

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

API 47-049-02410 County Marion District Lincoln & Mannington
Quad Shinnston Pad Name Swearingen Pad Field/Pool Name Marcellus
Farm name Carder, Don E. Well Number Hackett 4H
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 4368428 Easting 555568
Landing Point of Curve Northing 4368498.5 Easting 555683.6
Bottom Hole Northing 4367367 Easting 557229

Elevation (ft) 1372 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 11/06/2015 Date drilling commenced 11/21/15 Date drilling ceased 3/28/16
Date completion activities began 10/23/16 Date completion activities ceased 11/7/16
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 JAN 26 2017

Freshwater depth(s) ft None Noted Open mine(s) (Y/N) depths WV Department of Environmental Protection
Salt water depth(s) ft None Noted Void(s) encountered (Y/N) depths N
Coal depth(s) ft 586-590 Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by:
09/15/2017

APPROVED
NAME: Sara Ward
DATE: 8/23/17

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09/15/2017

APPROVED

NAME:
DATE:

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Environmental Protection

API 47-049 - 02410 Farm name Carder, Don E. Well number Hackett 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	28	24	40	New	94.62 / PE&B		Grouted to Surface
Surface	17 1/2	13 3/8	697.4	New	48 / H-40	529.4	N - Grouted to Surface
Coal							
Intermediate 1	12 3/8	9 5/8	3122.1	New	36 / J-55		Y
Intermediate 2							
Intermediate 3							
Production	8 3/4" & 8 1/2"	5 1/2	14380	New	20 / P-110		TOC - 4743
Tubing							
Packer type and depth set							

Comment Details Surface - Pump 40 bbls inside. Pump 95 bbls on backside. Cement to surface.

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	Redi-Mix	5 Yards				0	8
Surface	A	189 / 436	15.60	1.19 / 1.18	224.9 / 514.5	0	8
Coal							
Intermediate 1	A	1135	15.60	1.18	1339.3	0	8
Intermediate 2							
Intermediate 3							
Production	50:50 POZ / H	385 / 1875	15.2 / 15.6	1.07 / 1.18	411.9 / 2212.5	3112	8
Tubing							

Drillers TD (ft) 14,410' Loggers TD (ft) 14,410'
 Deepest formation penetrated Marcellus Plug back to (ft) _____
 Plug back procedure _____

Kick off depth (ft) 5500

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 _____

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Perforation Record Hackett 4H 47-049-02410

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	10/23/2016	14,054	14,232	60	Marcellus
2	10/24/2016	13,810	13,988	60	Marcellus
3	10/24/2016	13,566	13,744	60	Marcellus
4	10/25/2016	13,322	13,500	60	Marcellus
5	10/26/2016	13,082	13,256	60	Marcellus
6	10/26/2016	12,834	13,012	60	Marcellus
7	10/27/2016	12,590	12,768	60	Marcellus
8	10/28/2016	12,346	12,524	60	Marcellus
9	10/28/2016	12,102	12,280	60	Marcellus
10	10/29/2016	11,858	12,036	60	Marcellus
11	10/30/2016	11,612	11,792	60	Marcellus
12	10/30/2016	11,370	11,548	60	Marcellus
13	10/31/2016	11,126	11,304	60	Marcellus
14	11/1/2016	10,882	11,060	60	Marcellus
15	11/3/2016	10,638	10,816	60	Marcellus
16	11/3/2016	10,394	10,572	60	Marcellus
17	11/4/2016	10,150	10,328	60	Marcellus
18	11/4/2016	9,906	10,088	60	Marcellus
19	11/5/2016	9,662	9,840	60	Marcellus
20	11/5/2016	9,418	9,596	60	Marcellus
21	11/5/2016	9,172	9,352	60	Marcellus
22	11/6/2016	8,930	9,108	60	Marcellus
23	11/6/2016	8,686	8,864	60	Marcellus
24	11/6/2016	8,442	8,620	60	Marcellus
25	11/7/2016	8,198	8,378	60	Marcellus

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Stimulation Information Per Stage Hackett 4H 47-049-02410								
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)	Amt. of Nitrogen / other (units)
1	10/24/2016	85	7,534	6,457	5,028	402,020	11,029	
2	10/24/2016	84	7,944	6,869	5,278	366,266	10,278	
3	10/25/2016	85	7,806	6,638	5,023	399,980	10,623	
4	10/26/2016	85	7,895	7,078	5,399	349,744	9,962	
5	10/26/2016	85	8,168	6,795	5,121	406,460	10,238	
6	10/27/2016	85	8,188	7,264	5,739	400,100	10,258	
7	10/27/2016	85	8,348	7,109	5,440	375,040	10,540	
8	10/28/2016	85	8,044	6,780	5,831	402,740	10,386	
9	10/29/2016	83	8,337	6,815	5,946	365,380	11,926	
10	10/29/2016	85	7,722	6,728	5,328	400,120	10,306	
11	10/30/2016	86	7,638	6,733	5,587	400,800	10,342	
12	10/31/2016	85	7,932	7,012	4,735	393,545	10,793	
13	11/1/2016	86	7,721	6,994	5,130	396,400	10,368	
14	11/3/2016	85	7,748	7,364	5,813	400,580	11,325	
15	11/3/2016	85	7,656	6,444	5,480	396,506	11,321	
16	11/4/2016	86	7,764	6,909	4,884	400,417	10,893	
17	11/4/2016	85	7,480	7,695	5,163	391,520	10,766	
18	11/4/2016	86	7,592	6,835	5,375	376,217	11,231	
19	11/5/2016	85	7,361	7,105	5,122	395,400	10,537	
20	11/5/2016	86	7,285	6,577	5,457	395,120	10,524	
21	11/5/2016	86	7,205	6,592	5,284	392,340	10,166	
22	11/6/2016	85	7,205	6,652	5,443	382,560	10,018	
23	11/6/2016	85	7,167	6,553	5,843	398,867	10,075	
24	11/7/2016	85	7,161	7,054	5,485	399,032	10,293	
25	11/7/2016	85	7,315	6,966	5,431	402,700	10,311	

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API 47- 049 - 02410 Farm name Carder, Don E. Well number Hackett 4H

PRODUCING FORMATION(S)	DEPTHS	
<u>Marcellus</u>	<u>7640'</u> TVD	<u>14410'</u> MD
_____	_____	_____
_____	_____	_____

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 1800 psi Bottom Hole 3350 psi DURATION OF TEST 24 hrs

OPEN FLOW Gas 2300 mcfpd Oil 0 bpd NGL 0 bpd Water 500 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 ₂ S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	<u>0</u>		<u>0</u>		
	<u>See attached</u>				

Please insert additional pages as applicable.

Drilling Contractor Nomac Drilling
Address 3400 South Radio Road City El Reno State OK Zip 73036

Logging Company MS Energy Services
Address 7821 Will Rogers Blvd City Ft. Worth State TX Zip 76140

Cementing Company C&J Energy Services
Address 3990 Rogerdale Rd. City Houston State TX Zip 77042

Stimulating Company Keane Group
Address 120 Airstrip Dr. City Mill Hall State PA Zip 17751

Please insert additional pages as applicable.

Completed by Tim Sands Telephone 304-884-6000
Signature *Tim Sands* Title Regulatory Compliance Technician Date 1/24/17

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

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Lithology Hackett 4H 47-049-02410

Lithology / Formation Name	Top Depth	Bottom	Top	Bottom	Describe Rock Type and Record Quantity and Type of Fluid (Freshwater, Brine, Oil, Gas, H2S, ETC)
	in FT TVD	Depth in FT TVD	Depth in FT MD	Depth in FT MD	
CONDUCTOR	0	40	0	40	
GRAY SANDSTONE	40	272	40	272	
GRAY SAND	272	388	272	388	
SAND/SHALE	388	504	388	504	
GRAY SHALE	504	586	504	586	
COAL	586	590	586	590	
SAND/SHALE	590	830	590	830	
GRAY SHALE	830	835	830	835	
GRAY SHALE/SAND	835	1383	835	1383	
GRAY SHALE	1383	1972	1383	1972	
WHITE SAND	1972	2502	1972	2502	
RED ROCK	2502	2607	2502	2607	
GRAY SAND	2607	2829	2607	2829	
GRAY SHALE	2829	3306	2829	3306	
GRAY SAND/SHALE	3306	3531	3306	3531	
GRAY SHALE	3531	3644	3531	3644	
GRAY SAND/SHALE	3644	4543	3644	4543	
GRAY/SHALE	4543	5000	4543	5020	
SHALE/SILTSTONE			5020	5470	
SHALE			5470	5830	
SHALE/SILTSTONE			5830	6040	
SHALE			6040	7510	
LIMESTONE/ SHALE			7510	7720	
SHALE			7720	7920	
SHALE/ LIMESTONE			7920	7940	
SHALE / MARL			7940	8060	
SHALE			8060	8820	
SHALE / MARL			8820	9000	
SHALE			9000	10260	
SHALE/MARL			10260	10620	
SHALE			10620	10980	
SHALE/LIMESTONE/ MARL			10980	11300	
SHALE/MARL			11300	11370	
SHALE			11370	11820	
SHALE/MARL			11820	12000	
SHALE			12000	12180	
SHALE/MARL/LIMESTONE			12180	12270	
SHALE/MARL			12270	12540	
SHALE			12540	13980	
SHALE/MARL			13980	14370	
SHALE/MARL/LIMESTONE			14370	14410	

Geneseo Shale @ 7,484' MD / 7,243' TVD
Burkett Shale @ 7,508' MD / 7,261' TVD
Tully Limestone @ 7,542' MD / 7,288' TVD
Hamilton Shale @ 7,618' MD / 7,338' TVD
Upper Marcellus Shale @ 7,719' MD / 7,397' TVD
Purcell Limestone @ 7,919' MD / 7,479' TVD
Lower Marcellus Shale @ 7,943' MD / 7,485' TVD

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5902'
(1"=2000')

Latitude: 39°30'00"

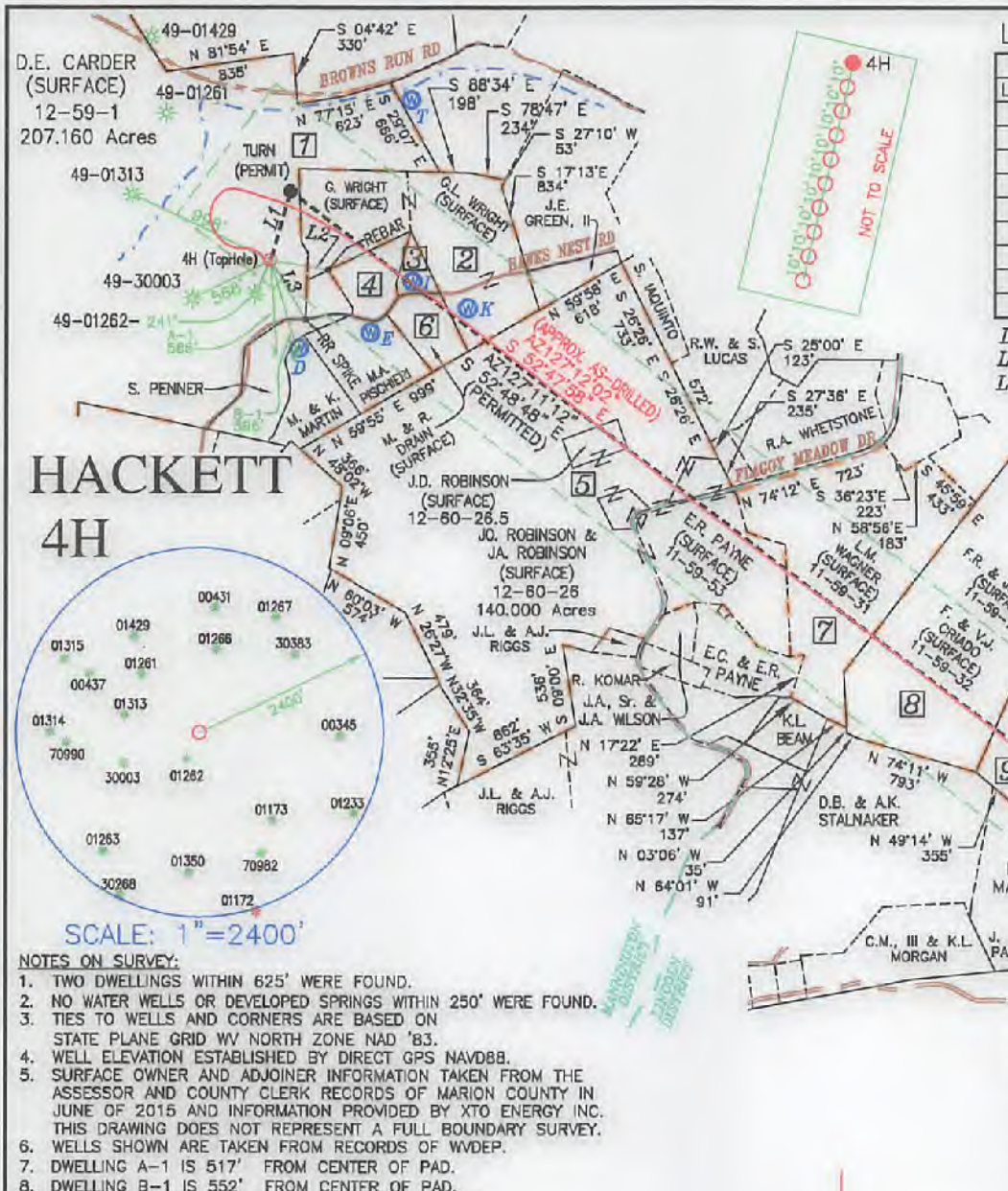
HACKETT 4H		
LEASE	LESSOR	MINERAL ACREAGE
1	DON E. CARDER et al.	111.000 ±
2	ALLEN & SHIRLEY COLE et al.	25.350 ±
3	ALLEN & SHIRLEY COLE et al.	1.440 ±
4	MARY & ROGER DRAIN et al.	3.820 ±
5	DOUGLAS S. DOLFIE et al.	140.000 ±
6	ALLEN & SHIRLEY COLE et al.	3.660 ±
7	MADONNA L. MATHENY et al.	26.460 ±
8	L.A. FERRARI ESTATE et al.	57.000 ±
9	D. & D. STALNAKER et al.	43.920 ±

L1: N 15°58'32" E 465.89'
L2: S 80°28'28" E 378.93'
L3: S 30°32'31" E 444.27'

State Plane Coord.
West Virginia North
Top Hole Loc (NAD27)
(N) 352092.029
(E) 1758823.375

Longitude: 80°20'00"

(1"=2000')



HACKETT 4H

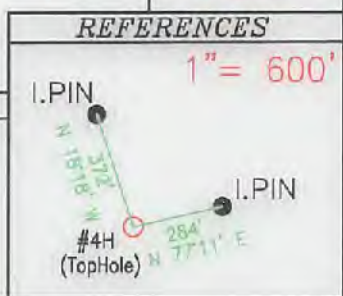


SCALE: 1"=2400'

- NOTES ON SURVEY:
- TWO DWELLINGS WITHIN 625' WERE FOUND.
 - NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250' WERE FOUND.
 - TIES TO WELLS AND CORNERS ARE BASED ON STATE PLANE GRID WV NORTH ZONE NAD '83.
 - WELL ELEVATION ESTABLISHED BY DIRECT GPS NAVD83.
 - SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF MARION COUNTY IN JUNE OF 2015 AND INFORMATION PROVIDED BY XTO ENERGY INC. THIS DRAWING DOES NOT REPRESENT A FULL BOUNDARY SURVEY.
 - WELLS SHOWN ARE TAKEN FROM RECORDS OF WVDEP.
 - DWELLING A-1 IS 517' FROM CENTER OF PAD.
 - DWELLING B-1 IS 552' FROM CENTER OF PAD.

LEGEND	
LEASE BOUNDARY	---
SURFACE BOUNDARY	----
CREEK / STREAM	~~~~~
ROADS	=====
PERMITTED LATERAL	----
AS-DRILLED LATERAL	----
500' LATERAL OFFSET	----
EXISTING GAS WELL	☼
GROUNDWATER SOURCE / WATER SUPPLY	⊕

HACKETT 4H BOTTOM HOLE		
STATE PLANE COORD. NORTH ZONE-NAD 27	L&L DECIMAL NAD 27	UTM (NAD 83) ZONE 17 - METERS
PERMITTED: (N) 348562 (E) 1764194	PERMITTED: 38.454000 -80.335097	PERMITTED: (N) 4367380 (E) 557222
AS-DRILLED: (N) 348520 (E) 1764217	AS-DRILLED: 39.453884 -80.335015	AS-DRILLED: (N) 4367367 (E) 557229

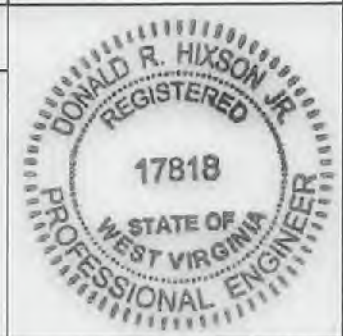


TRI-COUNTY ENGINEERING, LLC 319 PAINTERSVILLE RD. TCE@TRICOUNTYENG.COM
HUNKER, PA 15639 (724) 635-0210

FILE # XTO-OG61
DRAWING # OG61-23-4H
SCALE: 1"=1200'
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: [Signature]
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

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

WATERSHED: BINGAMON CREEK WATERSHED
COUNTY/DISTRICT: MARION CO. / LINCOLN & MANNINGTON DIST.
SURFACE OWNER DON E CARDER
OIL & GAS ROYALTY OWNER: DON E CARDER

DATE: 6/28/2016 PLACE SEAL HERE
OPERATOR'S WELL #: HACKETT 4H
API WELL #: 47 49 02410
STATE COUNTY PERMIT
Deep

ELEVATION: 1372'
QUADRANGLE SHINNSTON 7.5'
ACREAGE 207.16
ACREAGE 111.00

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

TARGET FORMATION MARCELLUS
ACTUAL DEPTH: TVD: 7.638' / TMD: 14.410'

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

DESIGNATED AGENT GARY BEAL
Address PO BOX 2000
City JANE WEAVER State WV Zip Code 26378



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

DESIGNATED AGENT: GARY BEALL
 Address: 600 BOXWOOD DRIVE
 City: JANA, TX Zip Code: 76238

ACTUAL DEPTH: TMD: 7.838' \ TMD: 14.410'
 JAN 26 2017

TARGET FORMATION: MARCELLUS

CLEAN OUT & REPLUG OTHER CHANGE (SPECIFY):

DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG PLUG AND ABANDON

WATERSHED: BINGAMON CREEK WATERSHED

WELL TYPE: Oil Waste Disposal Production Storage Shallow

WDP: OFFICE OF OIL & GAS
 601 5TH STREET
 CHARLESTOWN, WV 26034

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

DATE: 6/28/2016 PLACE SEAL HERE

Oil & Gas Royalty Owner: DON E GARDER
 1001 W DON E GARDER

COUNTY/DISTRICT: MARION CO \ LINCOLN & MANNINGTON DIST.

WATERSHED: BINGAMON CREEK WATERSHED

DRAWING # 0681-23-4H
 FILE # XTO-0681

OF ELEVATION: DIRECT GPS
 PROVEN SOURCE

OF ACCURACY: 1:2500
 MINIMUM DEGREE

SCALE: 1" = 1200'

Signed: *[Signature]*
 R.P.E.: 17818 L.S.:

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS
 PLAN IS CORRECT TO THE BEST OF MY KNOWLEDGE AND
 BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY
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310 PAINTERSVILLE RD.
 HUNKER, PA 15839
 TRI-COUNTY ENGINEERING, LLC
 TCE@TRICOUNTYENG.COM
 (724) 632-0210

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

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6	ALLEN & SHIRLEY COLE et al.	3.860 ±
7	MADONNA L. MATHENY et al.	28.480 ±
8	L.A. FERRARI ESTATE et al.	27.000 ±
9	D. & D. STANAKER et al.	43.920 ±

HACKETT 4H
 TOP HOLE

STATE PLANE COORD.
 WEST VIRGINIA NORTH
 TOP HOLE LOC (NAD83)
 (N) 352092.029
 (E) 1758823.375

Latitude: 39°30'00"
 Longitude: 80°50'00"

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	10/23/2016
Job End Date:	11/7/2016
State:	West Virginia
County:	Marion
API Number:	47-049-02410-00-00
Operator Name:	XTO Energy/ExxonMobil
Well Name and Number:	Hackett 4H
Latitude:	39.46355200
Longitude:	-80.35423500
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	7,640
Total Base Water Volume (gal):	10,923,444
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	XTO	Carrier/Base Fluid	Water	7732-18-5	100.00000	89.42699	None
Sand (Proppant)	Keane	Proppant	Crystalline silica: Quartz (SiO2)	14808-60-7	100.00000	9.62529	None
Hydrochloric Acid (15%)	Keane	Acidizing	Water	7732-18-5	85.00000	0.70556	None
			Hydrochloric Acid	7647-01-0	15.00000	0.12451	None
MBC-516	Keane	Biocide	glutaral	111-30-8	26.70000	0.00632	None
			didecyltrimethylammonium chloride	7173-51-5	8.00000	0.00084	None
			quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl, chlorides	68424-85-1	5.30000	0.00056	None
KSI-16	Keane	Scale Inhibitor	Alkyl phosphonic acid	Proprietary	5.00000	0.00411	None
			Ethylene glycol	107-21-1	5.00000	0.00118	None
			ammonia	7664-41-7	0.50000	0.00041	None
KFR-16FW	Keane	Friction Reducer					

			oleic acid diethanolamide	93-83-4	1.50000	0.00123	None
			alcohols, C12-16, ethoxylated	68551-12-2	1.00000	0.00082	None
			Distillates (petroleum), hydrotreated light	64742-47-8	20.00000	0.00022	None
			ammonium chloride	12125-02-9	1.50000	0.00002	None
KAI-13	Keane	Acid Inhibitor					
			ethanediol	107-21-1	40.00000	0.00045	None
			dipropylene glycol, monomethyl ether	34590-94-8	20.00000	0.00022	None
			Cinnamaldehyde	104-55-2	10.00000	0.00011	None
			formic acid	64-18-6	10.00000	0.00011	None
			Tar bases, quinoline derivs., benzyl chloride-quaternized	72480-70-7	10.00000	0.00011	None
			Ethoxylated alcohol	Proprietary	10.00000	0.00011	None
			propan-2-ol	67-63-0	5.00000	0.00006	None
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.							
Other Chemical(s)	Listed Above	See Trade Name(s) List					
			Water	7732-18-5	85.00000	0.70556	
			Alkyl phosphonic acid	Proprietary	5.00000	0.00411	
			oleic acid diethanolamide	93-83-4	1.50000	0.00123	
			Ethylene glycol	107-21-1	5.00000	0.00118	
			didecyldimethylammonium chloride	7173-51-5	8.00000	0.00084	
			alcohols, C12-16, ethoxylated	68551-12-2	1.00000	0.00082	
			quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl, chlorides	68424-85-1	5.30000	0.00056	
			dipropylene glycol, monomethyl ether	34590-94-8	20.00000	0.00022	
			formic acid	64-18-6	10.00000	0.00011	
			Tar bases, quinoline derivs., benzyl chloride-quaternized	72480-70-7	10.00000	0.00011	
			Cinnamaldehyde	104-55-2	10.00000	0.00011	
			Ethoxylated alcohol	Proprietary	10.00000	0.00011	
			propan-2-ol	67-63-0	5.00000	0.00006	
			ammonium chloride	12125-02-9	1.50000	0.00002	

* 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)