west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
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Jim Justice, Governor
Austin Caperton, 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 POSTLETHWAIT 1M
47-103-03157-00-00

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: POSTLETHWAIT 1M
Farm Name: MASON, KENNETH & JENNIFER
U.S. WELL NUMBER: 47-103-03157-00-00
Horizontal 6A / Horizontal 6A Well - 1
Date Issued: 1/18/2017

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

WW-6B
(04/15)

API NO. 47- 103 - 03157
OPERATOR WELL NO. Postlethwait 1M
Well Pad Name: Postlethwait/Rock Camp

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: Postlethwait 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 x Oil _____ Underground Storage _____
Other _____
(b)If Gas Shallow x Deep _____
Horizontal x

6) Existing Pad: Yes or No No DMH 11/18/16

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Formation: Marcellus Shale TVD: 7,438' TMD: 15,928' 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: 15,928'

11) Proposed Horizontal Leg Length: 7,477'

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 x

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

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API NO. 47- 103 - 03157
OPERATOR WELL NO. Postlethwait 1M
Well Pad Name: Postlethwait/Rock Camp

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	15,903'	15,903'	(Lead: 357 sks/Tail: 1,448 sks)
Tubing							
Liners							

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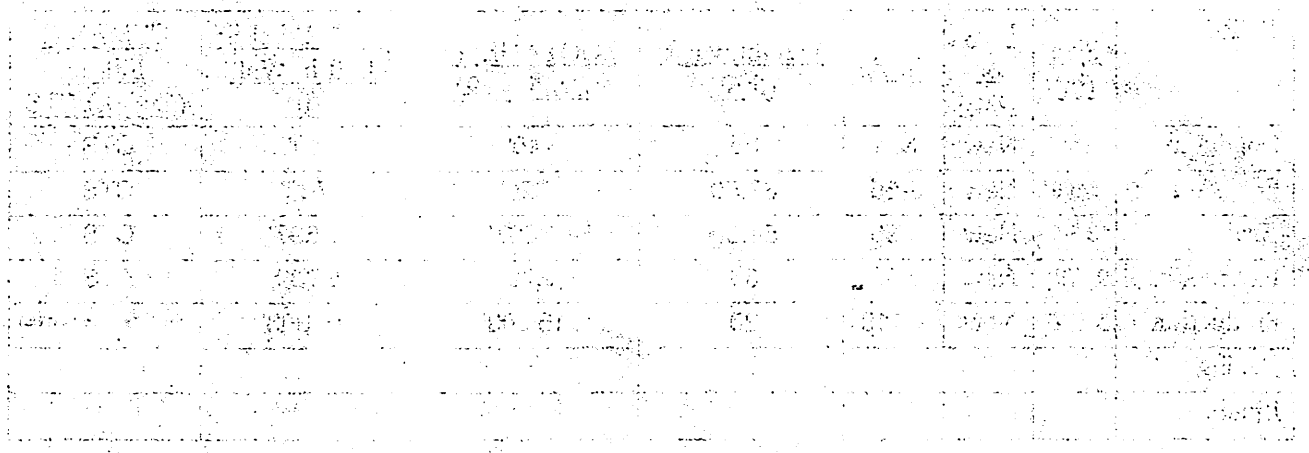
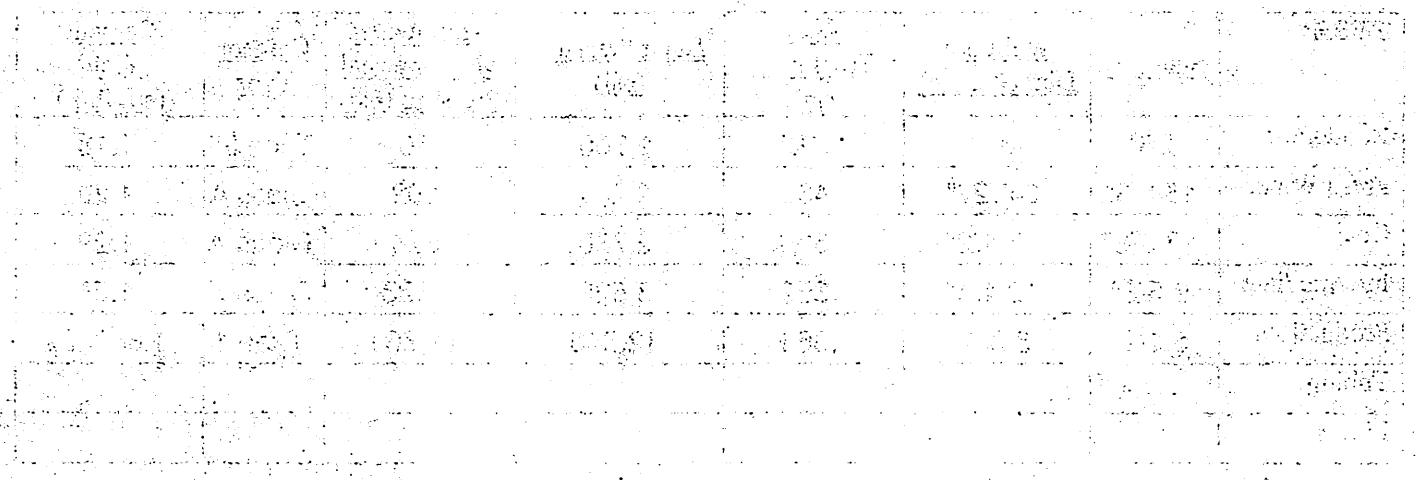
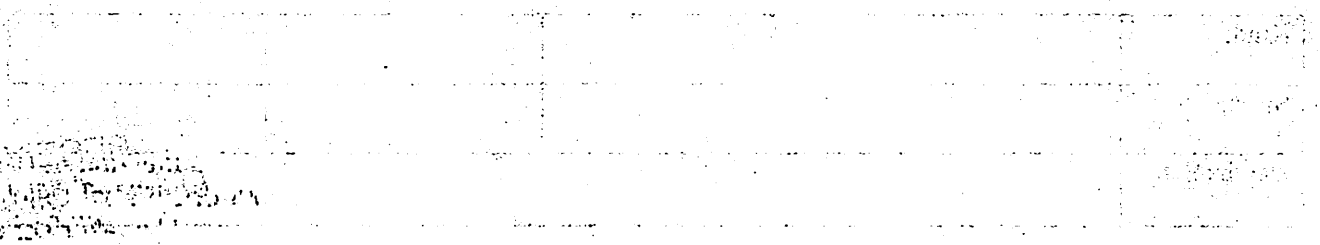
TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	26"	30"	.312	1,360	50	Type I/II	1.18
Fresh Water	18 5/8"	24"/22"	.435	2,250	162	Class A	1.20
Coal	13 3/8"	17 1/2"	.380	2,730	574	Class 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:				







API NO. 47- 103 - 03157
OPERATOR WELL NO. Postlethwait 1M
Well Pad Name: Postlethwait/Rock Camp

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 are clear and drill string can be pulled freely.

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*Note: Attach additional sheets as needed.

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Drilling Fluid Additives

Synvert LI

Synvert LII

Synvert Wa

Synvert Lem/

Synvert Twa DMH 11/18/16

Synvert Clay

Synvert Base Fluid

Barite

Nutshell

Calcium Chloride

Calcium Carbonate

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)

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FR-16 (Winterized FR- Anionic)

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**

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Coal:

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

Intermediate:

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

Production:

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

Postlethwait 1M
Well Schematic

47-103-03157

Well:	Postlethwait 1M	**AFE #**	
Well Type:	Horizontal	**Field:**	Marcellus Shale
County / District:	Wetzel County, West Virginia, Center District	**API Well Number:**	47-103-03157
Geo Datum:	NAD 83	**GL (ft):**	1397.10'
Permitt Landing Point Lat/Lo:	Lat: 39.637089; Lon: -80.62287	**KB to GL (ft):**	10'-20'
Permitted Penetration Pt:	Lat: 39.63556; Lon: -80.622737	**Objectives:**	Drill, Eval, Run Prod Csg on Marcellus Shale
Permitted TMD/TD Lat/Lon:	Lat: 39.651928; Lon: -80.641218		
TD:	15,928' MD / 7,438' TVD		

Evaluation Program	Geology (ft. TVD)	Drill Depths	Casing Depth (ft. TVD)	Hole Size	Casing and Cement	Mud	Directional & Surveys Drlg./Csg Point
		40' MD / TVD		30"	(Cem to Surf.) 26" 0.375" Wall Conductor		
	26" Weld On Air Bowl						
	Fresh Water 120'						
	Fresh Water 630'						
	Pitt. Coal 68(	745' MD / TVD	720'	22"/24"	(Cem. To Surf.) Casing 18 5/8", 87.50#, J-55	Air	Single Shot on bit trips and / or 500' intervals
	26" Weld On Air Bowl						
	Coal 1235'						Single Shot on bit trips and / or 500' intervals
	Red Rocks 1547'	1722' MD/TVD	1697'		(Cem. To Surf.) 16"/17.5' Hole Size Casing 13 3/8", 54.5#, J-55	Air	
	Screw-On Flange with Annular Preventer						
	Big Lime 2,387'					Air	Single Shot on bit trips and / or 500' intervals
	Big Injun 2,473'				(Cem. To Surf.)		
	Big Injun (Base) 2,667'				12 1/4" Hole Size		
		2792' MD/TVD	2767'		Casing 95/8", 36#, J-55		
	Install Wellhead / BOPs (11" 5K)						
	GR Marker 2,797'						
	Gordon Stra #1 3,003'						
	Gordon Stray #2 3,126'						
	Gordon 3,231'						
	Bayard 3,481'						
						3,716' - TDpilot hol Air	Single Shot on bit trips and / or 500' intervals for pilot hole
							Gyro Survey @ end of vertical hole
				7-7/8"			
					Lead Cement: 367 sks/107.3 bbls Tail Cement: 1448 sks/340.4 bbls Cement to Intermediate Casing		Surveys every 30' from KOP to LP, every 60' - 90' thereafter
	KOP 6,483'						
	Sonya Formation 6,919' TVD					KOP - TD 12.5 - 13.0 ppg Mud	Directional Build @ 10°/100' Azimuth 317 00' 47" Hold 90°
	Genesee Formation 7,118' TVD						
	Geneseo Shale 7,197' TVD						
	Tully Formation 7,231' TVD						
	Hamilton 7,235' TVD						
	Marcellus Shale 7,379' TVD						
	Landing Point 7,394' TVD						
	TD 15,928' MD / 7,438' TVD				Lateral Length - 7,477' 5-1/2", 20#, P-110 4040FTC 15,928'		
					5-1/2", 20#, reamer shoe 15,903' 5-1/2", 20# float collar 15,853'		

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