

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 - 05818 County Harrison District Union
Quad West Milford, WV 7.5' Pad Name KST5 Field/Pool Name _____
Farm name James Ivan McDonald Well Number KST5 EHS
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 4335855.96 Easting 545523.68
Landing Point of Curve Northing 4335685.45 Easting 545522.07
Bottom Hole Northing 4332694.35 Easting 546581.56

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 03/07/2018 Date drilling commenced 6/27/2018 Date drilling ceased 7/13/18
Date completion activities began 7/29/18 Date completion activities ceased 12/02/18
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:
JDW 5/20/2020

API 47-033 - 05818

Farm name James Ivan McDonald

Well number KST5 EHS

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"	507'		J-55 54#	None	Y
Coal							
Intermediate 1	12 3/8"	9 5/8"	2628'	N	J-55 40#	None	Y
Intermediate 2							
Intermediate 3							
Production	8 1/2"	5 1/2"	17520'	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	481	15.6	1.20		Surface	8
Coal							
Intermediate 1	Class A	915	Lead 15.4, Tail 15.9	Lead 1.24, Tail 1.17		Surface	8
Intermediate 2							
Intermediate 3							
Production	Class A	3590	Lead 13.5, Tail 14.5	Lead 1.41, Tail 1.18		Surface	8
Tubing							

Drillers TD (ft) 18133' Loggers TD (ft) 18133'

Deepest formation penetrated Marcellus Plug back to (ft) _____

Plug back procedure _____

Kick off depth (ft) 6274'

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 _____

KHS 5 EHS
Stimulation Information Per Stage

Stage No.	Perforation Date	Avg Pump Rate (BPM)	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (sks)	Amount of Water (BBLs)	Amount of Nitrogen/Other (units)
1	9/13/2018	81.7	8,727	5,918	5,325	1797	6,193	2,000
2	9/13/2018	80.9	8,622	-	5,080	5362	12,321	1,043
3	9/14/2018	81.7	8,863	6,196	5,550	6242	13,946	994
4	9/14/2018	81.3	9,038	6,001	5,810	6003	12,641	1,040
5	9/14/2018	77.7	9,709	6,924	5,116	5960	15,119	995
6	9/14/2018	79.7	9,170	5,657	6,731	4066	10,902	1,042
7	9/15/2018	81.1	10,089	6,262	6,650	5626	11,562	2,071
8	9/15/2018	84.4	10,144	6,131	6,525	2920	10,785	2,053
9	9/15/2018	78.5	9,448	6,018	6,805	4494	13,164	2,000
10	9/15/2018	77.1	9,809	6,185	4,870	3375	11,756	946
11	9/16/2018	83.7	8,899	6,435	4,975	6782	13,607	2,043
12	9/16/2018	84.2	8,829	6,180	5,125	6972	12,932	1,982
13	9/16/2018	86.5	9,146	6,138	5,016	3695	10,630	1,974
14	9/16/2018	79.3	8,793	N/A	4,267	6952	15,054	2,000
15	9/17/2018	82.0	8,482	5,826	4,475	6952	14,759	2,024
16	9/17/2018	85.6	8,227	6,113	4,750	7214	12,883	2,043
17	9/17/2018	82.4	8,488	6,505	5,699	6955	13,330	1,974
18	9/17/2018	83.4	8,535	6,257	6,184	7050	13,607	1,974
19	9/18/2018	83.9	8,872	5,863	5,225	7146	15,048	2,024
20	9/18/2018	90.2	9,221	6,185	5,125	7040	13,693	2,024
21	9/18/2018	85.5	8,762	5,896	5,237	6969	13,386	2,058
22	9/18/2018	85.4	8,998	5,927	5,045	7027	13,542	2,000
23	9/18/2018	85.0	9,076	6,224	5,660	7076	13,895	2,053
24	9/19/2018	80.7	9,158	6,170	5,247	7082	14,499	2,000
25	9/19/2018	77.4	9,156	6,203	5,244	2510	9,818	2,100
26	9/19/2018	84.0	8,713	6,007	5,150	6970	12,551	2,109
27	9/20/2018	90.6	8,426	6,085	5,540	6946	16,220	2,061
28	9/20/2018	89.2	8,184	6,505	9,370	7071	15,268	2,050
29	9/20/2018	85.8	7,813	6,072	5,481	7025	13,177	2,100
30	9/20/2018	95.6	8,362	6,083	5,150	6921	13,533	2,102
31	9/21/2018	94.2	7,989	5,889	5,310	7033	15,987	1,562
32	9/21/2018	92.2	8,520	6,180	4,822	5137	12,595	1,596
33	9/21/2018	88.0	7,722	6,075	5,159	7213	14,319	1,000
34	9/22/2018	90.5	7,605	5,721	4,910	7087	15,160	1,014
35	9/22/2018	93.4	7,633	6,029	4,960	7013	14,759	1,000
36	9/22/2018	89.7	7,463	6,051	5,189	6946	14,043	1,000
37	9/22/2018	89.0	7,682	6,010	4,996	7037	14,143	1,000
38	9/22/2018	88.7	8,278	5,985	5,015	7135	15,471	1,047
39	9/23/2018	95.5	8,334	5,638	5,270	4119	10,959	980
40	9/23/2018	95.7	7,775	5,622	4,625	7051	16,156	980
41	9/23/2018	88.7	7,709	5,958	4,940	7088	14,567	1,000
42	9/23/2018	88.2	7,627	5,857	5,515	7296	15,461	1,000
43	9/24/2018	94.0	8,406	5,881	4,570	7012	15,173	994
44	9/24/2018	91.0	7,827	5,512	5,235	7010	15,234	978
45	9/24/2018	89.8	7,605	5,706	4,994	6975	14,421	956
46	9/24/2018	93.1	7,598	5,794	5,860	7310	14,904	986
47	9/25/2018	99.5	9,081	5,933	5,070	7050	13,638	994
48	9/25/2018	97.0	7,816	5,875	5,570	6897	13,460	986
49	9/25/2018	93.5	7,674	6,187	5,725	7021	13,377	958
50	9/25/2018	95.3	7,863	6,481	5,419	6986	13,103	1,024
51	9/26/2018	94.5	7,953	6,191	5,670	6999	13,453	996
52	9/26/2018	94.8	7,654	6,384	5,650	6937	13,316	999
53	9/26/2018	93.8	7,502	6,883	5,725	6989	13,406	1,028

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KST5 EHS
Perforation Record

Stage No.	Perforation Date	Perforated from MD ft	Perforated to MD ft	# of Perforations	Formation
1	9/13/2018	17,407		NA	
2	9/13/2018	17,322	17,154	49	
3	9/14/2018	17,124	16,956	49	
4	9/14/2018	16,926	16,758	49	
5	9/14/2018	16,728	16,560	49	
6	9/14/2018	16,530	16,362	49	
7	9/15/2018	16,332	16,164	49	
8	9/15/2018	16,134	15,966	49	
9	9/15/2018	15,936	15,768	49	
10	9/15/2018	15,738	15,570	49	
11	9/16/2018	15,540	15,372	49	
12	9/16/2018	15,342	15,174	49	
13	9/16/2018	15,144	14,976	49	
14	9/16/2018	14,946	14,778	49	
15	9/17/2018	14,748	14,580	49	
16	9/17/2018	14,550	14,382	49	
17	9/17/2018	14,352	14,184	49	
18	9/17/2018	14,154	13,986	49	
19	9/18/2018	13,956	13,788	49	
20	9/18/2018	13,758	13,590	49	
21	9/18/2018	13,560	13,392	49	
22	9/18/2018	13,362	13,194	49	
23	9/18/2018	13,164	12,996	49	
24	9/19/2018	12,966	12,798	49	
25	9/19/2018	12,768	12,600	49	
26	9/19/2018	12,570	12,402	49	
27	9/20/2018	12,378	12,258	70	
28	9/20/2018	12,890	12,060	70	
29	9/20/2018	11,976	11,808	49	
30	9/20/2018	11,778	11,610	49	
31	9/21/2018	11,586	11,466	70	
32	9/21/2018	11,388	11,268	70	
33	9/21/2018	11,190	11,070	70	
34	9/22/2018	10,992	10,872	70	
35	9/22/2018	10,794	10,674	70	
36	9/22/2018	10,596	10,476	70	
37	9/22/2018	10,398	10,278	70	
38	9/22/2018	10,200	10,080	70	
39	9/23/2018	10,002	9,882	70	
40	9/23/2018	9,804	9,684	70	
41	9/23/2018	9,606	9,486	70	
42	9/23/2018	9,408	9,288	70	
43	9/24/2018	9,210	9,090	70	
44	9/24/2018	9,012	8,892	70	
45	9/24/2018	8,814	8,694	70	
46	9/24/2018	8,616	8,496	70	
47	9/25/2018	8,412	8,244	49	
48	9/25/2018	8,214	8,046	49	
49	9/25/2018	8,016	7,848	49	
50	9/25/2018	7,818	7,650	49	
51	9/26/2018	7,620	7,452	49	
52	9/26/2018	7,422	7,254	49	
53	9/26/2018	7,224		42	

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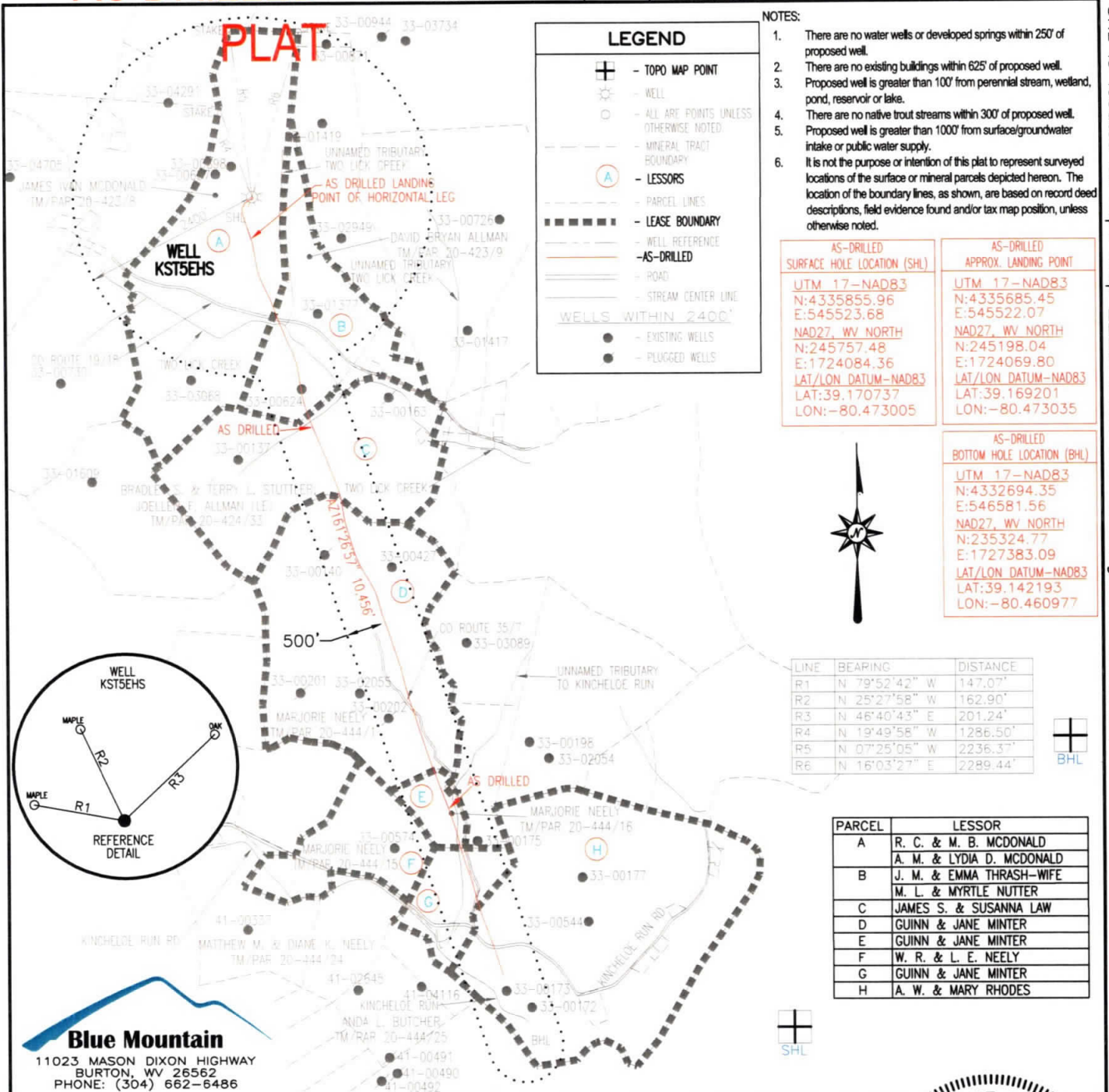
APR 03 2020

WV Department of
Environmental Protection

AS DRILLED

BHL is located on topo map 9,821 feet south of Latitude: 39° 10' 00"
 SHL is located on topo map 13,694 feet south of Latitude: 39° 12' 30"

BHL is located on topo map 452 feet west of Longitude: 80° 27' 30"
 SHL is located on topo map 4,160 feet west of Longitude: 80° 27' 30"



FILE #: KST5EHS-AS DRILLED
 DRAWING #: KST5EHS-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

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

RECEIVED
 Office of Oil and Gas
 APR 03 2020

DATE: JANUARY 25, 2019
 OPERATOR'S WELL #: KST5EHS-AS DRILLED
 API WELL #: 47 33 05818
 STATE COUNTY PERMIT

WV Department of Environmental Protection

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: 6,695'± TMD: 17,540±

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

