

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

API 47-051-01712 County Marshall District Clay  
Quad Glen Easton Pad Name Francis Field/Pool Name \_\_\_\_\_  
Farm name Francis Well Number 4H  
Operator (as registered with the OOG) Chevron Appalachia, LLC  
Address 800 Mountain View Drive City Smithfield State PA Zip 15478

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4413741.162 Easting 526316.742  
Landing Point of Curve Northing 4414087.0 Easting 526503.5  
Bottom Hole Northing 4414894.6 Easting 525844.7

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 3/20/2013 Date drilling commenced 4/18/2014 Date drilling ceased 9/29/2014  
Date completion activities began 2/5/2015 Date completion activities ceased 7/3/2015  
Verbal plugging (Y/N) N Date permission granted \_\_\_\_\_ Granted by Office of Oil and Gas

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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', 490-520', 700-840', 1080-1190', 1475-1585', 1640-1660' Cavern(s) encountered (Y/N) depths No  
Is coal being mined in area (Y/N) No but not sealed

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Reviewed by:  
JE 8/21/15  
10/23/2015

API 47-051 - 01712 Farm name Francis Well number 4H

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	659	New	J-55, 54.50		
Coal							
Intermediate 1	12-1/4	9-5/8	2659	New	N-80, 40		
Intermediate 2							
Intermediate 3							
Production	8-1/2	5-1/2	10722	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	741	Surface	8.0
Coal							
Intermediate 1	Class A	921	15.6	1.19	1095	Surface	8.0
Intermediate 2							
Intermediate 3							
Production	Class A	1874	15.2	1.25	2341	107'	Well TD'd
Tubing							

Drillers TD (ft) <sup>10769</sup> 6476 Loggers TD (ft) <sup>10769</sup> \_\_\_\_\_  
 Deepest formation penetrated Marcellus Shale Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) <sup>4357</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 fts on the Surface string and intermediate. Two centralizer every ft in the lateral and curve, then one every two fts from KOP to surface  
 \_\_\_\_\_  
 \_\_\_\_\_

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

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

WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED water based chemical tracer used





API: 47-051-01712	Well Name: Francis	Well Number: 4H
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PERFORATION RECORD					
Stage No.	Perforation Date	Perforated From TMD Ft.	Perforated To TMD Ft.	Number of Perforations	Formation(s)
1	4/4/2015	10692	10530	50	Marcellus
2	4/4/2015	10492	10330	50	Marcellus
3	4/5/2015	10292	10130	50	Marcellus
4	4/5/2015	10084	9930	50	Marcellus
5	4/5/2015	9892	9730	50	Marcellus
6	4/6/2015	9692	9526	50	Marcellus
7	4/6/2015	9487	9333	50	Marcellus
8	4/6/2015	9292	9130	50	Marcellus
9	4/7/2015	9092	8930	50	Marcellus
10	4/7/2015	8892	8730	50	Marcellus
11	4/7/2015	8692	8530	50	Marcellus
12	4/8/2015	8493	8335	50	Marcellus
13	4/8/2015	8288	8133	50	Marcellus
14	4/8/2015	8093	7930	50	Marcellus
15	4/9/2015	7892	7730	50	Marcellus
16	4/9/2015	7688	7530	50	Marcellus
17	4/10/2015	7492	7330	50	Marcellus
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Please insert additional copies of this page if additional rows/stages are needed.

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API: 47-051-01712	Well Name: Francis	Well Number: 4H
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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	4/4/2015	98.7	7940	5925	4091	149920	7563	0
2	4/4/2015	99.6	7880	5400	4679	303120	8511	0
3	4/5/2015	98.8	7653	5891	5165	299220	7723	0
4	4/5/2015	100.1	7462	6080	679	292680	7768	0
5	4/5/2015	100.4	7438	5906	4886	299140	7982	0
6	4/6/2015	99.9	7779	5780	5058	299120	8638	0
7	4/6/2015	100.9	7820	5958	5058	301680	7637	0
8	4/6/2015	99.5	7374	6203	5010	303140	7230	0
9	4/7/2015	99.3	7582	6135	5149	301380	7909	0
10	4/7/2015	100.1	7834	6772	4711	304320	7226	0
11	4/7/2015	97.7	7044	6771	4940	301360	7958	0
12	4/8/2015	99.7	7493	6232	4840	292860	7996	0
13	4/8/2015	99.8	7377	6162	4798	299960	6628	0
14	4/8/2015	99.8	7106	6405	5328	301360	7219	0
15	4/9/2015	99.6	7057	6322	4780	300520	7192	0
16	4/9/2015	100	7115	6726	4982	301300	7333	0
17	4/10/2015	100	7213	5674	4672	317300	7328	0
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API 47- 051 - 01712 Farm name Francis Well number 4H

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' 25bbbls/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, lcemt, mg-fg, sbang-ang, arg, msph, non calc, tr flor, ext fast cut, frt odr, lse pyr
Burket Shale	6382	6403	6779	6806	SH: drkgy, v drkgy, frm, slty, grty, sbblky-sbfiss, modcalc, embd calc, lse calc
Tully Limestone	6403	6436	6806	6864	LS: ltgy, gy, mgy, frm-hrd, dns, cln, mic-fxln, v. arg
Hamilton Shale	6436	6514	6864	7084	SH: drkgy, v drkgy, frm, slty, grty, sbblky-sbfiss, carb, modv, calc, lse calc, w/LS
Marcellus Shale	6514		7084		SH: drkgy, v drkgy, frm, slty, grty, sbblky-sbfiss, non calc, lse calc, lse pyr, w/LS gy, ltgy, hrd, moit, mic, fxln, v. arg

Please insert additional pages as applicable.

Drilling Contractor SEE ATTACHED  
 Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Logging Company Stratagraph NE Inc.  
 Address 116 Ellsworth Avenue City Marietta State OH Zip 45750

Cementing Company Baker Hughes  
 Address 5373 West Alabama, Suite 300 City Houston State TX Zip 77056

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 [Signature] Title Regulatory Compliance Team Lead Date 7/14/2015

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API: 47-51-01712	Well Name: Francis	Well Number: H
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DRILLING CONTRACTORS			
Driller	Driller	Driller	Driller
Name <b>Rocky Mountain Drilling</b>	Name <b>Highlands Drilling LLC</b>	Name <b>Nabors Drilling USA</b>	Name
Address 185 North Vernal Ave, Suite 200	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
Phone 435.789.3320	Phone 304.380.0114	Phone 405.324.8081	Phone

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**10/23/2015**



# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	4/4/2015
Job End Date:	4/10/2015
State:	West Virginia
County:	Marshall
API Number:	47-051-01712-00-00
Operator Name:	Chevron USA Inc.
Well Name and Number:	Francis 4H
Longitude:	-80.69228947
Latitude:	39.87317257
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,476
Total Base Water Volume (gal):	5,453,278
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	89.78214	
Proppant	Schlumberger	Proppant	Crystalline Silica	14808-60-7	100.00000	9.98923	
J580	Schlumberger	Gelling Agent, Water	Carbohydrate Polymer	Proprietary	100.00000	0.06101	
B466	Schlumberger	Friction Reducer	Distillates (petroleum), hydrotreated light	54742-47-8	30.00000	0.00414	
			Ammonium Acetate	631-61-8	6.00000	0.00083	
			Alcohol Ethoxylates	Proprietary	5.00000	0.00069	
J134	Schlumberger	Gel Breaker	Hemicellulase enzyme	9012-54-8	100.00000	0.00269	
U042	Schlumberger	Iron Chelating Agent	Tetrasodium ethylenediaminetetraacetate	64-02-8	60.00000	0.00165	
			Trisodium nitrilotriacetate (100% purity)	5064-31-3	10.00000	0.00027	
			Sodium hydroxide	1310-73-2	5.00000	0.00014	
EG6116A	Nalco	Biocide					

51-01712



Amended 6/24/15



51-01712

			Polyethylene Glycol	25322-68-3	60.00000	0.00105
			2,2-Dibromo-3-nitropropanamide	10222-01-2	30.00000	0.00053
			Dibromoacetamide	3252-43-5	5.00000	0.00009
7.5% Acid	Schlumberger	Perf Cleanup	Hydrochloric Acid	7647-01-0	8.00000	0.00137
L058	Schlumberger	Iron Stabilizer	Sodium erythorbate	6381-77-7	100.00000	0.00068
M300	BASF Corporation	Biocide	Glutaral	111-30-8	25.00000	0.00037
			Water	7732-18-5	75.00000	0.00012
B317	Schlumberger	Scale Inhibitor	Ethane-1,2-diol	107-21-1	5.00000	0.00010
			Trisodium ortho phosphate	7601-54-9	5.00000	0.00010
A264	Schlumberger	Corrosion Inhibitor	Methanol	67-56-1	40.00000	0.00005
			Aliphatic acids	Proprietary	30.00000	0.00004
			Aliphatic alcohols, ethoxylated #1	Proprietary	30.00000	0.00004
			Prop-2-yn-1-ol	107-19-7	10.00000	0.00001

Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

\* Total Water Volume sources may include fresh water, produced water, and/or recycled water

\*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided. Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)



Well is located on topo map 616 feet south of Latitude: 39° 52' 30"

**AS DRILLED APPROX. LANDING POINT**  
 UTM 17-NAD83  
 N:4414087.0  
 E:526503.5  
 NAD83, WV NORTH  
 N:503548.84  
 E:1634513.64

**PERMITTED APPROX. LANDING POINT**  
 UTM 17-NAD83  
 N:4414092.72  
 E:526505.54  
 NAD83, WV NORTH  
 N:503567.61  
 E:1634520.55

# AS DRILLED PLAT

**NOTES:**

1. There are no water wells or developed springs within 250' of proposed well.
2. There are no existing buildings within 625' of proposed well.
3. Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
4. There are no native trout streams within 300' of proposed well.
5. Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
6. 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.

Well is located on topo map 7.184 feet west of Longitude: 80° 40' 00"

**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
- PLUGGED WELLS

PARCEL	LESSOR
A	BARBARA P. FRANCIS
B	BARBARA P. FRANCIS
C	JOSEPH D. & NELLIE B. PARRIOTT
D	JOSEPH D. & NELLIE B. PARRIOTT



LINE	BEARING	DISTANCE
R1	S 85°21'21" W	152.36'
R2	S 80°14'41" E	145.75'
R3	S 80°08'10" E	138.44'
R4	N 26°17'10" W	2870.43'
R5	N 08°49'32" W	2036.84'
R6	N 48°52'02" E	3484.45'

**AS DRILLED BOTTOM HOLE LOCATION (BHL)**  
 UTM 17-NAD83  
 N:4414894.6  
 E:525844.7  
 NAD83, WV NORTH  
 N:506235.36  
 E:1632395.92

**PERMITTED BOTTOM HOLE LOCATION (BHL)**  
 UTM 17-NAD83  
 N:4414906.48  
 E:525852.83  
 NAD83, WV NORTH  
 N:506273.76  
 E:1632423.31

**AS DRILLED SURFACE HOLE LOCATION (SHL)**  
 UTM 17-NAD83  
 N:4413741.162  
 E:526316.742  
 NAD83, WV NORTH  
 N:502424.319  
 E:1633881.724

**PERMITTED SURFACE HOLE LOCATION (SHL)**  
 UTM 17-NAD83  
 N:4413741.162  
 E:526316.742  
 NAD83, WV NORTH  
 N:502424.319  
 E:1633881.724

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

FILE #: FRANCIS 4H-AS DRILLED  
 DRAWING #: FRANCIS 4H-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

PLACE SEAL HERE

(+) 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 4H-AS DRILLED  
 API WELL #: 47 51 01712  
 STATE COUNTY PERMIT

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

WATERSHED: MIDDLE GRAVE CREEK ELEVATION: 1260.14'

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: 398.065±

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: 10,744'±

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