



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Tuesday, July 16, 2019
WELL WORK PERMIT
Horizontal 6A / New Drill

TUG HILL OPERATING, LLC
380 SOUTHPOINTE BLVD

CANONSBURG, PA 15317

Re: Permit approval for FITZGERALD S-8HM
47-051-02232-00-00

This well work permit is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to any additional specific conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas Inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days of completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

Per 35 CSR 4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

Operator's Well Number: FITZGERALD S-8HM
Farm Name: DANNY R. KERNS
U.S. WELL NUMBER: 47-051-02232-00-00
Horizontal 6A New Drill
Date Issued: 7/16/2019

A blue ink signature of James A. Martin, written in a cursive style.

PERMIT CONDITIONS 4705102232

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than one hundred (100) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
7. 24 hours prior to the initiation of the completion process the operator shall notify the Chief or his designee.
8. During the completion process the operator shall monitor annular pressures and report any anomaly noticed to the chief or his designee immediately.
9. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
10. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

PERMIT CONDITIONS 4705102232

11. The operator shall provide to the Office of Oil and Gas the dates of each of the following within 30 days of their occurrence: completion of construction of the well pad, commencement of drilling, cessation of drilling, completion of any other permitted well work, and completion of the well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov.

WW-6B
(04/15)

API NO. 47-051
OPERATOR WELL NO. Fitzgerald S-8HM
Well Pad Name: Fitzgerald

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Tug Hill Operating, LLC 494510851 Marshall Liberty Glen Easton 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Fitzgerald S-8HM Well Pad Name: Fitzgerald

3) Farm Name/Surface Owner: Danny and Frances Kerns Estate Public Road Access: Rines Ridge Road (County Route 76)

4) Elevation, current ground: 1316.5' Elevation, proposed post-construction: 1293.30'

5) Well Type (a) Gas Oil _____ Underground Storage _____
Other _____

(b) If Gas Shallow Deep _____
Horizontal _____

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus is the target formation at a depth of 6970' - 6918', thickness of 52' and an anticipated approximate pressure of 3800 psi.

8) Proposed Total Vertical Depth: 7,070'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 10,894'

11) Proposed Horizontal Leg Length: 3,591.56'

12) Approximate Fresh Water Strata Depths: 70'; 1059'

13) Method to Determine Fresh Water Depths: Use shallow offset wells to determine deepest freshwater, or determine using pre-drill tests, testing while drilling or petrophysical evaluation of resistivity.

14) Approximate Saltwater Depths: 1,740'

15) Approximate Coal Seam Depths: Sewickley Coal - 968' and Pittsburgh Coal - 1053'

16) Approximate Depth to Possible Void (coal mine, karst, other): None

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes No _____

(a) If Yes, provide Mine Info: Name: Marshall County Coal Co./Marshall County Mine
Depth: 1059' TVD and 291' subsea level
Seam: Pittsburgh #8
Owner: Murray Energy / Consolidated Coal Co.

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WW-6B
(04/15)

API NO. 47- 051 - _____
 OPERATOR WELL NO. Fitzgerald S-8HM
 Well Pad Name: Fitzgerald

18)

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	30"	NEW	BW	BW	120'	120'	259ft^3(CTS)
Fresh Water	13 3/8"	NEW	J55	54.5#	1150'	1150'	1149ft^3(CTS)
Coal	13 3/8"	NEW	J55	54.5#	1150'	1150'	1149ft^3(CTS)
Intermediate	9 5/8"	NEW	J55	36#	2,980'	2,980'	990ft^3(CTS)
Production	5 1/2"	NEW	P110	20#	10,894'	10,894'	2792ft^3(CTS)
Tubing	2 3/8"	NEW	N80	4.7#	6,728'		
Liners							

Handwritten signature and date: 5/12/19

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	30"	36"	1.0	2,333	1,866	CLASS A	1.2
Fresh Water	13 3/8"	17.5"	.33	2,740	2,192	SEE #24	1.2
Coal	13 3/8"	17.5"	.33	2,740	2,192	SEE #24	1.2
Intermediate	9 5/8"	12 1/4"	.352	3,520	2,816	SEE #24	1.19
Production	5 1/2"	8 7/8" _ 8 3/4"	.361	12,640	10,112	SEE #24	1.17/1.19
Tubing	2 3/8"		.19	11,200	8,960		
Liners							

PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

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WW-6B
(10/14)

API NO. 47-051 -

OPERATOR WELL NO. Fitzgerald S-8HM

Well Pad Name: Fitzgerald

JM
5/16/19

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill through the Marcellus tagging less than 100' from the top of the Onondaga to get depths and log data. Plug back to proposed kick off point. Drill the horizontal section to planned and proposed TD. Run casing and cement to surface. Run Bond Log from app. 60 deg to surface. Make clean out run and stimulate.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Well to completed with approximately 8,977,500 lb. proppant and 138,799 barrels of water. Max rate = 80bpm; max psi = 9,000#.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 21.21 acres

22) Area to be disturbed for well pad only, less access road (acres): 7.44 acres

23) Describe centralizer placement for each casing string:

Will run 3 centralizers on surface casing at equal distance. Intermediate will have 1 centralizer every other joint. Production casing will have one centralizer every other joint in lateral, one centralizer every joint through curve, one centralizer every other joint to surface.

24) Describe all cement additives associated with each cement type:

*See attachment

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25) Proposed borehole conditioning procedures:

Will circulate a minimum of 3 hours at TD, short trip to curve, circulate bottoms up, check for flow, POOH.

*Note: Attach additional sheets as needed.

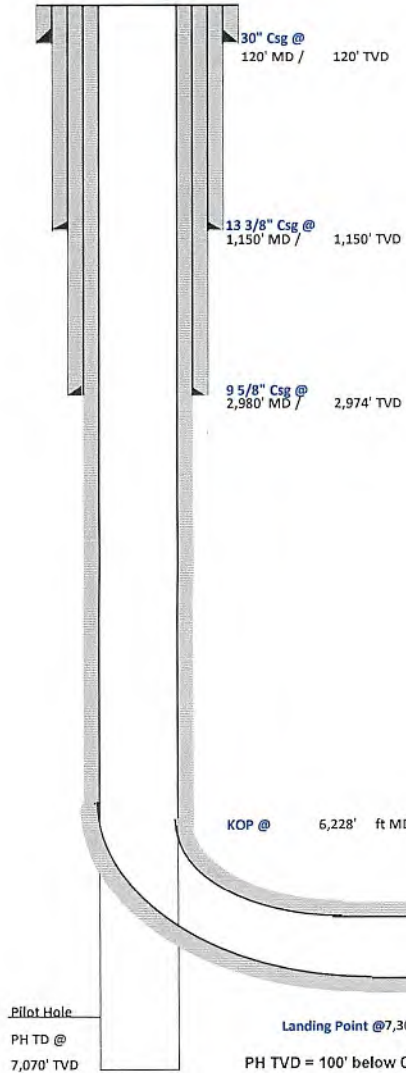


WELL NAME: Fitzgerald S-8HM
 STATE: WV COUNTY: Marshall
 DISTRICT: Meade
 DF Elev: 1,293' GL Elev: 1,293'
 TD: 10,894'
 TH Latitude: 39.801291
 TH Longitude: -80.641437
 BH Latitude: 39.79203
 BH Longitude: 80.63512

FORMATION TOPS	
Formation	Depth TVD
Deepest Fresh Water	1059
Sewickley Coal	968
Pittsburgh Coal	1053
Big Lime	2254
Weir	2680
Berea	2878
Gordon	3139
Rhinestreet	6261
Geneseo/Burkett	6795
Tully	6810
Hamilton	6843
Marcellus	6918
Landing Depth	6953
Onondaga	6970
Pilot Hole Depth	7070

CASING SUMMARY							
Type	Hole Size (in)	Csg Size (in)	Depth (MD)	Depth (TVD)	Weight (lb/ft)	Grade	Top of Cement
Conductor	36	30	120'	120'	BW	BW	Surface
Surface	17.5	13 3/8	1,150'	1,150'	54.5	J55	Surface
Intermediate 1	12 1/4	9 5/8	2,980'	2,974'	36	J55	Surface
Production	8 7/8 x 8 3/4	5 1/2	10,894'	7,015'	20	CYHP110	Surface

CEMENT SUMMARY				DRILLING DETAILS	
	Sacks	Class	Density	Fluid Type	Centralizer Notes
Conductor	338	A	15.6	Air	None
Surface	1,165	A	15.6	Air	3 Centralizers at equal distance
Intermediate 1	991	A	15	Air	1 Centralizer every other jt
Production	2,547	A	14.5	Air / SOBM	1 every other joint in lateral; 1 per joint in curve; 1 every other jt to sfc



ju 5/14/19

Pilot Hole
PH TD @
7,070' TVD

Landing Point @7,303' MD / 6,953' TVD
PH TVD = 100' below Onondaga Top

Lateral TD @ 10,894' ft MD
7,015' ft TVD

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Tug Hill Operating, LLC Casing and Cement Program

Fitzgerald S-8HM

Casing

	String	Grade	Bit Size	Depth (Measured)	Cement Fill Up
Conductor	30"	BW	36"	120'	CTS
Surface	13 3/8"	J55	17 1/2"	1,150'	CTS
Intermediate	9 5/8"	J55	12 1/4"	2,980'	CTS
Production	5 1/2"	CYHP110	8 7/8 x 8 3/4"	10,894'	CTS

Cement

Conductor: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Conductor Cement mixed at 15.6 ppg, Y=1.2

Surface: Premium NE-1 + 2% bwoc CaC12 + 46.5% Fresh Water – Surface Cement mixed at 15.6 ppg, Y=1.2

Intermediate: Premium NE-1 + 1% bwoc CaC12 + 46.5% Fresh Water – Intermediate Cement mixed at 15.6 ppg, Y=1.19

Kick Off Plug: Class H Cement + 1% CD-32 + .7% Sodium Metasilicate + .1% R-3 + .75 gal/100sk FP-13L - KOP Plug

Production: 50:50 Poz: Premium NE-1 + .1% bwoc ASA-301 + 60lb/sk ASCA-1 + .35% bwoc BA-10A + .25% bwoc MPA-170, 44 lb sack + .5% bwoc R-3 + .75 gals/100sk FP-13L – Production Cement mixed at 15.2ppg, Y = 1.19

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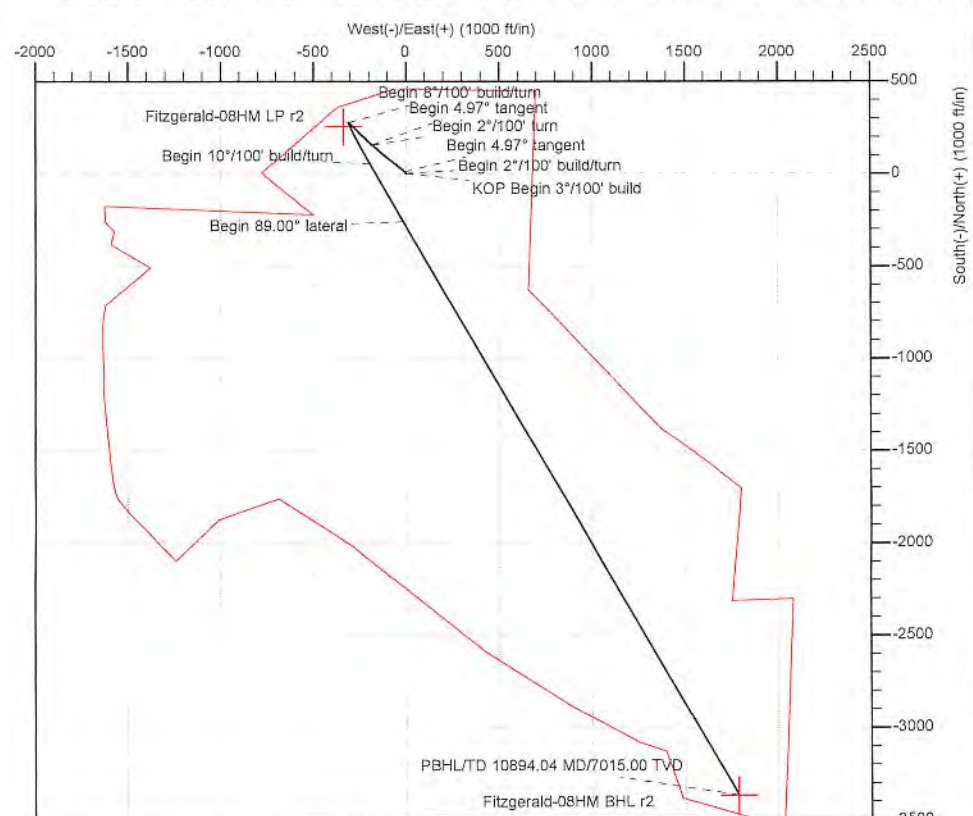
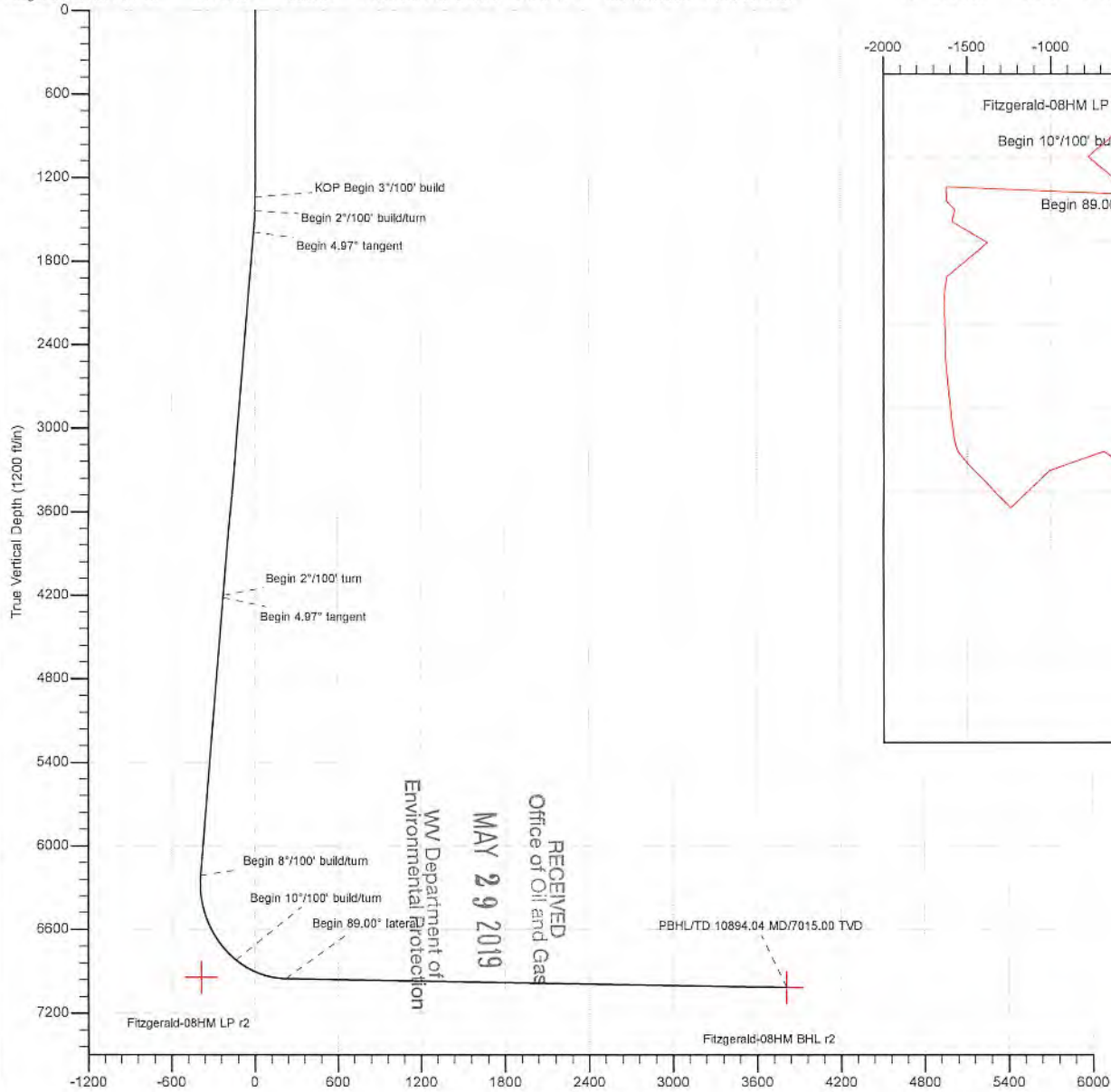
Well: Fitzgerald 08 HM (slot V)
 Site: Fitzgerald
 Project: Marshall County, West Virginia
 Design: rev3
 Rig:

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	
2	1340.00	0.00	0.00	1340.00	0.00	0.00	0.00	0.000	0.00	KOP Begin 3°/100' build
3	1440.00	3.00	345.00	1439.95	2.53	-0.68	3.00	345.000	-2.55	Begin 2°/100' build/turn
4	1592.20	4.97	310.00	1591.80	10.62	-6.76	2.00	-69.347	-12.55	Begin 4.97° tangent
5	4210.24	4.97	310.00	4200.00	156.41	-180.51	0.00	0.000	-222.82	Begin 2°/100' turn
6	4227.39	4.97	313.96	4217.08	157.40	-181.61	2.00	91.168	-224.21	Begin 4.97° tangent
7	6228.31	4.97	313.96	6210.47	277.84	-306.52	0.00	0.000	-389.18	Begin 8°/100' build/turn
8	6912.98	50.00	150.89	6818.59	51.85	-191.41	8.00	-164.149	-135.60	Begin 10°/100' build/turn
9	7303.13	89.00	149.88	6952.59	-259.54	-13.91	10.00	-1.609	222.67	Begin 89.00° lateral
10	10894.05	89.00	149.88	7015.00	-3365.03	1787.95	0.00	0.000	3810.54	PBHL/TD 10894.04 MD/7015.00 TVD

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Fitzgerald-08HM LP r2	6941.91	256.84	-333.29	14454835.30	1740789.87	39.80200000	-80.64262000
Fitzgerald-08HM BHL r2	7015.00	-3365.03	1787.95	14451213.43	1742911.11	39.79203000	-80.63512000



Geodetic System: Universal Transverse Mercator (US Survey Feet)
 Datum: NAD83 West Virginia - HARN
 Ellipsoid: GRS 1980
 Zone: Zone 17N (84 W to 78 W)

System Datum: Mean Sea Level
 Depth Reference: GL @ 1292.91ft
 Northing: 14454578.46
 Easting: 1741123.16
 Latitude: 39.80129100
 Longitude: -80.64143700

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 9.009°



Azimuths to Grid North
 True North: -0.23°
 Magnetic North: -9.01°
 Magnetic Field
 Strength: 52006.2sNT
 Dip Angle: 56.84°
 Date: 11/28/2018
 Model: IGRF2015



47 05 102232



Planning Report - Geographic

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Fitzgerald 08 HM (slot V)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1292.91ft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1292.91ft
Site:	Fitzgerald	North Reference:	Grid
Well:	Fitzgerald 08 HM (slot V)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Project	Marshall County, West Virginia		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	NAD83 West Virginia - HARN		
Map Zone:	Zone 17N (84 W to 78 W)		

Site	Fitzgerald				
Site Position:		Northing:	14,454,567.73 usft	Latitude:	39.80126184
From:	Lat/Long	Easting:	1,741,096.26 usft	Longitude:	-80.64153292
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.229 °

Well	Fitzgerald 08 HM (slot V)					
Well Position	+N/-S	0.00 ft	Northing:	14,454,578.46 usft	Latitude:	39.80129100
	+E/-W	0.00 ft	Easting:	1,741,123.16 usft	Longitude:	-80.64143700
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	1,292.91 ft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	11/28/2018	-8.780	66.837	52,006.23269133

Design	rev3			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	152.02

Plan Survey Tool Program	Date	5/2/2019		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	10,894.05 rev3 (Original Hole)	MWD	MWD - Standard

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Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Fitzgerald 08 HM (slot V)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1292.91ft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1292.91ft
Site:	Fitzgerald	North Reference:	Grid
Well:	Fitzgerald 08 HM (slot V)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
1,340.00	0.00	0.00	1,340.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
1,440.00	3.00	345.00	1,439.95	2.53	-0.68	3.00	3.00	0.00	345.000	
1,592.20	4.97	310.00	1,591.80	10.62	-6.76	2.00	1.29	-23.00	-69.347	
4,210.24	4.97	310.00	4,200.00	156.41	-180.51	0.00	0.00	0.00	0.000	
4,227.39	4.97	313.96	4,217.08	157.40	-181.61	2.00	0.03	23.08	91.168	
6,228.31	4.97	313.96	6,210.47	277.84	-306.52	0.00	0.00	0.00	0.000	
6,912.98	50.00	150.89	6,818.59	51.85	-191.41	8.00	6.58	-23.82	-164.149	
7,303.13	89.00	149.88	6,952.59	-259.54	-13.91	10.00	10.00	-0.26	-1.609	
10,894.05	89.00	149.88	7,015.00	-3,365.03	1,787.95	0.00	0.00	0.00	0.000	Fitzgerald-08HM BHL

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Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Fitzgerald
 Well: Fitzgerald 08 HM (slot V)
 Wellbore: Original Hole
 Design: rev3

Local Co-ordinate Reference: Well Fitzgerald 08 HM (slot V)
 TVD Reference: GL @ 1292.91ft
 MD Reference: GL @ 1292.91ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
100.00	0.00	0.00	100.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
200.00	0.00	0.00	200.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
300.00	0.00	0.00	300.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
400.00	0.00	0.00	400.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
500.00	0.00	0.00	500.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
600.00	0.00	0.00	600.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
700.00	0.00	0.00	700.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
800.00	0.00	0.00	800.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
900.00	0.00	0.00	900.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
1,340.00	0.00	0.00	1,340.00	0.00	0.00	14,454,578.46	1,741,123.16	39.80129100	-80.64143700
KOP Begin 3°/100' build									
1,400.00	1.80	345.00	1,399.99	0.91	-0.24	14,454,579.37	1,741,122.91	39.80129350	-80.64143786
1,440.00	3.00	345.00	1,439.95	2.53	-0.68	14,454,580.99	1,741,122.48	39.80129795	-80.64143938
Begin 2°/100' build/turn									
1,500.00	3.60	326.83	1,499.86	5.62	-2.12	14,454,584.08	1,741,121.04	39.80130647	-80.64144445
1,592.20	4.97	310.00	1,591.80	10.62	-6.76	14,454,589.08	1,741,116.40	39.80132023	-80.64146092
Begin 4.97° tangent									
1,600.00	4.97	310.00	1,599.57	11.05	-7.28	14,454,589.51	1,741,115.88	39.80132143	-80.64146275
1,700.00	4.97	310.00	1,699.20	16.62	-13.91	14,454,595.08	1,741,109.24	39.80133679	-80.64148630
1,800.00	4.97	310.00	1,798.82	22.19	-20.55	14,454,600.65	1,741,102.60	39.80135216	-80.64150985
1,900.00	4.97	310.00	1,898.45	27.76	-27.19	14,454,606.22	1,741,095.97	39.80136752	-80.64153340
2,000.00	4.97	310.00	1,998.07	33.32	-33.82	14,454,611.79	1,741,089.33	39.80138289	-80.64155695
2,100.00	4.97	310.00	2,097.69	38.89	-40.46	14,454,617.35	1,741,082.70	39.80139826	-80.64158050
2,200.00	4.97	310.00	2,197.32	44.46	-47.10	14,454,622.92	1,741,076.06	39.80141362	-80.64160405
2,300.00	4.97	310.00	2,296.94	50.03	-53.73	14,454,628.49	1,741,069.42	39.80142899	-80.64162760
2,400.00	4.97	310.00	2,396.57	55.60	-60.37	14,454,634.06	1,741,062.79	39.80144435	-80.64165115
2,500.01	4.97	310.00	2,496.19	61.17	-67.01	14,454,639.63	1,741,056.15	39.80145972	-80.64167470
2,600.01	4.97	310.00	2,595.82	66.74	-73.64	14,454,645.20	1,741,049.51	39.80147509	-80.64169825
2,700.01	4.97	310.00	2,695.44	72.31	-80.28	14,454,650.77	1,741,042.88	39.80149045	-80.64172180
2,800.01	4.97	310.00	2,795.06	77.87	-86.92	14,454,656.33	1,741,036.24	39.80150582	-80.64174535
2,900.01	4.97	310.00	2,894.69	83.44	-93.55	14,454,661.90	1,741,029.60	39.80152118	-80.64176890
3,000.01	4.97	310.00	2,994.31	89.01	-100.19	14,454,667.47	1,741,022.97	39.80153655	-80.64179245
3,100.01	4.97	310.00	3,093.94	94.58	-106.83	14,454,673.04	1,741,016.33	39.80155192	-80.64181600
3,200.01	4.97	310.00	3,193.56	100.15	-113.46	14,454,678.61	1,741,009.69	39.80156728	-80.64183955
3,300.01	4.97	310.00	3,293.19	105.72	-120.10	14,454,684.18	1,741,003.06	39.80158265	-80.64186310
3,400.01	4.97	310.00	3,392.81	111.29	-126.74	14,454,689.75	1,740,996.42	39.80159801	-80.64188665
3,500.01	4.97	310.00	3,492.43	116.86	-133.37	14,454,695.32	1,740,989.78	39.80161338	-80.64191020
3,600.01	4.97	310.00	3,592.06	122.42	-140.01	14,454,700.88	1,740,983.15	39.80162875	-80.64193375
3,700.01	4.97	310.00	3,691.68	127.99	-146.65	14,454,706.45	1,740,976.51	39.80164411	-80.64195730
3,800.01	4.97	310.00	3,791.31	133.56	-153.28	14,454,712.02	1,740,969.87	39.80165948	-80.64198085
3,900.01	4.97	310.00	3,890.93	139.13	-159.92	14,454,717.59	1,740,963.24	39.80167484	-80.64200439
4,000.01	4.97	310.00	3,990.55	144.70	-166.56	14,454,723.16	1,740,956.60	39.80169021	-80.64202794
4,100.01	4.97	310.00	4,090.18	150.27	-173.19	14,454,728.73	1,740,949.96	39.80170558	-80.64205149
4,200.01	4.97	310.00	4,189.80	155.84	-179.83	14,454,734.30	1,740,943.33	39.80172094	-80.64207504
4,210.24	4.97	310.00	4,200.00	156.41	-180.51	14,454,734.87	1,740,942.65	39.80172251	-80.64207745
Begin 2°/100' turn									
4,227.39	4.97	313.96	4,217.08	157.40	-181.61	14,454,735.86	1,740,941.54	39.80172526	-80.64208137
Begin 4.97° tangent									
4,300.01	4.97	313.96	4,289.43	161.77	-186.15	14,454,740.23	1,740,937.01	39.80173731	-80.64209745

Database: DB_Jul2216dt_v14
 Company: Tug Hill Operating LLC
 Project: Marshall County, West Virginia
 Site: Fitzgerald
 Well: Fitzgerald 08 HM (slot V)
 Wellbore: Original Hole
 Design: rev3

Local Co-ordinate Reference: Well Fitzgerald 08 HM (slot V)
 TVD Reference: GL @ 1292.91ft
 MD Reference: GL @ 1292.91ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,400.01	4.97	313.96	4,389.05	167.79	-192.39	14,454,746.25	1,740,930.77	39.80175391	-80.64211959
4,500.01	4.97	313.96	4,488.67	173.81	-198.63	14,454,752.27	1,740,924.53	39.80177051	-80.64214173
4,600.01	4.97	313.96	4,588.30	179.83	-204.87	14,454,758.29	1,740,918.28	39.80178710	-80.64216387
4,700.01	4.97	313.96	4,687.92	185.85	-211.12	14,454,764.31	1,740,912.04	39.80180370	-80.64218601
4,800.01	4.97	313.96	4,787.54	191.87	-217.36	14,454,770.33	1,740,905.80	39.80182030	-80.64220815
4,900.01	4.97	313.96	4,887.17	197.89	-223.60	14,454,776.35	1,740,899.56	39.80183690	-80.64223029
5,000.01	4.97	313.96	4,986.79	203.91	-229.84	14,454,782.37	1,740,893.31	39.80185350	-80.64225243
5,100.01	4.97	313.96	5,086.41	209.93	-236.09	14,454,788.39	1,740,887.07	39.80187010	-80.64227457
5,200.01	4.97	313.96	5,186.04	215.94	-242.33	14,454,794.40	1,740,880.83	39.80188670	-80.64229671
5,300.01	4.97	313.96	5,285.66	221.96	-248.57	14,454,800.42	1,740,874.59	39.80190330	-80.64231885
5,400.01	4.97	313.96	5,385.29	227.98	-254.81	14,454,806.44	1,740,868.34	39.80191989	-80.64234099
5,500.01	4.97	313.96	5,484.91	234.00	-261.06	14,454,812.46	1,740,862.10	39.80193649	-80.64236313
5,600.01	4.97	313.96	5,584.53	240.02	-267.30	14,454,818.48	1,740,855.86	39.80195309	-80.64238527
5,700.01	4.97	313.96	5,684.16	246.04	-273.54	14,454,824.50	1,740,849.62	39.80196969	-80.64240742
5,800.01	4.97	313.96	5,783.78	252.06	-279.78	14,454,830.52	1,740,843.37	39.80198629	-80.64242956
5,900.01	4.97	313.96	5,883.40	258.08	-286.03	14,454,836.54	1,740,837.13	39.80200289	-80.64245170
6,000.01	4.97	313.96	5,983.03	264.10	-292.27	14,454,842.56	1,740,830.89	39.80201949	-80.64247384
6,100.01	4.97	313.96	6,082.65	270.12	-298.51	14,454,848.58	1,740,824.65	39.80203608	-80.64249598
6,200.01	4.97	313.96	6,182.27	276.14	-304.75	14,454,854.60	1,740,818.40	39.80205268	-80.64251812
6,228.31	4.97	313.96	6,210.47	277.84	-306.52	14,454,856.30	1,740,816.64	39.80205738	-80.64252438
Begin 8°/100° build/turn									
6,300.01	1.66	204.80	6,282.08	279.06	-309.19	14,454,857.52	1,740,813.96	39.80206075	-80.64253389
6,400.01	9.05	158.31	6,381.60	270.42	-306.89	14,454,848.88	1,740,816.27	39.80203702	-80.64252580
6,500.01	17.00	154.20	6,478.95	249.92	-297.60	14,454,828.38	1,740,825.56	39.80198061	-80.64249303
6,600.01	24.98	152.67	6,572.23	217.94	-281.51	14,454,796.40	1,740,841.64	39.80189262	-80.64243620
6,700.01	32.97	151.84	6,659.64	175.12	-258.94	14,454,753.58	1,740,864.22	39.80177477	-80.64235643
6,800.01	40.97	151.31	6,739.47	122.28	-230.31	14,454,700.75	1,740,892.84	39.80162935	-80.64225527
6,900.01	48.96	150.93	6,810.17	60.46	-196.20	14,454,638.92	1,740,926.96	39.80145920	-80.64213469
6,912.98	50.00	150.89	6,818.59	51.85	-191.41	14,454,630.31	1,740,931.75	39.80143550	-80.64211776
Begin 10°/100° build/turn									
7,000.01	58.70	150.61	6,869.27	-9.79	-156.87	14,454,568.67	1,740,966.28	39.80126583	-80.64199567
7,100.01	68.70	150.34	6,913.52	-87.69	-112.74	14,454,490.77	1,741,010.42	39.80105142	-80.64183964
7,200.01	78.69	150.10	6,941.56	-170.89	-65.12	14,454,407.57	1,741,058.03	39.80082242	-80.64167130
7,300.01	88.69	149.88	6,952.53	-256.85	-15.47	14,454,321.61	1,741,107.68	39.80058580	-80.64149576
7,303.13	89.00	149.88	6,952.59	-259.54	-13.91	14,454,318.92	1,741,109.24	39.80057839	-80.64149023
Begin 89.00° lateral									
7,400.01	89.00	149.88	6,954.27	-343.33	34.70	14,454,235.13	1,741,157.86	39.80034775	-80.64131834
7,500.02	89.00	149.88	6,956.01	-429.81	84.88	14,454,148.65	1,741,208.04	39.80010970	-80.64114092
7,600.02	89.00	149.88	6,957.75	-516.30	135.06	14,454,062.17	1,741,258.22	39.79987165	-80.64096350
7,700.02	89.00	149.88	6,959.49	-602.78	185.24	14,453,975.68	1,741,308.39	39.79963360	-80.64078609
7,800.02	89.00	149.88	6,961.23	-689.26	235.42	14,453,889.20	1,741,358.57	39.79939555	-80.64060867
7,900.02	89.00	149.88	6,962.96	-775.74	285.60	14,453,802.72	1,741,408.75	39.79915749	-80.64043126
8,000.02	89.00	149.88	6,964.70	-862.22	335.77	14,453,716.24	1,741,458.93	39.79891944	-80.64025385
8,100.02	89.00	149.88	6,966.44	-948.71	385.95	14,453,629.76	1,741,509.11	39.79868139	-80.64007643
8,200.02	89.00	149.88	6,968.18	-1,035.19	436.13	14,453,543.28	1,741,559.29	39.79844333	-80.63989902
8,300.02	89.00	149.88	6,969.92	-1,121.67	486.31	14,453,456.79	1,741,609.47	39.79820528	-80.63972161
8,400.02	89.00	149.88	6,971.65	-1,208.15	536.49	14,453,370.31	1,741,659.64	39.79796722	-80.63954421
8,500.02	89.00	149.88	6,973.39	-1,294.63	586.67	14,453,283.83	1,741,709.82	39.79772917	-80.63936680
8,600.02	89.00	149.88	6,975.13	-1,381.12	636.85	14,453,197.35	1,741,760.00	39.79749112	-80.63918939
8,700.02	89.00	149.88	6,976.87	-1,467.60	687.02	14,453,110.87	1,741,810.18	39.79725306	-80.63901199
8,800.02	89.00	149.88	6,978.61	-1,554.08	737.20	14,453,024.38	1,741,860.36	39.79701501	-80.63883459
8,900.02	89.00	149.88	6,980.34	-1,640.56	787.38	14,452,937.90	1,741,910.54	39.79677695	-80.63865719
9,000.02	89.00	149.88	6,982.08	-1,727.04	837.56	14,452,851.42	1,741,960.71	39.79653889	-80.63847978
9,100.02	89.00	149.88	6,983.82	-1,813.53	887.74	14,452,764.94	1,742,010.89	39.79630084	-80.63830239



Planning Report - Geographic

4705102232

Database:	DB_Jul2216dt_v14	Local Co-ordinate Reference:	Well Fitzgerald 08 HM (slot V)
Company:	Tug Hill Operating LLC	TVD Reference:	GL @ 1292.91ft
Project:	Marshall County, West Virginia	MD Reference:	GL @ 1292.91ft
Site:	Fitzgerald	North Reference:	Grid
Well:	Fitzgerald 08 HM (slot V)	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev3		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,200.02	89.00	149.88	6,985.56	-1,900.01	937.92	14,452,678.46	1,742,061.07	39.79606278	-80.63812499	
9,300.02	89.00	149.88	6,987.30	-1,986.49	988.10	14,452,591.98	1,742,111.25	39.79582472	-80.63794759	
9,400.02	89.00	149.88	6,989.03	-2,072.97	1,038.27	14,452,505.49	1,742,161.43	39.79558667	-80.63777019	
9,500.02	89.00	149.88	6,990.77	-2,159.45	1,088.45	14,452,419.01	1,742,211.61	39.79534861	-80.63759280	
9,600.02	89.00	149.88	6,992.51	-2,245.94	1,138.63	14,452,332.53	1,742,261.78	39.79511055	-80.63741541	
9,700.02	89.00	149.88	6,994.25	-2,332.42	1,188.81	14,452,246.05	1,742,311.96	39.79487250	-80.63723801	
9,800.02	89.00	149.88	6,995.99	-2,418.90	1,238.99	14,452,159.57	1,742,362.14	39.79463444	-80.63706062	
9,900.02	89.00	149.88	6,997.72	-2,505.38	1,289.17	14,452,073.08	1,742,412.32	39.79439638	-80.63688323	
10,000.02	89.00	149.88	6,999.46	-2,591.86	1,339.35	14,451,986.60	1,742,462.50	39.79415832	-80.63670585	
10,100.02	89.00	149.88	7,001.20	-2,678.34	1,389.52	14,451,900.12	1,742,512.68	39.79392026	-80.63652846	
10,200.02	89.00	149.88	7,002.94	-2,764.83	1,439.70	14,451,813.64	1,742,562.86	39.79368220	-80.63635107	
10,300.02	89.00	149.88	7,004.68	-2,851.31	1,489.88	14,451,727.16	1,742,613.03	39.79344414	-80.63617369	
10,400.02	89.00	149.88	7,006.41	-2,937.79	1,540.06	14,451,640.68	1,742,663.21	39.79320608	-80.63599630	
10,500.02	89.00	149.88	7,008.15	-3,024.27	1,590.24	14,451,554.19	1,742,713.39	39.79296802	-80.63581892	
10,600.02	89.00	149.88	7,009.89	-3,110.75	1,640.42	14,451,467.71	1,742,763.57	39.79272996	-80.63564154	
10,700.02	89.00	149.88	7,011.63	-3,197.24	1,690.60	14,451,381.23	1,742,813.75	39.79249190	-80.63546416	
10,800.02	89.00	149.88	7,013.37	-3,283.72	1,740.77	14,451,294.75	1,742,863.93	39.79225384	-80.63528678	
10,894.04	89.00	149.88	7,015.00	-3,365.03	1,787.95	14,451,213.44	1,742,911.10	39.79203002	-80.63512001	
PBHL/TD 10894.04 MD/7015.00 TVD										
10,894.05	89.00	149.88	7,015.00	-3,365.03	1,787.95	14,451,213.43	1,742,911.11	39.79203000	-80.63512000	

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Fitzgerald-08HM LP r2	0.00	0.00	6,941.91	256.84	-333.29	14,454,835.30	1,740,789.87	39.80200000	-80.64262000	
- hit/miss target										
- plan misses target center by 261.52ft at 6824.85ft MD (6757.94 TVD, 107.72 N, -222.33 E)										
- Point										
Fitzgerald-08HM BHL r2	0.00	0.00	7,015.00	-3,365.03	1,787.95	14,451,213.43	1,742,911.11	39.79203000	-80.63512000	
- plan hits target center										
- Point										

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
1,340.00	1,340.00	0.00	0.00	KOP Begin 3°/100' build	
1,440.00	1,439.95	2.53	-0.68	Begin 2°/100' build/turn	
1,592.20	1,591.80	10.62	-6.76	Begin 4.97° tangent	
4,210.24	4,200.00	156.41	-180.51	Begin 2°/100' turn	
4,227.39	4,217.08	157.40	-181.61	Begin 4.97° tangent	
6,228.31	6,210.47	277.84	-306.52	Begin 8°/100' build/turn	
6,912.98	6,818.59	51.85	-191.41	Begin 10°/100' build/turn	
7,303.13	6,952.59	-259.54	-13.91	Begin 89.00° lateral	
10,894.04	7,015.00	-3,365.03	1,787.95	PBHL/TD 10894.04 MD/7015.00 TVD	

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Area of Review

4705102232

Sources of information to Support 35CSR8 - 5.11: 9.3 et seq.

Description of process to identify potential pathways for well communication during hydraulic fracturing activities.

Data Sources Reviewed:

1. IHS Well Data service: Public nationwide data service that pulls directly from State agency Oil and Gas databases
2. Farm Maps
3. Topo Maps: Recent and older (contact WVGES)
4. Check with DPS

Contacted Devin Ducoeur 724-705-0444, dducoeur@dpslandservices.com DPS GIS (05/24/2018) to have him make maps of the wellbores with his information. DPS utilizes WVGES maps for their mapping seems it as the best publicly available. See attached map he provided.

Request maps for:

1. Wellbore with IHS All Wells Layer
2. Map with Farm lines overlain and any well spots identified on Farm Maps
3. More recent (1970s vintage) topos and older topos

Discussion with Phil Dinterman WVGES GIS Department (7/15/2016)

- WVGES has plotted every well spot they have access to and are aware of with that contains a coordinate. 30000, 70000, and 90000 series wells are available via the WVGES online map. Some locations aren't great due to vintage and manipulation of maps through time
- 30000 series – any well drilled prior to 1929 – APIs were not assigned to original wells
- 70000 series – Well spots pulled from old Farm line maps that the WVGES has access to
- 90000 series – Any sources that the WVGES has access that shows a well spot but has no additional supporting information. DEP does not have 90000 series on their maps.
- There can be duplication between wells in the 3 series
- Phil indicated that other Operators are providing a screenshot of the WVGES map with their planned well and using that for permits

Permit well - Fitzgerald S-8HM

Wells within 500' Buffer

Note: Well spots depicted on Area of Review map (page 3) are derived from State held coordinates. The spots may differ from those depicted on the Well Plat because the Plat locations represent actual field surveyed locations. Please refer to the Plat for surveyed well spots

4705102232

API Number	Operator Name	Total Depth	Perforated Fms	Producing zones not perforated	Is this well "known or reasonably expected to penetrate a depth that could be within the range of Fracture propagation"? 1000' is max limit I would assign to wells that might be within in range of fracture propagation	Comments
4705170625	Unknown	Unknown	Unknown	Unknown	Unknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Marcellus well.	State records are incomplete
4705100614	East Resources	6461' TVD 12725' MD	Unknown	Unknown	Unknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Marcellus well.	Plugged 8/27/2001
4705100901	Consolidation Coal Co.	Unknown	Unknown	Unknown	Unknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Marcellus well.	Plugged 3/20/2003
4705100393	CNX Gas Co	3062' TVD	Gordon, Big I	Unknown	No, This was a shallow producer that falls outside if the 1000' range of fracture propogation.	Plugged 12/4/2002
4705100933	Consolidation Coal Co.	Unknown	Unknown	Unknown	Unknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Marcellus well.	Plugged 8/20/2004
4705100951	Consolidation Coal Co.	Unknown	Unknown	Unknown	Unknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Marcellus well.	Plugged 9/7/2004
4705170616	Unknown	Unknown	Unknown	Unknown	Unknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Marcellus well.	State records are incomplete
4705170617	Unknown	Unknown	Unknown	Unknown	Unknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Marcellus well.	State records are incomplete
4705170054	South Penn Oil	Unknown	Unknown	Unknown	Unknown but unlikely. The well likely represents an old shallow well that is too shallow to be effected by fracturing in the planned Marcellus well.	State records are incomplete
4705100887	Consolidation Coal Co.	2798' TVD	Gordon	Unknown	No, This was a shallow producer that falls outside if the 1000' range of fracture propogation.	Plugged 2/6/2003

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WV Geological & Economic Survey Well: County = 51 Permit = 00593

Location Information View Map

WELL	COUNTY	PERMIT	SURF_DISTRICT	QUAD	T5	QUAD	T4	LOC	LOC	UTM	UTM
47050293	Mingo	53		26	26	26	26	26	26	26	26

There is no Bottom Hole Location data for this well.

Owner Information:

WELL	CMP_ID	SURF	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VS	PROP_IND	FM	TIMEEST_PR
47050293	47050293	47050293	Completed	Joseph B Pugh	5					Remco Company	200	200		

Completion Information:

WELL	CMP_ID	SURF	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VS	PROP_IND	FM	TIMEEST_PR
47050293	47050293	47050293	Completed	Joseph B Pugh	5					Remco Company	200	200		

Pay/Show/Well Information:

WELL	CMP_ID	SURF	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VS	PROP_IND	FM	TIMEEST_PR
47050293	47050293	47050293	Completed	Joseph B Pugh	5					Remco Company	200	200		

Production Gas Information (Volumes in Mcf) ** 2019 data for NGA wells only. Other wells are incomplete at this time.

WELL	CMP_ID	SURF	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VS	PROP_IND	FM	TIMEEST_PR
47050293	47050293	47050293	Completed	Joseph B Pugh	5					Remco Company	200	200		

Production Oil Information (Volumes in Bbl) ** Some operators may have reported NGL under Oil. 2019 data for NGA wells only. Other wells are incomplete at this time.

WELL	CMP_ID	SURF	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VS	PROP_IND	FM	TIMEEST_PR
47050293	47050293	47050293	Completed	Joseph B Pugh	5					Remco Company	200	200		

There is no Production NGL data for this well. ** some operators may have reported NGL under Oil

There is no Production Water data for this well.

Stratigraphy Information:

WELL	CMP_ID	SURF	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VS	PROP_IND	FM	TIMEEST_PR
47050293	47050293	47050293	Completed	Joseph B Pugh	5					Remco Company	200	200		

There is no Wireline (E-Log) data for this well.

Plugging Information:

WELL	CMP_ID	SURF	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VS	PROP_IND	FM	TIMEEST_PR
47050293	47050293	47050293	Completed	Joseph B Pugh	5					Remco Company	200	200		

WV Geological & Economic Survey Well: County = 51 Permit = 00593

Well Reassignment Information: Reassigned From

WELL	COUNTY	PERMIT	SURF_DISTRICT	QUAD	T5	QUAD	T4	LOC	LOC	UTM	UTM
47050293	Mingo	53		26	26	26	26	26	26	26	26

Location Information View Map

There is no Bottom Hole Location data for this well.

Owner Information:

WELL	CMP_ID	SURF	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VS	PROP_IND	FM	TIMEEST_PR
47050293	47050293	47050293	Completed	Joseph B Pugh	5					Remco Company	200	200		

Completion Information:

WELL	CMP_ID	SURF	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VS	PROP_IND	FM	TIMEEST_PR
47050293	47050293	47050293	Completed	Joseph B Pugh	5					Remco Company	200	200		

There is no Pay data for this well.

There is no Production Gas data for this well.

There is no Production Oil data for this well. ** some operators may have reported NGL under Oil

There is no Production NGL data for this well. ** some operators may have reported NGL under Oil

There is no Production Water data for this well.

There is no Stratigraphy data for this well.

There is no Wireline (E-Log) data for this well.

Plugging Information:

WELL	CMP_ID	SURF	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VS	PROP_IND	FM	TIMEEST_PR
47050293	47050293	47050293	Completed	Joseph B Pugh	5					Remco Company	200	200		

There is no Sample data for this well.

WV Geological & Economic Survey Well: County = 51 Permit = 00551

Location Information View Map

WELL	COUNTY	PERMIT	SURF_DISTRICT	QUAD	T5	QUAD	T4	LOC	LOC	UTM	UTM
47050291	Mingo	53		26	26	26	26	26	26	26	26

There is no Bottom Hole Location data for this well.

Owner Information:

WELL	CMP_ID	SURF	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VS	PROP_IND	FM	TIMEEST_PR
47050291	47050291	47050291	Completed	Joseph B Pugh	5					Remco Company	200	200		

Completion Information:

WELL	CMP_ID	SURF	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VS	PROP_IND	FM	TIMEEST_PR
47050291	47050291	47050291	Completed	Joseph B Pugh	5					Remco Company	200	200		

There is no Pay data for this well.

There is no Production Gas data for this well.

There is no Production Oil data for this well. ** some operators may have reported NGL under Oil

There is no Production NGL data for this well. ** some operators may have reported NGL under Oil

There is no Production Water data for this well.

There is no Stratigraphy data for this well.

There is no Wireline (E-Log) data for this well.

Plugging Information:

WELL	CMP_ID	SURF	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR_AT_COMPLETION	PROP_VS	PROP_IND	FM	TIMEEST_PR
47050291	47050291	47050291	Completed	Joseph B Pugh	5					Remco Company	200	200		

There is no Sample data for this well.

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WV Geologic & Economic Survey Well: County = 51 Permit = 70516

Location Information - View Log

APN	COUNTY	PERMIT	TAX_DISTRICT	QUAD_7E	QUAD_7E	QUAD_1E	LAT_DD	LONG_DD	DYME	DYME
470410017	Wayne	70516	Wayne	24	25	26	39°32'21.42"	-81°30'37.21"	242012.4	242012.4

There is no Bottom Hole Location data for this well.

Owner Information

APN	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR	COMPLETION	PROP_ID	PROP_TRTD	TRM_EST	TRM
470410017				Wayne	51000	00000	00000	00000		Wayne	00000				

Completion Information

APN	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR	COMPLETION	PROP_ID	PROP_TRTD	TRM_EST	TRM
470410017				Wayne	51000	00000	00000	00000		Wayne	00000				

There is no Pay data for this well.

There is no Production Gas data for this well.

There is no Production Oil data for this well. ** some operators may have reported NGL under Oil.

There is no Production NGL data for this well. ** some operators may have reported NGL under Oil.

There is no Production Water data for this well.

There is no Stratigraphy data for this well.

There is no Wireline (E-Log) data for this well.

There is no Plugging data for this well.

There is no Sample data for this well.

WV Geologic & Economic Survey Well: County = 51 Permit = 70517

Location Information - View Log

APN	COUNTY	PERMIT	TAX_DISTRICT	QUAD_7E	QUAD_7E	QUAD_1E	LAT_DD	LONG_DD	DYME	DYME
470410017	Wayne	70517	Wayne	24	25	26	39°32'21.42"	-81°30'37.21"	242012.4	242012.4

There is no Bottom Hole Location data for this well.

Owner Information

APN	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR	COMPLETION	PROP_ID	PROP_TRTD	TRM_EST	TRM
470410017				Wayne	51000	00000	00000	00000		Wayne	00000				

Completion Information

APN	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR	COMPLETION	PROP_ID	PROP_TRTD	TRM_EST	TRM
470410017				Wayne	51000	00000	00000	00000		Wayne	00000				

There is no Pay data for this well.

There is no Production Gas data for this well.

There is no Production Oil data for this well. ** some operators may have reported NGL under Oil.

There is no Production NGL data for this well. ** some operators may have reported NGL under Oil.

There is no Production Water data for this well.

There is no Stratigraphy data for this well.

There is no Wireline (E-Log) data for this well.

There is no Plugging data for this well.

There is no Sample data for this well.

WV Geologic & Economic Survey Well: County = 51 Permit = 70054

Well Reassignment Information - Reassigned To

OLD_COUNTY	OLD_PERMIT	NEW_COUNTY	NEW_PERMIT
41	70054	41	70054

Location Information - View Log

APN	COUNTY	PERMIT	TAX_DISTRICT	QUAD_7E	QUAD_7E	QUAD_1E	LAT_DD	LONG_DD	DYME	DYME
470410024	Wayne	70054	Wayne	24	25	26	39°32'21.42"	-81°30'37.21"	242012.4	242012.4

There is no Bottom Hole Location data for this well.

Owner Information

APN	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR	COMPLETION	PROP_ID	PROP_TRTD	TRM_EST	TRM
470410024				Wayne	51000	00000	00000	00000		Wayne	00000				

Completion Information

APN	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR	COMPLETION	PROP_ID	PROP_TRTD	TRM_EST	TRM
470410024				Wayne	51000	00000	00000	00000		Wayne	00000				

There is no Pay data for this well.

There is no Production Gas data for this well.

There is no Production Oil data for this well. ** some operators may have reported NGL under Oil.

There is no Production NGL data for this well. ** some operators may have reported NGL under Oil.

There is no Production Water data for this well.

There is no Stratigraphy data for this well.

There is no Wireline (E-Log) data for this well.

There is no Plugging data for this well.

There is no Sample data for this well.

WV Geologic & Economic Survey Well: County = 51 Permit = 00887

Well Reassignment Information - Reassigned From

OLD_COUNTY	OLD_PERMIT	NEW_COUNTY	NEW_PERMIT
41	70074	41	800

Location Information - View Log

APN	COUNTY	PERMIT	TAX_DISTRICT	QUAD_7E	QUAD_7E	QUAD_1E	LAT_DD	LONG_DD	DYME	DYME
470410007	Wayne	887	Wayne	24	25	26	39°32'21.42"	-81°30'37.21"	242012.4	242012.4

There is no Bottom Hole Location data for this well.

Owner Information

APN	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR	COMPLETION	PROP_ID	PROP_TRTD	TRM_EST	TRM
470410007	10	001		Wayne	51000	00000	00000	00000		Wayne	00000				

Completion Information

APN	CMP_ID	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR	COMPLETION	PROP_ID	PROP_TRTD	TRM_EST	TRM
470410007	10	001		Wayne	51000	00000	00000	00000		Wayne	00000				

Pay/Seal/Tester Information

APN	CMP_ID	ACTIVITY	PRODUCTION	REVISION	DEPTH_TOP	PI_TOP	DEPTH_BOTTOM	PI_BOTTOM	Q_BEST	Q_APT	Q_WATER	Q_APT
470410007	10	001	Pay	Oil	2703	2703	2703	2703	0	0	0	0

There is no Production Gas data for this well.

There is no Production Oil data for this well. ** some operators may have reported NGL under Oil.

There is no Production NGL data for this well. ** some operators may have reported NGL under Oil.

There is no Production Water data for this well.

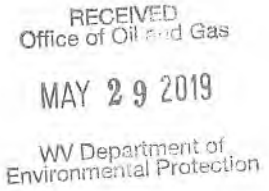
There is no Stratigraphy data for this well.

There is no Wireline (E-Log) data for this well.

Plugging Information

APN	CMP_ID	DEPTH	PERF
470410007	10	2703	

There is no Sample data for this well.



4705102232

MEADE
MARSHALL

LIBERTY

Legend

- Well Locations (ims.wvgs.wvnet.edu)
- Fitzgerald - 08HM
- 500 Ft. Buffer
- Marcellus Drilled Laterals
- Utica Drilled Laterals
- ▭ Counties
- ▭ Districts



Map Created: May 24, 2019

Fitzgerald - 08HM

Meade District

Marshall County, WV

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Environmental Protection

Map Prepared by:



Notes:

All locations are approximate and are for visualization purposes only.



WW-9
(4/16)

API Number 47 - 051 - _____
Operator's Well No. Fitzgerald S-8HM

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Tug Hill Operating, LLC OP Code 494510851

Watershed (HUC 10) Upper Fish Creek Quadrangle Glen Easton 7.5'

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes No

Will a pit be used? Yes No

If so, please describe anticipated pit waste: AST Tanks with proper containment will be used for staging fresh water for frac and flow back water

Will a synthetic liner be used in the pit? Yes No If so, what ml.? AST Tanks will be used with proper contain⁺

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Undergound Injection (UIC Permit Number UIC 2459, UIC 965, UIC 359, UIC 2D0732540, UIC 2D0732523)
- Reuse (at API Number _____)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain _____)

Will closed loop system be used? If so, describe: Yes - For Vertical and Horizontal Drilling

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Air for vertical / Oil for Horizontal

-If oil based, what type? Synthetic, petroleum, etc. Synthetic Oil Base

Additives to be used in drilling medium? Barite for weight

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. All drill cuttings to be disposed of in a Landfill

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) N/A

-Landfill or offsite name/permit number? Wetzel County Sanitary Landfill (SWF-1021 / WV01091B5) and Westmoreland Sanitary Landfill, LLC (SAN1405 / PA DEP EC#1386426)

Permittee shall provide written notice to the Office of Oil and Gas of any load of drill cuttings or associated waste rejected at any West Virginia solid waste facility. The notice shall be provided within 24 hours of rejection and the permittee shall also disclose where it was properly disposed.

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature *Jim Pancake*
Company Official (Typed Name) Jim Pancake
Company Official Title Vice President - Geosciences

Subscribed and sworn before me this 13th day of May, 20 19

[Signature] Notary Public
My commission expires 2-10-2020

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Chester Arthur West IV, Notary Public
Pine Twp., Allegheny County
My Commission Expires Feb. 10, 2020
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

Tug Hill Operating, LLC

Proposed Revegetation Treatment: Acres Disturbed 7.44 Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 500 lbs/acre

Mulch 2.5 Tons/acre

Seed Mixtures

Temporary

Permanent

Seed Type	lbs/acre
Annual Ryegrass	40
Spring Oats	96

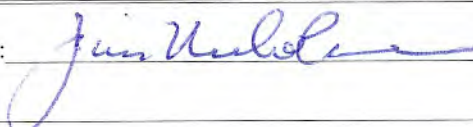
Seed Type	lbs/acre
Orchard Grass	12
Ladino	3
White Clover	2

Attach:

Maps(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided). If water from the pit will be land applied, include dimensions (L x W x D) of the pit, and dimensions (L x W), and area in acreage, of the land application area.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by:



Comments:

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MAY 29 2019

WV Department of
Environmental Protection

Title: Oil and Gas Inspector

Date: 5/16/19

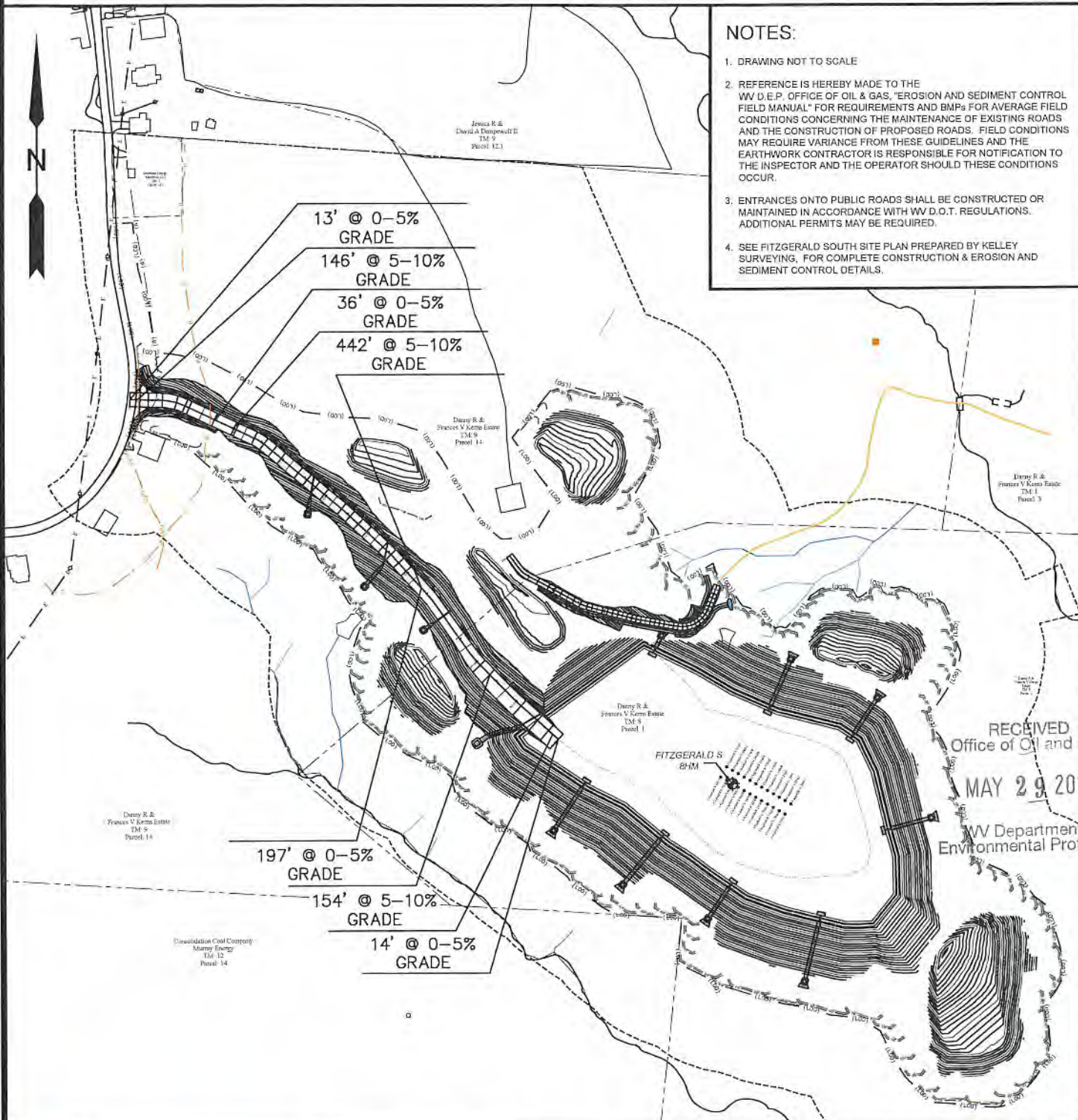
Field Reviewed? Yes

No

PROPOSED FITZGERALD S - 8HM 4705102232

NOTES:

1. DRAWING NOT TO SCALE
2. REFERENCE IS HEREBY MADE TO THE WV D.E.P. OFFICE OF OIL & GAS, "EROSION AND SEDIMENT CONTROL FIELD MANUAL" FOR REQUIREMENTS AND BMPs FOR AVERAGE FIELD CONDITIONS CONCERNING THE MAINTENANCE OF EXISTING ROADS AND THE CONSTRUCTION OF PROPOSED ROADS. FIELD CONDITIONS MAY REQUIRE VARIANCE FROM THESE GUIDELINES AND THE EARTHWORK CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION TO THE INSPECTOR AND THE OPERATOR SHOULD THESE CONDITIONS OCCUR.
3. ENTRANCES ONTO PUBLIC ROADS SHALL BE CONSTRUCTED OR MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATIONS. ADDITIONAL PERMITS MAY BE REQUIRED.
4. SEE FITZGERALD SOUTH SITE PLAN PREPARED BY KELLEY SURVEYING, FOR COMPLETE CONSTRUCTION & EROSION AND SEDIMENT CONTROL DETAILS.



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www.sls-wv.com

TOPO SECTION:		OPERATOR:	
GLEN EASTON 7.5'		PREPARED FOR: TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317	
COUNTY	DISTRICT		
MARSHALL	LIBERTY		
DRAWN BY	JOB NO.	DATE	SCALE
K.G.M.	8910	05/03/19	NONE

TUG HILL
OPERATING

47 05 \ 02232



Well Site Safety Plan

Tug Hill Operating, LLC

ju
5/16/19

Well Name: Fitzgerald S-8HM

Pad Location: Fitzgerald Pad

Marshall County, West Virginia

UTM (meters), NAD83, Zone 17:

Northing: 4,405,764.30

Easting: 530,695.36

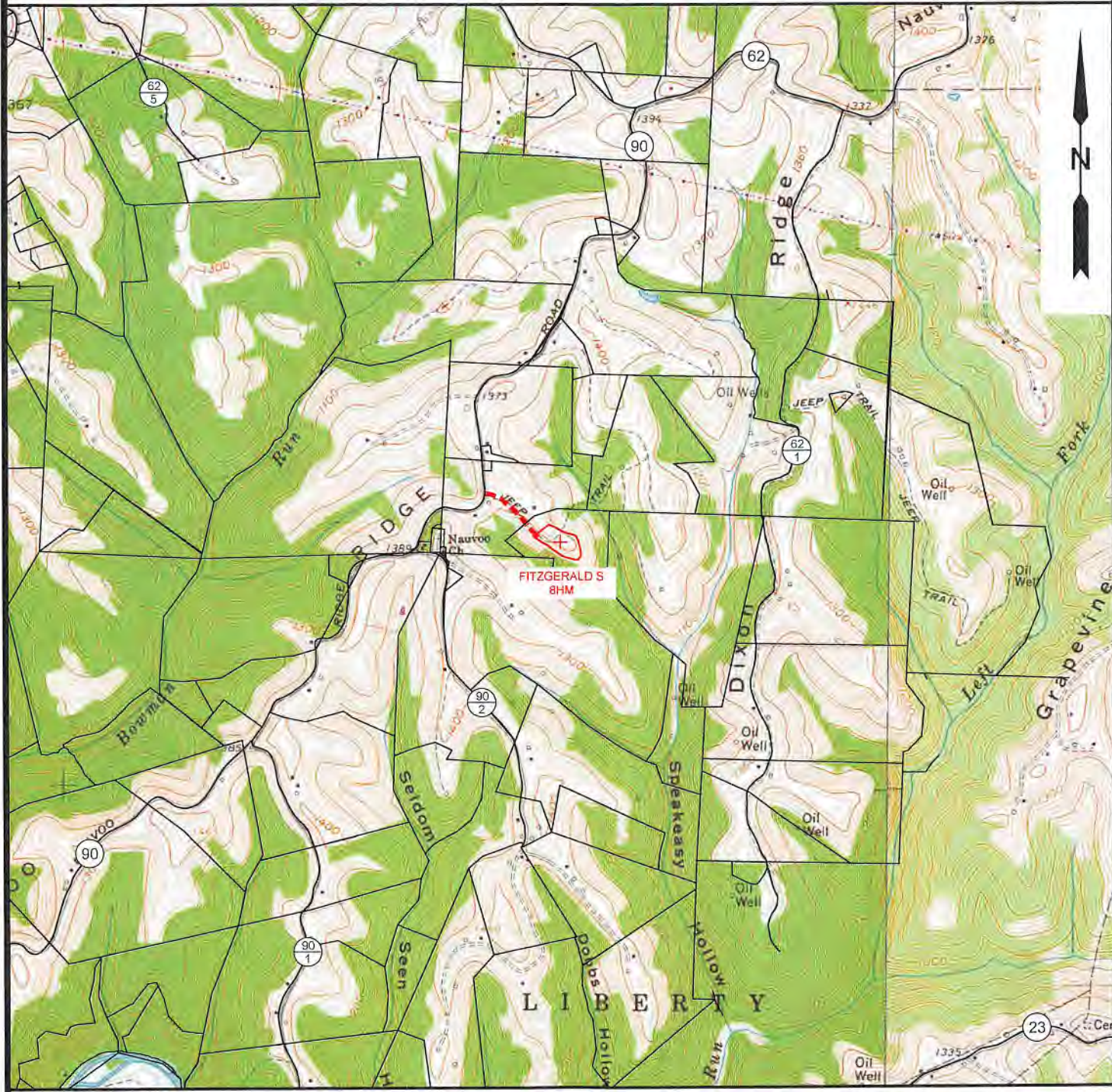
May 2019

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MAY 29 2019

WV Department of
Environmental Protection

PROPOSED FITZGERALD S - 8HM



NOTE: CLOSEST WATER PURVEYOR
CITY OF CAMERON - FRANK WALKER RESERVOIR
CAMDEN, WV

LAT: 39.829865
LON: -80.573724
LOCATED: N 62°00'46" E AT 21,684.26' FROM THE CENTER OF FITZGERALD S WELL PAD LOCATION.

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TOPO SECTION:		OPERATOR:	
GLEN EASTON 7.5' & CAMERON 7.5'		PREPARED FOR:	
COUNTY	DISTRICT	TUG HILL OPERATING, LLC	
MARSHALL	LIBERTY & MEADE	380 SOUTHPOINTE BLVD	
		SUITE 200	
		CANONSBURG, PA 15317	
DRAWN BY	JOB NO.	DATE	SCALE
K.G.M.	8910	05/03/2019	1" = 2000'

TUG HILL
OPERATING

**FITZGERALD S LEASE
WELL 8HM
TUG HILL OPERATING**

LEGEND

- LEASE LINE
- SURFACE LINE
- WELL LATERAL
- OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- TAX MAP-PARCEL SURFACE OWNER (SEE TABLE)
- LEASE # (SEE WW-6A1)

T.H. LATITUDE 39°50'00"
B.H. LATITUDE 39°50'00"

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

NAD'83 S.P.C.(FT) N. 476,008.22 E. 1,647,812.58
NAD'83 GEO. LAT-(N) 39.801291 LONG-(W) 80.641437
NAD'83 UTM (M) N. 4,405,764.30 E. 530,695.37

LANDING POINT

NAD'83 S.P.C.(FT) N. 475,748.9 E. 1,647,794.4
NAD'83 GEO. LAT-(N) 39.800578 LONG-(W) 80.641490
NAD'83 UTM (M) N. 4,405,685.2 E. 530,691.2

BOTTOM HOLE

NAD'83 S.P.C.(FT) N. 472,612.7 E. 1,649,544.7
NAD'83 GEO. LAT-(N) 39.792030 LONG-(W) 80.635120
NAD'83 UTM (M) N. 4,404,736.7 E. 531,240.4

T.H. LONGITUDE 80°37'30"
B.H. LONGITUDE 80°37'30"

TAG	SURFACE OWNER	PARCEL	ACRES
A	DANNY R. & FRANCES V. KERNS ESTATE	7-8-1	27.00
B	CONSOL MINING CO., LLC	9-12-14	127.61
C	DANNY R. KERNS	9-9-13	25 AC. 47 POLES

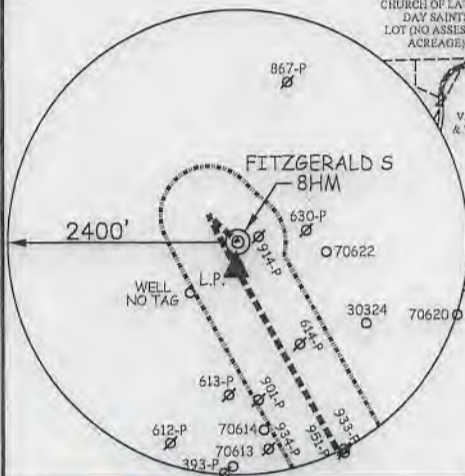
CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	12.72'	25.51'	N 31°33' W	12.59'
C2	3.72'	1.55'	S 57°16' W	2.89'
C3	64.47'	585.71'	S 24°13' E	64.43'
C4	189.03'	7039.26'	S 27°31' E	189.03'
C5	358.56'	32666.95'	S 28°44' E	358.55'

LINE	BEARING	DISTANCE
L1	N 49°03' W	226.89'
L2	N 45°06' W	175.06'
L3	N 07°28' E	1264.89'
L4	N 55°45' E	1949.79'

DETAIL SCALE: 1"=500'



NAD'83 GRID NORTH

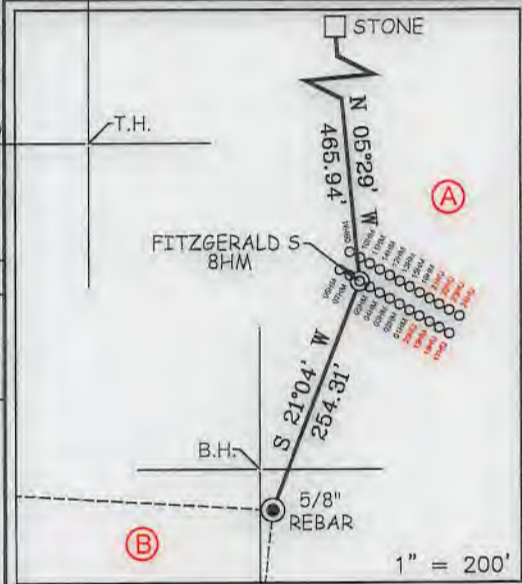


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www.slsrv.com

NOTES ON SURVEY

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

REFERENCES



11,672' T.H.

15,045' B.H.

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 APRIL 30, 20 19

REVISED MAY 13, 20 19

OPERATORS WELL NO. FITZGERALD S-8HM

API WELL NO. 47 - 051 - 02232
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/2500 FILE NO. 8910P8HMREV3.dwg
FITZGERALD S-8HM REV3

HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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



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

LOCATION: GROUND = 1,316.70' ELEVATION PROPOSED = 1,293.30' WATERSHED SPEAKEASY HOLLOW, A TRIBUTARY OF MAGGOTY RUN

DISTRICT LIBERTY COUNTY MARSHALL QUADRANGLE GLEN EASTON 7.5'

SURFACE OWNER DANNY R. KERNS ACREAGE 27.00±

ROYALTY OWNER DANNY S. KERNS, ET AL ACREAGE 27.00±

PROPOSED WORK: LEASE NO. SEE WW-6A1

DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X 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 TVD: 7,070' / TMD: 10,894'

WELL OPERATOR TUG HILL OPERATING, LLC
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500
FORT WORTH, TX 76107

DESIGNATED AGENT DIANNA STAMPER
ADDRESS 5400 D BIG TYLER ROAD
CHARLESTON, WV 25313

COUNTY NAME

PERMIT

4,618' T.H. 2,844' B.H.

**FITZGERALD S LEASE
WELL 8HM
TUG HILL OPERATING**

LEGEND

LEASE LINE	
SURFACE LINE	
WELL LATERAL	
OFFSET LINE	
TIE LINE	
CREEK	
ROAD	
COUNTY ROUTE	
PROPOSED WELL	
EXISTING WELL	
PERMITTED WELL	
TAX MAP-PARCEL SURFACE OWNER (SEE TABLE)	00-00
LEASE # (SEE WW-6A1)	(A)

T.H. LATITUDE 39°50'00"
B.H. LATITUDE 39°50'00"

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

NAD'83 S.P.C.(FT)	N. 476,008.22	E. 1,647,812.58
NAD'83 GEO.	LAT-(N) 39.801291	LONG-(W) 80.641437
NAD'83 UTM (M)	N. 4,405,764.30	E. 530,695.37

LANDING POINT

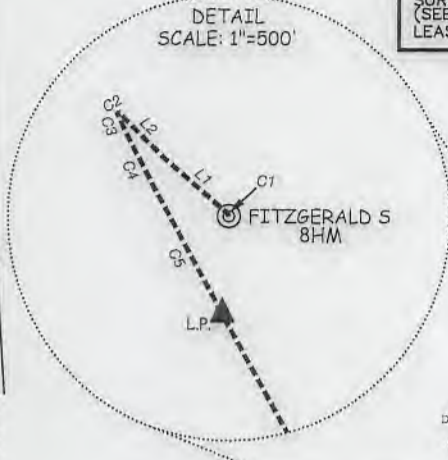
NAD'83 S.P.C.(FT)	N. 475,748.9	E. 1,647,794.4
NAD'83 GEO.	LAT-(N) 39.800578	LONG-(W) 80.641490
NAD'83 UTM (M)	N. 4,405,685.2	E. 530,691.2

BOTTOM HOLE

NAD'83 S.P.C.(FT)	N. 472,612.7	E. 1,649,544.7
NAD'83 GEO.	LAT-(N) 39.792030	LONG-(W) 80.635120
NAD'83 UTM (M)	N. 4,404,798.7	E. 531,240.4

T.H. LONGITUDE 80°37'30"
B.H. LONGITUDE 80°37'30"

DETAIL SCALE: 1"=500'

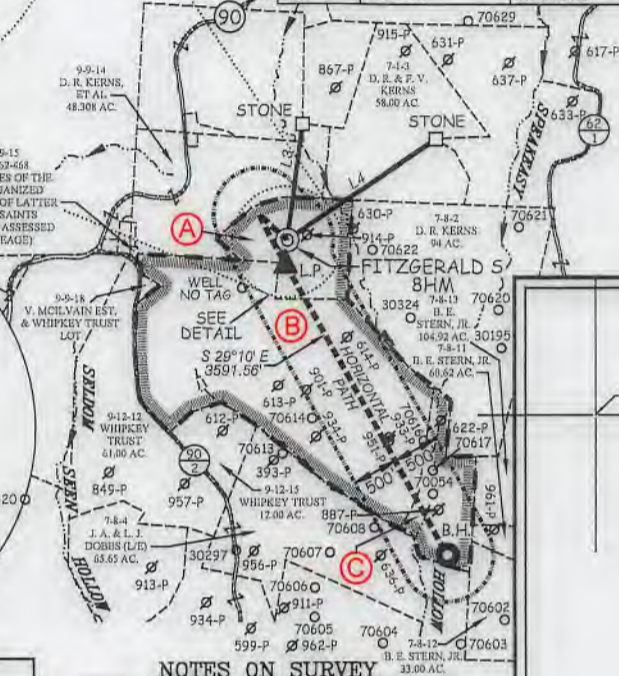
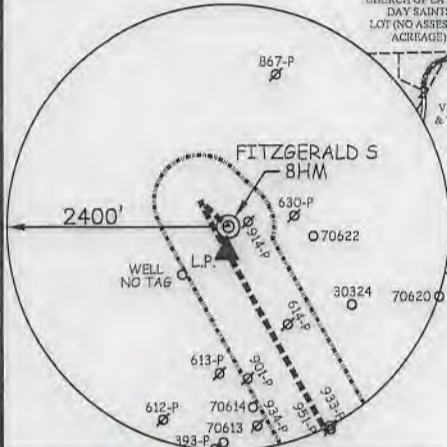


TAG	SURFACE OWNER	PARCEL	ACRES
A	DANNY R. & FRANCES V. KERNS ESTATE	7-8-1	27.00
B	CONSOL MINING CO., LLC	9-12-14	127.61
C	DANNY R. KERNS	9-9-13	25 AC. 47 POLES

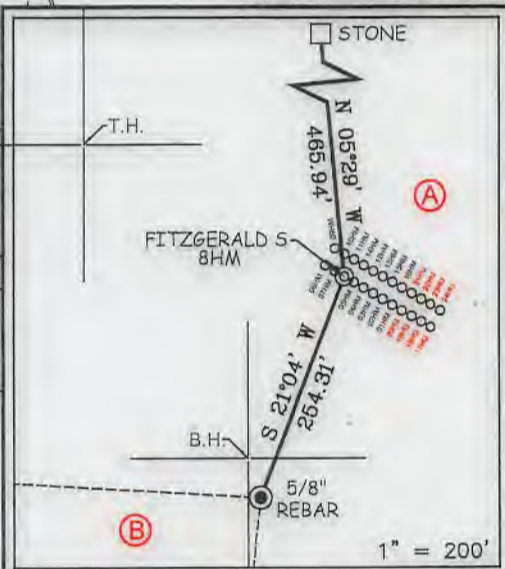
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NAD' 83 GRID NORTH



REFERENCES

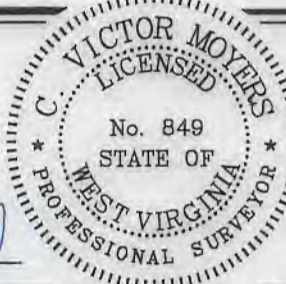


11,672' T.H. 15,045' B.H.

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www.slsuv.com

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 - WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'.

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

DATE APRIL 30, 20 19

REVISED MAY 13, 20 19

OPERATORS WELL NO. FITZGERALD S-8HM

API WELL NO. 47-51-02232

STATE COUNTY PERMIT

P.S. 849 C. Victor Moyers

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8910P8HMREV3.dwg
FITZGERALD S-8HM REV3

HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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: GROUND = 1,316.70' ELEVATION PROPOSED = 1,293.30' WATERSHED SPEAKEASY HOLLOW, A TRIBUTARY OF MAGGOTY RUN

DISTRICT LIBERTY COUNTY MARSHALL QUADRANGLE GLEN EASTON 7.5'

SURFACE OWNER DANNY R. KERNS ACREAGE 27.00±

ROYALTY OWNER DANNY S. KERNS, ET AL ACREAGE 27.00±

PROPOSED WORK: 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 TVD: 7,070' / TMD: 10,894'

WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 ADDRESS CT CORPORATION SYSTEM
FORT WORTH, TX 76107 ADDRESS 5400 D BIG TYLER ROAD
CHARLESTON, WV 25313

COUNTY NAME PERMIT

WW-6A1
(5/13)

Operator's Well No. Fitzgerald S-8HM

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
----------------------	-----------------------	-----------------------	---------	-----------

*See attached pages

**Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas**

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

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The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: Tug Hill Operating, LLC
 By: Amy L. Miller *Amy Miller*
 Its: Permitting Specialist - Appalachia Region

4705102232

WW-6A1 Supplement

Operator's Well No. Fitzgerald S - 8HM

Lease ID	Parcel	Tag	Grantor, Lessor, Etc.	Grantee, Lessee, Etc.	Royalty	Deed Book/Page	Assignment
10*25522	7-8-1	A	REGINA D FIGUEROA	AMERICAN PETROLEUM PARTNERS LLC	1/8+	1010 535	American Petroleum Partners Operating LLC to TH Exploration LLC: 43/515
10*25518	7-8-1	A	DANNY S KERNS, MARRIED MAN DEALING WITH HIS SOLE AND SEPARATE PROPERTY	AMERICAN PETROLEUM PARTNERS LLC	1/8+	1010 532	American Petroleum Partners Operating LLC to TH Exploration LLC: 43/515
10*25520	7-8-1	A	DEENA J PALOMO	AMERICAN PETROLEUM PARTNERS LLC	1/8+	1009 357	American Petroleum Partners Operating LLC to TH Exploration LLC: 43/515
10*18339	9-12-14	B	RESOURCE MINERALS HEADWATER I LP	TH EXPLORATION LLC	1/8+	940 448	N/A
10*22524	9-12-14	B	ALYCE LYNNIE MCGUEFIE	TH EXPLORATION LLC	1/8+	964 446	N/A
10*25518	9-9-13	C	DANNY S KERNS, MARRIED MAN DEALING WITH HIS SOLE AND SEPARATE PROPERTY	AMERICAN PETROLEUM PARTNERS LLC	1/8+	1010 532	American Petroleum Partners Operating LLC to TH Exploration LLC: 43/515
10*25520	9-9-13	C	DEENA J PALOMO	AMERICAN PETROLEUM PARTNERS LLC	1/8+	1009 357	American Petroleum Partners Operating LLC to TH Exploration LLC: 43/515
10*25522	9-9-13	C	REGINA D FIGUEROA	AMERICAN PETROLEUM PARTNERS LLC	1/8+	1010 535	American Petroleum Partners Operating LLC to TH Exploration LLC: 43/515

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Environmental Protection



May 23, 2019

WV Department of Environmental Protection
Office of Oil & Gas
601 57th Street, SE
Charleston, WV 25304
Attention: Laura Adkins

RE: Fitzgerald S-8HM

Subject: Road Crossing Letter

Dear Laura:

Tug Hill Operating, LLC will not be drilling, extracting or producing any minerals under any WV County or State Routes in the area reflected on the Fitzgerald S-8HM well plat.

If your office has any questions or concerns regarding the contents of this letter, please do not hesitate to contact me directly at 304-376-0111, or by email at amiller@tug-hillop.com.

Sincerely,

A handwritten signature in blue ink that reads "Amy L. Miller".

Amy L. Miller
Permitting Specialist – Appalachia Region

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MAY 29 2019
WV Department of
Environmental Protection

**STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE CERTIFICATION**

Date of Notice Certification: 05/23/2019

API No. 47- 051 -

Operator's Well No. Fitzgerald S-8HM

Well Pad Name: Fitzgerald

Notice has been given:

Pursuant to the provisions in West Virginia Code § 22-6A, the Operator has provided the required parties with the Notice Forms listed below for the tract of land as follows:

State:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>530,695.36</u>
County:	<u>Marshall</u>		Northing:	<u>4,405,764.30</u>
District:	<u>Liberty</u>	Public Road Access:	<u>Rines Ridge Road (County Route 76)</u>	
Quadrangle:	<u>Glen Easton 7.5'</u>	Generally used farm name:	<u>Danny S. Kerns, et al</u>	
Watershed:	<u>Upper Fish Creek</u>			

Pursuant to West Virginia Code § 22-6A-7(b), every permit application filed under this section shall be on a form as may be prescribed by the secretary, shall be verified and shall contain the following information: (14) A certification from the operator that (i) it has provided the owners of the surface described in subdivisions (1), (2) and (4), subsection (b), section ten of this article, the information required by subsections (b) and (c), section sixteen of this article; (ii) that the requirement was deemed satisfied as a result of giving the surface owner notice of entry to survey pursuant to subsection (a), section ten of this article six-a; or (iii) the notice requirements of subsection (b), section sixteen of this article were waived in writing by the surface owner; and Pursuant to West Virginia Code § 22-6A-11(b), the applicant shall tender proof of and certify to the secretary that the notice requirements of section ten of this article have been completed by the applicant.

<p>Pursuant to West Virginia Code § 22-6A, the Operator has attached proof to this Notice Certification that the Operator has properly served the required parties with the following:</p> <p>*PLEASE CHECK ALL THAT APPLY</p> <p><input type="checkbox"/> 1. NOTICE OF SEISMIC ACTIVITY or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NO SEISMIC ACTIVITY WAS CONDUCTED</p> <p><input checked="" type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input checked="" type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p style="padding-left: 40px;"><input type="checkbox"/> WRITTEN WAIVER BY SURFACE OWNER (PLEASE ATTACH)</p> <p><input checked="" type="checkbox"/> 4. NOTICE OF PLANNED OPERATION</p> <p><input checked="" type="checkbox"/> 5. PUBLIC NOTICE</p> <p><input checked="" type="checkbox"/> 6. NOTICE OF APPLICATION</p>	<p>OOG OFFICE USE ONLY</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input checked="" type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input checked="" type="checkbox"/> RECEIVED</p> <p><input checked="" type="checkbox"/> RECEIVED</p> <p><input checked="" type="checkbox"/> RECEIVED</p>
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MAY 29 2019
WV Department of
Environmental Protection

Required Attachments:

The Operator shall attach to this Notice Certification Form all Notice Forms and Certifications of Notice that have been provided to the required parties and/or any associated written waivers. For the Public Notice, the operator shall attach a copy of the Class II Legal Advertisement with publication date verification or the associated Affidavit of Publication. The attached Notice Forms and Certifications of Notice shall serve as proof that the required parties have been noticed as required under West Virginia Code § 22-6A. Pursuant to West Virginia Code § 22-6A-11(b), the Certification of Notice to the person may be made by affidavit of personal service, the return receipt card or other postal receipt for certified mailing.

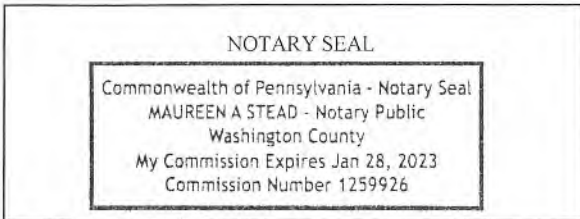
4705102232

Certification of Notice is hereby given:

THEREFORE, I Amy L. Miller, have read and understand the notice requirements within West Virginia Code § 22-6A. I certify that as required under West Virginia Code § 22-6A, I have served the attached copies of the Notice Forms, identified above, to the required parties through personal service, by registered mail or by any method of delivery that requires a receipt or signature confirmation. I certify under penalty of law that I have personally examined and am familiar with the information submitted in this Notice Certification and all attachments, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Well Operator: Tug Hill Operating, LLC
By: Amy L. Miller *Amy Miller*
Its: Permitting Specialist - Appalachia Region
Telephone: 724-749-8388

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030
Email: amiller@tug-hillop.com



Subscribed and sworn before me this 24 day of MAY.
Maureen A Stead Notary Public
My Commission Expires 1/28/23

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

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Environmental Protection

WW-6A
(9-13)

API NO. 47- 051 -
OPERATOR WELL NO. Fitzgerald S-8HM
Well Pad Name: Fitzgerald

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF APPLICATION

Notice Time Requirement: notice shall be provided no later than the filing date of permit application.

Date of Notice: 5/22/2019 Date Permit Application Filed: 5/23/2019

Notice of:

- PERMIT FOR ANY WELL WORK
- CERTIFICATE OF APPROVAL FOR THE CONSTRUCTION OF AN IMPOUNDMENT OR PIT

Delivery method pursuant to West Virginia Code § 22-6A-10(b)

- PERSONAL SERVICE
- REGISTERED MAIL
- METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to W. Va. Code § 22-6A-10(b) no later than the filing date of the application, the applicant for a permit for any well work or for a certificate of approval for the construction of an impoundment or pit as required by this article shall deliver, by personal service or by registered mail or by any method of delivery that requires a receipt or signature confirmation, copies of the application, the erosion and sediment control plan required by section seven of this article, and the well plat to each of the following persons: (1) The owners of record of the surface of the tract on which the well is or is proposed to be located; (2) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for roads or other land disturbance as described in the erosion and sediment control plan submitted pursuant to subsection (c), section seven of this article; (3) The coal owner, operator or lessee, in the event the tract of land on which the well proposed to be drilled is located [sic] is known to be underlain by one or more coal seams; (4) The owners of record of the surface tract or tracts overlying the oil and gas leasehold being developed by the proposed well work, if the surface tract is to be used for the placement, construction, enlargement, alteration, repair, removal or abandonment of any impoundment or pit as described in section nine of this article; (5) Any surface owner or water purveyor who is known to the applicant to have a water well, spring or water supply source located within one thousand five hundred feet of the center of the well pad which is used to provide water for consumption by humans or domestic animals; and (6) The operator of any natural gas storage field within which the proposed well work activity is to take place. (c)(1) If more than three tenants in common or other co-owners of interests described in subsection (b) of this section hold interests in the lands, the applicant may serve the documents required upon the person described in the records of the sheriff required to be maintained pursuant to section eight, article one, chapter eleven-a of this code. (2) Notwithstanding any provision of this article to the contrary, notice to a lien holder is not notice to a landowner, unless the lien holder is the landowner. W. Va. Code R. § 35-8-5.7.a requires, in part, that the operator shall also provide the Well Site Safety Plan ("WSSP") to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Application Notice WSSP Notice E&S Plan Notice Well Plat Notice is hereby provided to:

SURFACE OWNER(s)
 Name: Regina D. Figueroa
 Address: 94 E. 700 N
 Valparaiso, IN 46383
 Name: Danny S. Kerns *See attached list
 Address: 3500 West 80th Place
 Merrillville, IN 46410

SURFACE OWNER(s) (Road and/or Other Disturbance)
 Name: Regina D. Figueroa
 Address: 94 E. 700 N
 Valparaiso, IN 46383
 Name: Danny S. Kerns *See attached list
 Address: 3500 West 80th Place
 Merrillville, IN 46410

SURFACE OWNER(s) (Impoundments or Pits)
 Name: _____
 Address: _____

COAL OWNER OR LESSEE
 Name: Consol Energy
 Address: 1000 Consol Energy Drive
 Canonsburg, PA 15317

COAL OPERATOR
 Name: Murray American Energy, Inc. attn: Mason Smith
 Address: 46226 National Road
 St. Clairsville, OH 43905

SURFACE OWNER OF WATER WELL AND/OR WATER PURVEYOR(s)
 Name: Danny R. Kerns *See attached list
 Address: 3500 West 80th Place
 Merrillville, IN 64610

OPERATOR OF ANY NATURAL GAS STORAGE FIELD
 Name: _____
 Address: _____

*Please attach additional forms if necessary

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MAY 29 2019
WV Department of Environmental Protection

WW-6A
(8-13)

API NO. 47- 051 - _____
OPERATOR WELL NO. Fitzgerald S-8HM
Well Pad Name: Fitzgerald

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-10(b), notice is hereby given that the undersigned well operator has applied for a permit for well work or for a certificate of approval for the construction of an impoundment or pit.

This Notice Shall Include:

Pursuant to W. Va. Code § 22-6A-10(b), this notice shall include: (1) copies of the application; (2) the erosion and sediment control plan required by section seven of this article; and (3) the well plat.

Pursuant to W. Va. Code § 22-6A-10(f), this notice shall include: (1) a statement of the time limits for filing written comments; (2) who may file written comments; (3) the name and address of the secretary for the purpose of filing the comments and obtaining additional information; and (4) a statement that the persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

Pursuant to W. Va. Code R. § 35-8-5.7.a, the operator shall provide the Well Site Safety Plan to the surface owner and any water purveyor or surface owner subject to notice and water testing as provided in section 15 of this rule.

Pursuant to W. Va. Code R. § 35-8-15.2.c, this notice shall: (1) contain a statement of the surface owner's and water purveyor's right to request sampling and analysis; (2) advise the surface owner and water purveyor of the rebuttable presumption for contamination or deprivation of a fresh water source or supply; advise the surface owner and water purveyor that refusal to allow the operator to conduct a pre-drilling water well test constitutes a method to rebut the presumption of liability; (3) advise the surface owner and water purveyor of his or her independent right to sample and analyze any water supply at his or her own expense; advise the surface owner and water purveyor whether or not the operator will utilize an independent laboratory to analyze any sample; and (4) advise the surface owner and or water purveyor that he or she can obtain from the Chief a list of water testing laboratories in the subject area capable of and qualified to test water supplies in accordance with standard acceptable methods.

Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Location Restrictions

Pursuant to W. Va. Code § 22-6A-12, Wells may not be drilled within two hundred fifty feet measured horizontally from any existing water well or developed spring used for human or domestic animal consumption. The center of well pads may not be located within six hundred twenty-five feet of an occupied dwelling structure, or a building two thousand five hundred square feet or larger used to house or shelter dairy cattle or poultry husbandry. This limitation is applicable to those wells, developed springs, dwellings or agricultural buildings that existed on the date a notice to the surface owner of planned entry for surveying or staking as provided in section ten of this article or a notice of intent to drill a horizontal well as provided in subsection (b), section sixteen of this article was provided, whichever occurs first, and to any dwelling under construction prior to that date. This limitation may be waived by written consent of the surface owner transmitted to the department and recorded in the real property records maintained by the clerk of the county commission for the county in which such property is located. Furthermore, the well operator may be granted a variance by the secretary from these distance restrictions upon submission of a plan which identifies the sufficient measures, facilities or practices to be employed during well site construction, drilling and operations. The variance, if granted, shall include terms and conditions the department requires to ensure the safety and protection of affected persons and property. The terms and conditions may include insurance, bonding and indemnification, as well as technical requirements. (b) No well pad may be prepared or well drilled within one hundred feet measured horizontally from any perennial stream, natural or artificial lake, pond or reservoir, or a wetland, or within three hundred feet of a naturally reproducing trout stream. No well pad may be located within one thousand feet of a surface or ground water intake of a public water supply. The distance from the public water supply as identified by the department shall be measured as follows: (1) For a surface water intake on a lake or reservoir, the distance shall be measured from the boundary of the lake or reservoir. (2) For a surface water intake on a flowing stream, the distance shall be measured from a semicircular radius extending upstream of the surface water intake. (3) For a groundwater source, the distance shall be measured from the wellhead or spring. The department may, in its discretion, waive these distance restrictions upon submission of a plan identifying sufficient measures, facilities or practices to be employed during well site construction, drilling and operations to protect the waters of the state. A waiver, if granted, shall impose any permit conditions as the secretary considers necessary. (c) Notwithstanding the foregoing provisions of this section, nothing contained in this section prevents an operator from conducting the activities permitted or authorized by a Clean Water Act Section 404 permit or other approval from the United States Army Corps of Engineers within any waters of the state or within the restricted areas referenced in this section. (d) The well location restrictions set forth in this section shall not apply to any well on a multiple well pad if at least one of the wells was permitted prior to the effective date of this article. (e) The secretary shall, by December 31, 2012, report to the Legislature on the noise, light, dust and volatile organic compounds generated by the drilling of horizontal wells as they relate to the well location restrictions regarding occupied dwelling structures pursuant to this section. Upon a finding, if any, by the secretary that the well location restrictions regarding occupied dwelling structures are inadequate or otherwise require alteration to address the items

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WW-6A
(8-13)

API NO. 47-051 - _____
OPERATOR WELL NO. Fitzgerald S-8HM
Well Pad Name: Fitzgerald

examined in the study required by this subsection, the secretary shall have the authority to propose for promulgation legislative rules establishing guidelines and procedures regarding reasonable levels of noise, light, dust and volatile organic compounds relating to drilling horizontal wells, including reasonable means of mitigating such factors, if necessary.

Water Well Testing:

Pursuant to West Virginia Code § 22-6A-10(d), notification shall be made, with respect to surface landowners identified in subsection (b) or water purveyors identified in subdivision (5), subsection (b) of this section, of the opportunity for testing their water well. The operator shall provide an analysis to such surface landowner or water purveyor at their request.

Water Testing Laboratories:

Pursuant to West Virginia Code § 22-6A-10(i), persons entitled to notice pursuant to subsection (b) of this section may contact the department to ascertain the names and locations of water testing laboratories in the subject area capable and qualified to test water supplies in accordance with standard accepted methods. In compiling that list of names the department shall consult with the state Bureau for Public Health and local health departments. A surface owner and water purveyor has an independent right to sample and analyze any water supply at his or her own expense. The laboratory utilized by the operator shall be approved by the agency as being certified and capable of performing sample analyses in accordance with this section.

Rebuttable Presumption for Contamination or Deprivation of a Fresh Water Source or Supply:

W. Va. Code § 22-6A-18 requires that (b) unless rebutted by one of the defenses established in subsection (c) of this section, in any action for contamination or deprivation of a fresh water source or supply within one thousand five hundred feet of the center of the well pad for horizontal well, there is a rebuttable presumption that the drilling and the oil or gas well or either was the proximate cause of the contamination or deprivation of the fresh water source or supply. (c) In order to rebut the presumption of liability established in subsection (b) of this section, the operator must prove by a preponderance of the evidence one of the following defenses: (1) The pollution existed prior to the drilling or alteration activity as determined by a predrilling or prealteration water well test. (2) The landowner or water purveyor refused to allow the operator access to the property to conduct a predrilling or prealteration water well test. (3) The water supply is not within one thousand five hundred feet of the well. (4) The pollution occurred more than six months after completion of drilling or alteration activities. (5) The pollution occurred as the result of some cause other than the drilling or alteration activity. (d) Any operator electing to preserve its defenses under subdivision (1), subsection (c) of this section shall retain the services of an independent certified laboratory to conduct the predrilling or prealteration water well test. A copy of the results of the test shall be submitted to the department and the surface owner or water purveyor in a manner prescribed by the secretary. (e) Any operator shall replace the water supply of an owner of interest in real property who obtains all or part of that owner's supply of water for domestic, agricultural, industrial or other legitimate use from an underground or surface source with a comparable water supply where the secretary determines that the water supply has been affected by contamination, diminution or interruption proximately caused by the oil or gas operation, unless waived in writing by that owner. (f) The secretary may order the operator conducting the oil or gas operation to: (1) Provide an emergency drinking water supply within twenty-four hours; (2) Provide temporary water supply within seventy-two hours; (3) Within thirty days begin activities to establish a permanent water supply or submit a proposal to the secretary outlining the measures and timetables to be used in establishing a permanent supply. The total time in providing a permanent water supply may not exceed two years. If the operator demonstrates that providing a permanent replacement water supply cannot be completed within two years, the secretary may extend the time frame on case-by-case basis; and (4) Pay all reasonable costs incurred by the real property owner in securing a water supply. (g) A person as described in subsection (b) of this section aggrieved under the provisions of subsections (b), (e) or (f) of this section may seek relief in court... (i) Notwithstanding the denial of the operator of responsibility for the damage to the real property owner's water supply or the status of any appeal on determination of liability for the damage to the real property owner's water supply, the operator may not discontinue providing the required water service until authorized to do so by the secretary or a court of competent jurisdiction.

Written Comment:

Pursuant to West Virginia Code § 22-6A-11(a), all persons described in subsection (b), section ten of this article may file written comments with the secretary as to the location or construction of the applicant's proposed well work within thirty days after the application is filed with the secretary. All persons described in West Virginia Code § 22-6A-10(b) may file written comments as to the location or construction of the applicant's proposed well work to the Secretary at:

Chief, Office of Oil and Gas
Department of Environmental Protection
601 57th St. SE
Charleston, WV 25304
(304) 926-0450

Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water. **NOTE: YOU ARE NOT REQUIRED TO FILE ANY COMMENT.**

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API NO. 47-051 -
OPERATOR WELL NO. Fitzgerald S-8HM
Well Pad Name: Fitzgerald

Time Limits and Methods for Filing Comments.

The law requires these materials to be served on or before the date the operator files its Application. You have **THIRTY (30) DAYS** after the filing date to file your comments. Comments must be filed in person or received in the mail by the Chief's office by the time stated above. You may call the Chief's office to be sure of the date. Check with your postmaster to ensure adequate delivery time or to arrange special expedited handling. If you have been contacted by the well operator and you have signed a "voluntary statement of no objection" to the planned work described in these materials, then the permit may be issued at any time.

Pursuant to West Virginia Code § 22-6A-11(c)(2), Any objections of the affected coal operators and coal seam owners and lessees shall be addressed through the processes and procedures that exist under sections fifteen, seventeen and forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article. The written comments filed by the parties entitled to notice under subdivisions (1), (2), (4), (5) and (6), subsection (b), section ten of this article shall be considered by the secretary in the permit issuance process, but the parties are not entitled to participate in the processes and proceedings that exist under sections fifteen, seventeen or forty, article six of this chapter, as applicable and as incorporated into this article by section five of this article.

Comment Requirements

Your comments must be in writing and include your name, address and telephone number, the well operator's name and well number and the approximate location of the proposed well site including district and county from the application. You may add other documents, such as sketches, maps or photographs to support your comments.

Disclaimer: All comments received will be placed on our web site <http://www.dep.wv.gov/oil-and-gas/Horizontal-Permits/Pages/default.aspx> and the applicant will automatically be forwarded an email notice that such comments have been submitted. The applicant will be expected to provide a response to comments submitted by any surface owner, water purveyor or natural gas storage operator noticed within the application.

Permit Denial or Condition

The Chief has the power to deny or condition a well work permit. Pursuant to West Virginia Code § 22-6A-8(d), the permit may not be issued or be conditioned, including conditions with respect to the location of the well and access roads prior to issuance if the director determines that:

- (1) The proposed well work will constitute a hazard to the safety of persons;
- (2) The plan for soil erosion and sediment control is not adequate or effective;
- (3) Damage would occur to publicly owned lands or resources; or
- (4) The proposed well work fails to protect fresh water sources or supplies.

A permit may also be denied under West Virginia Code § 22-6A-7(k), the secretary shall deny the issuance of a permit if the secretary determines that the applicant has committed a substantial violation of a previously issued permit for a horizontal well, including the applicable erosion and sediment control plan associated with the previously issued permit, or a substantial violation of one or more of the rules promulgated under this article, and in each instance has failed to abate or seek review of the violation within the time prescribed by the secretary pursuant to the provisions of subdivisions (1) and (2), subsection (a), section five of this article and the rules promulgated hereunder, which time may not be unreasonable.

Pursuant to West Virginia Code § 22-6A-10(g), any person entitled to submit written comments to the secretary pursuant to subsection (a), section eleven of this article, shall also be entitled to receive from the secretary a copy of the permit as issued or a copy of the order modifying or denying the permit if the person requests receipt of them as a part of the written comments submitted concerning the permit application. Such persons may request, at the time of submitting written comments, notice of the permit decision and a list of persons qualified to test water.

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API NO. 47-051 -
OPERATOR WELL NO. Fitzgerald S-8HM
Well Pad Name: Fitzgerald

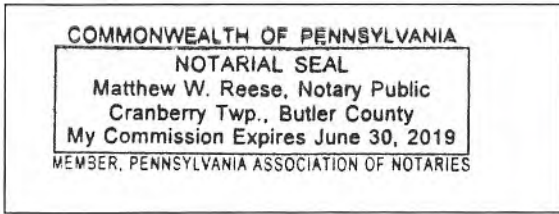
Notice is hereby given by:

Well Operator: Jug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@jug-hilltop.com *amiller*

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030

Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.



Subscribed and sworn before me this 22 day of May, 2019.

[Signature] Notary Public

My Commission Expires 6-30-2019

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WW-6A NOTICE OF APPLICATION

FITZGERALD S-8HM

ADDITIONAL PARTIES TO NOTICE

Surface Owner (Pad and Access Road)

Deena J. Palomo
20 Maxwell St.
Apt. 4
Hebron, IN 46341

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Exhibit WW-6A**Supplement Pg. 1A**

Tug Hill Operating, LLC
 380 Southpointe Blvd, Suite 200
 Cannonsburg, PA 15137

Residences within Two-Thousand Feet (2,000')

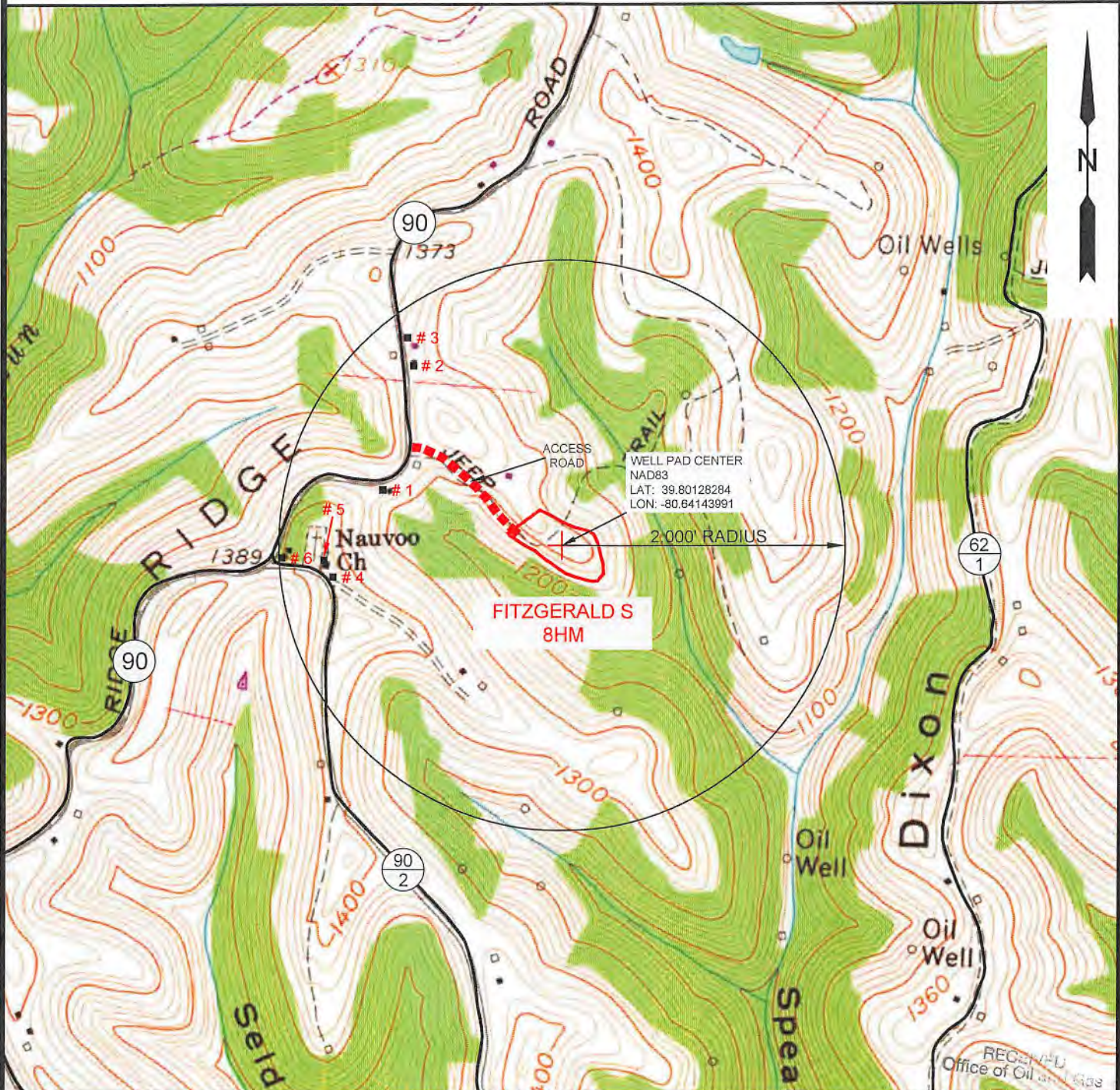
Well: Fitzgerald S – 8HM
 District: Liberty
 State: WV

There are four (4) residences, one (1) business or commercial site, one (1) church, no schools or no emergency facilities within two-thousand feet (2,000') of the above referenced well location.

<p>Residence (#1) TM 9 Pcl. 14 Danny R. Kerns, Et Al Phone: 219-887-6761 (Reverse Address – David A. & Regina D. Figueroa) Physical Address: 3500 West 80th Place Merrillville, IN 46410 Tax Address: 94 E 700 N Valparaiso, IN 46383</p>	<p>Residence (#2) TM 9 Pcl. 12.1 Jessica R. & David A. II Dempewolf Phone: 304-810-0500 (Reverse Address – Jolene Morris) Physical Address: 1180 Nauvoo Ridge Rd. Cameron, WV 26033 Tax Address: Same</p>	<p>Residence (#3) TM 9 Pcl. 12 Gary W. Morris c/o Gary Morris & Cynthia Patrello Phone: None Found Physical Address: 1156 Nauvoo Ridge Rd. Cameron, WV 26033 Tax Address: Same</p>
<p>Business/Commercial Site (#4) TM 12 Pcl. 14 Consolidation Coal Company c/o Murray American Energy Physical Address: 90 The Corner Ln. Glen Easton, WV 26039 (Appears to be an underground mine vent or fan site or other related infrastructure) Tax Address: 46226 National Rd. Saint Clairsville, OH 43950</p>	<p>Church (#5) TM 9 Pcl. 15 Trustees of the Reorganized Church of Latter Day Saints Phone: None Physical Address: 88 The Corner Ln. Glen Easton, WV 26039 Tax Address: Exempt/None</p>	<p>Residence (#6) TM 9 Pcl. 22 Gary W. Morris Phone: None Found Physical Address: 1556 Nauvoo Ridge Rd. Cameron, WV 26033 Tax Address: 1156 Nauvoo RDG Glen Easton, WV 26039</p>

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PROPOSED FITZGERALD S - 8HM



NOTE: THERE APPEARS TO BE FIVE (5) POSSIBLE WATER SOURCES WITHIN 2,000'.

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WV Department of Environmental Protection

SLS
Land & Energy Development
Solutions from the ground up.
P.O. Box 150 • 12 Vanhorn Drive • Glenville, WV 26351 • (304) 462-5634
www.slsww.com

TOPO SECTION:		OPERATOR:	
GLEN EASTON 7.5' & CAMERON 7.5'		PREPARED FOR: TUG HILL OPERATING, LLC 380 SOUTHPOINTE BLVD SUITE 200 CANONSBURG, PA 15317	
COUNTY	DISTRICT		
MARSHALL	LIBERTY & MEADE		
DRAWN BY	JOB NO.	DATE	SCALE
K.G.M.	8910	05/03/2019	1" = 1000'

TUG HILL OPERATING

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF ENTRY FOR PLAT SURVEY

Notice Time Requirement: Notice shall be provided at least **SEVEN (7)** days but no more than **FORTY-FIVE (45)** days prior to entry

Date of Notice: 4/24/2019 **Date of Planned Entry:** 5/3/2019

Delivery method pursuant to West Virginia Code § 22-6A-10a

- PERSONAL SERVICE
 REGISTERED MAIL
 METHOD OF DELIVERY THAT REQUIRES A RECEIPT OR SIGNATURE CONFIRMATION

Pursuant to West Virginia Code § 22-6A-10(a), Prior to filing a permit application, the operator shall provide notice of planned entry on to the surface tract to conduct any plat surveys required pursuant to this article. Such notice shall be provided at least seven days but no more than forty-five days prior to such entry to: (1) The surface owner of such tract; (2) to any owner or lessee of coal seams beneath such tract that has filed a declaration pursuant to section thirty-six, article six, chapter twenty-two of this code; and (3) any owner of minerals underlying such tract in the county tax records. The notice shall include a statement that copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, which statement shall include contact information, including the address for a web page on the Secretary's web site, to enable the surface owner to obtain copies from the secretary.

Notice is hereby provided to:

SURFACE OWNER(s)

Name: Regina D. Figueroa
Address: 94 E 700 N
Valparaiso, IN 46383

Name: Danny S. Kerns
Address: 3500 West 80th Pl.
Merrillville, IN 46410

Name: Deena J. Palomo
Address: 20 Maxwell St., Apt. 4
Hebron, IN 46341

COAL OWNER OR LESSEE

Name: Consol Energy Attn: Casey Saunders
Address: 1000 Consol Energy Drive
Canonsburg, PA 15317

MINERAL OWNER(s)

Name: Regina D. Figueroa
Address: 94 E 700 N
Valparaiso, IN 46383 *See attached list
*please attach additional forms if necessary

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-10(a), notice is hereby given that the undersigned well operator is planning entry to conduct a plat survey on the tract of land as follows:

State:	<u>West Virginia</u>	Approx. Latitude & Longitude:	<u>39.80128284; -80.64143991</u>
County:	<u>Marshall</u>	Public Road Access:	<u>County Route 90</u>
District:	<u>Liberty</u>	Watershed:	<u>Upper Fish Creek</u>
Quadrangle:	<u>Glen Easton 7.5'</u>	Generally used farm name:	<u>Danny & Frances Kerns Estate</u>

Copies of the state Erosion and Sediment Control Manual and the statutes and rules related to oil and gas exploration and production may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450). Copies of such documents or additional information related to horizontal drilling may be obtained from the Secretary by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Notice is hereby given by:

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@tug-hilltop.com

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030

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Oil and Gas Privacy Notice:

The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

WW-6A3 NOTICE OF ENTRY FOR PLAT SURVEY
FITZGERALD PAD

MINERAL OWNERS

Danny S. Kerns
3500 West 80th Pl.
Merrillville, IN 46410

Deena J. Palomo
20 Maxwell Street, Apt. 4
Hebron, IN 46341

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WW-6A5
(1/12)

47 05 : 02232
Operator Well No. Fitzgerald S-8HM

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF PLANNED OPERATION

Notice Time Requirement: notice shall be provided no later than the **filing date of permit application.**

Date of Notice: 05/23/2019 **Date Permit Application Filed:** 05/24/2019

Delivery method pursuant to West Virginia Code § 22-6A-16(c)

CERTIFIED MAIL HAND
RETURN RECEIPT REQUESTED DELIVERY

Pursuant to W. Va. Code § 22-6A-16(c), no later than the date for filing the permit application, an operator shall, by certified mail return receipt requested or hand delivery, give the surface owner whose land will be used for the drilling of a horizontal well notice of the planned operation. The notice required by this subsection shall include: (1) A copy of this code section; (2) The information required to be provided by subsection (b), section ten of this article to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. (d) The notices required by this section shall be given to the surface owner at the address listed in the records of the sheriff at the time of notice.

Notice is hereby provided to the SURFACE OWNER(s)
(at the address listed in the records of the sheriff at the time of notice):

Name: Regina D. Figueroa
Address: 94 E 700 N
Valparaiso, IN 46383

Name: Danny S. Kerns
Address: 3500 West 80th Pl
Merrillville, IN 46410

Notice is hereby given:

Pursuant to West Virginia Code § 22-6A-16(c), notice is hereby given that the undersigned well operator has developed a planned operation on the surface owner's land for the purpose of drilling a horizontal well on the tract of land as follows:

State:	<u>West Virginia</u>	UTM NAD 83	Easting:	<u>530,695.36</u>
County:	<u>Marshall</u>		Northing:	<u>4,405,764.30</u>
District:	<u>Liberty</u>	Public Road Access:	<u>Rines Ridge Road (County Route 76)</u>	
Quadrangle:	<u>Glen Easton 7.5'</u>	Generally used farm name:	<u>Danny R. Kerns, et al</u>	
Watershed:	<u>Upper Fish Creek (HUC 10)</u>			

This Notice Shall Include:

Pursuant to West Virginia Code § 22-6A-16(c), this notice shall include: (1) A copy of this code section; (2) The information required to be provided by **W. Va. Code § 22-6A-10(b)** to a surface owner whose land will be used in conjunction with the drilling of a horizontal well; and (3) A proposed surface use and compensation agreement containing an offer of compensation for damages to the surface affected by oil and gas operations to the extent the damages are compensable under article six-b of this chapter. Additional information related to horizontal drilling may be obtained from the Secretary, at the WV Department of Environmental Protection headquarters, located at 601 57th Street, SE, Charleston, WV 25304 (304-926-0450) or by visiting www.dep.wv.gov/oil-and-gas/pages/default.aspx.

Well Operator: Tug Hill Operating, LLC
Telephone: 724-749-8388
Email: amiller@tug-hillop.com

Address: 380 Southpointe Boulevard, Plaza II, Suite 200
Canonsburg, PA 15317
Facsimile: 724-338-2030

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The Office of Oil and Gas processes your personal information, such as name, address and telephone number, as part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use or your personal information, please contact DEP's Chief Privacy Officer at depprivacyofficer@wv.gov.

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • (304) 558-3505

Byrd E. White, III
Secretary of Transportation

May 10, 2019

Jimmy Wriston, P. E.
Deputy Secretary/
Acting Commissioner

James A. Martin, Chief
Office of Oil and Gas
Department of Environmental Protection
601 57th Street, SE
Charleston, WV 25304

Subject: DOH Permit for the Fitzgerald Pad, Marshall County
Fitzgerald S-8HM Well site

Dear Mr. Martin,

This well site will be accessed from a DOH permit #06-2019-0351 which has been issued to Tug Hill Operating, LLC for access to the State Road for a well site located off of Marshall County Route 90 SLS.

The operator has signed a STATEWIDE OIL AND GAS ROAD MAINTENANCE BONDING AGREEMENT and provided the required Bond. This operator is currently in compliance with the DOH OIL AND GAS POLICY dated October 1, 2018.

Very Truly Yours,

Gary K. Clayton, P.E.
Regional Maintenance Engineer
Central Office O&G Coordinator

Cc: Amy Miller
Tug Hill Operating, LLC
CH, OM, D-6
File

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PLANNED ADDITIVES TO BE USED IN FRACTURING OR STIMULATION

Well No. Fitzgerald S-8HM

PRODUCT NAME:	CHEMICAL DESCRIPTION:	PRODUCT USE:	HAZARDOUS COMPONENT:
GBW-20C	Hemicellulase Breaker	Breaker - Water	None
ALPHA 1427		Biocide	Glutaraldehyde – CAS#000111-30-8 Quaternary ammonium chloride CAS# 007173-51-5 Alky dimethyl benzyl ammonium Chloride (C12-16) – CAS#068424-85-1 Ethanol – CAS# 000064-17-5 Water – CAS# 007732-18-5
FRAC SAND	Silica Sand (various Mesh sizes)	Proppant	Crystalline silica (quartz) CAS# 14808-60-7
S-8C, Sand	Silica Sand (100 mesh)	Sand	Silica – CAS# 14808-60-7
GW-3LDF		Gellant - Water	Petroleum Distillate Blend – Proprietary, (Not Associated with Diesel Fuel) Guar gum – CAS# 009000-30-0
FRW-18		Friction Reducer	Hydrotreated light distillate CAS# 064742-47-8
Scaletrol		Scale Inhibitor	Ethylene glycol – CAS# 000107-21-1 Diethylene glycol – CAS# 000111-46-6

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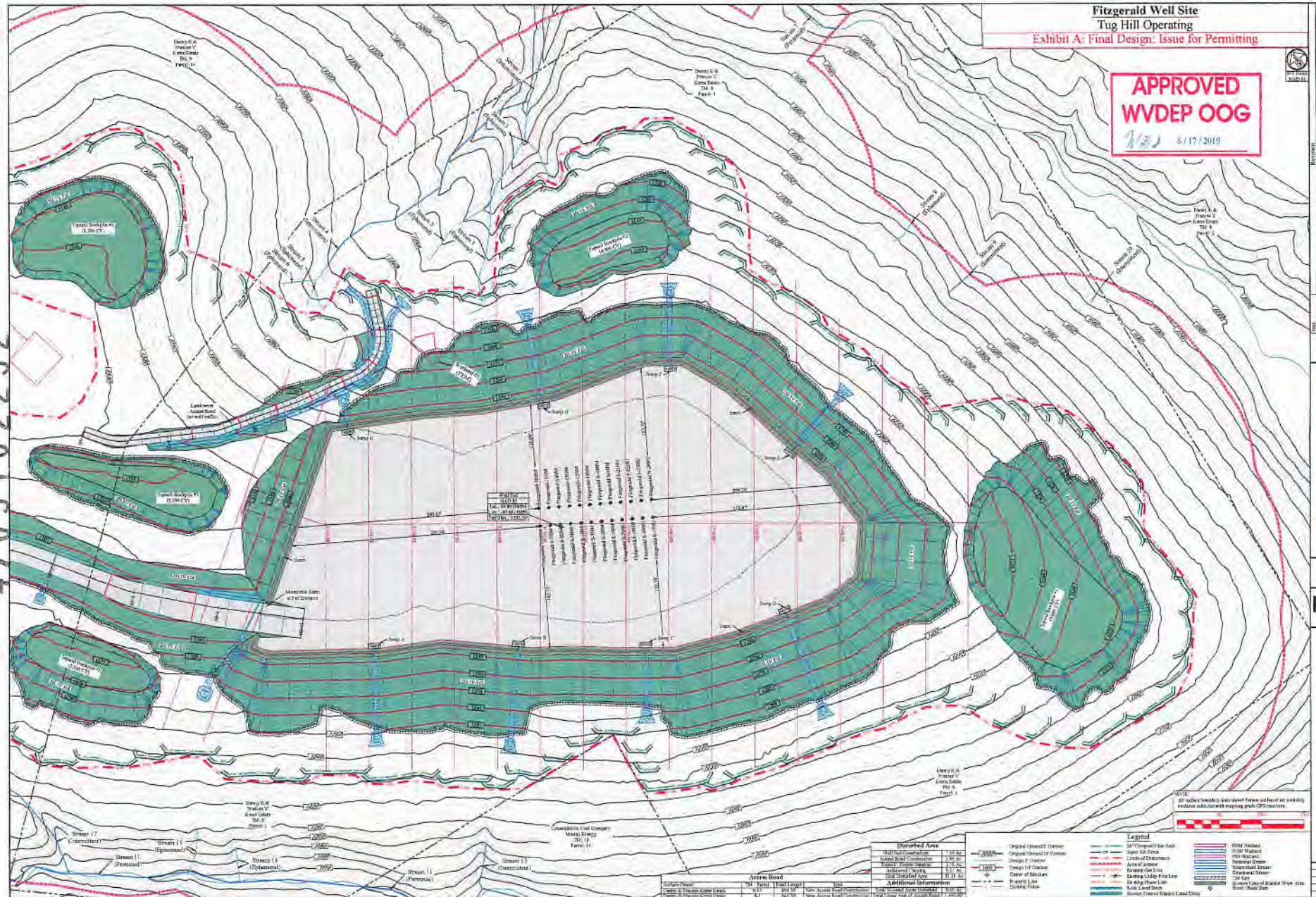
WV Department of
Environmental Protection

4705102232

**Fitzgerald Well Site
Tug Hill Operating**

Exhibit A: Final Design: Issue for Permitting

**APPROVED
WVDEP OOG**
8/17/2019



Area Road			
Surface	WV	Feet	Grade
2.500	1.5	10.0	5.0%
2.500	1.5	10.0	5.0%
2.500	1.5	10.0	5.0%

Disturbed Area	
WV 10.000	10.000
WV 10.000	10.000
WV 10.000	10.000
WV 10.000	10.000
WV 10.000	10.000

Legend	
Original Ground Contour	24' Contour Interval
Original Ground 10' Contour	Water Set Point
Original 5' Contour	Line of Obstruction
Proposed 10' Contour	Area of Interest
Center of Structure	Existing Gas Line
Proposed 5' Contour	24' High Utility Fire Line
Proposed 1' Contour	12' High Stone Lim
Existing 5' Contour	Rock Land Data
Existing 1' Contour	Proposed Road Right of Way
Existing 0.5' Contour	WV 10.000
Existing 0.2' Contour	WV 10.000
Existing 0.1' Contour	WV 10.000
Existing 0.05' Contour	WV 10.000
Existing 0.02' Contour	WV 10.000
Existing 0.01' Contour	WV 10.000
Existing 0.005' Contour	WV 10.000
Existing 0.002' Contour	WV 10.000
Existing 0.001' Contour	WV 10.000
Existing 0.0005' Contour	WV 10.000
Existing 0.0002' Contour	WV 10.000
Existing 0.0001' Contour	WV 10.000
Existing 0.00005' Contour	WV 10.000
Existing 0.00002' Contour	WV 10.000
Existing 0.00001' Contour	WV 10.000

NOTE: All surface boundary data shown herein is based on available evidence and is not a warranty of accuracy or completeness.

TUG HILL OPERATING
 THIS DOCUMENT PREPARED FOR TUG HILL OPERATING
 K+S OPERATING
 Fitzgerald Well Site
 Liberty District
 Mineral County, WV
 DATE: 08/09/2019
 SCALE: AS SHOWN
 DRAWN BY: JES
 FILE NO:
 SHEET 11 OF 14