

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

API 47 - 049 - 02405 County Marion District Mannington
Quad Shinnston Pad Name Hughes Pad Field/Pool Name Marcellus
Farm name Rockwell, Faye C. Well Number Hughes 10H
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 4367333 Easting 554146
Landing Point of Curve Northing 4367389.2 Easting 554393.7
Bottom Hole Northing 4369026 Easting 553441

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)

APPROVED

NAME: Sam W. ...
DATE: 8/23/17

Date permit issued 10/21/2015 Date drilling commenced 11/19/2015 Date drilling ceased 2/26/2016
Date completion activities began 7/29/2016 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 _____
Salt water depth(s) ft 1410 Void(s) encountered (Y/N) depths _____
Coal depth(s) ft 98-102, 470-477, 874-879 Cavern(s) encountered (Y/N) depths _____
Is coal being mined in area (Y/N) Y

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WV Department of
Environmental Protection
Reviewed by:
9/15/2017

API 47-049 - 02405 Farm name Rockwell, Faye C. Well number Hughes 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	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"	9 5/8"	3096	New	J-55 36#		Y
Intermediate 2							
Intermediate 3							
Production	8 3/4" / 8 1/2"	5 1/2"	14210	New	P-110 20#		TOC - 2551
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	Redi-Mix	5 Yards				0	8
Surface	A	520	15.60	1.19	618.8	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	346/2011	15.20/15.60	1.07/1.18	370.22 / 2372.98	2551	8
Tubing							

Drillers TD (ft) 14,249' Loggers TD (ft) 14,249'

Deepest formation penetrated Marcellus Plug back to (ft) _____

Plug back procedure _____

Kick off depth (ft) 5170

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)

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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 _____

API 47- 049 - 02405 Farm name Rockwell, Faye C. Well number Hughes 10H

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
<u>Marcellus</u>	<u>7479</u>	<u>TVD</u>	<u>14,209</u> <u>MD</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 1900 psi Bottom Hole 3460 psi DURATION OF TEST 24 hrs

OPEN FLOW Gas 2116 mcfpd Oil 0 bpd NGL 0 bpd Water 537 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

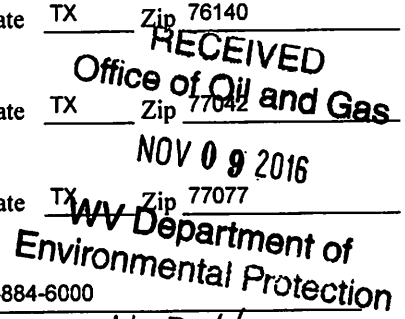
Logging Company MS Energy Services
Address 7821 Will Rogers Blvd City Ft. Worth State TX Zip 76140

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

Stimulating Company Schlumberger Oilfield Services
Address 1325 S. Dairy Ashford Dr. City Houston State TX Zip 77077

Please insert additional pages as applicable.

Completed by Tim Sands Telephone 304-884-6000
Signature [Signature] Title Regulatory Compliance Technician Date 11-7-16



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

Perforation Record Hughes 10H 47-049-02405

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formations
1	7/29/2016	13,891	14,061	60	Marcellus
2	7/31/2016	13,656	13,821	60	Marcellus
3	7/31/2016	13,411	13,581	60	Marcellus
4	8/1/2016	13,213	13,343	60	Marcellus
5	8/1/2016	12,936	13,101	60	Marcellus
6	8/2/2016	12,688	12,861	60	Marcellus
7	8/2/2016	12,451	12,621	60	Marcellus
8	8/2/2016	12,209	12,381	60	Marcellus
9	8/3/2016	11,971	12,141	60	Marcellus
10	8/4/2016	11,731	11,904	60	Marcellus
11	8/4/2016	11,496	11,661	60	Marcellus
12	8/5/2016	11,251	11,421	60	Marcellus
13	8/6/2016	11,011	11,181	60	Marcellus
14	8/6/2016	10,771	10,941	60	Marcellus
15	8/7/2016	10,531	10,701	60	Marcellus
16	8/8/2016	10,291	10,461	60	Marcellus
17	8/9/2016	10,051	10,221	60	Marcellus
18	8/9/2016	9,813	9,981	60	Marcellus
19	8/10/2016	9,571	9,741	60	Marcellus
20	8/10/2016	9,331	9,501	60	Marcellus
21	8/11/2016	9,091	9,261	60	Marcellus
22	8/11/2016	8,851	9,021	60	Marcellus
23	8/12/2016	8,606	8,781	60	Marcellus
24	8/13/2016	8,371	8,497	60	Marcellus
25	8/13/2016	8,131	8,301	60	Marcellus
26	8/14/2016	7,891	8,061	60	Marcellus

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09/15/2017

Stimulation Information Per Stage Hughes 10H 47-049-02405

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	7/26/2016	77.6	8,030	8,025	8,025	364,260	13,514	0
2	7/31/2016	74.8	8,239	7,379	4,775	199,680	12,868	0
3	8/1/2016	73.7	7,921	6,675	5,203	339,740	15,210	0
4	8/1/2016	78.7	7,770	6,192	4,657	430,220	12,620	0
5	8/1/2016	71.5	7,830	5,993	5,926	244,220	13,411	0
6	8/2/2016	76.5	7,807	6,274	4,832	400,500	12,810	0
7	8/2/2016	76.3	7,979	6,481	4,733	297,500	12,684	0
8	8/2/2016	75.1	7,757	6,593	5,553	378,040	14,026	0
9	8/3/2016	79.2	7,932	6,513	5,826	225,820	11,748	0
10	8/4/2016	80.7	7,895	6,095	4,583	403,080	14,639	0
11	8/5/2016	78	7,569	6,449	6,001	403,820	12,891	0
12	8/6/2016	77	7,600	6,205	5,454	402,760	14,575	0
13	8/6/2016	78.5	7,663	6,291	5,503	335,680	12,941	0
14	8/6/2016	72.9	7,587	5,975	5,879	334,400	15,423	0
15	8/7/2016	75.2	7,992	6,292	5,713	403,720	15,772	0
16	8/8/2016	76.9	7,842	6,001	5,852	220,640	10,994	0
17	8/8/2016	75.9	7,610	6,684	4,956	400,220	13,725	0
18	8/9/2016	76	7,831	7,346	5,181	402,620	12,865	0
19	8/10/2016	79.7	7,711	6,403	5,712	333,660	13,241	0
20	8/10/2016	80.5	7,195	6,148	4,906	402,120	12,150	0
21	8/11/2016	76.8	7,547	7,643	5,727	255,030	13,367	0
22	8/12/2016	79	7,240	6,830	5,205	401,700	12,646	0
23	8/12/2016	77.2	7,268	7,558	5,852	336,760	13,061	0
24	8/12/2016	78.3	7,350	6,667	6,008	402,580	12,748	0
25	8/13/2016	78.4	7,290	6,784	6,001	295,120	11,670	0
26	8/13/2016	78.7	7,067	6,692	5,032	402,960	12,500	0

09/15/2017

Lithology / Formation Name	Describe Rock Type and Record		Quantity and Type of Fluid	
	Top Depth in FT TVD	Bottom Depth in FT TVD	Top Depth in FT MD	Bottom Depth in FT MD
SOIL / GRAY SANDSTONE	0	98	0	98
COAL	98	102	98	102
SAND	102	300	102	300
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
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/shale			3670	4020
Sand, shale, Limestone, Siltstone			4020	5000
Shale, Siltstone, Sandstone			5000	5100
Shale and Siltstone			5100	5150
Shale			5150	7400
Shale & LIMESTONE			7400	7430
Limestone & Shale			7430	7560
Shale			7560	7600
Shale & LIMESTONE			7600	7620
Shale			7620	7720
Shale & LIMESTONE			7720	7740
Shale			7740	7920
Shale, Marl, & Limestone			7920	8015
Shale & Marl			8015	9200
Shale			9200	14249

10 GP @ 115' - FW

10 GP @ 1410' - SW

Burkett Shale @ 7414'MD / 7129'TVD
 Tully Limestone @ 7420'md / 7152'tvd
 Hamilton Shale @ 7515'MD / 7211'TVD
 Upper Marcellus Shale @ 7620'MD / 7288'TVD
 Purcell Limestone @ 7737'MD / 7355'TVD
 Lower Marcelles Shale @ 7753'MD / 7362'TVD

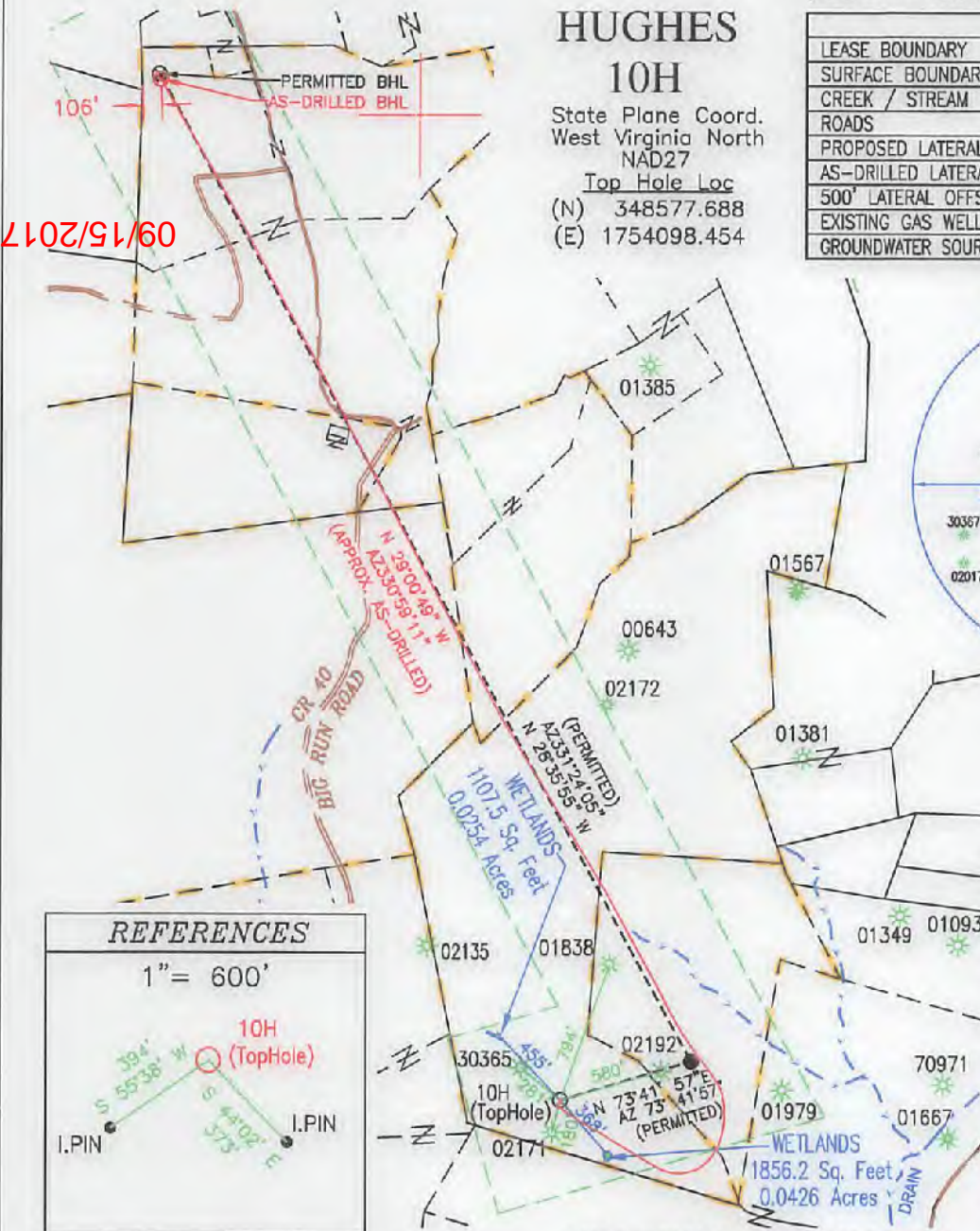
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 Office of Oil and Gas
 NOV 09 2016
 WV Department of
 Environmental Protection

HUGHES 10H

State Plane Coord.
West Virginia North
NAD27
Top Hole Loc
(N) 348577.688
(E) 1754098.454

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

09/15/2017



SCALE: 1" = 2400'



- 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 WDEP.

REFERENCES

1" = 600'

10H (TopHole)
I.PIN
I.PIN

TRI-COUNTY ENGINEERING, LLC

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

FILE # XTO-OG57
 DRAWING # OG57-11-10H
 SCALE: 1" = 1000'
 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

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



DATE: 6/28/2016 PLACE SEAL HERE

OPERATOR'S WELL #: HUGHES 10H

API WELL #: 47 49 02405
 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 (THL) SHINNSTON 7.5'

SURFACE OWNER FAYE C. ROCKWELL ACREAGE 107.50

OIL & GAS ROYALTY OWNER: BEVERLY & DAN M. KELLY et al. ACREAGE 417.97

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 ACTUAL DEPTH: TVD: 7,480' / TMD: 14,249'

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

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

CITY FORT WORTH State TX Zip Code 76102
 WELL OPERATOR XTO ENERGY INC.
 Address 810 HOUSTON STREET
 Designated Agent GARY BEALL
 Address P.O. BOX 1008
 State WV Zip Code 26378

TARGET FORMATION MARCELLUS
 ACTUAL DEPTH: TVD: 7,480' \ TMD: 14,249'
 CLEAN OUT & REPLUG OTHER CHANGE (SPECIFY):
 PLUG OFF OLD FORMATION PERFORATE NEW FORMATION PLUG & ABANDON
 DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE

0.25 Acre ROYALTY OWNER: BEVERLY & DAN M. KELLY et al. ACRES 417.97
 SURFACE OWNER FAYE C. ROCKWELL ACRES 107.50
 COUNTY/DISTRICT: MARION \ MANNINGTON
 WATERSHED: BINGAMON CREEK WATERSHED
 Well Type: Oil Waste Disposal Production Deep
 Gas Liquid Injection Storage Shallow

CHARLESTOWN, WV 25304
 OFFICE OF OIL & GAS
 601 5TH STREET
 WDEP
 WELL ON UNITED STATES TOPOGRAPHIC MAPS
 (+) DENOTES LOCATION OF AS-DRILLED

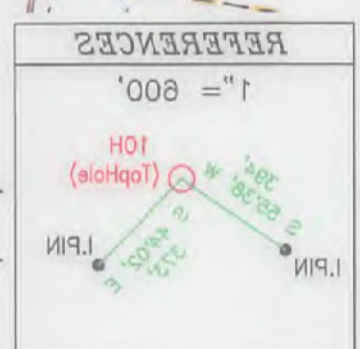


FILE # XTO-0627
 DRAWING # 0627-11-10H
 SCALE: 1" = 1000'
 MINIMUM DEGREE OF ACCURACY: 1:2500
 PROVEN SOURCE OF ELEVATION: DIRECT GPS

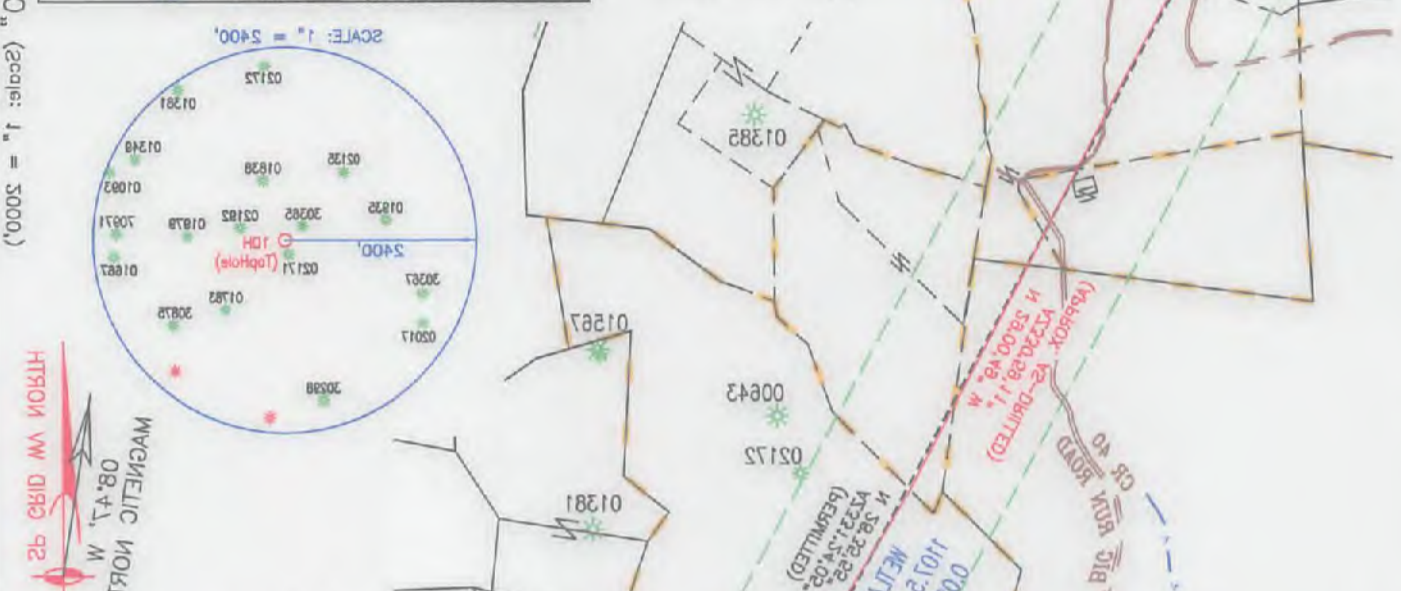
R.P.E.: 17818
 Signed: _____
 L.S.: _____
 I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION



TRI-COUNTY ENGINEERING, LLC
 218 PAINTERSVILLE RD.
 HUNKER, PA 15839
 TEL@TRICOUNTYENG.COM (724) 625-0210
 PAGE 1 of 2



NOTES ON SURVEY:
 1. NO DWELLINGS WITHIN 825' 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 W/ NORTH ZONE NAD 83.
 4. WELL ELEVATION ESTABLISHED BY DIRECT GPS NAVD83.
 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 2012. LEASE OWNERS AND BOUNDARIES PROVIDED BY XTO ENERGY, INC.
 7. WELLS SHOWN ARE TAKEN FROM RECORDS OF WDEP.

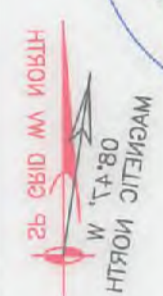
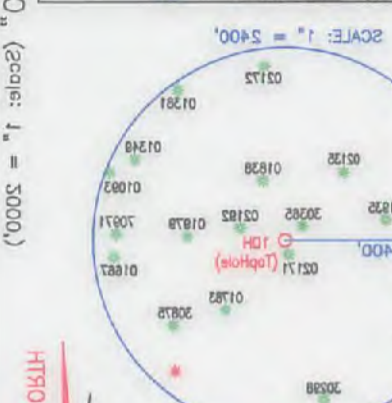


HUGHES 10H
 State Plane Coord.
 West Virginia North
 NAD27
 Top Hole Loc
 (N) 348527.888
 (E) 1754098.454

LEGEND

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

Scale: 1" = 2000' (Latitude: 39.27, 30')
 Longitude: 80.50, 00' (Scale: 1" = 5000')



1943

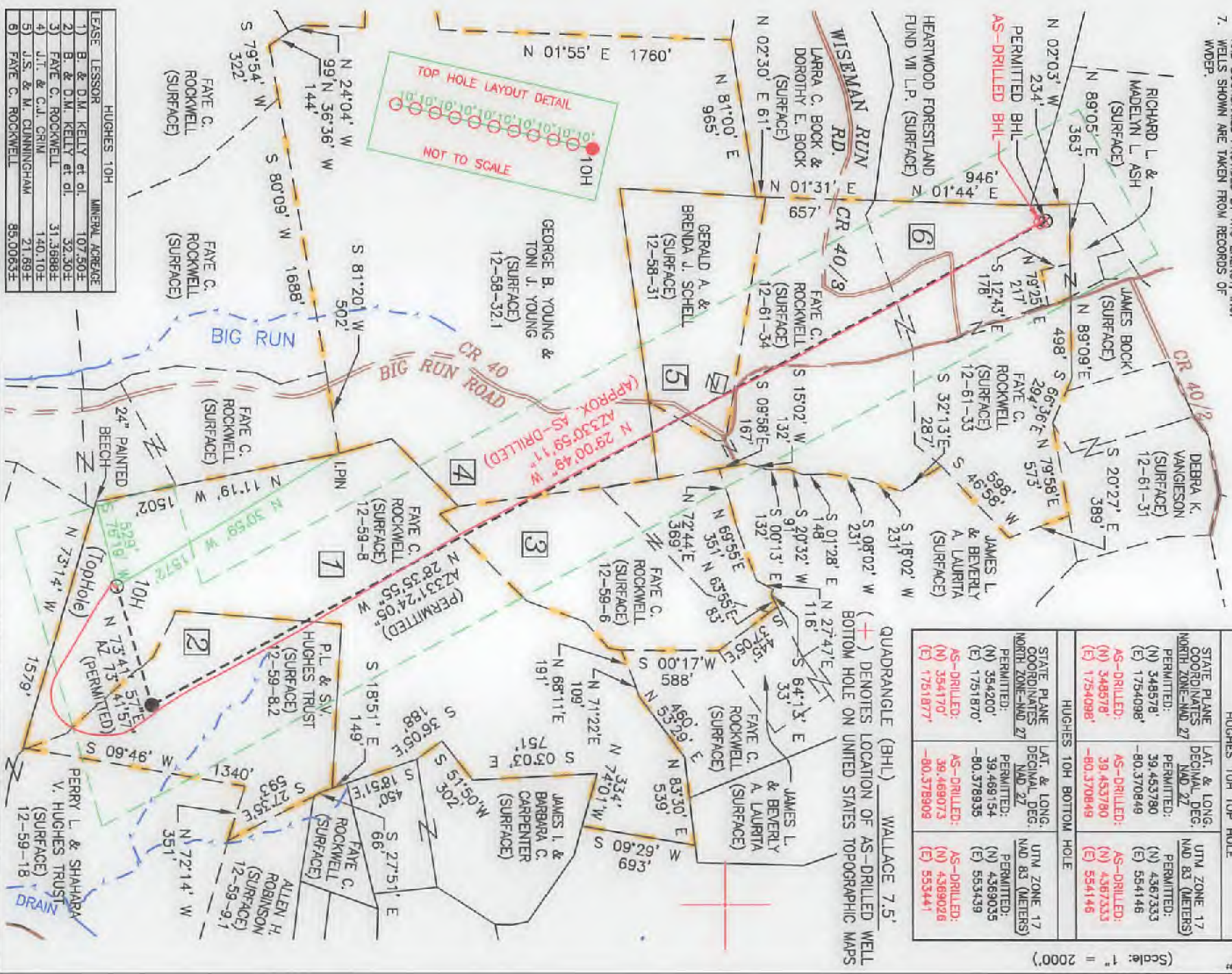
Longitude: 80°22'30" (Scale: 1" = 2000') Latitude: 39°30'00" (Scale: 1" = 2000')

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

HUGHES 10H
 State Plane Coord.
 West Virginia North
 NAD27
 Top Hole Log
 (N) 348577.688
 (E) 1754098.454

- NOTES ON SURVEY:
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HUGHES 10H TOP HOLE		
STATE PLANE COORDINATES NORTH ZONE-NAD 27	LAT & LONG. DECIMAL DEG. NAD 27	UTM ZONE 17 NAD 83 (METERS)
PERMITTED: (N) 348578 (E) 1754098	PERMITTED: 39.453780 -80.370849	PERMITTED: (N) 4367333 (E) 554146
AS-DRILLED: (N) 348578 (E) 1754098	AS-DRILLED: 39.453780 -80.370849	AS-DRILLED: (N) 4367333 (E) 554146
HUGHES 10H BOTTOM HOLE		
STATE PLANE COORDINATES NORTH ZONE-NAD 27	LAT & LONG. DECIMAL DEG. NAD 27	UTM ZONE 17 NAD 83 (METERS)
PERMITTED: (N) 354200 (E) 1751870	PERMITTED: 39.469154 -80.378935	PERMITTED: (N) 4369035 (E) 553439
AS-DRILLED: (N) 354170 (E) 1751877	AS-DRILLED: 39.469073 -80.378909	AS-DRILLED: (N) 4369026 (E) 553441



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

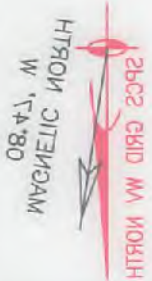
LEASE LESSOR	HUGHES 10H MINERAL ACREAGE
1) B. & D.M. KELLY et al.	107.50±
2) B. & D.M. KELLY et al.	32.50±
3) FAYE C. ROCKWELL	31.3688±
4) J.T. & C.J. CRIM	140.10±
5) J.S. & M. CUNNINGHAM	21.89±
6) FAYE C. ROCKWELL	95.0083±



XTO ENERGY
 810 HOUSTON STREET
 FORT WORTH, TX 76102

TRI-COUNTY ENGINEERING, LLC
 An ENERCON Company
 319 Palmerville Road
 Hunker, PA 15639
 www.tricountyeng.com
 Voice: (724) 635-0210
 Fax: (724) 635-0676

SUPPLEMENTAL SURFACE & LESSOR EXHIBIT		HUGHES 10H	
DRAWN BY:	NJP	MANNINGTON DISTRICT,	MARION COUNTY, WEST VIRGINIA
DATE:	6/28/2016	SHEET:	2 OF 2
SCALE:	1"=800'	FILE NO.:	0657-11



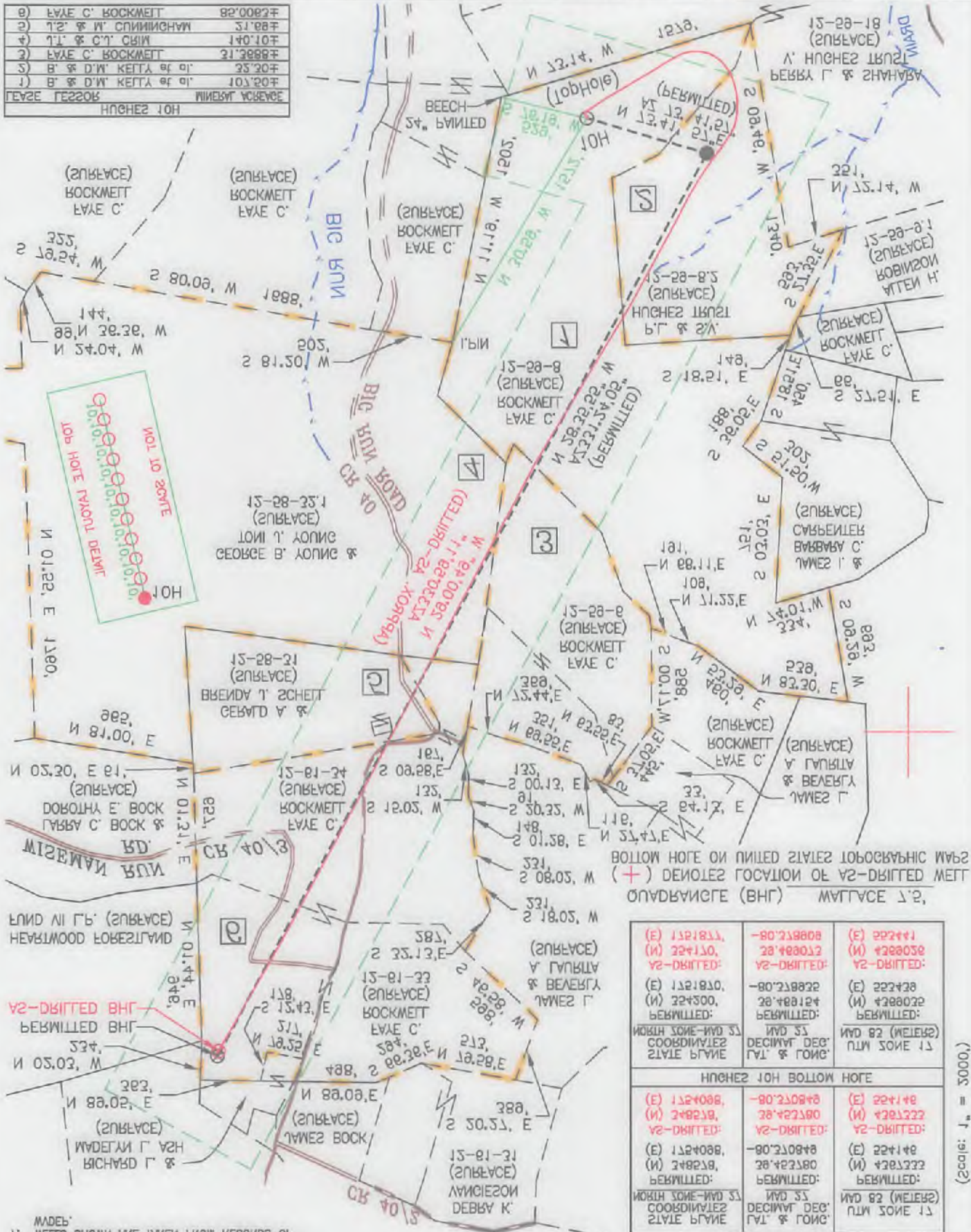
SCALE: 1" = 800'



1" = 800', SCALE: SHEET: 5 OF 3 DATE: 06/21/11
 09/15/2011 DWG: LITE NO: MARION COUNTY, WEST VIRGINIA
 MANNINGTON DISTRICT
HUGHES 10H
SURFACE & GESSOR EXHIBIT
SUBSEGMENTAL

WWW.TRI-COUNTY-ENGINEERING.COM
 1000 W. 12TH ST. SUITE 100
 FORT WORTH, TX 76102
 (817) 332-0510 FAX: (817) 332-0510
 TRI-COUNTY ENGINEERING, LLC

8) EYAE C. ROCKWELL	82'0082F
7) T. & M. SLIMINGHAM	31'88F
4) T. & C. T. SWIN	140'10F
2) EYAE C. ROCKWELL	21'3888F
5) B. & D. M. KEITZ & M.	23'20F
1) B. & D. M. KEITZ & M.	10'20F
GEASE GE220K	MINERALS YORSEVE



BOTTOM HOLE ON UNITED STATES TOPOGRAPHIC MAPS (+) DENOTES LOCATION OF Y2-DRILLED WELL QUADRANGLE (BHQ) MAPSPACE 12,

(E) 1321813, (N) 224130, Y2-DRILLED:	-80°218808 28°48012 Y2-DRILLED:	(E) 224141 (N) 228038 Y2-DRILLED:
(E) 1321810, (N) 224200, PERMITTED:	-80°218832 28°488124 PERMITTED:	(E) 224238 (N) 228032 PERMITTED:
NORTH ZONE-NAV 33 COORDINATES STATE PLANE	NAV 33 DECIMAL DEC. LAT. & LONG.	NAV 82 (METERS) PLM ZONE 13
HUGHES 10H BOTTOM HOLE		
(E) 1324086, (N) 248238, Y2-DRILLED:	-80°210848 28°422180 Y2-DRILLED:	(E) 224148 (N) 228122 Y2-DRILLED:
(E) 1324088, (N) 248238, PERMITTED:	-80°210848 28°422180 PERMITTED:	(E) 224148 (N) 228122 PERMITTED:
NORTH ZONE-NAV 33 COORDINATES STATE PLANE	NAV 33 DECIMAL DEC. LAT. & LONG.	NAV 82 (METERS) PLM ZONE 13
HUGHES 10H TOP HOLE		

- MADE:
1. WELLS SHOWN ARE TAKEN FROM RECORDS OF AND BOUNDARIES PROVIDED BY XTO ENERGY, INC. COMPANY, MA IN AUGUST OF 2012. GEASE OWNERS, AGGREGATOR AND COMPANY CHECK RECORDS OF MARION SURFACE OWNER INFORMATION TAKEN FROM THE REPRESENTATIVE OF A LITTL BOUNDARY SURVEY DEEDS, AND FIELD SURVEY. THIS DRAWING IS NOT BOUNDARIES SHOWN ARE TAKEN FROM TAX MAPS, IN/088.
 2. WELL ELEVATION ESTABLISHED BY DIRECT OBS. BY THE GRID NORTH MA NORTH ZONE NAV 82.
 3. TIES TO WELLS AND CORNERS ARE BASED ON STATE 320, WERE FOUND.
 4. NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 1' NO DWELLINGS WITHIN 852, WERE FOUND.
- NOTES ON SURVEY:

(E) 1324088.424
(N) 248237.888
Top Hole Loc
NAV33
West Virginia North
State Plane Coord.
10H
HUGHES

COORDINATES SOURCE \ WATER SURVEY	09/15/2011
EXISTING GAS WELL	
200, GATEWAY OFFSET	
Y2-DRILLED GATEWAY	
PROPOSED GATEWAY	
ROADS	
CREEK \ STREAM	
SURFACE BOUNDARY	
GEASE BOUNDARY	
LEGEND	

(Scale: 1" = 3000') Latitude: 38.20.00"

(Scale: 1" = 3000') Longitude: 80.33.20"



Company: XTO Energy
 Site: Hughes
 Well: 10H
 Project: Marion County, West Virginia (NAD 27)
 Rig: Nomac 78



M T

Azimuths to True North
 Magnetic North: -8.85°

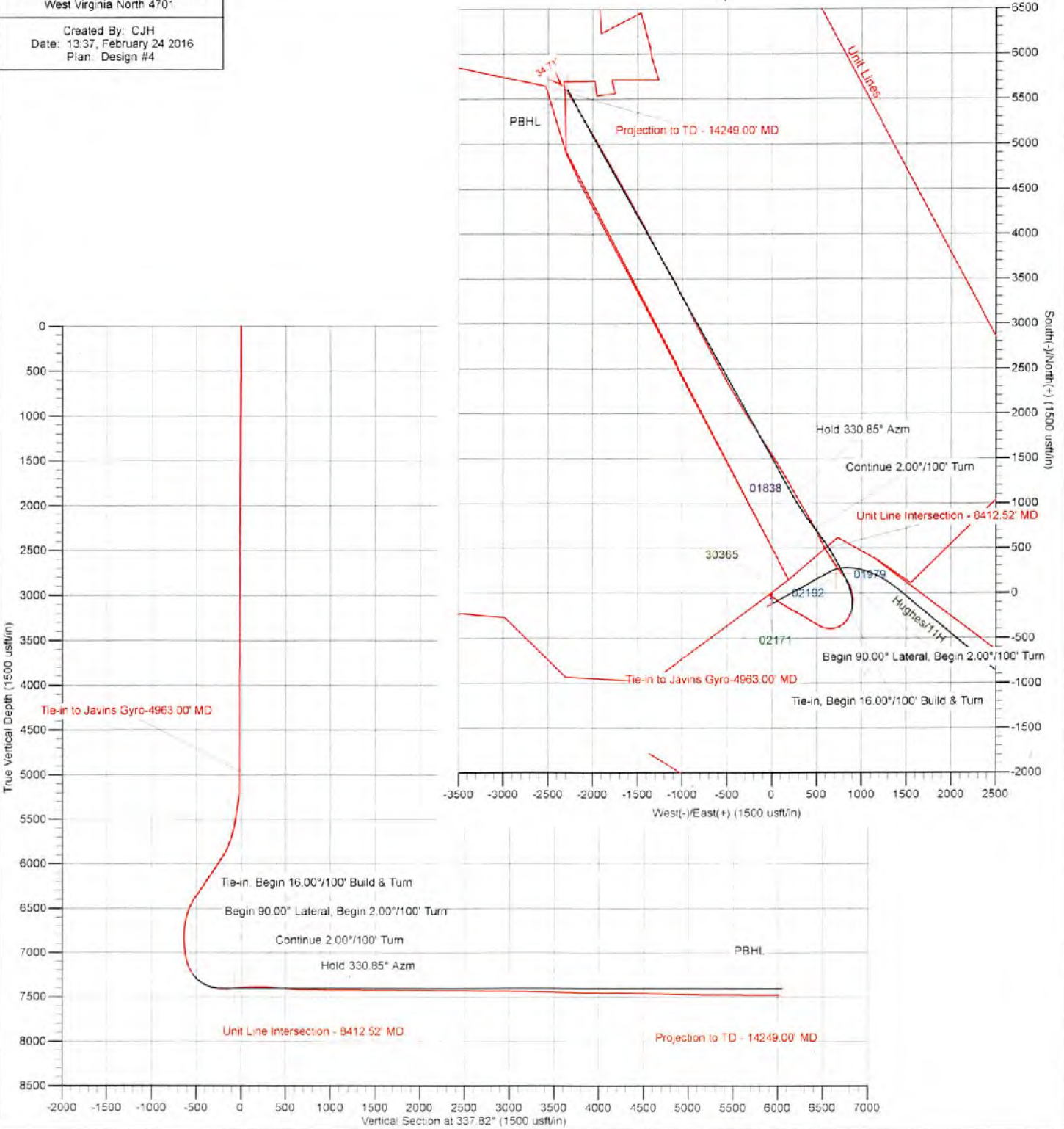
Magnetic Field
 Strength: 52121.7snT
 Dip Angle: 66.76°
 Date: 02/12/2016
 Model: BGGM2015

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure	Annotation
7550.00	40.80	20.60	7238.49	-221.69	863.21	-538.68	0.00	Tie-in, Begin 16.00'/100' Build & Turn
7938.72	90.00	336.15	7402.00	107.98	845.53	-219.18	339.22	Begin 90.00° Lateral, Begin 2.00'/100' Turn
8649.99	90.00	321.94	7402.00	716.39	480.61	481.95	1050.49	Continue 2.00'/100' Turn
9095.98	90.00	330.85	7402.00	1087.45	234.02	918.67	1496.48	Hold 330.85° Azm
14262.98	90.00	330.85	7402.00	5600.05	-2282.81	6047.45	6663.48	PBHL

US State Plane 1927 (Exact solution)
 West Virginia North 4701

Created By: CJH
 Date: 13.37, February 24 2016
 Plan: Design #4



The customer should only rely on this document after independently verifying all paths, targets, coordinates, lease and hard lines represented. Any decisions made or wells drilled utilizing this or any other information supplied by MS Energy are at the sole risk and responsibility of the customer. MS Energy is not responsible for the accuracy of this schematic or the information contained herein.

09/15/2017



XTO Energy

Marion County, West Virginia (NAD 27)

Hughes

10H

Wellbore #1

Survey: Javins Gyro

Standard Survey Report

24 February, 2016



09/15/2017



MS Energy Services
Survey Report



Company:	XTO Energy	Local Co-ordinate Reference:	Well 10H
Project:	Marion County, West Virginia (NAD 27)	TVD Reference:	WELL @ 1312.00usft (Nomac 78)
Site:	Hughes	MD Reference:	WELL @ 1312.00usft (Nomac 78)
Well:	10H	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Project	Marion County, West Virginia (NAD 27)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	West Virginia North 4701		

Well	10H					
Well Position	+N/-S	0.00 usft	Northing:	348,577.69 usft	Latitude:	39° 27' 13.605 N
	+E/-W	0.00 usft	Easting:	1,754,098.45 usft	Longitude:	80° 22' 15.056 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	1,286.00 usft

Wellbore	Wellbore #1
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2015	02/12/16	-8.85	66.76	52,122

Design	Surveys
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Audit Notes:	
Version:	1.0
Phase:	ACTUAL
Tie On Depth:	0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	337.82

Survey Program	Date	02/24/16
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From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
13.00	4,983.00	Javins Gyro (Wellbore #1)	GYRO-NS	OWSG Gyrocompass Gyro
5,073.00	14,249.00	MS MWD (Wellbore #1)	MWD	OWSG MWD - Standard

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
13.00	0.00	0.00	13.00	0.00	0.00	0.00	0.00	0.00	0.00	
Added to adjust for KB-13.00' MD										
113.00	0.26	57.40	113.00	0.12	0.19	0.04	0.26	0.26	0.00	
213.00	0.34	81.40	213.00	0.29	0.68	0.01	0.15	0.08	24.00	
313.00	1.03	77.70	312.99	0.52	1.85	-0.21	0.69	0.69	-3.70	
413.00	1.00	120.80	412.98	0.27	3.47	-1.06	0.75	-0.03	43.10	
513.00	0.36	136.00	512.97	-0.40	4.44	-2.05	0.66	-0.64	15.20	
613.00	0.33	82.00	612.97	-0.59	4.95	-2.41	0.31	-0.03	-54.00	
713.00	0.54	71.70	712.96	-0.40	5.68	-2.52	0.22	0.21	-10.30	
813.00	0.45	86.40	812.96	-0.23	6.52	-2.67	0.15	-0.09	14.70	
913.00	0.48	150.90	912.96	-0.57	7.11	-3.21	0.50	0.03	64.50	
1,013.00	0.62	157.70	1,012.95	-1.44	7.52	-4.17	0.15	0.14	6.80	
1,113.00	0.61	103.80	1,112.95	-2.06	8.24	-5.02	0.56	-0.01	-53.90	
1,213.00	0.55	88.60	1,212.94	-2.18	9.24	-5.51	0.16	-0.06	-15.20	



MS Energy Services
Survey Report



Company:	XTO Energy	Local Co-ordinate Reference:	Well 10H
Project:	Marion County, West Virginia (NAD 27)	TVD Reference:	WELL @ 1312.00usft (Nomac 78)
Site:	Hughes	MD Reference:	WELL @ 1312.00usft (Nomac 78)
Well:	10H	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,313.00	0.25	196.30	1,312.94	-2.38	9.66	-5.85	0.67	-0.30	107.70
1,413.00	0.42	192.20	1,412.94	-2.94	9.52	-6.32	0.17	0.17	-4.10
1,513.00	0.54	177.30	1,512.94	-3.77	9.47	-7.07	0.17	0.12	-14.90
1,613.00	0.50	200.40	1,612.93	-4.65	9.34	-7.83	0.21	-0.04	23.10
1,713.00	0.44	150.70	1,712.93	-5.40	9.37	-8.54	0.40	-0.06	-49.70
1,813.00	0.43	121.80	1,812.93	-5.93	9.88	-9.22	0.22	-0.01	-28.90
1,913.00	0.37	308.00	1,912.93	-5.93	9.94	-9.24	0.80	-0.06	-173.80
2,013.00	0.51	170.70	2,012.92	-6.17	9.76	-9.40	0.82	0.14	-137.30
2,113.00	0.49	143.70	2,112.92	-6.95	10.09	-10.25	0.23	-0.02	-27.00
2,213.00	0.37	118.80	2,212.92	-7.45	10.62	-10.91	0.22	-0.12	-24.90
2,313.00	0.44	260.50	2,312.92	-7.67	10.53	-11.08	0.77	0.07	141.70
2,413.00	0.50	249.30	2,412.91	-7.89	9.74	-10.98	0.11	0.06	-11.20
2,513.00	0.66	224.70	2,512.91	-8.45	8.93	-11.20	0.29	0.16	-24.60
2,613.00	0.47	147.90	2,612.91	-9.21	8.74	-11.83	0.72	-0.19	-76.80
2,713.00	0.32	292.50	2,712.90	-9.45	8.70	-12.04	0.75	-0.15	144.60
2,813.00	0.53	253.10	2,812.90	-9.48	8.00	-11.80	0.35	0.21	-39.40
2,913.00	0.16	45.80	2,912.90	-9.52	7.66	-11.70	0.68	-0.37	152.70
3,013.00	0.45	292.10	3,012.90	-9.27	7.39	-11.37	0.53	0.29	-113.70
3,113.00	0.68	234.00	3,112.90	-9.47	6.55	-11.24	0.58	0.23	-58.10
3,213.00	0.42	162.50	3,212.89	-10.17	6.18	-11.75	0.68	-0.26	-71.50
3,313.00	0.43	195.40	3,312.89	-10.88	6.19	-12.41	0.24	0.01	32.90
3,413.00	0.45	167.20	3,412.89	-11.83	6.18	-13.10	0.22	0.02	-28.20
3,513.00	0.24	16.00	3,512.89	-11.81	6.32	-13.32	0.67	-0.21	-151.20
3,613.00	0.48	173.80	3,612.88	-12.02	6.42	-13.56	0.71	0.24	157.80
3,713.00	0.62	239.60	3,712.88	-12.71	6.00	-14.04	0.81	0.14	65.80
3,813.00	0.84	230.70	3,812.87	-13.45	4.97	-14.33	0.25	0.22	-8.90
3,913.00	0.86	185.50	3,912.86	-14.86	4.33	-15.21	0.65	0.02	-45.20
4,013.00	1.10	229.10	4,012.85	-16.04	3.53	-16.18	0.76	0.24	43.60
4,113.00	1.00	248.50	4,112.83	-16.99	1.99	-16.48	0.37	-0.10	19.40
4,213.00	0.65	216.90	4,212.82	-17.76	0.84	-16.76	0.56	-0.35	-31.60
4,313.00	0.92	275.80	4,312.81	-18.13	-0.30	-16.68	0.81	0.27	58.90
4,413.00	1.56	255.20	4,412.79	-18.40	-2.41	-16.13	0.77	0.64	-20.60
4,513.00	1.46	246.20	4,512.76	-19.26	-4.89	-15.99	0.26	-0.10	-9.00
4,613.00	1.21	249.50	4,612.73	-20.14	-7.05	-15.99	0.26	-0.25	3.30
4,713.00	1.38	249.20	4,712.70	-20.94	-9.16	-15.93	0.17	0.17	-0.30
4,813.00	1.15	286.90	4,812.68	-21.08	-11.25	-15.27	0.85	-0.23	37.70
4,913.00	1.57	254.70	4,912.65	-21.15	-13.53	-14.48	0.86	0.42	-32.20
4,963.00	1.15	246.50	4,962.64	-21.53	-14.65	-14.41	0.92	-0.84	-16.40

Final Javins Gyro - 4963.00' MD



Company:	XTO Energy	Local Co-ordinate Reference:	Well 10H
Project:	Marion County, West Virginia (NAD 27)	TVD Reference:	WELL @ 1312.00usft (Nomac 78)
Site:	Hughes	MD Reference:	WELL @ 1312.00usft (Nomac 78)
Well:	10H	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
13.00	13.00	0.00	0.00	Added to adjust for KB-13.00' MD
4,963.00	4,962.64	-21.53	-14.65	Final Javins Gyro - 4963.00' MD



XTO Energy

Marion County, West Virginia (NAD 27)

Hughes

10H

Wellbore #1

Survey: MS MWD

Standard Survey Report

24 February, 2016



09/15/2017



MS Energy Services
Survey Report



Company:	XTO Energy	Local Co-ordinate Reference:	Well 10H
Project:	Marion County, West Virginia (NAD 27)	TVD Reference:	WELL @ 1312.00usft (Nomac 78)
Site:	Hughes	MD Reference:	WELL @ 1312.00usft (Nomac 78)
Well:	10H	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Project	Marion County, West Virginia (NAD 27)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	West Virginia North 4701		

Well	10H				
Well Position	+N/-S	0.00 usft	Northing:	348,577.69 usft	Latitude: 39° 27' 13.605 N
	+E/-W	0.00 usft	Easting:	1,754,098.45 usft	Longitude: 80° 22' 15.056 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level: 1,286.00 usft

Wellbore	Wellbore #1
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2015	02/12/16	-8.85	66.76	52,122

Design	Surveys
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Audit Notes:	
Version:	1.0
Phase:	ACTUAL
Tie On Depth:	0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	337.82

Survey Program	Date	02/24/16
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From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
13.00	4,963.00	Javins Gyro (Wellbore #1)	GYRO-NS	OWSG Gyrocompass Gyro
5,073.00	14,249.00	MS MWD (Wellbore #1)	MWD	OWSG MWD - Standard

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
4,963.00	1.15	246.50	4,962.64	-21.53	-14.65	-14.41	0.00	0.00	0.00	
Tie-in to Javins Gyro-4963.00' MD										
5,073.00	1.10	242.70	5,072.62	-22.45	-16.60	-14.53	0.08	-0.05	-3.45	
5,168.00	1.30	212.40	5,167.60	-23.78	-17.99	-15.23	0.69	0.21	-31.89	
5,264.00	9.60	145.00	5,263.12	-31.27	-13.97	-23.69	9.56	8.65	-70.21	
5,359.00	11.10	116.40	5,358.63	-41.84	-1.23	-38.28	5.57	1.58	-30.11	
5,454.00	10.70	113.10	5,449.92	-49.36	15.07	-51.40	0.78	-0.42	-3.47	
5,549.00	13.50	121.40	5,542.81	-58.60	32.66	-66.59	3.46	2.95	8.74	
5,644.00	16.00	126.50	5,634.67	-72.17	52.65	-86.70	2.96	2.63	5.37	
5,740.00	20.40	127.60	5,725.85	-90.26	76.55	-112.48	4.60	4.58	1.15	
5,835.00	26.80	123.20	5,812.86	-112.11	107.63	-144.44	6.98	6.74	-4.63	
5,930.00	37.40	121.10	5,893.23	-138.82	150.37	-185.31	11.22	11.16	-2.21	
6,025.00	41.10	120.20	5,966.78	-169.44	202.08	-233.18	3.94	3.89	-0.95	
6,121.00	38.90	118.30	6,040.32	-199.60	255.90	-281.43	2.62	-2.29	-1.98	
6,216.00	40.10	119.70	6,113.62	-228.91	308.75	-328.51	1.57	1.26	1.47	



MS Energy Services
Survey Report



Company:	XTO Energy	Local Co-ordinate Reference:	Well 10H
Project:	Marion County, West Virginia (NAD 27)	TVD Reference:	WELL @ 1312.00usft (Nomac 78)
Site:	Hughes	MD Reference:	WELL @ 1312.00usft (Nomac 78)
Well:	10H	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,312.00	41.60	121.70	6,186.24	-260.97	362.72	-378.58	2.07	1.56	2.08
6,407.00	39.70	119.00	6,258.32	-292.26	416.10	-427.70	2.73	-2.00	-2.84
6,503.00	40.60	122.40	6,331.71	-323.87	469.30	-477.05	2.47	0.94	3.54
6,598.00	38.50	120.50	6,404.96	-355.44	520.88	-525.76	2.55	-2.21	-2.00
6,694.00	33.10	110.50	6,482.86	-379.83	571.26	-567.35	8.28	-5.63	-10.42
6,789.00	30.90	98.80	6,563.50	-392.66	619.72	-597.52	6.91	-2.32	-12.32
6,883.00	27.70	86.70	6,645.53	-395.10	665.44	-617.04	7.15	-3.40	-12.87
6,978.00	24.30	79.60	6,730.93	-390.29	706.73	-628.17	4.85	-3.58	-7.47
7,074.00	20.00	68.10	6,819.86	-380.60	741.42	-632.29	6.34	-4.48	-11.98
7,169.00	20.20	58.30	6,909.10	-365.91	770.46	-629.65	3.55	0.21	-10.32
7,265.00	23.40	50.60	6,998.24	-345.09	799.30	-621.26	4.46	3.33	-8.02
7,360.00	28.80	42.20	7,083.56	-316.14	829.28	-605.76	6.88	5.68	-8.84
7,455.00	35.80	29.70	7,163.90	-274.95	858.49	-578.65	10.15	7.37	-13.16
7,550.00	40.80	20.60	7,238.49	-221.69	883.21	-538.65	7.92	5.26	-9.58
7,646.00	50.00	8.60	7,305.94	-155.71	899.81	-483.82	13.05	9.58	-12.50
7,740.00	64.40	2.40	7,356.77	-77.29	907.01	-413.92	16.26	15.32	-6.60
7,836.00	73.10	347.90	7,391.69	11.44	899.15	-328.78	16.72	9.06	-15.10
LP for 11H Plan									
7,932.00	83.00	331.00	7,411.68	98.84	866.11	-235.38	20.05	10.31	-17.60
8,027.00	97.80	322.10	7,411.02	177.81	813.95	-142.56	18.17	15.58	-9.37
8,072.00	98.50	321.40	7,404.64	212.79	786.37	-99.76	2.19	1.56	-1.56
8,168.00	93.50	324.10	7,394.60	288.77	728.62	-7.61	5.91	-5.21	2.81
8,263.00	91.80	327.10	7,390.21	367.06	675.01	85.13	3.63	-1.79	3.16
8,358.00	90.50	329.70	7,388.30	447.95	625.25	178.82	3.06	-1.37	2.74
8,412.52	89.52	331.48	7,388.29	495.44	598.48	232.90	3.72	-1.79	3.26
Unit Line Intersection - 8412.52' MD									
8,453.00	88.80	332.80	7,388.88	531.22	579.56	273.17	3.72	-1.79	3.26
8,549.00	85.10	332.70	7,393.99	616.43	535.68	368.65	3.86	-3.85	-0.10
8,645.00	85.10	333.20	7,402.19	701.62	492.18	463.95	0.52	0.00	0.52
8,739.00	84.80	331.20	7,410.47	784.44	448.51	557.13	2.14	-0.32	-2.13
8,835.00	87.90	329.40	7,416.58	867.64	401.05	652.09	3.73	3.23	-1.88
8,930.00	89.70	329.70	7,418.57	949.52	352.92	746.08	1.92	1.89	0.32
9,025.00	89.80	329.80	7,418.98	1,031.58	305.06	840.14	0.15	0.11	0.11
9,120.00	90.50	330.60	7,418.73	1,114.02	257.85	934.30	1.12	0.74	0.84
9,215.00	89.90	330.40	7,418.40	1,196.70	211.07	1,028.52	0.67	-0.63	-0.21
9,311.00	89.80	330.10	7,418.65	1,280.05	163.43	1,123.68	0.33	-0.10	-0.31
9,406.00	89.50	329.30	7,419.23	1,362.07	115.50	1,217.72	0.90	-0.32	-0.84
9,502.00	89.10	327.70	7,420.41	1,443.91	65.35	1,312.45	1.72	-0.42	-1.67
9,597.00	89.90	327.70	7,421.24	1,524.21	14.59	1,405.96	0.84	0.84	0.00
9,692.00	89.10	327.00	7,422.06	1,604.19	-36.66	1,499.37	1.12	-0.84	-0.74
9,787.00	89.50	326.50	7,423.22	1,683.63	-88.75	1,592.60	0.67	0.42	-0.53
9,883.00	89.50	327.80	7,424.06	1,764.28	-140.82	1,686.93	1.35	0.00	1.35
9,978.00	90.40	328.60	7,424.15	1,845.02	-190.88	1,780.59	1.27	0.95	0.84



MS Energy Services
Survey Report



Company:	XTO Energy	Local Co-ordinate Reference:	Well 10H
Project:	Marion County, West Virginia (NAD 27)	TVD Reference:	WELL @ 1312.00usft (Nomac 78)
Site:	Hughes	MD Reference:	WELL @ 1312.00usft (Nomac 78)
Well:	10H	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,074.00	89.80	328.60	7,423.98	1,926.96	-240.90	1,875.35	0.63	-0.63	0.00
10,169.00	89.10	326.70	7,424.89	2,007.21	-291.72	1,968.85	2.13	-0.74	-2.00
10,264.00	89.10	328.60	7,426.38	2,087.45	-342.55	2,062.34	2.00	0.00	2.00
10,360.00	90.40	330.80	7,426.80	2,170.33	-390.98	2,157.36	2.66	1.35	2.29
10,455.00	90.50	330.60	7,426.06	2,253.17	-437.47	2,251.63	0.24	0.11	-0.21
10,550.00	89.90	330.40	7,425.72	2,335.85	-484.25	2,345.85	0.67	-0.63	-0.21
10,646.00	88.60	330.80	7,426.98	2,419.48	-531.37	2,441.08	1.42	-1.35	0.42
10,742.00	88.40	331.20	7,429.49	2,503.41	-577.90	2,536.37	0.47	-0.21	0.42
10,837.00	88.40	331.70	7,432.15	2,586.83	-623.28	2,630.74	0.53	0.00	0.53
10,933.00	89.40	331.60	7,433.99	2,671.30	-668.86	2,726.17	1.05	1.04	-0.10
11,028.00	89.20	331.60	7,435.15	2,754.86	-714.04	2,820.60	0.21	-0.21	0.00
11,123.00	90.00	332.30	7,435.81	2,838.70	-758.71	2,915.10	1.12	0.84	0.74
11,218.00	89.90	332.10	7,435.90	2,922.73	-803.02	3,009.64	0.24	-0.11	-0.21
11,312.00	89.60	332.30	7,436.31	3,005.88	-846.86	3,103.19	0.38	-0.32	0.21
11,407.00	89.50	334.00	7,437.05	3,090.63	-889.76	3,197.86	1.79	-0.11	1.79
11,502.00	89.10	334.70	7,438.21	3,176.27	-930.88	3,292.68	0.85	-0.42	0.74
11,598.00	87.30	332.80	7,441.23	3,262.32	-973.31	3,388.38	2.73	-1.88	-1.98
11,694.00	87.90	331.60	7,445.25	3,347.16	-1,018.05	3,483.83	1.40	0.63	-1.25
11,789.00	88.60	330.70	7,448.15	3,430.33	-1,063.87	3,578.14	1.20	0.74	-0.95
11,885.00	88.20	330.50	7,450.83	3,513.93	-1,110.97	3,673.34	0.47	-0.42	-0.21
11,979.00	89.20	330.10	7,452.96	3,595.56	-1,157.53	3,766.51	1.15	1.06	-0.43
12,075.00	89.20	329.90	7,454.30	3,678.69	-1,205.53	3,861.61	0.21	0.00	-0.21
12,171.00	89.40	331.00	7,455.48	3,762.20	-1,252.87	3,956.80	1.16	0.21	1.15
12,266.00	90.20	332.20	7,455.81	3,845.76	-1,298.05	4,051.24	1.52	0.84	1.26
12,362.00	90.10	332.50	7,455.56	3,930.80	-1,342.60	4,146.80	0.33	-0.10	0.31
12,457.00	88.90	331.30	7,456.38	4,014.59	-1,387.35	4,241.29	1.79	-1.26	-1.26
12,552.00	88.70	331.60	7,458.37	4,098.02	-1,432.74	4,335.68	0.38	-0.21	0.32
12,647.00	89.70	331.20	7,459.70	4,181.42	-1,478.21	4,430.07	1.13	1.05	-0.42
12,743.00	89.20	331.30	7,460.82	4,265.58	-1,524.38	4,525.44	0.53	-0.52	0.10
12,838.00	89.50	330.80	7,461.70	4,348.71	-1,570.36	4,619.77	0.61	0.32	-0.53
12,934.00	88.60	332.10	7,463.29	4,433.02	-1,616.24	4,715.16	1.65	-0.94	1.35
13,028.00	87.80	331.60	7,466.24	4,515.86	-1,660.56	4,808.60	1.00	-0.85	-0.53
13,124.00	88.30	329.70	7,469.51	4,599.48	-1,707.59	4,903.79	2.05	0.52	-1.98
13,218.00	88.50	330.60	7,472.14	4,680.98	-1,754.35	4,996.91	0.98	0.21	0.96
13,313.00	88.30	329.40	7,474.79	4,763.22	-1,801.83	5,090.99	1.28	-0.21	-1.26
13,408.00	90.40	330.50	7,475.87	4,845.44	-1,849.40	5,185.08	2.50	2.21	1.16
13,503.00	90.20	330.70	7,475.37	4,928.20	-1,896.04	5,279.32	0.30	-0.21	0.21
13,598.00	90.00	329.80	7,475.20	5,010.68	-1,943.18	5,373.49	0.97	-0.21	-0.95
13,693.00	90.30	330.80	7,474.95	5,093.20	-1,990.24	5,467.67	1.10	0.32	1.05
13,789.00	89.60	329.00	7,475.04	5,176.25	-2,038.39	5,562.75	2.01	-0.73	-1.88
13,884.00	88.50	328.60	7,476.61	5,257.50	-2,087.59	5,656.56	1.23	-1.16	-0.42
13,980.00	90.20	329.00	7,477.70	5,339.60	-2,137.32	5,751.36	1.82	1.77	0.42
14,076.00	89.80	329.30	7,477.70	5,422.02	-2,186.54	5,846.26	0.52	-0.42	0.31
14,172.00	89.00	328.90	7,478.71	5,504.39	-2,235.84	5,941.15	0.93	-0.83	-0.42



Company:	XTO Energy	Local Co-ordinate Reference:	Well 10H
Project:	Marion County, West Virginia (NAD 27)	TVD Reference:	WELL @ 1312.00usft (Nomac 78)
Site:	Hughes	MD Reference:	WELL @ 1312.00usft (Nomac 78)
Well:	10H	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
14,249.00	89.00	328.90	7,480.05	5,570.31	-2,275.61	6,017.20	0.00	0.00	0.00
Projection to TD - 14249.00' MD									

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,963.00	4,962.64	-21.53	-14.65	Tie-in to Javins Gyro-4963.00' MD
7,836.00	7,391.69	11.44	899.15	LP for 11H Plan
8,412.52	7,388.29	495.44	598.48	Unit Line Intersection - 8412.52' MD
14,249.00	7,480.05	5,570.31	-2,275.61	Projection to TD - 14249.00' MD

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:	47-049-02405-00-00
Operator Name:	XTO Energy/ExxonMobil
Well Name and Number:	Hughes 10H
Latitude:	39.45378000
Longitude:	-80.37084900
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	7,480
Total Base Water Volume (gal):	14,206,497
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		92.85063	
B317	Schlumberger	Scale Inhibitor					
				Listed Below			

L058	Schlumberger	Iron Control Agent					
				Listed Below			
H315	Schlumberger	Acid					
				Listed Below			
S012-3050	Schlumberger	Propping Agent					
				Listed Below			
S100	Schlumberger	Fluid Loss Additive					
				Listed Below			
M300	Schlumberger	Myacide TS GA 25					
				Listed Below			
A264A	Schlumberger	Corrosion 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	98.47813	7.04056	
			Hydrochloric acid	7647-01-0	0.63902	0.04569	
			Glutaraldehyde	111-30-8	0.31433	0.02247	
			Ammonium sulfate	7783-20-2	0.25847	0.01848	

			Acrylamide, 2-acrylamido-2-methylpropanesulfonic acid, sodium salt polymer	38193-60-1	0.19077	0.01364	
			Ethanol, 2,2',2"-nitrilotris-, 1,1',1"-tris (dihydrogen phosphate), sodium salt	68171-29-9	0.04223	0.00302	
			Polymer of 2-acrylamido-2-methylpropanesulfonic acid sodium salt and methyl acrylate	136793-29-8	0.02044	0.00146	
			Trisodium ortho phosphate	7601-54-9	0.01856	0.00133	
			Urea	57-13-6	0.01255	0.00090	
			Sodium erythorbate	6381-77-7	0.00548	0.00039	
			Ethylene Glycol	107-21-1	0.00528	0.00038	
			Methanol	67-56-1	0.00365	0.00026	
			Sodium sulfate	7757-82-6	0.00293	0.00021	
			Silicon Dioxide	7631-86-9	0.00261	0.00019	
			Reaction product of: acetophenone, formaldehyde, cyclohexylamine, methanol and acetic acid	224635-63-6	0.00151	0.00011	
			Cinnamaldehyde	104-55-2	0.00084	0.00006	
			Alcohol, C9-C11, Ethoxylated	68439-46-3	0.00063	0.00004	
			2-Propenamid (impurity)	79-06-1	0.00062	0.00004	
			Alcohols, C10-16, ethoxylated	68002-97-1	0.00042	0.00003	
			Tetrasodium ethylenediaminetetraacetate	64-02-8	0.00032	0.00002	
			Acetophenone	98-86-2	0.00016	0.00001	
			Amines, tallow alkyl, ethoxylated	61791-26-2	0.00013	0.00001	
			Acetic acid(impurity)	64-19-7	0.00016	0.00001	
			Formaldehyde (impurity)	50-00-0	0.00010	0.00001	

			Dimethyl siloxanes and silicones	63148-62-9	0.00018	0.00001	
			Octamethylcyclotetrasiloxane	556-67-2	0.00002		
			Copper(II) sulfate	7758-98-7	0.00001		
			Dodecamethylcyclohexasiloxane	540-97-6	0.00001		
			Siloxanes and silicones, dimethyl, reaction products with silica	67762-90-7	0.00002		
			Decamethyl cyclopentasiloxane	541-02-6	0.00001		

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