

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

RECEIVED  
Office of Oil and Gas  
JAN 26 2023

WV Department of  
Environmental Protection

API 47-051-02227 County Marshall District Franklin  
Quad Powhatan Point 7.5' Pad Name Old Crow Field/Pool Name \_\_\_\_\_  
Farm name Donna Yoho Well Number Old Crow N-4HM  
Operator (as registered with the OOG) Tug Hill Operating, LLC  
Address 380 Southpointe Boulevard, Plaza II, Suite 200 City Canonsburg State PA Zip 15317

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4,403,194.81 Easting 520,286.96  
Landing Point of Curve Northing 4,404,109.5 Easting 520,534.2  
Bottom Hole Northing 4,406,705.8 Easting 519,018.2

Elevation (ft) 1,264.99' 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)  
SOBM; Base oil, osmotic inhibitor, weighting agent, viscosifier, emulsifier, hardness buffer, fluid loss additive, LCM, Shale inhibitor, de-foamer, soaping agent, coagulant, flocculant; specific additives per WSSP and Permit.

Date permit issued 4/12/2019 Date drilling commenced <sup>spud: 1/27/21 big rig: 11/25/2021</sup> Date drilling ceased 12/28/2021  
Date completion activities began 9/14/2022 Date completion activities ceased 9/14/2022  
Verbal plugging (Y/N) n Date permission granted n/a Granted by n/a

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

Freshwater depth(s) ft 919' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft 1,353' Void(s) encountered (Y/N) depths N  
Coal depth(s) ft 821-827', 913-919' Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by:  
[Signature] 03/17/2023  
2-1-2023

API 47-051 - 02227 Farm name Donna Yoho Well number Old Crow N-4HM

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"	120'	NEW	94.5#	N/A	Y
Surface	17 1/2"	13 3/8"	1,014'	NEW	54.5#	N/A	Y
Coal	17 1/2"	13 3/8"	1,014'	NEW	54.5#	N/A	Y
Intermediate 1	12 1/4"	9 5/8"	2,735'	NEW	36#	N/A	Y
Intermediate 2							Y
Intermediate 3							
Production	8 1/2"	5 1/2"	17,632'	NEW	20#	N/A	Y
Tubing		2 7/8"	8,816'	NEW	4.7#	N/A	Y
Packer type and depth set							

Comment Details \_\_\_\_\_

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	A	65	15.6	1.21	78	0	8
Surface	A	1080	15.6	1.2	900	0	8
Coal	A	1080	15.6	1.2	900	0	8
Intermediate 1	A	860	15	1.4	614	0	8
Intermediate 2							
Intermediate 3							
Production	A	4235	14.5	1.16	3,651	0	8
Tubing							

Drillers TD (ft) 17,655' Loggers TD (ft) n/a  
 Deepest formation penetrated Marcellus Plug back to (ft) n/a  
 Plug back procedure n/a

Kick off depth (ft) 6,980'

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 3 centralizers on surface casing at equal distance.  
 Intermediate - 1 centralizer every other joint.  
 Production - one centralizer every other joint in lateral, one centralizer every joint through curve, one centralizer every other joint to surface.

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 \_\_\_\_\_





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**OLD CROW N-4HM**  
PEFORATION RECORD  
JAN 26 2023

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Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD. Ft.	Number of Perforations	Formation(s)
1	9/14/2022	17,449	17,495	16	Marcellus
2	9/14/2022	17,249	17,395	48	Marcellus
3	9/15/2022	17,075	17,221	48	Marcellus
4	9/15/2022	16,901	17,047	48	Marcellus
5	9/15/2022	16,727	16,873	48	Marcellus
6	9/15/2022	16,553	16,699	48	Marcellus
7	9/16/2022	16,379	16,525	48	Marcellus
8	9/16/2022	16,205	16,351	48	Marcellus
9	9/16/2022	16,031	16,177	48	Marcellus
10	9/16/2022	15,857	16,003	48	Marcellus
11	9/17/2022	15,683	15,829	48	Marcellus
12	9/17/2022	15,508	15,654	48	Marcellus
13	9/17/2022	15,334	15,480	48	Marcellus
14	9/18/2022	15,160	15,306	48	Marcellus
15	9/18/2022	14,986	15,132	48	Marcellus
16	9/19/2022	14,812	14,958	48	Marcellus
17	9/19/2022	14,638	14,784	48	Marcellus
18	9/19/2022	14,464	14,610	48	Marcellus
19	9/19/2022	14,290	14,436	48	Marcellus
20	9/20/2022	14,116	14,262	48	Marcellus
21	9/20/2022	13,942	14,088	48	Marcellus
22	9/20/2022	13,767	13,913	48	Marcellus
23	9/20/2022	13,593	13,739	48	Marcellus
24	9/21/2022	13,419	13,565	48	Marcellus
25	9/21/2022	13,245	13,391	48	Marcellus
26	9/21/2022	13,071	13,217	48	Marcellus
27	9/21/2022	12,897	13,043	48	Marcellus
28	9/22/2022	12,723	12,869	48	Marcellus
29	9/22/2022	12,549	12,695	48	Marcellus
30	9/22/2022	12,375	12,521	48	Marcellus
31	9/22/2022	12,201	12,347	48	Marcellus
32	9/23/2022	12,026	12,172	48	Marcellus
33	9/23/2022	11,852	11,998	48	Marcellus
34	9/23/2022	11,678	11,824	48	Marcellus
35	9/24/2022	11,504	11,650	48	Marcellus
36	9/24/2022	11,330	11,476	48	Marcellus
37	9/24/2022	11,156	11,302	48	Marcellus
38	9/25/2022	10,982	11,128	48	Marcellus
39	9/25/2022	10,808	10,954	48	Marcellus
40	9/25/2022	10,634	10,780	48	Marcellus
41	9/25/2022	10,460	10,606	48	Marcellus

03/17/2023

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD. Ft.	Number of Perforations	Formation(s)
42	9/26/2022	10,285	10,431	48	Marcellus
43	9/26/2022	10,111	10,257	48	Marcellus
44	9/26/2022	9,937	10,083	48	Marcellus
45	9/26/2022	9,763	9,909	48	Marcellus
46	9/27/2022	9,589	9,735	48	Marcellus
47	9/27/2022	9,415	9,561	48	Marcellus
48	9/27/2022	9,241	9,387	48	Marcellus
49	9/28/2022	9,067	9,213	48	Marcellus
50	9/28/2022	8,893	9,039	48	Marcellus
51	9/28/2022	8,719	8,865	48	Marcellus
52	9/28/2022	8,544	8,690	48	Marcellus
53	9/29/2022	8,370	8,516	48	Marcellus
54	9/29/2022	8,196	8,342	48	Marcellus
55	9/29/2022	8,022	8,168	48	Marcellus
56	9/29/2022	7,848	7,994	48	Marcellus
57	9/30/2022	7,674	7,820	48	Marcellus

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STIMULATION INFORMATION PER STAGE

Stage No.	Ave. Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
1	84.00	7333	0	3585	253320	6,322	0
2	85.00	7318	5256	4167	445320	8,679	0
3	85.00	7050	5200	4374	443220	8,524	0
4	84.00	6870	4702	4504	446250	8,570	0
5	84.00	7006	5039	4885	439700	8,487	0
6	84.00	6927	4884	4475	446900	8,582	0
7	85.00	6757	4705	4763	444280	8,559	0
8	84.00	6555	4525	5145	442540	8,525	0
9	83.00	6687	4807	4112	445820	9,474	0
10	84.00	6939	4893	4586	437080	8,386	0
11	84.00	6602	4608	4988	446440	8,515	0
12	84.00	6771	4667	4856	446900	8,545	0
13	85.00	6807	4860	4560	447120	8,589	0
14	84.00	6865	4729	4744	445220	8,320	0
15	84.00	6662	4677	4485	448700	8,366	0
16	83.00	6535	4556	4519	444240	8,425	0
17	84.00	6430	4563	5167	437820	8,365	0
18	84.00	6574	4547	4917	442220	8,297	0
19	84.00	6408	4830	4520	443580	8,542	0
20	84.00	6442	4264	5053	444660	8,459	0
21	85.00	6468	4419	4770	445900	8,407	0
22	84.00	6514	4602	4845	439160	8,278	0
23	84.00	6331	4830	4529	440440	8,359	0
24	84.00	6326	4425	5025	442980	8,337	0
25	85.00	6481	4757	4821	443030	8,403	0
26	85.00	6519	4476	4512	443240	8,278	0
27	84.00	6446	4854	4946	443180	8,283	0
28	84.00	6367	4826	4816	437120	8,272	0
29	85.00	6336	5005	5172	444820	8,319	0
30	84.00	6405	4878	4583	439640	7,998	0
31	85.00	6302	4814	4744	444040	8,343	0
32	85.00	6289	5314	5034	444960	8,356	0

Stage No.	Ave. Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
33	85.00	6336	4666	4932	447300	8,393	0
34	85.00	6188	5226	4641	444120	8,311	0
35	85.00	6250	4757	5007	446580	8,317	0
36	84.00	6146	4635	4713	443540	8,199	0
37	84.00	6255	4719	4724	440460	8,138	0
38	80.00	6022	4514	4731	444460	8,927	0
39	85.00	6187	4829	4648	445120	8,333	0
40	83.00	6090	4367	5124	446380	8,217	0
41	82.00	6052	4987	5244	447300	8,289	0
42	83.00	6111	5168	4911	446460	8,214	0
43	83.00	6109	5004	5062	446380	8,148	0
44	83.00	6060	5200	5084	439080	8,105	0
45	84.00	6049	5199	4878	443220	8,209	0
46	83.00	6073	5040	5105	437340	8,145	0
47	84.00	6084	5017	4946	437480	8,134	0
48	83.00	6066	5253	4901	438920	8,064	0
49	84.00	6069	4984	4910	436920	8,096	0
50	84.00	6112	4909	5157	443900	8,184	0
51	84.00	6019	4995	4994	446020	8,158	0
52	84.00	6037	4964	5009	437935	7,996	0
53	84.00	6059	5140	4929	437460	8,065	0
54	84.00	5946	4527	4815	441100	8,110	0
55	84.00	6003	4991	5069	445160	8,203	0
56	84.00	5990	4938	4715	436680	7,930	0
57	84.00	6080	5231	4829	438400	7,983	0

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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
Maxton	2014	2104	2015	2105	Sandstone
Big Lime	2104	2174	2105	2176	Limestone
Big Injun	2174	2458	2176	2467	Sandstone
Weir	2458	2653	2467	2671	Sandstone
Berea	2653	2998	2671	3043	Sandstone
Gordon	2998	3052	3043	3105	Sandstone
Fifty Foot	3052	3600	3105	3756	Sandstone
Speechley	3600	5022	3756	5495	Sandstone
Benson	5022	5377	5495	5931	Sandstone
Alexander	5377	5971	5931	6656	Siltstone
Rhinestreet	5971	6387	6656	7186	Black Shale
Middlesex	6387	6462	7186	7306	Black Shale
Geneseo/Burkett	6462	6486	7306	7348	Black Shale
Tully	6486	6526	7348	7425	Limestone
Hamilton	6526	6576	7425	7547	Gray Shale
Marcellus	6576	-	7547	-	Black Shale

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# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	9/14/2022
Job End Date:	9/30/2022
State:	West Virginia
County:	Marshall
API Number:	47-051-02227-00-00
Operator Name:	Tug Hill Operating, LLC
Well Name and Number:	Old Crow N 4HM
Latitude:	39.77845155
Longitude:	-80.76309964
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,565
Total Base Water Volume (gal):	19,867,344
Total Base Non Water Volume:	0

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## Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Tug Hill Operating	Carrier/Base Fluid	Water	7732-18-5	100.00000	86.52680	None
Sand (40/70 White Proppant)	Tug Hill Operating	Proppant	Silica Substrate	14808-60-7	100.00000	8.75737	None
Sand (100 Mesh Proppant)	Tug Hill Operating	Proppant	Silica Substrate	14808-60-7	100.00000	3.13499	None
Sand (30/50 White Proppant)	Tug Hill Operating	Proppant	Silica Substrate	14808-60-7	100.00000	1.18510	None
Hydrochloric Acid (7.5%)	CNR	Acidizing	Water	7732-18-5	85.00000	0.23093	None
			Hydrochloric Acid (Hydrogen Chloride)	7647-01-0	37.00000	0.10052	None
StimStream FR 9800	Chemstream	Friction Reducer	Butene, homopolymer	9003-29-6	25.00000	0.01929	None
			Alkanes, C16-20-iso-	90622-59-6	25.00000	0.01929	None
			Ethoxylated alcohols (C12-18)	68213-23-0	3.00000	0.00231	None



MC MX 9-4743	Multi-Chem	Biocide					
			Sodium Nitrate	7631-99-4	60.00000	0.02204	None
LD-7750W	Multi-Chem	Scale Inhibitor					
			Methanol	67-56-1	60.00000	0.00501	None
			Phosphonic Acid Salt	Proprietary	5.00000	0.00042	None
ProHib 100	CNR	Acid Inhibitor					
			2-Butoxyethanol	111-76-2	60.00000	0.00050	None
			Proprietary material	Proprietary	30.00000	0.00025	None
			Proprietary non-ionic surfactant	Proprietary	20.00000	0.00017	None
			Proprietary corrosion inhibitor	Proprietary	10.00000	0.00008	None
			Proprietary ethoxylated alcohol	Proprietary	10.00000	0.00008	None
ProFE 105	CNR	Iron Control					
			Citric Acid	77-92-9	20.00000	0.00020	None
			Acetic Acid	64-19-7	5.00000	0.00005	None
Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.							
Other Chemical(s)	Listed Above	See Trade Name(s) List					
			Water	7732-18-5	85.00000	0.23093	
			Butene, homopolymer	9003-29-6	25.00000	0.01929	
			Ethoxylated alcohols (C12-18)	68213-23-0	3.00000	0.00231	
			Phosphonic Acid Salt	Proprietary	5.00000	0.00042	
			Proprietary material	Proprietary	30.00000	0.00025	
			Proprietary non-ionic surfactant	Proprietary	20.00000	0.00017	
			Proprietary ethoxylated alcohol	Proprietary	10.00000	0.00008	
			Proprietary corrosion inhibitor	Proprietary	10.00000	0.00008	
			Acetic Acid	64-19-7	5.00000	0.00005	

\* Total Water Volume sources may include fresh water, produced water, and/or recycled water

\*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.

Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)



**OLD CROW N LEASE  
WELL 4HM  
TUG HILL OPERATING**

T.H. LATITUDE 39°47'30"  
B.H. LATITUDE 39°50'00"

3,682' T.H. A.D.

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

NAD'83 S.P.C.(FT)	N. 468,147.23	E. 1,613,516.69
NAD'83 GEO.	LAT-(N) 39.778452	LONG-(W) 80.763100
NAD'83 UTM (M)	N. 4,403,194.81	E. 520,286.96

LANDING POINT

NAD'83 S.P.C.(FT)	N. 471,093.7	E. 1,614,402.3
NAD'83 GEO.	LAT-(N) 39.786574	LONG-(W) 80.760096
NAD'83 UTM (M)	N. 4,404,097.0	E. 520,541.8

BOTTOM HOLE

NAD'83 S.P.C.(FT)	N. 479,741.4	E. 1,609,550.8
NAD'83 GEO.	LAT-(N) 39.810124	LONG-(W) 80.777796
NAD'83 UTM (M)	N. 4,406,706.8	E. 519,019.7

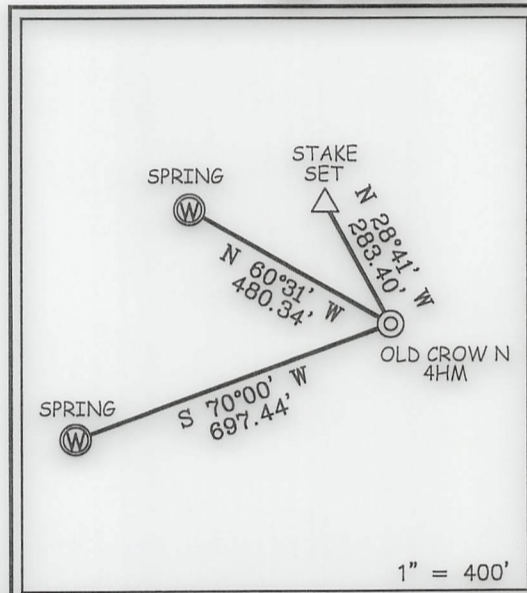
T.H. LONGITUDE 80°45'00"  
B.H. LONGITUDE 80°45'00"  
4,814' T.H. A.D.  
8,456' B.H. A.D.

MAP/PARCEL	ADJOINING SURFACE OWNER LIST	ACRES
5-9-4.3	HARRY E. KARR, JR., ET UX	1.471
5-9-4.5	DYLAN AULENBACHER	0.991 & PCL 10x40x50
5-9-4.7	FRANCIS D. BARR, ET UX	0.481
5-9-4.9	THOMAS MIDCAP, ET UX	0.375
5-9-4.12	SAMUEL L. & DEBRA N. CANTERBURY	0.650
5-9-4.13	SAMUEL LEE CANTERBURY, ET UX	0.9284
5-9-4.14	PAUL G. BROWN	0.500
5-9-4.15	PAUL G. BROWN	0.500
5-9-4.18	PAUL G. BROWN	0.657
5-9-23	DELBERT K. & LINDA K. MYERS	7.00
5-9-26	EDWIN C. MILLER	1.00
5-9-28	WILLIAM N. & DOLORES E. MCDONOUGH - LIFE	4.01
5-9-29	JAMES M. & ROBERTA L. STERN	3.1777
5-9-30	MATTHEW B. GRIFFITH	2.708
5-9-30.1	DAVID JR., & MELISSA LOVE	2.518
5-9-30.3	MATTHEW B. GRIFFITH	0.82
5-9-32	SANDRA J. BONNETTE	2.321
5-9-32.5	GARNET D. MIDCAP	PCL 270 x 390
5-9-32.8	TIMOTHY Q. HOYT, ET UX	0.711
5-9-32.9	LIONEL E. HENRY SR., ET AL	1.269
5-9-32.10	TIMOTHY Q. HOYT, ET UX	0.588
5-9-32.11	TIMOTHY Q. HOYT, ET UX	1.717
5-9-33.1	KEITH D. & BEVERLY A. DANIELS	1.00
5-9-33.2	KEITH D. DANIELS, ET UX	1.534
5-9-33.4	DAVID D. & CHRISTINE S. DANIELS	1.025
5-9-36	FRANK T. & ANNA M. WALKER	PARCEL
5-9-38	SHIRLEY A. HILL EST.	3.331
5-9-40	SHIRLEY A. HILL EST.	PCL 368 x 425

**NOTES ON SURVEY**

- NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS OR DWELLINGS > 2500 SQ. FT. WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
- WELL SPOT CIRCLE & TOPO MARK SCALE IS 1"=2000'.
- BASED ON WV DOT COUNTY ROUTE 74 IS A 40' STRIP OF LAND ACQUIRED IN NUMEROUS DEEDS.
- PLAT UPDATED TO SHOW AS-DRILLED PATH.
- AS DRILLED DATA PROVIDED BY TUG HILL OPERATING.

**REFERENCES**



12 Vanhorn Drive | P.O. Box 150 | Glenville, WV 26351 | 304.462.5634  
1412 Kanawha Boulevard, East | Charleston, WV 25301 | 304.346.3952  
254 East Beckley Bypass | Beckley, WV 25801 | 304.255.5296  
slsvv.com



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 JANUARY 17, 20 23  
REVISED \_\_\_\_\_, 20 \_\_\_\_\_  
OPERATORS WELL NO. OLD CROW N-4HM  
API WELL NO. 47 - 051 - 02227  
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8796P4HMAD.dwg  
OLD CROW NORTH 4HM REV1  
HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

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

WELL TYPE: OIL \_\_\_ GAS X LIQUID INJECTION \_\_\_ WASTE DISPOSAL \_\_\_ IF "GAS" PRODUCTION X STORAGE \_\_\_ DEEP \_\_\_ SHALLOW X

LOCATION: GROUND = 1,286.40' ELEVATION PROPOSED = 1,264.99' WATERSHED TRIBUTARY OF FISH CREEK (HUC-10)  
DISTRICT FRANKLIN COUNTY MARSHALL QUADRANGLE POWHATAN POINT 7.5'

SURFACE OWNER DONNA VIVIAN YOHO (TOD) GARY LANCE YOHO ACREAGE 71.205±  
ROYALTY OWNER DONNA VIVIAN YOHO, ET AL ACREAGE 71.205±

PROPOSED WORK: DRILL X CONVERT \_\_\_ DRILL DEEPER \_\_\_ REDRILL \_\_\_ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION \_\_\_ PERFORATE NEW FORMATION \_\_\_ PLUG AND ABANDON \_\_\_ CLEAN OUT AND REPLUG \_\_\_ OTHER \_\_\_  
PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD: 6,694' / TMD: 17,638'

WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DARREN BROWN - CT CORPORATION  
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 ADDRESS 5098 WASHINGTON ST. W, STE 407  
FORT WORTH, TX 76107 CHARLESTON, WV 25313-1561

03/17/2023

COUNTY NAME PERMIT

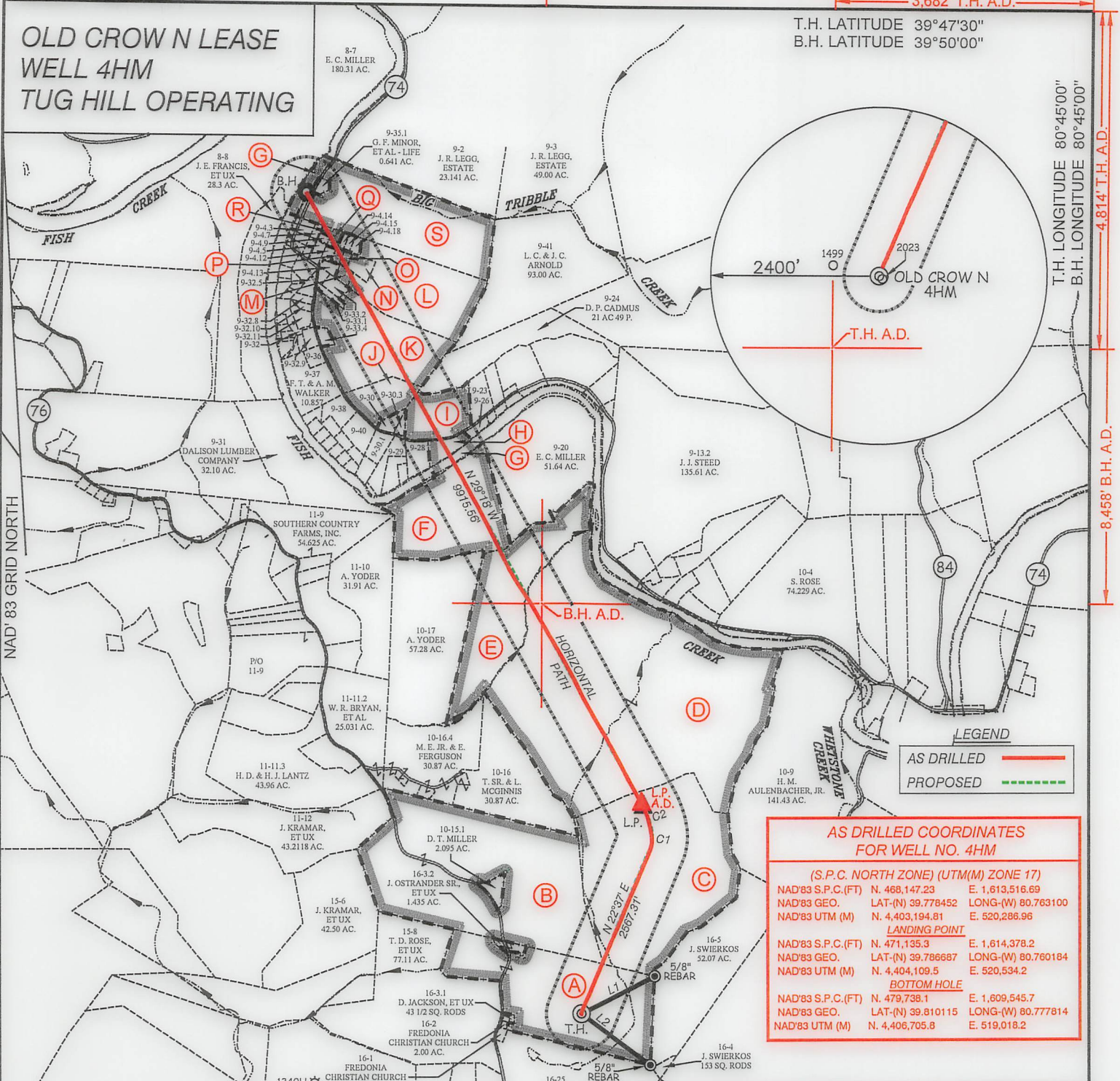


**OLD CROW N LEASE  
WELL 4HM  
TUG HILL OPERATING**

T.H. LATITUDE 39°47'30"  
B.H. LATITUDE 39°50'00"

T.H. LONGITUDE 80°45'00"  
B.H. LONGITUDE 80°45'00"

8,458' B.H. A.D.  
4,814' T.H. A.D.



**LEGEND**

AS DRILLED ———

PROPOSED - - - - -

**AS DRILLED COORDINATES FOR WELL NO. 4HM**

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

NAD'83 S.P.C. (FT)	N. 468,147.23	E. 1,613,516.69
NAD'83 GEO.	LAT-(N) 39.778452	LONG-(W) 80.763100
NAD'83 UTM (M)	N. 4,403,194.81	E. 520,286.96

**LANDING POINT**

NAD'83 S.P.C. (FT)	N. 471,135.3	E. 1,614,378.2
NAD'83 GEO.	LAT-(N) 39.786687	LONG-(W) 80.760184
NAD'83 UTM (M)	N. 4,404,109.5	E. 520,534.2

**BOTTOM HOLE**

NAD'83 S.P.C. (FT)	N. 479,738.1	E. 1,609,545.7
NAD'83 GEO.	LAT-(N) 39.810115	LONG-(W) 80.777814
NAD'83 UTM (M)	N. 4,406,705.8	E. 519,018.2

TAG	SURFACE OWNER	PARCEL	ACRES
A	DONNA VIVIAN YOHO (TOD) GARY LANCE YOHO	5-16-3	71.205
B	PAUL ANDREW & DEBRA A. RINE	5-10-15	120.805
C	JOHN SWIERKOS	5-10-14	100.00

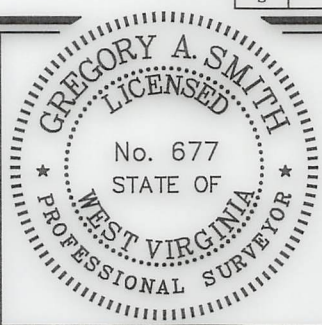
CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	247.71'	433.60'	N 04°36' E	244.35'
C2	356.40'	1036.87'	N 20°03' W	354.65'

TAG	SURFACE OWNER	PARCEL	ACRES
D	HERBERT M. AULENBACHER, JR.	5-10-3	225.50
E	WILLIAM A. PRASCIC, ET AL	5-10-2	52.00
F	EDWIN C. MILLER	5-10-1	49.96
G	STATE OF WEST VIRGINIA (FISH CREEK)	N/A	N/A
H	JOHN F. KAZEMKA	5-9-27	4.02
I	DELBERT K. & LINDA K. MYERS	5-9-25	14.49
J	DENNIS P. CADMUS	5-9-39	9.50
K	KEITH D. DANIELS, ET UX	5-9-33	40.331
L	LLOYD C. & JUDITH C. ARNOLD	5-9-4	18.854
M	GARY PORTER	5-9-4.11	1.00
N	SAMUEL L. CANTERBURY, ET UX	5-9-4.19	2.078
O	SAMUEL L. CANTERBURY, ET UX	5-9-4.17	0.500
P	SAMUEL L. CANTERBURY, ET UX	5-9-4.16	0.517
Q	DEBORAH S. MIDCAP	5-9-4.10	0.819
R	THOMAS MIDCAP, ET UX	5-9-4.8	0.376
S	LLOYD C. & JUDITH C. ARNOLD	5-9-35	47.00

LINE	BEARING	DISTANCE
L1	N 63°00' E	1174.92'
L2	S 53°50' E	1217.93'



12 Vanhorn Drive | P.O. Box 150 | Glenville, WV 26351 | 304.462.5634  
1412 Kanawha Boulevard, East | Charleston, WV 25301 | 304.346.3952  
254 East Beckley Bypass | Beckley, WV 25801 | 304.255.5296  
slswv.com



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

P.S. 677 *Gregory A. Smith*

**LEGEND**

- LEASE LINE
- SURFACE LINE
- WELL LATERAL
- OFFSET LINE
- TIE LINE
- CREEK
- ROAD
- COUNTY ROUTE
- PROPOSED WELL
- EXISTING WELL
- PERMITTED WELL
- TAX MAP-PARCEL
- SURFACE OWNER (SEE TABLE)
- LEASE # (SEE WW-6A1)

SCALE 1" = 2000' FILE NO. 8796P4HMAD.dwg  
OLD CROW NORTH 4HM REV1  
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