

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

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APR 03 2020

WV Department of
Environmental Protection

API 47 - 033 - 05817 County Harrison District Union
Quad West Milford, WV 7.5' Pad Name KST5 Field/Pool Name _____
Farm name James Ivan McDonald Well Number KST5 DHS
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 4335838.53 Easting 545518.12
Landing Point of Curve Northing 4335471.15 Easting 544956.94
Bottom Hole Northing 4332648.65 Easting 545949.26

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 3/09/2018 Date drilling ceased 6/02/18
Date completion activities began 7/29/18 Date completion activities ceased 11/29/18
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:

SDW 5/20/2020

API 47-033 - 05817 Farm name James Ivan McDonald Well number KST5 DHS

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"	933'		J-55 54#	None	Y
Coal							
Intermediate 1	12 3/8"	9 5/8"	2459'	N	J-55 40#	None	Y
Intermediate 2							
Intermediate 3							
Production	8 1/2"	5 1/2"	18179'	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	484	15.6	1.20		Surface	8
Coal							
Intermediate 1	Class A	920	Lead 15.4, Tail 15.9	Lead 1.24, Tail 1.17		Surface	8
Intermediate 2							
Intermediate 3							
Production	Class A	4024	14.5	1.17		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) ^{5274'} _____

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 DHS
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 (lbs)	Amount of Water (BBLs)	Amount of Nitrogen/Other (units)
1	9/27/2018	92.3	8,923	n/a	4,425	245540	7,273	2,100
2	9/29/2018	89.9	8,783	6,309	5,325	489580	12,649	2,100
3	9/29/2018	86.5	9,004	6,509	5,950	600794	13,354	2,058
4	9/29/2018	86.9	9,313	6,181	5,325	528720	12,973	2,058
5	9/30/2018	87.8	9,231	6,167	5,560	608680	13,457	2,058
6	9/30/2018	87.0	9,236	6,340	5,725	615780	13,502	966
7	10/1/2018	86.7	9,074	6,504	5,350	607940	13,662	1,050
8	10/1/2018	85.5	9,220	6,274	5,650	525020	12,620	966
9	10/1/2018	87.1	8,919	6,080	5,265	501420	11,926	1,050
10	10/1/2018	88.0	9,020	6,032	5,025	585160	12,761	1,050
11	10/2/2018	88.2	8,713	6,070	5,370	647640	13,083	1,008
12	10/2/2018	87.7	8,754	5,940	5,250	617520	13,364	1,008
13	10/3/2018	89.4	8,662	5,840	5,625	633240	12,660	1,008
14	10/3/2018	88.0	8,575	6,074	5,475	640640	12,609	1,008
15	10/4/2018	89.9	8,742	5,683	5,744	644240	12,677	1,008
16	10/4/2018	90.2	9,203	6,155	5,350	348080	10,894	1,008
17	10/5/2018	87.1	8,644	6,106	6,052	420620	10,889	1,050
18	10/5/2018	88.2	9,107	6,273	5,097	639660	12,636	1,050
19	10/5/2018	88.9	8,833	6,164	5,850	505360	11,724	1,050
20	10/6/2018	87.0	8,473	6,254	6,246	632840	12,571	1,050
21	10/6/2018	87.3	8,621	6,235	5,450	510560	11,669	1,008
22	10/7/2018	89.0	8,559	6,024	5,494	636840	12,710	1,008
23	10/7/2018	89.6	8,629	6,250	5,600	549820	11,967	1,008
24	10/8/2018	89.7	8,472	6,025	5,675	517840	11,978	1,050
25	10/8/2018	88.5	8,581	6,218	5,488	643940	14,036	1,008
26	10/8/2018	90.2	8,758	6,265	5,400	515760	13,150	1,050
27	10/8/2018	90.3	8,565	6,151	5,460	536260	11,688	1,008
28	10/9/2018	93.2	8,688	6,061	5,425	555800	12,078	1,008
29	10/9/2018	88.8	8,490	6,001	5,150	487360	11,505	1,008
30	10/10/2018	86.8	8,207	6,051	6,005	635720	13,451	1,008
31	10/10/2018	92.5	8,484	5,892	5,340	514060	12,659	966
32	10/11/2018	89.6	8,423	6,627	5,171	638300	13,434	1,008
33	10/11/2018	92.2	8,126	6,574	5,839	636360	12,959	1,008
34	10/11/2018	95.3	8,545	6,854	5,580	632760	13,220	1,008
35	10/12/2018	91.3	8,433	6,058	5,104	463160	12,103	1,008
36	10/12/2018	94.6	8,552	6,695	5,480	639200	13,502	1,050
37	10/13/2018	93.1	8,685	6,663	6,002	635400	12,850	1,008
38	10/13/2018	98.0	8,531	6,558	5,850	627800	13,192	1,050
39	10/14/2018	95.3	8,521	6,599	5,475	638200	13,246	1,050
40	10/14/2018	96.3	8,493	6,379	5,551	575800	12,655	1,302
41	10/14/2018	98.0	8,620	6,371	5,480	534080	12,302	1,008
42	10/15/2018	94.7	8,098	7,079	5,654	640460	13,049	1,050
43	10/15/2018	95.3	7,830	6,656	6,036	635400	12,988	1,008
44	10/16/2018	96.8	7,709	6,497	5,430	636620	13,213	1,050
45	10/16/2018	95.4	8,037	6,695	5,293	640160	12,809	1,176
46	10/16/2018	100.7	8,201	6,775	5,315	643040	13,989	1,050
47	10/17/2018	98.9	8,274	6,832	5,600	646920	12,338	966
48	10/17/2018	96.2	8,344	7,065	5,600	377240	10,447	1,008
49	10/17/2018	95.5	8,117	6,851	5,255	650420	12,689	1,008
50	10/18/2018	94.0	7,821	6,522	5,650	642900	12,486	1,008
51	10/18/2018	95.3	7,585	6,845	5,525	601000	12,274	1,050
52	10/19/2018	96.2	8,091	6,968	5,570	636660	12,718	1,008
53	10/19/2018	95.2	7,902	6,733	5,850	647780	12,551	1,008
54	10/19/2018	95.2	7,962	6,250	5,500	650840	12,843	1,050
55	10/20/2018	97.0	8,035	6,488	5,215	638980	12,626	1,008
56	10/20/2018	101.1	8,076	5800	5200	638160	12584	1,008

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55	10/20/2018	97.0	8,035	6,488	5,215	638980	12,626	1,008
56	10/20/2018	101.1	8,076	5800	5200	638160	12584	1,008

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KST5 DHS
Perforation Record

1 8

Stage No.	Perforation Date	Perforated from MD ft	Perforated to MD ft	# of Perforations	Formation
1	9/27/2018	18,016	18,067	0	
2	9/29/2018	17,814	17,982	49	
3	9/29/2018	17,618	17,786	49	
4	9/29/2018	17,422	17,590	49	
5	9/30/2018	17,226	17,394	49	
6	9/30/2018	17,030	17,198	49	
7	10/1/2018	16,834	17,002	49	
8	10/1/2018	16,638	16,806	49	
9	10/1/2018	16,442	16,610	49	
10	10/1/2018	16,246	16,414	49	
11	10/2/2018	16,050	16,218	49	
12	10/2/2018	15,854	16,022	49	
13	10/3/2018	15,658	15,826	49	
14	10/3/2018	15,462	15,630	49	
15	10/4/2018	15,266	15,434	49	
16	10/4/2018	15,070	15,238	49	
17	10/5/2018	14,874	15,042	49	
18	10/5/2018	14,678	14,846	49	
19	10/5/2018	14,482	14,650	49	
20	10/6/2018	14,286	14,454	49	
21	10/6/2018	14,090	14,258	49	
22	10/7/2018	13,894	14,062	49	
23	10/7/2018	13,698	13,866	49	
24	10/8/2018	13,502	13,670	49	
25	10/8/2018	13,306	13,474	49	
26	10/8/2018	13,110	13,278	49	
27	10/8/2018	12,914	13,082	49	
28	10/9/2018	12,718	12,886	49	
29	10/9/2018	12,522	12,690	49	
30	10/10/2018	12,326	12,494	49	
31	10/10/2018	12,130	12,298	49	
32	10/11/2018	11,934	12,102	49	
33	10/11/2018	11,738	11,906	49	
34	10/11/2018	11,542	11,710	49	
35	10/12/2018	11,346	11,514	49	
36	10/12/2018	11,150	11,318	49	
37	10/13/2018	10,954	11,122	49	
38	10/13/2018	10,758	10,926	49	
39	10/14/2018	10,562	10,730	49	
40	10/14/2018	10,366	10,534	49	
41	10/14/2018	10,170	10,338	49	
42	10/15/2018	9,974	10,142	49	
43	10/15/2018	9,778	9,946	49	
44	10/16/2018	9,582	9,750	49	
45	10/16/2018	9,386	9,554	49	
46	10/16/2018	9,190	9,358	49	
47	10/17/2018	8,994	9,162	49	
48	10/17/2018	8,798	8,966	49	
49	10/17/2018	8,602	8,770	49	
50	10/18/2018	8,406	8,574	49	
51	10/18/2018	8,210	8,378	49	
52	10/19/2018	8,014	8,182	49	
53	10/19/2018	7,818	7,986	49	
54	10/19/2018	7,622	7,790	49	
55	10/20/2018	7,426	7,594	49	
56	43393	7258	7,398	49	

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6	9/30/2018	17,030	17,198	49	
7	10/1/2018	16,834	17,002	49	
8	10/1/2018	16,638	16,806	49	
9	10/1/2018	16,442	16,610	49	
10	10/1/2018	16,246	16,414	49	
11	10/2/2018	16,050	16,218	49	
12	10/2/2018	15,854	16,022	49	
13	10/3/2018	15,658	15,826	49	
14	10/3/2018	15,462	15,630	49	
15	10/4/2018	15,266	15,434	49	
16	10/4/2018	15,070	15,238	49	
17	10/5/2018	14,874	15,042	49	
18	10/5/2018	14,678	14,846	49	
19	10/5/2018	14,482	14,650	49	
20	10/6/2018	14,286	14,454	49	
21	10/6/2018	14,090	14,258	49	
22	10/7/2018	13,894	14,062	49	
23	10/7/2018	13,698	13,866	49	
24	10/8/2018	13,502	13,670	49	
25	10/8/2018	13,306	13,474	49	
26	10/8/2018	13,110	13,278	49	
27	10/8/2018	12,914	13,082	49	
28	10/9/2018	12,718	12,886	49	
29	10/9/2018	12,522	12,690	49	
30	10/10/2018	12,326	12,494	49	
31	10/10/2018	12,130	12,298	49	
32	10/11/2018	11,934	12,102	49	
33	10/11/2018	11,738	11,906	49	
34	10/11/2018	11,542	11,710	49	
35	10/12/2018	11,346	11,514	49	
36	10/12/2018	11,150	11,318	49	
37	10/13/2018	10,954	11,122	49	
38	10/13/2018	10,758	10,926	49	
39	10/14/2018	10,562	10,730	49	
40	10/14/2018	10,366	10,534	49	
41	10/14/2018	10,170	10,338	49	
42	10/15/2018	9,974	10,142	49	
43	10/15/2018	9,778	9,946	49	
44	10/16/2018	9,582	9,750	49	
45	10/16/2018	9,386	9,554	49	
46	10/16/2018	9,190	9,358	49	
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56	43393	7258	7,398	49	

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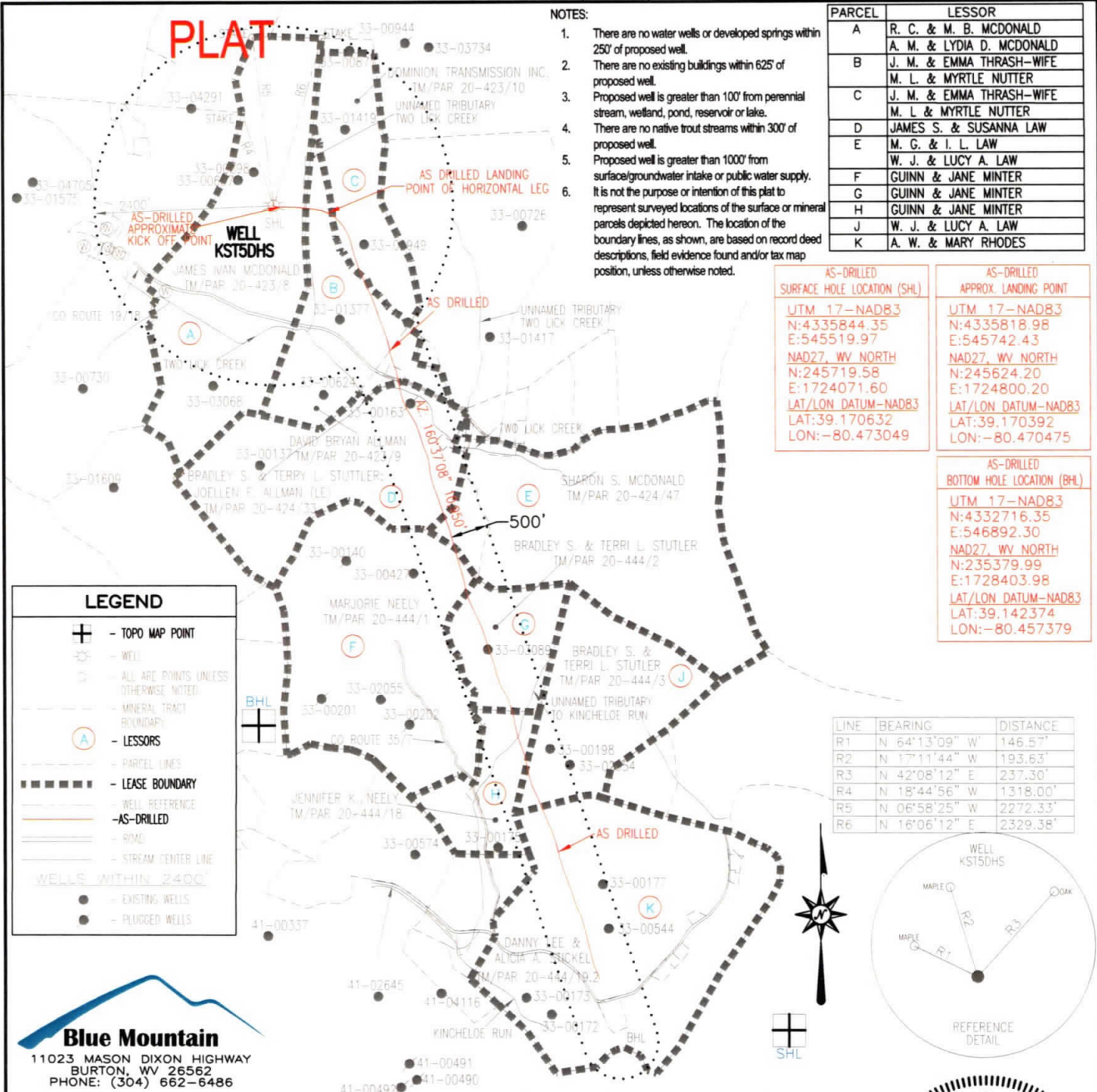
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Environmental Protection

AS DRILLED

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-AS DRILLED
 DRAWING #: KST5DHS-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

RECEIVED
 Office of Oil and Gas
 APR 03 2020
 WV Department of Environmental Protection

DATE: JANUARY 25, 2019
 OPERATOR'S WELL #: KST5DHS-AS DRILLED
 API WELL #: 47 33 05817
 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±

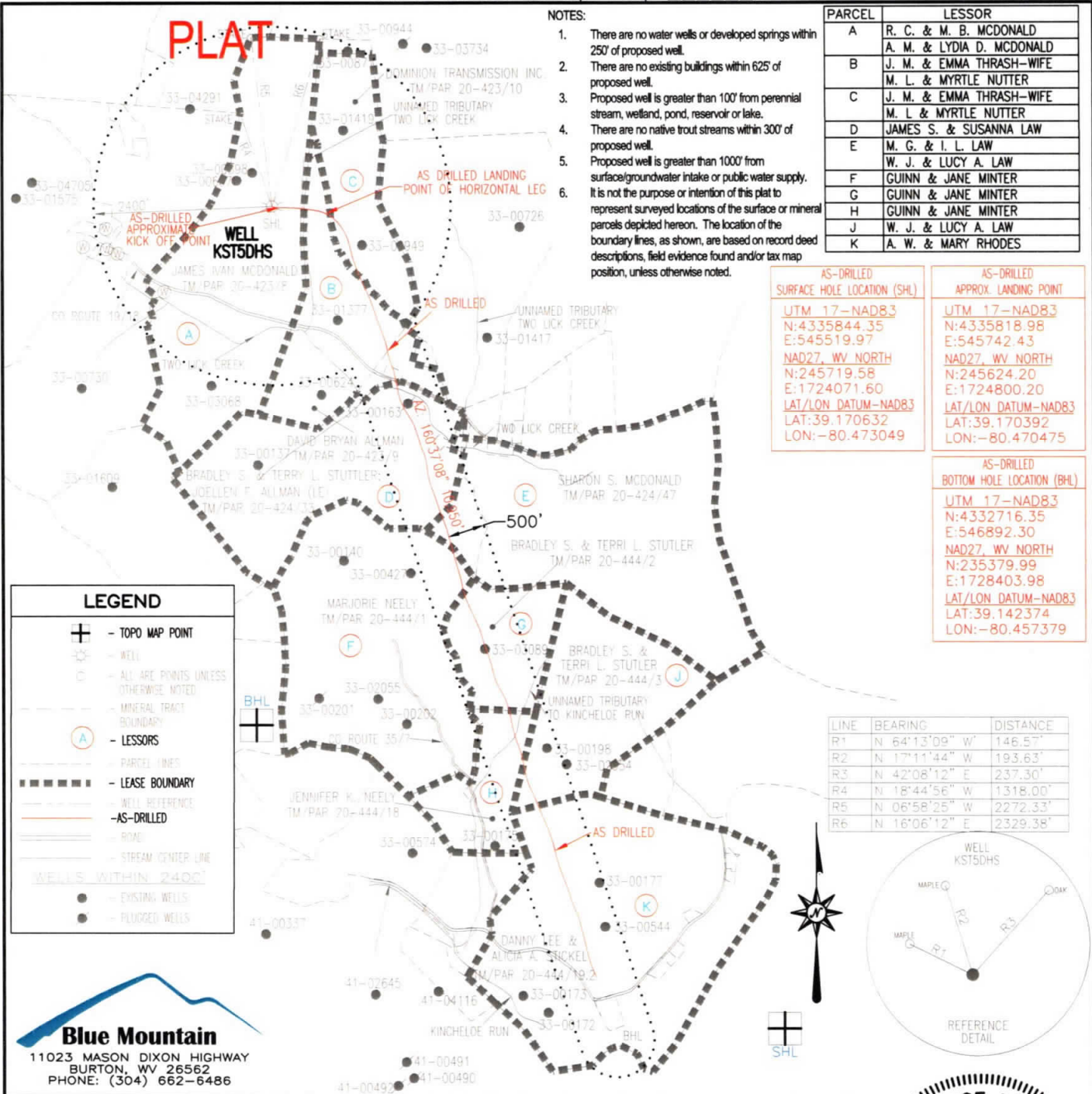
DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE
 PLUG OFF OLD FORMATION PERFORATE NEW FORMATION PLUG & ABANDON
 CLEAN OUT & REPLUG OTHER CHANGE (SPECIFY): AS-DRILLED PLAT

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: AS-DRILLED TVD: 6,724± TMD: 18,208±
 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

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