

APPROVED

NAME: ikoran

DATE: 11/8/17

WR-35
Rev. 8/23/13

Page ___ of ___

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

API 47-049-02361 County Marion District Mannington
Quad Shinnston Pad Name Hughes Pad Field/Pool Name Marcellus
Farm name Rockwell, Faye C. Well Number Hughes 11H
Operator (as registered with the OOG) XTO Energy Inc.
Address PO Box 1008 City Jane Lew State WV Zip 26378

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4367330 Easting 554145
Landing Point of Curve Northing 4367313.2 Easting 554623.8
Bottom Hole Northing 4366297 Easting 555865

Elevation (ft) 1287 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)
Synthetic Oil Based Mud

Date permit issued 3/11/2015 Date drilling commenced 11/19/2015 Date drilling ceased 3/5/2016
Date completion activities began 7/28/2016 Date completion activities ceased 8/14/2016
Verbal plugging (Y/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 115 Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1410 Void(s) encountered (Y/N) depths N
Coal depth(s) ft 98-102, 470-477, 874-879 Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) Y

RECEIVED
Office of Oil and Gas
JAN 23 2018

WV Department of
Environmental Protection

API 47-049 - 02361 Farm name Rockwell, Faye C. Well number Hughes 11H

| CASING STRINGS | Hole Size | Casing Size | Depth | New or Used | Grade w/ft | Basket Depth(s) | Did cement circulate (Y/N) * Provide details below* |
|---------------------------|-------------------|-------------|-------|-------------|-------------|-----------------|--|
| Conductor | 28" | 24" | 40 | NEW | PE&B 94.62# | | Grouted to surface |
| Surface | 17 1/2" | 13 3/8" | 613 | NEW | H-40 48# | | Y |
| Coal | | | | | | | |
| Intermediate 1 | 12 3/8" / 12 1/4" | 9 5/8" | 3152 | NEW | J-55 36# | | Y |
| Intermediate 2 | | | | | | | |
| Intermediate 3 | | | | | | | |
| Production | 8 3/4" | 5 1/2" | 13603 | NEW | P-110 20# | | TOC - 2644 |
| Tubing | | | | | | | |
| 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 | Redl-mix | 5 Yards | | | | 0 | 8 |
| Surface | 1 | 460 | 15.60 | 1.19 | 547.40 | 0 | 8 |
| Coal | | | | | | | |
| Intermediate 1 | A | 1130 | 15.60 | 1.18 | 1333.4 | 0 | 8 |
| Intermediate 2 | | | | | | | |
| Intermediate 3 | | | | | | | |
| Production | 50:50 POZ H / H | 355/1875 | 15.20 / 15.60 | 1.07 / 1.18 | 379.85 / 2212.5 | 2644 | 8 |
| Tubing | | | | | | | |

Drillers TD (ft) 13,830 Loggers TD (ft) 13,830
 Deepest formation penetrated Marcellus Plug back to (ft) _____
 Plug back procedure _____

Kick off depth (ft) 5786

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 _____
Surface - Every 3rd Joint
Intermediate - Every 3rd Joint
Production - Every other Joint (TD-TOC)

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 _____

01/05/2018

RECEIVED
Office of Oil and Gas

JAN 23 2017

WV Department of
Environmental Protection

Perforation Record Hughes 11H 47-049-02361

| Stage No. | Perforation Date | Perforated from MD ft. | Perforated to MD ft. | Number of Perforations | Formations |
|------------------|-------------------------|-------------------------------|-----------------------------|-------------------------------|-------------------|
| 1 | 7/28/2016 | 13,321 | 13,455 | 48 | Marcellus |
| 2 | 7/29/2016 | 13,117 | 13,251 | 48 | Marcellus |
| 3 | 7/29/2016 | 12,913 | 13,047 | 48 | Marcellus |
| 4 | 7/30/2016 | 12,709 | 12,843 | 48 | Marcellus |
| 5 | 7/31/2016 | 12,505 | 12,639 | 48 | Marcellus |
| 6 | 7/31/2016 | 12,301 | 12,435 | 48 | Marcellus |
| 7 | 8/1/2016 | 12,035 | 12,231 | 84 | Marcellus |
| 8 | 8/3/2016 | 11,831 | 11,963 | 60 | Marcellus |
| 9 | 8/3/2016 | 11,631 | 11,757 | 60 | Marcellus |
| 10 | 8/4/2016 | 11,429 | 11,559 | 60 | Marcellus |
| 11 | 8/4/2016 | 11,229 | 11,352 | 60 | Marcellus |
| 12 | 8/6/2016 | 11,025 | 11,155 | 60 | Marcellus |
| 13 | 8/6/2016 | 10,823 | 10,956 | 60 | Marcellus |
| 14 | 8/6/2016 | 10,621 | 10,751 | 60 | Marcellus |
| 15 | 8/7/2016 | 10,419 | 10,549 | 60 | Marcellus |
| 16 | 8/7/2016 | 10,201 | 10,351 | 60 | Marcellus |
| 17 | 8/9/2016 | 10,014 | 10,145 | 60 | Marcellus |
| 18 | 8/9/2016 | 9,813 | 9,943 | 60 | Marcellus |
| 19 | 8/9/2016 | 9,611 | 9,741 | 60 | Marcellus |
| 20 | 8/10/2016 | 9,411 | 9,539 | 60 | Marcellus |
| 21 | 8/11/2016 | 9,207 | 9,337 | 60 | Marcellus |
| 22 | 8/11/2016 | 9,005 | 9,139 | 60 | Marcellus |
| 23 | 8/11/2016 | 8,803 | 8,933 | 60 | Marcellus |
| 24 | 8/12/2016 | 8,601 | 8,734 | 60 | Marcellus |
| 25 | 8/13/2016 | 8,399 | 8,529 | 60 | Marcellus |
| 26 | 8/14/2016 | 8,197 | 8,322 | 60 | Marcellus |
| 27 | 8/14/2016 | 7,995 | 8,125 | 60 | Marcellus |

RECEIVED 01/05/2018
Office of Oil and Gas

JAN 23 2017

WV Department of
Environmental Protection

Stimulation Information Per Stage Hughes 11H 47-049-02361

| 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 (bbbls) | Amount of Nitrogen/other (units) |
|-----------|-------------------|---------------------|------------------------------|------------------------------|------------|--------------------------|-------------------------|----------------------------------|
| 1 | 7/28/2016 | 75.8 | 8,736 | 6,919 | 5,597 | 108,800 | 7,724 | 0 |
| 2 | 7/29/2016 | 78.4 | 8,213 | 6,950 | 4,726 | 346,680 | 11,835 | 0 |
| 3 | 7/30/2016 | 78.3 | 8,137 | 7,162 | 4,799 | 345,980 | 14,466 | 0 |
| 4 | 7/31/2016 | 66.5 | 8,409 | 6,496 | 6,056 | 114,820 | 11,278 | 0 |
| 5 | 7/31/2016 | 73.5 | 7,984 | 6,618 | 4,644 | 319,580 | 12,314 | 0 |
| 6 | 8/2/2016 | 78.3 | 7,990 | 7,395 | 4,606 | 311,340 | 10,794 | 0 |
| 7 | 8/2/2016 | 47 | 8,494 | 7,133 | 8,638 | 44,730 | 4,999 | 0 |
| 8 | 8/3/2016 | 74.4 | 7,870 | 7,465 | 5,081 | 286,300 | 10,892 | 0 |
| 9 | 8/4/2016 | 80 | 8,084 | 7,318 | 5,653 | 306,420 | 11,236 | 0 |
| 10 | 8/4/2016 | 79.4 | 7,978 | 6,892 | 4,782 | 304,200 | 10,590 | 0 |
| 11 | 8/5/2016 | 80.5 | 7,797 | 7,487 | 3,139 | 310,800 | 10,729 | 0 |
| 12 | 8/6/2016 | 80.3 | 7,799 | 6,845 | 5,527 | 307,515 | 10,667 | 0 |
| 13 | 8/6/2016 | 85.1 | 7,798 | 6,453 | 5,171 | 302,860 | 10,544 | 0 |
| 14 | 8/7/2016 | 82.7 | 7,749 | 6,826 | 5,627 | 309,120 | 10,746 | 0 |
| 15 | 8/8/2016 | 85.1 | 8,052 | 6,577 | 5,951 | 308,540 | 11,264 | 0 |
| 16 | 8/9/2016 | 81.5 | 8,022 | 6,837 | 5,380 | 307,120 | 10,753 | 0 |
| 17 | 8/9/2016 | 80.1 | 8,230 | 6,476 | 5,560 | 254,520 | 12,698 | 0 |
| 18 | 8/9/2016 | 80.7 | 8,152 | 7,142 | 5,253 | 307,900 | 11,006 | 0 |
| 19 | 8/10/2016 | 85.2 | 7,528 | 6,414 | 5,300 | 306,520 | 10,760 | 0 |
| 20 | 8/10/2016 | 83 | 7,770 | 6,485 | 5,503 | 307,620 | 11,196 | 0 |
| 21 | 8/11/2016 | 84.8 | 7,663 | 6,722 | 5,205 | 307,930 | 10,948 | 0 |
| 22 | 8/11/2016 | 83 | 7,588 | 6,433 | 5,428 | 308,020 | 10,601 | 0 |
| 23 | 8/12/2016 | 84.9 | 7,505 | 6,794 | 5,268 | 307,300 | 10,456 | 0 |
| 24 | 8/12/2016 | 82.5 | 7,570 | 6,778 | 5,521 | 307,660 | 10,861 | 0 |
| 25 | 8/13/2016 | 83.2 | 7,621 | 6,769 | 5,090 | 307,540 | 10,626 | 0 |
| 26 | 8/13/2016 | 84.6 | 7,485 | 6,418 | 5,478 | 307,300 | 10,480 | 0 |
| 27 | 8/13/2016 | 83.1 | 7,139 | 6,134 | 5,062 | 308,900 | 10,383 | 0 |

RECEIVED
Office of Oil and Gas

01/05/2018

JAN 23 2017

WV Department of
Environmental Protection

| Lithology / Formation Name | Top Depth | | Bottom Depth | | Describe Rock Type and Record Quantity and Type of Fluid (Freshwater, Brine, Oil, Gas, H2S, ETC) |
|----------------------------|-----------|-----------|--------------|----------|--|
| | in FT TVD | in FT TVD | in FT MD | in FT MD | |
| SOIL / GRAY SANDSTONE | 0 | 98 | 0 | 98 | |
| COAL | 98 | 102 | 98 | 102 | |
| SAND | 102 | 300 | 102 | 300 | 10 GP @ 115' - FW |
| SAND & SHALE | 300 | 400 | 300 | 400 | |
| GRAY SAND | 400 | 470 | 400 | 470 | |
| COAL | 470 | 477 | 470 | 477 | |
| SAND AND SHALE | 477 | 717 | 477 | 717 | |
| GRAY SHALE | 717 | 874 | 717 | 874 | |
| COAL | 874 | 879 | 874 | 879 | |
| GRAY SHALE AND SAND | 879 | 1383 | 879 | 1383 | |
| GRAY SHALE | 1383 | 1859 | 1383 | 1859 | 10 GP @1410' - SW |
| WHITE SAND | 1859 | 2398 | 1859 | 2398 | |
| RED ROCK | 2398 | 2494 | 2398 | 2494 | |
| GRAY SAND | 2494 | 2716 | 2494 | 2716 | |
| GRAY SHALE | 2716 | 3193 | 2716 | 3193 | |
| GRAY SAND AND SANDSTONE | 3193 | 3415 | 3193 | 3415 | |
| GRAY SHALE | 3415 | 3670 | 3415 | 3670 | |
| GRAY SAND AND SHALE | 3670 | 4020 | 3670 | 4020 | |
| SST, SH, SLTST | 4020 | 5500 | 4020 | 5500 | |
| SHALE | | | 5500 | 7510 | |
| LIMESTONE, SHALE | | | 7510 | 7660 | |
| SHALE | | | 7660 | 7780 | |
| SHALE, LIMESTONE | | | 7780 | 7810 | |
| SHALE | | | 7810 | 7990 | |
| LIMESTONE, SHALE | | | 7990 | 8090 | |
| SHALE | | | 8090 | 8170 | |
| SHALE, LIMESTONE | | | 8170 | 8210 | |
| SHALE | | | 8210 | 8330 | |
| SHALE, LIMESTONE | | | 8330 | 8990 | |
| SHALE | | | 8990 | 12410 | |
| SHALE, LIMESTONE | | | 12410 | 12500 | |
| SHALE | | | 12500 | 12630 | |

Geneseo Shale @ 7,473' MD / 7,133' TVD
 Burkett Shale @ 7,495' MD / 7,129' TVD
 Tully Limestone @ 7,540' MD / 7,158' TVD
 Hamilton Shale @ 7,620' MD / 7,204' TVD
 Upper Marcellus Shale @ 7,749' MD / 7,266' TVD
 Purcell Limestone @ 8,024' MD / 7,354' TVD
 Lower Marcellus Shale @ 8,047' MD / 7,359' TVD

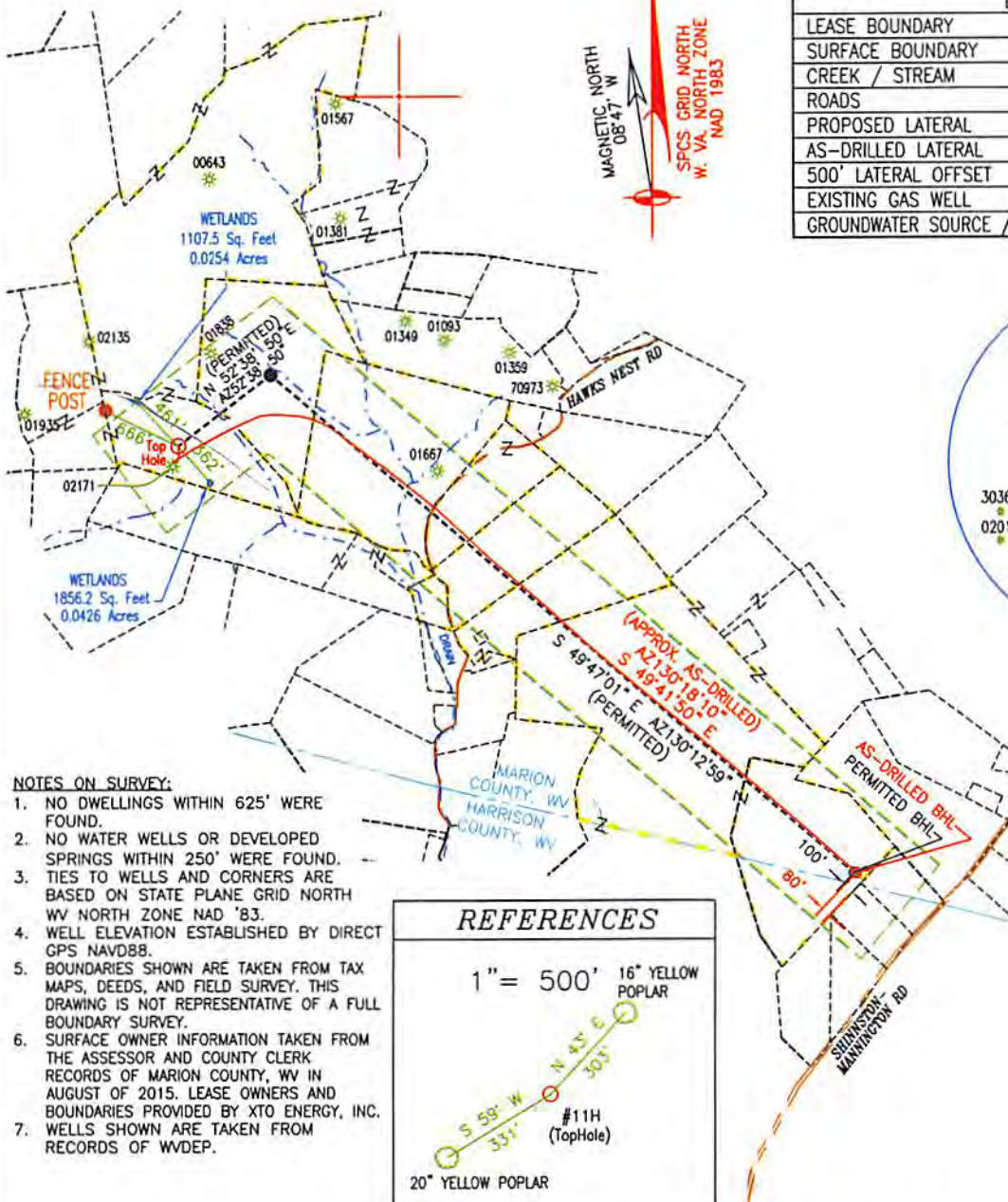
10585' (Scale: 1" = 2000')

Latitude: 39°27'30"

| LEGEND | |
|-----------------------------------|--|
| LEASE BOUNDARY | |
| SURFACE BOUNDARY | |
| CREEK / STREAM | |
| ROADS | |
| PROPOSED LATERAL | |
| AS-DRILLED LATERAL | |
| 500' LATERAL OFFSET | |
| EXISTING GAS WELL | |
| GROUNDWATER SOURCE / WATER SUPPLY | |

1667' (Scale: 1" = 2000')

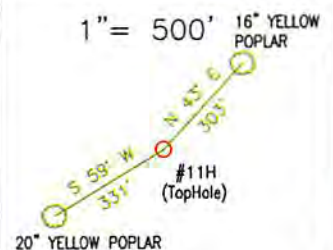
Longitude: 80°02'08"



NOTES ON SURVEY:

1. NO DWELLINGS WITHIN 625' WERE FOUND.
2. NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250' WERE FOUND.
3. TIES TO WELLS AND CORNERS ARE BASED ON STATE PLANE GRID NORTH WV NORTH ZONE NAD '83.
4. WELL ELEVATION ESTABLISHED BY DIRECT GPS NAVD88.
5. BOUNDARIES SHOWN ARE TAKEN FROM TAX MAPS, DEEDS, AND FIELD SURVEY. THIS DRAWING IS NOT REPRESENTATIVE OF A FULL BOUNDARY SURVEY.
6. SURFACE OWNER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF MARION COUNTY, WV IN AUGUST OF 2015. LEASE OWNERS AND BOUNDARIES PROVIDED BY XTO ENERGY, INC.
7. WELLS SHOWN ARE TAKEN FROM RECORDS OF WVDEP.

REFERENCES



HUGHES 11H

State Plane Coord.
West Virginia North
NAD27
Top Hole Loc
(N) 348567.868
(E) 1754096.245

TRI-COUNTY ENGINEERING, LLC

319 PAINTERSVILLE RD. HUNKER, PA 15639

TCE@TRICOUNTYENG.COM (724) 635-0210

PAGE 1 of 2

FILE # XTOOG57-11
DRAWING # XTOOG57-11-11H
SCALE: 1" = 1500'
MINIMUM DEGREE OF ACCURACY: 1:2500
PROVEN SOURCE OF ELEVATION: DIRECT GPS

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 REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Signed: *Donald R. Hixson Jr.*
R.P.E.: 17818 L.L.S.:



(+) DENOTES LOCATION OF AS-DRILLED WELL ON UNITED STATES TOPOGRAPHIC MAPS

WVDEP
OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTOWN, WV 25304



DATE: 6/28/2016 PLACE SEAL HERE
OPERATOR'S WELL #: HUGHES 11H
API WELL #: 47 49 02361
STATE COUNTY PERMIT

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

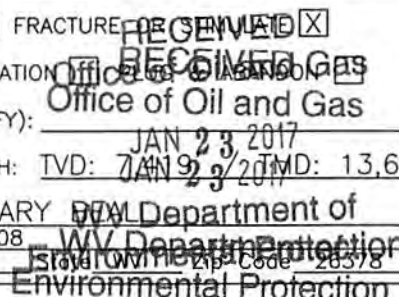
WATERSHED: BINGAMON CREEK WATERSHED ELEVATION: 1287'
COUNTY/DISTRICT: MARION / MANNINGTON QUADRANGLE SHINNSTON 7.5'
SURFACE OWNER FAYE C. ROCKWELL ACREAGE 107.50
OIL & GAS ROYALTY OWNER: FAYE C. ROCKWELL ACREAGE 4

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

TARGET FORMATION MARCELLUS ACTUAL DEPTH: TVD: 13,630'

WELL OPERATOR XTO ENERGY INC.
Address 810 HOUSTON STREET
City FORT WORTH State TX Zip Code 76102

DESIGNATED AGENT GARY BOW
Address P.O. BOX 1008
City JANE LEW State WV Zip Code 26378



01/05/2018

WV Department of Environmental Protection

4914'
(Scale: 1" = 2000')

Latitude: 39°27'30"

5084'
"00,02,08"
Longitude: 1" = 2000'

NOTES ON SURVEY:

1. NO DWELLINGS WITHIN 625' WERE FOUND.
2. NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250' WERE FOUND. TIES TO WELLS AND CORNERS ARE BASED ON STATE PLANE GRID NORTH WV NORTH ZONE NAD '83.
3. WELL ELEVATION ESTABLISHED BY DIRECT GPS NAVD88.
4. BOUNDARIES SHOWN ARE TAKEN FROM TAX MAPS, DEEDS, AND FIELD SURVEY. THIS DRAWING IS NOT REPRESENTATIVE OF A FULL BOUNDARY SURVEY.
5. SURFACE OWNER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF MARION COUNTY, WV IN AUGUST OF 2015. LEASE OWNERS AND BOUNDARIES PROVIDED BY XTO ENERGY, INC.
6. WELLS SHOWN ARE TAKEN FROM RECORDS OF WDEP.

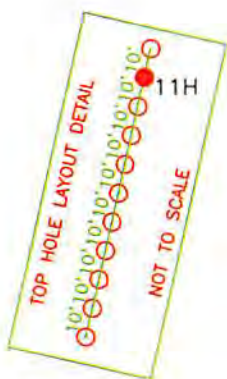
HUGHES 11H

State Plane Coord.
West Virginia North
NAD27

Top Hole Loc
(N) 348567.868
(E) 1754096.245

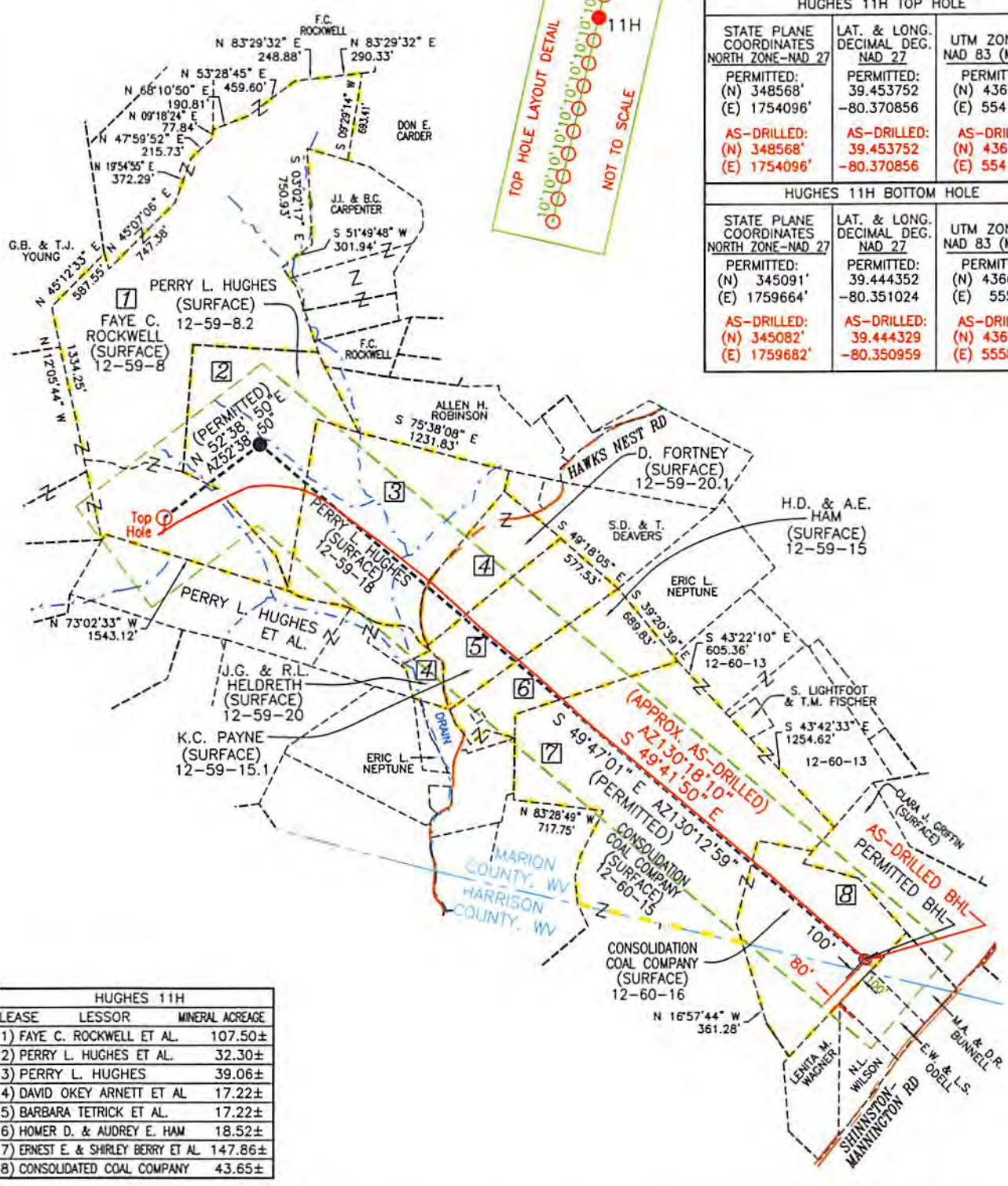
| LEGEND | |
|-----------------------------------|-----------------------|
| LEASE BOUNDARY | --- (dashed line) |
| SURFACE BOUNDARY | --- (dashed line) |
| CREEK / STREAM | --- (dashed line) |
| ROADS | --- (solid line) |
| PROPOSED LATERAL | --- (dashed line) |
| AS-DRILLED LATERAL | --- (solid line) |
| 500' LATERAL OFFSET | --- (dashed line) |
| EXISTING GAS WELL | ☀ (sun symbol) |
| GROUNDWATER SOURCE / WATER SUPPLY | ⊕ (circle with cross) |

QUADRANGLE (BHL) SHINNSTON 7.5'
(+) DENOTES LOCATION OF AS-DRILLED WELL
BOTTOM HOLE ON UNITED STATES TOPOGRAPHIC MAPS

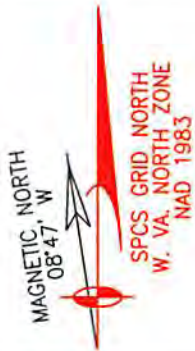


| HUGHES 11H TOP HOLE | | |
|--|--|--|
| STATE PLANE COORDINATES NORTH ZONE-NAD 27 | LAT. & LONG. DECIMAL DEG. NAD 27 | UTM ZONE 17 NAD 83 (METERS) |
| PERMITTED: (N) 348568' (E) 1754096' | PERMITTED: 39.453752 -80.370856 | PERMITTED: (N) 4367330 (E) 554145 |
| AS-DRILLED: (N) 348568' (E) 1754096' | AS-DRILLED: 39.453752 -80.370856 | AS-DRILLED: (N) 4367330 (E) 554145 |

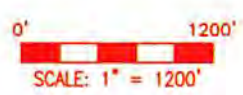
| HUGHES 11H BOTTOM HOLE | | |
|--|--|--|
| STATE PLANE COORDINATES NORTH ZONE-NAD 27 | LAT. & LONG. DECIMAL DEG. NAD 27 | UTM ZONE 17 NAD 83 (METERS) |
| PERMITTED: (N) 345091' (E) 1759664' | PERMITTED: 39.444352 -80.351024 | PERMITTED: (N) 4366299 (E) 555859 |
| AS-DRILLED: (N) 345082' (E) 1759682' | AS-DRILLED: 39.444329 -80.350959 | AS-DRILLED: (N) 4366297 (E) 555865 |



| HUGHES 11H | | |
|------------|----------------------------------|-----------------|
| LEASE | LESSOR | MINERAL ACREAGE |
| 1) | FAYE C. ROCKWELL ET AL. | 107.50± |
| 2) | PERRY L. HUGHES ET AL. | 32.30± |
| 3) | PERRY L. HUGHES | 39.06± |
| 4) | DAVID OKEY ARNETT ET AL. | 17.22± |
| 5) | BARBARA TETRICK ET AL. | 17.22± |
| 6) | HOMER D. & AUDREY E. HAM | 18.52± |
| 7) | ERNEST E. & SHIRLEY BERRY ET AL. | 147.86± |
| 8) | CONSOLIDATED COAL COMPANY | 43.65± |



810 HOUSTON STREET
FORT WORTH, TX 76102



Voice: (724) 635-0210

TRI-COUNTY ENGINEERING, LLC
An ENERCON Company
319 Paintersville Road
Hunker, PA 15639
www.tricountyeng.com

01/05/2018
Fax: (724) 635-0678



SUPPLEMENTAL SURFACE LESSOR EXHIBIT
Office of Oil and Gas
HUGHES 11H

DRAWN BY: NJP
DATE: 6/28/2016
SCALE: 1" = 100'

AN 2nd CLASS DISTRICT,
MARION COUNTY, WEST VIRGINIA

FILE NO. OG57-09-11H

Environmental Protection

Hydraulic Fracturing Fluid Product Component Information Disclosure

| | |
|--------------------------------|-----------------------|
| Job Start Date: | 7/29/2016 |
| Job End Date: | 8/13/2016 |
| State: | West Virginia |
| County: | Marion |
| API Number: | 47-049-02361-00-00 |
| Operator Name: | XTO Energy/ExxonMobil |
| Well Name and Number: | Hughes 11H |
| Latitude: | 39.44460500 |
| Longitude: | -80.35064100 |
| Datum: | NAD27 |
| Federal Well: | NO |
| Indian Well: | NO |
| True Vertical Depth: | 7,420 |
| Total Base Water Volume (gal): | 12,304,030 |
| Total Base Non Water Volume: | 0 |



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 |
|------------|--------------|---------------------|---|--|--|--|----------|
| Water | Schlumberger | N/A | | | | | |
| | | | Water (Including Mix Water Supplied by Client)* | 7732-18-5 | | 92.92235 | |
| S100 | Schlumberger | Fluid Loss Additive | | | | | |
| | | | | Listed Below | | | |

WV Department of Environmental Protection
 RECEIVED
 Office of Oil and Gas
 JAN 2 2017

| | | | | | | | |
|---|--------------|---------------------|----------------------------|--------------|----------|---------|--|
| A264A | Schlumberger | Corrosion Inhibitor | | | | | |
| | | | | Listed Below | | | |
| L058 | Schlumberger | Iron Control Agent | | | | | |
| | | | | Listed Below | | | |
| M300 | Schlumberger | Myacide TS GA 25 | | | | | |
| | | | | Listed Below | | | |
| S012-3050 | Schlumberger | Propping Agent | | | | | |
| | | | | Listed Below | | | |
| H315 | Schlumberger | Acid | | | | | |
| | | | | Listed Below | | | |
| B317 | Schlumberger | Scale Inhibitor | | | | | |
| | | | | Listed Below | | | |
| J609W | Schlumberger | Friction Reducer | | | | | |
| | | | | Listed Below | | | |
| Items above are Trade Names with the exception of Base Water. Items below are the individual ingredients. | | | | | | | |
| | | | Quartz, Crystalline silica | 14808-60-7 | 98.10546 | 6.94356 | |
| | | | Hydrochloric acid | 7647-01-0 | 1.02103 | 0.07226 | |
| | | | Glutaraldehyde | 111-30-8 | 0.32482 | 0.02299 | |
| | | | Ammonium sulfate | 7783-20-2 | 0.24468 | 0.01732 | |

| | | | | | | |
|--|--|--|--|-------------|---------|---------|
| | | | Acrylamide, 2-acrylamido-2-methylpropanesulfonic acid, sodium salt polymer | 38193-60-1 | 0.18059 | 0.01278 |
| | | | Ethanol, 2,2',2"-nitrilotris-, 1,1',1"-tris (dihydrogen phosphate), sodium salt | 68171-29-9 | 0.04178 | 0.00296 |
| | | | Polymer of 2-acrylamido-2-methylpropanesulfonic acid sodium salt and methyl acrylate | 136793-29-8 | 0.01935 | 0.00137 |
| | | | Trisodium ortho phosphate | 7601-54-9 | 0.01836 | 0.00130 |
| | | | Urea | 57-13-6 | 0.01188 | 0.00084 |
| | | | Sodium erythorbate | 6381-77-7 | 0.00844 | 0.00060 |
| | | | Methanol | 67-56-1 | 0.00558 | 0.00040 |
| | | | Ethylene Glycol | 107-21-1 | 0.00523 | 0.00037 |
| | | | Sodium sulfate | 7757-82-6 | 0.00277 | 0.00020 |
| | | | Silicon Dioxide | 7631-86-9 | 0.00247 | 0.00017 |
| | | | Reaction product of: acetophenone, formaldehyde, cyclohexylamine, methanol and acetic acid | 224635-63-6 | 0.00231 | 0.00016 |
| | | | Cinnamaldehyde | 104-55-2 | 0.00128 | 0.00009 |
| | | | Alcohol, C9-C11, Ethoxylated | 68439-46-3 | 0.00096 | 0.00007 |
| | | | Alcohols, C10-16, ethoxylated | 68002-97-1 | 0.00064 | 0.00005 |
| | | | 2-Propenamid (impurity) | 79-06-1 | 0.00059 | 0.00004 |
| | | | Tetrasodium ethylenediaminetetraacetate | 64-02-8 | 0.00031 | 0.00002 |
| | | | Acetic acid(impurity) | 64-19-7 | 0.00025 | 0.00002 |
| | | | Acetophenone | 98-86-2 | 0.00024 | 0.00002 |
| | | | Amines, tallow alkyl, ethoxylated | 61791-26-2 | 0.00019 | 0.00001 |

| | | | | | | | |
|--|--|--|--|------------|---------|---------|--|
| | | | Dimethyl siloxanes and silicones | 63148-62-9 | 0.00017 | 0.00001 | |
| | | | Formaldehyde (impurity) | 50-00-0 | 0.00016 | 0.00001 | |
| | | | Dodecamethylcyclohexa siloxane | 540-97-6 | 0.00001 | | |
| | | | Decamethyl cyclopentasiloxane | 541-02-6 | 0.00001 | | |
| | | | Copper(II) sulfate | 7758-98-7 | 0.00001 | | |
| | | | Siloxanes and silicones, dimethyl, reaction products with silica | 67762-90-7 | 0.00002 | | |
| | | | Octamethylcyclotetrasiloxane | 556-67-2 | 0.00002 | | |

* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water

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

*** If you are calculating a percentage of total ingredients do not add the water volume below the green line to the water volume above the green line

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(l) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)