



west virginia department of environmental protection

Office of Oil and Gas
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Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

PERMIT MODIFICATION APPROVAL
Horizontal 6A / Horizontal 6A Well - 1

DAC ENERGY, LLC
POST OFFICE BOX 99

ALMA, WV 26320

Re: Permit Modification Approval for ROCK CAMP 1M
47-103-03158-00-00

Modified Casing Program

DAC ENERGY, LLC

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926- 0450.



James A. Martin
Chief

Operator's Well Number: ROCK CAMP 1M
Farm Name: MASON, KENNETH & JENNIFER
U.S. WELL NUMBER: 47-103-03158-00-00
Horizontal 6A / Horizontal 6A Well - 1
Date Issued: 1/10/2017

Promoting a healthy environment.

01/20/2017

November 21, 2016

This letter is to inform you that we have modified the casing program. We have adjusted the casing size but not depth.

DAC Energy LLC

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STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: DAC Energy, LLC. 4944962 Wetzel Center Wileyville, WV 7.5
Operator ID County District Quadrangle

2) Operator's Well Number: Rock Camp 1M Well Pad Name: Postlethwait/Rock Camp

3) Farm Name/Surface Owner: Kenneth & Jennifer Mason Public Road Access: County Rt. 7/8 (Greathouse Hill Rd.)

4) Elevation, current ground: 1430' Elevation, proposed post-construction: 1397.10

5) Well Type (a) Gas Oil _____ Underground Storage _____
Other _____

(b) If Gas Shallow Deep _____
Horizontal

6) Existing Pad: Yes or No No

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7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Formation: Marcellus Shale TVD: 7,438' TMD: 16,142' Thickness: 50' Associated Pressures: 4000 psi

8) Proposed Total Vertical Depth: 7,438'

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 16,142'

11) Proposed Horizontal Leg Length: 7,530.33'

12) Approximate Fresh Water Strata Depths: 120', 630'

13) Method to Determine Fresh Water Depths: Offsetting Water Well & Drillers Log

14) Approximate Saltwater Depths: 2,057'

15) Approximate Coal Seam Depths: 680', 1235'

16) Approximate Depth to Possible Void (coal mine, karst, other): N/A

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes _____ No

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

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18)

CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	26"	New	N/A	85	40'	40'	CTS
Fresh Water	18 5/8"	New	J-55	87.50	720'	720'	CTS
Coal	13 3/8"	New	J-55	54.50	1,697'	1,697'	CTS
Intermediate	9 5/8"	New	J-55	36	2,792	2,792'	CTS
Production	5 1/2"	New	P-110	20	16,117'	16,117'	(Lead: 367 sks/Tail: 1,475 sks)
Tubing							
Liners							

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TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	26"	30"	.312	1,360	50	Type I/II	1.18
Fresh Water	18 5/8"	24"/22"	.435	2,250	162	Class A	1.20
Coal	13 3/8"	17 1/2"	.380	2,730	574	Class A	1.29
Intermediate	9 5/8"	12 1/4"	.352	3,520	1323	Class A	1.55
Production	5 1/2"	8 3/4"	.361	12,640	11,701	Type 1	1.64/1.32
Tubing							
Liners							

PACKERS

Kind:				
Sizes:				
Depths Set:				

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill Pilot hole on air to KOP. Switch to Synthetic Oil Based mud system and drill the lateral section of the Marcellus Well. When completed, run P-110 5.5" Production Casing, Cement, Perforate, Stimulate, and Produce a horizontal Marcellus Shale Well.

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20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Hydraulically fracture/stimulate the Marcellus Shale by perforating, slickwater fracturing/stimulating, plugging, starting at the bottom hole section and working back towards the curve. The job should consist of 23-29 stages.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 24.3

22) Area to be disturbed for well pad only, less access road (acres): 5.3

23) Describe centralizer placement for each casing string:

Conductor: None Used
Freshwater: Every third joint and top 2 joints Coal: Every third joint and top 2 joints
Production: Every third joint in the horizontal section through the top of the curve; Every 5th joint from the top of the curve to surface.

24) Describe all cement additives associated with each cement type:

*see attached sheets

25) Proposed borehole conditioning procedures:

Freshwater: Circulate Air/Foam at T.D. of hole section for 1/2 hour to 1 hour or until hole is clean.
Coal: Circulate Air/Foam at T.D. of hole section for 1/2 hour to 1 hour or until hole is clean.
Intermediate: Circulate Air/Foam at T.D. of hole section for 1/2 hour to 1 hour or until hole is clean.
Production: Circulate Drilling Fluid through the drill string for 1 to 10 hours or until shaker screens screens are clear and drill string can be pulled freely.

*Note: Attach additional sheets as needed.

Drilling Fluid Additives

Synvert Li

Synvert LII

Synvert Wa

Synvert Lem/

Synvert Twa

Synvert Clay

Synvert Base Fluid

Barite

Nutshell

Calcium Chloride

Calcium Carbonate

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Lime

Lc-20

Gilsonite

Fracture/Stimulation Additives

BioClear 2000 (20% DBNPA)

BR-1 (Ammonium Persulfate)

BR-7 (Enzyme Breaker)

BR-11 (Lightly Encap. Ammonium Persulfate)

CI-3 (Corrosion Inhibitor)

FR-16 (Winterized FR- Anionic)

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FR-18 (Winterized High Brine FR-Anionic)

GA-7A (Crosslink Approved Gel Slurry 40-45 cP)

HC-15 (15% HCL Acid)

HC-7.5 (7.5% HCL Acid)

IA-2 (Inhibitor Aid-Potassium Iodide)

NE-2 (Microemulsion NE Surf. Anionic)

NE-3 (NE Surf. -Cationic)

SI-6 (Scale Inhibitor)

SU-3 (Complex Nano-Fluid Tech Non-Ionic)

SU-5 (Oil Recovery Enhance Surf Non-ionic)

XL-2 (Istant XL)

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Cement Additives

Surface:

- **Type 1 Cement**
- **CaCl₂**
- **Celloflake**

Coal:

- **Class A Cement**
- **W-60**
- **CaCl₂**
- **Salt**
- **Celloflake**

Intermediate:

- **Class A Cement**
- **W-60**
- **CaCl₂**
- **Salt**
- **CR-3**

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Production:

- **Type 1 Cement**
- **Bentonite**
- **CR-3**
- **Defoamer**
- **Fluid Loss Additive**

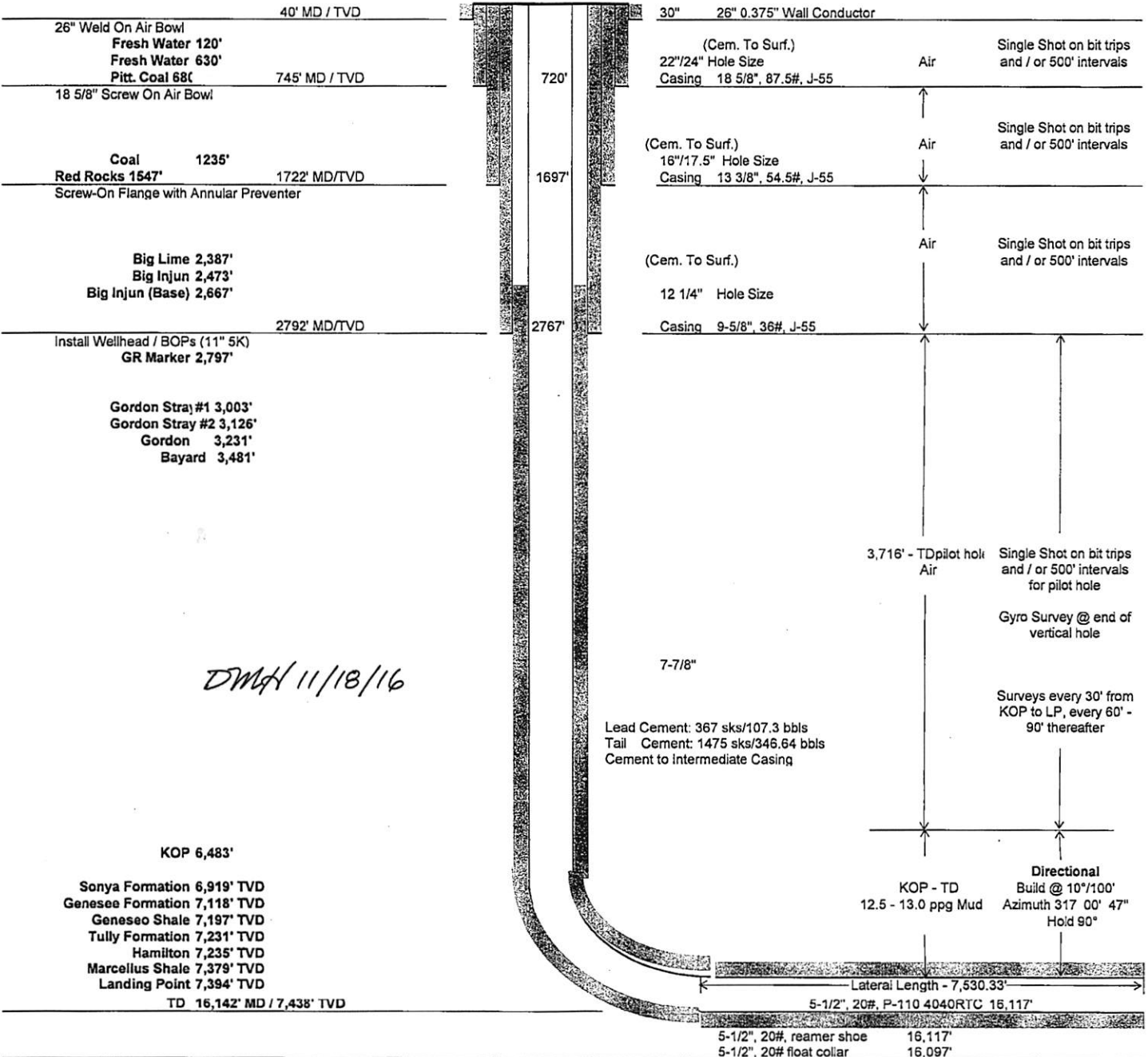
Rock Camp 1M Well Schematic

47-103-03158

Well: Rock Camp 1M
Well Type: Horizontal
County / District: Wetzel County, West Virginia, Center District
Geo Datum: NAD 83
Permit Landing Point Lat/Lon: Lat: 39.635572; Lon: -80.624923
Permitted Penetration Pt: Lat: 39.635575; Lon: -80.622685
Permitted TMD/TD Lat/Lon: Lat: 39.650516; Lon: -80.643402
TD: 16,142' MD / 7,438' TVD

AFE #
Field: Marcellus Shale
API Well Number: 47-103-00000
GL (ft): 1397.10'
KB to GL (ft): 10'-20'
Objectives: Drill, Eval, Run Prod Csg on Marcellus Shale

Evaluation Program	Geology (ft. TVD)	Drift Depths	Casing Depth (ft. TVD)	Hole Size	Casing and Cement	Mud	Directional & Surveys Orig./Csg Point
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01/20/2017