

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

API 47-033-05821 County Harrison District Clark
Quad Wolf Summit Pad Name Goff East Field/Pool Name _____
Farm name Cather, H Dotson Trustee Well Number 20HM
Operator (as registered with the OOG) PDC Mountaineer, LLC
Address 6031 Wallace Road Extension, Suite 300 City Wexford State PA Zip 15090

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4,347,791 Easting 553,870
Landing Point of Curve Northing 4,347,383 Easting 554,130
Bottom Hole Northing 4,345,768 Easting 554,855

Elevation (ft) 1129' 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-based Mud

Date permit issued 9/26/2015 Date drilling commenced 2/23/2015 Date drilling ceased 3/7/2015
Date completion activities began 5/10/2015 Date completion activities ceased 5/19/2015
Verbal plugging (Y/N) N Date permission granted NA Granted by NA

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

Freshwater depth(s) ft 25' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 749' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 500' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) Y

Reviewed by:
Zec

APPROVED

NAME: Sam Ward
DATE: 8/17/2017

09/15/2017

API 47-033 - 05821 Farm name Cather, H Dotson Trustee Well number 20HM

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	30"	24"	60'	New	94.00	N/A	Y
Surface	17.5"	13 3/8"	636'	New	54.50	N/A	Y
Coal							
Intermediate 1	12 1/4"	9 5/8"	2645'	New	40.00	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8 3/4" & 8 1/2"	5 1/2"	13367'	New	20.00	N/A	Y
Tubing							
Packer type and depth set							

Comment Details _____

CEMENT DATA	Class/Type of Cement	Number of Sacks	Shurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	Grout						
Surface	Class A 2% CaCl ₂	487	15.6	1.18	442.14	Surface	8
Coal							
Intermediate 1	Class A	534/172	14.50/15.70	1.55/1.29	1049.58	Surface	8
Intermediate 2							
Intermediate 3							
Production	Type 1 4% Gel/Type 1 2% Gel	670/1364	13.8/15.0	1.64/1.32	2899.28	2700'	8
Tubing							

Drillers TD (ft) 13367 Loggers TD (ft) 13367
 Deepest formation penetrated Marcellus Plug back to (ft) NA
 Plug back procedure None

Kick off depth (ft) 8455' MD

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 _____

13 3/8": 1 bow spring centralizer placed on every joint

9 5/8": 1 bow spring centralizer placed on every third joint

5 1/2": 1 rigid poly centralizer every joint in the lateral, 1 rigid poly centralizer every other joint through the curve, 1 rigid poly centralizer every third joint from kick off point to estimated TOC

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS 29 stages, 1,160 perforations

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

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

Stage	Perforation	Perforated from	Perforated to	Number of	
No.	Date	MD ft.	MD ft.	Perforations	Formation(s)
29	5/19/2015 5:29	7586	7588	40	Marcellus Shale
29	5/19/2015 5:28	7625	7627	40	Marcellus Shale
29	5/19/2015 5:27	7664	7666	40	Marcellus Shale
29	5/19/2015 5:26	7703	7705	40	Marcellus Shale
29	5/19/2015 5:25	7742	7744	40	Marcellus Shale
28	5/19/2015 0:37	7782	7784	40	Marcellus Shale
28	5/19/2015 0:36	7821	7823	40	Marcellus Shale
28	5/19/2015 0:35	7860	7862	40	Marcellus Shale
28	5/19/2015 0:34	7899	7901	40	Marcellus Shale
28	5/19/2015 0:33	7938	7940	40	Marcellus Shale
27	5/18/2015 20:30	7978	7980	40	Marcellus Shale
27	5/18/2015 20:29	8017	8019	40	Marcellus Shale
27	5/18/2015 20:28	8056	8058	40	Marcellus Shale
27	5/18/2015 20:27	8095	8097	40	Marcellus Shale
27	5/18/2015 20:26	8134	8136	40	Marcellus Shale
26	5/17/2015 12:35	8174	8176	40	Marcellus Shale
26	5/17/2015 12:34	8213	8215	40	Marcellus Shale
26	5/17/2015 12:33	8252	8254	40	Marcellus Shale
26	5/17/2015 12:32	8291	8293	40	Marcellus Shale
26	5/17/2015 12:31	8330	8332	40	Marcellus Shale
25	5/17/2015 7:47	8370	8372	40	Marcellus Shale
25	5/17/2015 7:46	8409	8411	40	Marcellus Shale
25	5/17/2015 7:45	8448	8450	40	Marcellus Shale
25	5/17/2015 7:44	8487	8489	40	Marcellus Shale
25	5/17/2015 7:43	8526	8527	40	Marcellus Shale
24	5/17/2015 3:05	8566	8568	40	Marcellus Shale
24	5/17/2015 3:04	8605	8607	40	Marcellus Shale
24	5/17/2015 3:03	8644	8646	40	Marcellus Shale
24	5/17/2015 3:02	8683	8685	40	Marcellus Shale
24	5/17/2015 3:01	8722	8724	40	Marcellus Shale
23	5/16/2015 22:56	8762	8764	40	Marcellus Shale
23	5/16/2015 22:55	8801	8803	40	Marcellus Shale
23	5/16/2015 22:54	8840	8842	40	Marcellus Shale
23	5/16/2015 22:53	8879	8881	40	Marcellus Shale
23	5/16/2015 22:52	8918	8920	40	Marcellus Shale
22	5/16/2015 18:55	8958	8960	40	Marcellus Shale
22	5/16/2015 18:54	8997	8999	40	Marcellus Shale
22	5/16/2015 18:53	9036	9038	40	Marcellus Shale
22	5/16/2015 18:52	9075	9077	40	Marcellus Shale
22	5/16/2015 18:51	9114	9116	40	Marcellus Shale
21	5/16/2015 14:12	9154	9156	40	Marcellus Shale
21	5/16/2015 14:11	9193	9195	40	Marcellus Shale
21	5/16/2015 14:10	9232	9234	40	Marcellus Shale
21	5/16/2015 14:09	9271	9273	40	Marcellus Shale
21	5/16/2015 14:08	9310	9312	40	Marcellus Shale

20	5/16/2015 9:39	9350	9352	40	Marcellus Shale
20	5/16/2015 9:38	9389	9391	40	Marcellus Shale
20	5/16/2015 9:37	9428	9430	40	Marcellus Shale
20	5/16/2015 9:36	9467	9469	40	Marcellus Shale
20	5/16/2015 9:35	9506	9508	40	Marcellus Shale
19	5/16/2015 4:07	9546	9548	40	Marcellus Shale
19	5/16/2015 4:06	9585	9587	40	Marcellus Shale
19	5/16/2015 4:05	9624	9626	40	Marcellus Shale
19	5/16/2015 4:04	9663	9665	40	Marcellus Shale
19	5/16/2015 4:03	9702	9704	40	Marcellus Shale
18	5/15/2015 21:26	9742	9744	40	Marcellus Shale
18	5/15/2015 21:25	9781	9783	40	Marcellus Shale
18	5/15/2015 21:24	9820	9822	40	Marcellus Shale
18	5/15/2015 21:23	9859	9861	40	Marcellus Shale
18	5/15/2015 21:22	9898	9900	40	Marcellus Shale
17	5/15/2015 16:33	9938	9940	40	Marcellus Shale
17	5/15/2015 16:32	9977	9979	40	Marcellus Shale
17	5/15/2015 16:31	10016	10018	40	Marcellus Shale
17	5/15/2015 16:30	10055	10057	40	Marcellus Shale
17	5/15/2015 16:29	10094	10096	40	Marcellus Shale
16	5/15/2015 11:22	10134	10136	40	Marcellus Shale
16	5/15/2015 11:21	10173	10175	40	Marcellus Shale
16	5/15/2015 11:20	10212	10214	40	Marcellus Shale
16	5/15/2015 11:19	10251	10253	40	Marcellus Shale
16	5/15/2015 11:18	10290	10292	40	Marcellus Shale
15	5/15/2015 5:18	10330	10332	40	Marcellus Shale
15	5/15/2015 5:17	10369	10371	40	Marcellus Shale
15	5/15/2015 5:16	10408	10410	40	Marcellus Shale
15	5/15/2015 5:15	10447	10449	40	Marcellus Shale
15	5/15/2015 5:14	10486	10488	40	Marcellus Shale
14	5/14/2015 22:25	10526	10528	40	Marcellus Shale
14	5/14/2015 22:24	10565	10567	40	Marcellus Shale
14	5/14/2015 22:23	10604	10606	40	Marcellus Shale
14	5/14/2015 22:22	10643	10645	40	Marcellus Shale
14	5/14/2015 22:21	10682	10684	40	Marcellus Shale
13	5/14/2015 16:10	10722	10724	40	Marcellus Shale
13	5/14/2015 16:09	10761	10763	40	Marcellus Shale
13	5/14/2015 16:08	10800	10802	40	Marcellus Shale
13	5/14/2015 16:07	10839	10841	40	Marcellus Shale
13	5/14/2015 16:06	10878	10880	40	Marcellus Shale
12	5/14/2015 10:43	10918	10920	40	Marcellus Shale
12	5/14/2015 10:42	10957	10959	40	Marcellus Shale
12	5/14/2015 10:41	10996	10998	40	Marcellus Shale
12	5/14/2015 10:40	11035	11037	40	Marcellus Shale
12	5/14/2015 10:39	11074	11076	40	Marcellus Shale
11	5/14/2015 4:12	11114	11116	40	Marcellus Shale
11	5/14/2015 4:11	11153	11155	40	Marcellus Shale

11	5/14/2015 4:10	11192	11194	40	Marcellus Shale
11	5/14/2015 4:09	11231	11233	40	Marcellus Shale
11	5/14/2015 4:08	11270	11272	40	Marcellus Shale
10	5/13/2015 16:20	11310	11312	40	Marcellus Shale
10	5/13/2015 16:19	11349	11351	40	Marcellus Shale
10	5/13/2015 16:18	11388	11390	40	Marcellus Shale
10	5/13/2015 16:17	11427	11429	40	Marcellus Shale
10	5/13/2015 16:16	11466	11468	40	Marcellus Shale
9	5/13/2015 8:49	11506	11508	40	Marcellus Shale
9	5/13/2015 8:48	11545	11547	40	Marcellus Shale
9	5/13/2015 8:47	11584	11586	40	Marcellus Shale
9	5/13/2015 8:46	11623	11625	40	Marcellus Shale
9	5/13/2015 8:45	11662	11664	40	Marcellus Shale
8	5/13/2015 2:25	11702	11704	40	Marcellus Shale
8	5/13/2015 2:24	11741	11743	40	Marcellus Shale
8	5/13/2015 2:23	11780	11782	40	Marcellus Shale
8	5/13/2015 2:22	11819	11821	40	Marcellus Shale
8	5/13/2015 2:21	11858	11860	40	Marcellus Shale
7	5/12/2015 19:46	11898	11900	40	Marcellus Shale
7	5/12/2015 19:49	11937	11939	40	Marcellus Shale
7	5/12/2015 19:48	11976	11978	40	Marcellus Shale
7	5/12/2015 19:47	12015	12017	40	Marcellus Shale
7	5/12/2015 19:46	12054	12056	40	Marcellus Shale
6	5/11/2015 20:14	12094	12096	40	Marcellus Shale
6	5/11/2015 20:13	12133	12135	40	Marcellus Shale
6	5/11/2015 20:12	12172	12174	40	Marcellus Shale
6	5/11/2015 20:11	12211	12213	40	Marcellus Shale
6	5/11/2015 20:10	12250	12252	40	Marcellus Shale
5	5/11/2015 13:46	12290	12292	40	Marcellus Shale
5	5/11/2015 13:45	12329	12331	40	Marcellus Shale
5	5/11/2015 13:44	12368	12370	40	Marcellus Shale
5	5/11/2015 13:43	12407	12409	40	Marcellus Shale
5	5/11/2015 13:42	12446	12448	40	Marcellus Shale
4	5/11/2015 7:32	12486	12488	40	Marcellus Shale
4	5/11/2015 7:31	12525	12527	40	Marcellus Shale
4	5/11/2015 7:30	12564	12566	40	Marcellus Shale
4	5/11/2015 7:29	12603	12605	40	Marcellus Shale
4	5/11/2015 7:28	12642	12644	40	Marcellus Shale
3	5/10/2015 23:07	12682	12684	40	Marcellus Shale
3	5/10/2015 23:06	12721	12723	40	Marcellus Shale
3	5/10/2015 23:05	12760	12762	40	Marcellus Shale
3	5/10/2015 23:04	12799	12801	40	Marcellus Shale
3	5/10/2015 23:03	12838	12840	40	Marcellus Shale
2	5/10/2015 16:20	12878	12880	40	Marcellus Shale
2	5/10/2015 16:19	12917	12919	40	Marcellus Shale
2	5/10/2015 16:18	12956	12957	40	Marcellus Shale
2	5/10/2015 16:17	12995	12997	40	Marcellus Shale

2	5/10/2015 16:16	13034	13036	40	Marcellus Shale
1	5/10/2015 16:16	13076	13081	40	Marcellus Shale
1	5/10/2015 16:16	13126	13132	40	Marcellus Shale
1	5/10/2015 16:16	13178	13184	40	Marcellus Shale
1	5/10/2015 16:16	13230	13235	40	Marcellus Shale

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of N/Other (units)
1	5/10/2015 11:33	61.2	7499	0	4892	236860	6759	NA
2	5/10/2015 18:55	69.5	7565	6688	5003	270060	6736	NA
3	5/11/2015 2:31	68.3	7520	6866	4345	393200	8853	NA
4	5/11/2015 10:21	80.2	8128	6373	4871	409880	8369	NA
5	5/11/2015 16:31	78.1	8122	6044	4932	404480	8569	NA
6	5/12/2015 15:19	69.2	8137	6362	4703	400160	11351	NA
7	5/12/2015 22:51	74.7	7788	6326	4735	404020	8558	NA
8	5/13/2015 4:32	73.5	7720	5958	4356	400100	9632	NA
9	5/13/2015 10:37	75.8	7792	6037	5350	400140	9033	NA
10	5/14/2015 0:42	79.8	7837	6384	4431	400160	8786	NA
11	5/14/2015 7:24	79.4	7907	6405	5060	400580	8410	NA
12	5/14/2015 12:30	79	7697	5797	4767	400840	8295	NA
13	5/14/2015 18:54	83.4	7590	5836	5243	400840	9663	NA
14	5/15/2015 1:46	80.9	7611	6305	5032	400740	9793	NA
15	5/15/2015 7:24	80.1	7712	6040	5776	400280	9517	NA
16	5/15/2015 13:31	81.7	7602	6123	5729	400140	8236	NA
17	5/15/2015 18:58	81.9	7839	6770	5744	332020	9829	NA
18	5/16/2015 0:42	80.8	7570	6881	5940	400250	9441	NA
19	5/16/2015 6:43	80.3	7271	6119	6073	400260	7585	NA
20	5/16/2015 11:19	81	7133	6080	5980	400260	7565	NA
21	5/16/2015 16:06	81.6	7069	6806	5697	400800	7119	NA
22	5/16/2015 20:21	89.7	7240	6741	5529	400200	7021	NA
23	5/17/2015 0:31	88.9	7326	6073	5769	402420	6897	NA
24	5/17/2015 5:19	89.7	7284	6952	5332	400900	6812	NA
25	5/17/2015 9:55	80.6	8117	8174	5780	403360	7047	NA
26	5/17/2015 15:03	83.3	7175	6577	5894	400120	7334	NA
27	5/18/2015 21:50	88.2	7706	6387	5640	400600	8004	NA
28	5/19/2015 2:09	79.4	7783	6294	6616	400400	9638	NA
29	5/19/2015 7:18	80.6	7182	6655	5018	406360	7105	NA

API 47- 033 - 05821

Farm name Cather, H Dotson Trustee

Well number 20HM

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
Marcellus	7107	TVD	13367 MD
_____	_____	_____	_____
_____	_____	_____	_____

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface _____ psi Bottom Hole _____ psi DURATION OF TEST _____ hrs

OPEN FLOW Gas _____ mcfpd Oil _____ bpd NGL _____ bpd Water _____ bpd GAS MEASURED BY Estimated Orifice Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
Sands, Silt, and Coals	0	1817	0	1820	Sand, Silt, and Coal
Big Lime	1817	1876	1820	1879	Sandstone
Balltown	3599	3641	3608	3650	Sandstone
Bradford	4332	4361	4341	4371	Sandstone
Benson	4806	4973	4915	4982	Sandstone
Elk	5190	5248	5199	5257	Siltstone
Burkett	6798	6819	6988	7012	Shale
Tully	6819	6878	7012	7087	Limestone
Mahantango	6878	7013	7087	7317	Shale
Marcellus	7013	7107	7317	13367	Shale- Gas shows through lateral
Purcell	7072	7075	7542	7547	Limestone
Onondaga	7107		N/A*		Limestone
					*Onondaga MD not listed-lateral drilled in Marcellus**Onondaga top is estimated of thickness from offset 4703305741
					**Big Lime-Elk tops taken from offset 4703305741 Pilot, Burkett-Purcell taken from Geol East 20HM mudlog

Please insert additional pages as applicable.

Drilling Contractor Sidewinder Drilling
Address 952 Echo Land, Suite 460 City Houston State TX Zip 77024

Logging Company NA
Address _____ City _____ State _____ Zip _____

Cementing Company Universal Well Services
Address 18360 Technology Dr Box 4 City Meadville State PA Zip 16335

Stimulating Company USWS
Address 2121 Sage Road City Houston State TX Zip 77056

Please insert additional pages as applicable.

Completed by Zach Allman Telephone 724-940-1200
Signature  Title Senior Completions Engineer Date 8/15/17

Submission of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

WELL NO. 20 HM GOFF LEASE

LATITUDE 39°17'30"

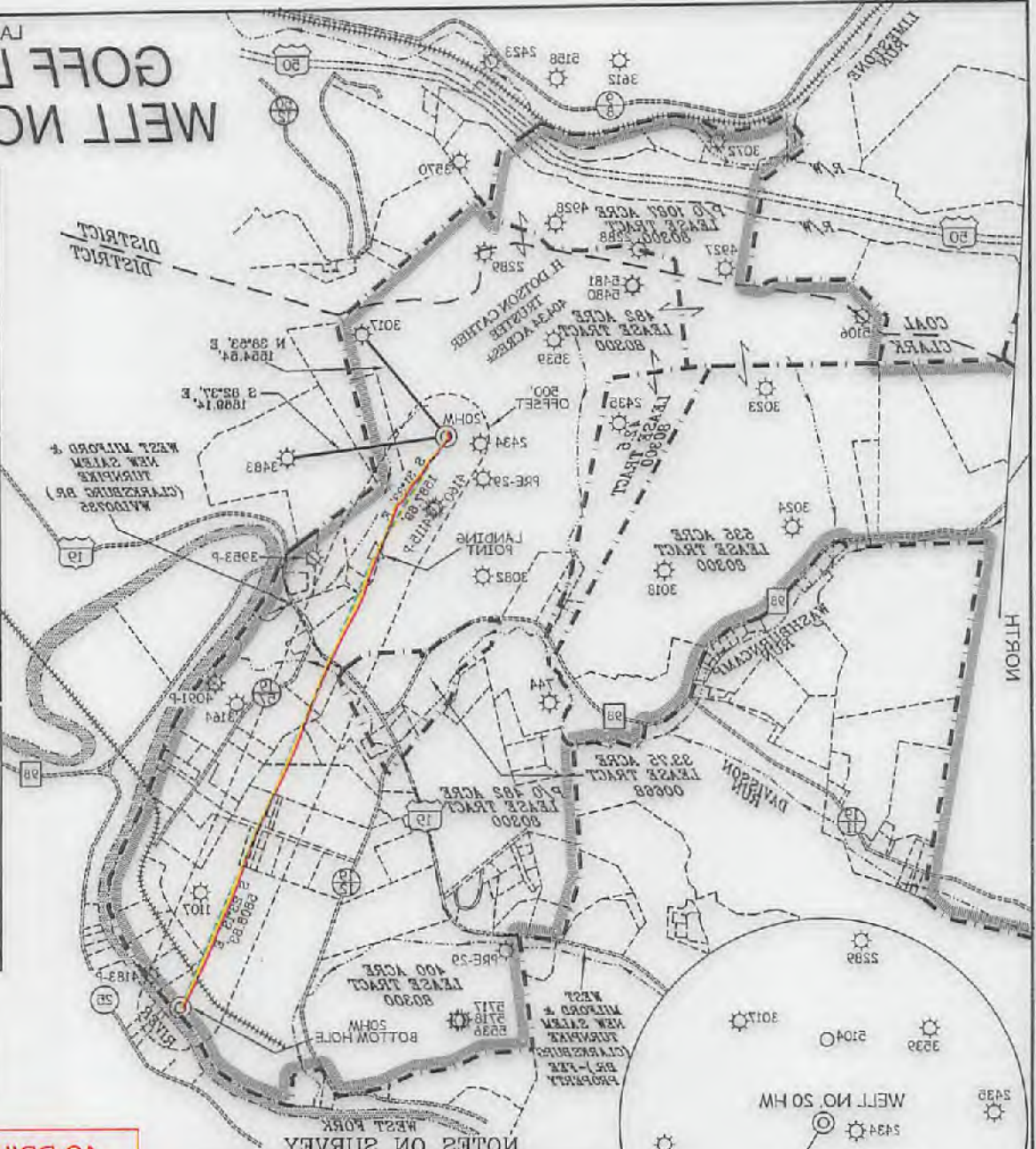
LONGITUDE 80°55'30"

WELL NO. 20 HM TOP HOLE STATE PLANE COORDINATES (NORTH ZONE NAD 83) N. 284,452 E. 1,752,128 TOP HOLE (NAD 83) LAT=(N) 39°16'33.8" LONG=(W) 80°52'32.2" TOP HOLE (NAD 83) LAT=(N) 39°16'40.1" LONG=(W) 80°52'31.8" TOP HOLE UTM (NAD 83) (N) 4,347,791 (E) 252,870	WELL NO. 20 HM LANDING POINT STATE PLANE COORDINATES (NORTH ZONE NAD 83) N. 283,112 E. 1,752,952 LANDING POINT (NAD 83) LAT=(N) 39°16'28.4" LONG=(W) 80°52'31.5" LANDING POINT (NAD 83) LAT=(N) 39°16'28.8" LONG=(W) 80°52'30.8" LANDING POINT UTM (NAD 83) (N) 4,347,993 (E) 252,130	WELL NO. 20 HM BOTTOM HOLE STATE PLANE COORDINATES (NORTH ZONE NAD 83) N. 277,773 E. 1,752,248 BOTTOM HOLE (NAD 83) LAT=(N) 39°15'32.8" LONG=(W) 80°51'51.7" BOTTOM HOLE (NAD 83) LAT=(N) 39°15'34.2" LONG=(W) 80°51'51.1" BOTTOM HOLE UTM (NAD 83) (N) 4,345,788 (E) 252,485
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LEGEND

AS DRILLED (Solid line)

PROPOSED (Dashed line)



NOTES ON SURVEY

1. TIES TO WELLS, REFERENCES, AND CORNERS ARE BASED ON GRID NORTH FOR THE WEST VIRGINIA COORDINATE SYSTEM NORTH ZONE NAD 83.
2. SURFACE OWNER AND ADJOINING INFORMATION TAKEN FROM THE ASSessor AND COUNTY CLERK RECORDS OF HARRISON COUNTY IN JULY, 2012.
3. WELL COORDINATES ESTABLISHED BY DGPS (SURVEY GRADE). NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250'. NO APPLICABLE DWELLINGS OR BUILDINGS WITHIN 650'. PLAT UPDATED 08-08-17 TO SHOW AS DRILLED DATA PROVIDED BY ARENAL RESOURCES.
4. LEASE BOUNDARY SHOWN HEREON TAKEN FROM DEED BOOK 70 PAGE 152 AND ADJOINING DEEDS.
5. SURFACE BOUNDARY SHOWN HEREON TAKEN FROM DEED BOOK 70 PAGE 152 AND ADJOINING DEEDS.

AS DRILLED COORDINATES FOR WELL NO. 20HM

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

NAD83 UTM (M)	N. 434,791.0	E. 252,870.0
NAD83 GEO	LAT=(N) 39°16'40.1"	LONG=(W) 80°52'31.8"
NAD83 GEO	LAT=(N) 39°16'33.8"	LONG=(W) 80°52'32.2"
NAD83 S.P.C.(FT)	N. 284,452.0	E. 1,752,128.0

BOTTOM HOLE

NAD83 UTM (M)	N. 434,578.8	E. 252,485.0
NAD83 GEO	LAT=(N) 39°15'34.2"	LONG=(W) 80°51'51.1"
NAD83 GEO	LAT=(N) 39°15'32.8"	LONG=(W) 80°51'51.7"
NAD83 S.P.C.(FT)	N. 277,773.0	E. 1,752,248.0

DATE MAY 21 2014

REVISED 06/04/14 & 02/05/17

OPERATORS WELL NO. GOFF 20HM

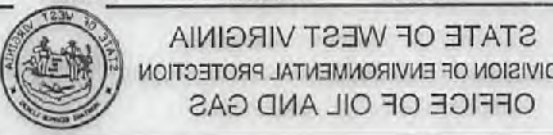
APL NO. 47 - 33 - 02851

PERMIT COUNTY STATE



I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.

P. S. 677
Gregory A. Smith



FILE NO. 80092093(475-70)

SCALE 1"=2,000'

MINIMUM DEGREE 1' 30"

OF ACCURACY

PROVEN SOURCE DGPS (SURVEY GRADE)

WELL TYPE: OIL GAS LIQUID WASTE DISPOSAL "GAS" PRODUCTION STORAGE DEEP SHALLOW

LOCATION: ELEVATION 1,128.00' PRE POST WEST FORK RIVER WATERSHED

DISTRICT CLARK COUNTY HARRISON

SURFACE OWNER H. DOTSON CATHER TRUSTEE

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD

PHYSICAL CHANGE IN WELL (SPECIFY) PERFORATE NEW FORMATION PLUG AND ABANDON CLEAN OUT AND REPLUG OTHER MARCELLUS

ESTIMATED DEPTH 7,089. TVD \ TMD 14,024'

TARGET FORMATION

DESIGNATED AGENT STEVEN P. JOHNSON

WELL OPERATOR PDC MOUNTAINEER, LLC

ADDRESS 120 GENESIS BOULEVARD BRIDGEPORT, WV 26330

ADDRESS 120 GENESIS BOULEVARD BRIDGEPORT, WV 26330

09/15/2017

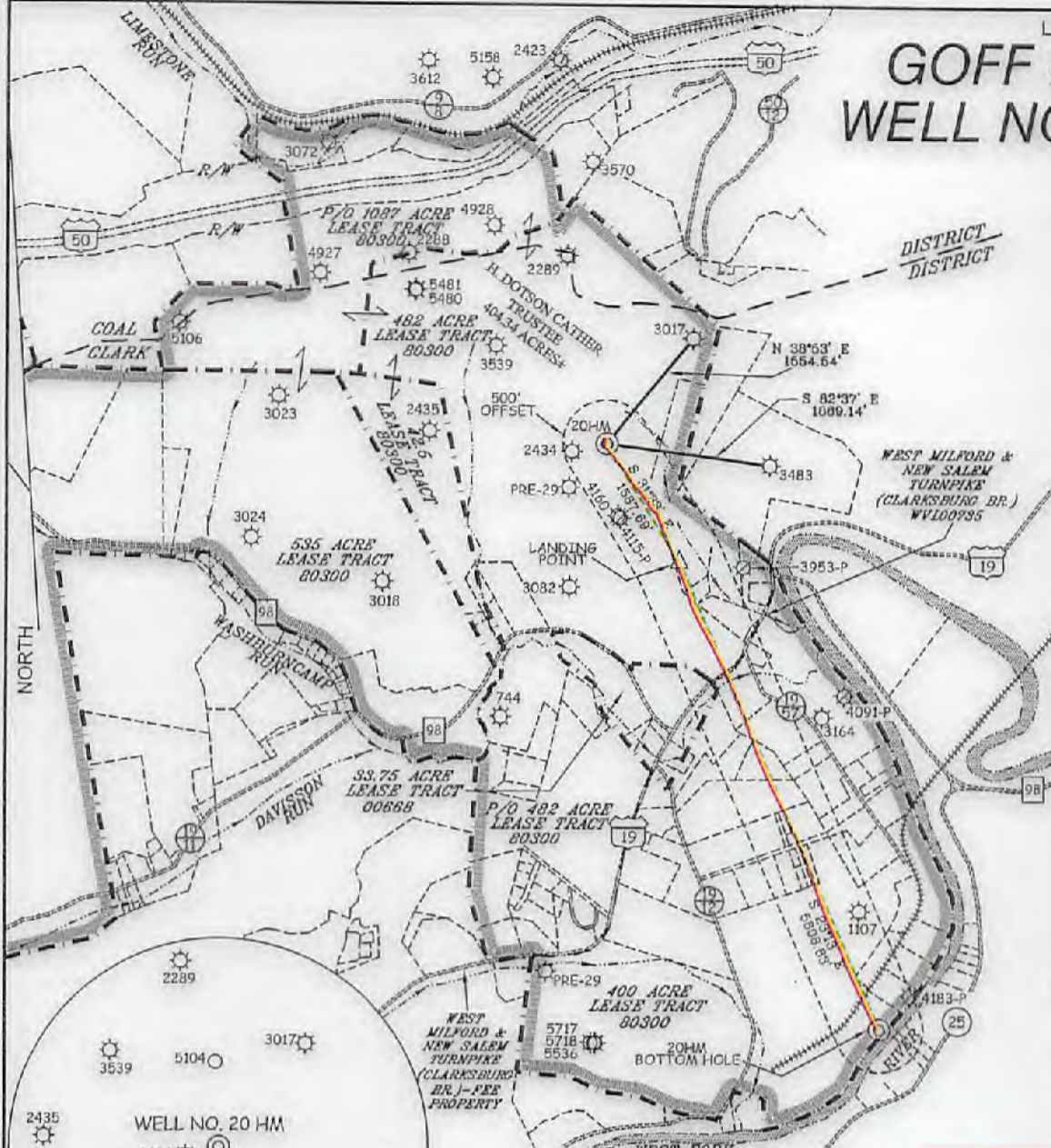
COUNTY NAME

PERMIT

LATITUDE 39°17'30"

GOFF LEASE WELL NO. 20 HM

LONGITUDE 80°22'30"



WELL NO. 20 HM TOP HOLE	
STATE PLANE COORDINATES (NORTH ZONE NAD '27)	
N. 284,465	E. 1,752,125
TOP HOLE (NAD 27)	
LAT=(N) 39°16'39.9"	LONG=(W) 80°22'32.2"
TOP HOLE (NAD 83)	
LAT=(N) 39°16'40.1"	LONG=(W) 80°22'31.6"
TOP HOLE UTM (NAD 83)	
(N) 4,347,791	(E) 553,870

WELL NO. 20 HM LANDING POINT	
STATE PLANE COORDINATES (NORTH ZONE NAD '27)	
N. 283,112	E. 1,752,956
LANDING POINT (NAD 27)	
LAT=(N) 39°16'26.4"	LONG=(W) 80°22'21.5"
LANDING POINT (NAD 83)	
LAT=(N) 39°16'26.8"	LONG=(W) 80°22'20.8"
LANDING POINT UTM (NAD 83)	
(N) 4,347,383	(E) 554,130

WELL NO. 20 HM BOTTOM HOLE	
STATE PLANE COORDINATES (NORTH ZONE NAD '27)	
N. 277,773	E. 1,755,246
BOTTOM HOLE (NAD 27)	
LAT=(N) 39°15'33.9"	LONG=(W) 80°21'51.7"
BOTTOM HOLE (NAD 83)	
LAT=(N) 39°15'34.2"	LONG=(W) 80°21'51.1"
BOTTOM HOLE UTM (NAD 83)	
(N) 4,345,768	(E) 554,855

LEGEND

AS DRILLED ——— (solid line)

PROPOSED - - - - - (dashed line)



NOTES ON SURVEY

1. TIES TO WELLS, REFERENCES, AND CORNERS ARE BASED ON GRID NORTH FOR THE WV STATE PLANE COORDINATE SYSTEM NORTH ZONE NAD '27.
2. LEASE BOUNDARY SHOWN HEREON TAKEN FROM DEED BOOK 70 PAGE 152 AND ADJOINING DEEDS.
3. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF HARRISON COUNTY IN JULY, 2013.
4. WELL COORDINATES ESTABLISHED BY DGPS(SURVEY GRADE).
5. NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250'. NO APPLICABLE DWELLINGS OR BUILDINGS WITHIN 625'.
6. PLAT UPDATED 05-05-17 TO SHOW AS DRILLED DATA PROVIDED BY ARSENAL RESOURCES.

AS DRILLED COORDINATES FOR WELL NO. 20HM

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

NAD27 S.P.C. (FT)	N. 284,466.0	E. 1,752,124.8
NAD27 GEO.	LAT=(N) 39°16'39.8"	LONG=(W) 80°22'32.3"
NAD83 GEO.	LAT=(N) 39°16'40.1"	LONG=(W) 80°22'31.6"
NAD83 UTM (M)	N. 4,347,791.0	E. 553,870.0

BOTTOM HOLE

NAD27 S.P.C. (FT)	N. 277,763.7	E. 1,755,245.8
NAD27 GEO.	LAT=(N) 39°15'33.9"	LONG=(W) 80°21'51.7"
NAD83 GEO.	LAT=(N) 39°15'34.2"	LONG=(W) 80°21'51.1"
NAD83 UTM (M)	N. 4,345,764.9	E. 554,854.8



I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.

P.S.
677 *Gregory A. Smith*



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

DATE MAY 21, 20 14

REVISED 06/05/14 & 05/05/17

OPERATORS WELL NO. GOFF 20HM


API WELL NO. 47-33-05821

STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 8099P20R3(475-70)

PROVEN SOURCE OF ELEVATION DGPS (SURVEY GRADE) SCALE 1" = 2,000'

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



WELL TYPE: OIL <input type="checkbox"/> GAS <input checked="" type="checkbox"/> LIQUID INJECTION <input type="checkbox"/> WASTE DISPOSAL <input type="checkbox"/> IF "GAS" PRODUCTION <input checked="" type="checkbox"/> STORAGE <input type="checkbox"/> DEEP <input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/>
LOCATION: PRE ELEVATION <u>1,128.00'</u> POST ELEVATION <u>1126.30'</u> WATERSHED <u>WEST FORK RIVER</u>
DISTRICT <u>CLARK</u> COUNTY <u>HARRISON</u> QUADRANGLE <u>WOLF SUMMIT 7.5'</u>
SURFACE OWNER <u>H. DOTSON CATHER TRUSTEE</u> ACREAGE <u>404.34±</u>
ROYALTY OWNER <u>H. DOTSON CATHER TRUSTEE ETAL & STATE OF W.V.(TURNPIKE)</u> ACREAGE <u>1087±</u>
PROPOSED WORK: DRILL <input checked="" type="checkbox"/> CONVERT <input type="checkbox"/> DRILL DEEPER <input type="checkbox"/> REDRILL <input type="checkbox"/> FRACTURE OR STIMULATE <input checked="" type="checkbox"/> PLUG OFF OLD <input type="checkbox"/>
FORMATION <u> </u> PERFORATE NEW FORMATION <input type="checkbox"/> PLUG AND ABANDON <input type="checkbox"/> CLEAN OUT AND REPLUG <input type="checkbox"/> OTHER <input type="checkbox"/>
PHYSICAL CHANGE IN WELL (SPECIFY) <u> </u> TARGET FORMATION <u>MARCELLUS</u>
ESTIMATED DEPTH <u>7,089' TVD / TMD 14,024'</u>

WELL OPERATOR PDC MOUNTAINEER, LLC DESIGNATED AGENT STEVEN P. JOHNSON

ADDRESS 120 GENESIS BOULEVARD BRIDGEPORT, WV 26330 ADDRESS 120 GENESIS BOULEVARD BRIDGEPORT, WV 26330

COUNTY NAME PERMIT

09/15/2014

WELL NO. 20 HM GOFF LEASE

LATITUDE 39°17'30"

LONGITUDE 80°55'30"

WELL NO. 20 HM
TOP HOLE
STATE PLANE COORDINATES
(NORTH ZONE NAD 83)
E. 1,782,152
N. 284,485

TOP HOLE (NAD 83)
LAT=(N) 39°16'38.8"
LONG=(W) 80°52'32.2"

TOP HOLE (NAD 83)
LAT=(N) 39°16'40.1"
LONG=(W) 80°52'31.8"

TOP HOLE UTM (NAD 83)
(N) 4347,791
(E) 523,870

WELL NO. 20 HM
LANDING POINT
STATE PLANE COORDINATES
(NORTH ZONE NAD 83)
E. 1,782,888
N. 283,112

LANDING POINT (NAD 83)
LAT=(N) 39°16'35.4"
LONG=(W) 80°52'31.2"

LANDING POINT (NAD 83)
LAT=(N) 39°16'36.8"
LONG=(W) 80°52'30.8"

LANDING POINT UTM (NAD 83)
(N) 4347,383
(E) 524,130

WELL NO. 20 HM
BOTTOM HOLE
STATE PLANE COORDINATES
(NORTH ZONE NAD 83)
E. 1,782,248
N. 277,773

BOTTOM HOLE (NAD 83)
LAT=(N) 39°15'33.9"
LONG=(W) 80°51'51.7"

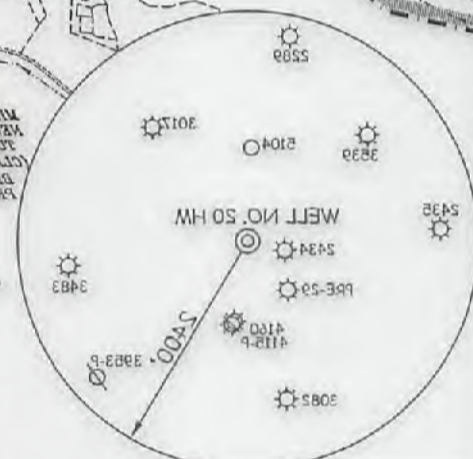
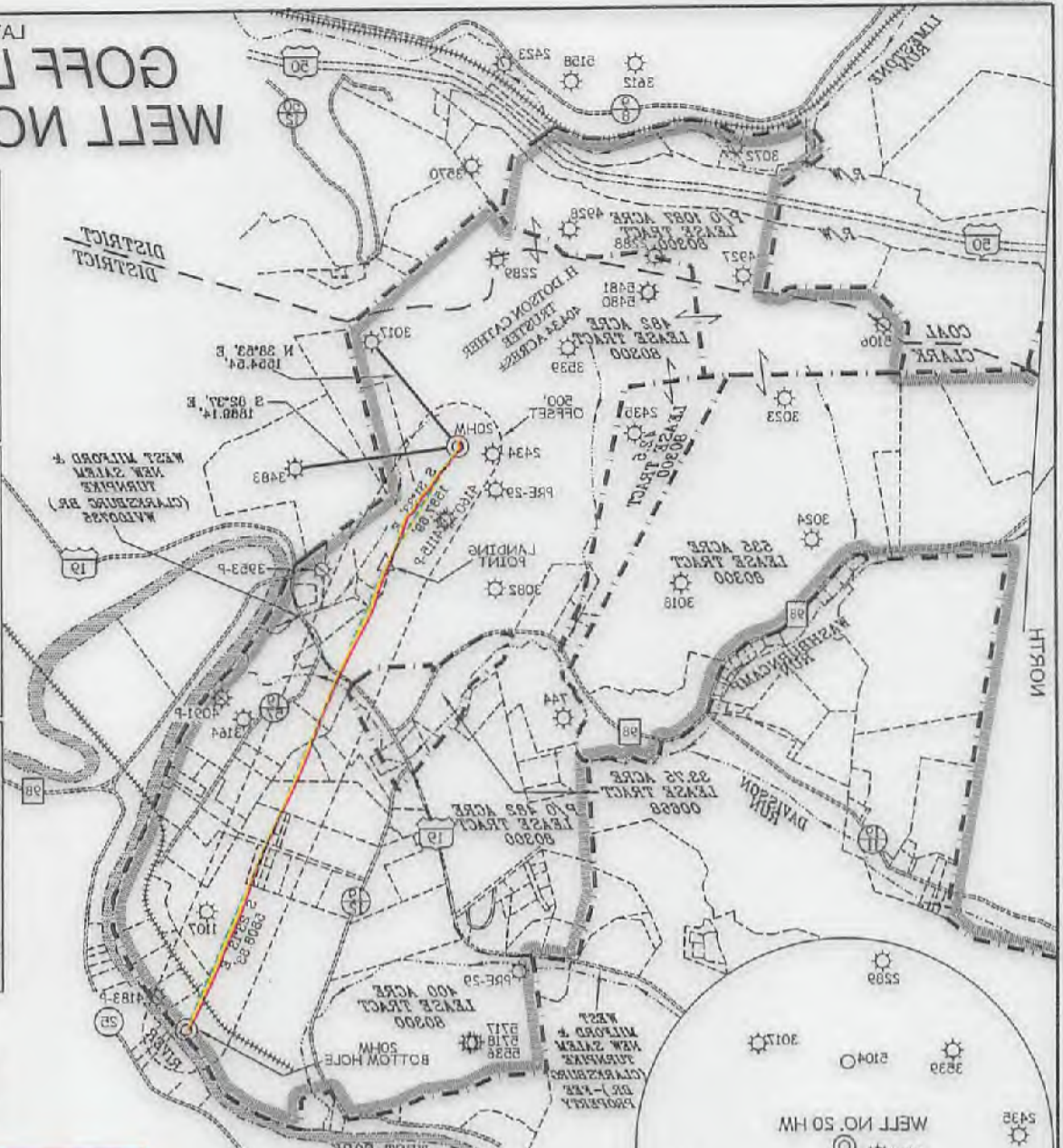
BOTTOM HOLE (NAD 83)
LAT=(N) 39°15'34.3"
LONG=(W) 80°51'51.1"

BOTTOM HOLE UTM (NAD 83)
(N) 4342,788
(E) 524,882

LEGEND

AS DRILLED

PROPOSED



NOTES ON SURVEY

1. TIES TO WELLS, REFERENCES, AND CORNERS ARE BASED ON GRID NORTH FOR THE STATE PLANE COORDINATE SYSTEM NORTH ZONE NAD 83.
 2. LEASE BOUNDARY SHOWN HEREON TAKEN FROM DEED BOOK 70 PAGE 152 AND ADJOINING DEEDS.
 3. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSessor AND COUNTY CLERK RECORDS OF HARRISON COUNTY IN JULY, 2012.
 4. WELL COORDINATES ESTABLISHED BY DOP(SURVEY GRADE).
 5. NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250'.
 6. NO APPLICABLE DWELLINGS OR BUILDINGS WITHIN 250'.
6. PLAT UPDATED 05-05-17 TO SHOW AS DRILLED DATA PROVIDED BY AREAL RESOURCES.

AS DRILLED COORDINATES FOR WELL NO. 20HM

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

NAD83 UTM (M) N. 4347,810 E. 523,870

NAD83 GEO. LAT=(N) 39°16'38.8" LONG=(W) 80°52'32.2"

NAD83 GEO. LAT=(N) 39°16'40.1" LONG=(W) 80°52'31.8"

NAD83 UTM (M) N. 4347,791 E. 523,870

BOTTOM HOLE

NAD83 UTM (M) N. 4342,788 E. 524,882

NAD83 GEO. LAT=(N) 39°15'33.9" LONG=(W) 80°51'51.7"

NAD83 GEO. LAT=(N) 39°15'34.3" LONG=(W) 80°51'51.1"

NAD83 UTM (M) N. 4342,788 E. 524,882

OPERATORS WELL NO. GOFF 20HM

DATE MAY 21 2014

REVISED 08/05/14 & 05/05/17

STATE 47 COUNTY 33 PERMIT 02891

APL

WELL NO. 47



I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.

P. S. 677

Gregory A. Smith

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

FILE NO. 8089P20R3(47-270)

SCALE 1" = 2,000'

MINIMUM DEGREE OF ACCURACY 1/200'

PROVEN SOURCE DGPS (SURVEY GRADE)

WELL TYPE: OIL GAS LIQUID WASTE DISPOSAL "GAS" PRODUCTION STORAGE DEEP SHALLOW

LOCATION: ELEVATION 1158.00' PRE 1158.30' POST

DISTRICT CLARK COUNTY HARRISON QUADRANGLE WOLF SUMMIT 7.5

SURFACE OWNER H. DOTSON CATHER TRUSTEE ACREAGE 404.34±

PROPOSED WORK: DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION PERFORM NEW FORMATION PLUG AND ABANDON CLEAN OUT AND REPLUG OTHER

PHYSICAL CHANGE IN WELL (SPECIFY) MARCELLUS TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,089' TMD 14,024'

WELL OPERATOR PDC MOUNTAINEER, LLC DESIGNATED AGENT STEVEN P. JOHNSON

ADDRESS 120 GENESIS BOULEVARD ADDRESS 120 GENESIS BOULEVARD

BRIDGEPORT, WV 28330 BRIDGEPORT, WV 28330

09/15/2017

COUNTY NAME

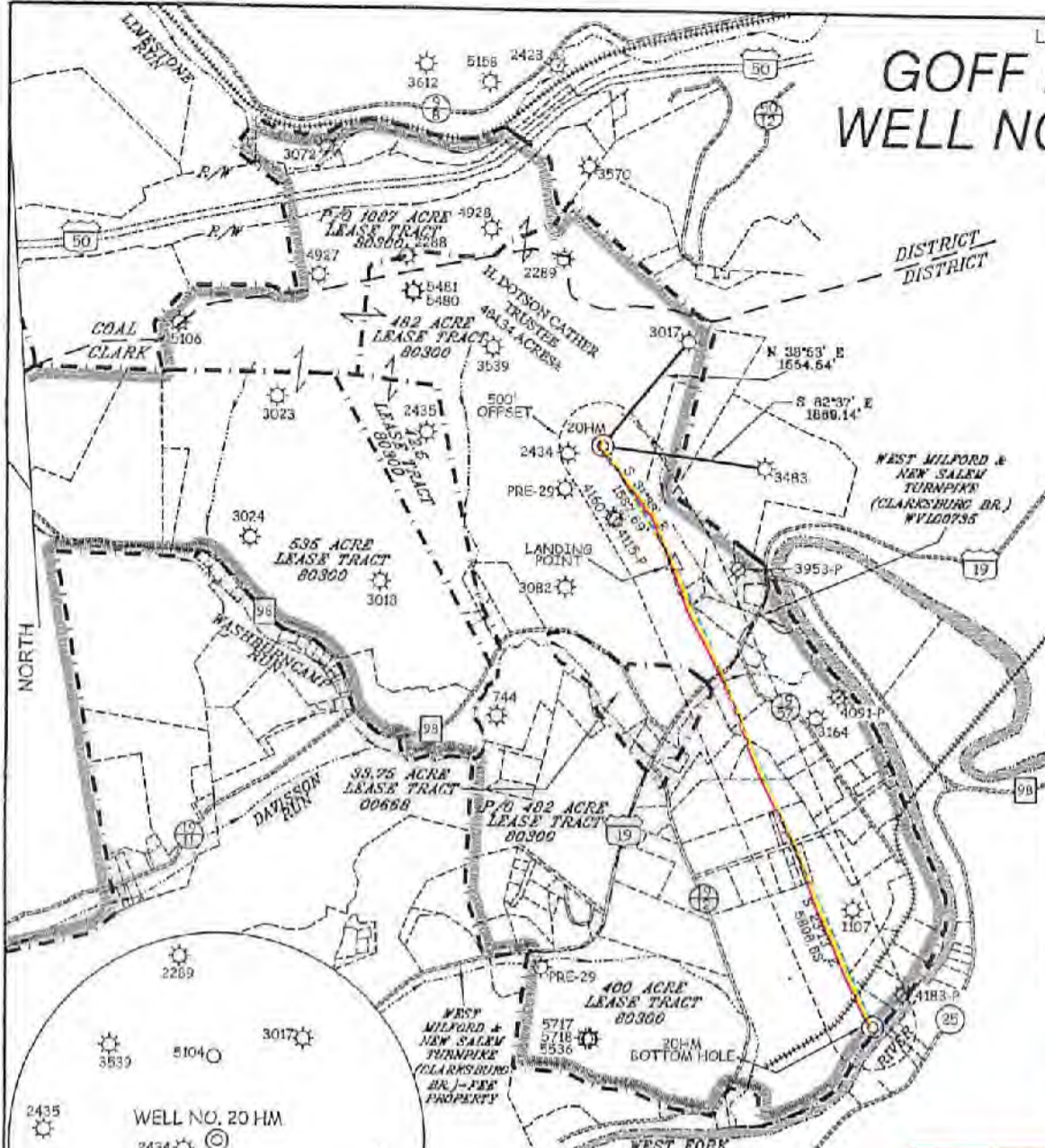
PERMIT

178

GOFF LEASE WELL NO. 20 HM

LATITUDE 39°17'30"

LONGITUDE 80°22'30"



WELL NO. 20 HM TOP HOLE	
STATE PLANE COORDINATES (NORTH ZONE NAD '27)	
N. 284,465	E. 1,752,125
TOP HOLE (NAD 27)	
LAT=(N) 39°16'39.8"	LONG=(W) 80°22'32.2"
TOP HOLE (NAD 83)	
LAT=(N) 39°16'40.1"	LONG=(W) 80°22'31.6"
TOP HOLE UTM (NAD 83)	
(N) 4,347,791	(E) 553,870

WELL NO. 20 HM LANDING POINT	
STATE PLANE COORDINATES (NORTH ZONE NAD '27)	
N. 263,112	E. 1,752,866
LANDING POINT (NAD 27)	
LAT=(N) 39°16'26.4"	LONG=(W) 80°22'21.5"
LANDING POINT (NAD 83)	
LAT=(N) 39°16'26.8"	LONG=(W) 80°22'20.8"
LANDING POINT UTM (NAD 83)	
(N) 4,347,383	(E) 554,130

WELL NO. 20 HM BOTTOM HOLE	
STATE PLANE COORDINATES (NORTH ZONE NAD '27)	
N. 277,973	E. 1,755,246
BOTTOM HOLE (NAD 27)	
LAT=(N) 39°16'33.9"	LONG=(W) 80°21'51.7"
BOTTOM HOLE (NAD 83)	
LAT=(N) 39°16'34.2"	LONG=(W) 80°21'51.1"
BOTTOM HOLE UTM (NAD 83)	
(N) 4,345,768	(E) 554,855

LEGEND

AS DRILLED —

PROPOSED - - -

NOTES ON SURVEY

1. TIES TO WELLS, REFERENCES, AND CORNERS ARE BASED ON GRID NORTH FOR THE WV STATE PLANE COORDINATE SYSTEM NORTH ZONE NAD '27.
2. LEASE BOUNDARY SHOWN HEREON TAKEN FROM DEED BOOK 70 PAGE 152 AND ADJOINING DEEDS.
3. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF HARRISON COUNTY IN JULY, 2013.
4. WELL COORDINATES ESTABLISHED BY DGPS(SURVEY GRADE).
5. NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250'. NO APPLICABLE DWELLINGS OR BUILDINGS WITHIN 625'.
6. PLAT UPDATED 05-05-17 TO SHOW AS DRILLED DATA PROVIDED BY ARSENAL RESOURCES.

AS DRILLED COORDINATES FOR WELL NO. 20HM
(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

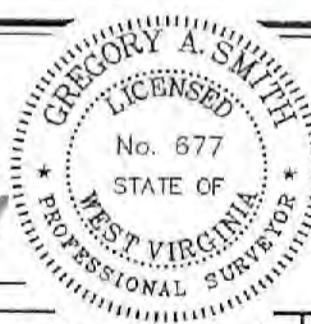
NAD27 S.P.C.(FT)	N. 284,465.5	E. 1,752,124.9
NAD27 GEO.	LAT=(N) 39°16'39.8"	LONG=(W) 80°22'32.2"
NAD83 GEO.	LAT=(N) 39°16'40.1"	LONG=(W) 80°22'31.6"
NAD83 UTM (M)	N. 4,347,791.0	E. 553,870.0

BOTTOM HOLE

NAD27 S.P.C.(FT)	N. 277,973.7	E. 1,755,245.8
NAD27 GEO.	LAT=(N) 39°16'33.9"	LONG=(W) 80°21'51.7"
NAD83 GEO.	LAT=(N) 39°16'34.2"	LONG=(W) 80°21'51.1"
NAD83 UTM (M)	N. 4,345,768.9	E. 554,854.9

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.

P.S.
677 *Gregory A. Smith*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE MAY 21, 20 14
REVISED 06/05/14 & 05/05/17
OPERATORS WELL NO. GOFF 20HM
API WELL NO. 47 - 33 - 05821
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 8099P20R3(475-70)
PROVEN SOURCE OF ELEVATION DGPS (SURVEY GRADE) SCALE 1" = 2,000'

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

WELL TYPE:	OIL	GAS <input checked="" type="checkbox"/>	LIQUID INJECTION	WASTE DISPOSAL	IF "GAS" PRODUCTION <input checked="" type="checkbox"/>	STORAGE	DEEP	SHALLOW <input checked="" type="checkbox"/>
LOCATION:	PRE	POST	WATERSHED <u>WEST FORK RIVER</u>					
ELEVATION	<u>1,128.00'</u>	<u>1126.30'</u>						
DISTRICT	<u>CLARK</u>	COUNTY	<u>HARRISON</u>	QUADRANGLE	<u>WOLF SUMMIT 7.5'</u>			
SURFACE OWNER	<u>H. DOTSON CATHER TRUSTEE</u>			ACREAGE	<u>404.34±</u>			
ROYALTY OWNER	<u>H. DOTSON CATHER TRUSTEE ETAL & STATE OF W.V.(TURNPIKE)</u>			ACREAGE	<u>1087±</u>			
PROPOSED WORK:	DRILL <input checked="" type="checkbox"/> CONVERT <input type="checkbox"/> DRILL DEEPER <input type="checkbox"/> REDRILL <input type="checkbox"/> FRACTURE OR STIMULATE <input checked="" type="checkbox"/> PLUG OFF OLD <input type="checkbox"/>							
FORMATION	PERFORATE NEW FORMATION <input type="checkbox"/> PLUG AND ABANDON <input type="checkbox"/> CLEAN OUT AND REPLUG <input type="checkbox"/> OTHER <input type="checkbox"/>							
PHYSICAL CHANGE IN WELL (SPECIFY)				TARGET FORMATION	<u>MARCELLUS</u>			
				ESTIMATED DEPTH	<u>7,069' TVD / TMD 14,024'</u>			

WELL OPERATOR PDC MOUNTAINEER, LLC DESIGNATED AGENT STEVEN P. JOHNSON
ADDRESS 120 GENESIS BOULEVARD ADDRESS 120 GENESIS BOULEVARD
BRIDGEPORT, WV 26330 BRIDGEPORT, WV 26330

RECEIVED
Office of Oil and Gas
JUN 30 2017
WV Department of Environmental Protection

09/15/2014

COUNTY NAME PERMIT