



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, March 06, 2018
WELL WORK PERMIT
Horizontal 6A / Drilling Deeper

HG ENERGY II APPALACHIA, LLC
5260 DUPONT ROAD

PARKERSBURG, WV 26101


Re: Permit approval for KST5DHS
47-033-05817-00-00

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: KST5DHS
Farm Name: MCDONALD, JAMES IVAN
U.S. WELL NUMBER: 47-033-05817-00-00
Horizontal 6A / Drilling Deeper
Date Issued: 3/6/2018

Promoting a healthy environment.

PERMIT CONDITIONS

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

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.

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

1) Well Operator: HG Energy II Appalachia, L.P.

<u>494519932</u>	<u>Harrison</u>	<u>Union</u>	<u>West Milford</u>
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Operator ID County District Quadrangle

2) Operator's Well Number: KST5 DHS Well Pad Name: KST5

3) Farm Name/Surface Owner: James Ivan McDonald Public Road Access: State County Road 19/18

4) Elevation, current ground: 1134' Elevation, proposed post-construction: 1134'

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

Other _____

(b) If Gas Shallow Deep _____

Horizontal

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus at 6853'/6935' and 51' in thickness. Anticipated pressure at 4314#.

8) Proposed Total Vertical Depth: 6900'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 19,024'

11) Proposed Horizontal Leg Length: 11,314'

12) Approximate Fresh Water Strata Depths: 135'

13) Method to Determine Fresh Water Depths: Offset well data

14) Approximate Saltwater Depths: 1570', 2355'

15) Approximate Coal Seam Depths: 80', 390', 1060', 1440'

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: _____
Depth: _____
Seam: _____
Owner: _____

*Sam Ward
app'd via
email
attached
9/20/2017*

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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	20"	New	J-55	94	114' "Conductor Already Set"	114'	CTS w/675 sks Class A
Fresh Water	13 3/8"	NEW	J-55	54.5	981' "Surface Casing Already Set"	981'	CTS w/700 sks Class A
Coal							
Intermediate	9 5/8"	NEW	J-55	36	2484' "Intermediate Casing Already Set"	2484'	CTS w/780 sks Class A
Production	5 1/2"	NEW	P-110	20	19024'	19024'	20% excess, load yield = 1.19, tail yield
Tubing							
Liners							

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	20"	24"	.438	2110		Class A	Yield = 1.22, CTS
Fresh Water	13 3/8"	17 1/2"	.380	2730	1200	Class A	yield = 1.21, CTS
Coal							
Intermediate	9 5/8"	12 1/4"	.352	3520		Class A	Yield = 1.41, CTS
Production	5 1/2"	8 1/2"	.361	12640	10000	Class A	20% excess yield = 1.19, tail yield 1.24
Tubing							
Liners							

PACKERS

Kind:	None			
Sizes:	None			
Depths Set:	None			

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Adkins, Laura L

From: Ward, Samuel D
Sent: Tuesday, February 13, 2018 12:26 PM
To: Adkins, Laura L
Cc: Diane White
Subject: Re: KST 5 revisions

If it is only changes in the lateral and not surface through intermediate, I have no need to see it.

Sent from my iPhone

On Feb 13, 2018, at 12:23 PM, Adkins, Laura L <Laura.L.Adkins@wv.gov> wrote:

Diane,

Going through the revised documents on the KST 5 pad, I don't see Sam's approvals on the revised casing and so far it just looks like the production casing is all that changed on these. If Sam is okay with changing the production and TD depths without seeing them he can send me an email in response to this. If he wants to see them...Sam, let us know and we can send a copy to you for your approval.

Thanks,

Laura

Laura L. Adkins

Environmental Resource Specialist III
Permit Review
WVDEP Office of Oil and Gas
601 57th Street, SE
Charleston, WV 25304
304-926-0499 ext. 1495

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

Drill the vertical depth to the Marcellus at an estimated total vertical depth of approximately 6900 feet. Drill horizontal leg - stimulate and be capable of producing from the Marcellus Formation. Should we encounter an unanticipated void in the coal, we will install a minimum of 20' of casing below the void but not more than 100' below the void, set a basket and grout to surface.

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

The stimulation will be multiple stages divided over the lateral length of the well. Stage spacing is dependent upon engineering design. Slickwater fracturing technique will be utilized on each stage using sand, water, and chemicals. See attached list. Maximum pressure not to exceed 10,000 psi.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 16.3 acres (this is a built pad, no further disturbance anticipated)

22) Area to be disturbed for well pad only, less access road (acres): 11.5 acres (this is a built pad, no further disturbance anticipated)

23) Describe centralizer placement for each casing string:

Conductor - NA
Freshwater - Bow spring on 1st Jt. Then every 4th Jt. To 100 ft. from surface
Intermediate - 1 Bow spring on each of the 1st two Jts. then every 4th Jt. in inside surface casing
Production - Run 1 spiral centralizer every 5 joints from the top of the curve to surface. Run 1 spiral centralizer every 3 joints from the 1st 5.5' long joint to the top of the curve.

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

Conductor - "Conductor already set" - CTS w/ 675 sika Class A, 15.6ppg, 1.22 cu-ft/sk, 820 cu-ft
Fresh Water - "Surface Casing already set" - CTS w/ 700 sika Class A, 15.61ppg, 1.21 cu-ft/sk, 847 cu-ft
Intermediate - "Intermediate Casing already set" - CTS w/ 780 sika Class A, 15.6ppg, 1.41 cu-ft/sk, 1099 cu-ft
Production - Lead: 14.8 ppg POZ-PNE-1 + 0.3% bwoc R3 + 1% bwoc EC1 + 0.75 gal/sk FP13L + 0.3% bwoc MPA170, Tail: 14.8 ppg PNE-1 + 0.35% bwoc R3 + 0.75 gal/sk FP13L + 50% bwoc ASCA1 + 0.5% bwoc MPA170, 20% Excess, Lead Yield=1.19, Tail Yield=1.94, CTS

25) Proposed borehole conditioning procedures:

Conductor -
Fresh Water -
Intermediate -
Production - Once on bottom/TD with casing, circulate at max allowable pump rate for at least 2x bottoms up, or until returns and pump pressures indicate the hole is clean. Circulate a minimum of one hole volume prior to pumping cement.

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*Note: Attach additional sheets as needed.

EXISTING WELLS LOCATED WITHIN THE AREA OF REVIEW FOR: KSTS PAD AND PROPOSED WELLS AHS, BHS, CHS, DHS, EHS & FHS										
CT	API	COUNTY	FARM	OPERATOR NAME	FORMATION NAME	WELL TYPE	TVD	STATUS	LATITUDE	LONGITUDE
1	4703300137	Harrison	J S Law 2	Dominion Energy Transmission Inc.	Speechley	Gas	3,015	ACTIVE	39.161098	-80.473614
2	4703300140	Harrison	G Minter	Dominion Energy Transmission Inc.	Speechley	Gas	3,056	PLUGGED	39.157614	-80.466515
3	4703300163	Harrison	J S Law 1	Dominion Energy Transmission Inc.	Greenland Gap Fm	Gas	2,878	PLUGGED	39.163420	-80.466534
4	4703300172	Harrison	A W Rhodes	Dominion Energy Transmission Inc.	Hampshire Grp	Storage	1,575	ACTIVE	39.141090	-80.459637
5	4703300173	Harrison	A W Rhodes	Dominion Energy Transmission Inc.	NA	NA	NA	ACTIVE	39.141665	-80.460845
6	4703300175	Harrison	G Minter	Dominion Energy Transmission Inc.	Gantz	Storage	1,720	ACTIVE	39.147180	-80.462245
7	4703300177	Harrison	A W Rhodes	Dominion Energy Transmission Inc.	Gantz	Storage	1,800	ACTIVE	39.145858	-80.457289
8	4703300196	Harrison	W J Law 1	Dominion Energy Transmission Inc.	Thirty-foot	Storage	2,005	ACTIVE	39.150793	-80.459825
9	4703300201	Harrison	G Minter	Dominion Energy Transmission Inc.	Thirty-foot	Storage	2,344	PLUGGED	39.152535	-80.470633
10	4703300202	Harrison	G Minter	Dominion Energy Transmission Inc.	Gordon (undiff)	Storage	2,042	PLUGGED	39.151624	-80.466475
11	4703300427	Harrison	Guinn Minter	Dominion Energy Transmission Inc.	Benson	Gas	4,520	ACTIVE	39.157400	-80.465748
12	4703300491	Harrison	M G Law	Dominion Energy Transmission Inc.	Benson	Gas	4,261	ACTIVE	39.162549	-80.459266
13	4703300517	Harrison	J S Law	Dominion Energy Transmission Inc.	Benson	Gas	4,400	ACTIVE	39.155873	-80.456916
14	4703300520	Harrison	M J Loughmiller	Dominion Energy Transmission Inc.	Benson	Gas	4,548	ACTIVE	39.152089	-80.474732
15	4703300544	Harrison	Den Lee Stickle	Dominion Energy Transmission Inc.	Benson	Gas	4,300	ACTIVE	39.144240	-80.456990
16	4703300574	Harrison	Lee Roy & Marjorie Neeley	Dominion Energy Transmission Inc.	Benson	Gas	4,370	ACTIVE	39.146874	-80.466161
17	4703300607	Harrison	J H/R C McDonald	Dominion Energy Transmission Inc.	Greenland Gap Fm	Gas	4,769	ACTIVE	39.171589	-80.474729
18	4703300624	Harrison	Rosemary Allman	Dominion Energy Transmission Inc.	Greenland Gap Fm	Gas	4,515	ACTIVE	39.163710	-80.470633
19	4703300898	Harrison	J H McDonald 1	Jackson Fuel Corporation	Big Injun (Grnbr)	Gas	1,705	ACTIVE	39.171849	-80.473987
20	4703301377	Harrison	J Thrash	Dominion Energy Transmission Inc.	Fifth	Gas	2,215	ACTIVE	39.166468	-80.469887
21	4703301417	Harrison	Paul McDonald	Dominion Energy Transmission Inc.	Alexander	Gas	4,782	ACTIVE	39.165887	-80.462806
22	4703302054	Harrison	W J Law	Dominion Energy Transmission Inc.	Alexander	Gas	4,800	ACTIVE	39.150213	-80.458893
23	4703302055	Harrison	Lee Roy & Marjorie Neeley	Dominion Energy Transmission Inc.	Benson	Gas	4,536	ACTIVE	39.152534	-80.467838
24	4703302949	Harrison	Consolidated Gas Supply	Dominion Energy Transmission Inc.	Greenland Gap Fm	Gas	4,998	ACTIVE	39.169237	-80.468769
25	4703303068	Harrison	Frank McDonald	Dominion Energy Transmission Inc.	Benson	Gas	4,606	ACTIVE	39.164000	-80.475851
26	4703303089	Harrison	David Allman	Dominion Energy Transmission Inc.	Benson	Gas	4,903	ACTIVE	39.154411	-80.462478
27	4703305335	Harrison	James I McDonald	CNX Gas Company	Alexander	Gas	NA	NOT DRILLED	39.171172	-80.466421
28	4703331380	Harrison	M G Law	Hope Natural Gas Company	Hampshire Grp	Gas	2,253	UNKNOWN	39.158776	-80.462620
29	4703331843	Harrison	W T Law	Consolidated Gas Supply Corp.	NA	NA	NA	UNKNOWN	39.171269	-80.463552
30	4703331935	Harrison	W R Neely	Consolidated Gas Supply Corp.	NA	NA	NA	UNKNOWN	39.146730	-80.467838
31	4703370343	Harrison	Arthur Rhodes 2	Hope Natural Gas Company	NA	NA	NA	UNKNOWN	39.141795	-80.458407
32	4703373743	Harrison	R A Beeghley	Hope Natural Gas Company	NA	NA	NA	UNKNOWN	39.139328	-80.453002
33	4703373745	Harrison	Arthur Rhodes	unknown	NA	NA	NA	UNKNOWN	39.143391	-80.450953
34	4703373746	Harrison	W V Brannon	unknown	NA	NA	NA	UNKNOWN	39.144262	-80.452444
35	4703373747	Harrison	Arthur Rhodes	unknown	NA	NA	NA	UNKNOWN	39.144117	-80.453935
36	4703373754	Harrison	J S Law	unknown	NA	NA	NA	UNKNOWN	39.151809	-80.459638

37	4703373755	Harrison	R C McDonald	----- unknown -----	NA	NA	NA	UNKNOWN	39.157759	-80.476224
38	4703373756	Harrison	R C McDonald	----- unknown -----	NA	NA	NA	UNKNOWN	39.168511	-80.476409
39	4703373757	Harrison	R C McDonald	----- unknown -----	NA	NA	NA	UNKNOWN	39.172430	-80.473055
40	4704100225	Lewis	W E Beeghley	Columbia Natural Resources	Gantz	Gas	1,714	ABANDONED	39.140365	-80.461872
41	4704100290	Lewis	W E Beeghley	Hope Natural Gas Company	NA	NA	NA	PLUGGED	39.138624	-80.465969
42	4704100291	Lewis	Wm Beeghley	Reserve Exploration Co.	NA	NA	NA	PLUGGED	39.139204	-80.466341
43	4704100292	Lewis	George W Neely	Hope Natural Gas Company	Gordon	Storage	2,040	PLUGGED	39.138334	-80.466713
44	4704102645	Lewis	W M Beeghley	Consolidated Gas Supply Corp.	NA	Storage	NA	ACTIVE	39.141670	-80.467831
45	4704102856	Lewis	Sarah E Hinzman	Dominion Energy Transmission Inc.	Greenland Gap Fm	Storage	2,828	ACTIVE	39.138335	-80.459452
46	4704104116	Lewis	James W Miller	Dominion Energy Transmission Inc.	Greenland Gap Fm	Gas	4,493	ACTIVE	39.141815	-80.464852
47	4704170226	Lewis	J M Beeghley	Reserve Exploration Co.	NA	NA	NA	UNKNOWN	39.138769	-80.466900
48	4704170666	Lewis	W H Bond	----- unknown -----	NA	NA	NA	UNKNOWN	39.138602	-80.453190

SOURCE: WVGES DATASET (2017) and WVDEP WEBSITE

4703305817
DD

**KST5 Well Pad
Cement Additives**

Material Name	Material Type	Material Description	CAS #																		
Premium NE-1	Portland Cement	Premium NE-1 is a portland cement with early compressive strength properties.	<table border="1"> <thead> <tr> <th>Ingredient name</th> <th>%</th> <th>CAS number</th> </tr> </thead> <tbody> <tr> <td>Portland cement</td> <td>90 - 100</td> <td>65997-15-1</td> </tr> <tr> <td>Calcium oxide</td> <td>1 - 5</td> <td>1305-78-8</td> </tr> <tr> <td>Magnesium oxide</td> <td>1 - 5</td> <td>1309-48-4</td> </tr> <tr> <td>Crystalline silica: Quartz (SiO2)</td> <td>0.1 - 1</td> <td>14808-60-7</td> </tr> </tbody> </table>	Ingredient name	%	CAS number	Portland cement	90 - 100	65997-15-1	Calcium oxide	1 - 5	1305-78-8	Magnesium oxide	1 - 5	1309-48-4	Crystalline silica: Quartz (SiO2)	0.1 - 1	14808-60-7			
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Magnesium oxide	1 - 5	1309-48-4																			
Crystalline silica: Quartz (SiO2)	0.1 - 1	14808-60-7																			
Bentonite	Extender	Commonly called gel, it is a clay material used as a cement extender and to control excessive free water.	<table border="1"> <thead> <tr> <th>Ingredient name</th> <th>%</th> <th>CAS number</th> </tr> </thead> <tbody> <tr> <td>bentonite</td> <td>90 - 100</td> <td>1302-78-9</td> </tr> <tr> <td>Crystalline silica: Quartz (SiO2)</td> <td>5 - 10</td> <td>14808-60-7</td> </tr> </tbody> </table>	Ingredient name	%	CAS number	bentonite	90 - 100	1302-78-9	Crystalline silica: Quartz (SiO2)	5 - 10	14808-60-7									
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Calcium Chloride	Accelerator	A powdered, flaked or pelletized material used to decrease thickening time and increase the rate of strength development.	<table border="1"> <thead> <tr> <th>Ingredient name</th> <th>%</th> <th>CAS number</th> </tr> </thead> <tbody> <tr> <td>Calcium chloride</td> <td>90 - 100</td> <td>10043-52-4</td> </tr> </tbody> </table>	Ingredient name	%	CAS number	Calcium chloride	90 - 100	10043-52-4												
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Cello Flake	Lost Circulation	Graded (3/8 to 3/4 inch) cellophane flakes used as a lost circulation material.	<table border="1"> <thead> <tr> <th>Ingredient name</th> <th>%</th> <th>CAS number</th> </tr> </thead> <tbody> <tr> <td>No hazardous ingredient</td> <td></td> <td></td> </tr> </tbody> </table>	Ingredient name	%	CAS number	No hazardous ingredient														
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FP-13L	Foam Preventer	FP-13L is a clear liquid organic phosphate antifoaming agent used in cementing operations. It is very effective minimizing air entrapment and preventing foaming tendencies of latex systems.	<table border="1"> <thead> <tr> <th>Ingredient name</th> <th>%</th> <th>CAS number</th> </tr> </thead> <tbody> <tr> <td>Tributyl phosphate</td> <td>90 - 100</td> <td>126-73-8</td> </tr> </tbody> </table>	Ingredient name	%	CAS number	Tributyl phosphate	90 - 100	126-73-8												
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Granulated Sugar	Retarder	Used to retard cement returns at surface. A proprietary product that provides expansive properties and improves bonding at low to moderate temperatures.	<table border="1"> <thead> <tr> <th>Ingredient name</th> <th>%</th> <th>CAS number</th> </tr> </thead> <tbody> <tr> <td>Sucrose</td> <td>90 - 100</td> <td>57-50-1</td> </tr> </tbody> </table>	Ingredient name	%	CAS number	Sucrose	90 - 100	57-50-1												
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MPA-170	Gas Migration	Multi-purpose polymer additive used to control free fluid, fluid loss, rheology, and gas migration.	<table border="1"> <thead> <tr> <th>Ingredient name</th> <th>%</th> <th>CAS number</th> </tr> </thead> <tbody> <tr> <td>No hazardous ingredient</td> <td></td> <td></td> </tr> </tbody> </table>	Ingredient name	%	CAS number	No hazardous ingredient														
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Poz (Fly Ash)	Base	A synthetic pozzolan, (primarily Silicon Dioxide). When blended with cement, Pozzolan can be used to create lightweight cement slurries used as either a filler slurry or a sulfate resistant completion cement.	<table border="1"> <thead> <tr> <th>Ingredient name</th> <th>%</th> <th>CAS number</th> </tr> </thead> <tbody> <tr> <td>Crystalline silica: Quartz (SiO2)</td> <td>5 - 10</td> <td>14808-60-7</td> </tr> <tr> <td>Calcium oxide</td> <td>1 - 5</td> <td>1305-78-8</td> </tr> </tbody> </table>	Ingredient name	%	CAS number	Crystalline silica: Quartz (SiO2)	5 - 10	14808-60-7	Calcium oxide	1 - 5	1305-78-8									
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R-3	Retarder	A low temperature retarder used in a wide range of slurry formulations to extend the slurry thickening time.	<table border="1"> <thead> <tr> <th>Ingredient name</th> <th>%</th> <th>CAS number</th> </tr> </thead> <tbody> <tr> <td>Organic acid salt</td> <td>40 - 50</td> <td>Trade secret.</td> </tr> </tbody> </table>	Ingredient name	%	CAS number	Organic acid salt	40 - 50	Trade secret.												
Ingredient name	%	CAS number																			
Organic acid salt	40 - 50	Trade secret.																			
S-5	Surfactant	Used to water wet casing and formation to facilitate cement bonding.	<table border="1"> <thead> <tr> <th>Ingredient name</th> <th>%</th> <th>CAS number</th> </tr> </thead> <tbody> <tr> <td>2-Butoxyethanol</td> <td>20 - 30</td> <td>111-76-2</td> </tr> <tr> <td>Proprietary surfactant</td> <td>10 - 20</td> <td>Trade secret.</td> </tr> <tr> <td>D-Glucopyranose, oligomeric, C10-16-alkyl glycosides</td> <td>5 - 10</td> <td>110615-47-9</td> </tr> <tr> <td>Alkylarylsulfonate amine salt</td> <td>1 - 5</td> <td>Trade secret.</td> </tr> <tr> <td>Polyoxyalkylenes</td> <td>0.1 - 1</td> <td>Trade secret.</td> </tr> </tbody> </table>	Ingredient name	%	CAS number	2-Butoxyethanol	20 - 30	111-76-2	Proprietary surfactant	10 - 20	Trade secret.	D-Glucopyranose, oligomeric, C10-16-alkyl glycosides	5 - 10	110615-47-9	Alkylarylsulfonate amine salt	1 - 5	Trade secret.	Polyoxyalkylenes	0.1 - 1	Trade secret.
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Polyoxyalkylenes	0.1 - 1	Trade secret.																			

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List of Frac Additives by Chemical Name and CAS #**KST5 Well Pad (ASH,BHS,CHS,DHS,EHS,FHS)**

Chemical Name	CAS #	Multiple CAS #'s
Pro Shale Slik 405	Mixture	68551-12-2 7647-14-5 12125-02-9 64742-47-8
Pro Hib II	Mixture	68412-54-4 68607-28-3 107-21-1 111-76-2 67-56-1 107-19-7
Silica Sand and Ground Sand	Mixture	14808-60-7 1344-28-1 1309-37-1 13463-67-7
Hydrochloric Acid 22 DEG BE	7647-01-0	
PROGEL - 4.5	64742-96-7	
BIO CLEAR 2000	Mixture	25322-68-3 10222-01-2
SCALE CLEAR SI 112	107-21-1	
PROBREAK 4	Mixture	57-50-1 107-21-1
Sulfamic Acid	5329-14-6	
PRO - Flow - 102-N	Mixture	67-63-0 68439-45-2 2687-96-9
PROGEL - 4	9000-30-0	

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WW-9
(4/16)

API Number 47 - 33 - 05817 DD
Operator's Well No. KST5 DHS

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name HG Energy II Appalachia, LLC OP Code 494519932

Watershed (HUC 10) Middle West Fork Creek Quadrangle West Milford WV 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: Closed loop - no utilization of a pit

Will a synthetic liner be used in the pit? Yes No If so, what ml.? _____

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
- Underground Injection (UIC Permit Number See Attached Sheet)
- Reuse (at API Number At next anticipated well)
- Off Site Disposal (Supply form WW-9 for disposal location)
- Other (Explain _____)

*SDW
9/20/2017*

Will closed loop system be used? If so, describe: Yes

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Air/water based mud through intermediate string then SOBM

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

Additives to be used in drilling medium? Water, soap, KCl, barite

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Approved landfill

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

-Landfill or offsite name/permit number? Please see attached sheet

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 Diane White

Company Official (Typed Name) Diane White

Company Official Title Accountant

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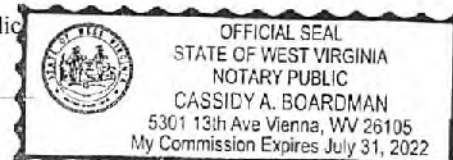
WV Department of
Environmental Protection

Subscribed and sworn before me this 19th day of September, 2017

Cassidy A. Boardman

Notary Public

My commission expires 7/31/2022



HG Energy II Appalachia, LLC

Proposed Revegetation Treatment: Acres Disturbed 18.3 (pad built, no further disturbance anticipated) Prevegetation pH 6.0

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20 or equal

Fertilizer amount 500 lbs/acre

Mulch Hay or Straw @ 2 Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Tall Fescue	40	Tall Fescue	40
Ladino Clover	5	Ladino Clover	5

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: S. L. Allen

Comments: Pre-seed and mulch all cut area, maintain E&S standards during entire operation.

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Title: COG Inspector

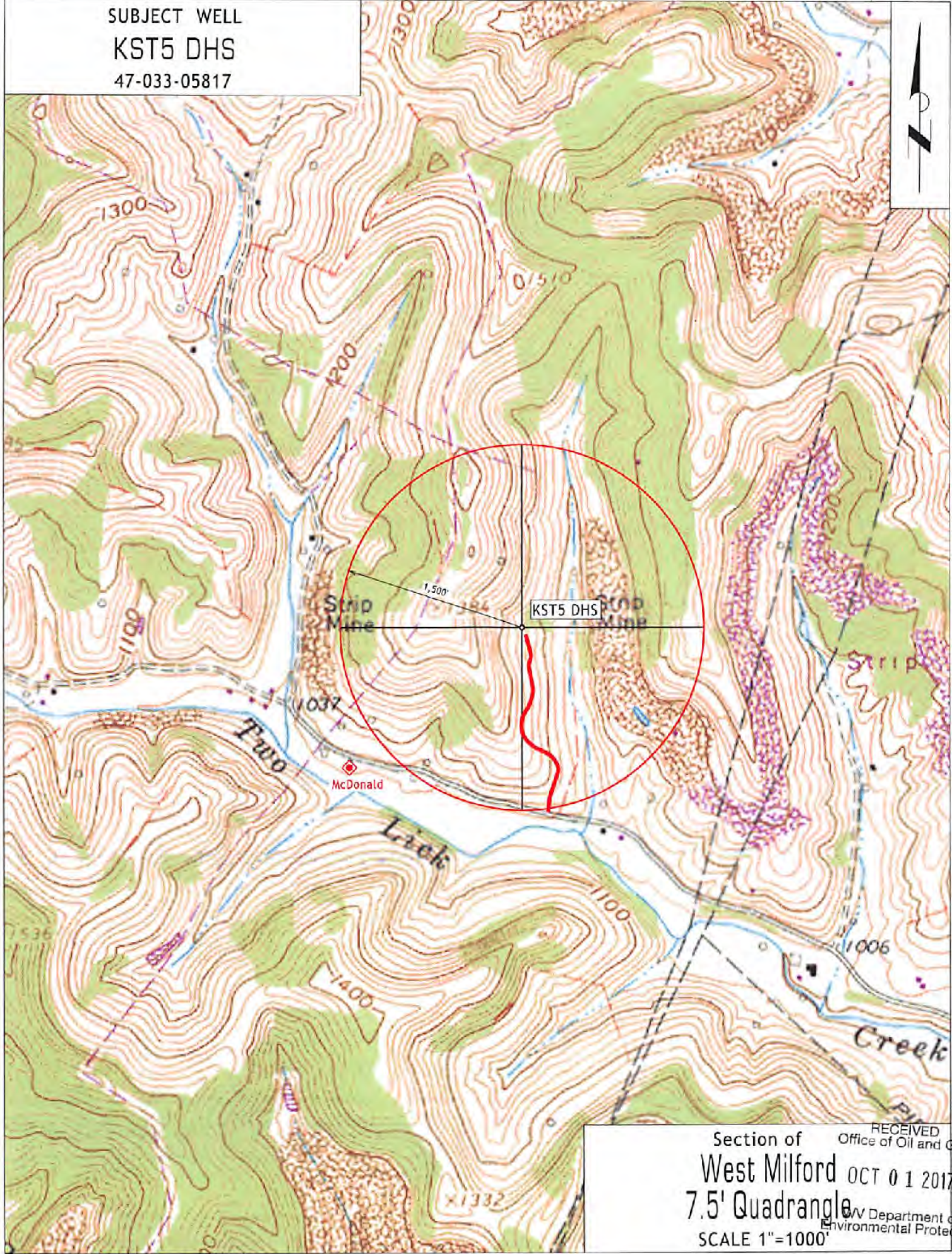
Date: 9/20/2017

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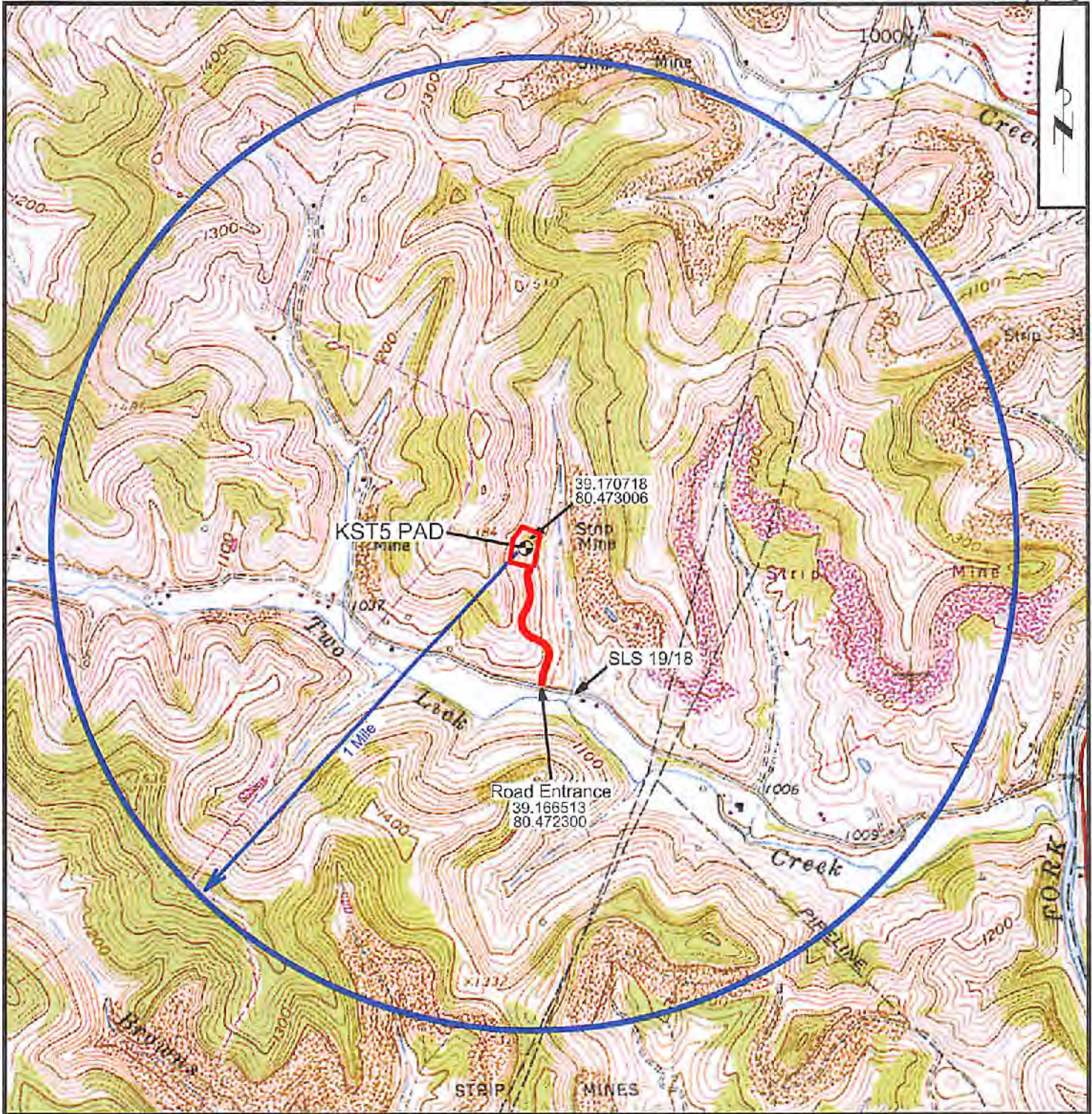
Field Reviewed? Yes No

33-05817 120

SUBJECT WELL
KST5 DHS
47-033-05817



Section of West Milford 7.5' Quadrangle
SCALE 1"=1000'
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WELL SITE SAFETY PLAN FOR:

KST5 PAD

Union District, Harrison County, W.Va.

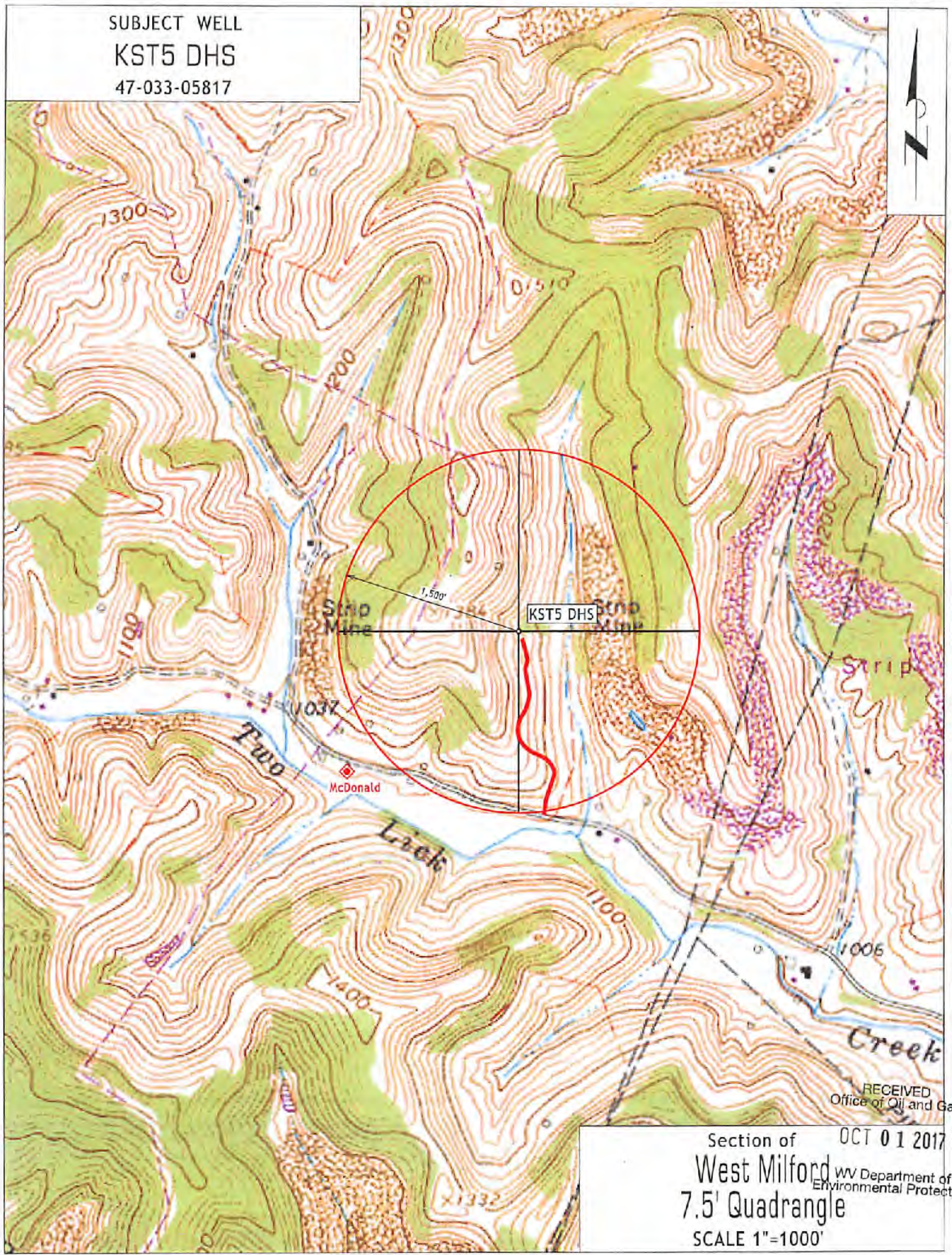
TOPOGRAPHIC MAP
West Milford 7.5' Quadrangle

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SCALE: 1" = 1,500'

SUBJECT WELL
KST5 DHS
47-033-05817



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Section of
West Milford
7.5' Quadrangle
SCALE 1"=1000'

WV Department of
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HG Energy II Appalachia, LLC

Site Safety Plan

**KST 5 Well Pad
2 Lick Run Road
Harrison County, WV**

August 2017: Version 1

*SDW
9/20/2017*

**For Submission to
West Virginia Department of Environmental Protection,
Office of Oil and Gas**

HG Energy II Appalachia, LLC

5260 Dupont Road

Parkersburg, WV 26101

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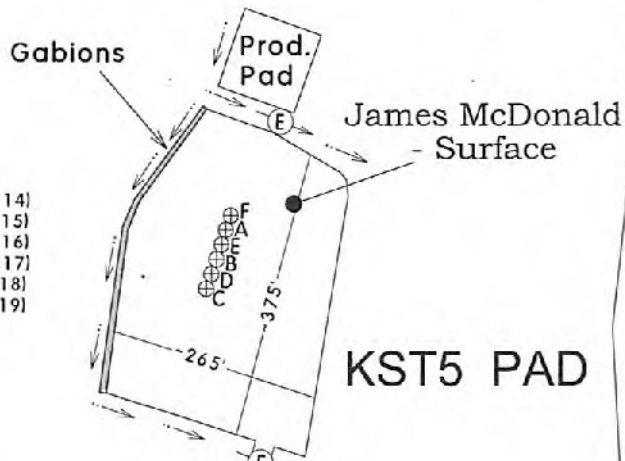
Reclamation Plan For:

KST5 PAD

33-05817DD

Wade Dickinson
- Surface

- KST5 AHS (47-033-05814)
- KST5 BHS (47-033-05815)
- KST5 CHS (47-033-05816)
- KST5 DHS (47-033-05817)
- KST5 EHS (47-033-05818)
- KST5 FHS (47-033-05819)



KST5 PAD

350' of 5-8% Grade

300' of 0-5% Grade

1,500' of
Existing Stoned
Access Road

850' of 12-15% Grade

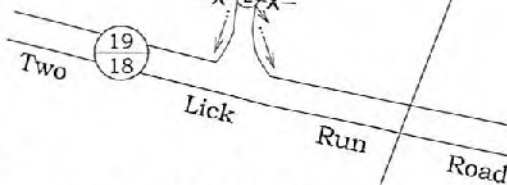
Tank
Grade

David Allman
- Surface

NOTE
REFER TO THE WVDEP
EROSION AND SEDIMENT CONTROL
FIELD MANUAL VER. MAY 2012 FOR
BMPs CONTROLLING EROSION AND
SEDIMENT FROM SOIL-DISTURBING
OPERATIONS.

Notes:

- REQUESTED PERMIT IS FOR DRILLING NEW HORIZONTAL WELL.
- ALL ACCESS ROADS ARE EXISTING AND WILL BE MAINTAINED TO WVDEP STANDARDS.
- ONLY MINIMAL EARTHWORK WILL BE REQUIRED TO COMPLETE PROPOSED WELL WORK. SEE ENGINEERED DRAWING THAT ACCOMPANIES THIS PERMIT PACKAGE FOR ADDITIONAL DETAIL.
- ALL DISTURBED AREAS WILL BE RE-VEGETATED AS OUTLINED ON FORM WW-9.
- MAINTAIN SEDIMENT BARRIERS AND DRAINAGE STRUCTURES.
- ALL ROAD GRADES <5% EXCEPT AS NOTED.
- NO DRILL PIT WILL BE CONSTRUCTED AND A CLOSED LOOP SYSTEM WILL BE UTILIZED TO HANDLE DRILL CUTTINGS.
- DRAWING NOT TO SCALE.



James McDonald
- Surface

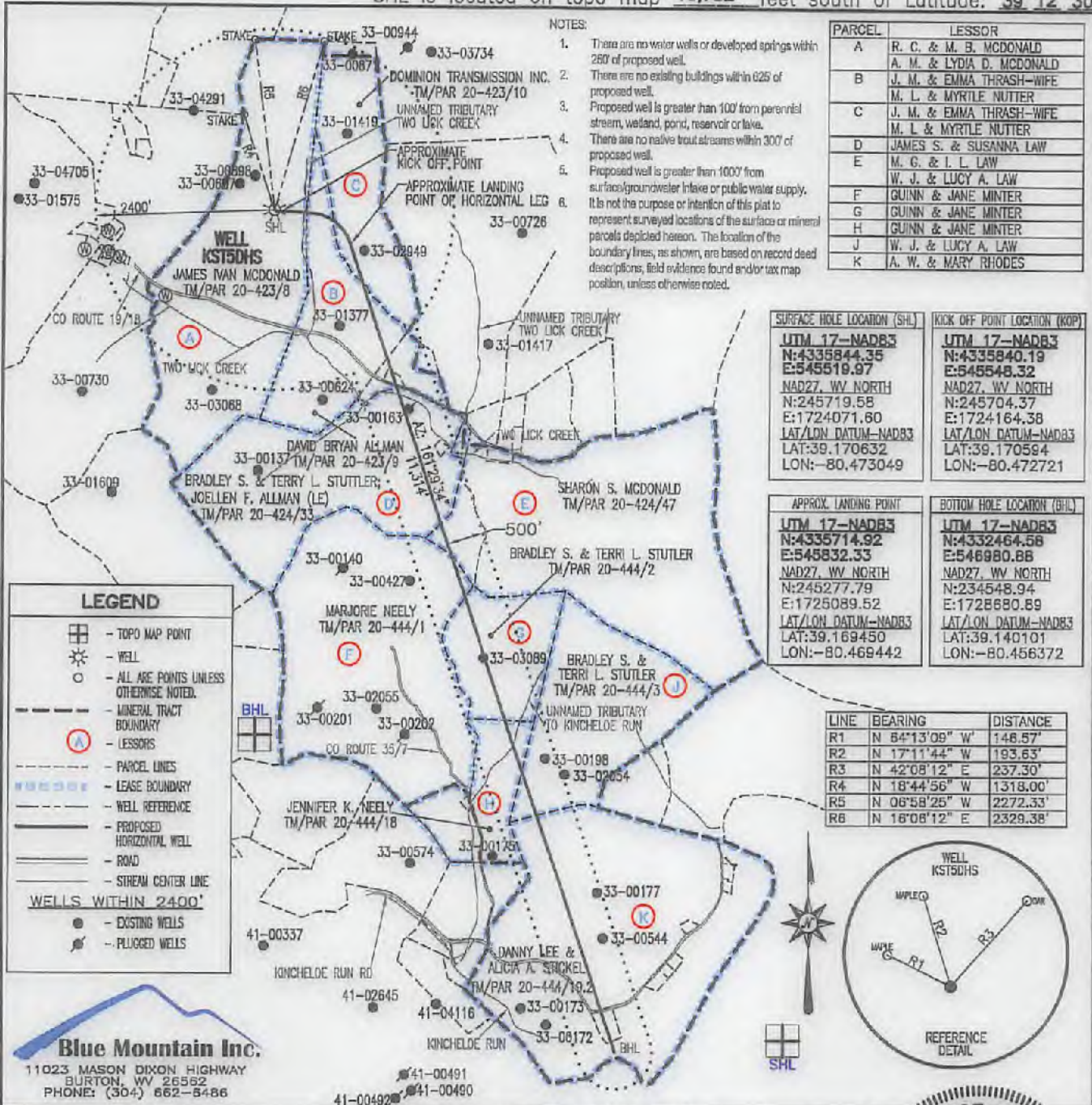
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BHL is located on topo map 9,676 feet south of Latitude: 39°10'00"
 SHL is located on topo map 13,732 feet south of Latitude: 39°12'30"

BHL is located on topo map 11,262 feet west of Longitude: 80°25'00"
 SHL is located on topo map 4,172 feet west of Longitude: 80°27'30"



FILE #: KST5DHS

DRAWING #: KST5DHS

SCALE: 1" = 2000'

MINIMUM DEGREE OF ACCURACY: 1/2500

PROVEN SOURCE OF ELEVATION: U.S.G.S. MONUMENT THOMAS 1498.81'

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 DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Signed: George D. Six

R.P.E.: _____ L.L.S.: P.S. No. 2000

GEORGE D. SIX
 LICENSED
 No. 2000
 STATE OF
 WEST VIRGINIA
 PROFESSIONAL SURVEYOR

PLACE SEAL HERE

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

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

DATE: JANUARY 03, 2018

OPERATOR'S WELL #: KST5DHS

API WELL #: 47 33 05817D

STATE COUNTY PERMIT

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

WATERSHED: MIDDLE WEST FORK CREEK ELEVATION: 1,134±

COUNTY/DISTRICT: HARRISON / UNION QUADRANGLE: WEST MILFORD, WV 7.5'

SURFACE OWNER: JAMES IVAN McDONALD ACREAGE: 176.000±

OIL & GAS ROYALTY OWNER: R. C. McDONALD & M. B. McDONALD; A. M. McDONALD & LYDIA D. McDONALD ACREAGE: 1328.95±

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

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6,900± TMD: 19,024±

WELL OPERATOR HG ENERGY II APPALACHIA, LLC DESIGNATED AGENT DIANE C. WHITE
 Address 5260 DUPONT ROAD Address 5260 DUPONT ROAD
 City PARKERSBURG State WV Zip Code 26101 City PARKERSBURG State WV Zip Code 26101

WW-6A1
(3/13)

Operator's Well No. _____

**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 Sheets****

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**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

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: HG Energy II Appalachia, LLC
 By: Diane White Diane White
 Its: Agent



HG Energy, LLC
5260 Dupont Road
Parkersburg, WV 26101
(304) 420-1100 - Office
(304) 863-3172 - Fax

33-05817DD

September 21, 2017

Laura Adkins
WV DEP
Division of Oil & Gas
601 57th Street
Charleston, WV 25304

RE: Drilling Under Roads – KST5 DHS
Union District, Harrison County
West Virginia

Dear Ms. Adkins:

HG Energy II Appalachia, LLC, has the right to drill, stimulate and produce wells that are drilled under the County and State Roads as designated on the plats.

Should you have any questions or desire further information, please contact me at dwhite@hgenergyllc.com or 304-420-1119.

Very truly yours,

Diane White

Diane C. White

Enclosures

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

Date of Notice Certification: 09/21/2017

API No. 47- 033 05817 DD
Operator's Well No. KST5 DHS
Well Pad Name: KST5

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>545520.0</u>
County: <u>Harrison</u>		Northing: <u>4335844.3</u>
District: <u>Union</u>	Public Road Access: <u>CR 19/18</u>	
Quadrangle: <u>West Milford WV 7.5'</u>	Generally used farm name: <u>James Ivan McDonald</u>	
Watershed: <u>Middle West Fork 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 type="checkbox"/> 2. NOTICE OF ENTRY FOR PLAT SURVEY or <input checked="" type="checkbox"/> NO PLAT SURVEY WAS CONDUCTED</p> <p><input type="checkbox"/> 3. NOTICE OF INTENT TO DRILL or <input type="checkbox"/> NOTICE NOT REQUIRED BECAUSE NOTICE OF ENTRY FOR PLAT SURVEY WAS CONDUCTED or</p> <p align="center"><input checked="" 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 type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED/ NOT REQUIRED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p> <p><input type="checkbox"/> RECEIVED</p>
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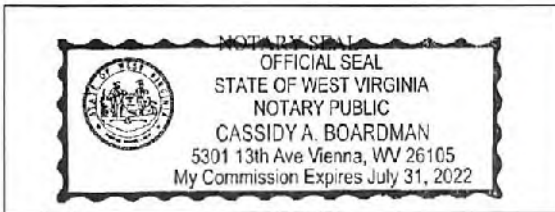
Required Attachments:

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.

Certification of Notice is hereby given:

THEREFORE, I Diane White, 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:	<u>HG Energy II Appalachia, LLC</u>	Address:	<u>5260 Dupont Road</u>
By:	<u>Diane White <i>Diane White</i></u>		<u>Parkersburg, WV 26101</u>
Its:	<u>Agent</u>	Facsimile:	<u>304-863-3172</u>
Telephone:	<u>304-420-1119</u>	Email:	<u>dwhite@hgenergyllc.com</u>



Subscribed and sworn before me this 21st day of September 2017.

Cassidy A. Boardman Notary Public

My Commission Expires 7/31/2022

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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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: 09/19/2017 **Date Permit Application Filed:** 09/21/2017

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.

Notice is hereby provided to:

SURFACE OWNER(s)
Name: James I. McDonald
Address: 7416 Good Hope Pike
Lost Creek, WV 26385

Name: _____
Address: _____

SURFACE OWNER(s) (Road and/or Other Disturbance)
Name: Same as Above
Address: _____

Name: _____
Address: _____

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

COAL OWNER OR LESSEE
Name: NA
Address: _____

COAL OPERATOR
Name: NA
Address: _____

WATER PURVEYOR(s)
Name: NA
Address: _____

OPERATOR OF ANY NATURAL GAS STORAGE FIELD
Name: Dominion Transmission Inc. - Ronald Walden
Address: 445 West Main Street
Clarksburg, WV 26301

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Environmental Protection

*Please attach additional forms if necessary

WW-6A
(5-12)

OCT 01 2017

API NO. 47- 033 0581700
OPERATOR WELL NO. KST5 DHSWV Department of Environmental Protection
Well Pad Name: KST5**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 also 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.

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.

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.

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.

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 wellpad 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 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.

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.**

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.

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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.

Notice is hereby given by:

Well Operator: HG Energy II Appalachia, LLC
Telephone: 304-420-1119
Email: dwhite@hgenergyllc.com

Address: 5260 Dupont Road
Parkersburg, WV 26101
Facsimile: 304-863-9127

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.



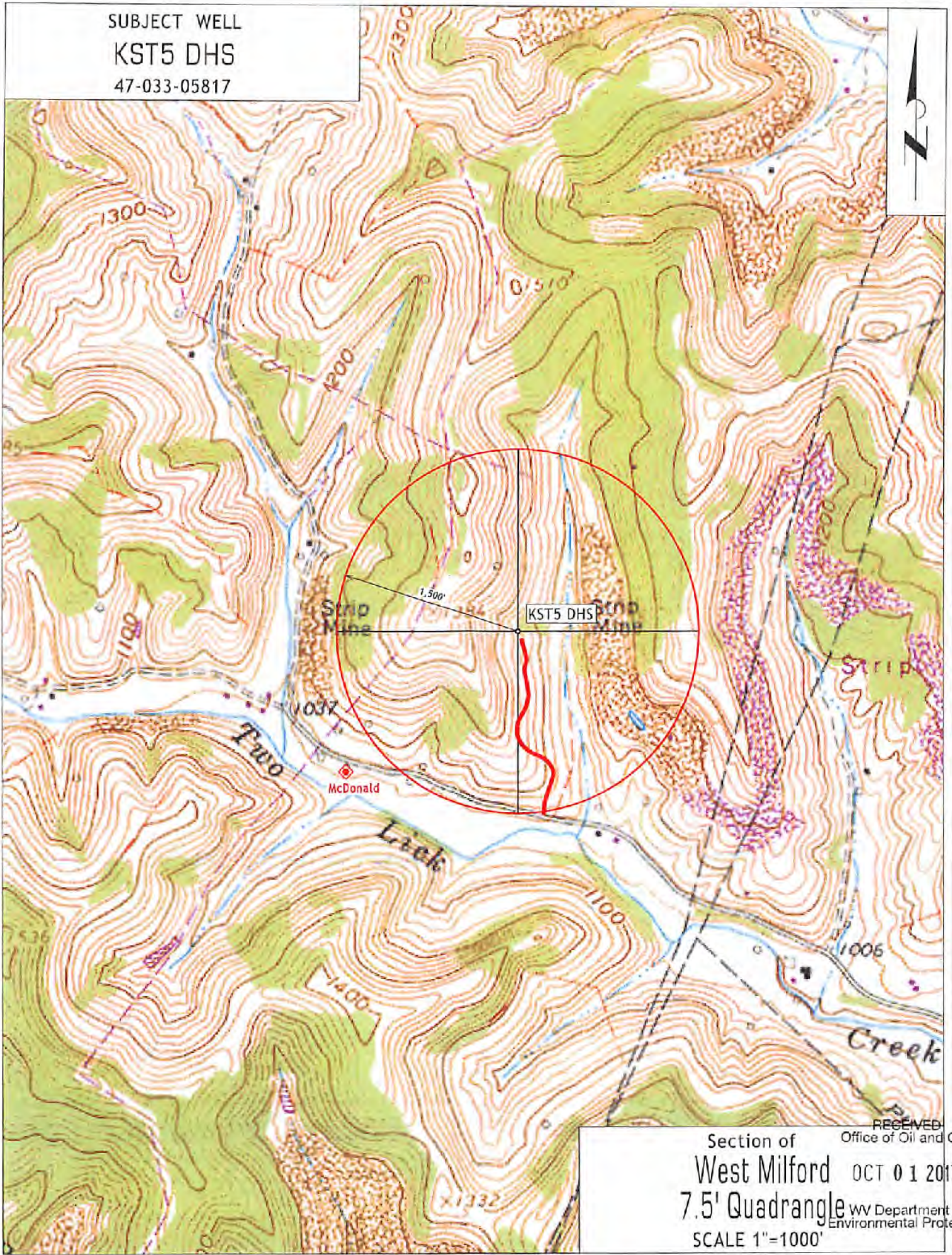
Subscribed and sworn before me this 26 day of 9, 2017.
Mark J Schall Notary Public
My Commission Expires 11/2/2021

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SUBJECT WELL
KST5 DHS
47-033-05817



Section of West Milford 7.5' Quadrangle
SCALE 1"=1000'

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33-058777

HG Energy, LLC
Certified Mail Receipt
KST5 DHS
WW-6A4W Notice of Intent to Drill Waiver

- See Attached Waiver -

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33-058171D

WW-6A5
(1/12)

Operator Well No. KST5 DHS

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: 08/30/2017 **Date Permit Application Filed:** 09/11/2017

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: James McDonald Name: _____
Address: 7416 Good Hope Road Address: _____
Lost Creek, WV 26385 _____

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>545520.0</u>
County: <u>Harrison</u>		Northing: <u>4335844.3</u>
District: <u>Union</u>	Public Road Access: <u>Two Lick Run (CR19/18)</u>	
Quadrangle: <u>West Milford, WV 7.5'</u>	Generally used farm name: <u>R. C. McDonald</u>	
Watershed: <u>Middle West Fork Creek</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: <u>HG Energy II Appalachia, LLC</u>	Address: <u>5260 Dupont Road</u>
Telephone: <u>304-420-1119</u>	<u>Parkersburg, WV 26101</u>
Email: <u>dwhite@hgenergyllc.com</u>	Facsimile: <u>304-653-3172</u>

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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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

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

Earl Ray Tomblin
Governor

Paul A. Mattox, Jr., P. E.
Secretary of Transportation/
Commissioner of Highways

September 20, 2017

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 KST5HS Well Pad, Harrison County

Dear Mr. Martin,

This well site will be accessed from Permit #04-2014-0458 reissued to HG Energy, LLC for access to the State Road for a well site located off of Harrison County 19/18 SLS.

The operator has signed a DISTRICT WIDE 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 January 3, 2012.

Very Truly Yours,

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

Cc: Matt McGuire
HG Energy, LLC
CH, OM, D-4
File

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4703305817D

List of Frac Additives by Chemical Name and CAS #

KST5 Well Pad (ASH,BHS,CHS,DHS,EHS,FHS)

Chemical Name	CAS #	Multiple CAS #'s
Pro Shale Slik 405	Mixture	68551-12-2 7647-14-5 12125-02-9 64742-47-8
Pro Hib II	Mixture	68412-54-4 68607-28-3 107-21-1 111-76-2 67-56-1 107-19-7
Silica Sand and Ground Sand	Mixture	14808-60-7 1344-28-1 1309-37-1 13463-67-7
Hydrochloric Acid 22 DEG BE	7647-01-0	
PROGEL - 4.5	64742-96-7	
BIO CLEAR 2000	Mixture	25322-68-3 10222-01-2
SCALE CLEAR SI 112	107-21-1	
PROBREAK 4	Mixture	57-50-1 107-21-1
Sulfamic Acid	5329-14-6	
PRO - Flow - 102-N	Mixture	67-63-0 68439-45-2 2687-96-9
PROGEL - 4	9000-30-0	

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AP167305814
 AP167305813
 AP167305812
 AP167305811
 AP167305810
 AP167305809



HG ENERGY II APPALACHIA, LLC

5260 DuPont Road
 Parkersburg, WV 26101

**WV DEP O&G
 ACCEPTED AS-BUILT**
 2/21 12/12/2017



LOCATION MAP
 NOT TO SCALE

KST5HS WELL SITE

PAD CENTER LOCATION

NAD 83 - LAT: N 39° 10' 14.53"; LONG: W 80° 28' 22.27"
 NAD 27 - LAT: N 39° 10' 14.20"; LONG: W 80° 28' 22.94"
 UTM NAD 83 ZONE 17 - N: 4335852.248; E: 545536.849

ENTRANCE LOCATION

NAD 83 - LAT: N 39° 09' 59.05"; LONG: W 80° 28' 20.09"
 NAD 27 - LAT: N 39° 09' 58.72"; LONG: W 80° 28' 21.57"
 UTM NAD 83 ZONE 17 - N: 4335375.359; E: 545591.936

UNION DISTRICT,

HARRISON COUNTY, WEST VIRGINIA

DATE: JULY 11, 2014

Electronic Version of These Plans May Be Viewed at: QI.OIL.GAS/SAV/FILES/REVIEWS

GENERAL INFORMATION

OWNER:
 M & B. McDONALD
 MAP/PARCEL 20-423-B
 AL PROPERTY AREA: 176.00 +/- ACRES
 AS ROYALTY OWNER:
 M & B. McDONALD, A. M. McDONALD & LYDIA McDONALD
 MAP/PARCEL 20-423-B
 AL PROPERTY AREA: 176.00 +/- ACRES
 CAUTION:
 KST5HS SITE IS LOCATED NORTH OF TWO LICK ROAD
 APPROXIMATELY 1,300 FEET EAST OF THE INTERSECTION OF COUNTY
 RR 3622 & COUNTY ROUTE 1975

PERMITS

COMPANY WILL OBTAIN AN ENCROACHMENT PERMIT (FORM PPM-09)
 FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF
 HIGHWAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.

UTILITY

UTILITY OF WEST VIRGINIA HAS NOTIFIED FOR THE LOCATING OF
 UTILITY PRIOR TO THIS PROJECT DESIGN (TICKET NO. 1504502887) IN
 HARRISON COUNTY. WEST VIRGINIA UTILITY WILL BE CONTACTED PRIOR TO THE START OF THE
 PROJECT.

PLAIN NOTE

PROPOSED LIMITS OF DISTURBANCE FOR THIS PROJECT ARE NOT LOCATED
 ON A FLOOD INSURANCE RATE MAP (FIRM) NUMBER
 22240D

DRAWING WAS CREATED ON 22x34 PAPER. 11x17 DRAWINGS
 ARE HALF SCALE. REFER TO SCALE BAR FOR PROPER SCALING.

SHEET INDEX	
NUMBER	DRAWING NAME
	COVER SHEET
	GENERAL NOTES
	GENERAL NOTES
	1/2 MILE BOUNDARY OVERVIEW
	EXISTING CONDITIONS
	OVERALL SITE PLAN
	OVERALL SITE PLAN WITH DRIBD
	NOTATION SHEET (1 OF 1)

SHEET INDEX	
DRAWING NUMBER	DRAWING NAME
12	ROAD & PAD PROFILES
13	RECLAMATION PLAN (1 OF 4)
14	RECLAMATION PLAN (2 OF 4)
15	RECLAMATION PLAN (3 OF 4)
16	RECLAMATION PLAN (4 OF 4)
17	CONSTRUCTION DETAILS
18	CONSTRUCTION DETAILS
19	CONSTRUCTION DETAILS

Blue Mountain Inc.
 Engineers and Land Surveyors
 11023 Mason Dixon Hwy.
 Burton, WV 26362-9656
 (304) 662-6486



ENVIRONMENTAL NOTES

A WETLAND DELINEATION WAS PERFORMED ON DECEMBER 17-19, 2013 BY BLUE MOUNTAIN INC. TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY JURISDICTION OF THE U.S. ARMY CORPS OF ENGINEERS AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION. THE JANUARY 10, 2014 REPORT FOR KST5HS, WHICH WAS PREPARED BY BLUE MOUNTAIN INC. SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THIS REPORT DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR WVDEP. IT IS STRONGLY RECOMMENDED THAT THE APPROPRIATE AGENCIES BE CONSULTED IN AN EFFORT TO OBTAIN CONFIRMATION OF THE DELINEATION DESCRIBED BY THE REPORT PRIOR TO ENDOING CONSTRUCTION ON THE PROPERTY DESCRIBED HEREIN. THE DEVELOPER SHALL OBTAIN THE APPROPRIATE PERMITS FROM THE FEDERAL AND/OR STATE REGULATORY AGENCIES PRIOR TO ANY PROPOSED IMPACTS TO WATERS OF THE U.S. INCLUDING WETLAND FILLS AND STREAM CROSSINGS.

GEOTECHNICAL NOTES

A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY THE FIELD BY RETTEW ASSOCIATES, INC. ON FEBRUARY 24-26, 2014. THE REPORTS PREPARED BY RETTEW ASSOCIATES, INC. DATED MARCH 17, 2014, REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. PLEASE REFER TO THE SUBSURFACE INVESTIGATION REPORT FOR ADDITIONAL INFORMATION, AS NEEDED.

RESTRICTIONS

1. THERE ARE NO NATURALLY PRODUCING TROUT STREAMS WITHIN 500' OF THE PAD & LOD.
2. THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000' OF THE PAD AND LOD.
3. THERE ARE NO EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250' OF THE WELLS BEING DRILLED.
4. THERE ARE NO OCCUPIED DWELLING STRUCTURES WITHIN 625' OF THE CENTER OF THE PAD.
5. THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,500 SQUARE FEET WITHIN 625' OF THE CENTER OF THE PAD.

CERTIFICATION

I, DAN HENRY, CERTIFY TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF THAT THE DESIGN AND SURVEY CONTROL, PLAN AND SITE PREPARATION PLAN AND FOOT CONSTRUCTION BHPIC ARE TRUE AND CORRECT, REPRESENT ACTUAL FIELD CONDITIONS AND ARE IN ACCORDANCE WITH THE WEST VIRGINIA CODE AND THE DEPARTMENT'S RULES AND REGULATIONS. I AM AWARE THAT THERE ARE PENALTIES FOR THE FAILURE TO COMPLY WITH THESE REQUIREMENTS.

Blue Mountain Inc.
 Engineers and Land Surveyors
 11023 Mason Dixon Hwy.
 Burton, WV 26362-9656
 (304) 662-6486

HG ENERGY II APPALACHIA, LLC
 5260 DuPont Road
 Parkersburg, WV 26101

KST5HS WELL SITE
 COVER

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 WV Department of Environmental Protection
 OCT 01 2017

**WVDEP OOG
ACCEPTED AS-BUILT**
12/18/2017



Note: Drawing was checked on 22.5x36 paper. All drawings and plans to be filed with the proper authority.

Blue Mountain Inc.
Engineers and Construction Managers
1000 W. 10th Street
Martinsburg, WV 26150
Tel: 304.263.2222

MC ENERGY SERVICES LLC
1500 HARBOR ROAD
HARRISBURG, PA 17111



REVISIONS

NO.	DATE	DESCRIPTION
1	12/18/2017	AS-BUILT

DATE: 12/18/2017
DRAWN BY: [Name]
CHECKED BY: [Name]
SCALE: AS SHOWN
SHEET 3 OF 3

