

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

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Office of Oil and Gas

APR 03 2020

WV Department of
Environmental Protection

API 47 - 033 - 05814 County Harrison District Union
Quad West Milford, WV 7.5' Pad Name KST5 Field/Pool Name _____
Farm name James Ivan McDonald Well Number KST5 AHS
Operator (as registered with the OOG) HG Energy II Appalachia, LLC
Address 5260 Dupont Road City Parkersburg State WV Zip 26101

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4335861.75 Easting 545525.53
Landing Point of Curve Northing 4335852.43 Easting 546098.32
Bottom Hole Northing 4332741.27 Easting 547213.39

Elevation (ft) 1134 GL Type of Well New Existing Type of Report Interim Final
Permit Type Deviated Horizontal Horizontal 6A Vertical Depth Type Deep Shallow
Type of Operation Convert Deepen Drill Plug Back Redrilling Rework Stimulate
Well Type Brine Disposal CBM Gas Oil Secondary Recovery Solution Mining Storage Other _____
Type of Completion Single Multiple Fluids Produced Brine Gas NGL Oil Other _____
Drilled with Cable Rotary

Drilling Media Surface hole Air Mud Fresh Water Intermediate hole Air Mud Fresh Water Brine
Production hole Air Mud Fresh Water Brine

Mud Type(s) and Additive(s)
Synthetic Oil Base Mud, Additives - Lime, Calcium Chloride, Gilsonite, Asphalt, Barite, Emulsifier, Base Oil

Date permit issued 03/06/2018 Date drilling commenced 3/19/2018 Date drilling ceased 7/02/18
Date completion activities began 9/27/18 Date completion activities ceased 12/7/18
Verbal plugging (Y/N) _____ Date permission granted _____ Granted by _____

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

Freshwater depth(s) ft 521' Open mine(s) (Y/N) depths _____ No
Salt water depth(s) ft Not observed Void(s) encountered (Y/N) depths _____ No
Coal depth(s) ft 620, 692 Cavern(s) encountered (Y/N) depths _____ No
Is coal being mined in area (Y/N) _____

Reviewed by:
SPW 5/20/2020

API 47-033 - 05814 Farm name James Ivan McDonald Well number KST5 AHS

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	24"	20"	114'	N	J-55 94#		N - Drilled In
Surface	17 1/2"	13 3/8"	519'		J-55 54#	None	Y
Coal							
Intermediate 1	12 3/8"	9 5/8"	2624'	N	J-55 40#	None	Y
Intermediate 2							
Intermediate 3							
Production	8 1/2"	5 1/2"	18184'	N	P-110 20#	None	Y
Tubing							
Packer type and depth set							

Comment Details _____

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	Drilled In					Drilled In	
Surface	Class A	950	15.6	1.19		Surface	8
Coal							
Intermediate 1	Class A	903	15.4	1.14		Surface	8
Intermediate 2							
Intermediate 3							
Production	Class A	3830	15.3	1.17		Surface	8
Tubing							

Drillers TD (ft) ^{16446'} _____ Loggers TD (ft) ^{16446'} _____
 Deepest formation penetrated Marcellus Plug back to (ft) _____
 Plug back procedure _____

Kick off depth (ft) ^{5400'} _____

Check all wireline logs run caliper density deviated/directional induction
 neutron resistivity gamma ray temperature sonic

Well cored Yes No Conventional Sidewall Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING _____
Fresh Water - Bow spring centralizers on first joint then every fourth joint to 100 feet from surface
Coal - Bow spring centralizers on first joint then every fourth joint to 100 feet from surface
Intermediate - Bow spring centralizers on the first two joints and every fourth joint inside surface casing
Production - Run 1 spiral centralizer every 3 joints from the 1st 5.5" long joint to the top of the curve

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____

API 47-033 - 05814 Farm name James Ivan McDonald Well number KST5 AHS

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	36"	30"	40'	N	LS 117#		N - Drilled In
Surface	17 1/2"	13 3/8"	1158'		J-55 54#	None	Y
Coal							
Intermediate 1	12 3/8"	9 5/8"	2597'	N	J-55 36#	None	Y
Intermediate 2							
Intermediate 3							
Production	8 1/2"	5 1/2"	16406'	N	P-110 23#	None	Y
Tubing							
Packer type and depth set							

Comment Details _____

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	Drilled In					Drilled In	
Surface	Class A	950	15.6	1.19		Surface	8
Coal							
Intermediate 1	Class A	903	15.4	1.14		Surface	8
Intermediate 2							
Intermediate 3							
Production	Class A	3830	15.3	1.17		Surface	8
Tubing							

Drillers TD (ft) 16446' Loggers TD (ft) 16446' RECEIVED Office of Oil and Gas
 Deepest formation penetrated Marcellus Plug back to (ft) _____ APR 03 2020
 Plug back procedure _____

WV Department of Environmental Protection

Kick off depth (ft) 5400'

Check all wireline logs run caliper density deviated/directional induction
 neutron resistivity gamma ray temperature sonic

Well cored Yes No Conventional Sidewall Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING _____

- Fresh Water - Bow spring centralizers on first joint then every fourth joint to 100 feet from surface
- Coal - Bow spring centralizers on first joint then every fourth joint to 100 feet from surface
- Intermediate - Bow spring centralizers on the first two joints and every fourth joint inside surface casing
- Production - Run 1 spiral centralizer every 3 joints from the 1st 5.5" long joint to the top of the curve

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____

Stimulation Information Per Stage

AG AF AM AP AD U X

Stage No.	Perforation Date	Avg Pump Rate (BPM)	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (BBLs)	Amount of Nitrogen/Other (units)
1	9/27/2018	80.5	8,728	N/A	4,350	43,451	6,433	2,071
2	9/28/2018	87.6	8,807	6,673	4,675	43,459	13,479	2,000
3	9/29/2018	85.9	9,457	6,585	4,880	43,458	11,053	2,053
4	9/29/2018	87.5	9,107	6,057	4,650	43,460	15,928	2,024
5	9/29/2018	86.1	9,358	6,190	4,885	43,458	15,171	2,000
6	9/30/2018	87.2	9,016	N/A	5,500	43,460	11,020	1,564
7	9/30/2018	88.0	9,046	N/A	4,925	43,461	15,183	1,030
8	10/1/2018	87.2	8,845	6,219	5,115	43,461	14,481	1,008
9	10/1/2018	87.8	8,387	6,099	5,160	43,462	13,948	1,022
10	10/2/2018	88.5	8,570	5,884	5,743	43,464	14,468	1,000
11	10/3/2018	87.9	8,694	5,931	5,000	43,464	14,097	1,014
12	10/3/2018	86.7	8,708	5,700	5,450	43,463	13,124	1,068
13	10/4/2018	85.9	9,126	N/A	4,598	43,463	12,900	1,038
14	10/4/2018	89.5	8,685	5,882	5,600	43,467	13,981	1,000
15	10/4/2018	78.3	9,107	5,974	6,054	43,455	14,161	1,048
16	10/5/2018	89.6	8,810	5,907	4,825	43,468	14,126	1,051
17	10/5/2018	83.8	8,043	5,936	6,038	43,462	13,761	1,032
18	10/6/2018	86.0	8,511	5,963	6,205	43,465	13,614	1,040
19	10/6/2018	88.8	8,617	6,030	5,267	43,468	11,304	1,014
20	10/7/2018	90.2	8,788	6,062	5,492	43,470	9,245	1,048
21	10/7/2018	92.4	8,804	6,025	5,825	43,472	14,059	1,016
22	10/7/2018	89.6	8,763	5,953	6,203	43,470	13,369	1,038
23	10/8/2018	90.7	9,000	6,002	5,825	43,472	13,677	1,024
24	10/8/2018	91.1	8,558	5,852	5,425	43,472	13,707	1,048
25	10/8/2018	91.3	8,623	5,853	5,649	43,472	13,710	1,008
26	10/9/2018	89.2	8,553	5,902	5,250	43,471	13,814	1,040
27	10/9/2018	84.0	8,388	6,012	4,864	43,466	15,663	983
28	10/10/2018	92.8	8,710	6,005	5,260	43,476	14,102	1,038
29	10/10/2018	89.0	8,637	5,905	5,180	43,472	13,225	1,020
30	10/11/2018	91.3	8,653	6,281	5,730	43,475	13,576	1,000
31	10/11/2018	95.5	8,641	6,102	4,975	43,480	13,939	1,006
32	10/11/2018	90.5	8,664	6,280	5,480	43,475	14,244	1,006
33	10/12/2018	93.9	8,445	6,334	5,637	43,479	13,687	938
34	10/12/2018	93.9	8,885	5,743	5,125	43,479	13,573	998
35	10/12/2018	94.8	8,601	6,240	5,013	43,480	13,743	1,000
36	10/13/2018	85.3	8,205	5,873	4,738	43,471	12,567	1,014
37	10/13/2018	94.6	8,947	5,974	4,815	43,481	12,865	1,044
38	10/13/2018	93.2	8,241	5,770	4,786	43,479	12,939	1,035
39	10/14/2018	91.7	8,383	6,475	5,120	43,479	13,617	1,030
40	10/14/2018	94.6	8,604	6,097	5,500	43,482	13,944	1,012
41	10/14/2018	89.2	7,235	6,260	5,206	43,476	13,468	995
42	10/15/2018	96.8	7,587	6,235	5,090	43,485	14,076	1,008
43	10/15/2018	95.9	7,985	6,447	5,372	43,484	13,585	1,002
44	10/16/2018	98.1	8,142	6,060	5,475	43,487	12,982	978
45	10/16/2018	99.3	8,149	5,999	5,400	43,488	13,928	1,043
46	10/17/2018	95.0	8,080	6,300	6,225	43,485	13,421	1,039
47	10/17/2018	94.7	8,123	6,340	5,215	43,485	12,845	1,000
48	10/17/2018	96.3	7,895	6,134	5,915	43,486	13,742	999
49	10/18/2018	95.5	7,879	6,222	5,975	43,487	13,493	1,010
50	10/18/2018	96.2	7,729	6,218	5,825	43,487	13,924	980
51	10/18/2018	95.4	8,322	6,449	6,150	43,486	13,839	1,000
52	10/18/2018	95.0	7,951	6,715	5,925	43,486	13,604	1,020
53	10/19/2018	95.9	8,188	6,736	5,275	43,488	13,777	994
54	10/19/2018	94.3	8,131	7,230	5,525	43,486	13,313	1,027
55	10/20/2018	99.1	7,934	6,257	5,825	43,492	13,464	1,032

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KST5 AHS
Perforation Record

Stage No.	Perforation Date	Perforated from MD ft	Perforated to MD ft	# of Perforations	Formation
1	9/27/2018	18,123		N/A	
2	9/28/2018	17,992	17,812	70	
3	9/29/2018	17,794		63	
4	9/29/2018	17,596	17,416	70	
5	9/29/2018	17,398	17,218	70	
6	9/30/2018	17,200	17,020	70	
7	9/30/2018	17,002	16,822	70	
8	10/1/2018	16,804	16,624	70	
9	10/1/2018	16,606	16,426	70	
10	10/2/2018	16,408	16,228	70	
11	10/3/2018	16,210	16,030	70	
12	10/3/2018	16,012	15,832	70	
13	10/4/2018	15,814	15,634	70	
14	10/4/2018	15,616	15,436	70	
15	10/4/2018	15,418	15,238	70	
16	10/5/2018	15,220	15,040	70	
17	10/5/2018	15,022	14,842	70	
18	10/6/2018	14,824	14,644	70	
19	10/6/2018	14,626	14,446	70	
20	10/7/2018	14,428	14,248	70	
21	10/7/2018	14,230	14,050	70	
22	10/7/2018	14,032	13,852	70	
23	10/8/2018	13,834	13,654	70	
24	10/8/2018	13,636	13,456	70	
25	10/8/2018	13,438	13,258	70	
26	10/9/2018	13,240	13,060	70	
27	10/9/2018	13,042	12,862	70	
28	10/10/2018	12,844	12,664	70	
29	10/10/2018	12,646	12,466	70	
30	10/11/2018	12,448	12,268	70	
31	10/11/2018	12,250	12,070	70	
32	10/11/2018	12,052	11,872	70	
33	10/12/2018	11,854	11,674	70	
34	10/12/2018	11,656	11,476	70	
35	10/12/2018	11,458	11,278	70	
36	10/13/2018	11,260	11,080	70	
37	10/13/2018	11,062	10,882	70	
38	10/13/2018	10,864	10,684	70	
39	10/14/2018	10,666	10,486	70	
40	10/14/2018	10,468	10,288	70	
41	10/14/2018	10,270	10,090	70	
42	10/15/2018	10,072	9,892	70	
43	10/15/2018	9,874	9,694	70	
44	10/16/2018	9,676	9,496	70	
45	10/16/2018	9,478	9,298	70	
46	10/17/2018	9,280	9,100	70	
47	10/17/2018	9,082	8,902	70	
48	10/17/2018	8,884	8,704	70	
49	10/18/2018	8,686	8,506	70	
50	10/18/2018	8,488	8,308	70	
51	10/18/2018	9,290	8,110	70	
52	10/18/2018	8,092	7,912	70	
53	10/19/2018	7,894	7,714	70	
54	10/19/2018	7,696	7,516	70	
55	10/20/2018	7,478	N/A	63	

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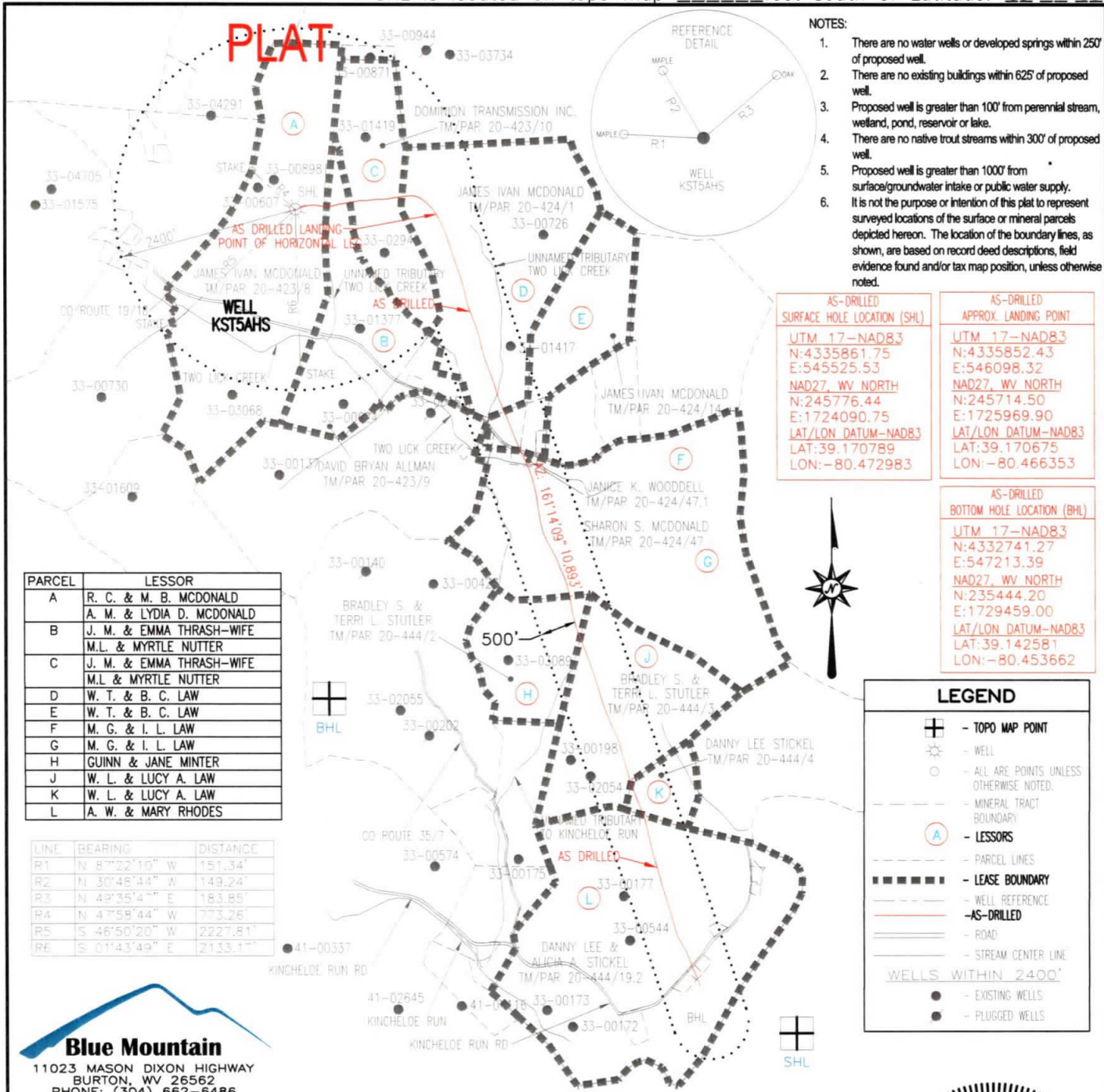
APR 03 2020

WV Department of
Environmental Protection

AS DRILLED

BHL is located on topo map 9,227 feet south of Latitude: 39° 10' 00"
 SHL is located on topo map 13,675 feet south of Latitude: 39° 12' 30"

BHL is located on topo map 10,359 feet west of Longitude: 80° 25' 00"
 SHL is located on topo map 4,153 feet west of Longitude: 80° 27' 30"



- NOTES:
1. There are no water wells or developed springs within 250' of proposed well.
 2. There are no existing buildings within 625' of proposed well.
 3. Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
 4. There are no native trout streams within 300' of proposed well.
 5. Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
 6. It is not the purpose or intention of this plat to represent surveyed locations of the surface or mineral parcels depicted hereon. The location of the boundary lines, as shown, are based on record deed descriptions, field evidence found and/or tax map position, unless otherwise noted.

AS-DRILLED SURFACE HOLE LOCATION (SHL)	AS-DRILLED APPROX. LANDING POINT
UTM 17-NAD83 N:4335861.75 E:545525.53	UTM 17-NAD83 N:4335852.43 E:546098.32
NAD27, WV NORTH N:245776.44 E:1724090.75	NAD27, WV NORTH N:245714.50 E:1725969.90
LAT/LON DATUM-NAD83 LAT:39.170789 LON:-80.472983	LAT/LON DATUM-NAD83 LAT:39.170675 LON:-80.466353

AS-DRILLED BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83 N:4332741.27 E:547213.39
NAD27, WV NORTH N:235444.20 E:1729459.00
LAT/LON DATUM-NAD83 LAT:39.142581 LON:-80.453662

PARCEL	LESSOR
A	R. C. & M. B. MCDONALD
B	A. M. & LYDIA D. MCDONALD
C	J. M. & EMMA THRASH-WIFE
D	M.L. & MYRTLE NUTTER
E	J. M. & EMMA THRASH-WIFE
F	M.L. & MYRTLE NUTTER
G	W. T. & B. C. LAW
H	W. T. & B. C. LAW
I	M. G. & I. L. LAW
J	M. G. & I. L. LAW
K	GUINN & JANE MINTER
L	W. L. & LUCY A. LAW
	W. L. & LUCY A. LAW
	A. W. & MARY RHODES

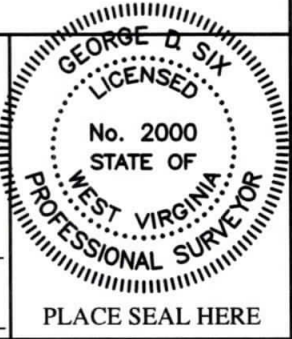
LINE	BEARING	DISTANCE
R1	N 87°22'16" W	151.34'
R2	N 30°48'44" W	149.24'
R3	N 49°35'4" E	183.85'
R4	N 47°58'44" W	773.26'
R5	S 46°50'20" W	2227.81'
R6	S 01°43'49" E	2133.11'

Blue Mountain
 11023 MASON DIXON HIGHWAY
 BURTON, WV 26562
 PHONE: (304) 662-6486

FILE #: KST5AHS-AS DRILLED
 DRAWING #: KST5AHS-AS DRILLED
 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



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

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

RECEIVED
 OIL & GAS
 APR 03 2020
 WV Department of Environmental Protection

DATE: JANUARY 25, 2019
 OPERATOR'S WELL #: KST5AHS-AS DRILLED
 API WELL #: 47 33 05814
 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): AS-DRILLED PLAT

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: AS-DRILLED TVD: 6,768'± TMD: 18,211±
 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

