

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

API 47-051-01717 County Marshall District Clay  
Quad Glen Easton Pad Name Francis Field/Pool Name \_\_\_\_\_  
Farm name Francis Well Number 10H  
Operator (as registered with the OOG) Chevron Appalachia, LLC  
Address 800 Mountain View Drive City Smithfield State PA Zip 15458

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4413729.029 Easting 526310.301  
Landing Point of Curve Northing 4413637.8 Easting 525964.8  
Bottom Hole Northing 4415141.9 Easting 524743.3

Elevation (ft) 1283 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)  
None Aqueous Fluid containing weighting agent, fluid loss additive, emulsifier, Viscosity and Rheological Control agent, Oil-Wetting Agent, fluid rheology conditioner

Date permit issued 3/20/2014 Date drilling commenced 6/3/2014 Date drilling ceased 8/23/2014  
Date completion activities began 3/3/2015 Date completion activities ceased 6/16/2015  
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 619 - 648 Open mine(s) (Y/N) depths \_\_\_\_\_  
Salt water depth(s) ft 1890' Void(s) encountered (Y/N) depths \_\_\_\_\_  
Coal depth(s) ft 105-145', 450-520', 700-840', 1080-1190', 1475-1585', 1640-1660' Cavern(s) encountered (Y/N) depths \_\_\_\_\_  
Is coal being mined in area (Y/N) No but not sealed

Received  
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No  
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No

Reviewed by:  
JK 8/21/15  
**10/23/2015**

API 47-051 - 01717 Farm name Francis Well number 10H

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	36	30	45	New	X-56; 118.6		
Surface	17 1/2	13 3/8	661'	New	J-55; 54.50		
Coal							
Intermediate 1	12 1/4	9 5/8	2583'	New	L-80; 40		
Intermediate 2							
Intermediate 3							
Production	8 1/2	5 1/2	13675'	New	P-110; 20		
Tubing							
Packer type and depth set							

Comment Details \_\_\_\_\_

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	Bulk Cement	Bulk Cement	Bulk Cement	Bulk Cement	Bulk Cement	Surface	8.0
Surface	Class A	635	15.6	1.21	768	Surface	8.0
Coal							
Intermediate 1	Class A	850	15.6	1.24	1044	Surface	8.0
Intermediate 2							
Intermediate 3							
Production	Class A	2536	15.2	1.29	3262	Surface	Well TD'd
Tubing							

Drillers TD (ft) <sup>13707</sup> 6555 Loggers TD (ft) <sup>13707</sup> \_\_\_\_\_  
 Deepest formation penetrated Marcellus Shale Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) <sup>5000</sup> \_\_\_\_\_

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 \_\_\_\_\_  
One bow spring centralizer every two jts on the Surface string and intermediate. Two centralizer every j in the lateral and curve, then one every two jts from KOP to surface

WAS WELL COMPLETED AS SHOT HOLE  Yes  No DETAILS SEE ATTACHED PERFORATION/STIMULATION REPORT

WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED \_\_\_\_\_

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API 47- 051 - 01717 Farm name Francis Well number 10H

**PERFORATION RECORD**

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

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)
			SEE					
			ATTACHED					

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JUL 16 2015

Please insert additional pages as applicable.

API 47- 051 - 01717 Farm name Francis Well number 10H

PRODUCING FORMATION(S)	DEPTHS	
	TVD	MD

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump  
 SHUT-IN PRESSURE Surface \_\_\_\_\_ psi Bottom Hole \_\_\_\_\_ psi DURATION OF TEST \_\_\_\_\_ hrs  
 OPEN FLOW Gas \_\_\_\_\_ mcfpd Oil \_\_\_\_\_ bpd NGL \_\_\_\_\_ bpd Water \_\_\_\_\_ bpd GAS MEASURED BY  
 Estimated  Orifice  Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	0		0		
Monongahela Group Sand	596	635	596	635	Fresh Water 619'-648'MD 2" stream
Pittsburgh Coal	816	820	816	820	Coal
Big Lime	1860	1940	1860	1940	Limestone: crm-wh, hd, crpxln (Brine @ 1890' 25bbls/hr)
Burgoon (Big Injun)	1940	2130	1938	2128	SS:offwh, wh, cons, clr, trans, lcemt, fg-mg
Weir Sand	2290	2310	2288	2308	SLTST: ltgy-mgy, occ mgy, hrd, vf-fg, tcmt, bio, arg, sl calc
Berea Sand	2525	2550	2522	2547	SS: wh, clr, trans, ltgy-gy, cns, lcmt, mg-fg, sbang-ang, arg, msph, non calc, tr flor, exd fast cut, fnt odr, lse pyr
Burket Shale	6394	6413	6738	6771	SH:drkgy,v.drkgy,frm,slty,grty,sbbiky-sbfiss,modcalc,embd calc,lse calct
Tully Limestone	6413	6447	6771	6838	LS: ltgy, gy, mgy, frm-hrd, dns, cln, mic-fxln, v. arg
Hamilton Shale	6447	6524	6838	7065	SH:drkgy,v.drkgy,frm,slty,grty,sbbiky-sbfiss,carb,modv. calc,lse calct,w/LS
Marcellus Shale	6524		7065		SH:drkgy,v.drkgy,frm,slty,grty,sbbiky-sbfiss,non calc,lse calct,lse pyr,w/LSgy,ltgy,hrd,mod,mic,fxln,v. arg

Please insert additional pages as applicable.

Drilling Contractor SEE ATTACHED  
 Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 Logging Company \_\_\_\_\_  
 Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 Cementing Company SEE ATTACHED  
 Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 Stimulating Company Schlumberger Technology Corp  
 Address Two Robinson Plaza, Suite 200 City Pittsburgh State PA Zip 15205

Please insert additional pages as applicable.

Completed by Jackie M. Scholar Telephone 724-564-3721  
 Signature Jackie M. Scholar Title Regulatory Compliance Team Lead Date 6/30/2015

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

API: 47-051-01717	Well Name: Francis	Well Number: 10H
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PERFORATION RECORD					
Stage No.	Perforation Date	Perforated From TMD Ft.	Perforated To TMD Ft.	Number of Perforations	Formation(s)
1	5/6/2015	13644	13482	40	Marcellus
2	5/7/2015	13443	13292	40	Marcellus
3	5/7/2015	13249	13092	40	Marcellus
4	5/7/2015	13044	12892	40	Marcellus
5	5/8/2015	12844	12690	40	Marcellus
6	5/8/2015	12644	12497	40	Marcellus
7	5/9/2015	12444	12292	40	Marcellus
8	5/24/2015	12242	12092	40	Marcellus
9	5/25/2015	12044	11892	40	Marcellus
10	5/25/2015	11844	11692	40	Marcellus
11	5/26/2015	11644	11492	40	Marcellus
12	5/26/2015	11444	11288	40	Marcellus
13	5/27/2015	11244	11094	40	Marcellus
14	5/27/2015	11044	10892	40	Marcellus
15	5/28/2015	10844	10692	40	Marcellus
16	5/28/2015	10636	10496	40	Marcellus
17	5/28/2015	10440	10292	40	Marcellus
18	5/29/2015	10244	10095	40	Marcellus
19	5/29/2015	10044	9892	40	Marcellus
20	5/29/2015	9838	9692	40	Marcellus
21	5/30/2015	9641	9492	40	Marcellus
22	5/30/2015	6444	9292	40	Marcellus
23	5/30/2015	9244	9092	40	Marcellus
24	5/31/2015	9039	8892	40	Marcellus
25	5/31/2015	8844	8697	40	Marcellus
26	5/31/2015	8644	8492	40	Marcellus
27	6/1/2015	8438	8292	40	Marcellus
28	6/1/2015	8244	8092	40	Marcellus
29	6/1/2015	8044	7892	40	Marcellus
30	6/2/2015	7844	7692	40	Marcellus
31	6/2/2015	7644	7492	40	Marcellus
32	6/2/2015	7444	7292	40	Marcellus
33					
34					
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Please insert additional copies of this page if additional rows/stages are needed.

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10/23/2015

API: 47-051-01717	Well Name: Francis	Well Number: 10H
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STIMULATION INFORMATION / STAGE								
Complete a separate record for each stimulation stage. (Please insert additional lines for additional stages or additional pages as applicable).								
Stg No.	Stimulation 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	5/6/2015	93.5	8693	6920	4575	305740	7338	N/A
2	5/7/2015	89	8944	6632	4575	302060	7651	N/A
3	5/7/2015	88.4	8819	5894	4680	300780	7599	N/A
4	5/7/2015	95.3	8886	6020	4746	301360	7597	N/A
5	5/8/2015	89.9	8716	5719	4954	299680	7335	N/A
6	5/8/2015	88.7	8924	5954	4712	293480	7734	N/A
7	5/9/2015	89.6	8934	6191	4852	300860	7624	N/A
8	5/24/2015	89	8445	6000	4505	227017	9678	N/A
9	5/25/2015	86.6	8252	6870	4828	303220	8334	N/A
10	5/25/2015	88.1	8404	5908	4814	301820	7356	N/A
11	5/26/2015	85	8108	7175	4368	304560	8756	N/A
12	5/26/2015	87.5	8249	6670	4499	301340	9093	N/A
13	5/27/2015	88.1	8106	5820	4785	305280	9026	N/A
14	5/27/2015	89.1	8216	6267	4582	302660	7896	N/A
15	5/28/2015	86	8275	6640	4886	298120	7993	N/A
16	5/28/2015	87.1	8355	6017	4836	306680	7761	N/A
17	5/28/2015	82.4	8644	6049	4800	118660	5074	N/A
18	5/29/2015	88.9	7758	5713	4812	301120	9248	N/A
19	5/29/2015	88	8635	6565	4885	305240	8884	N/A
20	5/29/2015	77	9207	6404	6022	113400	6431	N/A
21	5/30/2015	71.3	9629	3737	5616	53280	6855	N/A
22	5/30/2015	73.5	8945	5879	6226	103900	7191	N/A
23	5/30/2015	87.7	8548	6654	4887	298600	11541	N/A
24	5/31/2015	84.6	8655	7170	4989	281140	10209	N/A
25	5/31/2015	93.9	7871	6187	4834	282140	7302	N/A
26	5/31/2015	91.5	8136	6440	4610	304720	8612	N/A
27	6/1/2015	91.5	8129	6916	4863	302900	7761	N/A
28	6/1/2015	91.1	7973	5007	4927	302140	8532	N/A
29	6/1/2015	92.6	7538	7994	5058	300760	7510	N/A
30	6/2/2015	75.7	9148	7032	6197	107740	7323	N/A
31	6/2/2015	83.5	8668	5876	4468	305400	8889	N/A
32	6/2/2015	90.6	8026	6002	4967	301180	7545	N/A
33								
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40								

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API: 47-051-01717	Well Name: Francis	Well Number: 10H
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CEMENTING CONTRACTORS			
Name Schlumberger Technology Corp	Name Baker Hughes	Name	Name
Address Two Robinson Plaza, Suite 200	Address 5373 West Alabama, Suite 300	Address	Address
City - State - Zip Pittsburgh, PA 15205	City - State - Zip Houston, TX 77056	City - State - Zip	City - State - Zip

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Office of Oil & Gas  
JUL 16 2015

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API: 47-051-01717	Well Name: Francis	Well Number: 10H
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DRILLING CONTRACTORS			
Driller	Driller	Driller	Driller
Name Rocky Mountain Drilling	Name Highlands Drilling LLC	Name Nabors Drilling USA	Name
Address 185 North Vernal Avenue, Suite 2	Address 900 Virginia Street East	Address 10100 NW 10th Street	Address
City - State - Zip Vernal, UT 84078	City - State - Zip Charleston, WV 25301	City - State - Zip Oklahoma City, OK 73127	City - State - Zip

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JUL 16 2015

10/23/2015



51-01717

# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	5/6/2015
Job End Date:	6/2/2015
State:	West Virginia
County:	Marshall
API Number:	47-051-01717-00-00
Operator Name:	Chevron USA Inc.
Well Name and Number:	Francis 10H
Longitude:	-80.69236499
Latitude:	39.87306400
Datum:	NAD83
Federal/Tribal Well:	NC
True Vertical Depth:	6,503
Total Base Water Volume (gal):	10,822,477
Total Base Non Water Volume:	



## Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Base Fluid	Chevron	Carrier/Base Fluid	Water (Including Mix Water Supplied by Client)	7732-18-5	100.00000	90.86336	
Proppant	Schlumberger	Proppant	Crystalline Silica	14808-60-7	100.00000	8.86013	
U580	Schlumberger	Gelling Agent, Water	Carbohydrate Polymer	Proprietary	100.00000	0.08103	
10% Acid	Schlumberger	Perf Cleanup	Hydrochloric Acid	7647-01-0	10.00000	0.00962	
7.5% Acid	Schlumberger	Perf Cleanup	Hydrochloric Acid	7647-01-0	8.00000	0.00585	
J609W	Schlumberger	Friction Reducer	Ammonium Sulfate	7783-20-2	30.00000	0.00384	
J134	Schlumberger	Gel Breaker	Urea	57-13-6	5.00000	0.00064	
M300	BASF Corporation	Biocide	Hemicellulase enzyme	9012-54-8	100.00000	0.00396	
			Water	7732-18-5	75.00000	0.00225	
U042	Schlumberger	Iron Chelating Agent	Glutaral	111-30-8	25.00000	0.00075	

Amended 6/24/15



Well is located on topo map 656 feet south of Latitude: 39° 52' 30"

**AS DRILLED**  
APPROX. LANDING POINT  
UTM 17-NAD83  
N:4413637.8  
E:525964.8  
NAD83, WV NORTH  
N:502104.52  
E:1632721.12

**PERMITTED**  
APPROX. LANDING POINT  
UTM 17-NAD83  
N:4413602.06  
E:525981.18  
NAD83, WV NORTH  
N:501986.28  
E:1632772.96

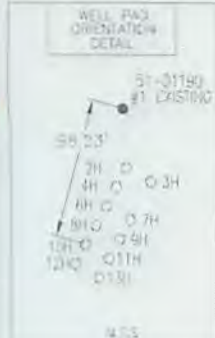
**AS DRILLED PLAT**



**LEGEND**

- TOPO MAP POINT
- WELL
- ALL ARE POINTS UNLESS OTHERWISE NOTED
- LEASE LETTER
- MINERAL TRACT BOUNDARY
- PARCEL LINES
- WELL REFERENCE
- PROPOSED HORIZONTAL WELL
- ROAD
- STREAM CENTER LINE
- AS DRILLED
- EXISTING WELLS
- EXISTING WELLS
- FLOODED WELLS

LINE	BEARING	DISTANCE
R1	S 78°55'51" W	175.74
R2	S 77°50'33" E	134.25
R3	S 67°38'08" E	131.80
R4	N 28°46'42" W	2853.44
R5	N 09°20'48" W	2013.23
R6	N 48°46'10" E	2456.31



**PERMITTED**  
BOTTOM HOLE LOCATION (BHL)  
UTM 17-NAD83  
N:4415143.39  
E:524744.89  
NAD83, WV NORTH  
N:507111.95  
E:1628800.62

**AS DRILLED**  
BOTTOM HOLE LOCATION (BHL)  
UTM 17-NAD83  
N:4415141.9  
E:524743.3  
NAD83, WV NORTH  
N:507107.01  
E:1628795.35

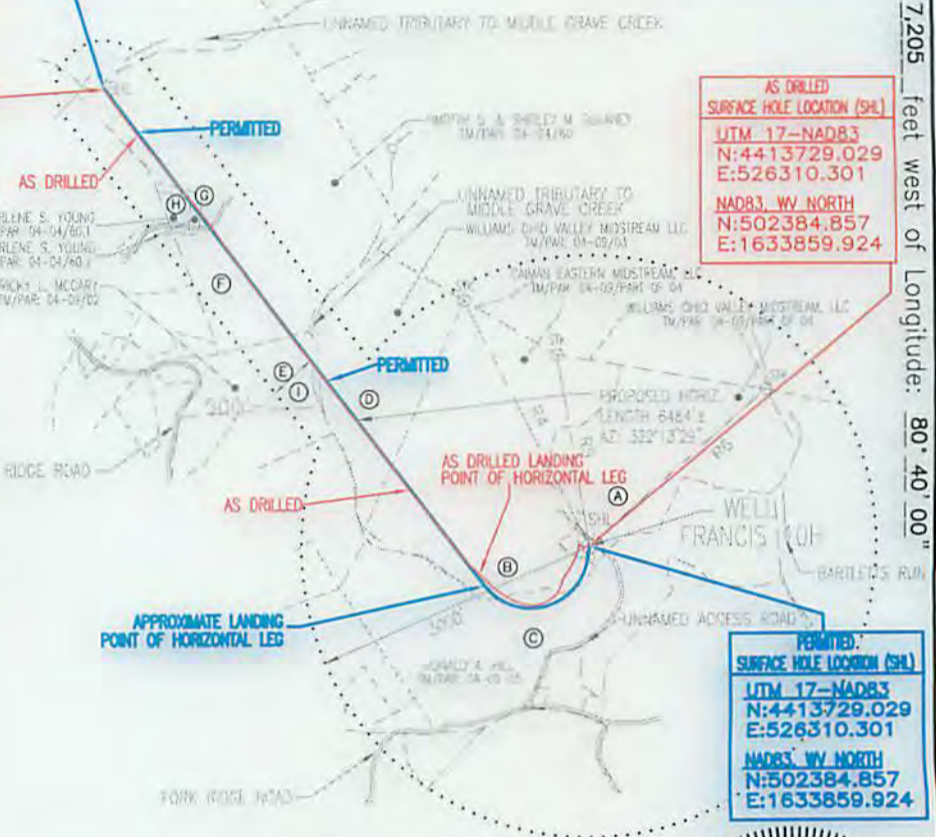
PARCEL	LESSOR
A	BARBARA P. FRANCIS
B	BARBARA P. FRANCIS
C	RONALD A. HILL & MARTIN DEAN HILL
D	BARBARA P. FRANCIS
E	RICKY LEE & LISA MCGARY
F	TIMOTHY S. & SHIRLEY M. DULANEY
G	CHARLES S. YOUNG
H	CHARLES V. WHITELATCH
I	ROGER & JUDITH MCGARY

- NOTES:
- There are no water wells or developed springs within 250' of proposed well.
  - There are no existing buildings within 625' of proposed well.
  - Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
  - There are no native trout streams within 300' of proposed well.
  - Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
  - It is not the purpose or intention of this plat to represent surveyed locations of the surface or mineral parcels depicted hereon. The location of the boundary lines, as shown, are based on record deed descriptions, field evidence found and/or tax map position, unless otherwise noted.

**Blue Mountain Inc.**  
10125 MASON DIXON HIGHWAY  
BURTON, WV 26562  
PHONE: (304) 662-6486

**AS DRILLED**  
SURFACE HOLE LOCATION (SHL)  
UTM 17-NAD83  
N:4413729.029  
E:526310.301  
NAD83, WV NORTH  
N:502384.857  
E:1633859.924

**PERMITTED**  
SURFACE HOLE LOCATION (SHL)  
UTM 17-NAD83  
N:4413729.029  
E:526310.301  
NAD83, WV NORTH  
N:502384.857  
E:1633859.924



Well is located on topo map 7205 feet west of Longitude: 80° 40' 00"

FILE #: FRANCIS 10H-AS DRILLED  
DRAWING #: FRANCIS 10H-AS DRILLED  
SCALE: 1" = 2000'  
MINIMUM DEGREE OF ACCURACY: 1/2500  
PROVEN SOURCE OF ELEVATION: U.S.G.S. MONUMENT THOMAS 1498.81'

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: *George D. Six*  
R.P.E.: \_\_\_\_\_ L.L.S.: P.S. No. 2000



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



DATE: JUNE 23, 2015  
OPERATOR'S WELL #: FRANCIS 10H-AS DRILLED  
API WELL #: 47 51 01717  
STATE COUNTY PERMIT

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

WATERSHED: MIDDLE GRAVE CREEK ELEVATION: 1260.65'

COUNTY/DISTRICT: MARSHALL / CLAY QUADRANGLE: GLEN EASTON, WV 7.5'

SURFACE OWNER: WILLIAMS OHIO VALLEY MIDSTREAM, LLC ACREAGE: 70.41±

OIL & GAS ROYALTY OWNER: BARBARA P. FRANCIS ACREAGE: 507.994±

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

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6,512± TMD: 13,861±

WELL OPERATOR: CHEVRON APPALACHIA, LLC DESIGNATED AGENT: KENNETH E. TAWNEY  
Address: 800 MOUNTAIN VIEW DRIVE Address: 500 LEE STREET, EAST SUITE 1600  
City: SMITHFIELD State: PA Zip Code: 15478 City: CHARLESTON State: WV Zip Code: 25301-3202

10/23/2015