

**APPROVED**

NAME: *Jul 2 m*

DATE *6/14/17*

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 514101

API: 47 - 017 - 06770

Submission:  Initial  Amended *Final*

Notes:

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WV Department of  
Environmental Protection

09/15/2017

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

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API 47 - 017 - 06770 County Doddridge District Southwest  
Quad Oxford Pad Name OXF160 Field/Pool Name \_\_\_\_\_  
Farm name Ronald Hart and Jeffery Hart Well Number 514101  
Operator (as registered with the OOG) EQT Production Company  
Address 625 Liberty Ave. EQT Plaza, Suite 1700 City Pittsburgh State PA Zip 15222

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4,336,944.23 Easting 517,357.99  
Landing Point of Curve Northing 4,336,739.02 Easting 517,009.14  
Bottom Hole Northing 4,335,366.25 Easting 517,386.14

Elevation (ft) 1220 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)

Water base Mud 12.5 ppg barium sulfate, sodium chloride, xanthan gum, polyanionic cellulose, modified starch, sodium hydroxide, phosphonates and alkyl phosphates, glutaraldehyde solution, calcium hydroxide, partially hydrolyzed polyacrylamide  
polyacrylate, potassium chloride, sodium carbonate, ground walnut shells, alcohol and modified fatty acid, ferrochrome lignosulfonate, calcium carbonate, fibrous cellulose

Date permit issued 6/15/2016 Date drilling commenced 10/28/2016 Date drilling ceased 12/14/2016  
Date completion activities began 2/22/2017 Date completion activities ceased 3/2/2017  
Verbal plugging (Y/N) N Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 31',215',262',358',578' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft N/A Void(s) encountered (Y/N) depths N  
Coal depth(s) ft N/A Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by:

09/15/2017

API 47-017 - 06770

Farm name Ronald Hart and Jeffery Hart

Well number 514101

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	24"	20"	93'	NEW	A-500 78.5LB/FT	NONE	Y
Surface	17.5"	13.375"	728'	NEW	J-55 54.5LB/FT	NONE	Y
Coal							
Intermediate 1	12.375"	9.625"	3075'	NEW	A-500 40LB/FT	2104	Y
Intermediate 2							
Intermediate 3							
Production	8.75" / 8.5"	5.5"	12062'	NEW	P-110 20LB/FT	NONE	N
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	CLASS A	77	15.6	1.18	90.86	0	8+
Surface	CLASS A	610	15.6	1.20	732	0	8
Coal							
Intermediate 1	Class A / Class A	205 / 861	15.6 / 15.6	1.18 / 1.20	1275	0	8
Intermediate 2							
Intermediate 3							
Production	CLASS A / CLASS H	540 / 720	15.2 / 15.6	1.12 / 1.84	1930	4600	72+
Tubing							

Drillers TD (ft) 12065'

Loggers TD (ft) N/A

Deepest formation penetrated MARCELLUS

Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 4856

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 \_\_\_\_\_

CONDUCTOR- NONE

SURFACE- RAN AT LEAST EVERY 500' FEET

INTERMEDIATE- RAN AT LEAST EVERY 500' FEET

PRODUCTION- COMPOSITE BODY CENTRALIZERS RAN EVERY JOINT FROM SHOE TO KOP

WAS WELL COMPLETED AS SHOT HOLE    Yes    No   DETAILS \_\_\_\_\_

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

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

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Farm name Ronald Hart and Jeffery Hart

Well number 514101

**PERFORATION RECORD**

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
					<b>Please See Attached</b>
					RECEIVED Office of Oil and Gas
					<b>MAY 26 2017</b>
					WV Department of Environmental Protection

Please insert additional pages as applicable.

**STIMULATION INFORMATION PER STAGE**

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
						<b>Please</b>	<b>See</b>	<b>Attached</b>

Please insert additional pages as applicable.

API 47- 017 - 06770

Farm name Ronald Hart and Jeffery Hart

Well number 514101

PRODUCING FORMATION(S)

DEPTHS

MARCELLUS 6,598.50 TVD 7,208.00 MD

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface 2,001 psi Bottom Hole N/A psi DURATION OF TEST 40.50 hrs

OPEN FLOW Gas 4,192 mcfpd Oil N/A bpd NGL 22 bpd Water 781 bpd  
GAS MEASURED BY  Estimated  Orifice  Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
	0		0		

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Please insert additional pages as applicable.

Drilling Contractor Decker Drilling  
Address 11565 State Route 676 City Vicent State OH Zip 45784

Logging Company GYRODATA INC.  
Address 601 MAYER ST. City BRIDGEVILLE State PA Zip 15017

Cementing Company Allied Oil & Gas  
Address 1036 E Main St City Bridgeport State WV Zip 26330

Stimulating Company C&J Energy Services  
Address 3990 Rogerdale Road City Houston State TX Zip 77042

Please insert additional pages as applicable.

Completed by Michael Rehl Telephone 412-553-5815  
Signature *[Signature]* Title Mgr Completions Date 5/25/2017

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

09/15/2017

API 47- 017 - 06770 Farm name Ronald Hart and Jeffery Hart Well number 514101

Drilling Contractor Savanna Drilling  
Address 125 Industry Road City Waynesburg State PA Zip 15370

Logging Company Scientific Drilling International  
Address 124 Vista Drive City Charleroi State PA Zip 15022

Logging Company PROFESSIONAL DIRECTIONAL  
Address 750 Conroe Park North Dr. City Conroe State TX Zip 77303

Cementing Company Halliburton Energy Services  
Address 121 Champion Way City Canonsburg State PA Zip 15317

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Well #514101 Final Formations API #47-017-06770				
Formation Name	Final Top MD (ftGL) (ft)	Final Top (TVD) (ft)	Final Btm MD (ftGL) (ft)	Final Btm (TVD) (ft)
SAND/SHALE	1	1	1,740.00	1,740.00
MAXTON	1,740.00	1,740.00	1,904.00	1,904.00
BIG LIME	1,904.00	1,904.00	1,958.00	1,958.00
KEENER	1,958.00	1,958.00	3,270.00	3,269.90
WARREN	3,270.00	3,269.90	3,320.00	3,319.90
SPEECHLEY	3,320.00	3,319.90	3,848.00	3,847.90
BALLTOWN A	3,848.00	3,847.90	4,216.00	4,215.90
BRADFORD	4,216.00	4,215.90	4,779.00	4,778.80
RILEY	4,779.00	4,778.80	4,868.00	4,867.70
BENSON	4,868.00	4,867.70	5,115.00	5,104.60
ALEXANDER	5,115.00	5,104.60	5,828.00	5,677.50
RHINESTREET	5,828.00	5,677.50	6,280.00	6,023.70
SONYEA	6,280.00	6,023.70	6,793.00	6,401.60
MIDDLESEX	6,793.00	6,401.60	9,885.00	6,648.20
GENESSEE	9,885.00	6,648.20	7,015.00	6,525.10
GENESE0	7,015.00	6,525.10	7,119.00	6,568.50
TULLY	7,119.00	6,568.50	7,171.00	6,586.90
HAMILTON	7,171.00	6,586.90	7,208.00	6,598.50
MARCELLUS	7,208.00	6,598.50	12,065.00	6,668.10

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09/15/2017

**OXF160**  
**WV 514101**  
**EQT PRODUCTION COMPANY**

2.130'  
 2.055'  
 LATITUDE 39°12'30"  
 LONGITUDE 80°47'30"

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**AS DRILLED COORDINATES**  
**(OXF160 H9)**  
**(S.P.C. NORTH ZONE) (UTM/M ZONE 17 NORTH)**

NAD27 S.P.C.(FT)	N. 250,870.75	E. 1,031,717.49
NAD27 GEO.	LAT-(N) 39.181476	LONG-(W) 80.803245
NAD83 UTM (M)	N. 4,336,944.23	E. 517,357.99
<b>LANDING POINT</b>		
NAD27 S.P.C.(FT)	N. 250,218.44	E. 1,030,561.45
NAD27 GEO.	LAT-(N) 39.179634	LONG-(W) 80.803245
NAD83 UTM (M)	N. 4,336,739.02	E. 517,009.14
<b>BOTTOM HOLE</b>		
NAD27 S.P.C.(FT)	N. 245,090.89	E. 1,031,723.45
NAD27 GEO.	LAT-(N) 39.167256	LONG-(W) 80.798918
NAD83 UTM (M)	N. 4,335,566.25	E. 517,396.14

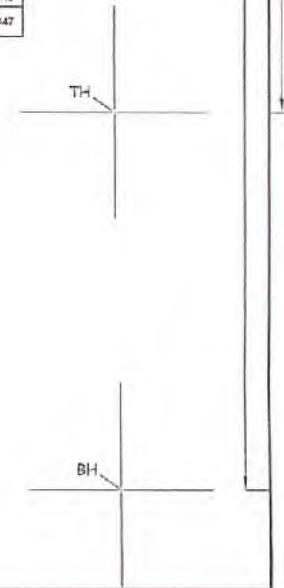
**NOTES ON SURVEY**

1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS
2. 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
3. WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'.
3. AS DRILLED INFORMATION PROVIDED BY EQT.

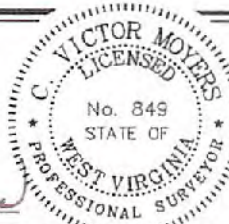
**ROYALTY OWNERS**

GLENN H. SHIVE ET AL	53 AC.±	LEASE NO. 114449
C. BURKE MORRIS & S.A. SMITH ET AL	26 AC.±	LEASE NO. 114447

A	ROBERT BRANNON ET AL	70 ACRES±	SW TM-09-19
B	RONALD HART & JEFFERY HART	60 ACRES±	SW TM-09-20
C	I.L. MORRIS	6,600.75 ACRES±	SW TM-10-02
D	ROBERT BRANNON ET AL	25.1 ACRES±	SW TM-13-18
E	RONALD HART & JEFFERY HART	46 ACRES±	SW TM-13-12
F	RONALD HART & JEFFERY HART	45 ACRES±	SW TM-09-21
G	MARIA HRUSCOV	57.5 ACRES±	SW TM-10-01
H	WILLIAM ARMENTROUT ET AL	44.35 ACRES±	SW TM-14-02
I	MICHAEL & SUSAN ZORN	52.5 ACRES±	SW TM-14-01
J	MICHAEL & SUSAN ZORN	47.5 ACRES±	SW TM-14-1.1
K	WILLIAM ARMENTROUT ET AL	16.8 ACRES±	SW TM-14-04
L	EDWARD & GINA BASSETT	41 ACRES±	SW TM-13-39
M	MARIAN ZORN	34.78 ACRES±	SW TM-13-40
N	WILLIAM ARMENTROUT ET AL	75 ACRES±	SW TM-13-41



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 THE REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
 DATE MARCH 24, 20 16  
 REVISED 04/06/16 & 12/27/16  
 OPERATORS WELL NO WV 514101  
 API WELL NO. 47 - 017 - 06770H  
 STATE COUNTY PERMIT

P.S. 849 C. Victor Moyers  
 MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 7310AD514101  
 SCALE SEE NOTE 2  
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK)

STATE OF WEST VIRGINIA  
 DIVISION OF ENVIRONMENTAL PROTECTION  
 OFFICE OF OIL AND GAS

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  IF "GAS" PRODUCTION  STORAGE  DEEP  SHALLOW

LOCATION:  
 PAD ELEVATION 1,220' WATERSHED UPPER RUN OF MIDDLE FORK OF SOUTH FORK HUGHES RIVER  
 DISTRICT SOUTHWEST COUNTY DODDRIDGE QUADRANGLE OXFORD 7.5'

SURFACE OWNER RONALD HART & JEFFERY HART ACREAGE 80±  
 ROYALTY OWNER MONA R. CUMBERLEDGE ET AL ACREAGE 206±  
 PROPOSED WORK: LEASE NO. 107453

DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION  PERFORATE NEW FORMATION  PLUG AND ABANDON  CLEAN OUT AND REPLUG  OTHER   
 PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ TARGET FORMATION MARCELLUS  
 ESTIMATED DEPTH 6,603'

WELL OPERATOR EQT PRODUCTION COMPANY DESIGNATED AGENT REX C. RAY  
 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

COUNTY NAME  
 PERMIT

09/15/2017



**OXF160**  
**WV 514101**  
**EQT PRODUCTION COMPANY**

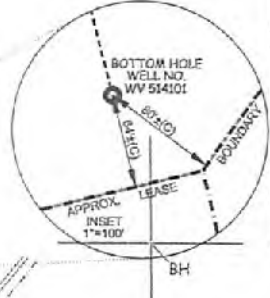
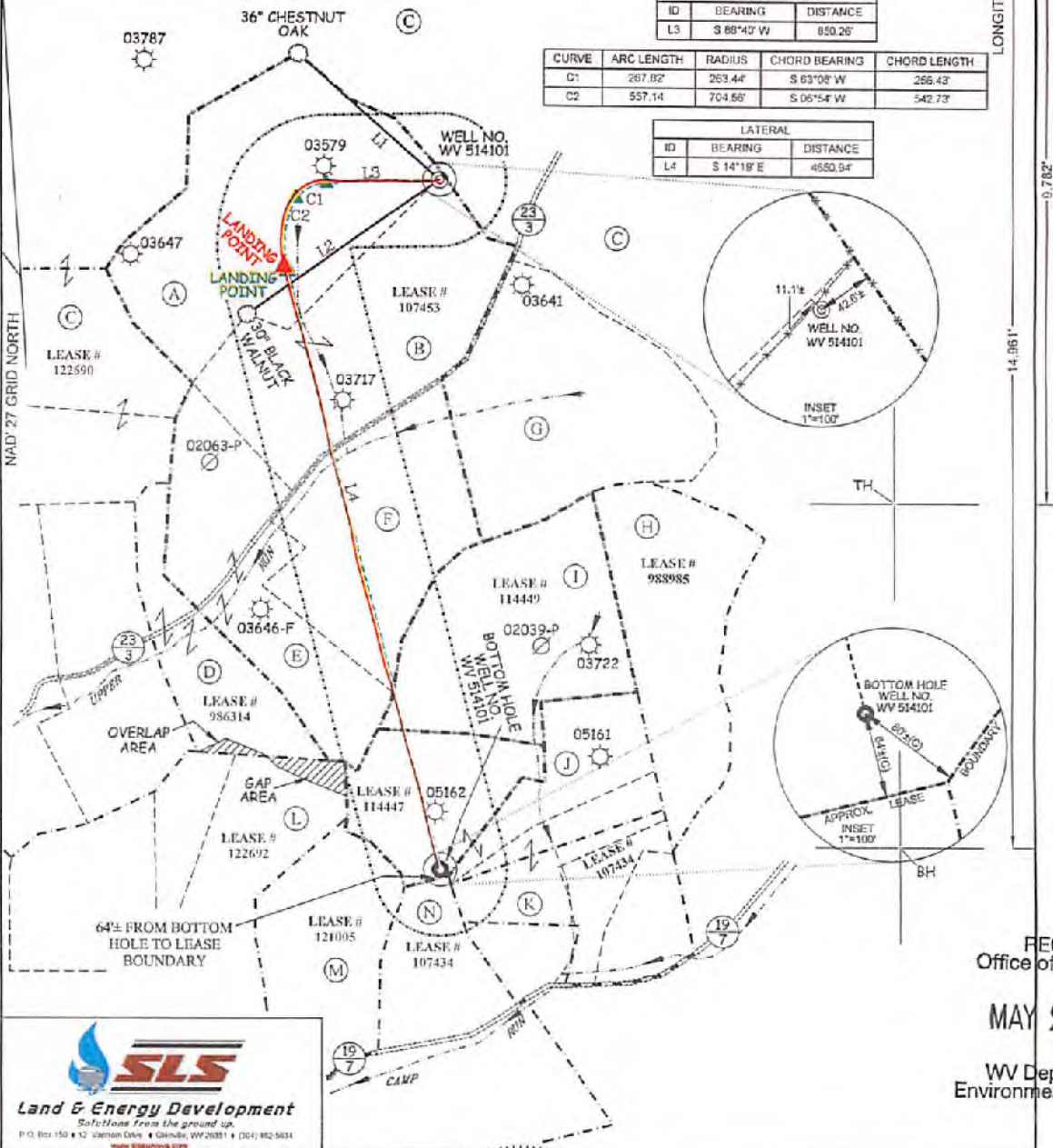
LATITUDE 39°12'30"

WELL TIES		
ID	BEARING	DISTANCE
L1	N 48°32' W	1423.46'
L2	S 54°59' W	1767.59'

BUILD OUT DATA		
ID	BEARING	DISTANCE
L3	S 68°43' W	850.26'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	267.02'	269.44'	S 63°08' W	266.43'
C2	557.14'	704.66'	S 06°54' W	542.73'

LATERAL		
ID	BEARING	DISTANCE
L4	S 14°18' E	4650.94'



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AS DRILLED COORDINATES (OXF160 H9)	
(S.P.C. NORTH ZONE) (UTM/M) ZONE 17 NORTH)	
NAD27 S.P.C. (FT)	N. 250,570.75    E. 1,051,717.40
NAD27 GEO. (LAT-N)	39-15-14.76 LONG-W) 80-7099.01
NAD83 UTM (M)	N. 4,336,944.23    E. 517,257.90
LANDING POINT:	
NAD27 S.P.C. (FT)	N. 250,215.44    E. 1,020,501.45
NAD27 GEO. (LAT-N)	39-17-56.94 LONG-W) 80-6232.45
NAD83 UTM (M)	N. 4,336,739.02    E. 517,005.14
BOTTOM HOLE:	
NAD27 S.P.C. (FT)	N. 245,592.89    E. 1,051,722.45
NAD27 GEO. (LAT-N)	39-15-22.86 LONG-W) 80-7262.18
NAD83 UTM (M)	N. 4,335,306.25    E. 517,305.14

**VICTOR MOYERS**  
 LICENSED  
 No. 849  
 STATE OF  
 WEST VIRGINIA  
 PROFESSIONAL SURVEYOR  
 12-27 miles

STATE OF WEST VIRGINIA  
 DIVISION OF  
 ENVIRONMENTAL PROTECTION  
 OFFICE OF OIL AND GAS

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.

**LEGEND**

- LEASE LINE
- SURFACE LINE
- PROPOSED PATH
- AS DRILLED PATH
- OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- SOUTH WEST DISTRICT TAX MAP-PARCEL SW-00-00

<b>WELL OPERATOR</b>	EQT PRODUCTION COMPANY	<b>DESIGNATED AGENT</b>	REX C. RAY
<b>ADDRESS</b>	115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330	<b>ADDRESS</b>	115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

COUNTY NAME  
 PERMIT

09/15/2017

**514101- 47-017-06770-0000- Perforations**

<b>Stage Number</b>	<b>Perforation Date</b>	<b>Top Perf Depth (ftKB)</b>	<b>Bottom Perf Depth (ftKB)</b>	<b>Number of Shots</b>	<b>Formation</b>
<b>Initiation Sleeve</b>	2/7/2017	12,036	12,062	10	MARCELLUS
<b>1</b>	2/23/2017	11,875	11,997	32	MARCELLUS
<b>2</b>	2/23/2017	11,675	11,837	40	MARCELLUS
<b>3</b>	2/23/2017	11,475	11,637	40	MARCELLUS
<b>4</b>	2/23/2017	11,275	11,437	40	MARCELLUS
<b>5</b>	2/24/2017	11,075	11,237	40	MARCELLUS
<b>6</b>	2/24/2017	10,875	11,037	40	MARCELLUS
<b>7</b>	2/24/2017	10,675	10,837	40	MARCELLUS
<b>8</b>	2/24/2017	10,475	10,637	40	MARCELLUS
<b>9</b>	2/25/2017	10,275	10,437	40	MARCELLUS
<b>10</b>	2/25/2017	10,075	10,237	40	MARCELLUS
<b>11</b>	2/25/2017	9,875	10,037	40	MARCELLUS
<b>12</b>	2/26/2017	9,675	9,837	40	MARCELLUS
<b>13</b>	2/26/2017	9,475	9,637	40	MARCELLUS
<b>14</b>	2/27/2017	9,275	9,437	40	MARCELLUS
<b>15</b>	2/27/2017	9,075	9,237	40	MARCELLUS
<b>16</b>	2/27/2017	8,875	9,037	40	MARCELLUS
<b>17</b>	2/28/2017	8,675	8,837	40	MARCELLUS
<b>18</b>	2/28/2017	8,475	8,637	40	MARCELLUS
<b>19</b>	2/28/2017	8,275	8,437	40	MARCELLUS
<b>20</b>	2/28/2017	8,075	8,237	40	MARCELLUS
<b>21</b>	3/1/2017	7,875	8,037	40	MARCELLUS
<b>22</b>	3/1/2017	7,675	7,836	40	MARCELLUS
<b>23</b>	3/1/2017	7,475	7,637	40	MARCELLUS
<b>24</b>	3/2/2017	7,275	7,437	40	MARCELLUS

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**514101- 47-017-06770-0000 - Stimulated Stages**

<b>Stage Number</b>	<b>Stimulation Date</b>	<b>Ave Pump Rate (BPM)</b>	<b>Ave Treatment Pressure (PSI)</b>	<b>Max Breakdown Pressure (PSI)</b>	<b>ISIP (PSI)</b>	<b>Amount of Proppant (lbs)</b>	<b>Amount of Water (bbls)</b>	<b>Amount of Nitrogen/other (units)</b>
<b>Initiation Sleeve</b>	2/22/2017	31	7,594	8,251	4,144	0	1,083	0
<b>1</b>	2/23/2017	97	8,273	8,949	3,661	446720	9,697	0
<b>2</b>	2/23/2017	100	8,083	8,517	3,972	452600	9,294	0
<b>3</b>	2/23/2017	100	8,380	9,139	4,025	444340	9,304	0
<b>4</b>	2/23/2017	100	8,326	8,823	3,902	448540	9,133	0
<b>5</b>	2/24/2017	100	7,916	8,331	3,801	449560	9,266	0
<b>6</b>	2/24/2017	94	7,517	8,937	3,827	450320	9,330	0
<b>7</b>	2/24/2017	88	7,363	8,192	3,679	451580	8,956	0
<b>8</b>	2/25/2017	99	7,812	8,432	3,879	449280	8,922	0
<b>9</b>	2/25/2017	99	7,955	8,376	4,036	451820	9,738	0
<b>10</b>	2/25/2017	98	7,710	8,074	4,580	453940	10,603	0
<b>11</b>	2/26/2017	100	7,951	8,333	4,576	448940	9,003	0
<b>12</b>	2/26/2017	99	7,725	8,169	3,937	450900	8,814	0
<b>13</b>	2/26/2017	92	8,239	8,786	4,582	35000	2,943	0
<b>13</b>	2/27/2017	99	7,618	8,531	4,582	415280	11,534	0
<b>14</b>	2/27/2017	100	7,694	8,088	3,971	454480	8,626	0
<b>15</b>	2/27/2017	97	7,913	9,407	4,026	450400	8,940	0
<b>16</b>	2/27/2017	100	7,643	8,165	4,296	450020	9,037	0
<b>17</b>	2/28/2017	100	7,820	8,330	4,180	450300	8,787	0
<b>18</b>	2/28/2017	100	7,496	8,115	3,869	450800	8,996	0
<b>19</b>	2/28/2017	99	7,822	8,149	4,087	451440	10,053	0
<b>20</b>	2/28/2017	90	7,077	7,692	4,306	451000	10,535	0
<b>21</b>	3/1/2017	99	7,727	8,667	3,566	452950	8,700	0
<b>22</b>	3/1/2017	91	7,191	7,812	4,049	443720	8,535	0
<b>23</b>	3/1/2017	98	7,220	7,860	4,293	0	8,240	0
<b>23</b>	3/2/2017	14	4,021	5,381	4,345	444560	2,204	0
<b>24</b>	3/2/2017	95	7,386	7,923	3,926	449500	9,072	0

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**MAY 26 2017**

WV Department of  
Environmental Protection

# Hydraulic Fracturing Fluid Product Component Information Disclosure

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Environmental Protection

Job Start Date:	2/22/2017
Job End Date:	3/2/2017
State:	West Virginia
County:	Doddridge
API Number:	47-017-06770-00-00
Operator Name:	EQT Production
Well Name and Number:	514101
Latitude:	39.18147600
Longitude:	-80.79920100
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,599
Total Base Water Volume (gal):	9,632,490
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
CI-3	C and J Energy Services	Corrosion Inhibitor					
				Listed Below			
MC MX 5-3886	Multi-Chem Group	Specialty Brine					
				Listed Below			

Hydrochloric Acid (15%)	C and J Energy Services	Acidizing					
				Listed Below			
BR-11	C and J Energy Services	Gel Breaker					
				Listed Below			
MC MX 8-2544	Multi-Chem Group	Live Culture - Nitrate Reducing Bacteria					
				Listed Below			
SI-6	C and J Energy Services	Scale Inhibitor					
				Listed Below			
Water	C and J Energy Services	Carrier/Base Fluid					
				Listed Below			
NI-200	ECM Supply	Friction Reducing Agent					
				Listed Below			
Sand (Proppant)	C and J Energy Services	Proppant					
				Listed Below			
GA-7A	C and J Energy Services	Gelling Agent					
				Listed Below			
Items above are Trade Names with the exception of Base Water . Items below are the individual ingredients.							
			Water	7732-18-5	100.00000	87.94513	None

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MAY 26 2017  
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			Silica Substrate	14808-60-7	100.00000	11.81381	None
			Water	7732-18-5	50.00000	0.03301	None
			Water	7732-18-5	50.00000	0.03301	
			Copolymer of Two Propenamide	69418-26-4	30.00000	0.01980	None
			Copolymer of Two Propenamide	69418-26-4	30.00000	0.01980	
			Hydrochloric Acid	7647-01-0	15.00000	0.01978	None
			Petroleum Distillate	64742-47-8	20.00000	0.01320	
			Petroleum Distillate	64742-47-8	20.00000	0.01320	None
			Sodium chloride	7647-14-5	100.00000	0.00947	None
			Sodium chloride	7647-14-5	100.00000	0.00947	
			Calcium nitrate.4H2O	13477-34-4	100.00000	0.00883	
			Calcium nitrate.4H2O	13477-34-4	100.00000	0.00883	None
			Trade Secret	Proprietary	7.00000	0.00170	None
			Oleic Acid Diethanolamide	93-83-4	2.00000	0.00132	None
			Oleic Acid Diethanolamide	93-83-4	2.00000	0.00132	
			Alcohols, C-12-16, Ethoxylated	68551-12-2	2.00000	0.00132	
			Alcohols, C-12-16, Ethoxylated	68551-12-2	2.00000	0.00132	None
			Ammonium Chloride ((NH4)Cl)	12125-02-9	1.00000	0.00066	
			Ammonium Chloride ((NH4)Cl)	12125-02-9	1.00000	0.00066	None
			Ammonium Chloride	12125-02-9	2.00000	0.00049	None
			Monoethanolamine hydrochloride	2002-24-6	2.00000	0.00049	None
			Sodium nitrate	7631-99-4	5.00000	0.00047	None
			Sodium nitrate	7631-99-4	5.00000	0.00047	
			Methanol	67-56-1	1.00000	0.00024	None
			Guar Gum	9000-30-0	60.00000	0.00015	None
			Guar Gum	9000-30-0	60.00000	0.00015	

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Environmental Protection

		Distillates (petroleum), Hydrotreated Light	64742-47-8	60.00000	0.00015	
		Distillates (petroleum), Hydrotreated Light	64742-47-8	60.00000	0.00015	None
		Ethylene Glycol	107-21-1	40.00000	0.00011	None
		Ammonium Persulfate	7727-54-0	85.00000	0.00006	
		Ammonium Persulfate	7727-54-0	85.00000	0.00006	None
		Dimethylformamide	68-12-2	20.00000	0.00005	None
		Cinnamaldehyde	104-55-2	15.00000	0.00004	
		Tar Bases, Quinoline Derivs., Benzyl Chloride-quaternized	72480-70-7	15.00000	0.00004	
		Cinnamaldehyde	104-55-2	15.00000	0.00004	None
		Tar Bases, Quinoline Derivs., Benzyl Chloride-quaternized	72480-70-7	15.00000	0.00004	None
		2-butoxyethanol	111-76-2	15.00000	0.00004	None
		Surfactants	Proprietary	10.00000	0.00003	None
		Surfactants	Proprietary	10.00000	0.00003	
		4-nonylphenol, Branched, Ethoxylated	127087-87-0	5.00000	0.00001	
		4-nonylphenol, Branched, Ethoxylated	127087-87-0	5.00000	0.00001	None
		1-decanol	112-30-1	5.00000	0.00001	
		1-decanol	112-30-1	5.00000	0.00001	None
		Cured Resin	Proprietary	13.00000	0.00001	None
		Cured Resin	Proprietary	13.00000	0.00001	
		Isopropanol	67-63-0	2.50000	0.00001	None
		Isopropanol	67-63-0	2.50000	0.00001	
		Triethyl Phosphate	78-40-0	2.50000	0.00001	None
	RECEIVED Office of Oil and Gas	1-octanol	111-87-5	2.50000	0.00001	
		1-octanol	111-87-5	2.50000	0.00001	None
	<b>MAY 26 2017</b>	Triethyl Phosphate	78-40-0	2.50000	0.00001	
	WV Department of Environmental Protection	Silica - Crystalline, Quartz	14808-60-7	1.00000	0.00000	None

			Silica - Crystalline, Quartz	14808-60-7	1.00000	0.00000
--	--	--	---------------------------------	------------	---------	---------

\* 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)

RECEIVED  
 Office of Oil and Gas  
 MAY 26 2017  
 WV Department of  
 Environmental Protection



**OXF160**  
**WV 514101**  
**EQT PRODUCTION COMPANY**

LATITUDE 39°12'30"

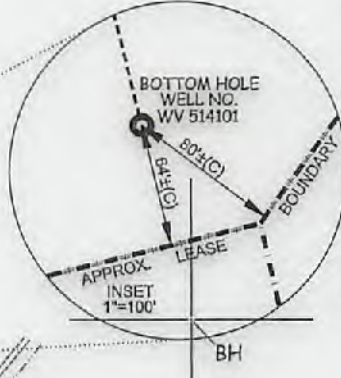
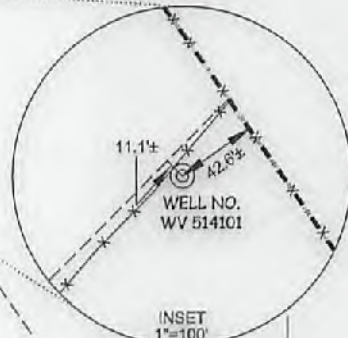
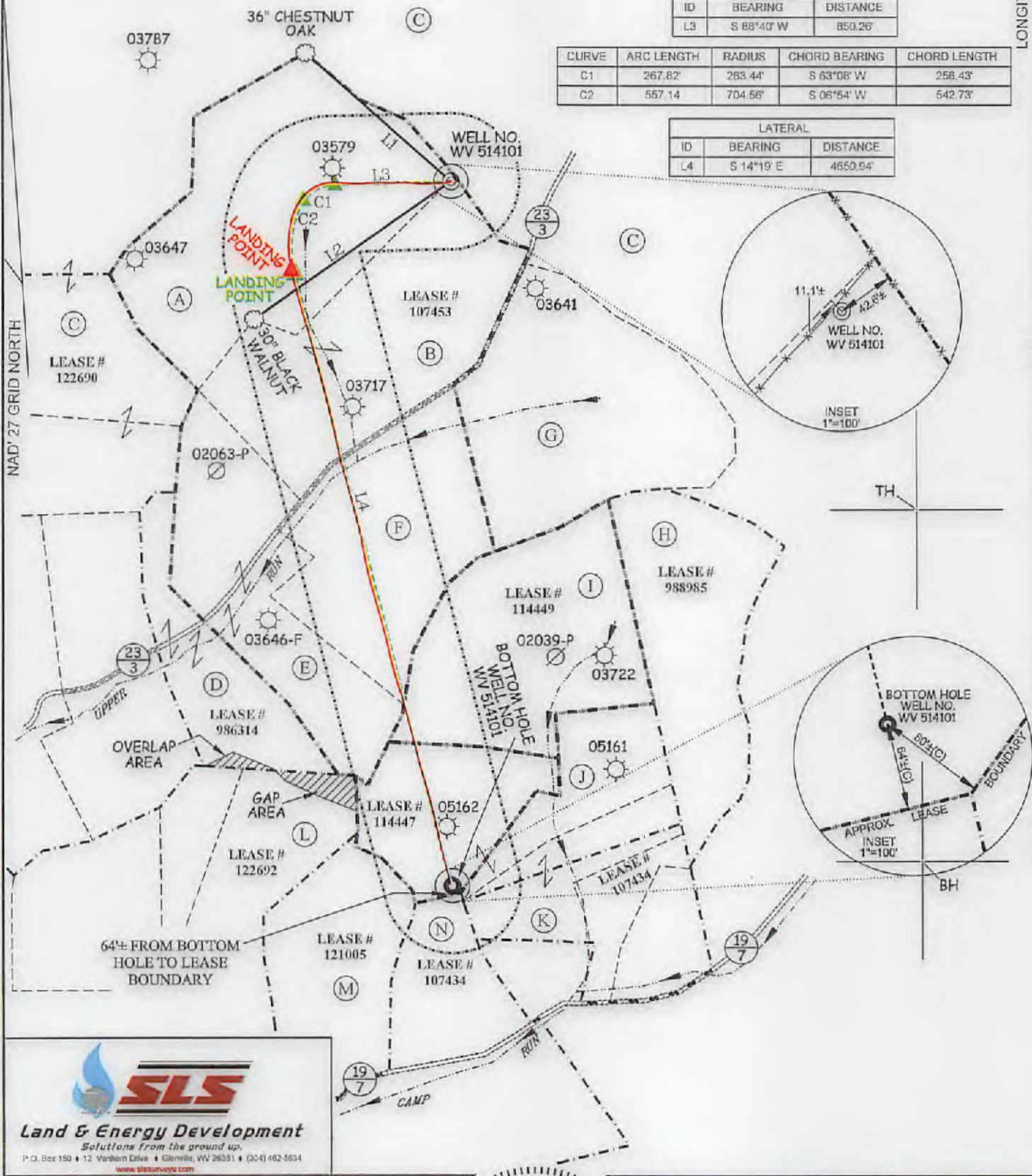
LONGITUDE 80°47'30"

WELL TIES		
ID	BEARING	DISTANCE
L1	N 46°32' W	1423.46'
L2	S 54°59' W	1767.59'

BUILD OUT DATA		
ID	BEARING	DISTANCE
L3	S 88°40' W	850.26'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	267.82'	283.44'	S 63°08' W	256.43'
C2	557.14'	704.56'	S 06°54' W	542.73'

LATERAL		
ID	BEARING	DISTANCE
L4	S 14°19' E	4650.94'



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**AS DRILLED COORDINATES**  
**(OXF160 H9)**  
**(S.P.C. NORTH ZONE) (UTM/M) ZONE 17 NORTH)**  
 NAD'27 S.P.C.(FT) N. 250,870.75 E. 1,931,717.49  
 NAD'27 GEO. LAT-(N) 39.181478 LONG-(W) 80.799201  
 NAD'83 UTM (M) N. 4,338,944.23 E. 517,357.99  
**LANDING POINT**  
 NAD'27 S.P.C.(FT) N. 250,215.44 E. 1,930,591.45  
 NAD'27 GEO. LAT-(N) 39.179634 LONG-(W) 80.803245  
 NAD'83 UTM (M) N. 4,338,739.02 E. 517,009.14  
**BOTTOM HOLE**  
 NAD'27 S.P.C.(FT) N. 245,890.89 E. 1,931,723.45  
 NAD'27 GEO. LAT-(N) 39.167256 LONG-(W) 80.799915  
 NAD'83 UTM (M) N. 4,335,368.25 E. 517,386.14



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.

**LEGEND**

LEASE LINE	---
SURFACE LINE	----
PROPOSED PATH	---
AS DRILLED PATH	---
OFFSET LINE	---
TIE LINE	---
CREEK	---
ROAD	---
COUNTY ROUTE	---
PROPOSED WELL	⊙
EXISTING WELL	⊙
PERMITTED WELL	⊙
SOUTH WEST DISTRICT TAX MAP-PARCEL	SW-00-00

SCALE 1" = 1000'  
 DATE MARCH 24, 2016  
 REVISED 04/06/16 & 12/27/16  
 OPERATORS WELL NO. WV 514101  
 API WELL NO. 47 - 017 - 06770H  
 STATE COUNTY PERMIT

STATE OF WEST VIRGINIA  
 DIVISION OF ENVIRONMENTAL PROTECTION  
 OFFICE OF OIL AND GAS

WELL OPERATOR EQT PRODUCTION COMPANY DESIGNATED AGENT REX C. RAY  
 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

COUNTY NAME  
 PERMIT

09/15/2016

OXF160  
WV 514101  
EQT PRODUCTION COMPANY

Intamin WR-32

WELL TIES	
ID	BEARING DISTANCE
L1	N 48°32' W 1423.46'
L2	S 84°58' W 1787.88'

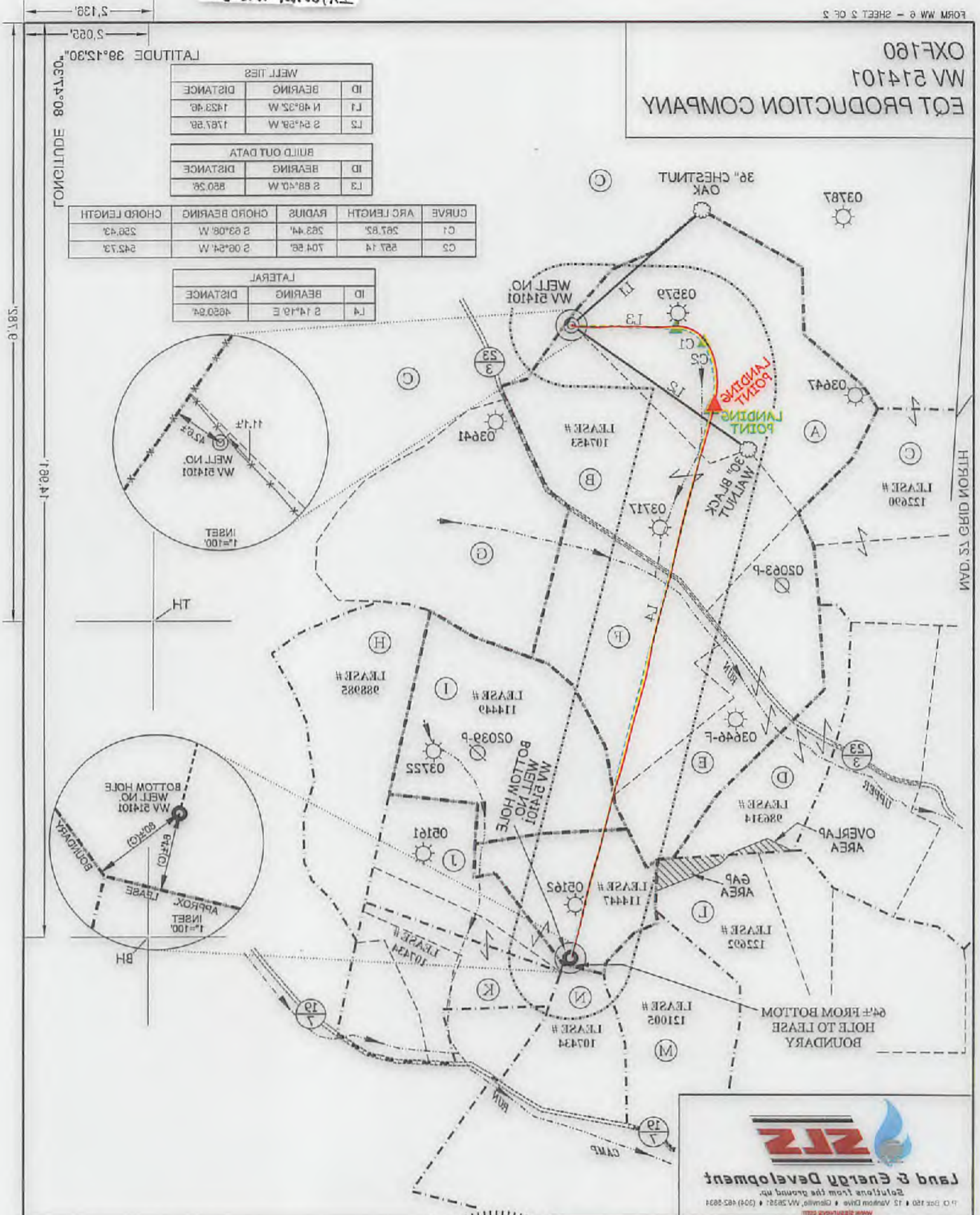
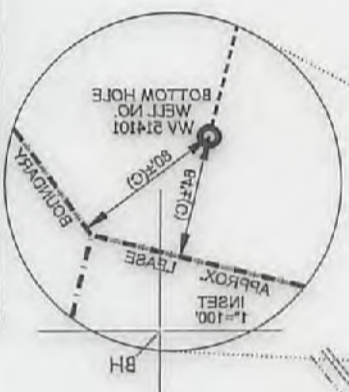
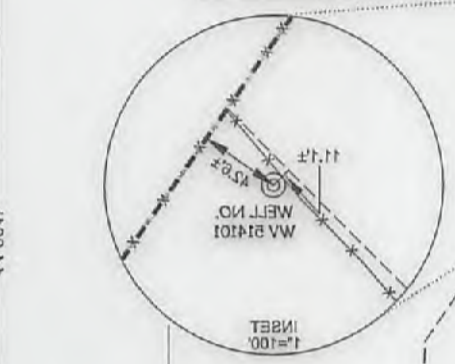
BUILD OUT DATA	
ID	BEARING DISTANCE
L3	S 88°40' W 850.28'

CURVE			
C1	ARC LENGTH	RADIUS	CHORD BEARING
	287.85'	282.44'	S 63°08' W
C2	287.14'	104.88'	S 08°54' W
	242.73'		

LATERAL	
ID	BEARING DISTANCE
L4	S 14°10' E 4820.84'



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LEGEND

- LEASE LINE
- SURFACE LINE
- PROPOSED PATH
- AS DRILLED PATH
- OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL

SOUTH WEST DISTRICT  
TAX MAP-PARCEL 2W-00-00

STATE OF WEST VIRGINIA  
DIVISION OF ENVIRONMENTAL PROTECTION  
OFFICE OF OIL AND GAS

PROFESSIONAL SURVEYOR  
STATE OF WEST VIRGINIA  
No. 849  
C. VICTOR MOYERS  
LICENSED

AS DRILLED COORDINATES

(2 P.C. NORTH ZONE (UTM) ZONE 17 NORTH)  
 NAD83 S.P.C. (FT) N. 280,670.25 E. 1,891,717.49  
 NAD83 GEO. LAT.(N) 39.181478 LONG.(W) 80.798014  
 NAD83 UTM (M) N. 4,238,944.23 E. 517,287.88  
 LANDING POINT  
 NAD83 S.P.C. (FT) N. 280,218.44 E. 1,830,881.42  
 NAD83 GEO. LAT.(N) 39.178834 LONG.(W) 80.802242  
 NAD83 UTM (M) N. 4,238,739.02 E. 517,008.14  
 BOTTOM HOLE  
 NAD83 S.P.C. (FT) N. 242,600.80 E. 1,811,723.42  
 NAD83 GEO. LAT.(N) 39.187258 LONG.(W) 80.798018  
 NAD83 UTM (M) N. 4,232,288.25 E. 517,288.14

DATE 09/15/2017  
 REVISIONS 04/06/16 & 12/27/16  
 OPERATORS WELL NO. WV 514101  
 AP# 47 - 017 - 06770H  
 COUNTY PERMIT

WELL OPERATOR: EQT PRODUCTION COMPANY  
 ADDRESS: 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330  
 DESIGNATED AGENT: REX C. RAY  
 COUNTY NAME: PERMIT

**OXF160**  
**WV 514101**  
**EQT PRODUCTION COMPANY**

2,136'  
 2,055'  
 LATITUDE 39°12'30"  
 LONGITUDE 80°47'30"

**AS DRILLED COORDINATES**  
**(OXF160 H9)**

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD'27 S.P.C.(FT) N. 250,870.75 E. 1,631,717.49  
 NAD'27 GEO. LAT-(N) 39.181476 LONG-(W) 80.799201  
 NAD'83 UTM (M) N. 4,336,944.23 E. 517,357.99

**LANDING POINT**

NAD'27 S.P.C.(FT) N. 250,216.44 E. 1,630,561.45  
 NAD'27 GEO. LAT-(N) 39.179834 LONG-(W) 80.803245  
 NAD'83 UTM (M) N. 4,336,739.02 E. 517,009.14

**BOTTOM HOLE**

NAD'27 S.P.C.(FT) N. 245,690.89 E. 1,631,723.45  
 NAD'27 GEO. LAT-(N) 39.167256 LONG-(W) 80.798916  
 NAD'83 UTM (M) N. 4,335,366.25 E. 517,386.14

**NOTES ON SURVEY**

1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
2. WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'.
3. AS DRILLED INFORMATION PROVIDED BY EQT.

ROYALTY OWNERS		
GLENN H. SHIVE ET AL	53 AC±	LEASE NO. 114449
C. BURKE MORRIS & S.A. SMITH ET AL	28 AC±	LEASE NO. 114447

A	ROBERT BRANNON ET AL	70 ACRES±	SW TM-09-19
B	RONALD HART & JEFFERY HART	60 ACRES±	SW TM-09-20
C	I.L. MORRIS	6,600.75 ACRES±	SW TM-10-02
D	ROBERT BRANNON ET AL	25.1 ACRES±	SW TM-13-18
E	RONALD HART & JEFFERY HART	46 ACRES±	SW TM-13-12
F	RONALD HART & JEFFERY HART	45 ACRES±	SW TM-09-21
G	MARIA HRUSCOV	57.5 ACRES±	SW TM-10-01
H	WILLIAM ARMENTROUT ET AL	44.35 ACRES±	SW TM-14-02
I	MICHAEL & SUSAN ZORN	52.5 ACRES±	SW TM-14-01
J	MICHAEL & SUSAN ZORN	47.5 ACRES±	SW TM-14-1.1
K	WILLIAM ARMENTROUT ET AL	16.8 ACRES±	SW TM-14-04
L	EDWARD & GINA BASSETT	41 ACRES±	SW TM-13-39
M	MARIAN ZORN	34.78 ACRES±	SW TM-13-40
N	WILLIAM ARMENTROUT ET AL	76 ACRES±	SW TM-13-41



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 DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. 849 *C. Victor Moyers*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
 DATE MARCH 24, 20 16  
 REVISED 04/06/16 & 12/27/16  
 OPERATORS WELL NO. WV 514101  
 API WELL NO. 47 - 017 - 06770H  
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 7310AD514101  
 SCALE SEE NOTE 2

STATE OF WEST VIRGINIA  
 DIVISION OF ENVIRONMENTAL PROTECTION  
 OFFICE OF OIL AND GAS

HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK)

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  IF "GAS" PRODUCTION  STORAGE  DEEP  SHALLOW

LOCATION: PAD ELEVATION 1,220' WATERSHED UPPER RUN OF MIDDLE FORK OF SOUTH FORK HUGHES RIVER  
 DISTRICT SOUTHWEST COUNTY DODDRIDGE QUADRANGLE OXFORD 7.5'

SURFACE OWNER RONALD HART & JEFFERY HART ACREAGE 60±  
 ROYALTY OWNER MONA R. CUMBERLEDGE ET AL ACREAGE 206±

PROPOSED WORK: LEASE NO. 107453 **09/15/2014**

DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION  PERFORATE NEW FORMATION  PLUG AND ABANDON  CLEAN OUT AND REPLUG  OTHER

PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ TARGET FORMATION MARCELLUS  
 ESTIMATED DEPTH 6,603'

WELL OPERATOR EQT PRODUCTION COMPANY DESIGNATED AGENT REX C. RAY  
 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

9,782'  
 14,951'

OXF160  
WV 514101  
EQT PRODUCTION COMPANY

AS DRILLED COORDINATES  
(OXF160 H9)  
(S.P.C. NORTH ZONE) (UTM) ZONE 17 NORTH  
NAD83 UTM (M) N. 4,398,944.23 E. 217,257.99  
NAD83 GEO. LAT-(N) 39.179634 LONG-(W) 80.802545  
NAD83 S.P.C.(FT) N. 280,218.44 E. 1,630,681.48  
LANDING POINT  
NAD83 UTM (M) N. 4,398,739.02 E. 217,009.14  
NAD83 GEO. LAT-(N) 39.179634 LONG-(W) 80.802545  
NAD83 S.P.C.(FT) N. 280,218.44 E. 1,630,681.48  
BOTTOM HOLE  
NAD83 UTM (M) N. 4,398,739.02 E. 217,009.14  
NAD83 GEO. LAT-(N) 39.179634 LONG-(W) 80.802545  
NAD83 S.P.C.(FT) N. 280,218.44 E. 1,630,681.48

NOTES ON SURVEY

1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL NO AGRICULTURAL BUILDINGS > 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.  
2. WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'.  
3. AS DRILLED INFORMATION PROVIDED BY EQT.

ROYALTY OWNERS table with columns for owner name, acreage, and lease number.

Table with columns for well ID, acreage, and owner name.



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 THE REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.



DATE MARCH 24, 2018  
REVISED 04/06/18 & 12/27/18  
OPERATORS WELL NO. WV 514101  
WELL NO. 47 - 017 - 06770H  
STATE COUNTY PERMIT

STATE OF WEST VIRGINIA  
DIVISION OF ENVIRONMENTAL PROTECTION  
OFFICE OF OIL AND GAS

MINIMUM DEGREE OF ACCURACY 1/2500  
FILE NO. 7310AD514101  
SCALE SEE NOTE 2  
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK)

WELL TYPE: OIL GAS X INJECTION  
WASTE DISPOSAL "GAS" PRODUCTION X STORAGE DEEP SHALLOW X  
LOCATION: PAD ELEVATION 1250' DISTRICT SOUTHWEST COUNTY DODDRIDGE  
SURFACE OWNER RONALD HART & JEFFERY HART  
PROPOSED WORK: DRILL CONVERT X  
PERMIT: PHYSICAL CHANGE IN WELL (SPECIFY) TARGET FORMATION MARCELLUS ESTIMATED DEPTH 6'03'

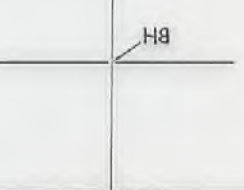
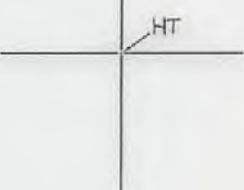
WELL OPERATOR EQT PRODUCTION COMPANY ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330  
DESIGNATED AGENT REX C. RAY ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

10/15/2017

LATITUDE 39°15'30"  
LONGITUDE 80°47'08"

3871.8

1788.41



COUNTY NAME

PERMIT