188.8	-503.5	471.3	444.8	17.831	
6,000.0	5,823.3	5,898.5	5,823.3	24.5	16.0	-178.26	-188.8	-503.5	506.1	479.2	18.804	
6,100.0	5,917.0	5,992.3	5,917.0	25.2	16.2	-178.37	-188.8	-503.5	540.9	513.5	19.741	
6,200.0	6,010.8	6,086.0	6,010.8	25.9	16.4	-178.47	-188.8	-503.5	575.7	547.8	20.644	
6,300.0	6,104.5	6,179.7	6,104.5	26.7	16.5	-178.56	-188.8	-503.5	610.5	582.2	21.516	
6,400.0	6,198.3	6,273.5	6,198.3	27.4	16.7	-178.63	-188.8	-503.5	645.4	616.5	22.356	
6,475.6	6,269.1	6,344.3	6,269.1	27.9	16.8	-178.69	-188.8	-503.5	671.7	642.4	22.972	
6,500.0	6,292.0	6,367.2	6,292.0	28.1	16.8	-178.71	-188.8	-503.5	680.1	650.7	23.167	
6,600.0	6,386.6	6,461.9	6,386.6	28.6	17.0	-178.78	-188.8	-503.5	712.5	682.6	23.888	
6,700.0	6,482.3	6,557.5	6,482.3	29.1	17.2	-178.84	-188.8	-503.5	741.5	711.2	24.481	
6,800.0	6,579.0	6,654.2	6,579.0	29.5	17.4	-178.89	-188.8	-503.5	767.2	736.5	24.952	
6,900.0	6,676.4	6,751.6	6,676.4	29.9	17.5	-178.93	-188.8	-503.5	789.5	758.3	25.307	
7,000.0	6,774.6	6,849.8	6,774.6	30.2	17.7	-178.96	-188.8	-503.5	808.4	776.8	25.550	
7,100.0	6,873.4	6,948.6	6,873.4	30.5	17.9	-178.99	-188.8	-503.5	823.9	791.8	25.687	
7,200.0	6,972.7	7,047.9	6,972.7	30.8	18.1	-179.01	-188.8	-503.5	835.9	803.4	25.723	
7,300.0	7,072.3	7,147.5	7,072.3	31.0	18.3	-179.02	-188.8	-503.5	844.4	811.5	25.660	
7,400.0	7,172.2	7,247.4	7,172.2	31.1	18.4	-179.03	-188.8	-503.5	849.5	816.2	25.604	
7,494.7	7,266.9	7,342.1	7,266.9	31.2	18.6	71.95	-188.8	-503.5	851.0	817.4	25.273	
7,500.0	7,272.2	7,347.3	7,272.0	31.3	18.6	-89.00	-188.8	-503.5	851.0	817.3	25.259	
7,550.0	7,322.1	7,396.1	7,320.8	31.3	18.7	-89.00	-191.0	-502.8	851.0	817.2	25.137	
7,600.0	7,371.7	7,445.0	7,369.3	31.3	18.8	-89.01	-196.7	-500.8	851.0	817.0	25.015	
7,650.0	7,420.6	7,493.9	7,417.2	31.4	18.9	-89.03	-205.8	-497.6	851.0	816.8	24.891	
7,700.0	7,468.6	7,542.8	7,464.3	31.4	18.9	-89.05	-218.5	-493.3	851.0	816.6	24.763	
7,750.0	7,515.4	7,591.7	7,510.1	31.5	19.0	-89.08	-234.5	-487.7	851.0	816.5	24.628	
7,800.0	7,560.6	7,640.7	7,554.6	31.5	19.1	-89.11	-253.8	-481.1	851.0	816.2	24.481	
7,850.0	7,604.0	7,689.7	7,597.4	31.6	19.2	-89.15	-276.3	-473.3	851.0	816.0	24.318	
7,900.0	7,645.3	7,738.7	7,638.3	31.6	19.3	-89.19	-301.9	-464.5	851.0	815.7	24.135	
7,950.0	7,684.3	7,787.8	7,677.1	31.7	19.4	-89.24	-330.4	-454.6	851.0	815.4	23.927	
8,000.0	7,720.8	7,837.0	7,713.4	31.8	19.5	-89.29	-361.6	-443.8	851.0	815.0	23.689	
8,050.0	7,754.4	7,886.2	7,747.1	31.8	19.7	-89.35	-395.5	-432.1	851.0	814.6	23.420	
8,100.0	7,785.0	7,935.5	7,778.0	31.9	19.9	-89.41	-431.8	-419.6	850.9	814.1	23.115	
8,150.0	7,812.4	7,984.8	7,805.9	32.0	20.0	-89.48	-470.3	-406.3	850.9	813.6	22.776	
8,200.0	7,836.5	8,034.2	7,830.5	32.2	20.3	-89.54	-510.8	-392.4	850.9	812.9	22.403	
8,250.0	7,857.1	8,083.7	7,851.8	32.3	20.6	-89.62	-553.0	-377.8	850.9	812.2	21.997	
8,300.0	7,874.0	8,133.3	7,869.6	32.5	20.9	-89.69	-596.7	-362.7	850.9	811.5	21.564	
8,350.0	7,887.1	8,183.0	7,883.7	32.6	21.2	-89.76	-641.7	-347.1	850.9	810.6	21.107	
8,400.0	7,896.5	8,232.7	7,894.1	32.8	21.6	-89.84	-687.7	-331.3	850.9	809.7	20.632	
8,450.0	7,901.9	8,282.6	7,900.7	33.1	22.1	-89.92	-734.4	-315.1	850.9	808.7	20.147	
8,494.7	7,903.5	8,327.3	7,903.3	33.3	22.5	-89.99	-776.6	-300.6	850.9	807.7	19.708	
8,500.0	7,903.5	8,332.5	7,903.4	33.3	22.6	-90.00	-781.5	-298.9	850.9	807.6	19.657	
8,501.8	7,903.5	8,334.4	7,903.5	33.3	22.6	-90.00	-783.3	-298.3	850.9	807.6	19.638	
8,600.0	7,903.5	8,432.5	7,903.5	33.9	23.6	-90.00	-876.1	-266.2	850.9	805.3	18.678	
8,700.0	7,903.5	8,532.5	7,903.5	34.6	24.8	-90.00	-970.6	-233.6	850.9	802.9	17.721	

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #203 - 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	
8,800.0	7,903.5	8,632.5	7,903.5	35.3	26.1	-90.00	-1,065.1	-201.0	850.9	800.3	16,800		
8,900.0	7,903.5	8,732.5	7,903.5	36.2	27.4	-90.00	-1,159.6	-168.3	850.9	797.5	15,926		
9,000.0	7,903.5	8,832.5	7,903.5	37.2	28.8	-90.00	-1,254.2	-135.7	850.9	794.6	15,104		
9,100.0	7,903.5	8,932.5	7,903.5	38.2	30.3	-90.00	-1,348.7	-103.1	850.9	791.5	14,330		
9,200.0	7,903.5	9,032.5	7,903.5	39.3	31.8	-90.00	-1,443.2	-70.4	850.9	788.5	13,631		
9,300.0	7,903.5	9,132.5	7,903.5	40.5	33.4	-90.00	-1,537.7	-37.8	850.9	785.3	12,969		
9,400.0	7,903.5	9,232.5	7,903.5	41.7	35.0	-90.00	-1,632.2	-5.2	850.9	782.0	12,357		
9,500.0	7,903.5	9,332.5	7,903.5	43.0	36.6	-90.00	-1,726.8	27.5	850.9	778.7	11,790		
9,600.0	7,903.5	9,432.5	7,903.5	44.4	38.2	-90.00	-1,821.3	60.1	850.9	775.4	11,266		
9,700.0	7,903.5	9,532.5	7,903.5	45.8	39.9	-90.00	-1,915.8	92.8	850.9	772.0	10,781		
9,800.0	7,903.5	9,632.5	7,903.5	47.2	41.6	-90.00	-2,010.3	125.4	850.9	768.5	10,331		
9,900.0	7,903.5	9,732.5	7,903.5	48.7	43.3	-90.00	-2,104.9	158.0	850.9	765.1	9,912		
10,000.0	7,903.5	9,832.5	7,903.5	50.3	45.1	-90.00	-2,199.4	190.7	850.9	761.6	9,524		
10,100.0	7,903.5	9,932.5	7,903.5	51.8	46.8	-90.00	-2,293.9	223.3	850.9	758.0	9,162		
10,200.0	7,903.5	10,032.5	7,903.5	53.4	48.6	-90.00	-2,388.4	255.9	850.9	754.5	8,824		
10,300.0	7,903.5	10,132.5	7,903.5	55.0	50.4	-90.00	-2,483.0	288.6	850.9	750.9	8,508		
10,400.0	7,903.5	10,232.5	7,903.5	56.6	52.2	-90.00	-2,577.5	321.2	850.9	747.3	8,213		
10,500.0	7,903.5	10,332.5	7,903.5	58.2	53.9	-90.00	-2,672.0	353.8	850.9	743.7	7,936		
10,600.0	7,903.5	10,432.5	7,903.5	59.9	55.8	-90.00	-2,766.5	386.5	850.9	740.1	7,677		
10,700.0	7,903.5	10,532.5	7,903.5	61.6	57.6	-90.00	-2,861.1	419.1	850.9	736.4	7,432		
10,800.0	7,903.5	10,632.5	7,903.5	63.3	59.4	-90.00	-2,955.6	451.7	850.9	732.8	7,202		
10,900.0	7,903.5	10,732.5	7,903.5	65.0	61.2	-90.00	-3,050.1	484.4	850.9	729.1	6,986		
11,000.0	7,903.5	10,832.5	7,903.5	66.7	63.0	-90.00	-3,144.6	517.0	850.9	725.4	6,781		
11,100.0	7,903.5	10,932.5	7,903.5	68.4	64.9	-90.00	-3,239.2	549.7	850.9	721.7	6,587		
11,200.0	7,903.5	11,032.5	7,903.5	70.2	66.7	-90.00	-3,333.7	582.3	850.9	718.0	6,404		
11,300.0	7,903.5	11,132.5	7,903.5	71.9	68.6	-90.00	-3,428.2	614.9	850.9	714.3	6,231		
11,400.0	7,903.5	11,232.5	7,903.5	73.7	70.4	-90.00	-3,522.7	647.6	850.9	710.6	6,066		
11,500.0	7,903.5	11,332.5	7,903.5	75.4	72.3	-90.00	-3,617.3	680.2	850.9	706.9	5,909		
11,600.0	7,903.5	11,432.5	7,903.5	77.2	74.1	-90.00	-3,711.8	712.8	850.9	703.2	5,760		
11,700.0	7,903.5	11,532.5	7,903.5	79.0	76.0	-90.00	-3,806.3	745.5	850.9	699.4	5,618		
11,800.0	7,903.5	11,632.5	7,903.5	80.8	77.8	-90.00	-3,900.8	778.1	850.9	695.7	5,483		
11,900.0	7,903.5	11,732.5	7,903.5	82.6	79.7	-90.00	-3,995.4	810.7	850.9	692.0	5,354		
12,000.0	7,903.5	11,832.5	7,903.5	84.4	81.6	-90.00	-4,089.9	843.4	850.9	688.2	5,231		
12,100.0	7,903.5	11,932.5	7,903.5	86.2	83.4	-90.00	-4,184.4	876.0	850.9	684.5	5,113		
12,200.0	7,903.5	12,032.5	7,903.5	88.0	85.3	-90.00	-4,278.9	908.6	850.9	680.7	5,000		
12,300.0	7,903.5	12,132.5	7,903.5	89.8	87.2	-90.00	-4,373.5	941.3	850.9	677.0	4,892		
12,400.0	7,903.5	12,232.5	7,903.5	91.6	89.1	-90.00	-4,468.0	973.9	850.9	673.2	4,789		
12,500.0	7,903.5	12,332.5	7,903.5	93.5	90.9	-90.00	-4,562.5	1,006.5	850.9	669.4	4,689		
12,600.0	7,903.5	12,432.5	7,903.5	95.3	92.8	-90.00	-4,657.0	1,039.2	850.9	665.7	4,594		
12,700.0	7,903.5	12,532.5	7,903.5	97.1	94.7	-90.00	-4,751.6	1,071.8	850.9	661.9	4,502		
12,800.0	7,903.5	12,632.5	7,903.5	98.9	96.6	-90.00	-4,846.1	1,104.5	850.9	658.1	4,414		
12,900.0	7,903.5	12,732.5	7,903.5	100.8	98.5	-90.00	-4,940.6	1,137.1	850.9	654.4	4,329		
13,000.0	7,903.5	12,832.5	7,903.5	102.6	100.4	-90.00	-5,035.1	1,169.7	850.9	650.6	4,248		
13,100.0	7,903.5	12,932.5	7,903.5	104.5	102.2	-90.00	-5,129.7	1,202.4	850.9	646.8	4,169		
13,200.0	7,903.5	13,032.5	7,903.5	106.3	104.1	-90.00	-5,224.2	1,235.0	850.9	643.0	4,093		
13,300.0	7,903.5	13,132.5	7,903.5	108.2	106.0	-90.00	-5,318.7	1,267.6	850.9	639.2	4,020		
13,400.0	7,903.5	13,232.5	7,903.5	110.0	107.9	-90.00	-5,413.2	1,300.3	850.9	635.4	3,949		
13,500.0	7,903.5	13,332.5	7,903.5	111.9	109.8	-90.00	-5,507.8	1,332.9	850.9	631.6	3,881		
13,600.0	7,903.5	13,432.5	7,903.5	113.7	111.7	-90.00	-5,602.3	1,365.5	850.9	627.9	3,815		
13,700.0	7,903.5	13,532.5	7,903.5	115.6	113.6	-90.00	-5,696.8	1,398.2	850.9	624.1	3,751		
13,800.0	7,903.5	13,632.5	7,903.5	117.5	115.5	-90.00	-5,791.3	1,430.8	850.9	620.3	3,689		
13,900.0	7,903.5	13,732.5	7,903.5	119.3	117.4	-90.00	-5,885.9	1,463.4	850.9	616.5	3,630		

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #203 - 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 Tooface (°)	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	13,832.5	7,903.5	121.2	119.3	-90.00	-5,980.4	1,496.1	850.9	612.7	3.572		
14,100.0	7,903.5	13,932.5	7,903.5	123.1	121.2	-90.00	-6,074.9	1,528.7	850.9	608.9	3.516		
14,200.0	7,903.5	14,032.5	7,903.5	124.9	123.1	-90.00	-6,169.4	1,561.4	850.9	605.1	3.461		
14,300.0	7,903.5	14,132.5	7,903.5	126.8	125.0	-90.00	-6,264.0	1,594.0	850.9	601.3	3.409		
14,400.0	7,903.5	14,232.5	7,903.5	128.7	126.9	-90.00	-6,358.5	1,626.6	850.9	597.5	3.357		
14,500.0	7,903.5	14,332.5	7,903.5	130.5	128.8	-90.00	-6,453.0	1,659.3	850.9	593.7	3.308		
14,600.0	7,903.5	14,432.5	7,903.5	132.4	130.7	-90.00	-6,547.5	1,691.9	850.9	589.9	3.260		
14,700.0	7,903.5	14,532.5	7,903.5	134.3	132.6	-90.00	-6,642.1	1,724.5	850.9	586.0	3.213		
14,800.0	7,903.5	14,632.5	7,903.5	136.2	134.5	-90.00	-6,736.6	1,757.2	850.9	582.2	3.167		
14,900.0	7,903.5	14,732.5	7,903.5	138.0	136.4	-90.00	-6,831.1	1,789.8	850.9	578.4	3.123		
15,000.0	7,903.5	14,832.5	7,903.5	139.9	138.3	-90.00	-6,925.6	1,822.4	850.9	574.6	3.080		
15,100.0	7,903.5	14,932.5	7,903.5	141.8	140.2	-90.00	-7,020.2	1,855.1	850.9	570.8	3.038		
15,200.0	7,903.5	15,032.5	7,903.5	143.7	142.1	-90.00	-7,114.7	1,887.7	850.9	567.0	2.997		
15,300.0	7,903.5	15,132.5	7,903.5	145.6	144.0	-90.00	-7,209.2	1,920.3	850.9	563.2	2.957		
15,400.0	7,903.5	15,232.5	7,903.5	147.5	145.9	-90.00	-7,303.7	1,953.0	850.9	559.4	2.919		
15,500.0	7,903.5	15,332.5	7,903.5	149.3	147.8	-90.00	-7,398.3	1,985.6	850.9	555.6	2.881		
15,600.0	7,903.5	15,432.5	7,903.5	151.2	149.7	-90.00	-7,492.8	2,018.2	850.9	551.7	2.844		
15,700.0	7,903.5	15,532.5	7,903.5	153.1	151.6	-90.00	-7,587.3	2,050.9	850.9	547.9	2.809		
15,800.0	7,903.5	15,632.5	7,903.5	155.0	153.5	-90.00	-7,681.8	2,083.5	850.9	544.1	2.774		
15,900.0	7,903.5	15,732.5	7,903.5	156.9	155.4	-90.00	-7,776.4	2,116.2	850.9	540.3	2.740		
16,000.0	7,903.5	15,832.5	7,903.5	158.8	157.3	-90.00	-7,870.9	2,148.8	850.9	536.5	2.706		
16,100.0	7,903.5	15,932.5	7,903.5	160.7	159.2	-90.00	-7,965.4	2,181.4	850.9	532.7	2.674		
16,200.0	7,903.5	16,032.5	7,903.5	162.6	161.1	-90.00	-8,059.9	2,214.1	850.9	528.8	2.642		
16,300.0	7,903.5	16,132.5	7,903.5	164.5	163.1	-90.00	-8,154.5	2,246.7	850.9	525.0	2.611		
16,400.0	7,903.5	16,232.5	7,903.5	166.3	165.0	-90.00	-8,249.0	2,279.3	850.9	521.2	2.581		
16,500.0	7,903.5	16,332.5	7,903.5	168.2	166.9	-90.00	-8,343.5	2,312.0	850.9	517.4	2.551		
16,600.0	7,903.5	16,432.5	7,903.5	170.1	168.8	-90.00	-8,438.0	2,344.6	850.9	513.6	2.522		
16,700.0	7,903.5	16,532.5	7,903.5	172.0	170.7	-90.00	-8,532.6	2,377.2	850.9	509.7	2.494		
16,800.0	7,903.5	16,632.5	7,903.5	173.9	172.6	-90.00	-8,627.1	2,409.9	850.9	505.9	2.467		
16,900.0	7,903.5	16,732.5	7,903.5	175.8	174.5	-90.00	-8,721.6	2,442.5	850.9	502.1	2.440		
17,000.0	7,903.5	16,832.5	7,903.5	177.7	176.4	-90.00	-8,816.1	2,475.1	850.9	498.3	2.413		
17,100.0	7,903.5	16,932.5	7,903.5	179.6	178.3	-90.00	-8,910.7	2,507.8	850.9	494.5	2.387		
17,200.0	7,903.5	17,032.5	7,903.5	181.5	180.2	-90.00	-9,005.2	2,540.4	850.9	490.6	2.362		
17,300.0	7,903.5	17,132.5	7,903.5	183.4	182.2	-90.00	-9,099.7	2,573.1	850.9	486.8	2.337		
17,400.0	7,903.5	17,232.5	7,903.5	185.3	184.1	-90.00	-9,194.2	2,605.7	850.9	483.0	2.313		
17,500.0	7,903.5	17,332.5	7,903.5	187.2	186.0	-90.00	-9,288.8	2,638.3	850.9	479.2	2.289		
17,600.0	7,903.5	17,432.5	7,903.5	189.1	187.9	-90.00	-9,383.3	2,671.0	850.9	475.3	2.266		
17,700.0	7,903.5	17,532.5	7,903.5	191.0	189.8	-90.00	-9,477.8	2,703.6	850.9	471.5	2.243		
17,800.0	7,903.5	17,632.5	7,903.5	192.9	191.7	-90.00	-9,572.3	2,736.2	850.9	467.7	2.220		
17,900.0	7,903.5	17,732.5	7,903.5	194.8	193.6	-90.00	-9,666.9	2,768.9	850.9	463.9	2.198		
18,000.0	7,903.5	17,832.5	7,903.5	196.7	195.5	-90.00	-9,761.4	2,801.5	850.9	460.0	2.177		
18,100.0	7,903.5	17,932.5	7,903.5	198.6	197.4	-90.00	-9,855.9	2,834.1	850.9	456.2	2.156		
18,200.0	7,903.5	18,032.5	7,903.5	200.5	199.4	-90.00	-9,950.4	2,866.8	850.9	452.4	2.135		
18,300.0	7,903.5	18,132.5	7,903.5	202.4	201.3	-90.00	-10,044.9	2,899.4	850.9	448.6	2.115		
18,400.0	7,903.5	18,232.5	7,903.5	204.3	203.2	-90.00	-10,139.5	2,932.0	850.9	444.7	2.095		
18,500.0	7,903.5	18,332.5	7,903.5	206.2	205.1	-90.00	-10,234.0	2,964.7	850.9	440.9	2.075		
18,600.0	7,903.5	18,432.5	7,903.5	208.1	207.0	-90.00	-10,328.5	2,997.3	850.9	437.1	2.056		
18,700.0	7,903.5	18,532.5	7,903.5	210.0	208.9	-90.00	-10,423.0	3,029.9	850.9	433.2	2.037		
18,800.0	7,903.5	18,632.5	7,903.5	211.9	210.8	-90.00	-10,517.6	3,062.6	850.9	429.4	2.019		
18,900.0	7,903.5	18,732.5	7,903.5	213.8	212.8	-90.00	-10,612.1	3,095.2	850.9	425.6	2.001		
19,000.0	7,903.5	18,832.5	7,903.5	215.7	214.7	-90.00	-10,706.6	3,127.9	850.9	421.8	1.983		
19,100.0	7,903.5	18,932.5	7,903.5	217.6	216.6	-90.00	-10,801.1	3,160.5	850.9	417.9	1.965		

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #203 - 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 Tooface (")	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	19,032.5	7,903.5	219.5	218.5	-90.00	-10,895.7	3,193.1	850.9	414.1	1.948		
19,300.0	7,903.5	19,132.5	7,903.5	221.4	220.4	-90.00	-10,990.2	3,225.8	850.9	410.3	1.931		
19,400.0	7,903.5	19,232.5	7,903.5	223.3	222.3	-90.00	-11,084.7	3,258.4	850.9	406.4	1.914		
19,500.0	7,903.5	19,332.5	7,903.5	225.2	224.2	-90.00	-11,179.2	3,291.0	850.9	402.6	1.898		
19,600.0	7,903.5	19,432.5	7,903.5	227.2	226.2	-90.00	-11,273.8	3,323.7	850.9	398.8	1.882		
19,700.0	7,903.5	19,532.5	7,903.5	229.1	228.1	-90.00	-11,368.3	3,356.3	850.9	394.9	1.866		
19,800.0	7,903.5	19,632.5	7,903.5	231.0	230.0	-90.00	-11,462.8	3,388.9	850.9	391.1	1.851		
19,900.0	7,903.5	19,732.5	7,903.5	232.9	231.9	-90.00	-11,557.3	3,421.6	850.9	387.3	1.835		
20,000.0	7,903.5	19,832.5	7,903.5	234.8	233.8	-90.00	-11,651.9	3,454.2	850.9	383.5	1.820		
20,100.0	7,903.5	19,932.5	7,903.5	236.7	235.7	-90.00	-11,746.4	3,486.8	850.9	379.6	1.806		
20,200.0	7,903.5	20,032.5	7,903.5	238.6	237.6	-90.00	-11,840.9	3,519.5	850.9	375.8	1.791		
20,300.0	7,903.5	20,132.5	7,903.5	240.5	239.5	-90.00	-11,935.4	3,552.1	850.9	372.0	1.777		
20,400.0	7,903.5	20,232.5	7,903.5	242.4	241.5	-90.00	-12,030.0	3,584.8	850.9	368.1	1.763		
20,500.0	7,903.5	20,332.5	7,903.5	244.3	243.4	-90.00	-12,124.5	3,617.4	850.9	364.3	1.749		
20,600.0	7,903.5	20,432.5	7,903.5	246.2	245.3	-90.00	-12,219.0	3,650.0	850.9	360.5	1.735		
20,700.0	7,903.5	20,532.5	7,903.5	248.1	247.2	-90.00	-12,313.5	3,682.7	850.9	356.6	1.722		
20,800.0	7,903.5	20,632.5	7,903.5	250.0	249.1	-90.00	-12,408.1	3,715.3	850.9	352.8	1.708		
20,900.0	7,903.5	20,732.5	7,903.5	252.0	251.0	-90.00	-12,502.6	3,747.9	850.9	349.0	1.695		
21,000.0	7,903.5	20,832.5	7,903.5	253.9	253.0	-90.00	-12,597.1	3,780.6	850.9	345.1	1.682		
21,100.0	7,903.5	20,932.5	7,903.5	255.8	254.9	-90.00	-12,691.6	3,813.2	850.9	341.3	1.670		
21,200.0	7,903.5	21,032.5	7,903.5	257.7	256.8	-90.00	-12,786.2	3,845.8	850.9	337.5	1.657		
21,300.0	7,903.5	21,132.5	7,903.5	259.6	258.7	-90.00	-12,880.7	3,878.5	850.9	333.6	1.645		
21,400.0	7,903.5	21,232.5	7,903.5	261.5	260.6	-90.00	-12,975.2	3,911.1	850.9	329.8	1.633		
21,500.0	7,903.5	21,332.5	7,903.5	263.4	262.5	-90.00	-13,069.7	3,943.7	850.9	326.0	1.621		
21,600.0	7,903.5	21,432.5	7,903.5	265.3	264.5	-90.00	-13,164.3	3,976.4	850.9	322.1	1.609		
21,700.0	7,903.5	21,532.5	7,903.5	267.2	266.4	-90.00	-13,258.8	4,009.0	850.9	318.3	1.598		
21,800.0	7,903.5	21,632.5	7,903.5	269.1	268.3	-90.00	-13,353.3	4,041.6	850.9	314.5	1.586		
21,900.0	7,903.5	21,732.5	7,903.5	271.1	270.2	-90.00	-13,447.8	4,074.3	850.9	310.6	1.575		
22,000.0	7,903.5	21,832.5	7,903.5	273.0	272.1	-90.00	-13,542.4	4,106.9	850.9	306.8	1.564		
22,100.0	7,903.5	21,932.5	7,903.5	274.9	274.0	-90.00	-13,636.9	4,139.6	850.9	303.0	1.553		
22,136.9	7,903.5	21,969.5	7,903.5	275.6	274.8	-90.00	-13,671.8	4,151.6	850.9	301.5	1.549		

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Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #204 - 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	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		
400.0	400.0	400.0	400.0	0.8	0.8	0.00	30.0	0.0	30.0	28.5	19.832		
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	CC, ES	
2,600.0	2,600.0	2,599.7	2,599.7	5.7	5.7	115.22	30.3	1.7	31.0	19.6	2.726	SF	
2,700.0	2,699.8	2,698.7	2,698.6	5.9	5.9	130.80	31.0	6.8	35.9	24.1	3.053		
2,800.0	2,799.5	2,796.3	2,795.8	6.1	6.1	147.40	32.2	15.2	48.0	35.9	3.961		
2,900.0	2,898.7	2,891.9	2,890.6	6.3	6.3	159.38	33.9	26.5	68.8	56.1	5.501		
3,000.0	2,997.5	2,984.7	2,982.4	6.5	6.5	166.92	35.9	40.5	97.0	84.2	7.583		
3,100.0	3,095.6	3,074.4	3,070.6	6.8	6.8	171.65	38.3	56.8	132.4	119.3	10.114		
3,200.0	3,193.1	3,160.5	3,154.6	7.1	7.0	174.72	41.0	75.0	174.3	160.9	13.026		
3,300.0	3,289.6	3,242.5	3,234.2	7.4	7.3	176.81	43.9	94.7	222.1	208.4	16.269		
3,400.0	3,385.3	3,326.9	3,315.7	7.8	7.6	178.36	47.1	116.3	274.5	260.5	19.589		
3,500.0	3,479.8	3,409.9	3,395.9	8.2	7.9	179.45	50.2	137.5	330.0	315.6	22.933		
3,519.1	3,497.8	3,425.6	3,411.1	8.3	7.9	179.62	50.8	141.5	341.0	326.5	23.576		
3,600.0	3,573.6	3,491.6	3,474.9	8.7	8.2	-179.76	53.2	158.5	387.5	372.7	26.235		
3,700.0	3,667.3	3,573.3	3,553.8	9.2	8.5	-179.18	56.3	179.4	445.1	429.9	29.359		
3,800.0	3,761.1	3,655.0	3,632.7	9.8	8.8	-178.73	59.4	200.3	502.7	487.1	32.311		
3,900.0	3,854.8	3,748.0	3,722.7	10.4	9.2	-178.33	62.8	223.5	559.8	543.7	34.866		
4,000.0	3,948.5	3,853.1	3,825.2	11.0	9.5	-178.04	66.2	246.5	614.3	597.6	36.931		
4,100.0	4,042.3	3,963.3	3,933.4	11.6	9.8	-177.86	69.1	266.6	665.6	648.4	38.654		
4,200.0	4,136.0	4,078.5	4,047.4	12.2	10.2	-177.77	71.5	283.2	713.5	695.7	40.068		
4,300.0	4,229.7	4,198.6	4,166.9	12.8	10.5	-177.75	73.4	295.7	757.9	739.5	41.203		
4,400.0	4,323.5	4,323.6	4,291.6	13.5	10.7	-177.79	74.5	303.3	798.4	779.4	42.092		
4,500.0	4,417.2	4,449.3	4,417.2	14.1	11.0	-177.89	74.8	305.7	834.9	815.3	42.789		
4,600.0	4,511.0	4,543.0	4,511.0	14.8	11.1	-177.97	74.8	305.7	869.7	849.7	43.550		
4,700.0	4,604.7	4,636.7	4,604.7	15.5	11.3	-178.05	74.8	305.7	904.5	884.0	44.251		
4,800.0	4,698.4	4,730.5	4,698.4	16.1	11.5	-178.12	74.8	305.7	939.3	918.4	44.914		
4,900.0	4,792.2	4,824.2	4,792.2	16.8	11.7	-178.19	74.8	305.7	974.1	952.7	45.543		
5,000.0	4,885.9	4,918.0	4,885.9	17.5	11.9	-178.25	74.8	305.7	1,008.9	987.1	46.140		

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #204 - Wellbore #1 - Design #1												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												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)	Semi Major 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	
5,100.0	4,979.7	5,011.7	4,979.7	18.2	12.1	-178.31	74.8	305.7	1,043.7	1,021.4	46.706		
5,200.0	5,073.4	5,105.4	5,073.4	18.9	12.2	-178.36	74.8	305.7	1,078.6	1,055.7	47.244		
5,300.0	5,167.1	5,199.2	5,167.1	19.6	12.4	-178.42	74.8	305.7	1,113.4	1,090.1	47.756		
5,400.0	5,260.9	5,292.9	5,260.9	20.3	12.6	-178.46	74.8	305.7	1,148.2	1,124.4	48.243		
5,500.0	5,354.6	5,386.7	5,354.6	21.0	12.8	-178.51	74.8	305.7	1,183.0	1,158.7	48.707		
5,600.0	5,448.3	5,480.4	5,448.3	21.7	13.0	-178.55	74.8	305.7	1,217.8	1,193.0	49.150		
5,700.0	5,542.1	5,574.1	5,542.1	22.4	13.2	-178.59	74.8	305.7	1,252.6	1,227.4	49.573		
5,800.0	5,635.8	5,667.9	5,635.8	23.1	13.4	-178.63	74.8	305.7	1,287.5	1,261.7	49.977		
5,900.0	5,729.6	5,761.6	5,729.6	23.8	13.6	-178.67	74.8	305.7	1,322.3	1,296.0	50.364		
6,000.0	5,823.3	5,855.3	5,823.3	24.5	13.7	-178.70	74.8	305.7	1,357.1	1,330.4	50.733		
6,100.0	5,917.0	5,949.1	5,917.0	25.2	13.9	-178.73	74.8	305.7	1,391.9	1,364.7	51.087		
6,200.0	6,010.8	6,042.8	6,010.8	25.9	14.1	-178.76	74.8	305.7	1,426.8	1,399.0	51.427		
6,300.0	6,104.5	6,136.6	6,104.5	26.7	14.3	-178.79	74.8	305.7	1,461.6	1,433.3	51.752		
6,400.0	6,198.3	6,230.3	6,198.3	27.4	14.5	-178.82	74.8	305.7	1,496.4	1,467.7	52.065		
6,475.6	6,269.1	6,301.2	6,269.1	27.9	14.7	-178.84	74.8	305.7	1,522.7	1,493.6	52.293		
6,500.0	6,292.0	6,324.1	6,292.0	28.1	14.7	-178.85	74.8	305.7	1,531.1	1,501.9	52.366		
6,600.0	6,386.6	6,418.7	6,386.6	28.6	14.9	-178.89	74.8	305.7	1,563.5	1,533.8	52.616		
6,700.0	6,482.3	6,514.4	6,482.3	29.1	15.1	-178.92	74.8	305.7	1,592.6	1,562.4	52.757		
6,800.0	6,579.0	6,611.0	6,579.0	29.5	15.3	-178.95	74.8	305.7	1,618.3	1,587.6	52.794		
6,900.0	6,676.4	6,708.5	6,676.4	29.9	15.5	-178.97	74.8	305.7	1,640.6	1,609.5	52.734		
7,000.0	6,774.6	6,806.7	6,774.6	30.2	15.7	-178.99	74.8	305.7	1,659.5	1,627.9	52.582		
7,100.0	6,873.4	6,905.5	6,873.4	30.5	15.9	-179.00	74.8	305.7	1,674.9	1,642.9	52.343		
7,200.0	6,972.7	7,004.7	6,972.7	30.8	16.1	-179.01	74.8	305.7	1,686.9	1,654.5	52.021		
7,300.0	7,072.3	7,104.4	7,072.3	31.0	16.3	-179.02	74.8	305.7	1,695.5	1,662.6	51.620		
7,400.0	7,172.2	7,204.2	7,172.2	31.1	16.5	-179.03	74.8	305.7	1,700.5	1,667.3	51.143		
7,494.7	7,266.9	7,298.9	7,266.9	31.2	16.7	-179.05	74.8	305.7	1,702.1	1,668.4	50.623		
7,500.0	7,272.2	7,304.0	7,271.9	31.3	16.8	-89.00	74.8	305.7	1,702.1	1,668.4	50.596		
7,550.0	7,322.1	7,351.7	7,319.6	31.3	16.8	-89.00	72.8	306.4	1,702.1	1,668.3	50.351		
7,600.0	7,371.7	7,400.0	7,367.5	31.3	16.9	-89.01	67.3	308.3	1,702.1	1,668.1	50.099		
7,650.0	7,420.6	7,447.3	7,414.0	31.4	17.0	-89.03	58.6	311.3	1,702.1	1,667.9	49.848		
7,700.0	7,468.6	7,495.2	7,460.1	31.4	17.1	-89.05	46.5	315.5	1,702.0	1,667.7	49.584		
7,750.0	7,515.4	7,543.1	7,505.1	31.5	17.2	-89.08	31.1	320.8	1,702.0	1,667.5	49.302		
7,800.0	7,560.6	7,591.1	7,548.9	31.5	17.3	-89.11	12.6	327.1	1,702.0	1,667.3	49.009		
7,850.0	7,604.0	7,639.1	7,591.1	31.6	17.4	-89.15	-9.0	334.6	1,702.0	1,667.0	48.664		
7,900.0	7,645.3	7,687.2	7,631.5	31.6	17.6	-89.19	-33.6	343.1	1,702.0	1,666.7	48.284		
7,950.0	7,684.3	7,735.4	7,670.0	31.7	17.7	-89.24	-61.1	352.6	1,702.0	1,666.4	47.853		
8,000.0	7,720.8	7,783.7	7,706.2	31.8	17.9	-89.29	-91.4	363.0	1,701.9	1,666.0	47.365		
8,050.0	7,754.4	7,832.1	7,739.9	31.8	18.1	-89.34	-124.2	374.4	1,701.9	1,665.6	46.812		
8,100.0	7,785.0	7,880.7	7,771.0	31.9	18.3	-89.40	-159.4	386.5	1,701.9	1,665.1	46.191		
8,150.0	7,812.4	7,929.4	7,799.2	32.0	18.6	-89.47	-196.9	399.5	1,701.9	1,664.5	45.502		
8,200.0	7,836.5	7,978.2	7,824.4	32.2	18.9	-89.54	-236.4	413.1	1,701.9	1,663.8	44.745		
8,250.0	7,857.1	8,027.2	7,846.4	32.3	19.3	-89.61	-277.8	427.4	1,701.8	1,663.1	43.927		
8,300.0	7,874.0	8,076.3	7,865.0	32.5	19.7	-89.68	-320.7	442.2	1,701.8	1,662.3	43.053		
8,350.0	7,887.1	8,125.6	7,880.1	32.6	20.1	-89.75	-365.1	457.5	1,701.8	1,661.4	42.135		
8,400.0	7,896.5	8,175.1	7,891.5	32.8	20.6	-89.83	-410.6	473.2	1,701.8	1,660.5	41.184		
8,450.0	7,901.9	8,224.7	7,899.2	33.1	21.1	-89.91	-456.9	489.2	1,701.8	1,659.5	40.211		
8,494.7	7,903.5	8,269.3	7,902.8	33.3	21.6	-89.98	-498.9	503.7	1,701.8	1,658.5	39.333		
8,500.0	7,903.5	8,274.5	7,903.1	33.3	21.6	-89.98	-503.9	505.5	1,701.8	1,658.4	39.230		
8,600.0	7,903.5	8,374.5	7,903.5	33.9	22.8	-90.00	-598.4	538.1	1,701.8	1,656.1	37.271		
8,700.0	7,903.5	8,474.5	7,903.5	34.6	24.0	-90.00	-692.9	570.7	1,701.8	1,653.7	35.358		
8,800.0	7,903.5	8,574.5	7,903.5	35.3	25.3	-90.00	-787.4	603.4	1,701.8	1,651.0	33.519		
8,900.0	7,903.5	8,674.5	7,903.5	36.2	26.8	-90.00	-881.9	636.0	1,701.8	1,648.2	31.775		

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #204 - 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	
9,000.0	7,903.5	8,774.5	7,903.5	37.2	28.2	-90.00	-976.5	668.6	1,701.8	1,645.3	30.137		
9,100.0	7,903.5	8,874.5	7,903.5	38.2	29.7	-90.00	-1,071.0	701.3	1,701.8	1,642.3	28.609		
9,200.0	7,903.5	8,974.5	7,903.5	39.3	31.3	-90.00	-1,165.5	733.9	1,701.8	1,639.2	27.189		
9,300.0	7,903.5	9,074.5	7,903.5	40.5	32.9	-90.00	-1,260.0	766.5	1,701.8	1,636.0	25.872		
9,400.0	7,903.5	9,174.5	7,903.5	41.7	34.5	-90.00	-1,354.6	799.2	1,701.8	1,632.8	24.654		
9,500.0	7,903.5	9,274.5	7,903.5	43.0	36.2	-90.00	-1,449.1	831.8	1,701.8	1,629.5	23.526		
9,600.0	7,903.5	9,374.5	7,903.5	44.4	37.9	-90.00	-1,543.6	864.4	1,701.8	1,626.1	22.481		
9,700.0	7,903.5	9,474.5	7,903.5	45.8	39.6	-90.00	-1,638.1	897.1	1,701.8	1,622.7	21.514		
9,800.0	7,903.5	9,574.5	7,903.5	47.2	41.3	-90.00	-1,732.7	929.7	1,701.8	1,619.3	20.617		
9,900.0	7,903.5	9,674.5	7,903.5	48.7	43.0	-90.00	-1,827.2	962.3	1,701.8	1,615.8	19.784		
10,000.0	7,903.5	9,774.5	7,903.5	50.3	44.8	-90.00	-1,921.7	995.0	1,701.8	1,612.3	19.009		
10,100.0	7,903.5	9,874.5	7,903.5	51.8	46.6	-90.00	-2,016.2	1,027.6	1,701.8	1,608.7	18.287		
10,200.0	7,903.5	9,974.5	7,903.5	53.4	48.4	-90.00	-2,110.8	1,060.2	1,701.8	1,605.2	17.614		
10,300.0	7,903.5	10,074.5	7,903.5	55.0	50.1	-90.00	-2,205.3	1,092.9	1,701.8	1,601.6	16.985		
10,400.0	7,903.5	10,174.5	7,903.5	56.6	51.9	-90.00	-2,299.8	1,125.5	1,701.8	1,598.0	16.397		
10,500.0	7,903.5	10,274.5	7,903.5	58.2	53.8	-90.00	-2,394.3	1,158.2	1,701.8	1,594.4	15.845		
10,600.0	7,903.5	10,374.5	7,903.5	59.9	55.6	-90.00	-2,488.8	1,190.8	1,701.8	1,590.8	15.327		
10,700.0	7,903.5	10,474.5	7,903.5	61.6	57.4	-90.00	-2,583.4	1,223.4	1,701.8	1,587.1	14.840		
10,800.0	7,903.5	10,574.5	7,903.5	63.3	59.2	-90.00	-2,677.9	1,256.1	1,701.8	1,583.5	14.382		
10,900.0	7,903.5	10,674.5	7,903.5	65.0	61.1	-90.00	-2,772.4	1,288.7	1,701.8	1,579.8	13.949		
11,000.0	7,903.5	10,774.5	7,903.5	66.7	62.9	-90.00	-2,867.0	1,321.3	1,701.8	1,576.1	13.541		
11,100.0	7,903.5	10,874.5	7,903.5	68.4	64.7	-90.00	-2,961.5	1,354.0	1,701.8	1,572.4	13.155		
11,200.0	7,903.5	10,974.5	7,903.5	70.2	66.6	-90.00	-3,056.0	1,386.6	1,701.8	1,568.7	12.790		
11,300.0	7,903.5	11,074.5	7,903.5	71.9	68.4	-90.00	-3,150.5	1,419.2	1,701.8	1,565.0	12.443		
11,400.0	7,903.5	11,174.5	7,903.5	73.7	70.3	-90.00	-3,245.1	1,451.9	1,701.8	1,561.3	12.115		
11,500.0	7,903.5	11,274.5	7,903.5	75.4	72.2	-90.00	-3,339.6	1,484.5	1,701.8	1,557.6	11.802		
11,600.0	7,903.5	11,374.5	7,903.5	77.2	74.0	-90.00	-3,434.1	1,517.1	1,701.8	1,553.9	11.505		
11,700.0	7,903.5	11,474.5	7,903.5	79.0	75.9	-90.00	-3,528.6	1,549.8	1,701.8	1,550.1	11.222		
11,800.0	7,903.5	11,574.5	7,903.5	80.8	77.8	-90.00	-3,623.2	1,582.4	1,701.8	1,546.4	10.952		
11,900.0	7,903.5	11,674.5	7,903.5	82.6	79.6	-90.00	-3,717.7	1,615.0	1,701.8	1,542.7	10.695		
12,000.0	7,903.5	11,774.5	7,903.5	84.4	81.5	-90.00	-3,812.2	1,647.7	1,701.8	1,538.9	10.449		
12,100.0	7,903.5	11,874.5	7,903.5	86.2	83.4	-90.00	-3,906.7	1,680.3	1,701.8	1,535.2	10.214		
12,200.0	7,903.5	11,974.5	7,903.5	88.0	85.3	-90.00	-4,001.3	1,712.9	1,701.8	1,531.4	9.989		
12,300.0	7,903.5	12,074.5	7,903.5	89.8	87.1	-90.00	-4,095.8	1,745.6	1,701.8	1,527.7	9.773		
12,400.0	7,903.5	12,174.5	7,903.5	91.6	89.0	-90.00	-4,190.3	1,778.2	1,701.8	1,523.9	9.566		
12,500.0	7,903.5	12,274.5	7,903.5	93.5	90.9	-90.00	-4,284.8	1,810.9	1,701.8	1,520.1	9.368		
12,600.0	7,903.5	12,374.5	7,903.5	95.3	92.8	-90.00	-4,379.4	1,843.5	1,701.8	1,516.4	9.178		
12,700.0	7,903.5	12,474.5	7,903.5	97.1	94.7	-90.00	-4,473.9	1,876.1	1,701.8	1,512.6	8.995		
12,800.0	7,903.5	12,574.5	7,903.5	98.9	96.6	-90.00	-4,568.4	1,908.8	1,701.8	1,508.8	8.819		
12,900.0	7,903.5	12,674.5	7,903.5	100.8	98.5	-90.00	-4,662.9	1,941.4	1,701.8	1,505.0	8.649		
13,000.0	7,903.5	12,774.5	7,903.5	102.6	100.3	-90.00	-4,757.5	1,974.0	1,701.8	1,501.3	8.486		
13,100.0	7,903.5	12,874.5	7,903.5	104.5	102.2	-90.00	-4,852.0	2,006.7	1,701.8	1,497.5	8.329		
13,200.0	7,903.5	12,974.5	7,903.5	106.3	104.1	-90.00	-4,946.5	2,039.3	1,701.8	1,493.7	8.178		
13,300.0	7,903.5	13,074.5	7,903.5	108.2	106.0	-90.00	-5,041.0	2,071.9	1,701.8	1,489.9	8.032		
13,400.0	7,903.5	13,174.5	7,903.5	110.0	107.9	-90.00	-5,135.6	2,104.6	1,701.8	1,486.1	7.891		
13,500.0	7,903.5	13,274.5	7,903.5	111.9	109.8	-90.00	-5,230.1	2,137.2	1,701.8	1,482.3	7.754		
13,600.0	7,903.5	13,374.5	7,903.5	113.7	111.7	-90.00	-5,324.6	2,169.8	1,701.8	1,478.5	7.623		
13,700.0	7,903.5	13,474.5	7,903.5	115.6	113.6	-90.00	-5,419.1	2,202.5	1,701.8	1,474.7	7.495		
13,800.0	7,903.5	13,574.5	7,903.5	117.5	115.5	-90.00	-5,513.7	2,235.1	1,701.8	1,470.9	7.372		
13,900.0	7,903.5	13,674.5	7,903.5	119.3	117.4	-90.00	-5,608.2	2,267.7	1,701.8	1,467.2	7.253		
14,000.0	7,903.5	13,774.5	7,903.5	121.2	119.3	-90.00	-5,702.7	2,300.4	1,701.8	1,463.4	7.137		
14,100.0	7,903.5	13,874.5	7,903.5	123.1	121.2	-90.00	-5,797.2	2,333.0	1,701.8	1,459.6	7.025		

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



Anticollision Report



Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #204 - 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	
14,200.0	7,903.5	13,974.5	7,903.5	124.9	123.1	-90.00	-5,891.7	2,365.7	1,701.8	1,455.8	6.917		
14,300.0	7,903.5	14,074.5	7,903.5	126.8	125.0	-90.00	-5,986.3	2,398.3	1,701.8	1,452.0	6.812		
14,400.0	7,903.5	14,174.5	7,903.5	128.7	126.9	-90.00	-6,080.8	2,430.9	1,701.8	1,448.1	6.709		
14,500.0	7,903.5	14,274.5	7,903.5	130.5	128.8	-90.00	-6,175.3	2,463.6	1,701.8	1,444.3	6.610		
14,600.0	7,903.5	14,374.5	7,903.5	132.4	130.7	-90.00	-6,269.8	2,496.2	1,701.8	1,440.5	6.514		
14,700.0	7,903.5	14,474.5	7,903.5	134.3	132.6	-90.00	-6,364.4	2,528.8	1,701.8	1,436.7	6.420		
14,800.0	7,903.5	14,574.5	7,903.5	136.2	134.5	-90.00	-6,458.9	2,561.5	1,701.8	1,432.9	6.329		
14,900.0	7,903.5	14,674.5	7,903.5	138.0	136.4	-90.00	-6,553.4	2,594.1	1,701.8	1,429.1	6.241		
15,000.0	7,903.5	14,774.5	7,903.5	139.9	138.3	-90.00	-6,647.9	2,626.7	1,701.8	1,425.3	6.155		
15,100.0	7,903.5	14,874.5	7,903.5	141.8	140.2	-90.00	-6,742.5	2,659.4	1,701.8	1,421.5	6.071		
15,200.0	7,903.5	14,974.5	7,903.5	143.7	142.1	-90.00	-6,837.0	2,692.0	1,701.8	1,417.7	5.990		
15,300.0	7,903.5	15,074.5	7,903.5	145.6	144.1	-90.00	-6,931.5	2,724.6	1,701.8	1,413.9	5.911		
15,400.0	7,903.5	15,174.5	7,903.5	147.5	146.0	-90.00	-7,026.0	2,757.3	1,701.8	1,410.1	5.833		
15,500.0	7,903.5	15,274.5	7,903.5	149.3	147.9	-90.00	-7,120.6	2,789.9	1,701.8	1,406.2	5.758		
15,600.0	7,903.5	15,374.5	7,903.5	151.2	149.8	-90.00	-7,215.1	2,822.5	1,701.8	1,402.4	5.685		
15,700.0	7,903.5	15,474.5	7,903.5	153.1	151.7	-90.00	-7,309.6	2,855.2	1,701.8	1,398.6	5.613		
15,800.0	7,903.5	15,574.5	7,903.5	155.0	153.6	-90.00	-7,404.1	2,887.8	1,701.8	1,394.8	5.543		
15,900.0	7,903.5	15,674.5	7,903.5	156.9	155.5	-90.00	-7,498.7	2,920.5	1,701.8	1,391.0	5.475		
16,000.0	7,903.5	15,774.5	7,903.5	158.8	157.4	-90.00	-7,593.2	2,953.1	1,701.8	1,387.2	5.409		
16,100.0	7,903.5	15,874.5	7,903.5	160.7	159.3	-90.00	-7,687.7	2,985.7	1,701.8	1,383.3	5.344		
16,200.0	7,903.5	15,974.5	7,903.5	162.6	161.2	-90.00	-7,782.2	3,018.4	1,701.8	1,379.5	5.281		
16,300.0	7,903.5	16,074.5	7,903.5	164.5	163.1	-90.00	-7,876.8	3,051.0	1,701.8	1,375.7	5.219		
16,400.0	7,903.5	16,174.5	7,903.5	166.3	165.0	-90.00	-7,971.3	3,083.6	1,701.8	1,371.9	5.158		
16,500.0	7,903.5	16,274.5	7,903.5	168.2	167.0	-90.00	-8,065.8	3,116.3	1,701.8	1,368.1	5.099		
16,600.0	7,903.5	16,374.5	7,903.5	170.1	168.9	-90.00	-8,160.3	3,148.9	1,701.8	1,364.2	5.042		
16,700.0	7,903.5	16,474.5	7,903.5	172.0	170.8	-90.00	-8,254.9	3,181.5	1,701.8	1,360.4	4.985		
16,800.0	7,903.5	16,574.5	7,903.5	173.9	172.7	-90.00	-8,349.4	3,214.2	1,701.8	1,356.6	4.930		
16,900.0	7,903.5	16,674.5	7,903.5	175.8	174.6	-90.00	-8,443.9	3,246.8	1,701.8	1,352.8	4.876		
17,000.0	7,903.5	16,774.5	7,903.5	177.7	176.5	-90.00	-8,538.4	3,279.4	1,701.8	1,349.0	4.823		
17,100.0	7,903.5	16,874.5	7,903.5	179.6	178.4	-90.00	-8,633.0	3,312.1	1,701.8	1,345.1	4.772		
17,200.0	7,903.5	16,974.5	7,903.5	181.5	180.3	-90.00	-8,727.5	3,344.7	1,701.8	1,341.3	4.721		
17,300.0	7,903.5	17,074.5	7,903.5	183.4	182.2	-90.00	-8,822.0	3,377.3	1,701.8	1,337.5	4.671		
17,400.0	7,903.5	17,174.5	7,903.5	185.3	184.2	-90.00	-8,916.5	3,410.0	1,701.8	1,333.7	4.623		
17,500.0	7,903.5	17,274.5	7,903.5	187.2	186.1	-90.00	-9,011.1	3,442.6	1,701.8	1,329.8	4.575		
17,600.0	7,903.5	17,374.5	7,903.5	189.1	188.0	-90.00	-9,105.6	3,475.2	1,701.8	1,326.0	4.529		
17,700.0	7,903.5	17,474.5	7,903.5	191.0	189.9	-90.00	-9,200.1	3,507.9	1,701.8	1,322.2	4.483		
17,800.0	7,903.5	17,574.5	7,903.5	192.9	191.8	-90.00	-9,294.6	3,540.5	1,701.8	1,318.4	4.438		
17,900.0	7,903.5	17,674.5	7,903.5	194.8	193.7	-90.00	-9,389.2	3,573.2	1,701.8	1,314.5	4.395		
18,000.0	7,903.5	17,774.5	7,903.5	196.7	195.6	-90.00	-9,483.7	3,605.8	1,701.8	1,310.7	4.352		
18,100.0	7,903.5	17,874.5	7,903.5	198.6	197.5	-90.00	-9,578.2	3,638.4	1,701.8	1,306.9	4.309		
18,200.0	7,903.5	17,974.5	7,903.5	200.5	199.5	-90.00	-9,672.7	3,671.1	1,701.8	1,303.0	4.268		
18,300.0	7,903.5	18,074.5	7,903.5	202.4	201.4	-90.00	-9,767.3	3,703.7	1,701.8	1,299.2	4.227		
18,400.0	7,903.5	18,174.5	7,903.5	204.3	203.3	-90.00	-9,861.8	3,736.3	1,701.8	1,295.4	4.188		
18,500.0	7,903.5	18,274.5	7,903.5	206.2	205.2	-90.00	-9,956.3	3,768.9	1,701.8	1,291.6	4.149		
18,600.0	7,903.5	18,374.5	7,903.5	208.1	207.1	-90.00	-10,050.8	3,801.6	1,701.8	1,287.7	4.110		
18,700.0	7,903.5	18,474.5	7,903.5	210.0	209.0	-90.00	-10,145.4	3,834.2	1,701.8	1,283.9	4.073		
18,800.0	7,903.5	18,574.5	7,903.5	211.9	210.9	-90.00	-10,239.9	3,866.9	1,701.8	1,280.1	4.036		
18,900.0	7,903.5	18,674.5	7,903.5	213.8	212.9	-90.00	-10,334.4	3,899.5	1,701.8	1,276.3	3.999		
19,000.0	7,903.5	18,774.5	7,903.5	215.7	214.8	-90.00	-10,428.9	3,932.1	1,701.8	1,272.4	3.964		
19,100.0	7,903.5	18,874.5	7,903.5	217.6	216.7	-90.00	-10,523.5	3,964.8	1,701.8	1,268.6	3.929		
19,200.0	7,903.5	18,974.5	7,903.5	219.5	218.6	-90.00	-10,618.0	3,997.4	1,701.8	1,264.8	3.894		
19,300.0	7,903.5	19,074.5	7,903.5	221.4	220.5	-90.00	-10,712.5	4,030.0	1,701.8	1,260.9	3.860		

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Johnson TFP40 Pad - Johnson TFP40 #204 - Wellbore #1 - Design #1												Offset Site Error:	0.0 usft
Survey Program: 0-MWD default												Offset Well Error:	0.0 usft
Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset 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	
19,400.0	7,903.5	19,174.5	7,903.5	223.3	222.4	-90.00	-10,807.0	4,062.7	1,701.8	1,257.1	3.827		
19,500.0	7,903.5	19,274.5	7,903.5	225.2	224.4	-90.00	-10,901.6	4,095.3	1,701.8	1,253.3	3.794		
19,600.0	7,903.5	19,374.5	7,903.5	227.2	226.3	-90.00	-10,996.1	4,128.0	1,701.8	1,249.4	3.762		
19,700.0	7,903.5	19,474.5	7,903.5	229.1	228.2	-90.00	-11,090.6	4,160.6	1,701.8	1,245.6	3.731		
19,800.0	7,903.5	19,574.5	7,903.5	231.0	230.1	-90.00	-11,185.1	4,193.2	1,701.8	1,241.8	3.700		
19,900.0	7,903.5	19,674.5	7,903.5	232.9	232.0	-90.00	-11,279.7	4,225.9	1,701.8	1,237.9	3.669		
20,000.0	7,903.5	19,774.5	7,903.5	234.8	233.9	-90.00	-11,374.2	4,258.5	1,701.8	1,234.1	3.639		
20,100.0	7,903.5	19,874.5	7,903.5	236.7	235.8	-90.00	-11,468.7	4,291.1	1,701.8	1,230.3	3.609		
20,200.0	7,903.5	19,974.5	7,903.5	238.6	237.8	-90.00	-11,563.2	4,323.8	1,701.8	1,226.5	3.580		
20,300.0	7,903.5	20,074.5	7,903.5	240.5	239.7	-90.00	-11,657.8	4,356.4	1,701.8	1,222.6	3.552		
20,400.0	7,903.5	20,174.5	7,903.5	242.4	241.6	-90.00	-11,752.3	4,389.0	1,701.8	1,218.8	3.523		
20,500.0	7,903.5	20,274.5	7,903.5	244.3	243.5	-90.00	-11,846.8	4,421.7	1,701.8	1,215.0	3.496		
20,600.0	7,903.5	20,374.5	7,903.5	246.2	245.4	-90.00	-11,941.3	4,454.3	1,701.8	1,211.1	3.468		
20,700.0	7,903.5	20,474.5	7,903.5	248.1	247.3	-90.00	-12,035.9	4,486.9	1,701.8	1,207.3	3.442		
20,800.0	7,903.5	20,574.5	7,903.5	250.0	249.3	-90.00	-12,130.4	4,519.6	1,701.8	1,203.5	3.415		
20,900.0	7,903.5	20,674.5	7,903.5	252.0	251.2	-90.00	-12,224.9	4,552.2	1,701.8	1,199.6	3.389		
21,000.0	7,903.5	20,774.5	7,903.5	253.9	253.1	-90.00	-12,319.4	4,584.8	1,701.8	1,195.8	3.363		
21,100.0	7,903.5	20,874.5	7,903.5	255.8	255.0	-90.00	-12,414.0	4,617.5	1,701.8	1,192.0	3.338		
21,200.0	7,903.5	20,974.5	7,903.5	257.7	256.9	-90.00	-12,508.5	4,650.1	1,701.8	1,188.1	3.313		
21,300.0	7,903.5	21,074.5	7,903.5	259.6	258.8	-90.00	-12,603.0	4,682.8	1,701.8	1,184.3	3.289		
21,400.0	7,903.5	21,174.5	7,903.5	261.5	260.8	-90.00	-12,697.5	4,715.4	1,701.8	1,180.5	3.264		
21,500.0	7,903.5	21,274.5	7,903.5	263.4	262.7	-90.00	-12,792.1	4,748.0	1,701.8	1,176.6	3.241		
21,588.6	7,903.5	21,363.2	7,903.5	265.1	264.4	-90.00	-12,875.9	4,777.0	1,701.8	1,173.2	3.220		
21,600.0	7,903.5	21,368.6	7,903.5	265.3	264.5	-90.00	-12,881.0	4,778.7	1,701.8	1,173.0	3.218		
21,700.0	7,903.5	21,368.6	7,903.5	267.2	264.5	-90.00	-12,881.0	4,778.7	1,705.1	1,176.3	3.225		
21,800.0	7,903.5	21,368.6	7,903.5	269.1	264.5	-90.00	-12,881.0	4,778.7	1,714.2	1,187.3	3.253		
21,900.0	7,903.5	21,368.6	7,903.5	271.1	264.5	-90.00	-12,881.0	4,778.7	1,729.1	1,205.7	3.304		
22,000.0	7,903.5	21,368.6	7,903.5	273.0	264.5	-90.00	-12,881.0	4,778.7	1,749.5	1,231.3	3.376		
22,100.0	7,903.5	21,368.6	7,903.5	274.9	264.5	-90.00	-12,881.0	4,778.7	1,775.4	1,263.7	3.470		
22,136.9	7,903.5	21,368.6	7,903.5	275.6	264.5	-90.00	-12,881.0	4,778.7	1,786.3	1,277.4	3.510		

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	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	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		
400.0	400.0	400.0	400.0	0.8	0.8	0.00	45.0	0.0	45.0	43.5	29.749		
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	2,599.5	2,599.5	5.7	5.7	113.11	45.4	1.7	46.1	34.8	4.056	SF	
2,700.0	2,699.8	2,698.2	2,698.1	5.9	5.9	123.94	46.7	6.6	50.8	39.0	4.319		
2,800.0	2,799.5	2,795.6	2,795.1	6.1	6.1	137.28	48.9	14.7	61.7	49.6	5.083		
2,900.0	2,898.7	2,890.9	2,889.7	6.3	6.3	148.87	51.8	25.7	80.6	68.1	6.455		
3,000.0	2,997.5	2,983.5	2,981.2	6.5	6.5	157.30	55.4	39.4	107.6	94.8	8.398		
3,100.0	3,095.6	3,072.9	3,069.1	6.8	6.8	163.06	59.5	55.2	142.1	128.9	10.828		
3,200.0	3,193.1	3,158.7	3,152.9	7.1	7.0	167.00	64.2	72.9	183.3	169.8	13.669		
3,300.0	3,289.6	3,240.4	3,232.2	7.4	7.3	169.75	69.2	92.0	230.6	217.0	16.861		
3,400.0	3,385.3	3,317.9	3,306.8	7.8	7.6	171.72	74.5	112.1	283.7	269.8	20.359		
3,500.0	3,479.8	3,390.9	3,376.6	8.2	7.8	173.17	80.0	132.9	342.0	327.8	24.123		
3,519.1	3,497.8	3,400.0	3,385.3	8.3	7.9	173.31	80.7	135.6	353.8	339.6	24.989		
3,600.0	3,573.6	3,459.9	3,442.0	8.7	8.1	174.37	85.6	154.1	404.3	389.9	28.056		
3,700.0	3,667.3	3,526.3	3,504.5	9.2	8.4	175.32	91.3	175.9	468.6	453.9	32.015		
3,800.0	3,761.1	3,590.1	3,563.9	9.8	8.8	176.06	97.2	198.1	534.6	519.7	35.994		
3,900.0	3,854.8	3,651.4	3,620.6	10.4	9.1	176.66	103.1	220.8	602.3	587.2	39.981		
4,000.0	3,948.5	3,710.3	3,674.6	11.0	9.5	177.16	109.1	243.6	671.6	656.3	43.986		
4,100.0	4,042.3	3,771.3	3,730.0	11.6	9.8	177.60	115.6	268.3	742.2	726.7	47.828		
4,200.0	4,136.0	3,841.6	3,793.7	12.2	10.3	178.03	123.2	297.0	813.3	797.4	51.159		
4,300.0	4,229.7	3,911.9	3,857.4	12.8	10.8	178.39	130.8	325.7	884.3	868.0	54.319		
4,400.0	4,323.5	3,982.1	3,921.1	13.5	11.3	178.70	138.3	354.4	955.4	938.7	57.308		
4,500.0	4,417.2	4,052.4	3,984.8	14.1	11.8	178.96	145.9	383.2	1,026.4	1,009.4	60.139		
4,600.0	4,511.0	4,122.7	4,048.5	14.8	12.3	179.20	153.4	411.9	1,097.5	1,080.0	62.825		
4,700.0	4,604.7	4,193.0	4,112.2	15.5	12.9	179.40	161.0	440.6	1,168.6	1,150.7	65.371		
4,800.0	4,698.4	4,263.2	4,175.8	16.1	13.4	179.58	168.6	469.3	1,239.7	1,221.4	67.782		
4,900.0	4,792.2	4,333.5	4,239.5	16.8	14.0	179.74	176.1	498.1	1,310.8	1,292.1	70.073		
5,000.0	4,885.9	4,403.8	4,303.2	17.5	14.5	179.88	183.7	526.8	1,381.9	1,362.8	72.250		

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



Anticollision Report



Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	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	
5,100.0	4,979.7	4,474.0	4,366.9	18.2	15.1	-179.99	191.3	555.5	1,453.0	1,433.5	74.314		
5,200.0	5,073.4	4,544.3	4,430.6	18.9	15.6	-179.87	198.8	584.2	1,524.1	1,504.1	76.278		
5,300.0	5,167.1	4,614.6	4,494.3	19.6	16.2	-179.76	206.4	613.0	1,595.2	1,574.8	78.148		
5,400.0	5,260.9	4,684.9	4,558.0	20.3	16.8	-179.66	213.9	641.7	1,666.4	1,645.5	79.927		
5,500.0	5,354.6	4,755.1	4,621.6	21.0	17.4	-179.57	221.5	670.4	1,737.5	1,716.2	81.620		
5,600.0	5,448.3	4,825.4	4,685.3	21.7	18.0	-179.49	229.1	699.1	1,808.6	1,786.9	83.236		
5,700.0	5,542.1	4,895.7	4,749.0	22.4	18.5	-179.42	236.6	727.9	1,879.7	1,857.6	84.778		
5,800.0	5,635.8	4,966.0	4,812.7	23.1	19.1	-179.34	244.2	756.6	1,950.9	1,928.2	86.248		
5,900.0	5,729.6	5,036.2	4,876.4	23.8	19.7	-179.28	251.8	785.3	2,022.0	1,998.9	87.652		
6,000.0	5,823.3	5,106.5	4,940.1	24.5	20.3	-179.22	259.3	814.0	2,093.1	2,069.6	88.996		
6,100.0	5,917.0	5,176.8	5,003.8	25.2	20.9	-179.16	266.9	842.7	2,164.2	2,140.3	90.280		
6,200.0	6,010.8	5,388.1	5,197.6	25.9	22.4	-179.02	288.3	924.1	2,234.1	2,208.6	87.583		
6,300.0	6,104.6	5,762.5	5,554.2	26.7	24.3	-178.88	317.1	1,033.7	2,295.8	2,267.9	82.463		
6,400.0	6,198.3	6,217.2	6,002.4	27.4	25.7	-178.85	335.9	1,105.0	2,345.5	2,315.6	78.573		
6,475.6	6,269.1	6,484.3	6,269.1	27.9	26.1	-178.89	338.5	1,114.7	2,373.7	2,343.0	77.421		
6,500.0	6,282.0	6,507.2	6,292.0	28.1	26.2	-178.89	338.5	1,114.7	2,382.1	2,351.3	77.418		
6,600.0	6,386.6	6,601.8	6,386.6	28.6	26.3	-178.92	338.5	1,114.7	2,414.4	2,383.2	77.350		
6,700.0	6,482.3	6,697.5	6,482.3	29.1	26.4	-178.94	338.5	1,114.7	2,443.5	2,411.8	77.191		
6,800.0	6,579.0	6,794.1	6,579.0	29.5	26.5	-178.97	338.5	1,114.7	2,469.2	2,437.1	76.945		
6,900.0	6,676.4	6,891.6	6,676.4	29.9	26.6	-178.98	338.5	1,114.7	2,491.5	2,459.0	76.618		
7,000.0	6,774.6	6,989.8	6,774.6	30.2	26.7	-179.00	338.5	1,114.7	2,510.4	2,477.5	76.215		
7,100.0	6,873.4	7,088.5	6,873.4	30.5	26.8	-179.01	338.5	1,114.7	2,525.9	2,492.5	75.740		
7,200.0	6,972.7	7,187.8	6,972.7	30.8	27.0	-179.02	338.5	1,114.7	2,537.9	2,504.1	75.197		
7,300.0	7,072.3	7,287.4	7,072.3	31.0	27.1	-179.02	338.5	1,114.7	2,546.4	2,512.2	74.589		
7,400.0	7,172.2	7,387.3	7,172.2	31.1	27.2	-179.03	338.5	1,114.7	2,551.4	2,516.9	73.919		
7,494.7	7,266.9	7,482.0	7,266.9	31.2	27.3	-179.03	338.5	1,114.7	2,553.0	2,518.1	73.228		
7,500.0	7,272.2	7,487.0	7,271.8	31.3	27.3	-89.00	338.5	1,114.7	2,553.0	2,518.1	73.191		
7,550.0	7,322.1	7,533.7	7,318.5	31.3	27.4	-89.00	336.5	1,115.4	2,553.0	2,518.0	72.848		
7,600.0	7,371.7	7,580.4	7,364.9	31.3	27.5	-89.01	331.3	1,117.2	2,553.0	2,517.8	72.502		
7,650.0	7,420.6	7,627.2	7,410.8	31.4	27.5	-89.03	322.9	1,120.1	2,553.0	2,517.6	72.146		
7,700.0	7,468.6	7,674.1	7,456.0	31.4	27.6	-89.05	311.3	1,124.1	2,553.0	2,517.4	71.773		
7,750.0	7,515.4	7,721.0	7,500.3	31.5	27.6	-89.08	296.6	1,129.2	2,552.9	2,517.2	71.375		
7,800.0	7,560.6	7,768.0	7,543.3	31.5	27.7	-89.11	278.8	1,135.3	2,552.9	2,516.9	70.942		
7,850.0	7,604.0	7,815.0	7,584.9	31.6	27.8	-89.14	258.0	1,142.5	2,552.9	2,516.7	70.463		
7,900.0	7,645.3	7,862.2	7,624.9	31.6	27.9	-89.19	234.3	1,150.7	2,552.9	2,516.4	69.926		
7,950.0	7,684.3	7,909.6	7,663.0	31.7	28.0	-89.23	207.8	1,159.8	2,552.8	2,516.0	69.319		
8,000.0	7,720.8	7,957.1	7,699.1	31.8	28.1	-89.28	178.6	1,169.9	2,552.8	2,515.6	68.632		
8,050.0	7,754.4	8,004.7	7,732.8	31.8	28.2	-89.34	146.8	1,180.9	2,552.8	2,515.2	67.859		
8,100.0	7,785.0	8,052.5	7,764.0	31.9	28.4	-89.40	112.6	1,192.7	2,552.8	2,514.6	66.992		
8,150.0	7,812.4	8,100.0	7,792.3	32.0	28.5	-89.46	76.5	1,205.2	2,552.7	2,514.1	66.040		
8,200.0	7,836.5	8,148.7	7,818.2	32.2	28.7	-89.53	37.6	1,218.6	2,552.7	2,513.4	64.977		
8,250.0	7,857.1	8,197.1	7,840.8	32.3	28.9	-89.60	-2.9	1,232.6	2,552.7	2,512.7	63.860		
8,300.0	7,874.0	8,245.8	7,860.2	32.5	29.2	-89.67	-45.0	1,247.1	2,552.7	2,511.9	62.631		
8,350.0	7,887.1	8,294.7	7,876.1	32.6	29.4	-89.74	-88.7	1,262.2	2,552.6	2,511.0	61.349		
8,400.0	7,896.5	8,343.8	7,888.6	32.8	29.7	-89.82	-133.6	1,277.7	2,552.6	2,510.1	60.021		
8,450.0	7,901.9	8,393.2	7,897.3	33.1	30.0	-89.90	-179.5	1,293.6	2,552.6	2,509.1	58.662		
8,494.7	7,903.5	8,437.6	7,902.0	33.3	30.3	-89.97	-221.3	1,308.0	2,552.6	2,508.2	57.434		
8,500.0	7,903.5	8,442.8	7,902.3	33.3	30.4	-89.97	-226.2	1,309.7	2,552.6	2,508.1	57.289		
8,528.5	7,903.5	8,471.2	7,903.4	33.5	30.6	-90.00	-263.1	1,319.0	2,552.6	2,507.4	56.493		
8,600.0	7,903.5	8,542.8	7,903.5	33.9	31.2	-90.00	-320.7	1,342.3	2,552.6	2,505.8	54.535		
8,700.0	7,903.5	8,642.8	7,903.5	34.6	32.1	-90.00	-415.2	1,374.9	2,552.6	2,503.4	51.831		
8,800.0	7,903.5	8,742.8	7,903.5	35.3	33.0	-90.00	-509.7	1,407.6	2,552.6	2,500.8	49.222		

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	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)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning	
8,900.0	7,903.5	8,842.8	7,903.5	36.2	34.1	-90.00	-604.3	1,440.2	2,552.6	2,498.0	46.738		
9,000.0	7,903.5	8,942.8	7,903.5	37.2	35.3	-90.00	-698.8	1,472.8	2,552.6	2,495.1	44.396		
9,100.0	7,903.5	9,042.8	7,903.5	38.2	36.5	-90.00	-793.3	1,505.5	2,552.6	2,492.1	42.203		
9,200.0	7,903.5	9,142.8	7,903.5	39.3	37.7	-90.00	-887.8	1,538.1	2,552.6	2,489.0	40.158		
9,300.0	7,903.5	9,242.8	7,903.5	40.5	39.1	-90.00	-982.4	1,570.8	2,552.6	2,485.9	38.256		
9,400.0	7,903.5	9,342.8	7,903.5	41.7	40.4	-90.00	-1,076.9	1,603.4	2,552.6	2,482.7	36.491		
9,500.0	7,903.5	9,442.8	7,903.5	43.0	41.9	-90.00	-1,171.4	1,636.0	2,552.6	2,479.4	34.854		
9,600.0	7,903.5	9,542.8	7,903.5	44.4	43.3	-90.00	-1,265.9	1,668.7	2,552.6	2,476.0	33.334		
9,700.0	7,903.5	9,642.8	7,903.5	45.8	44.8	-90.00	-1,360.5	1,701.3	2,552.6	2,472.7	31.923		
9,800.0	7,903.5	9,742.8	7,903.5	47.2	46.4	-90.00	-1,455.0	1,733.9	2,552.6	2,469.2	30.612		
9,900.0	7,903.5	9,842.8	7,903.5	48.7	47.9	-90.00	-1,549.5	1,766.6	2,552.6	2,465.8	29.393		
10,000.0	7,903.5	9,942.8	7,903.5	50.3	49.5	-90.00	-1,644.0	1,799.2	2,552.6	2,462.3	28.258		
10,100.0	7,903.5	10,042.8	7,903.5	51.8	51.1	-90.00	-1,738.6	1,831.8	2,552.6	2,458.8	27.199		
10,200.0	7,903.5	10,142.8	7,903.5	53.4	52.8	-90.00	-1,833.1	1,864.5	2,552.6	2,455.2	26.209		
10,300.0	7,903.5	10,242.8	7,903.5	55.0	54.4	-90.00	-1,927.6	1,897.1	2,552.6	2,451.7	25.284		
10,400.0	7,903.5	10,342.8	7,903.5	56.6	56.1	-90.00	-2,022.1	1,929.7	2,552.6	2,448.1	24.417		
10,500.0	7,903.5	10,442.8	7,903.5	58.2	57.8	-90.00	-2,116.7	1,962.4	2,552.6	2,444.5	23.604		
10,600.0	7,903.5	10,542.8	7,903.5	59.9	59.5	-90.00	-2,211.2	1,995.0	2,552.6	2,440.9	22.840		
10,700.0	7,903.5	10,642.8	7,903.5	61.6	61.2	-90.00	-2,305.7	2,027.7	2,552.6	2,437.2	22.121		
10,800.0	7,903.5	10,742.8	7,903.5	63.3	62.9	-90.00	-2,400.2	2,060.3	2,552.6	2,433.6	21.444		
10,900.0	7,903.5	10,842.8	7,903.5	65.0	64.7	-90.00	-2,494.8	2,092.9	2,552.6	2,429.9	20.804		
11,000.0	7,903.5	10,942.8	7,903.5	66.7	66.4	-90.00	-2,589.3	2,125.6	2,552.6	2,426.3	20.200		
11,100.0	7,903.5	11,042.8	7,903.5	68.4	68.2	-90.00	-2,683.8	2,158.2	2,552.6	2,422.6	19.629		
11,200.0	7,903.5	11,142.8	7,903.5	70.2	69.9	-90.00	-2,778.3	2,190.8	2,552.6	2,418.9	19.088		
11,300.0	7,903.5	11,242.8	7,903.5	71.9	71.7	-90.00	-2,872.9	2,223.5	2,552.6	2,415.2	18.574		
11,400.0	7,903.5	11,342.8	7,903.5	73.7	73.5	-90.00	-2,967.4	2,256.1	2,552.6	2,411.5	18.087		
11,500.0	7,903.5	11,442.8	7,903.5	75.4	75.3	-90.00	-3,061.9	2,288.7	2,552.6	2,407.8	17.623		
11,600.0	7,903.5	11,542.8	7,903.5	77.2	77.1	-90.00	-3,156.4	2,321.4	2,552.6	2,404.1	17.182		
11,700.0	7,903.5	11,642.8	7,903.5	79.0	78.9	-90.00	-3,251.0	2,354.0	2,552.6	2,400.3	16.762		
11,800.0	7,903.5	11,742.8	7,903.5	80.8	80.7	-90.00	-3,345.5	2,386.6	2,552.6	2,396.6	16.361		
11,900.0	7,903.5	11,842.8	7,903.5	82.6	82.5	-90.00	-3,440.0	2,419.3	2,552.6	2,392.9	15.979		
12,000.0	7,903.5	11,942.8	7,903.5	84.4	84.3	-90.00	-3,534.5	2,451.9	2,552.6	2,389.1	15.613		
12,100.0	7,903.5	12,042.8	7,903.5	86.2	86.2	-90.00	-3,629.1	2,484.5	2,552.6	2,385.4	15.264		
12,200.0	7,903.5	12,142.8	7,903.5	88.0	88.0	-90.00	-3,723.6	2,517.2	2,552.6	2,381.6	14.929		
12,300.0	7,903.5	12,242.8	7,903.5	89.8	89.8	-90.00	-3,818.1	2,549.8	2,552.6	2,377.9	14.608		
12,400.0	7,903.5	12,342.8	7,903.5	91.6	91.6	-90.00	-3,912.6	2,582.5	2,552.6	2,374.1	14.301		
12,500.0	7,903.5	12,442.8	7,903.5	93.5	93.5	-90.00	-4,007.2	2,615.1	2,552.6	2,370.4	14.006		
12,600.0	7,903.5	12,542.8	7,903.5	95.3	95.3	-90.00	-4,101.7	2,647.7	2,552.6	2,366.6	13.722		
12,700.0	7,903.5	12,642.8	7,903.5	97.1	97.2	-90.00	-4,196.2	2,680.4	2,552.6	2,362.8	13.450		
12,800.0	7,903.5	12,742.8	7,903.5	98.9	99.0	-90.00	-4,290.7	2,713.0	2,552.6	2,359.1	13.188		
12,900.0	7,903.5	12,842.8	7,903.5	100.8	100.9	-90.00	-4,385.3	2,745.6	2,552.6	2,355.3	12.936		
13,000.0	7,903.5	12,942.8	7,903.5	102.6	102.7	-90.00	-4,479.8	2,778.3	2,552.6	2,351.5	12.693		
13,100.0	7,903.5	13,042.8	7,903.5	104.5	104.6	-90.00	-4,574.3	2,810.9	2,552.6	2,347.7	12.459		
13,200.0	7,903.5	13,142.8	7,903.5	106.3	106.4	-90.00	-4,668.8	2,843.5	2,552.6	2,344.0	12.233		
13,300.0	7,903.5	13,242.8	7,903.5	108.2	108.3	-90.00	-4,763.4	2,876.2	2,552.6	2,340.2	12.015		
13,400.0	7,903.5	13,342.8	7,903.5	110.0	110.2	-90.00	-4,857.9	2,908.8	2,552.6	2,336.4	11.805		
13,500.0	7,903.5	13,442.8	7,903.5	111.9	112.0	-90.00	-4,952.4	2,941.4	2,552.6	2,332.6	11.602		
13,600.0	7,903.5	13,542.8	7,903.5	113.7	113.9	-90.00	-5,046.9	2,974.1	2,552.6	2,328.8	11.405		
13,700.0	7,903.5	13,642.8	7,903.5	115.6	115.7	-90.00	-5,141.4	3,006.7	2,552.6	2,325.0	11.215		
13,800.0	7,903.5	13,742.8	7,903.5	117.5	117.6	-90.00	-5,236.0	3,039.4	2,552.6	2,321.2	11.032		
13,900.0	7,903.5	13,842.8	7,903.5	119.3	119.5	-90.00	-5,330.5	3,072.0	2,552.6	2,317.4	10.854		
14,000.0	7,903.5	13,942.8	7,903.5	121.2	121.4	-90.00	-5,425.0	3,104.6	2,552.6	2,313.6	10.681		

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Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	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)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis 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		
14,100.0	7,903.5	14,042.8	7,903.5	123.1	123.2	-90.00	-5,519.5	3,137.3	2,552.6	2,309.8	10.514			
14,200.0	7,903.5	14,142.8	7,903.5	124.9	125.1	-90.00	-5,614.1	3,169.9	2,552.6	2,306.0	10.352			
14,300.0	7,903.5	14,242.8	7,903.5	126.8	127.0	-90.00	-5,708.6	3,202.5	2,552.6	2,302.2	10.195			
14,400.0	7,903.5	14,342.8	7,903.5	128.7	128.9	-90.00	-5,803.1	3,235.2	2,552.6	2,298.4	10.043			
14,500.0	7,903.5	14,442.8	7,903.5	130.5	130.7	-90.00	-5,897.6	3,267.8	2,552.6	2,294.6	9.895			
14,600.0	7,903.5	14,542.8	7,903.5	132.4	132.6	-90.00	-5,992.2	3,300.4	2,552.6	2,290.8	9.751			
14,700.0	7,903.5	14,642.8	7,903.5	134.3	134.5	-90.00	-6,086.7	3,333.1	2,552.6	2,287.0	9.611			
14,800.0	7,903.5	14,742.8	7,903.5	136.2	136.4	-90.00	-6,181.2	3,365.7	2,552.6	2,283.2	9.475			
14,900.0	7,903.5	14,842.8	7,903.5	138.0	138.3	-90.00	-6,275.7	3,398.3	2,552.6	2,279.4	9.343			
15,000.0	7,903.5	14,942.8	7,903.5	139.9	140.2	-90.00	-6,370.3	3,431.0	2,552.6	2,275.6	9.215			
15,100.0	7,903.5	15,042.8	7,903.5	141.8	142.0	-90.00	-6,464.8	3,463.6	2,552.6	2,271.8	9.090			
15,200.0	7,903.5	15,142.8	7,903.5	143.7	143.9	-90.00	-6,559.3	3,496.2	2,552.6	2,268.0	8.966			
15,300.0	7,903.5	15,242.8	7,903.5	145.6	145.8	-90.00	-6,653.8	3,528.9	2,552.6	2,264.2	8.850			
15,400.0	7,903.5	15,342.8	7,903.5	147.5	147.7	-90.00	-6,748.4	3,561.5	2,552.6	2,260.4	8.734			
15,500.0	7,903.5	15,442.8	7,903.5	149.3	149.6	-90.00	-6,842.9	3,594.2	2,552.6	2,256.6	8.622			
15,600.0	7,903.5	15,542.8	7,903.5	151.2	151.5	-90.00	-6,937.4	3,626.8	2,552.6	2,252.7	8.512			
15,700.0	7,903.5	15,642.8	7,903.5	153.1	153.4	-90.00	-7,031.9	3,659.4	2,552.6	2,248.9	8.405			
15,800.0	7,903.5	15,742.8	7,903.5	155.0	155.3	-90.00	-7,126.5	3,692.1	2,552.6	2,245.1	8.301			
15,900.0	7,903.5	15,842.8	7,903.5	156.9	157.2	-90.00	-7,221.0	3,724.7	2,552.6	2,241.3	8.199			
16,000.0	7,903.5	15,942.8	7,903.5	158.8	159.1	-90.00	-7,315.5	3,757.3	2,552.6	2,237.5	8.100			
16,100.0	7,903.5	16,042.8	7,903.5	160.7	161.0	-90.00	-7,410.0	3,790.0	2,552.6	2,233.7	8.003			
16,200.0	7,903.5	16,142.8	7,903.5	162.6	162.8	-90.00	-7,504.6	3,822.6	2,552.6	2,229.9	7.909			
16,300.0	7,903.5	16,242.8	7,903.5	164.5	164.7	-90.00	-7,599.1	3,855.2	2,552.6	2,226.0	7.816			
16,400.0	7,903.5	16,342.8	7,903.5	166.3	166.6	-90.00	-7,693.6	3,887.9	2,552.6	2,222.2	7.726			
16,500.0	7,903.5	16,442.8	7,903.5	168.2	168.5	-90.00	-7,788.1	3,920.5	2,552.6	2,218.4	7.638			
16,600.0	7,903.5	16,542.8	7,903.5	170.1	170.4	-90.00	-7,882.7	3,953.1	2,552.6	2,214.6	7.551			
16,700.0	7,903.5	16,642.8	7,903.5	172.0	172.3	-90.00	-7,977.2	3,985.8	2,552.6	2,210.8	7.467			
16,800.0	7,903.5	16,742.8	7,903.5	173.9	174.2	-90.00	-8,071.7	4,018.4	2,552.6	2,206.9	7.384			
16,900.0	7,903.5	16,842.8	7,903.5	175.8	176.1	-90.00	-8,166.2	4,051.1	2,552.6	2,203.1	7.304			
17,000.0	7,903.5	16,942.8	7,903.5	177.7	178.0	-90.00	-8,260.8	4,083.7	2,552.6	2,199.3	7.225			
17,100.0	7,903.5	17,042.8	7,903.5	179.6	179.9	-90.00	-8,355.3	4,116.3	2,552.6	2,195.5	7.147			
17,200.0	7,903.5	17,142.8	7,903.5	181.5	181.8	-90.00	-8,449.8	4,149.0	2,552.6	2,191.7	7.072			
17,300.0	7,903.5	17,242.8	7,903.5	183.4	183.7	-90.00	-8,544.3	4,181.6	2,552.6	2,187.8	6.998			
17,400.0	7,903.5	17,342.8	7,903.5	185.3	185.6	-90.00	-8,638.9	4,214.2	2,552.6	2,184.0	6.925			
17,500.0	7,903.5	17,442.8	7,903.5	187.2	187.5	-90.00	-8,733.4	4,246.9	2,552.6	2,180.2	6.854			
17,600.0	7,903.5	17,542.8	7,903.5	189.1	189.4	-90.00	-8,827.9	4,279.5	2,552.6	2,176.4	6.784			
17,700.0	7,903.5	17,642.8	7,903.5	191.0	191.3	-90.00	-8,922.4	4,312.1	2,552.6	2,172.5	6.716			
17,800.0	7,903.5	17,742.8	7,903.5	192.9	193.2	-90.00	-9,017.0	4,344.8	2,552.6	2,168.7	6.649			
17,900.0	7,903.5	17,842.8	7,903.5	194.8	195.1	-90.00	-9,111.5	4,377.4	2,552.6	2,164.9	6.583			
18,000.0	7,903.5	17,942.8	7,903.5	196.7	197.0	-90.00	-9,206.0	4,410.0	2,552.6	2,161.1	6.519			
18,100.0	7,903.5	18,042.8	7,903.5	198.6	198.9	-90.00	-9,300.5	4,442.7	2,552.6	2,157.2	6.456			
18,200.0	7,903.5	18,142.8	7,903.5	200.5	200.8	-90.00	-9,395.1	4,475.3	2,552.6	2,153.4	6.394			
18,300.0	7,903.5	18,242.8	7,903.5	202.4	202.8	-90.00	-9,489.6	4,507.9	2,552.6	2,149.6	6.334			
18,400.0	7,903.5	18,342.8	7,903.5	204.3	204.7	-90.00	-9,584.1	4,540.6	2,552.6	2,145.8	6.274			
18,500.0	7,903.5	18,442.8	7,903.5	206.2	206.6	-90.00	-9,678.6	4,573.2	2,552.6	2,141.9	6.215			
18,600.0	7,903.5	18,542.8	7,903.5	208.1	208.5	-90.00	-9,773.2	4,605.9	2,552.6	2,138.1	6.158			
18,700.0	7,903.5	18,642.8	7,903.5	210.0	210.4	-90.00	-9,867.7	4,638.5	2,552.6	2,134.3	6.102			
18,800.0	7,903.5	18,742.8	7,903.5	211.9	212.3	-90.00	-9,962.2	4,671.1	2,552.6	2,130.5	6.046			
18,900.0	7,903.5	18,842.8	7,903.5	213.8	214.2	-90.00	-10,056.7	4,703.8	2,552.6	2,126.6	5.992			
19,000.0	7,903.5	18,942.8	7,903.5	215.7	216.1	-90.00	-10,151.3	4,736.4	2,552.6	2,122.8	5.939			
19,100.0	7,903.5	19,042.8	7,903.5	217.6	218.0	-90.00	-10,245.8	4,769.0	2,552.6	2,119.0	5.886			
19,200.0	7,903.5	19,142.8	7,903.5	219.5	219.9	-90.00	-10,340.3	4,801.7	2,552.6	2,115.1	5.835			

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	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		
19,300.0	7,903.5	19,242.8	7,903.5	221.4	221.8	-90.00	-10,434.8	4,834.3	2,552.6	2,111.3	5.784			
19,400.0	7,903.5	19,342.8	7,903.5	223.3	223.7	-90.00	-10,529.4	4,866.9	2,552.6	2,107.5	5.734			
19,500.0	7,903.5	19,442.8	7,903.5	225.2	225.6	-90.00	-10,623.9	4,899.6	2,552.6	2,103.7	5.685			
19,600.0	7,903.5	19,542.8	7,903.5	227.2	227.5	-90.00	-10,718.4	4,932.2	2,552.6	2,099.8	5.637			
19,700.0	7,903.5	19,642.8	7,903.5	229.1	229.4	-90.00	-10,812.9	4,964.8	2,552.6	2,096.0	5.590			
19,800.0	7,903.5	19,742.8	7,903.5	231.0	231.3	-90.00	-10,907.5	4,997.5	2,552.6	2,092.2	5.544			
19,900.0	7,903.5	19,842.8	7,903.5	232.9	233.3	-90.00	-11,002.0	5,030.1	2,552.6	2,088.3	5.498			
20,000.0	7,903.5	19,942.8	7,903.5	234.8	235.2	-90.00	-11,096.5	5,062.8	2,552.6	2,084.5	5.453			
20,100.0	7,903.5	20,042.8	7,903.5	236.7	237.1	-90.00	-11,191.0	5,095.4	2,552.6	2,080.7	5.409			
20,200.0	7,903.5	20,142.8	7,903.5	238.6	239.0	-90.00	-11,285.6	5,128.0	2,552.6	2,076.8	5.365			
20,300.0	7,903.5	20,242.8	7,903.5	240.5	240.9	-90.00	-11,380.1	5,160.7	2,552.6	2,073.0	5.322			
20,400.0	7,903.5	20,342.8	7,903.5	242.4	242.8	-90.00	-11,474.6	5,193.3	2,552.6	2,069.2	5.280			
20,500.0	7,903.5	20,442.8	7,903.5	244.3	244.7	-90.00	-11,569.1	5,225.9	2,552.6	2,065.3	5.239			
20,600.0	7,903.5	20,542.8	7,903.5	246.2	246.6	-90.00	-11,663.7	5,258.6	2,552.6	2,061.5	5.198			
20,700.0	7,903.5	20,642.8	7,903.5	248.1	248.5	-90.00	-11,758.2	5,291.2	2,552.6	2,057.7	5.157			
20,800.0	7,903.5	20,742.8	7,903.5	250.0	250.4	-90.00	-11,852.7	5,323.8	2,552.6	2,053.8	5.118			
20,900.0	7,903.5	20,842.8	7,903.5	252.0	252.4	-90.00	-11,947.2	5,356.5	2,552.6	2,050.0	5.079			
21,000.0	7,903.5	20,942.8	7,903.5	253.9	254.3	-90.00	-12,041.8	5,389.1	2,552.6	2,046.2	5.040			
21,100.0	7,903.5	21,042.8	7,903.5	255.8	256.2	-90.00	-12,136.3	5,421.7	2,552.6	2,042.4	5.002			
21,200.0	7,903.5	21,142.8	7,903.5	257.7	258.1	-90.00	-12,230.8	5,454.4	2,552.6	2,038.5	4.965			
21,300.0	7,903.5	21,242.8	7,903.5	259.6	260.0	-90.00	-12,325.3	5,487.0	2,552.6	2,034.7	4.928			
21,400.0	7,903.5	21,342.8	7,903.5	261.5	261.9	-90.00	-12,419.9	5,519.6	2,552.6	2,030.9	4.892			
21,500.0	7,903.5	21,442.8	7,903.5	263.4	263.8	-90.00	-12,514.4	5,552.3	2,552.6	2,027.0	4.857			
21,600.0	7,903.5	21,542.8	7,903.5	265.3	265.7	-90.00	-12,608.9	5,584.9	2,552.6	2,023.2	4.821			
21,700.0	7,903.5	21,642.8	7,903.5	267.2	267.6	-90.00	-12,703.4	5,617.6	2,552.6	2,019.4	4.787			
21,800.0	7,903.5	21,742.8	7,903.5	269.1	269.6	-90.00	-12,798.0	5,650.2	2,552.6	2,015.5	4.753			
21,900.0	7,903.5	21,842.8	7,903.5	271.1	271.5	-90.00	-12,892.5	5,682.8	2,552.6	2,011.7	4.719			
22,000.0	7,903.5	21,942.8	7,903.5	273.0	273.4	-90.00	-12,987.0	5,715.5	2,552.6	2,007.9	4.686			
22,100.0	7,903.5	22,042.8	7,903.5	274.9	275.3	-90.00	-13,081.5	5,748.1	2,552.6	2,004.0	4.653			
22,136.9	7,903.5	22,079.7	7,903.5	275.6	276.0	-90.00	-13,116.4	5,760.1	2,552.6	2,002.6	4.641			

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Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	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	
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		
400.0	400.0	400.0	400.0	0.8	0.8	0.00	60.0	0.0	60.0	58.5	39.665		
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	112.09	60.5	1.7	61.1	49.8	5.375	SF	
2,700.0	2,699.8	2,697.9	2,697.8	5.9	5.9	120.46	61.9	6.6	65.5	53.7	5.567		
2,800.0	2,799.5	2,795.1	2,794.6	6.1	6.1	131.62	64.1	14.6	75.4	63.2	6.206		
2,900.0	2,898.7	2,890.2	2,889.0	6.3	6.3	142.47	67.2	25.5	92.8	80.3	7.416		
3,000.0	2,997.5	2,982.7	2,980.4	6.5	6.5	151.22	71.0	39.0	118.2	105.4	9.208		
3,100.0	3,095.6	3,072.0	3,068.2	6.8	6.8	157.68	75.4	54.8	151.4	138.3	11.516		
3,200.0	3,193.1	3,157.6	3,151.8	7.1	7.0	162.31	80.4	72.3	191.6	178.2	14.264		
3,300.0	3,289.6	3,239.2	3,231.1	7.4	7.3	165.64	85.7	91.3	238.3	224.6	17.386		
3,400.0	3,385.3	3,316.6	3,305.6	7.8	7.6	168.07	91.4	111.3	290.8	276.9	20.830		
3,500.0	3,479.8	3,389.5	3,375.3	8.2	7.8	169.87	97.2	131.9	348.7	334.5	24.551		
3,519.1	3,497.8	3,400.0	3,385.3	8.3	7.9	170.08	98.0	135.0	360.4	346.2	25.371		
3,600.0	3,573.6	3,458.5	3,440.7	8.7	8.1	171.41	103.1	152.9	410.7	396.3	28.449		
3,700.0	3,667.3	3,524.7	3,503.0	9.2	8.4	172.62	109.2	174.5	474.7	460.0	32.382		
3,800.0	3,761.1	3,588.5	3,562.5	9.8	8.8	173.58	115.4	196.6	540.5	525.7	36.337		
3,900.0	3,854.8	3,649.7	3,619.1	10.4	9.1	174.35	121.7	219.1	608.1	593.0	40.305		
4,000.0	3,948.5	3,700.0	3,665.2	11.0	9.4	174.90	127.2	238.4	677.3	662.1	44.615		
4,100.0	4,042.3	3,765.2	3,724.5	11.6	9.8	175.52	134.6	264.6	747.8	732.3	48.285		
4,200.0	4,136.0	3,819.6	3,773.4	12.2	10.2	175.96	141.0	287.4	819.8	804.1	52.290		
4,300.0	4,229.7	3,871.9	3,820.0	12.8	10.6	176.35	147.4	310.2	893.1	877.2	56.300		
4,400.0	4,323.5	3,922.1	3,864.4	13.5	10.9	176.69	153.8	332.8	967.6	951.5	60.316		
4,500.0	4,417.2	3,970.5	3,906.7	14.1	11.3	176.98	160.1	355.3	1,043.2	1,027.0	64.333		
4,600.0	4,511.0	4,016.9	3,947.0	14.8	11.7	177.24	166.4	377.6	1,120.0	1,103.6	68.356		
4,700.0	4,604.7	4,061.7	3,985.5	15.5	12.1	177.47	172.6	399.6	1,197.8	1,181.2	72.374		
4,800.0	4,698.4	4,100.0	4,018.1	16.1	12.5	177.65	178.1	419.0	1,276.5	1,259.9	76.648		
4,900.0	4,792.2	4,146.1	4,057.0	16.8	12.9	177.86	184.8	442.8	1,356.1	1,339.3	80.426		
5,000.0	4,885.9	4,200.7	4,102.7	17.5	13.4	178.08	192.9	471.5	1,436.4	1,419.2	83.638		

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Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	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)	Reference 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)	Distance Between Ellipses (usft)	Separation Factor	Warning		
5,100.0	4,979.7	4,260.2	4,152.6	18.2	14.0	178.30	201.7	502.8	1,516.7	1,499.2	86.433			
5,200.0	5,073.4	4,319.7	4,202.4	18.9	14.7	178.50	210.5	534.1	1,597.0	1,579.1	89.098			
5,300.0	5,167.1	4,379.2	4,252.2	19.6	15.3	178.67	219.3	565.4	1,677.3	1,659.0	91.628			
5,400.0	5,260.9	4,438.7	4,302.0	20.3	15.9	178.84	228.2	596.7	1,757.7	1,739.0	94.032			
5,500.0	5,354.6	4,498.2	4,351.9	21.0	16.5	178.99	237.0	628.0	1,838.0	1,818.9	96.325			
5,600.0	5,448.3	4,557.7	4,401.7	21.7	17.2	179.12	245.8	659.3	1,918.3	1,898.8	98.498			
5,700.0	5,542.1	4,617.2	4,451.5	22.4	17.8	179.25	254.6	690.6	1,998.6	1,978.8	100.575			
5,800.0	5,635.8	4,676.7	4,501.3	23.1	18.5	179.36	263.4	721.9	2,079.0	2,058.7	102.550			
5,900.0	5,729.6	4,736.2	4,551.2	23.8	19.1	179.47	272.3	753.2	2,159.3	2,138.6	104.434			
6,000.0	5,823.3	4,795.7	4,601.0	24.5	19.8	179.57	281.1	784.5	2,239.7	2,218.6	106.235			
6,100.0	5,917.0	4,855.2	4,650.8	25.2	20.5	179.66	289.9	815.8	2,320.0	2,298.5	107.948			
6,200.0	6,010.8	4,914.7	4,700.7	25.9	21.1	179.74	298.7	847.1	2,400.4	2,378.4	109.589			
6,300.0	6,104.5	4,974.2	4,750.5	26.7	21.8	179.83	307.5	878.4	2,480.7	2,458.4	111.155			
6,400.0	6,198.3	5,033.7	4,800.3	27.4	22.5	179.90	316.4	909.7	2,561.0	2,538.3	112.654			
6,475.6	6,269.1	5,078.6	4,838.0	27.9	23.0	179.95	323.0	933.3	2,621.8	2,598.7	113.744			
6,500.0	6,292.0	5,093.2	4,850.2	28.1	23.1	179.97	325.2	941.0	2,641.3	2,618.2	114.092			
6,600.0	6,386.6	5,154.8	4,901.8	28.6	23.8	-179.96	334.3	973.4	2,720.1	2,696.5	115.405			
6,700.0	6,482.3	5,219.1	4,955.6	29.1	24.6	-179.90	343.8	1,007.2	2,796.7	2,772.7	116.518			
6,800.0	6,579.0	5,286.0	5,011.6	29.5	25.3	-179.85	353.8	1,042.4	2,871.0	2,846.5	117.440			
6,900.0	6,676.4	5,355.4	5,069.8	29.9	26.1	-179.80	364.1	1,078.9	2,942.9	2,918.0	118.181			
7,000.0	6,774.6	5,427.4	5,130.0	30.2	27.0	-179.75	374.7	1,116.8	3,012.3	2,987.0	118.756			
7,100.0	6,873.4	5,501.7	5,192.2	30.5	27.8	-179.70	385.7	1,155.8	3,079.2	3,053.4	119.175			
7,200.0	6,972.7	5,578.2	5,256.4	30.8	28.7	-179.66	397.1	1,196.1	3,143.5	3,117.2	119.446			
7,300.0	7,072.3	5,657.0	5,322.3	31.0	29.6	-179.62	408.8	1,237.6	3,205.0	3,178.2	119.583			
7,400.0	7,172.2	5,737.9	5,390.1	31.1	30.6	-179.58	420.8	1,280.1	3,263.8	3,236.5	119.594			
7,494.7	7,266.9	5,816.4	5,455.8	31.2	31.5	71.43	432.4	1,321.4	3,316.8	3,289.1	119.500			
7,500.0	7,272.2	5,820.8	5,459.5	31.3	31.5	-89.21	433.0	1,323.7	3,319.7	3,291.9	119.492			
7,550.0	7,322.1	5,862.7	5,494.6	31.3	32.0	-86.31	439.3	1,345.7	3,346.9	3,318.9	119.413			
7,600.0	7,371.7	5,904.4	5,529.5	31.3	32.5	-83.54	445.4	1,367.7	3,374.0	3,345.7	119.322			
7,650.0	7,420.6	5,945.7	5,564.1	31.4	33.0	-80.90	451.6	1,389.4	3,400.7	3,372.1	119.218			
7,700.0	7,468.6	5,983.9	5,592.2	31.4	33.6	-89.05	457.1	1,412.8	3,403.9	3,365.9	89.577			
7,750.0	7,515.4	6,000.0	5,619.8	31.5	34.3	-89.07	462.9	1,437.7	3,403.9	3,365.7	89.126			
7,800.0	7,560.6	6,045.9	5,653.0	31.5	35.0	-89.11	468.9	1,463.5	3,403.8	3,365.4	88.632			
7,850.0	7,604.0	6,092.1	5,697.0	31.6	35.8	-89.14	475.0	1,490.4	3,403.8	3,365.2	88.084			
7,900.0	7,645.3	6,138.4	5,741.5	31.6	36.6	-89.18	481.1	1,518.3	3,403.8	3,364.8	87.470			
7,950.0	7,684.3	6,184.8	5,786.3	31.7	37.4	-89.23	487.5	1,547.2	3,403.7	3,364.5	86.777			
8,000.0	7,720.8	6,231.5	5,831.1	31.8	38.2	-89.28	494.3	1,577.1	3,403.7	3,364.1	85.993			
8,050.0	7,754.4	6,278.4	5,876.8	31.8	39.0	-89.33	501.5	1,608.0	3,403.6	3,363.7	85.109			
8,100.0	7,785.0	6,325.4	5,923.1	31.9	39.8	-89.39	509.0	1,639.8	3,403.6	3,363.1	84.119			
8,150.0	7,812.4	6,372.7	5,969.9	32.0	40.6	-89.45	516.8	1,672.6	3,403.6	3,362.6	83.021			
8,200.0	7,836.5	6,420.3	6,017.0	32.2	41.4	-89.52	524.9	1,707.4	3,403.5	3,361.9	81.816			
8,250.0	7,857.1	6,468.1	6,064.2	32.3	42.2	-89.59	533.3	1,743.2	3,403.5	3,361.2	80.511			
8,300.0	7,874.0	6,516.3	6,111.3	32.5	43.0	-89.66	542.0	1,780.0	3,403.5	3,360.5	79.114			
8,350.0	7,887.1	6,564.7	6,158.4	32.6	43.8	-89.73	551.0	1,817.8	3,403.4	3,359.6	77.640			
8,400.0	7,896.5	6,613.4	6,205.4	32.8	44.6	-89.81	560.2	1,856.6	3,403.4	3,358.7	76.103			
8,450.0	7,901.9	6,662.5	6,252.5	33.1	45.4	-89.88	569.7	1,896.4	3,403.4	3,357.7	74.521			
8,494.7	7,903.5	6,706.7	6,299.6	33.3	46.2	-89.95	579.4	1,937.2	3,403.4	3,356.8	73.087			
8,500.0	7,903.5	6,712.0	6,305.9	33.3	46.2	-89.96	580.0	1,937.2	3,403.4	3,356.7	72.907			
8,548.2	7,903.5	6,760.1	6,353.0	33.6	46.6	-90.00	5.9	2,129.6	3,403.4	3,355.7	71.349			
8,600.0	7,903.5	6,811.8	6,400.1	33.9	47.0	-90.00	-43.0	2,146.5	3,403.4	3,354.6	69.744			
8,700.0	7,903.5	6,811.8	6,400.1	34.6	47.0	-90.00	-137.6	2,179.2	3,403.4	3,352.2	66.477			
8,800.0	7,903.5	6,911.8	6,500.1	35.3	47.1	-90.00	-232.1	2,211.8	3,403.4	3,349.7	63.328			

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	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
Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis 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		
8,900.0	7,903.5	9,111.8	7,903.5	36.2	47.8	-90.00	-326.6	2,244.4	3,403.4	3,347.0	60.310			
9,000.0	7,903.5	9,211.8	7,903.5	37.2	48.6	-90.00	-421.1	2,277.1	3,403.4	3,344.2	57.443			
9,100.0	7,903.5	9,311.8	7,903.5	38.2	49.4	-90.00	-515.7	2,309.7	3,403.4	3,341.2	54.740			
9,200.0	7,903.5	9,411.8	7,903.5	39.3	50.3	-90.00	-610.2	2,342.3	3,403.4	3,338.2	52.203			
9,300.0	7,903.5	9,511.8	7,903.5	40.5	51.2	-90.00	-704.7	2,375.0	3,403.4	3,335.1	49.831			
9,400.0	7,903.5	9,611.8	7,903.5	41.7	52.2	-90.00	-799.2	2,407.6	3,403.4	3,331.9	47.617			
9,500.0	7,903.5	9,711.8	7,903.5	43.0	53.3	-90.00	-893.8	2,440.2	3,403.4	3,328.7	45.553			
9,600.0	7,903.5	9,811.8	7,903.5	44.4	54.4	-90.00	-988.3	2,472.9	3,403.4	3,325.4	43.630			
9,700.0	7,903.5	9,911.8	7,903.5	45.8	55.5	-90.00	-1,082.8	2,505.5	3,403.4	3,322.1	41.838			
9,800.0	7,903.5	10,011.8	7,903.5	47.2	56.7	-90.00	-1,177.3	2,538.1	3,403.4	3,318.7	40.167			
9,900.0	7,903.5	10,111.8	7,903.5	48.7	58.0	-90.00	-1,271.9	2,570.8	3,403.4	3,315.3	38.608			
10,000.0	7,903.5	10,211.8	7,903.5	50.3	59.3	-90.00	-1,366.4	2,603.4	3,403.4	3,311.8	37.152			
10,100.0	7,903.5	10,311.8	7,903.5	51.8	60.6	-90.00	-1,460.9	2,636.1	3,403.4	3,308.3	35.791			
10,200.0	7,903.5	10,411.8	7,903.5	53.4	61.9	-90.00	-1,555.4	2,668.7	3,403.4	3,304.8	34.516			
10,300.0	7,903.5	10,511.8	7,903.5	55.0	63.3	-90.00	-1,650.0	2,701.3	3,403.4	3,301.3	33.322			
10,400.0	7,903.5	10,611.8	7,903.5	56.6	64.7	-90.00	-1,744.5	2,734.0	3,403.4	3,297.7	32.201			
10,500.0	7,903.5	10,711.8	7,903.5	58.2	66.2	-90.00	-1,839.0	2,766.6	3,403.4	3,294.1	31.147			
10,600.0	7,903.5	10,811.8	7,903.5	59.9	67.6	-90.00	-1,933.5	2,799.2	3,403.4	3,290.5	30.155			
10,700.0	7,903.5	10,911.8	7,903.5	61.6	69.1	-90.00	-2,028.1	2,831.9	3,403.4	3,286.9	29.221			
10,800.0	7,903.5	11,011.8	7,903.5	63.3	70.6	-90.00	-2,122.6	2,864.5	3,403.4	3,283.3	28.339			
10,900.0	7,903.5	11,111.8	7,903.5	65.0	72.2	-90.00	-2,217.1	2,897.1	3,403.4	3,279.7	27.506			
11,000.0	7,903.5	11,211.8	7,903.5	66.7	73.7	-90.00	-2,311.6	2,929.8	3,403.4	3,276.0	26.718			
11,100.0	7,903.5	11,311.8	7,903.5	68.4	75.3	-90.00	-2,406.2	2,962.4	3,403.4	3,272.4	25.972			
11,200.0	7,903.5	11,411.8	7,903.5	70.2	76.9	-90.00	-2,500.7	2,995.0	3,403.4	3,268.7	25.264			
11,300.0	7,903.5	11,511.8	7,903.5	71.9	78.5	-90.00	-2,595.2	3,027.7	3,403.4	3,265.0	24.592			
11,400.0	7,903.5	11,611.8	7,903.5	73.7	80.1	-90.00	-2,689.7	3,060.3	3,403.4	3,261.3	23.954			
11,500.0	7,903.5	11,711.8	7,903.5	75.4	81.8	-90.00	-2,784.3	3,092.9	3,403.4	3,257.6	23.346			
11,600.0	7,903.5	11,811.8	7,903.5	77.2	83.4	-90.00	-2,878.8	3,125.6	3,403.4	3,253.9	22.768			
11,700.0	7,903.5	11,911.8	7,903.5	79.0	85.1	-90.00	-2,973.3	3,158.2	3,403.4	3,250.2	22.217			
11,800.0	7,903.5	12,011.8	7,903.5	80.8	86.8	-90.00	-3,067.8	3,190.9	3,403.4	3,246.5	21.690			
11,900.0	7,903.5	12,111.8	7,903.5	82.6	88.4	-90.00	-3,162.4	3,223.5	3,403.4	3,242.8	21.188			
12,000.0	7,903.5	12,211.8	7,903.5	84.4	90.1	-90.00	-3,256.9	3,256.1	3,403.4	3,239.0	20.707			
12,100.0	7,903.5	12,311.8	7,903.5	86.2	91.8	-90.00	-3,351.4	3,288.8	3,403.4	3,235.3	20.247			
12,200.0	7,903.5	12,411.8	7,903.5	88.0	93.6	-90.00	-3,445.9	3,321.4	3,403.4	3,231.6	19.806			
12,300.0	7,903.5	12,511.8	7,903.5	89.8	95.3	-90.00	-3,540.5	3,354.0	3,403.4	3,227.8	19.384			
12,400.0	7,903.5	12,611.8	7,903.5	91.6	97.0	-90.00	-3,635.0	3,386.7	3,403.4	3,224.1	18.979			
12,500.0	7,903.5	12,711.8	7,903.5	93.5	98.7	-90.00	-3,729.5	3,419.3	3,403.4	3,220.3	18.590			
12,600.0	7,903.5	12,811.8	7,903.5	95.3	100.5	-90.00	-3,824.0	3,451.9	3,403.4	3,216.6	18.217			
12,700.0	7,903.5	12,911.8	7,903.5	97.1	102.2	-90.00	-3,918.6	3,484.6	3,403.4	3,212.8	17.857			
12,800.0	7,903.5	13,011.8	7,903.5	98.9	104.0	-90.00	-4,013.1	3,517.2	3,403.4	3,209.1	17.512			
12,900.0	7,903.5	13,111.8	7,903.5	100.8	105.8	-90.00	-4,107.6	3,549.8	3,403.4	3,205.3	17.179			
13,000.0	7,903.5	13,211.8	7,903.5	102.6	107.5	-90.00	-4,202.1	3,582.5	3,403.4	3,201.5	16.858			
13,100.0	7,903.5	13,311.8	7,903.5	104.5	109.3	-90.00	-4,296.6	3,615.1	3,403.4	3,197.8	16.549			
13,200.0	7,903.5	13,411.8	7,903.5	106.3	111.1	-90.00	-4,391.2	3,647.7	3,403.4	3,194.0	16.251			
13,300.0	7,903.5	13,511.8	7,903.5	108.2	112.9	-90.00	-4,485.7	3,680.4	3,403.4	3,190.2	15.963			
13,400.0	7,903.5	13,611.8	7,903.5	110.0	114.7	-90.00	-4,580.2	3,713.0	3,403.4	3,186.4	15.685			
13,500.0	7,903.5	13,711.8	7,903.5	111.9	116.5	-90.00	-4,674.7	3,745.7	3,403.4	3,182.6	15.417			
13,600.0	7,903.5	13,811.8	7,903.5	113.7	118.3	-90.00	-4,769.3	3,778.3	3,403.4	3,178.9	15.157			
13,700.0	7,903.5	13,911.8	7,903.5	115.6	120.1	-90.00	-4,863.8	3,810.9	3,403.4	3,175.1	14.906			
13,800.0	7,903.5	14,011.8	7,903.5	117.5	121.9	-90.00	-4,958.3	3,843.6	3,403.4	3,171.3	14.663			
13,900.0	7,903.5	14,111.8	7,903.5	119.3	123.7	-90.00	-5,052.8	3,876.2	3,403.4	3,167.5	14.427			
14,000.0	7,903.5	14,211.8	7,903.5	121.2	125.5	-90.00	-5,147.4	3,908.8	3,403.4	3,163.7	14.199			

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Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	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	14,311.8	7,903.5	123.1	127.3	-90.00	-5,241.9	3,941.5	3,403.4	3,159.9	13,978			
14,200.0	7,903.5	14,411.8	7,903.5	124.9	129.1	-90.00	-5,336.4	3,974.1	3,403.4	3,156.1	13,764			
14,300.0	7,903.5	14,511.8	7,903.5	126.8	130.9	-90.00	-5,430.9	4,006.7	3,403.4	3,152.3	13,556			
14,400.0	7,903.5	14,611.8	7,903.5	128.7	132.8	-90.00	-5,525.5	4,039.4	3,403.4	3,148.5	13,354			
14,500.0	7,903.5	14,711.8	7,903.5	130.5	134.6	-90.00	-5,620.0	4,072.0	3,403.4	3,144.7	13,158			
14,600.0	7,903.5	14,811.8	7,903.5	132.4	136.4	-90.00	-5,714.5	4,104.6	3,403.4	3,140.9	12,967			
14,700.0	7,903.5	14,911.8	7,903.5	134.3	138.3	-90.00	-5,809.0	4,137.3	3,403.4	3,137.1	12,782			
14,800.0	7,903.5	15,011.8	7,903.5	136.2	140.1	-90.00	-5,903.6	4,169.9	3,403.4	3,133.3	12,600			
14,900.0	7,903.5	15,111.8	7,903.5	138.0	141.9	-90.00	-5,998.1	4,202.5	3,403.4	3,129.5	12,427			
15,000.0	7,903.5	15,211.8	7,903.5	139.9	143.8	-90.00	-6,092.6	4,235.2	3,403.4	3,125.7	12,257			
15,100.0	7,903.5	15,311.8	7,903.5	141.8	145.6	-90.00	-6,187.1	4,267.8	3,403.4	3,121.9	12,091			
15,200.0	7,903.5	15,411.8	7,903.5	143.7	147.5	-90.00	-6,281.7	4,300.4	3,403.4	3,118.1	11,930			
15,300.0	7,903.5	15,511.8	7,903.5	145.6	149.3	-90.00	-6,376.2	4,333.1	3,403.4	3,114.3	11,773			
15,400.0	7,903.5	15,611.8	7,903.5	147.5	151.2	-90.00	-6,470.7	4,365.7	3,403.4	3,110.5	11,620			
15,500.0	7,903.5	15,711.8	7,903.5	149.3	153.0	-90.00	-6,565.2	4,398.4	3,403.4	3,106.7	11,471			
15,600.0	7,903.5	15,811.8	7,903.5	151.2	154.9	-90.00	-6,659.8	4,431.0	3,403.4	3,102.9	11,325			
15,700.0	7,903.5	15,911.8	7,903.5	153.1	156.7	-90.00	-6,754.3	4,463.6	3,403.4	3,099.1	11,184			
15,800.0	7,903.5	16,011.8	7,903.5	155.0	158.6	-90.00	-6,848.8	4,496.3	3,403.4	3,095.3	11,045			
15,900.0	7,903.5	16,111.8	7,903.5	156.9	160.4	-90.00	-6,943.3	4,528.9	3,403.4	3,091.5	10,910			
16,000.0	7,903.5	16,211.8	7,903.5	158.8	162.3	-90.00	-7,037.9	4,561.5	3,403.4	3,087.6	10,779			
16,100.0	7,903.5	16,311.8	7,903.5	160.7	164.1	-90.00	-7,132.4	4,594.2	3,403.4	3,083.8	10,650			
16,200.0	7,903.5	16,411.8	7,903.5	162.6	166.0	-90.00	-7,226.9	4,626.8	3,403.4	3,080.0	10,524			
16,300.0	7,903.5	16,511.8	7,903.5	164.5	167.9	-90.00	-7,321.4	4,659.4	3,403.4	3,076.2	10,402			
16,400.0	7,903.5	16,611.8	7,903.5	166.3	169.7	-90.00	-7,416.0	4,692.1	3,403.4	3,072.4	10,282			
16,500.0	7,903.5	16,711.8	7,903.5	168.2	171.6	-90.00	-7,510.5	4,724.7	3,403.4	3,068.6	10,165			
16,600.0	7,903.5	16,811.8	7,903.5	170.1	173.5	-90.00	-7,605.0	4,757.3	3,403.4	3,064.7	10,050			
16,700.0	7,903.5	16,911.8	7,903.5	172.0	175.3	-90.00	-7,699.5	4,790.0	3,403.4	3,060.9	9,938			
16,800.0	7,903.5	17,011.8	7,903.5	173.9	177.2	-90.00	-7,794.1	4,822.6	3,403.4	3,057.1	9,828			
16,900.0	7,903.5	17,111.8	7,903.5	175.8	179.1	-90.00	-7,888.6	4,855.2	3,403.4	3,053.3	9,721			
17,000.0	7,903.5	17,211.8	7,903.5	177.7	180.9	-90.00	-7,983.1	4,887.9	3,403.4	3,049.5	9,616			
17,100.0	7,903.5	17,311.8	7,903.5	179.6	182.8	-90.00	-8,077.6	4,920.5	3,403.4	3,045.7	9,514			
17,200.0	7,903.5	17,411.8	7,903.5	181.5	184.7	-90.00	-8,172.2	4,953.2	3,403.4	3,041.8	9,413			
17,300.0	7,903.5	17,511.8	7,903.5	183.4	186.6	-90.00	-8,266.7	4,985.8	3,403.4	3,038.0	9,315			
17,400.0	7,903.5	17,611.8	7,903.5	185.3	188.4	-90.00	-8,361.2	5,018.4	3,403.4	3,034.2	9,218			
17,500.0	7,903.5	17,711.8	7,903.5	187.2	190.3	-90.00	-8,455.7	5,051.1	3,403.4	3,030.4	9,124			
17,600.0	7,903.5	17,811.8	7,903.5	189.1	192.2	-90.00	-8,550.3	5,083.7	3,403.4	3,026.6	9,031			
17,700.0	7,903.5	17,911.8	7,903.5	191.0	194.1	-90.00	-8,644.8	5,116.3	3,403.4	3,022.7	8,941			
17,800.0	7,903.5	18,011.8	7,903.5	192.9	195.9	-90.00	-8,739.3	5,149.0	3,403.4	3,018.9	8,852			
17,900.0	7,903.5	18,111.8	7,903.5	194.8	197.8	-90.00	-8,833.8	5,181.6	3,403.4	3,015.1	8,765			
18,000.0	7,903.5	18,211.8	7,903.5	196.7	199.7	-90.00	-8,928.4	5,214.2	3,403.4	3,011.3	8,679			
18,100.0	7,903.5	18,311.8	7,903.5	198.6	201.6	-90.00	-9,022.9	5,246.9	3,403.4	3,007.4	8,595			
18,200.0	7,903.5	18,411.8	7,903.5	200.5	203.5	-90.00	-9,117.4	5,279.5	3,403.4	3,003.6	8,513			
18,300.0	7,903.5	18,511.8	7,903.5	202.4	205.4	-90.00	-9,211.9	5,312.1	3,403.4	2,999.8	8,432			
18,400.0	7,903.5	18,611.8	7,903.5	204.3	207.2	-90.00	-9,306.5	5,344.8	3,403.4	2,996.0	8,353			
18,500.0	7,903.5	18,711.8	7,903.5	206.2	209.1	-90.00	-9,401.0	5,377.4	3,403.4	2,992.1	8,276			
18,600.0	7,903.5	18,811.8	7,903.5	208.1	211.0	-90.00	-9,495.5	5,410.0	3,403.4	2,988.3	8,199			
18,700.0	7,903.5	18,911.8	7,903.5	210.0	212.9	-90.00	-9,590.0	5,442.7	3,403.4	2,984.5	8,124			
18,800.0	7,903.5	19,011.8	7,903.5	211.9	214.8	-90.00	-9,684.6	5,475.3	3,403.4	2,980.7	8,051			
18,900.0	7,903.5	19,111.8	7,903.5	213.8	216.7	-90.00	-9,779.1	5,508.0	3,403.4	2,976.8	7,979			
19,000.0	7,903.5	19,211.8	7,903.5	215.7	218.6	-90.00	-9,873.6	5,540.6	3,403.4	2,973.0	7,908			
19,100.0	7,903.5	19,311.8	7,903.5	217.6	220.4	-90.00	-9,968.1	5,573.2	3,403.4	2,969.2	7,838			
19,200.0	7,903.5	19,411.8	7,903.5	219.5	222.3	-90.00	-10,062.7	5,605.9	3,403.4	2,965.4	7,770			

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

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	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
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 Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning		
19,300.0	7,903.5	19,511.8	7,903.5	221.4	224.2	-90.00	-10,157.2	5,638.5	3,403.4	2,961.5	7.702			
19,400.0	7,903.5	19,611.8	7,903.5	223.3	226.1	-90.00	-10,251.7	5,671.1	3,403.4	2,957.7	7.636			
19,500.0	7,903.5	19,711.8	7,903.5	225.2	228.0	-90.00	-10,346.2	5,703.8	3,403.4	2,953.9	7.571			
19,600.0	7,903.5	19,811.8	7,903.5	227.2	229.9	-90.00	-10,440.8	5,736.4	3,403.4	2,950.0	7.507			
19,700.0	7,903.5	19,911.8	7,903.5	229.1	231.8	-90.00	-10,535.3	5,769.0	3,403.4	2,946.2	7.444			
19,800.0	7,903.5	20,011.8	7,903.5	231.0	233.7	-90.00	-10,629.8	5,801.7	3,403.4	2,942.4	7.382			
19,900.0	7,903.5	20,111.8	7,903.5	232.9	235.6	-90.00	-10,724.3	5,834.3	3,403.4	2,938.6	7.322			
20,000.0	7,903.5	20,211.8	7,903.5	234.8	237.5	-90.00	-10,818.9	5,866.9	3,403.4	2,934.7	7.262			
20,100.0	7,903.5	20,311.8	7,903.5	236.7	239.4	-90.00	-10,913.4	5,899.6	3,403.4	2,930.9	7.203			
20,200.0	7,903.5	20,411.8	7,903.5	238.6	241.2	-90.00	-11,007.9	5,932.2	3,403.4	2,927.1	7.145			
20,300.0	7,903.5	20,511.8	7,903.5	240.5	243.1	-90.00	-11,102.4	5,964.8	3,403.4	2,923.2	7.088			
20,400.0	7,903.5	20,611.8	7,903.5	242.4	245.0	-90.00	-11,197.0	5,997.5	3,403.4	2,919.4	7.032			
20,500.0	7,903.5	20,711.8	7,903.5	244.3	246.9	-90.00	-11,291.5	6,030.1	3,403.4	2,915.6	6.977			
20,600.0	7,903.5	20,811.8	7,903.5	246.2	248.8	-90.00	-11,386.0	6,062.8	3,403.4	2,911.7	6.922			
20,700.0	7,903.5	20,911.8	7,903.5	248.1	250.7	-90.00	-11,480.5	6,095.4	3,403.4	2,907.9	6.869			
20,800.0	7,903.5	21,011.8	7,903.5	250.0	252.6	-90.00	-11,575.1	6,128.0	3,403.4	2,904.1	6.816			
20,900.0	7,903.5	21,111.8	7,903.5	252.0	254.5	-90.00	-11,669.6	6,160.7	3,403.4	2,900.2	6.764			
21,000.0	7,903.5	21,211.8	7,903.5	253.9	256.4	-90.00	-11,764.1	6,193.3	3,403.4	2,896.4	6.713			
21,100.0	7,903.5	21,311.8	7,903.5	255.8	258.3	-90.00	-11,858.6	6,225.9	3,403.4	2,892.6	6.663			
21,200.0	7,903.5	21,411.8	7,903.5	257.7	260.2	-90.00	-11,953.2	6,258.6	3,403.4	2,888.8	6.613			
21,300.0	7,903.5	21,511.8	7,903.5	259.6	262.1	-90.00	-12,047.7	6,291.2	3,403.4	2,884.9	6.564			
21,400.0	7,903.5	21,611.8	7,903.5	261.5	264.0	-90.00	-12,142.2	6,323.8	3,403.4	2,881.1	6.516			
21,500.0	7,903.5	21,711.8	7,903.5	263.4	265.9	-90.00	-12,236.7	6,356.5	3,403.4	2,877.3	6.469			
21,600.0	7,903.5	21,811.8	7,903.5	265.3	267.8	-90.00	-12,331.3	6,389.1	3,403.4	2,873.4	6.422			
21,700.0	7,903.5	21,911.8	7,903.5	267.2	269.7	-90.00	-12,425.8	6,421.7	3,403.4	2,869.6	6.376			
21,800.0	7,903.5	22,011.8	7,903.5	269.1	271.6	-90.00	-12,520.3	6,454.4	3,403.4	2,865.8	6.330			
21,900.0	7,903.5	22,111.8	7,903.5	271.1	273.5	-90.00	-12,614.8	6,487.0	3,403.4	2,861.9	6.286			
22,000.0	7,903.5	22,211.8	7,903.5	273.0	275.4	-90.00	-12,709.4	6,519.6	3,403.4	2,858.1	6.241			
22,100.0	7,903.5	22,311.8	7,903.5	274.9	277.3	-90.00	-12,803.9	6,552.3	3,403.4	2,854.3	6.198			
22,136.9	7,903.5	22,348.8	7,903.5	275.6	278.0	-90.00	-12,838.8	6,564.3	3,403.4	2,852.8	6.182			

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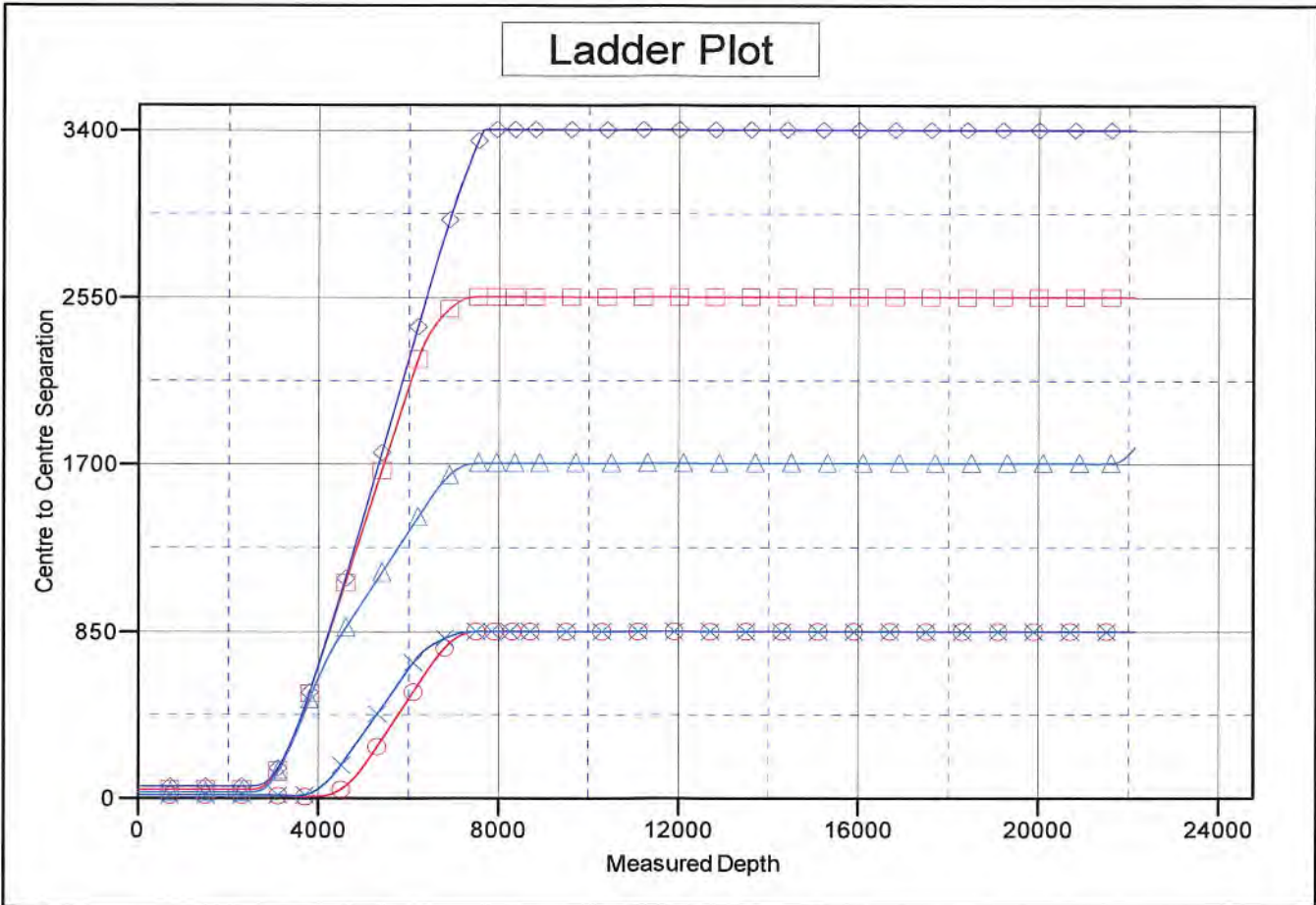
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WV Department of
Environmental Protection

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	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 #202
 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, Wellbore #1, Design #1 V0
- Johnson TFP40#203, Wellbore #1, Design #1 V0
- ✕ Johnson TFP40#201, Wellbore #1, Design #1 V0

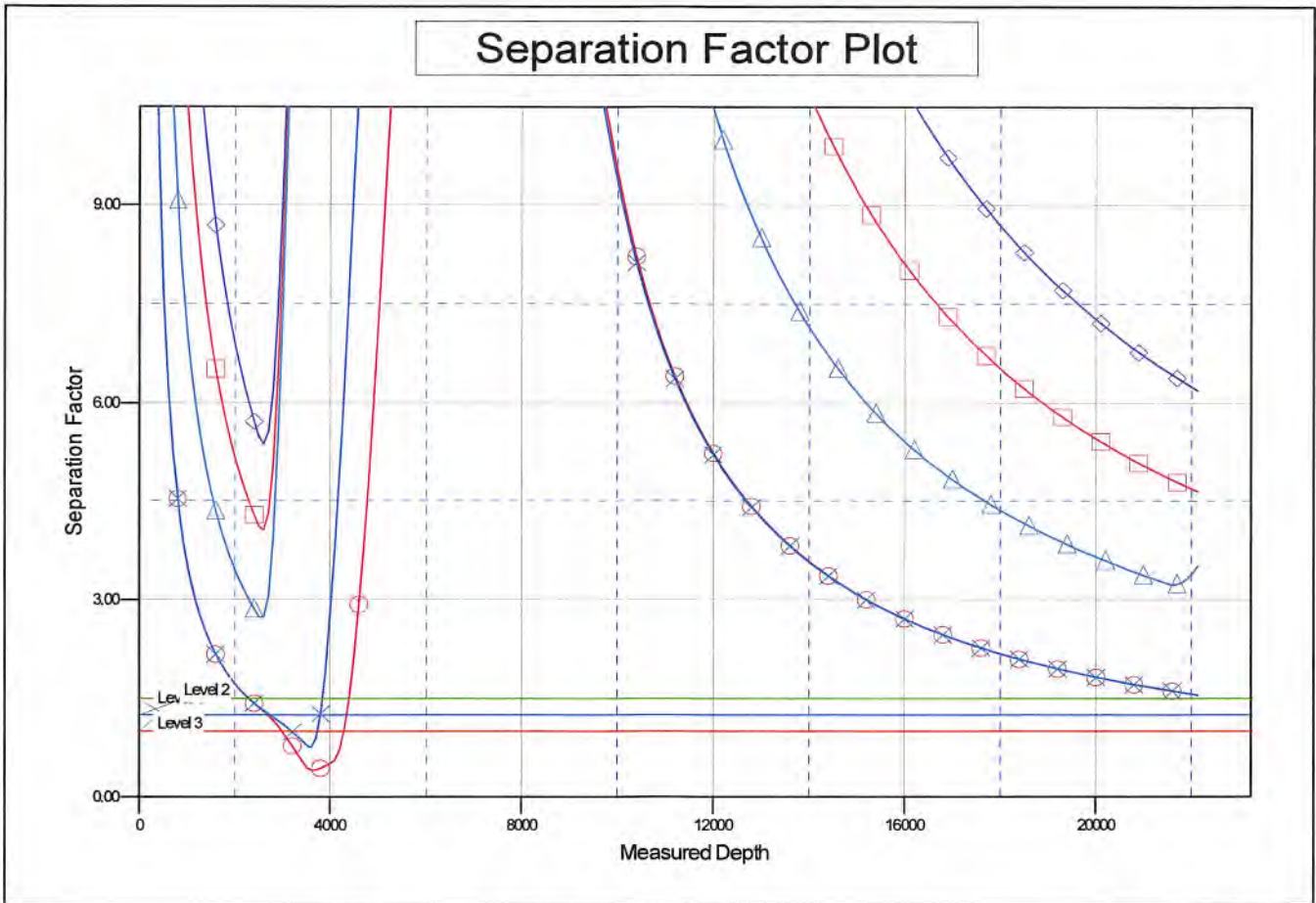
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WV Department of Environmental Protection

Company:	Arsenal Resources	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Project:	Taylor County, West Virginia	TVD Reference:	Well @ 1359.5usft
Reference Site:	Johnson TFP40 Pad	MD Reference:	Well @ 1359.5usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	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 #202
 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, Wellbore #1, Design #1 V0
- Johnson TFP40 #203, Wellbore #1, Design #1 V0
 ✱ Johnson TFP40 #201, Wellbore #1, Design #1 V0

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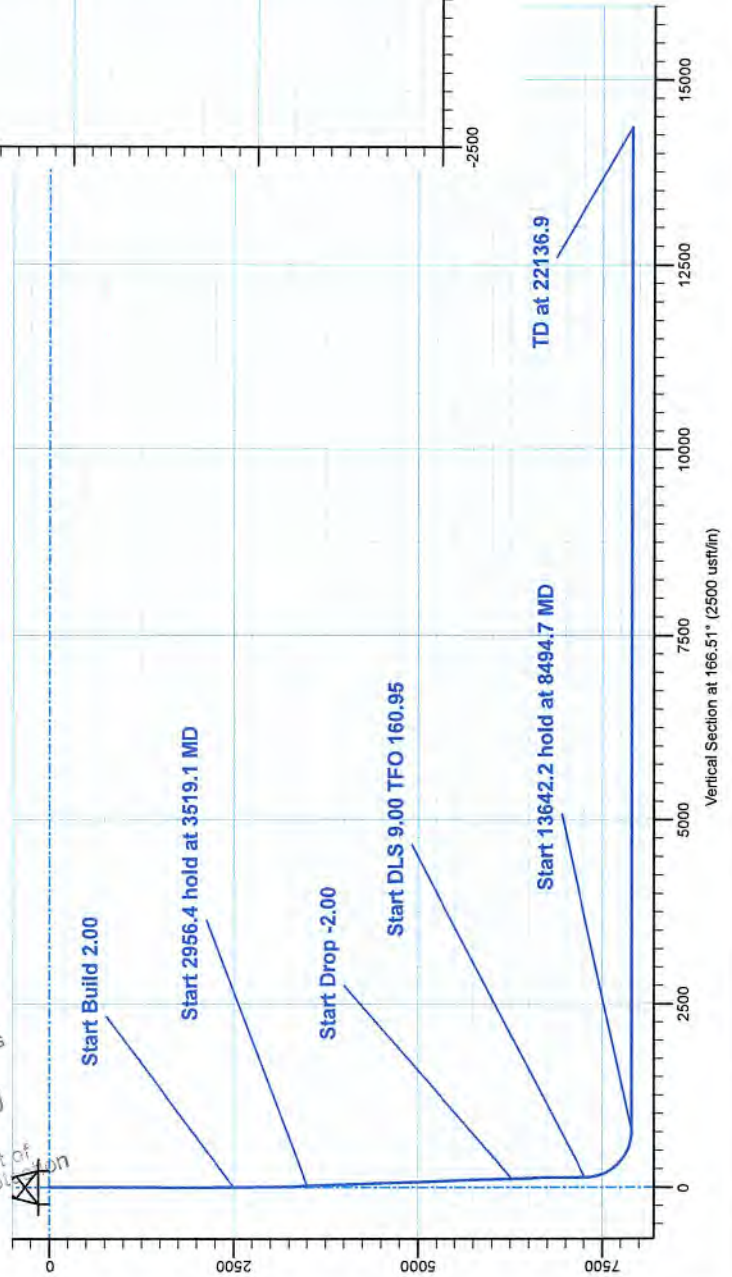
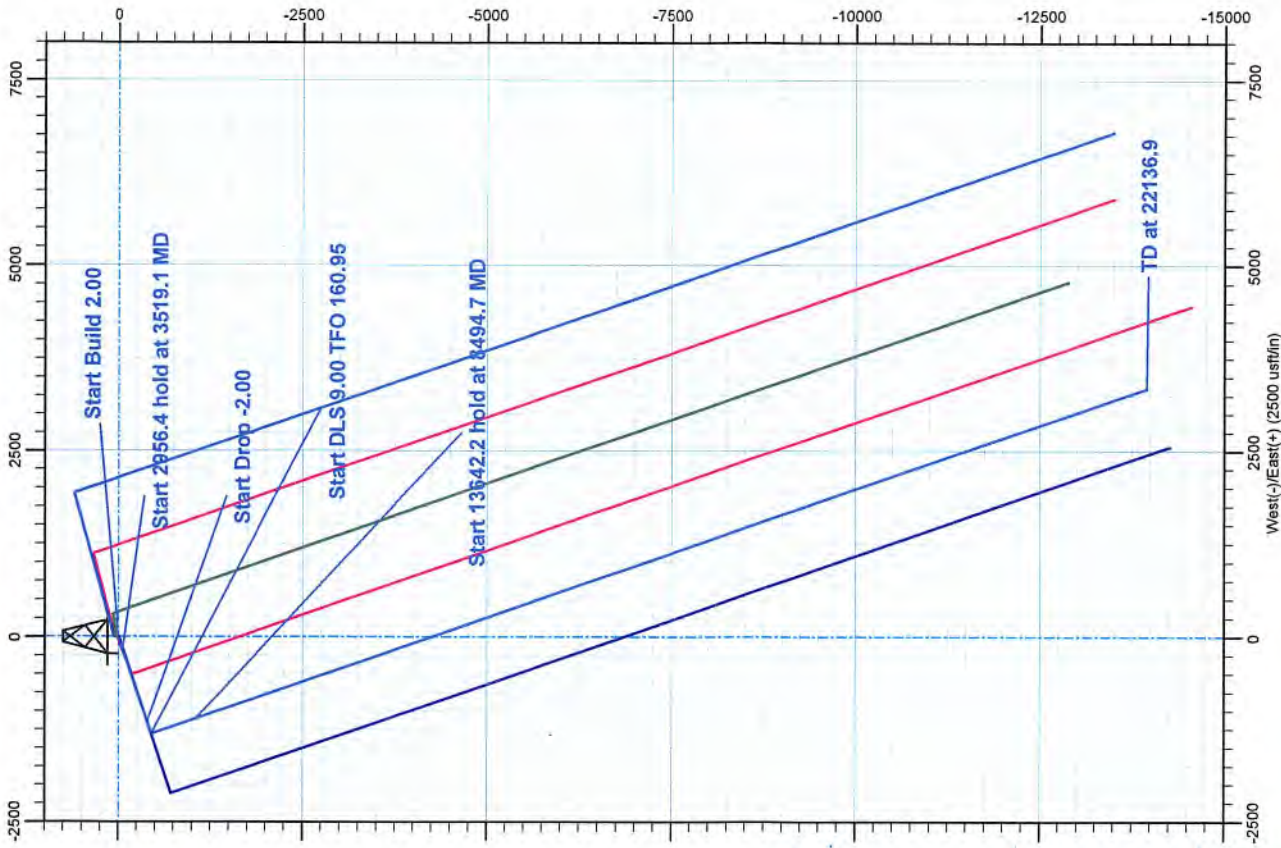


Arsenal Resources
Taylor County, West Virginia
Johnson TFP40 Pad
Design #1

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSe@Departure	Annotation
2500.0	0.00	0.00	2500.0	0.0	0.0	0.0	Start Build 2.00
3519.1	20.38	250.98	3497.8	-86.5	-169.6	17.3	Start 2956.4 hold at 3519.1 MD
6475.6	20.38	250.98	6269.1	-394.0	-1143.1	116.4	Start Drop -2.00
7494.7	0.00	0.00	7266.9	-452.5	-1312.7	133.7	Start DLS 9.00 TFO 160.95
8494.7	90.00	160.95	7903.5	-1054.2	-1104.9	767.3	Start 13642.2 hold at 8494.7 MD
22136.9	90.00	160.95	7903.5	-13949.5	3347.3	14345.5	TD at 22136.9

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Arsenal Resources

Taylor County, West Virginia

Johnson TFP40 Pad

Johnson TFP40 #202

Wellbore #1

Plan: Design #1

QES Well Planning Report

17 October, 2018

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Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Company:	Arsenal Resources	TVD Reference:	Well @ 1359.5usft
Project:	Taylor County, West Virginia	MD Reference:	Well @ 1359.5usft
Site:	Johnson TFP40 Pad	North Reference:	Grid
Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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

Site Johnson TFP40 Pad

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

Well Johnson TFP40 #202

Well Position	+N/-S	-60.0 usft	Northing:	276,986.72 usft	Latitude:	39° 15' 30.745 N
	+E/-W	0.0 usft	Easting:	1,779,051.66 usft	Longitude:	80° 10' 8.616 W
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	1,332.5 usft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	10/16/2018	-8.98	66.35	51,687.82250245

Design Design #1

Audit Notes:

Version:	Phase:	PLAN	Tie On Depth:	0.0
-----------------	---------------	------	----------------------	-----

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	166.51

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,519.1	20.38	250.98	3,497.8	-58.5	-169.6	2.00	2.00	0.00	250.98	
6,475.6	20.38	250.98	6,269.1	-394.0	-1,143.1	0.00	0.00	0.00	0.00	
7,494.7	0.00	0.00	7,266.9	-452.5	-1,312.7	2.00	-2.00	0.00	180.00	VP Johnson TFP40
8,494.7	90.00	160.95	7,903.5	-1,054.2	-1,104.9	9.00	9.00	16.10	160.95	
22,136.9	90.00	160.95	7,903.5	-13,949.5	3,347.3	0.00	0.00	0.00	0.00	PBHL Johnson TFF

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Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Company:	Arsenal Resources	TVD Reference:	Well @ 1359.5usft
Project:	Taylor County, West Virginia	MD Reference:	Well @ 1359.5usft
Site:	Johnson TFP40 Pad	North Reference:	Grid
Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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
Start Build 2.00									
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	250.98	2,600.0	-0.6	-1.6	0.2	2.00	2.00	0.00
2,700.0	4.00	250.98	2,699.8	-2.3	-6.6	0.7	2.00	2.00	0.00
2,800.0	6.00	250.98	2,799.5	-5.1	-14.8	1.5	2.00	2.00	0.00
2,900.0	8.00	250.98	2,898.7	-9.1	-26.4	2.7	2.00	2.00	0.00
3,000.0	10.00	250.98	2,997.5	-14.2	-41.1	4.2	2.00	2.00	0.00
3,100.0	12.00	250.98	3,095.6	-20.4	-59.2	6.0	2.00	2.00	0.00
3,200.0	14.00	250.98	3,193.1	-27.7	-80.5	8.2	2.00	2.00	0.00
3,300.0	16.00	250.98	3,289.6	-36.2	-104.9	10.7	2.00	2.00	0.00
3,400.0	18.00	250.98	3,385.3	-45.7	-132.6	13.5	2.00	2.00	0.00
3,500.0	20.00	250.98	3,479.8	-56.3	-163.3	16.6	2.00	2.00	0.00
Start 2956.4 hold at 3519.1 MD									
3,519.1	20.38	250.98	3,497.8	-58.5	-169.6	17.3	2.00	2.00	0.00
3,600.0	20.38	250.98	3,573.6	-67.6	-196.2	20.0	0.00	0.00	0.00
3,700.0	20.38	250.98	3,667.3	-79.0	-229.1	23.3	0.00	0.00	0.00
3,800.0	20.38	250.98	3,761.1	-90.3	-262.1	26.7	0.00	0.00	0.00
3,900.0	20.38	250.98	3,854.8	-101.7	-295.0	30.0	0.00	0.00	0.00
4,000.0	20.38	250.98	3,948.5	-113.0	-327.9	33.4	0.00	0.00	0.00
4,100.0	20.38	250.98	4,042.3	-124.4	-360.8	36.8	0.00	0.00	0.00
4,200.0	20.38	250.98	4,136.0	-135.7	-393.8	40.1	0.00	0.00	0.00
4,300.0	20.38	250.98	4,229.7	-147.1	-426.7	43.5	0.00	0.00	0.00
4,400.0	20.38	250.98	4,323.5	-158.4	-459.6	46.8	0.00	0.00	0.00
4,500.0	20.38	250.98	4,417.2	-169.8	-492.6	50.2	0.00	0.00	0.00
4,600.0	20.38	250.98	4,511.0	-181.1	-525.5	53.5	0.00	0.00	0.00
4,700.0	20.38	250.98	4,604.7	-192.5	-558.4	56.9	0.00	0.00	0.00
4,800.0	20.38	250.98	4,698.4	-203.8	-591.3	60.2	0.00	0.00	0.00
4,900.0	20.38	250.98	4,792.2	-215.2	-624.3	63.6	0.00	0.00	0.00
5,000.0	20.38	250.98	4,885.9	-226.5	-657.2	66.9	0.00	0.00	0.00

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Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Company:	Arsenal Resources	TVD Reference:	Well @ 1359.5usft
Project:	Taylor County, West Virginia	MD Reference:	Well @ 1359.5usft
Site:	Johnson TFP40 Pad	North Reference:	Grid
Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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	20.38	250.98	4,979.7	-237.9	-690.1	70.3	0.00	0.00	0.00	
5,200.0	20.38	250.98	5,073.4	-249.2	-723.1	73.6	0.00	0.00	0.00	
5,300.0	20.38	250.98	5,167.1	-260.6	-756.0	77.0	0.00	0.00	0.00	
5,400.0	20.38	250.98	5,260.9	-271.9	-788.9	80.4	0.00	0.00	0.00	
5,500.0	20.38	250.98	5,354.6	-283.3	-821.8	83.7	0.00	0.00	0.00	
5,600.0	20.38	250.98	5,448.3	-294.6	-854.8	87.1	0.00	0.00	0.00	
5,700.0	20.38	250.98	5,542.1	-306.0	-887.7	90.4	0.00	0.00	0.00	
5,800.0	20.38	250.98	5,635.8	-317.3	-920.6	93.8	0.00	0.00	0.00	
5,900.0	20.38	250.98	5,729.6	-328.7	-953.5	97.1	0.00	0.00	0.00	
6,000.0	20.38	250.98	5,823.3	-340.0	-986.5	100.5	0.00	0.00	0.00	
6,100.0	20.38	250.98	5,917.0	-351.4	-1,019.4	103.8	0.00	0.00	0.00	
6,200.0	20.38	250.98	6,010.8	-362.7	-1,052.3	107.2	0.00	0.00	0.00	
6,300.0	20.38	250.98	6,104.5	-374.1	-1,085.3	110.5	0.00	0.00	0.00	
6,400.0	20.38	250.98	6,198.3	-385.4	-1,118.2	113.9	0.00	0.00	0.00	
Start Drop -2.00										
6,475.6	20.38	250.98	6,269.1	-394.0	-1,143.1	116.4	0.00	0.00	0.00	
6,500.0	19.89	250.98	6,292.0	-396.8	-1,151.0	117.2	2.00	-2.00	0.00	
6,600.0	17.89	250.98	6,386.6	-407.3	-1,181.6	120.4	2.00	-2.00	0.00	
6,700.0	15.89	250.98	6,482.3	-416.8	-1,209.1	123.2	2.00	-2.00	0.00	
6,800.0	13.89	250.98	6,579.0	-425.2	-1,233.4	125.6	2.00	-2.00	0.00	
6,900.0	11.89	250.98	6,676.4	-432.4	-1,254.5	127.8	2.00	-2.00	0.00	
7,000.0	9.89	250.98	6,774.6	-438.6	-1,272.4	129.6	2.00	-2.00	0.00	
7,100.0	7.89	250.98	6,873.4	-443.6	-1,287.0	131.1	2.00	-2.00	0.00	
7,200.0	5.89	250.98	6,972.7	-447.5	-1,298.3	132.2	2.00	-2.00	0.00	
7,300.0	3.89	250.98	7,072.3	-450.3	-1,306.4	133.1	2.00	-2.00	0.00	
7,400.0	1.89	250.98	7,172.2	-452.0	-1,311.2	133.6	2.00	-2.00	0.00	
Start DLS 9.00 TFO 160.95										
7,494.7	0.00	0.00	7,266.9	-452.5	-1,312.7	133.7	2.00	-2.00	0.00	
7,500.0	0.47	160.95	7,272.2	-452.5	-1,312.7	133.7	9.00	9.00	0.00	
7,550.0	4.97	160.95	7,322.1	-454.7	-1,311.9	136.1	9.00	9.00	0.00	
7,600.0	9.47	160.95	7,371.7	-460.7	-1,309.8	142.3	9.00	9.00	0.00	
7,650.0	13.97	160.95	7,420.6	-470.3	-1,306.5	152.5	9.00	9.00	0.00	
7,700.0	18.47	160.95	7,468.6	-483.5	-1,302.0	166.4	9.00	9.00	0.00	
7,750.0	22.97	160.95	7,515.4	-500.2	-1,296.2	184.0	9.00	9.00	0.00	
7,800.0	27.47	160.95	7,560.6	-520.3	-1,289.2	205.2	9.00	9.00	0.00	
7,850.0	31.97	160.95	7,604.0	-543.8	-1,281.1	229.8	9.00	9.00	0.00	
7,900.0	36.47	160.95	7,645.3	-570.4	-1,272.0	257.8	9.00	9.00	0.00	
7,950.0	40.97	160.95	7,684.3	-599.9	-1,261.8	288.9	9.00	9.00	0.00	
8,000.0	45.47	160.95	7,720.8	-632.3	-1,250.6	323.0	9.00	9.00	0.00	
8,050.0	49.97	160.95	7,754.4	-667.2	-1,238.5	359.8	9.00	9.00	0.00	
8,100.0	54.47	160.95	7,785.0	-704.6	-1,225.6	399.1	9.00	9.00	0.00	
8,150.0	58.97	160.95	7,812.4	-744.1	-1,212.0	440.7	9.00	9.00	0.00	
8,200.0	63.47	160.95	7,836.5	-785.5	-1,197.7	484.4	9.00	9.00	0.00	
8,250.0	67.97	160.95	7,857.1	-828.6	-1,182.8	529.7	9.00	9.00	0.00	
8,300.0	72.47	160.95	7,874.0	-873.0	-1,167.5	576.5	9.00	9.00	0.00	
8,350.0	76.97	160.95	7,887.1	-918.6	-1,151.7	624.5	9.00	9.00	0.00	
8,400.0	81.47	160.95	7,896.5	-965.0	-1,135.7	673.4	9.00	9.00	0.00	
8,450.0	85.97	160.95	7,901.9	-1,012.0	-1,119.5	722.8	9.00	9.00	0.00	
Start 13642.2 hold at 8494.7 MD										
8,494.7	90.00	160.95	7,903.5	-1,054.2	-1,104.9	767.3	9.00	9.00	0.00	
8,500.0	90.00	160.95	7,903.5	-1,059.2	-1,103.2	772.6	0.00	0.00	0.00	
8,600.0	90.00	160.95	7,903.5	-1,153.7	-1,070.5	872.1	0.00	0.00	0.00	
8,700.0	90.00	160.95	7,903.5	-1,248.3	-1,037.9	971.6	0.00	0.00	0.00	

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Company:	Arsenal Resources	TVD Reference:	Well @ 1359.5usft
Project:	Taylor County, West Virginia	MD Reference:	Well @ 1359.5usft
Site:	Johnson TFP40 Pad	North Reference:	Grid
Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
8,800.0	90.00	160.95	7,903.5	-1,342.8	-1,005.3	1,071.2	0.00	0.00	0.00	
8,900.0	90.00	160.95	7,903.5	-1,437.3	-972.6	1,170.7	0.00	0.00	0.00	
9,000.0	90.00	160.95	7,903.5	-1,531.8	-940.0	1,270.2	0.00	0.00	0.00	
9,100.0	90.00	160.95	7,903.5	-1,626.4	-907.4	1,369.8	0.00	0.00	0.00	
9,200.0	90.00	160.95	7,903.5	-1,720.9	-874.7	1,469.3	0.00	0.00	0.00	
9,300.0	90.00	160.95	7,903.5	-1,815.4	-842.1	1,568.8	0.00	0.00	0.00	
9,400.0	90.00	160.95	7,903.5	-1,909.9	-809.5	1,668.3	0.00	0.00	0.00	
9,500.0	90.00	160.95	7,903.5	-2,004.5	-776.8	1,767.9	0.00	0.00	0.00	
9,600.0	90.00	160.95	7,903.5	-2,099.0	-744.2	1,867.4	0.00	0.00	0.00	
9,700.0	90.00	160.95	7,903.5	-2,193.5	-711.6	1,966.9	0.00	0.00	0.00	
9,800.0	90.00	160.95	7,903.5	-2,288.0	-678.9	2,066.5	0.00	0.00	0.00	
9,900.0	90.00	160.95	7,903.5	-2,382.6	-646.3	2,166.0	0.00	0.00	0.00	
10,000.0	90.00	160.95	7,903.5	-2,477.1	-613.6	2,265.5	0.00	0.00	0.00	
10,100.0	90.00	160.95	7,903.5	-2,571.6	-581.0	2,365.1	0.00	0.00	0.00	
10,200.0	90.00	160.95	7,903.5	-2,666.1	-548.4	2,464.6	0.00	0.00	0.00	
10,300.0	90.00	160.95	7,903.5	-2,760.7	-515.7	2,564.1	0.00	0.00	0.00	
10,400.0	90.00	160.95	7,903.5	-2,855.2	-483.1	2,663.7	0.00	0.00	0.00	
10,500.0	90.00	160.95	7,903.5	-2,949.7	-450.5	2,763.2	0.00	0.00	0.00	
10,600.0	90.00	160.95	7,903.5	-3,044.2	-417.8	2,862.7	0.00	0.00	0.00	
10,700.0	90.00	160.95	7,903.5	-3,138.8	-385.2	2,962.2	0.00	0.00	0.00	
10,800.0	90.00	160.95	7,903.5	-3,233.3	-352.6	3,061.8	0.00	0.00	0.00	
10,900.0	90.00	160.95	7,903.5	-3,327.8	-319.9	3,161.3	0.00	0.00	0.00	
11,000.0	90.00	160.95	7,903.5	-3,422.3	-287.3	3,260.8	0.00	0.00	0.00	
11,100.0	90.00	160.95	7,903.5	-3,516.9	-254.7	3,360.4	0.00	0.00	0.00	
11,200.0	90.00	160.95	7,903.5	-3,611.4	-222.0	3,459.9	0.00	0.00	0.00	
11,300.0	90.00	160.95	7,903.5	-3,705.9	-189.4	3,559.4	0.00	0.00	0.00	
11,400.0	90.00	160.95	7,903.5	-3,800.4	-156.8	3,659.0	0.00	0.00	0.00	
11,500.0	90.00	160.95	7,903.5	-3,895.0	-124.1	3,758.5	0.00	0.00	0.00	
11,600.0	90.00	160.95	7,903.5	-3,989.5	-91.5	3,858.0	0.00	0.00	0.00	
11,700.0	90.00	160.95	7,903.5	-4,084.0	-58.8	3,957.5	0.00	0.00	0.00	
11,800.0	90.00	160.95	7,903.5	-4,178.5	-26.2	4,057.1	0.00	0.00	0.00	
11,900.0	90.00	160.95	7,903.5	-4,273.1	6.4	4,156.6	0.00	0.00	0.00	
12,000.0	90.00	160.95	7,903.5	-4,367.6	39.1	4,256.1	0.00	0.00	0.00	
12,100.0	90.00	160.95	7,903.5	-4,462.1	71.7	4,355.7	0.00	0.00	0.00	
12,200.0	90.00	160.95	7,903.5	-4,556.6	104.3	4,455.2	0.00	0.00	0.00	
12,300.0	90.00	160.95	7,903.5	-4,651.2	137.0	4,554.7	0.00	0.00	0.00	
12,400.0	90.00	160.95	7,903.5	-4,745.7	169.6	4,654.3	0.00	0.00	0.00	
12,500.0	90.00	160.95	7,903.5	-4,840.2	202.2	4,753.8	0.00	0.00	0.00	
12,600.0	90.00	160.95	7,903.5	-4,934.7	234.9	4,853.3	0.00	0.00	0.00	
12,700.0	90.00	160.95	7,903.5	-5,029.3	267.5	4,952.9	0.00	0.00	0.00	
12,800.0	90.00	160.95	7,903.5	-5,123.8	300.1	5,052.4	0.00	0.00	0.00	
12,900.0	90.00	160.95	7,903.5	-5,218.3	332.8	5,151.9	0.00	0.00	0.00	
13,000.0	90.00	160.95	7,903.5	-5,312.8	365.4	5,251.4	0.00	0.00	0.00	
13,100.0	90.00	160.95	7,903.5	-5,407.4	398.0	5,351.0	0.00	0.00	0.00	
13,200.0	90.00	160.95	7,903.5	-5,501.9	430.7	5,450.5	0.00	0.00	0.00	
13,300.0	90.00	160.95	7,903.5	-5,596.4	463.3	5,550.0	0.00	0.00	0.00	
13,400.0	90.00	160.95	7,903.5	-5,690.9	496.0	5,649.6	0.00	0.00	0.00	
13,500.0	90.00	160.95	7,903.5	-5,785.5	528.6	5,749.1	0.00	0.00	0.00	
13,600.0	90.00	160.95	7,903.5	-5,880.0	561.2	5,848.6	0.00	0.00	0.00	
13,700.0	90.00	160.95	7,903.5	-5,974.5	593.9	5,948.2	0.00	0.00	0.00	
13,800.0	90.00	160.95	7,903.5	-6,069.0	626.5	6,047.7	0.00	0.00	0.00	
13,900.0	90.00	160.95	7,903.5	-6,163.6	659.1	6,147.2	0.00	0.00	0.00	
14,000.0	90.00	160.95	7,903.5	-6,258.1	691.8	6,246.8	0.00	0.00	0.00	
14,100.0	90.00	160.95	7,903.5	-6,352.6	724.4	6,346.3	0.00	0.00	0.00	

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Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Company:	Arsenal Resources	TVD Reference:	Well @ 1359.5usft
Project:	Taylor County, West Virginia	MD Reference:	Well @ 1359.5usft
Site:	Johnson TFP40 Pad	North Reference:	Grid
Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
14,200.0	90.00	160.95	7,903.5	-6,447.1	757.0	6,445.8	0.00	0.00	0.00
14,300.0	90.00	160.95	7,903.5	-6,541.7	789.7	6,545.3	0.00	0.00	0.00
14,400.0	90.00	160.95	7,903.5	-6,636.2	822.3	6,644.9	0.00	0.00	0.00
14,500.0	90.00	160.95	7,903.5	-6,730.7	854.9	6,744.4	0.00	0.00	0.00
14,600.0	90.00	160.95	7,903.5	-6,825.2	887.6	6,843.9	0.00	0.00	0.00
14,700.0	90.00	160.95	7,903.5	-6,919.8	920.2	6,943.5	0.00	0.00	0.00
14,800.0	90.00	160.95	7,903.5	-7,014.3	952.9	7,043.0	0.00	0.00	0.00
14,900.0	90.00	160.95	7,903.5	-7,108.8	985.5	7,142.5	0.00	0.00	0.00
15,000.0	90.00	160.95	7,903.5	-7,203.3	1,018.1	7,242.1	0.00	0.00	0.00
15,100.0	90.00	160.95	7,903.5	-7,297.9	1,050.8	7,341.6	0.00	0.00	0.00
15,200.0	90.00	160.95	7,903.5	-7,392.4	1,083.4	7,441.1	0.00	0.00	0.00
15,300.0	90.00	160.95	7,903.5	-7,486.9	1,116.0	7,540.6	0.00	0.00	0.00
15,400.0	90.00	160.95	7,903.5	-7,581.4	1,148.7	7,640.2	0.00	0.00	0.00
15,500.0	90.00	160.95	7,903.5	-7,676.0	1,181.3	7,739.7	0.00	0.00	0.00
15,600.0	90.00	160.95	7,903.5	-7,770.5	1,213.9	7,839.2	0.00	0.00	0.00
15,700.0	90.00	160.95	7,903.5	-7,865.0	1,246.6	7,938.8	0.00	0.00	0.00
15,800.0	90.00	160.95	7,903.5	-7,959.5	1,279.2	8,038.3	0.00	0.00	0.00
15,900.0	90.00	160.95	7,903.5	-8,054.1	1,311.8	8,137.8	0.00	0.00	0.00
16,000.0	90.00	160.95	7,903.5	-8,148.6	1,344.5	8,237.4	0.00	0.00	0.00
16,100.0	90.00	160.95	7,903.5	-8,243.1	1,377.1	8,336.9	0.00	0.00	0.00
16,200.0	90.00	160.95	7,903.5	-8,337.6	1,409.7	8,436.4	0.00	0.00	0.00
16,300.0	90.00	160.95	7,903.5	-8,432.2	1,442.4	8,536.0	0.00	0.00	0.00
16,400.0	90.00	160.95	7,903.5	-8,526.7	1,475.0	8,635.5	0.00	0.00	0.00
16,500.0	90.00	160.95	7,903.5	-8,621.2	1,507.7	8,735.0	0.00	0.00	0.00
16,600.0	90.00	160.95	7,903.5	-8,715.7	1,540.3	8,834.5	0.00	0.00	0.00
16,700.0	90.00	160.95	7,903.5	-8,810.3	1,572.9	8,934.1	0.00	0.00	0.00
16,800.0	90.00	160.95	7,903.5	-8,904.8	1,605.6	9,033.6	0.00	0.00	0.00
16,900.0	90.00	160.95	7,903.5	-8,999.3	1,638.2	9,133.1	0.00	0.00	0.00
17,000.0	90.00	160.95	7,903.5	-9,093.8	1,670.8	9,232.7	0.00	0.00	0.00
17,100.0	90.00	160.95	7,903.5	-9,188.3	1,703.5	9,332.2	0.00	0.00	0.00
17,200.0	90.00	160.95	7,903.5	-9,282.9	1,736.1	9,431.7	0.00	0.00	0.00
17,300.0	90.00	160.95	7,903.5	-9,377.4	1,768.7	9,531.3	0.00	0.00	0.00
17,400.0	90.00	160.95	7,903.5	-9,471.9	1,801.4	9,630.8	0.00	0.00	0.00
17,500.0	90.00	160.95	7,903.5	-9,566.4	1,834.0	9,730.3	0.00	0.00	0.00
17,600.0	90.00	160.95	7,903.5	-9,661.0	1,866.6	9,829.8	0.00	0.00	0.00
17,700.0	90.00	160.95	7,903.5	-9,755.5	1,899.3	9,929.4	0.00	0.00	0.00
17,800.0	90.00	160.95	7,903.5	-9,850.0	1,931.9	10,028.9	0.00	0.00	0.00
17,900.0	90.00	160.95	7,903.5	-9,944.5	1,964.6	10,128.4	0.00	0.00	0.00
18,000.0	90.00	160.95	7,903.5	-10,039.1	1,997.2	10,228.0	0.00	0.00	0.00
18,100.0	90.00	160.95	7,903.5	-10,133.6	2,029.8	10,327.5	0.00	0.00	0.00
18,200.0	90.00	160.95	7,903.5	-10,228.1	2,062.5	10,427.0	0.00	0.00	0.00
18,300.0	90.00	160.95	7,903.5	-10,322.6	2,095.1	10,526.6	0.00	0.00	0.00
18,400.0	90.00	160.95	7,903.5	-10,417.2	2,127.7	10,626.1	0.00	0.00	0.00
18,500.0	90.00	160.95	7,903.5	-10,511.7	2,160.4	10,725.6	0.00	0.00	0.00
18,600.0	90.00	160.95	7,903.5	-10,606.2	2,193.0	10,825.2	0.00	0.00	0.00
18,700.0	90.00	160.95	7,903.5	-10,700.7	2,225.6	10,924.7	0.00	0.00	0.00
18,800.0	90.00	160.95	7,903.5	-10,795.3	2,258.3	11,024.2	0.00	0.00	0.00
18,900.0	90.00	160.95	7,903.5	-10,889.8	2,290.9	11,123.7	0.00	0.00	0.00
19,000.0	90.00	160.95	7,903.5	-10,984.3	2,323.5	11,223.3	0.00	0.00	0.00
19,100.0	90.00	160.95	7,903.5	-11,078.8	2,356.2	11,322.8	0.00	0.00	0.00
19,200.0	90.00	160.95	7,903.5	-11,173.4	2,388.8	11,422.3	0.00	0.00	0.00
19,300.0	90.00	160.95	7,903.5	-11,267.9	2,421.4	11,521.9	0.00	0.00	0.00
19,400.0	90.00	160.95	7,903.5	-11,362.4	2,454.1	11,621.4	0.00	0.00	0.00
19,500.0	90.00	160.95	7,903.5	-11,456.9	2,486.7	11,720.9	0.00	0.00	0.00

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Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Johnson TFP40 #202
Company:	Arsenal Resources	TVD Reference:	Well @ 1359.5usft
Project:	Taylor County, West Virginia	MD Reference:	Well @ 1359.5usft
Site:	Johnson TFP40 Pad	North Reference:	Grid
Well:	Johnson TFP40 #202	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
19,600.0	90.00	160.95	7,903.5	-11,551.5	2,519.4	11,820.5	0.00	0.00	0.00
19,700.0	90.00	160.95	7,903.5	-11,646.0	2,552.0	11,920.0	0.00	0.00	0.00
19,800.0	90.00	160.95	7,903.5	-11,740.5	2,584.6	12,019.5	0.00	0.00	0.00
19,900.0	90.00	160.95	7,903.5	-11,835.0	2,617.3	12,119.1	0.00	0.00	0.00
20,000.0	90.00	160.95	7,903.5	-11,929.6	2,649.9	12,218.6	0.00	0.00	0.00
20,100.0	90.00	160.95	7,903.5	-12,024.1	2,682.5	12,318.1	0.00	0.00	0.00
20,200.0	90.00	160.95	7,903.5	-12,118.6	2,715.2	12,417.6	0.00	0.00	0.00
20,300.0	90.00	160.95	7,903.5	-12,213.1	2,747.8	12,517.2	0.00	0.00	0.00
20,400.0	90.00	160.95	7,903.5	-12,307.7	2,780.4	12,616.7	0.00	0.00	0.00
20,500.0	90.00	160.95	7,903.5	-12,402.2	2,813.1	12,716.2	0.00	0.00	0.00
20,600.0	90.00	160.95	7,903.5	-12,496.7	2,845.7	12,815.8	0.00	0.00	0.00
20,700.0	90.00	160.95	7,903.5	-12,591.2	2,878.3	12,915.3	0.00	0.00	0.00
20,800.0	90.00	160.95	7,903.5	-12,685.8	2,911.0	13,014.8	0.00	0.00	0.00
20,900.0	90.00	160.95	7,903.5	-12,780.3	2,943.6	13,114.4	0.00	0.00	0.00
21,000.0	90.00	160.95	7,903.5	-12,874.8	2,976.2	13,213.9	0.00	0.00	0.00
21,100.0	90.00	160.95	7,903.5	-12,969.3	3,008.9	13,313.4	0.00	0.00	0.00
21,200.0	90.00	160.95	7,903.5	-13,063.9	3,041.5	13,412.9	0.00	0.00	0.00
21,300.0	90.00	160.95	7,903.5	-13,158.4	3,074.2	13,512.5	0.00	0.00	0.00
21,400.0	90.00	160.95	7,903.5	-13,252.9	3,106.8	13,612.0	0.00	0.00	0.00
21,500.0	90.00	160.95	7,903.5	-13,347.4	3,139.4	13,711.5	0.00	0.00	0.00
21,600.0	90.00	160.95	7,903.5	-13,442.0	3,172.1	13,811.1	0.00	0.00	0.00
21,700.0	90.00	160.95	7,903.5	-13,536.5	3,204.7	13,910.6	0.00	0.00	0.00
21,800.0	90.00	160.95	7,903.5	-13,631.0	3,237.3	14,010.1	0.00	0.00	0.00
21,900.0	90.00	160.95	7,903.5	-13,725.5	3,270.0	14,109.7	0.00	0.00	0.00
22,000.0	90.00	160.95	7,903.5	-13,820.1	3,302.6	14,209.2	0.00	0.00	0.00
22,100.0	90.00	160.95	7,903.5	-13,914.6	3,335.2	14,308.7	0.00	0.00	0.00
TD at 22136.9									
22,136.9	90.00	160.95	7,903.5	-13,949.5	3,347.3	14,345.5	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	-13,949.5	3,347.3	263,037.23	1,782,398.95	39° 13' 13.117 N	80° 9' 24.764 W
LP Johnson TFP40 #2 - plan hits target center - Point	0.00	0.00	7,903.5	-1,054.2	-1,104.9	275,932.47	1,777,946.76	39° 15' 20.244 N	80° 10' 22.562 W

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
3,519.1	3,497.8	-58.5	-169.6	Start 2956.4 hold at 3519.1 MD
6,475.6	6,269.1	-394.0	-1,143.1	Start Drop -2.00
7,494.7	7,266.9	-452.5	-1,312.7	Start DLS 9.00 TFO 160.95
8,494.7	7,903.5	-1,054.2	-1,104.9	Start 13642.2 hold at 8494.7 MD
22,136.9	7,903.5	-13,949.5	3,347.3	TD at 22136.9

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Purpose

The purpose of this pad-specific Hydraulic Fracturing Monitoring Plan is to identify and notify conventional well operators near Arsenal Resources hydraulic fracturing in Taylor County, WV prior to hydraulic fracturing at Johnson TFP40 and Well Number 202.

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 5,000' 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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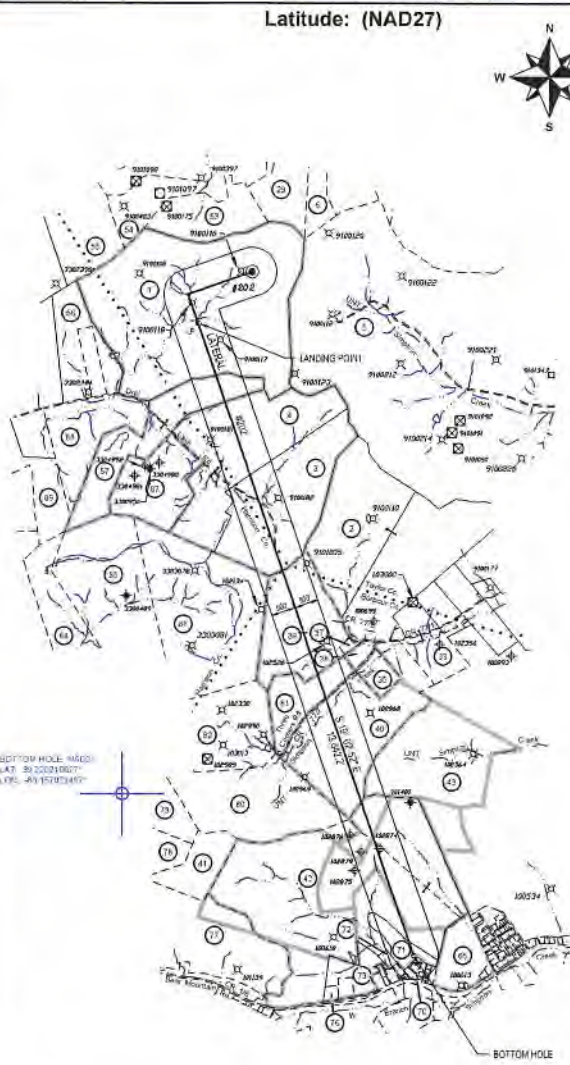
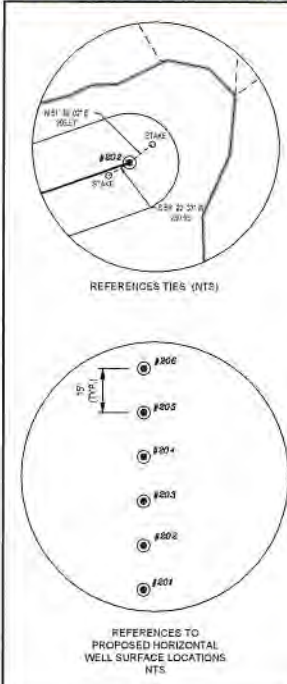
Area of Review Report - Johnson TFP40 Pad, 202 Lateral, Taylor County, WV

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
Goodwin 3	091-00117	Alliance Petroleum Corporation	Existing	39.254729	-80.171316	2581	Gordon, Benson	NA
Goff-Arnold 1	091-00181	Greylock Conventional, LLC	Existing	39.249118	-80.171944	4600	Benson	NA
Goff-Arnold 2	091-00182	Greylock Conventional, LLC	Existing	39.245897	-80.167017	4580	Benson	NA
Stewart 2A	091-01005	Alliance Petroleum Corporation	Existing	39.242262	-80.164901	4955	Fourth, Benson	NA
LL Moss 1A	001-02526	Alliance Petroleum Corporation	Existing	39.237911	-80.163406	4657	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
Coalquest 11	001-02874	ARP MOUNTAINEER PRODUCTION, LLC	Existing	39.22602	-80.159111	1048	Lo Kittanning Coal	NA

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

9 107' 822'



(NAD83-WVN) US SURVEY FT.	
TOP HOLE	
N)	276586.722
E)	177945.162
LANDING POINT	
N)	275532.474
E)	177796.764
BOTTOM HOLE	
N)	263037.230
E)	1762568.951
(NAD83-LAT/LONG) DECIMAL	
TOP HOLE	
N)	35.258540414
E)	-80.169059880
LANDING POINT	
N)	35.255623344
E)	-80.172944026
BOTTOM HOLE	
N)	35.220103656
E)	-80.154878856
(UTM, NAD83) METER	
TOP HOLE	
N)	4345795.713
E)	571690.472
LANDING POINT	
N)	4345469.921
E)	571859.186
BOTTOM HOLE	
N)	4341563.711
E)	572780.928

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 GFS.
- There are no railroads, dwellings, or agricultural buildings within 925 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
⊙ FH	PROPOSED WELL HEAD
⊙	EXISTING WELL HEAD (Active)
⊙	EXISTING WELL HEAD (Plugged)
⊙	EXISTING WELL HEAD (Abandoned)
⊙	EXISTING WELL HEAD (Aband. Drilled)
⊙	EXISTING WELL HEAD (Active LTR)
⊙	LANDING POINT/BOTTOM HOLE
⊙	SURFACE OWNER

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, III* 6-3-2019
 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 3, 2019
 JOHNSON TFP-40
 OPERATOR'S WELL #: # 202
 API WELL #: 47 091
 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 LAMBSON, 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 MARCEL 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: ROSEMONT, 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: 22,136.9'

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'



Click or tap to enter a date.

Alliance Petroleum Corporation

Address

State

RE: Johnson TFP 40 Pad

Dear Sir/Madam,

Arsenal Resources has developed a Marcellus pad, Johnson TFP40, well #202, 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 pad, well #202, 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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Office of Oil and Gas

JUN 11 2019

WV Department of
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