WR-35
Rev. 8/23/13

PM

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

API 47 - 017 - 06521 County Doddridge District New Milton 7.5
Quad New Milton 7.5 Pad Name Key Oil Field/Pool Name
Farm name Shirley Plauger Well Number A.W. Robinson #2
Operator (as registered with the OOG) Key Oil Company
Address 22 Garton Plaza City Weston State WV Zip 26452

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 39'.1937 Easting 80.7253
Landing Point of Curve Northing N/A Easting N/A
Bottom Hole Northing N/A Easting N/A

Elevation (ft) 1060 GL Type of Well ■New □ Existing Type of Report □Interim ■Final

Permit Type □ Deviated □ Horizontal □ Horizontal 6A ■ Vertical Depth Type □ Deep ■ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework ■ Stimulate

Well Type □ Brine Disposal □ CBM ■ Gas ■ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other

Type of Completion □ Single ■ Multiple Fluids Produced □ Brine ■Gas □ NGL ■ Oil □ Other
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud □Fresh Water Intermediate hole ■ Air □ Mud □ Fresh Water □ Brine
Production hole ■ Air □ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)

Date permit issued 06/26/2014 Date drilling commenced 08/08/14 Date drilling ceased 08/14/2014
Date completion activities began 09/16/14 Date completion activities ceased 09/16/14
Verbal plugging (Y/N) N/A Date permission granted Granted by

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 60 Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1200 Void(s) encountered (Y/N) depths N
Coal depth(s) ft N/A Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

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API 47- 017 - 06521 Farm name Shirley Plauger Well number A.W. Robinson #2

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	20"	13-3/8"	38	NEW	J-55	N/A	N
Surface							
Coal	N/A						
Intermediate 1	12-1/4"	9-5/8"	168	NEW	J-55	110	70 SKS. CTS (Y)
Intermediate 2	8-3/4"	7"	1183	NEW	J-55		170 SKS. CTS (Y)
Intermediate 3							
Production	6-1/4"	4-1/2"	2880	NEW	J-55		150 SKS. CBL POZ (N)
Tubing							ETOC 1100'
Packer type and depth set							

Comment Details

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor	N/A	N/A	N/A	N/A	N/A	N/A	
Surface	CLASS A	70	15.6	1.13		CTS	8 HRS.
Coal							
Intermediate 1							
Intermediate 2	CLASS A	170	15.6	1.23		CTS	8 HRS.
Intermediate 3							
Production	CBL POZ	150	13.5	1.53		ETOC 1100'	
Tubing							

Drillers TD (ft) 2970 Loggers TD (ft) 2950

Deepest formation penetrated GORDON 2730 Plug back to (ft)

Plug back procedure

Kick off depth (ft) N/A

Check all wireline logs run ■ caliper ■ density □ deviated/directional ■ induction ■ neutron ■ resistivity ■ gamma ray ■ temperature □ sonic

Well cored □ Yes ■ No Conventional Sidewall Were cuttings collected □ Yes ■ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING

WAS WELL COMPLETED AS SHOT HOLE □ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? □ Yes ■ No DETAILS

WERE TRACERS USED □ Yes ■ No TYPE OF TRACER(S) USED

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WR-35
Rev. 8/23/13

API 47- 017 - 06521 Farm name Shirley Plauger Well number A.W. Robinson #2

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
1	09/16/2014	2505	2725	20	GORDON/GANTZ
2	09/16/2014	2302	2370	20	WEIR
3	09/16/2014	2132	2160	20	INJUN
4	09/16/2014	2106	2112	20	KEENER
5	09/16/2014	2006	2016	20	BLUE MONDAY

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
1	09/16/14	21	2858	1904	2475	19,000	132	248,000
2	09/16/14	20	2950	2692	2700	600	87	160,000
3	09/16/14	22	2576	2565	2650	15,000	140	246,000
4	09/16/14	16	3475	3511	3050	1,000	74	174,000
5	09/16/14	18	3455	4120	2760	2,000	91	160,000

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WR-35
Rev. 8/23/13

API 47- 017 - 06521 Farm name Shirley Plauger Well number A.W. Robinson #2

PRODUCING FORMATION(S)	DEPTHS			
GORDON	2727	TVD	2733	MD
WEIR	2307		2399	
INJUN	2137		2159	
KEENER	2106		2122	

Please insert additional pages as applicable.

GAS TEST ☐ Build up ☐ Drawdown ■ Open Flow OIL TEST ■ Flow ☐ Pump

SHUT-IN PRESSURE Surface 1350 psi Bottom Hole 2548 psi DURATION OF TEST 72 hrs

OPEN FLOW Gas 671 mcfpd Oil 3 bpd NGL 0 bpd Water 0 bpd GAS MEASURED BY ☐ Estimated ■ Orifice ☐ Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		
SAND & SHALE	0	1180	0	1180	BROWN
SHALE	1180	1960	1180	1960	BROWN
LITTLE LIME	1960	2000	1960	2000	GRAY
BLUE MONDAY	2000	2020	2000	2020	GRAY
BIG LIME	2020	2120	2020	2120	GRAY
INJUN	2120	2170	2120	2170	BROWN
SHALE	2170	2350	2170	2350	BROWN
WEIR	2350	2380	2350	2380	GRAY
SAND & SHALE	2380	2710	2380	2710	GRAY
GORDON	2710	2730	2710	2730	GRAY
SHALE	2730	2970	2730	2970	GRAY
TD	2970				

Please insert additional pages as applicable.

Drilling Contractor NEXUS DRILLING
Address INDUSTRIAL PARK City JANE LEW State WV Zip 26378

Logging Company NABORS
Address 82 OLD ELKINS ROAD City BUCKHANNON State WV Zip 26201

Cementing Company UNIVERSAL WELL SERVICE
Address 5 HALL RUN ROAD City BUCKHANNON State WV Zip 26201

Stimulating Company UNIVERSAL WELL SERVICE
Address 5 HALL RUN ROAD City BUCKHANNON State WV Zip 26201

Please insert additional pages as applicable.

Completed by JAN CHAPMAN Telephone (304) 269-7102
Signature Jan Chapman Title PRESIDENT Date 10/22/2014

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Office of Oil and Gas
OCT 23 2014
WV Department of
Environmental Protection

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

API 47- 5 - 06521 Farm name Shirley Plauger Well number A.W. Robinson #2

Continued from Page 4

PRODUCING FORMATION(S)	DEPTHS			
BLUE MONDAY	2010	TVD	2020	MD

WR-35
Rev. 8/23/13

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

API 47 - 021 - 05765 County Gilmer District Glenville
Quad Glenville 7.5' Pad Name na Field/Pool Name na
Farm name Ernest L. Arbuckle Family Well Number Rinehart S-1
Operator (as registered with the OOG) Energy Corporation of America
Address 501 56th St. City Charleston State WV Zip 25304

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4310660.6 Easting 486971.7
Landing Point of Curve Northing na Easting na
Bottom Hole Northing na Easting na

Elevation (ft) 760 GL Type of Well ■New □ Existing Type of Report □Interim ■Final

Permit Type □ Deviated □ Horizontal □ Horizontal 6A ■ Vertical Depth Type □ Deep ■ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework □ Stimulate

Well Type □ Brine Disposal □ CBM ■ Gas □ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other _____

Type of Completion ■ Single □ Multiple Fluids Produced □ Brine ■Gas □ NGL □ Oil □ Other _____
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud □Fresh Water Intermediate hole ■ Air □ Mud □ Fresh Water □ Brine
Production hole ■ Air □ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)

Date permit issued 5/5/14 Date drilling commenced 5/28/14 Date drilling ceased 6/2/14
Date completion activities began Well was completed as a natural Date completion activities ceased na
Verbal plugging (Y/N) na Date permission granted na Granted by na

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 360-388 ft., 466-483 ft., 552-574 ft. Open mine(s) (Y/N) depths N
Salt water depth(s) ft NA Void(s) encountered (Y/N) depths N
Coal depth(s) ft NA Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Office of Oil and Gas
SEP 25 2014
WV Department of
Environmental Protection

Reviewed by:

WR-35
Rev. 8/23/13

API 47- 021 - 05765 Farm name Ernest L. Arbuckle Family Well number Rinehart S-1

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	17 1/2"	13 3/8"	40	N	43.6#/ft	na	Driven
Surface	8 7/8"	7"	675'	N	16#/ft	40'	Y
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production	6 3/8"		2091'				
Tubing	6 3/8"	2 3/8"	764'	N	4.6#/ft J-55	na	NA
Packer type and depth set	4 1/2" X 5 7/8" Hydropac Mechanical Set Open Hole Packer set @ 764'						

Comment Details Drilled well to a TD of 2091' w/ 6.3/8" Bit, Logged well, well producing enough gas naturally to complete open hole, production casing was not run.

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor	Driven						
Surface	Class A	155	15.6	1.20	186	Surface	8
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production							
Tubing							

Drillers TD (ft) 2091' Loggers TD (ft) 2069'
Deepest formation penetrated Berea Sandstone Plug back to (ft) na
Plug back procedure na

Kick off depth (ft) na

Check all wireline logs run ■ caliper ■ density □ deviated/directional ■ induction
■ neutron ■ resistivity ■ gamma ray ■ temperature □ sonic

Well cored □ Yes ■ No Conventional Sidewall Were cuttings collected ■ Yes □ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING Centralizers placed on Shoe and every 200' to surface on surface casing. Production casing was not run.

WAS WELL COMPLETED AS SHOT HOLE □ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? ■ Yes □ No DETAILS Drilled well to a TD of 2091' w/ 6.3/8" Bit, Logged well, well producing enough gas naturally to complete openhole, production casing was not run.

WERE TRACERS USED □ Yes ■ No TYPE OF TRACER(S) USED

WR-35
Rev. 8/23/13

API 47- 021 - 05765 Farm name Ernest L. Arbuckle Family Well number Rinehart S-1

PERFORATION RECORD

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

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
na	na	na	na	na	na	na	na	na

Please insert additional pages as applicable.

WR-35
Rev. 8/23/13

API 47- 021 - 05765 Farm name Ernest L. Arbuckle Family Well number Rinehart S-1

PRODUCING FORMATION(S)	DEPTHS	
Salt Sands	1052-1194 ft. TVD	1052-1194 ft. MD

Please insert additional pages as applicable.

GAS TEST □ Build up □ Drawdown ■ Open Flow OIL TEST □ Flow □ Pump

SHUT-IN PRESSURE Surface 188 psi Bottom Hole na psi DURATION OF TEST 24 hrs

OPEN FLOW Gas 169 mcfpd Oil na bpd NGL na bpd Water na bpd GAS MEASURED BY ■ Estimated □ Orifice □ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
Sandy Shale	0	510	0	510	Interbedded Sandstone and Shale
Sandstone	510	550	510	550	Sandstone with small amount of oil and a little freshwater
Shale	550	592	550	592	Shale with a little freshwater
Sandstone	592	792	592	792	Sandstone
Shale/Sandstone	792	1052	792	1052	Interbedded Sandstone and Shale
Salt Sands	1052	1194	1052	1194	Sandstone with 169 mcf/d Gas
Shale	1194	1264	1194	1264	Shale
Maxton	1264	1288	1264	1288	Sandstone
Shale	1288	1388	1288	1388	Shale
Sandstone/Lime	1388	1470	1388	1470	Interbedded Sandstone and Limestone
Big Lime	1470	1560	1470	1560	Limestone
Big Injun	1560	1628	1560	1628	Limey Sandstone
Shale	1628	1726	1628	1726	Shale
Weir	1726	1810	1726	1810	Sandstone

Please insert additional pages as applicable.

Drilling Contractor Waco Oil and Gas Co
Address 1595 U.S. 33 City Glenville State WV Zip 26351

Logging Company Baker Hughes
Address Rt. 4 Box 640 City Buckhannon State WV Zip 26201

Cementing Company Universal Well Services
Address RT. 5 Hall Road City Buckhannon State WV Zip 26201

Stimulating Company NA
Address City State Zip

Please insert additional pages as applicable.

Completed by Lowell Warden Telephone 304-925-6100
Signature Tara White Title Manager, Land Admin. Date 09-23-2014
Tara White

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

WR-35
Rev. 8/23/13

API 47- 021 - 05765 Farm name Ernest L. Arbuckle Family Well number Rinehart S-1

PRODUCING FORMATION(S)	DEPTHS			
Salt Sands	1052-1194 ft.	TVD	1052-1194 ft.	MD

Please insert additional pages as applicable.

GAS TEST ☐ Build up ☐ Drawdown ■ Open Flow OIL TEST ☐ Flow ☐ Pump

SHUT-IN PRESSURE Surface 175 psi Bottom Hole na psi DURATION OF TEST 24 hrs

OPEN FLOW Gas 169 mcfpd Oil na bpd NGL na bpd Water na bpd GAS MEASURED BY ■ Estimated ☐ Orifice ☐ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		
Shale	1801	2010	1801	2010	Shale
Berea	2010	2016	2010	2016	Sandstone
Shale	2016	2091	2016	2091	Shale

Please insert additional pages as applicable.

Drilling Contractor Waco Oil and Gas Co
Address 1595 U.S. 33 City Glenville State WV Zip 26351

Logging Company Baker Hughes
Address Rt. 4 Box 640 City Buckhannon State WV Zip 26201

Cementing Company Universal Well Services
Address RT. 5 Hall Road City Buckhannon State WV Zip 26201

Stimulating Company NA
Address City State Zip

Please insert additional pages as applicable.

Completed by Lowell Warden Telephone 304-925-6100
Signature Tara White Title Manager, Land Admin. Date 09-23-2014
Tara White

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

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Rev. 8/23/13

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

API 47 - 021 - 05766 County Gilmer District Glenville
Quad Glenville 7.5' Pad Name na Field/Pool Name na
Farm name Ernest L. Arbuckle Family Well Number Rinehart S-2
Operator (as registered with the OOG) Energy Corporation of America
Address 501 56th St. City Charleston State WV Zip 25304

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4311039.5 Easting 486708.9
Landing Point of Curve Northing na Easting na
Bottom Hole Northing na Easting na

Elevation (ft) 872 GL Type of Well ■New □ Existing Type of Report □Interim ■Final

Permit Type □ Deviated □ Horizontal □ Horizontal 6A ■ Vertical Depth Type □ Deep ■ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework □ Stimulate

Well Type □ Brine Disposal □ CBM ■ Gas □ Oil □ Secondary Recovery □ Solution Mining □ Storage □ Other _____

Type of Completion ■ Single □ Multiple Fluids Produced □ Brine ■Gas □ NGL □ Oil □ Other _____
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud □Fresh Water Intermediate hole ■ Air □ Mud □ Fresh Water □ Brine
Production hole ■ Air □ Mud □ Fresh Water □ Brine
Mud Type(s) and Additive(s)

_____

_____

Date permit issued 5/5/14 Date drilling commenced 6/2/14 Date drilling ceased 6/6/14
Date completion activities began Well was completed as a natural Date completion activities ceased _____
Verbal plugging (Y/N) na Date permission granted na Granted by na

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WV Department of Environmental Protection

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft NA Open mine(s) (Y/N) depths N
Salt water depth(s) ft NA Void(s) encountered (Y/N) depths N
Coal depth(s) ft NA Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by:

_____

WR-35
Rev. 8/23/13

API 47- 021 - 05766 Farm name Ernest L. Arbuckle Family Well number Rinehart S-2

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	17 1/2"	13 3/8"	40	N	43.6#/ft	na	Driven
Surface	8 7/8"	7"	762'	N	16#/ft	40'	Y
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production	6 3/8"		2150'				
Tubing	6 3/8"	2 3/8"	860'	N	4.6 #/ft J-55	na	na
Packer type and depth set	4 1/2" X 5 7/8" Hydropac Mechanical Set Open Hole Packer set @ 860'						

Comment Details Drilled well to a TD of 2150' w/ 6.3/8" Bit, Logged well, well producing enough gas naturally to complete open hole, production casing was not run.

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor	Driven						
Surface	Class A	180	15.6	1.20	216	Surface	8
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production							
Tubing							

Drillers TD (ft) 2150' Loggers TD (ft) 2139'
Deepest formation penetrated Berea Sandstone Plug back to (ft) na
Plug back procedure na

Kick off depth (ft) na

Check all wireline logs run ■ caliper ■ density □ deviated/directional ■ induction
■ neutron ■ resistivity ■ gamma ray ■ temperature □ sonic

Well cored □ Yes ■ No Conventional Sidewall Were cuttings collected ■ Yes □ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING Centralizers placed on Shoe and every 200' to surface on surface casing. Production casing was not run.

WAS WELL COMPLETED AS SHOT HOLE □ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? ■ Yes □ No DETAILS Drilled well to a TD of 2150' w/ 6.3/8" Bit, Logged well, well producing enough gas naturally to complete openhole, production casing was not run.

WERE TRACERS USED □ Yes ■ No TYPE OF TRACER(S) USED

WR-35
Rev. 8/23/13

API 47- 021 - 05766 Farm name Ernest L. Arbuckle Family Well number Rinehart S-2

PERFORATION RECORD

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

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
na	na	na	na	na	na	na	na	na

Please insert additional pages as applicable.

WR-35
Rev. 8/23/13

API 47- 021 - 05766 Farm name Ernest L. Arbuckle Family Well number Rinehart S-2

PRODUCING FORMATION(S)	DEPTHS	
Keener	1632' - 1640' TVD	1632' - 1640' MD

Please insert additional pages as applicable.

GAS TEST □ Build up □ Drawdown ■ Open Flow OIL TEST □ Flow □ Pump

SHUT-IN PRESSURE Surface 435 psi Bottom Hole na psi DURATION OF TEST 24 hrs

OPEN FLOW Gas 84 mcfpd Oil na bpd NGL na bpd Water na bpd GAS MEASURED BY ■ Estimated □ Orifice □ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
Siltstone / Shale	0	460	0	460	Interbedded Siltstone and Shale
Sandstone	460	508	460	508	Sandstone
Shale	508	628	508	628	Shale
Sandstone	628	720	628	720	Sandstone
Sandstone / Shale	720	840	720	840	Interbedded Sandstone and Shale
Sandstone	840	947	840	947	Sandstone
Sandstone / Shale	947	1162	947	1162	Interbedded Sandstone and Shale
Salt Sand	1162	1246	1162	1246	Sandstone
Siltstone	1246	1253	1246	1253	Siltstone
Salt Sand	1253	1272	1253	1272	Sandstone
Shale	1272	1350	1272	1350	Shale
Maxton Sandstone	1350	1368	1350	1368	Sandstone
Shale	1368	1518	1368	1518	Shale
Big Lime	1518	1632	1518	1632	Limestone

Please insert additional pages as applicable.

Drilling Contractor Waco Oil and Gas Co
Address 1595 U.S. 33 City Glenville State WV Zip 26351

Logging Company Weatherford International
Address 584 Hackers Creek Rd. City Jane Lew State WV Zip 26378

Cementing Company Universal Well Services
Address RT. 5 Hall Road City Buckhannon State WV Zip 26201

Stimulating Company NA
Address City State Zip

Please insert additional pages as applicable.

Completed by Lowell Warden Telephone 304-925-6100
Signature Tara White Title Manager, Land Admin. Date 09-23-2014
Tara White

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

WR-35
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API 47- 021 - 05766 Farm name Ernest L. Arbuckle Family Well number Rinehart S-2

PRODUCING FORMATION(S)	DEPTHS			
Keener	1632' - 1640'	TVD	1632' - 1640'	MD

Please insert additional pages as applicable.

GAS TEST □ Build up □ Drawdown ■ Open Flow OIL TEST □ Flow □ Pump

SHUT-IN PRESSURE Surface 435 psi Bottom Hole na psi DURATION OF TEST 24 hrs

OPEN FLOW	Gas	Oil	NGL	Water	GAS MEASURED BY
	84 mcfpd	na bpd	na bpd	na bpd	■ Estimated □ Orifice □ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		
Keener	1632	1640	1632	1640	Sandstone with 84 mcf/d Gas
Big Injun	1640	1728	1640	1728	Limey Sandstone
Sandstone	1728	1825	1728	1825	Sandstone
Weir	1825	1908	1825	1908	Sandstone
Shale	1908	2025	1908	2025	Shale
Berea	2025	2029	2025	2029	Sandstone
Shale	2029	2150	2029	2150	Shale

Please insert additional pages as applicable.

Drilling Contractor Waco Oil and Gas Co
Address 1595 U.S. 33 City Glenville State WV Zip 26351

Logging Company Weatherford International
Address 584 Hackers Creek Rd. City Jane Lew State WV Zip 26378

Cementing Company Universal Well Services
Address RT. 5 Hall Road City Buckhannon State WV Zip 26201

Stimulating Company NA
Address City State Zip

Please insert additional pages as applicable.

Completed by Lowell Warden Telephone 304-925-6100
Signature Tara White Title Manager, Land Admin. Date 09-23-2014
Tara White

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

WR-35

August 29, 2010

API # 47 - 033- 05416

State of West Virginia
Division of Environmental Protection
Section of Oil and Gas

Well Operator's Report of Well Work

Farm Name: Abner Stout Operator Well No. : Five (5)

LOCATION: Elevation: 1014 Quadrangle: Mount Clare
District: Simpson County: Harrison
Latitude: 7,730 Feet South of 39 Deg. 15 Min. 00 Sec.
Longitude: 4,820 Feet West of 80 Deg. 15 Min. 00 Sec.

Company: KEY OIL COMPANY
22 GARTON PLAZA
WESTON, WV 26452

Agent: Jan E. Chapman
Inspector: Tim Bennett
Permit Issued: 05-26-10
Well Work Commenced: 07-26-10
Well Work Completed: 08-09-10
Verbal Plugging
Permission granted on:
Rotary X Cable Rig
Total Depth (feet) 5030
Fresh water depths (ft) 30, 338 & 880
Salt water depths (ft) NR
Is coal being mined in area (Y / N)? No
Coal Depths (ft): NR

Casing & Tubing Size	Used in Drilling	Left in Well	Cement Fill Up Cu Ft
9-5/8"	132	132	70 Cu Ft
7"	928	928	196 Cu Ft
4-1/2"		4955	533 Cu Ft

OPEN FLOW DATA

Elk	4623-4895
Alexandeer	4412-4415
Benson	4126-4194
Riley	3876-3961
Balltown	3949-3952
Warren	3163-3406
Speechly	2622-2841
Fifth	2113-2143
Fourth	2030-2036

Producing formation Fourth Pay zone depth (ft) 2030-2036
Gas: Initial open flow Show MCF / D Oil: Initial open flow Show Bbl / D
Final open flow 1,639 MCF / D Oil: Final open flow Show Bbl / D
Time of open flow between initial and final tests N/A Hours
Static rock pressure 710 psig (surface pressure) after 48 Hours
All Formations Comingled.
Second producing formation Pay zone depth (ft)
Gas: Initial open flow MCF / D Oil: Initial open flow Bbl / D
Final open flow MCF / D Oil: Final open flow Bbl / D
Time of open flow between initial and final tests Hours
Static rock pressure psig (surface pressure) after Hours

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NOTE: ON BACK OF THIS FORM PUT THE FOLLOWING: 1). DETAILS OF PERFORATED INTERVALS, FRACTURING OR STIMULATING, PHYSICAL CHANGE, ETC. 2). THE WELL LOG WHICH IS A SYSTEMATIC DETAILED GEOLOGICAL RECORD OF ALL FORMATIONS, INCLUDING COAL ENCOUNTERED BY THE WELLBORE.

For: KEY OIL COMPANY
By: PRESIDENT
Date: August 29, 2010

Abner Stout No. 5 (47-033-05416)

TREATMENT:

Elk (13 Holes) 4413-4892	500 GA, 5,000# 80/100 Sand, 20,000# 20/40 Sand & 514 Bbls. 60 Quality Foam
Benson (13 Holes) 4127-4192	750 GA, 5,000# 80/100 Sand, 25,000# 20/40 Sand & 550 Bbls. 60 Quality Foam
Riley (13 Holes) 3363-3967 Ballitown & Warren (13 Holes) 2524-3202	1,250 GA, 10,000# 80/100 Sand, 50,000# 20/40 Sand & 987 Bbls. 60 Quality Foam
Fifth & Fourth (14 Holes) 2031-2139	750 GA, 25,000# 20/40 Sand & 413 Bbls. 60 Quality Foam

FORMATIONS:

Fill	0	15	
Sand	15	45	Water @ 30' - 1/2"
Sand/Shale	45	360	Water @ 338' - 1/8"
Sand	360	690	
Sand/Shale	690	1000	Water @ 880'
Little Lime	1000	1120	
Big Lime	1120	1200	Gas Ck @ 1116' - N/S
Sand/Shale	1200	1280	
Big Injun	1280	1350	Gas Ck @ 1326' - N/S
Sand/Shale	1350	2122	Gas Ck @ 2076' - N/S
Fifth Sand	2122	2180	
Sand/Shale	2180	4417	
Benson	4417	4537	Gas Ck @ 4506' - N/S
Elk	4537	4910	
Sand/Shale	4910	5030	
RTD	5030		

WR-35
Rev. 8/23/13

PM

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

API 47 - 033 - 05757 County HARRISON District TEN MILE
Quad SALEM 7.5' Pad Name WF WILLIAMS 136 Field/Pool Name WOLF SUMMIT
Farm name WILLIAMS, CLYDE ET AL. Well Number 136
Operator (as registered with the OOG) H.G. ENERGY LLC
Address 5260 DuPONT ROAD City PARKERSBURG State WV Zip 26101

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4,347,017 M Easting 543,083 M
Landing Point of Curve Northing ____ Easting ____
Bottom Hole Northing 4,347,144 M Easting 543,018 M

Elevation (ft) 1,155' GL Type of Well ■New □ Existing Type of Report □Interim ■Final

Permit Type ■ Deviated □ Horizontal □ Horizontal 6A □ Vertical Depth Type □ Deep ■ Shallow

Type of Operation □ Convert □ Deepen ■ Drill □ Plug Back □ Redrilling □ Rework □ Stimulate

Well Type □ Brine Disposal □ CBM □ Gas □ Oil ■ Secondary Recovery □ Solution Mining □ Storage □ Other ____

Type of Completion ■ Single □ Multiple Fluids Produced □ Brine □Gas □ NGL ■ Oil □ Other ____
Drilled with □ Cable ■ Rotary

Drilling Media Surface hole ■ Air □ Mud ■Fresh Water Intermediate hole ■ Air □ Mud ■ Fresh Water □ Brine
Production hole ■ Air □ Mud ■ Fresh Water □ Brine
Mud Type(s) and Additive(s)
N/A

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Date permit issued 7/3/13 Date drilling commenced 8/5/14 Date drilling ceased 8/7/14
Date completion activities began 8/21/14 Date completion activities ceased 9/4/14
Verbal plugging (Y/N) N Date permission granted ____ Granted by ____

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 580 Open mine(s) (Y/N) depths N
Salt water depth(s) ft NA Void(s) encountered (Y/N) depths N
Coal depth(s) ft 448'-455' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by:
____

WR-35
Rev. 8/23/13

API 47- 033 - 05757 Farm name WILLIAMS, CLYDE ET AL. Well number 136

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor	12 1/4"	11 5/8"	30'	Used	LS		Sand In
Surface	8 3/4"	7"	548'	New	LS	64'	Y
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production	6 1/2"	4 1/2"	2978.9'	New	J-55		Y
Tubing							
Packer type and depth set							

Comment Details Circulated Est. 50 sks to surface on 7" surface cement job. Circulated Est. 35 sks to surface on 4 1/2" cement job.

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	Reg Neat	135	15.6	1.18	115	Surface	8
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production	50:50 Pozmix	150/135	14.2/11.8	1.27/1.64	191/221	Surface	8
Tubing							

Drillers TD (ft) 3047' Loggers TD (ft) 3050'
Deepest formation penetrated Fifth Sand Plug back to (ft) N/A
Plug back procedure N/A

Kick off depth (ft) 650'

Check all wireline logs run ■ caliper ■ density ■ deviated/directional ■ induction
■ neutron ■ resistivity ■ gamma ray ■ temperature □ sonic

Well cored □ Yes ■ No Conventional Sidewall Were cuttings collected ■ Yes □ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING
20 Centralizers every 68 from bottom on 4 1/2", Centralizer placed mid string on 7"

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WAS WELL COMPLETED AS SHOT HOLE □ Yes ■ No DETAILS

WAS WELL COMPLETED OPEN HOLE? □ Yes ■ No DETAILS

WERE TRACERS USED □ Yes ■ No TYPE OF TRACER(S) USED

WR-35
Rev. 8/23/13

API 47- 033 - 05757 Farm name WILLIAMS, CLYDE ET AL. Well number 136

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
1	8/21/14	2842'	2844'	8	Fifth Sand
2	9/3/14	2552'	2556'	32	Fourth Sand
2	9/3/14	2604'	2614'	40	Fourth Sand
2	9/3/14	2654'	2656'	8	Fifty Ft
3	9/3/14	2422'	2426'	16	Fifty Ft
4	9/3/14	1942'	1946'	16	Big Injun

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
1	8/25/14	10	1915	2498	1640	15,000	332	
2	9/3/14	10	1828	2424	2128	15,000	266	
3	9/3/14	0		4188		N/A	N/A	
4	9/3/14	5	2439	2171	1762	4,000	171	

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WR-35
Rev. 8/23/13

API 47- 033 - 05757 Farm name WILLIAMS, CLYDE ET AL. Well number 136

PRODUCING FORMATION(S)	DEPTHS	
Fifth Sand	TVD	2842'-2844' MD
Fourth Sand		2552'-2656'
Fifty ft		2422'-2426'
Big Injun		1942'-1946'

Please insert additional pages as applicable.

GAS TEST ☐ Build up ☐ Drawdown ☐ Open Flow OIL TEST ☐ Flow ☐ Pump

SHUT-IN PRESSURE Surface _____ psi Bottom Hole _____ psi DURATION OF TEST _____ hrs

OPEN FLOW Gas _____ mcfpd Oil _____ bpd NGL _____ bpd Water _____ bpd GAS MEASURED BY ☐ Estimated ☐ Orifice ☐ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
Sand/Shale	0	448	0	448	
Pittsburgh Coal	448	455	448	455	
Sand/Shale	455	1808	455	1842	
Big Lime	1808	1894	1842	1930	
Big Injun	1894	1948	1930	1986	
Shale	1948	2365	1986	2416	
Fifty Foot	2365	2398	2416	2452	
Shale	2398	2457	2452	2514	
Fourth Sand	2457	2616	2514	2666	
Shale	2616	2776	2666	2842	
Fifth Sand	2776	2778	2842	2844	Drilled directional N 18° W a distance of 507'
Shale	2778	2979	2844	3047	
TD	2979		3047		

Please insert additional pages as applicable.

Drilling Contractor Decker Drilling
Address 11565 State Route 676 City Vincent State OH Zip 45784

Logging Company Weatherford International
Address 777 North River Avenue City Weston State WV Zip 26452

Cementing Company Universal Services
Address Hall Rd City Buckhannon State WV Zip 26201

Stimulating Company Producers Service Corp.
Address 109 South Graham Street City Zanesville State OH Zip 43701

Please insert additional pages as applicable.

Completed by Roger Heldman Telephone 304-420-1107
Signature _____ Title Operations Manager Date 9/28/14

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

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HG Energy, LLC

Harrison County, West Virginia
W.F. Williams #136
W.F. Williams #136

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

11 August, 2014

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The APPALACHIAN DIRECTIONAL COMPANY

33-05757

Survey Report - Geographic

Company:	HG Energy, LLC	**Local Co-ordinate Reference:**	Well W.F. Williams #136
Project:	Harrison County, West Virginia	**TVD Reference:**	WELL @ 1163.0usft (Decker #9)
Site:	W.F. Williams #136	**MD Reference:**	WELL @ 1163.0usft (Decker #9)
Well:	W.F. Williams #136	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM Compass

Project Harrison County, West Virginia

Map System:	Universal Transverse Mercator	**System Datum:**	Mean Sea Level
Geo Datum:	NAD83 West Virginia - HARN		
Map Zone:	Zone 17N (84 W to 78 W)		

Site W.F. Williams #136

Site Position:		**Northing:**	14,261,802.90 usft	**Latitude:**	39° 16' 16.800 N
From:	Lat/Long	**Easting:**	1,781,715.07 usft	**Longitude:**	80° 30' 2.600 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.32 °

Well W.F. Williams #136

Well Position	**+N/-S**	0.0 usft	**Northing:**	14,261,802.90 usft	**Latitude:**	39° 16' 16.800 N
	+E/-W	0.0 usft	**Easting:**	1,781,715.07 usft	**Longitude:**	80° 30' 2.600 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	0.0 usft	**Ground Level:**	1,155.0 usft

Wellbore Wellbore #1

Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2010	8/1/2014	-8.67	66.75	52,237

Design Wellbore #1

Audit Notes:

Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.0

Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**
	0.0	0.0	0.0	342.00

Survey Program **Date** 8/8/2014

From (usft)	**To (usft)**	**Survey (Wellbore)**	**Tool Name**	**Description**
650.0	3,047.0	MWD (Wellbore #1)	MWD default	MWD - Standard

Survey

Measured Depth (usft)	**Inclination (°)**	**Azimuth (°)**	**Vertical Depth (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Map Northing (usft)**	**Map Easting (usft)**	**Latitude**	**Longitude**
0.0	0.00	0.00	0.0	0.0	0.0	14,261,802.90	1,781,715.07	39° 16' 16.800 N	80° 30' 2.600 W
650.0	0.00	0.00	650.0	0.0	0.0	14,261,802.90	1,781,715.07	39° 16' 16.800 N	80° 30' 2.600 W
Tie-in @ 650' MD / 650' TVD									
682.0	1.50	98.70	682.0	-0.1	0.4	14,261,802.84	1,781,715.49	39° 16' 16.799 N	80° 30' 2.595 W
712.0	1.30	68.40	712.0	0.0	1.1	14,261,802.90	1,781,716.19	39° 16' 16.800 N	80° 30' 2.586 W
742.0	1.80	13.30	742.0	0.6	1.5	14,261,803.49	1,781,716.61	39° 16' 16.806 N	80° 30' 2.580 W
772.0	3.00	352.10	772.0	1.8	1.5	14,261,804.72	1,781,716.62	39° 16' 16.818 N	80° 30' 2.580 W
802.0	4.30	347.00	801.9	3.7	1.2	14,261,806.60	1,781,716.25	39° 16' 16.836 N	80° 30' 2.585 W
832.0	5.80	344.10	831.8	6.2	0.5	14,261,809.15	1,781,715.59	39° 16' 16.862 N	80° 30' 2.593 W
862.0	7.20	341.10	861.6	9.5	-0.5	14,261,812.39	1,781,714.56	39° 16' 16.894 N	80° 30' 2.606 W
892.0	8.60	339.20	891.3	13.4	-1.9	14,261,816.26	1,781,713.16	39° 16' 16.932 N	80° 30' 2.623 W
922.0	9.80	339.10	920.9	17.8	-3.6	14,261,820.75	1,781,711.45	39° 16' 16.977 N	80° 30' 2.645 W

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Survey Report - Geographic

Company:	HG Energy, LLC	**Local Co-ordinate Reference:**	Well W.F. Williams #136
Project:	Harrison County, West Virginia	**TVD Reference:**	WELL @ 1163.0usft (Decker #9)
Site:	W.F. Williams #136	**MD Reference:**	WELL @ 1163.0usft (Decker #9)
Well:	W.F. Williams #136	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
952.0	10.60	339.40	950.4	22.8	-5.5	14,261,825.71	1,781,709.57	39° 16' 17.026 N	80° 30' 2.668 W
982.0	11.60	339.80	979.9	28.2	-7.5	14,261,831.13	1,781,707.55	39° 16' 17.079 N	80° 30' 2.694 W
1,012.0	12.80	338.90	1,009.2	34.2	-9.8	14,261,837.06	1,781,705.32	39° 16' 17.138 N	80° 30' 2.722 W
1,042.0	13.90	338.60	1,038.4	40.6	-12.3	14,261,843.51	1,781,702.81	39° 16' 17.202 N	80° 30' 2.753 W
1,072.0	14.60	339.40	1,067.5	47.5	-14.9	14,261,850.41	1,781,700.16	39° 16' 17.271 N	80° 30' 2.786 W
1,102.0	15.30	340.10	1,096.4	54.8	-17.6	14,261,857.67	1,781,697.48	39° 16' 17.342 N	80° 30' 2.820 W
1,132.0	15.30	339.30	1,125.4	62.2	-20.3	14,261,865.09	1,781,694.74	39° 16' 17.416 N	80° 30' 2.854 W
1,162.0	15.60	339.30	1,154.3	69.7	-23.2	14,261,872.57	1,781,691.91	39° 16' 17.490 N	80° 30' 2.890 W
1,192.0	15.60	337.90	1,183.2	77.2	-26.1	14,261,880.08	1,781,688.97	39° 16' 17.565 N	80° 30' 2.927 W
1,222.0	15.70	338.20	1,212.1	84.7	-29.1	14,261,887.59	1,781,685.94	39° 16' 17.639 N	80° 30' 2.965 W
1,252.0	16.40	339.50	1,240.9	92.4	-32.1	14,261,895.32	1,781,682.95	39° 16' 17.716 N	80° 30' 3.002 W
1,282.0	16.50	341.10	1,269.7	100.4	-35.0	14,261,903.32	1,781,680.09	39° 16' 17.795 N	80° 30' 3.038 W
1,312.0	16.40	343.40	1,298.5	108.5	-37.6	14,261,911.41	1,781,677.50	39° 16' 17.875 N	80° 30' 3.070 W
1,342.0	16.10	344.70	1,327.3	116.6	-39.9	14,261,919.48	1,781,675.19	39° 16' 17.955 N	80° 30' 3.099 W
1,372.0	15.80	344.60	1,356.1	124.5	-42.1	14,261,927.43	1,781,673.01	39° 16' 18.034 N	80° 30' 3.126 W
1,402.0	15.70	343.70	1,385.0	132.4	-44.3	14,261,935.26	1,781,670.79	39° 16' 18.111 N	80° 30' 3.154 W
1,432.0	15.80	342.90	1,413.8	140.2	-46.6	14,261,943.06	1,781,668.45	39° 16' 18.188 N	80° 30' 3.183 W
1,462.0	15.60	341.40	1,442.7	147.9	-49.1	14,261,950.79	1,781,665.96	39° 16' 18.265 N	80° 30' 3.214 W
1,492.0	15.50	341.50	1,471.6	155.5	-51.7	14,261,958.41	1,781,663.40	39° 16' 18.340 N	80° 30' 3.246 W
1,522.0	15.80	342.70	1,500.5	163.2	-54.2	14,261,966.12	1,781,660.91	39° 16' 18.417 N	80° 30' 3.277 W
1,552.0	15.70	343.90	1,529.4	171.0	-56.5	14,261,973.91	1,781,658.57	39° 16' 18.494 N	80° 30' 3.307 W
1,582.0	14.90	341.80	1,558.3	178.6	-58.8	14,261,981.48	1,781,656.24	39° 16' 18.569 N	80° 30' 3.336 W
1,612.0	14.60	340.70	1,587.3	185.8	-61.3	14,261,988.71	1,781,653.79	39° 16' 18.640 N	80° 30' 3.366 W
1,642.0	15.00	341.00	1,616.3	193.0	-63.8	14,261,995.95	1,781,651.27	39° 16' 18.712 N	80° 30' 3.398 W
1,672.0	15.90	343.50	1,645.3	200.7	-66.2	14,262,003.56	1,781,648.84	39° 16' 18.788 N	80° 30' 3.428 W
1,702.0	16.10	344.20	1,674.1	208.6	-68.5	14,262,011.50	1,781,646.54	39° 16' 18.866 N	80° 30' 3.457 W
1,732.0	16.10	342.70	1,702.9	216.6	-70.9	14,262,019.48	1,781,644.17	39° 16' 18.945 N	80° 30' 3.487 W
1,762.0	16.40	342.60	1,731.7	224.6	-73.4	14,262,027.49	1,781,641.67	39° 16' 19.025 N	80° 30' 3.518 W
1,792.0	15.90	342.70	1,760.5	232.6	-75.9	14,262,035.46	1,781,639.18	39° 16' 19.103 N	80° 30' 3.549 W
1,822.0	15.70	343.30	1,789.4	240.4	-78.3	14,262,043.27	1,781,636.79	39° 16' 19.181 N	80° 30' 3.579 W
1,852.0	15.80	343.20	1,818.3	248.2	-80.6	14,262,051.07	1,781,634.45	39° 16' 19.258 N	80° 30' 3.608 W
1,882.0	15.80	342.40	1,847.1	256.0	-83.0	14,262,058.87	1,781,632.03	39° 16' 19.335 N	80° 30' 3.638 W
1,912.0	15.90	342.80	1,876.0	263.8	-85.5	14,262,066.69	1,781,629.58	39° 16' 19.413 N	80° 30' 3.669 W
1,942.0	15.90	341.70	1,904.9	271.6	-88.0	14,262,074.51	1,781,627.08	39° 16' 19.490 N	80° 30' 3.700 W
1,972.0	16.10	341.00	1,933.7	279.4	-90.6	14,262,082.35	1,781,624.43	39° 16' 19.568 N	80° 30' 3.733 W
2,002.0	15.60	339.70	1,962.6	287.2	-93.4	14,262,090.07	1,781,621.68	39° 16' 19.644 N	80° 30' 3.768 W
2,032.0	15.30	339.20	1,991.5	294.6	-96.2	14,262,097.55	1,781,618.87	39° 16' 19.718 N	80° 30' 3.803 W
2,062.0	15.40	339.40	2,020.4	302.1	-99.0	14,262,104.98	1,781,616.07	39° 16' 19.792 N	80° 30' 3.838 W
2,092.0	15.20	339.90	2,049.3	309.5	-101.8	14,262,112.40	1,781,613.31	39° 16' 19.866 N	80° 30' 3.873 W
2,122.0	15.50	340.60	2,078.3	317.0	-104.4	14,262,119.87	1,781,610.63	39° 16' 19.940 N	80° 30' 3.906 W
2,152.0	15.40	340.80	2,107.2	324.5	-107.1	14,262,127.42	1,781,607.99	39° 16' 20.014 N	80° 30' 3.939 W
2,182.0	15.30	341.60	2,136.1	332.0	-109.6	14,262,134.93	1,781,605.43	39° 16' 20.089 N	80° 30' 3.971 W
2,212.0	15.20	341.80	2,165.1	339.5	-112.1	14,262,142.43	1,781,602.95	39° 16' 20.163 N	80° 30' 4.002 W
2,242.0	15.00	341.70	2,194.0	346.9	-114.6	14,262,149.85	1,781,600.50	39° 16' 20.237 N	80° 30' 4.033 W
2,272.0	14.50	342.40	2,223.0	354.2	-116.9	14,262,157.11	1,781,598.15	39° 16' 20.309 N	80° 30' 4.062 W
2,302.0	14.80	343.30	2,252.1	361.5	-119.2	14,262,164.36	1,781,595.91	39° 16' 20.380 N	80° 30' 4.090 W
2,332.0	14.60	343.10	2,281.1	368.8	-121.4	14,262,171.65	1,781,593.71	39° 16' 20.453 N	80° 30' 4.118 W
2,362.0	14.40	341.10	2,310.1	375.9	-123.7	14,262,178.80	1,781,591.40	39° 16' 20.523 N	80° 30' 4.147 W
2,392.0	14.00	339.50	2,339.2	382.8	-126.1	14,262,185.73	1,781,588.92	39° 16' 20.592 N	80° 30' 4.178 W
2,422.0	13.60	338.40	2,368.3	389.5	-128.7	14,262,192.41	1,781,586.36	39° 16' 20.658 N	80° 30' 4.210 W
2,452.0	13.30	338.70	2,397.5	396.0	-131.3	14,262,198.90	1,781,583.80	39° 16' 20.722 N	80° 30' 4.242 W
2,482.0	13.10	339.10	2,426.7	402.4	-133.7	14,262,205.29	1,781,581.34	39° 16' 20.786 N	80° 30' 4.273 W
2,512.0	13.30	340.90	2,455.9	408.8	-136.1	14,262,211.73	1,781,579.00	39° 16' 20.850 N	80° 30' 4.302 W
2,542.0	13.80	342.20	2,485.1	415.5	-138.3	14,262,218.40	1,781,576.77	39° 16' 20.916 N	80° 30' 4.330 W
2,572.0	14.30	343.80	2,514.2	422.5	-140.4	14,262,225.36	1,781,574.64	39° 16' 20.985 N	80° 30' 4.357 W

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Survey Report - Geographic

Company:	HG Energy, LLC	**Local Co-ordinate Reference:**	Well W.F. Williams #136
Project:	Harrison County, West Virginia	**TVD Reference:**	WELL @ 1163.0usft (Decker #9)
Site:	W.F. Williams #136	**MD Reference:**	WELL @ 1163.0usft (Decker #9)
Well:	W.F. Williams #136	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,602.0	14.20	344.10	2,543.3	429.6	-142.5	14,262,232.46	1,781,572.60	39° 16' 21.055 N	80° 30' 4.382 W
2,632.0	14.20	344.60	2,572.4	436.6	-144.5	14,262,239.54	1,781,570.62	39° 16' 21.125 N	80° 30' 4.407 W
2,662.0	14.10	345.40	2,601.4	443.7	-146.4	14,262,246.63	1,781,568.72	39° 16' 21.195 N	80° 30' 4.431 W
2,692.0	13.70	343.60	2,630.6	450.7	-148.3	14,262,253.57	1,781,566.80	39° 16' 21.264 N	80° 30' 4.454 W
2,722.0	13.00	343.40	2,659.8	457.3	-150.2	14,262,260.21	1,781,564.83	39° 16' 21.330 N	80° 30' 4.479 W
2,752.0	12.40	342.90	2,689.0	463.6	-152.2	14,262,266.53	1,781,562.92	39° 16' 21.392 N	80° 30' 4.503 W
2,782.0	12.10	339.10	2,718.3	469.6	-154.2	14,262,272.54	1,781,560.85	39° 16' 21.452 N	80° 30' 4.529 W
2,812.0	12.50	337.20	2,747.7	475.6	-156.6	14,262,278.47	1,781,558.47	39° 16' 21.511 N	80° 30' 4.559 W
2,842.0	12.20	335.90	2,777.0	481.5	-159.2	14,262,284.36	1,781,555.92	39° 16' 21.569 N	80° 30' 4.591 W
2,872.0	11.40	334.10	2,806.3	487.0	-161.7	14,262,289.92	1,781,553.33	39° 16' 21.624 N	80° 30' 4.623 W
2,902.0	10.60	335.10	2,835.8	492.2	-164.2	14,262,295.09	1,781,550.87	39° 16' 21.675 N	80° 30' 4.654 W
2,932.0	9.60	333.70	2,865.3	496.9	-166.5	14,262,299.83	1,781,548.60	39° 16' 21.722 N	80° 30' 4.683 W
2,962.0	8.50	333.20	2,894.9	501.2	-168.6	14,262,304.06	1,781,546.49	39° 16' 21.764 N	80° 30' 4.709 W
2,992.0	7.70	333.00	2,924.6	504.9	-170.5	14,262,307.83	1,781,544.58	39° 16' 21.802 N	80° 30' 4.733 W
3,047.0	6.60	333.00	2,979.2	511.0	-173.6	14,262,313.93	1,781,541.47	39° 16' 21.862 N	80° 30' 4.772 W

TD @ 3047' MD / 2979' TVD

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
650.0	650.0	0.0	0.0	Tie-in @ 650' MD / 650' TVD
3,047.0	2,979.2	511.0	-173.6	TD @ 3047' MD / 2979' TVD

Checked By: _____ Approved By: _____ Date: _____

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HG Energy, LLC

Harrison County, West Virginia
W.F. Williams #136
W.F. Williams #136
Wellbore #1

Design: Wellbore #1

HG Energy EOW Report

11 August, 2014

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HG Energy EOW Report

Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.F. Williams #136
Project:	Harrison County, West Virginia	TVD Reference:	WELL @ 1163.0usft (Decker #9)
Site:	W.F. Williams #136	MD Reference:	WELL @ 1163.0usft (Decker #9)
Well:	W.F. Williams #136	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM Compass

Project: Harrison County, West Virginia

Map System:	Universal Transverse Mercator	System Datum:	Mean Sea Level
Geo Datum:	NAD83 West Virginia - HARN		
Map Zone:	Zone 17N (84 W to 78 W)		

Site: W.F. Williams #136

Site Position:		Northing:	14,261,802.90 usft	Latitude:	39° 16' 16.800 N
From:	Lat/Long	Easting:	1,781,715.07 usft	Longitude:	80° 30' 2.600 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.32 °

Well: W.F. Williams #136

Well Position	+N/-S	0.0 usft	Northing:	14,261,802.90 usft	Latitude:	39° 16' 16.800 N
	+E/-W	0.0 usft	Easting:	1,781,715.07 usft	Longitude:	80° 30' 2.600 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	1,155.0 usft

Wellbore: Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/1/2014	-8.67	66.75	52,237

Design: Wellbore #1

Audit Notes:

Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	342.00

Survey Program: Date 8/8/2014

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
650.0	3,047.0	MWD (Wellbore #1)	MWD default	MWD - Standard

Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.F. Williams #136
Project:	Harrison County, West Virginia	TVD Reference:	WELL @ 1163.0usft (Decker #9)
Site:	W.F. Williams #136	MD Reference:	WELL @ 1163.0usft (Decker #9)
Well:	W.F. Williams #136	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM Compass

33.05757

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.0	0.00
650.0	0.00	0.00	650.0	0.0	0.0	0.0	0.00	0.0	0.00
Tie-in @ 650' MD / 650' TVD									
682.0	1.50	98.70	682.0	-0.1	0.4	-0.2	4.69	0.4	98.70
712.0	1.30	68.40	712.0	0.0	1.1	-0.3	2.52	1.1	89.87
742.0	1.80	13.30	742.0	0.6	1.5	0.1	5.00	1.7	69.20
772.0	3.00	352.10	772.0	1.8	1.5	1.3	4.91	2.4	40.27
802.0	4.30	347.00	801.9	3.7	1.2	3.1	4.46	3.9	17.75
832.0	5.80	344.10	831.8	6.2	0.5	5.8	5.07	6.3	4.71
862.0	7.20	341.10	861.6	9.5	-0.5	9.2	4.80	9.5	356.93
892.0	8.60	339.20	891.3	13.4	-1.9	13.3	4.75	13.5	351.84
922.0	9.80	339.10	920.9	17.8	-3.6	18.1	4.00	18.2	348.52
952.0	10.60	339.40	950.4	22.8	-5.5	23.4	2.67	23.5	346.43
982.0	11.60	339.80	979.9	28.2	-7.5	29.2	3.34	29.2	345.09
1,012.0	12.80	338.90	1,009.2	34.2	-9.8	35.5	4.05	35.5	344.06
1,042.0	13.90	338.60	1,038.4	40.6	-12.3	42.4	3.67	42.4	343.19
1,072.0	14.60	339.40	1,067.5	47.5	-14.9	49.8	2.42	49.8	342.57
1,102.0	15.30	340.10	1,096.4	54.8	-17.6	57.5	2.41	57.5	342.20
1,132.0	15.30	339.30	1,125.4	62.2	-20.3	65.4	0.70	65.4	341.89
1,162.0	15.60	339.30	1,154.3	69.7	-23.2	73.4	1.00	73.4	341.61
1,192.0	15.60	337.90	1,183.2	77.2	-26.1	81.5	1.25	81.5	341.31
1,222.0	15.70	338.20	1,212.1	84.7	-29.1	89.5	0.43	89.6	341.02
1,252.0	16.40	339.50	1,240.9	92.4	-32.1	97.8	2.62	97.8	340.84
1,282.0	16.50	341.10	1,269.7	100.4	-35.0	106.3	1.55	106.3	340.79
1,312.0	16.40	343.40	1,298.5	108.5	-37.6	114.8	2.20	114.8	340.90
1,342.0	16.10	344.70	1,327.3	116.6	-39.9	123.2	1.57	123.2	341.12
1,372.0	15.80	344.60	1,356.1	124.5	-42.1	131.4	1.00	131.4	341.34

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Site:	W.F. Williams #136	MD Reference:	WELL @ 1163.0usft (Decker #9)
Well:	W.F. Williams #136	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM Compass

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
1,402.0	15.70	343.70	1,385.0	132.4	-44.3	139.6	0.88	139.6	341.50
1,432.0	15.80	342.90	1,413.8	140.2	-46.6	147.7	0.80	147.7	341.60
1,462.0	15.60	341.40	1,442.7	147.9	-49.1	155.8	1.51	155.8	341.63
1,492.0	15.50	341.50	1,471.6	155.5	-51.7	163.9	0.35	163.9	341.62
1,522.0	15.80	342.70	1,500.5	163.2	-54.2	172.0	1.47	172.0	341.64
1,552.0	15.70	343.90	1,529.4	171.0	-56.5	180.1	1.14	180.1	341.72
1,582.0	14.90	341.80	1,558.3	178.6	-58.8	188.0	3.24	188.0	341.77
1,612.0	14.60	340.70	1,587.3	185.8	-61.3	195.7	1.37	195.7	341.75
1,642.0	15.00	341.00	1,616.3	193.0	-63.8	203.3	1.36	203.3	341.71
1,672.0	15.90	343.50	1,645.3	200.7	-66.2	211.3	3.73	211.3	341.73
1,702.0	16.10	344.20	1,674.1	208.6	-68.5	219.6	0.93	219.6	341.81
1,732.0	16.10	342.70	1,702.9	216.6	-70.9	227.9	1.39	227.9	341.87
1,762.0	16.40	342.60	1,731.7	224.6	-73.4	236.3	1.00	236.3	341.90
1,792.0	15.90	342.70	1,760.5	232.6	-75.9	244.6	1.67	244.6	341.93
1,822.0	15.70	343.30	1,789.4	240.4	-78.3	252.8	0.86	252.8	341.96
1,852.0	15.80	343.20	1,818.3	248.2	-80.6	260.9	0.35	260.9	342.00
1,882.0	15.80	342.40	1,847.1	256.0	-83.0	269.1	0.73	269.1	342.03
1,912.0	15.90	342.80	1,876.0	263.8	-85.5	277.3	0.49	277.3	342.04
1,942.0	15.90	341.70	1,904.9	271.6	-88.0	285.5	1.00	285.5	342.05
1,972.0	16.10	341.00	1,933.7	279.4	-90.6	293.8	0.93	293.8	342.03
2,002.0	15.60	339.70	1,962.6	287.2	-93.4	302.0	2.04	302.0	341.98
2,032.0	15.30	339.20	1,991.5	294.6	-96.2	310.0	1.09	310.0	341.92
2,062.0	15.40	339.40	2,020.4	302.1	-99.0	317.9	0.38	317.9	341.85
2,092.0	15.20	339.90	2,049.3	309.5	-101.8	325.8	0.80	325.8	341.80
2,122.0	15.50	340.60	2,078.3	317.0	-104.4	333.7	1.18	333.7	341.76
2,152.0	15.40	340.80	2,107.2	324.5	-107.1	341.7	0.38	341.7	341.74
2,182.0	15.30	341.60	2,136.1	332.0	-109.6	349.7	0.78	349.7	341.73

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Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
2,212.0	15.20	341.80	2,165.1	339.5	-112.1	357.6	0.38	357.6	341.73
2,242.0	15.00	341.70	2,194.0	346.9	-114.6	365.4	0.67	365.4	341.73
2,272.0	14.50	342.40	2,223.0	354.2	-116.9	373.0	1.77	373.0	341.73
2,302.0	14.80	343.30	2,252.1	361.5	-119.2	380.6	1.26	380.6	341.75
2,332.0	14.60	343.10	2,281.1	368.8	-121.4	388.2	0.69	388.2	341.78
2,362.0	14.40	341.10	2,310.1	375.9	-123.7	395.7	1.80	395.7	341.79
2,392.0	14.00	339.50	2,339.2	382.8	-126.1	403.1	1.87	403.1	341.76
2,422.0	13.60	338.40	2,368.3	389.5	-128.7	410.2	1.59	410.2	341.71
2,452.0	13.30	338.70	2,397.5	396.0	-131.3	417.2	1.03	417.2	341.66
2,482.0	13.10	339.10	2,426.7	402.4	-133.7	424.0	0.73	424.0	341.62
2,512.0	13.30	340.90	2,455.9	408.8	-136.1	430.9	1.52	430.9	341.59
2,542.0	13.80	342.20	2,485.1	415.5	-138.3	437.9	1.95	437.9	341.59
2,572.0	14.30	343.80	2,514.2	422.5	-140.4	445.2	2.11	445.2	341.61
2,602.0	14.20	344.10	2,543.3	429.6	-142.5	452.6	0.41	452.6	341.65
2,632.0	14.20	344.60	2,572.4	436.6	-144.5	459.9	0.41	459.9	341.69
2,662.0	14.10	345.40	2,601.4	443.7	-146.4	467.2	0.73	467.2	341.75
2,692.0	13.70	343.60	2,630.6	450.7	-148.3	474.4	1.96	474.4	341.79
2,722.0	13.00	343.40	2,659.8	457.3	-150.2	481.4	2.34	481.4	341.81
2,752.0	12.40	342.90	2,689.0	463.6	-152.2	488.0	2.03	488.0	341.83
2,782.0	12.10	339.10	2,718.3	469.6	-154.2	494.3	2.87	494.3	341.82
2,812.0	12.50	337.20	2,747.7	475.6	-156.6	500.7	1.90	500.7	341.77
2,842.0	12.20	335.90	2,777.0	481.5	-159.2	507.1	1.36	507.1	341.71
2,872.0	11.40	334.10	2,806.3	487.0	-161.7	513.2	2.94	513.2	341.63
2,902.0	10.60	335.10	2,835.8	492.2	-164.2	518.8	2.74	518.9	341.55
2,932.0	9.60	333.70	2,865.3	496.9	-166.5	524.1	3.43	524.1	341.48
2,962.0	8.50	333.20	2,894.9	501.2	-168.6	528.7	3.66	528.7	341.41
2,992.0	7.70	333.00	2,924.6	504.9	-170.5	532.9	2.67	532.9	341.34

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Environmental Protection

Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.F. Williams #136
Project:	Harrison County, West Virginia	TVD Reference:	WELL @ 1163.0usft (Decker #9)
Site:	W.F. Williams #136	MD Reference:	WELL @ 1163.0usft (Decker #9)
Well:	W.F. Williams #136	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM Compass

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
3,047.0	6.60	333.00	2,979.2	511.0	-173.6	539.7	2.00	539.7	341.24
TD @ 3047' MD / 2979' TVD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
650.0	650.0	0.0	0.0	Tie-in @ 650' MD / 650' TVD
3,047.0	2,979.2	511.0	-173.6	TD @ 3047' MD / 2979' TVD

Checked By: _____ Approved By: _____ Date: _____

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OCT 07 2014
WV Department of
Environmental Protection

33057

33.05757

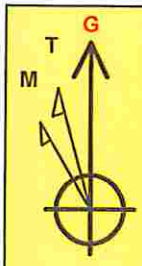
W.F. Williams #136
Harrison County, West Virginia
Q140815 & AM-140764
Design #1

Company Name: HG Energy, LLC
W.F. Williams #136
Harrison County, West Virginia
Rig: Decker #9
Created By: Will Jircik
Date: 08/08/2014

PROJECT DETAILS:	Harrison County, West Virginia
Geodetic System:	Universal Transverse Mercator
Datum:	NAD83 West Virginia - HARN
Ellipsoid:	GRS 1980
Zone:	Zone 17N (84 W to 78 W)
System Datum:	Mean Sea Level

The APPALACHIAN DIRECTIONAL COMPANY

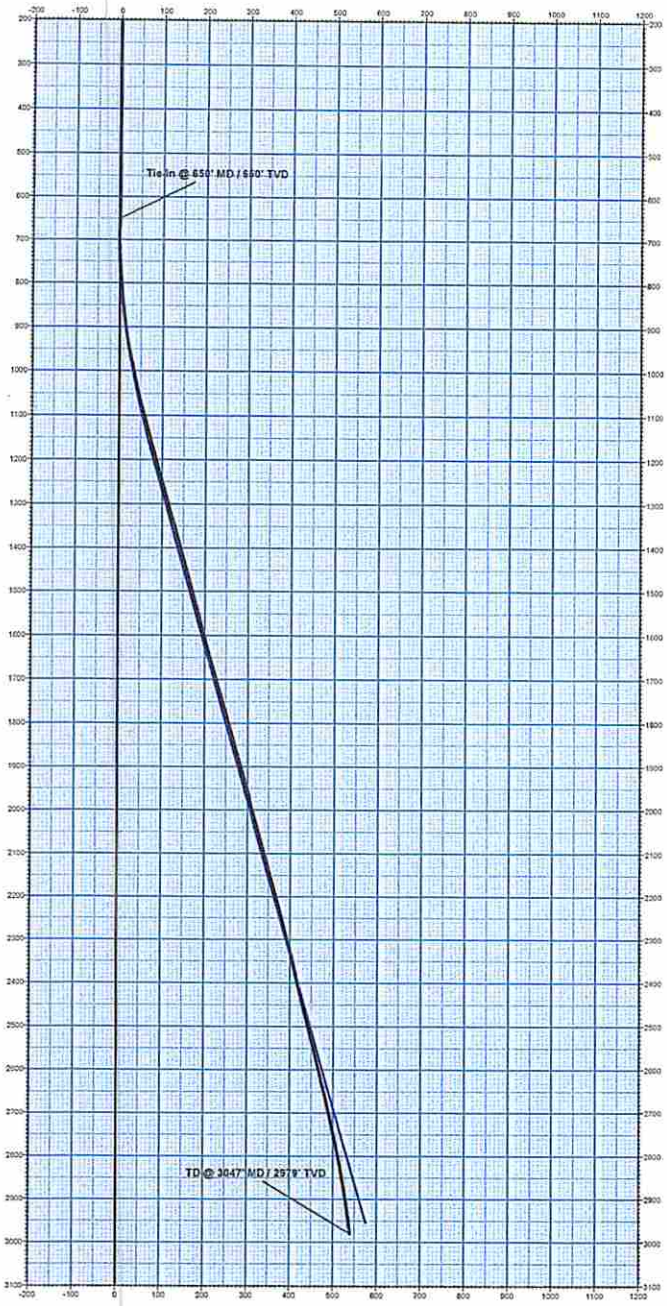
HG Energy



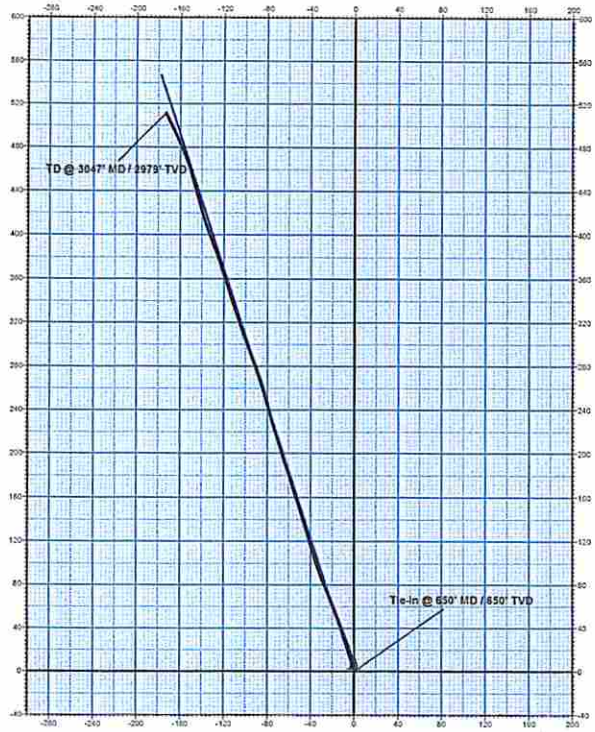
Azimuths to Grid North

Correction: -8.99°

Magnetic Field
Strength: 52236.6snT
Dip Angle: 66.75°
Date: 8/1/2014
Model: IGRF2010



Vertical Section at 342.00° (100 usft/in)



WELL DETAILS:	W.F. Williams #136				
		Ground Level:		1155.0	
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	14261602.50	1781715.07	39° 16' 16.800 N	80° 30' 2.600 W

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DESIGN TARGET DETAILS								
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Target W.F. Williams #136 - plan hits target center	2758.0	494.5	-160.7	14262297.45	1781554.38	39° 16' 21.656 N	80° 30' 4.603 W

ANNOTATIONS								
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Departure	Annotation
650.0	0.00	0.00	650.0	0.0	0.0	0.0	0.0	Tie-In @ 650' MD / 650' TVD
3047.0	6.60	333.00	2979.2	511.0	-173.6	539.7	542.3	TD @ 3047' MD / 2979' TVD

33-05757

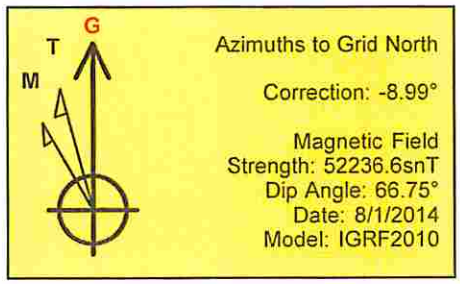
W.F. Williams #136
Harrison County, West Virginia
Q140815 & AM-140764
Design #1

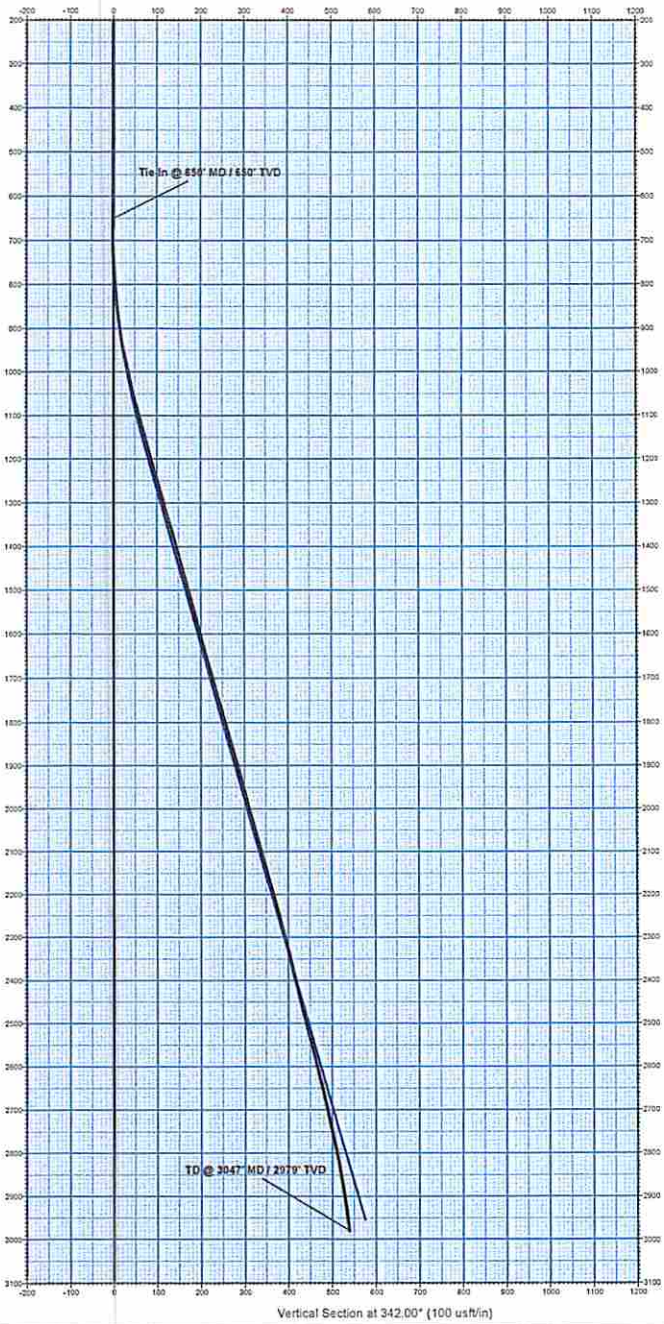
Company Name: HG Energy, LLC
W.F. Williams #136
Harrison County, West Virginia
Rig: Decker #9
Created By: Will Jircik
Date: 08/08/2014

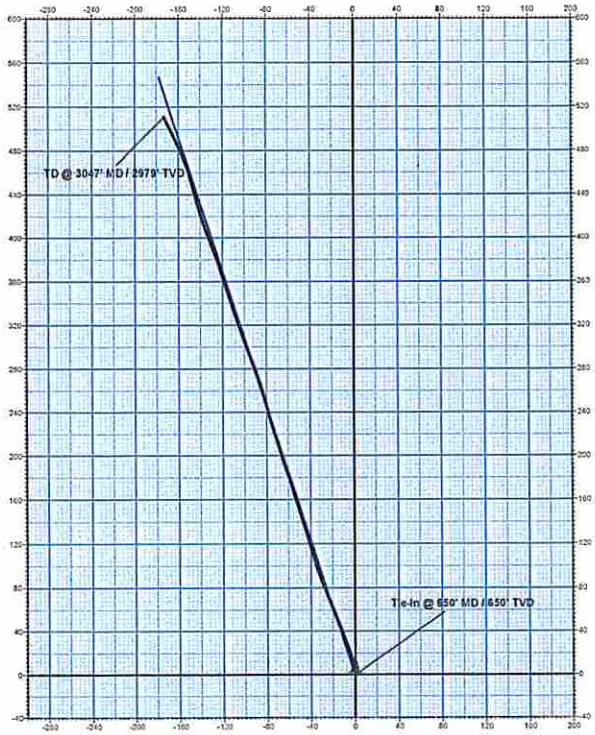
PROJECT DETAILS:	Harrison County, West Virginia
Geodetic System:	Universal Transverse Mercator
Datum:	NAD83 West Virginia - HARN
Ellipsoid:	GRS 1980
Zone:	Zone 17N (84 W to 78 W)
System Datum:	Mean Sea Level

The APPALACHIAN DIRECTIONAL COMPANY

HG Energy







WELL DETAILS:	W.F. Williams #136				
		Ground Level:		1155.0	
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	14261802.90	1781715.07	39° 15' 16.800 N	80° 30' 2.600 W

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Environmental Protection

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Target W.F. Williams #136 - plan hits target center	2758.0	494.5	-160.7	14262297.45	1781554.33	39° 15' 21.698 N	80° 30' 4.609 W

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Departure	Annotation
650.0	0.00	0.00	650.0	0.0	0.0	0.0	0.0	Tie-In @ 650' MD / 650' TVD
3047.0	6.60	333.00	2979.2	511.0	-173.6	539.7	542.3	TD @ 3047' MD / 2979' TVD

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JR

WR-35
Rev. 8/23/13

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

API 47- 039 - 02327W County Kanawha District Elk
Quad Blue Creek Pad Name ____ Field/Pool Name ____
Farm name ____ Well Number W. C. Booker #1
Operator (as registered with the OOG) Exco Resources (PA), LLC
Address 260 Executive Drive City Cranberry Township State PA Zip 16066

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4257148.2 Easting 457597.4
Landing Point of Curve Northing ____ Easting ____
Bottom Hole Northing ____ Easting ____

Elevation (ft) 716 GL Type of Well ☐New ☒Existing Type of Report ☐Interim ☒Final

Permit Type ☐ Deviated ☐ Horizontal ☐ Horizontal 6A ☒ Vertical Depth Type ☐ Deep ☒ Shallow

Type of Operation ☐ Convert ☐ Deepen ☐ Drill ☐ Plug Back ☐ Redrilling ☐ Rework ☒Stimulate

Well Type ☒Brine Disposal ☐ CBM ☐ Gas ☐ Oil ☐ Secondary Recovery ☐ Solution Mining ☐ Storage ☐ Other ____

Type of Completion ☐ Single ☒Multiple Fluids Produced ☐ Brine ☐Gas ☐ NGL ☐ Oil ☒Other N/A - SWD
Drilled with ☐ Cable ☐ Rotary

Drilling Media Surface hole ☐ Air ☐ Mud ☐Fresh Water Intermediate hole ☐ Air ☐ Mud ☐ Fresh Water ☐ Brine
Production hole ☐ Air ☐ Mud ☐ Fresh Water ☐ Brine
Mud Type(s) and Additive(s)
N/A

Date permit issued 6/12/14 Date drilling commenced N/A Date drilling ceased N/A
Date completion activities began 6/25/14 Date completion activities ceased 6/25/14
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 75 Open mine(s) (Y/N) depths N/A
Salt water depth(s) ft 1000 Void(s) encountered (Y/N) depths N/A
Coal depth(s) ft N/A Cavern(s) encountered (Y/N) depths N/A
Is coal being mined in area (Y/N) N/A

Reviewed by:
____

WR-35
Rev. 8/23/13

Page ___ of ___

API 47-039- 02327 Farm name _____ Well number W.C. Booker #1

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/ N) * Provide details below*
Conductor							
Surface		8-5/8"	296'	J-55	24 #		
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production		4-1/2"	1810'	J-55	9.5 #		
Tubing		2-7/8"	1156	J-55	6.5 #		
Packer type and depth set		Halliburton R-4 @ 1156'					

Comment Details _____

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft^3/sks)	Volume (ft^3)	Cement Top (MD)	WOC (hrs)
Conductor							
Surface		247					
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production		150					
Tubing							

Drillers TD (ft) N/A Loggers TD (ft) _____
Deepest formation penetrated _____ Plug back to (ft) _____
Plug back procedure _____

Kick off depth (ft) N/A

Check all wireline logs run ☐ caliper ☐ density ☐ deviated/directional ☐ induction
☐ neutron ☐ resistivity ☐ gamma ray ☐ temperature ☐ sonic

Well cored ☐ Yes ☐ No Conventional Sidewall Were cuttings collected ☐ Yes ☐ No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING N/A

WAS WELL COMPLETED AS SHOT HOLE ☐ Yes ☐ No DETAILS N/A

WAS WELL COMPLETED OPEN HOLE? ☐ Yes ☐ No DETAILS N/A

WERE TRACERS USED ☐ Yes ☐ No TYPE OF TRACER(S) USED N/A

WR-35
Rev. 8/23/13

Page ___ of ___

API 47- 039- 02327 Farm name_____ Well number W.C. Booker #1

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
	1968	1689	1694	6	Big Injun
	1992	1180	1340	118	3rd Salt Sand

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)

Please insert additional pages as applicable.

WR-35
Rev. 8/23/13

Page ___ of ___

API 47- 039 - 02327 Farm name _____ Well number W.C. Booker #1

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

Please insert additional pages as applicable.

GAS TEST ☐ Build up ☐ Drawdown ☐ Open Flow OIL TEST ☐ Flow ☐ Pump

SHUT-IN PRESSURE Surface _____ psi Bottom Hole _____ psi DURATION OF TEST _____ hrs

OPEN FLOW	Gas	Oil	NGL	Water	GAS MEASURED BY
	_____ mcfpd	_____ bpd	_____ bpd	_____ bpd	☐ Estimated ☐ Orifice ☐ Pilot

LITHOLOGY/ FORMATION NAME	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H_2S, ETC)
	0		0		
	N/A				

Please insert additional pages as applicable.

Drilling Contractor _____
Address _____ City _____ State _____ Zip _____

Logging Company _____
Address _____ City _____ State _____ Zip _____

Cementing Company _____
Address _____ City _____ State _____ Zip _____

Stimulating Company Universal Well Services
Address Route 5, Hall Road City Buckhannon State WV Zip 26201
Please insert additional pages as applicable.

Completed by Brian E. Rushe, P.E. w/ EXCO Telephone 724-720-2590
Signature Brian E. Rushe Title Construction + Regulatory Manager Date 10/27/14

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