



west virginia department of environmental protection

Office of Oil and Gas
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Charleston, WV 25304
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Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Wednesday, October 24, 2018
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

HG ENERGY II APPALACHIA, LLC
5260 DUPONT ROAD

PARKERSBURG, WV 26101

Re: Permit Modification Approval for MND 20 CU
47-051-02013-00-00


Modified Casing.

HG ENERGY II APPALACHIA, 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: MND 20 CU
Farm Name: CONSOLIDATION COAL COMPANY / MURRAY 
U.S. WELL NUMBER: 47-051-02013-00-00
Horizontal 6A New Drill
Date Modification Issued: October 24,2018

Promoting a healthy environment.

WW-6B
(04/15)

API NO. 47- 051 - 02013 **MOD**
 OPERATOR WELL NO. MND20 CU
 Well Pad Name: MND20

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	30"	New	LS	157.5#	60'	60'	NA
Fresh Water	20"	New	J-55	94#	950'	950'	CTS
Coal	13 3/8"	New	J-55	68#	2700'	2700'	CTS
Intermediate	9 5/8"	New	P-110	47#	9143'	9143'	CTS
Production	6 5/8"	New	Q-125	28.6#	9000'	9000'	20% excess, yield = 1.7669, CTS
Production	5 1/2"	New	P-110	23#	27370'	27370'	20% excess, yield = 1.7669, CTS

JW 9/18/18

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	30"	30"	0.5"			Class A	CTS
Fresh Water	20"	26"	0.438"	2110 psi		Class A	40% Excess Yield = 1.1924, CTS
Coal	13 3/8"	17.5"	0.480"	3450 psi		Class A	30% Excess Yield = 1.18, CTS
Intermediate	9 5/8"	12.25"	0.472"	9440 psi		Stage 1, Class H, Stage 2	30% Excess Yield = 1.1744, CTS
Production	6 5/8"	8.5"	0.432"	15410 psi	11,500	Class H	20% Excess Yield = 1.7669, CTS
Production	5 1/2"	8.5"	0.415"	14520 psi	11.500	Class H	20% Excess Yield = 1.7669, CTS

PACKERS

Kind:				
Sizes:				
Depths Set:				

M^{OD}
4705102013



MND20CUHS
Utica Shale Horizontal
Marshall County, WV

Ground Elevation		1058'		MND20CUHS SHL				494946.59N 1634115.63E				
Azm		144.906°		MND20CUHS LP				494735.62N 1634115.51E				
WELLBORE DIAGRAM		HOLE		GEOLOGY		TOP	BASE	MUD	CEMENT	CENTRALIZERS	CONDITIONING	COMMENTS
	30"	30" 157.5# LS	Conductor	0	50			AIR	N/A, Casing to be drilled in w/ Dual Rotary Rig	N/A	Ensure the hole is clean at TD.	Conductor casing = 0.5" wall thickness
	26"	20" 94# J-55	Fresh Water		445,708,605			AIR	15.6 ppg Class A 40% Excess Yield = 1.1924 / CTS	Centralized every 3 joints to surface	Once casing is at setting depth, circulate a minimum of one hole volume with Fresh Water prior to pumping cement.	Surface casing = 0.438" wall thickness Burst = 2110 psi
			Pittsburgh Coal	526	536							
			Surface Casing	0	950							
	17.5"	13-3/8" 68# J-55 BTC	Big Lime	1625	1741			AIR	Lead: 15.0 ppg / Class A / 30% Excess / Yield = 1.2883 Tail: 15.6 ppg / Class A / 30% Excess / Yield = 1.18 CTS	Bow Spring on first 2 joints then every third joint to 100' form surface	Once casing is at setting depth, Circulate and condition at TD. Circulate a minimum of one hole volume prior to pumping cement.	Intermediate casing = 0.480" wall thickness Burst = 3450 psi
			Big Injun	1741	1854							
			1st Intermediate Casing	0	2700							
	12.25"	9-5/8" 47# P-110 BTC	5th Sand	2599	3156			AIR / KCL Salt Polymer / 9.0ppg SOB M	Stage 1: 15.2 ppg / 35.85 Class H / 30% Excess / Yield = 1.1313 Stage 2: 14.5 ppg / 50.50 Class A / 30% Excess / Yield = 1.1744 CTS	Bow Spring on first 8 joints then every third joint to 100' form surface	Once casing is at setting depth, Circulate and condition mud at TD. Circulate a minimum of one hole volume prior to pumping cement.	Intermediate casing = 0.472" wall thickness Burst = 9440 psi
			Speechley	3156	3770							
			Warren	3770	4707							
			Java	4707	4802							
			Pipe Creek	4802	4889							
			Angola	4889	5471							
			Rhinestreet	5471	5792							
			Cashaqua	5792	5884							
Middlesex			5864	5887								
West River			5887	5948								
Burkett			5948	5973								
Tully LS			5973	5997								
Hamilton			5997	6032								
Marcellus			6032	6097								
Onondaga			6087	6095								
Huntersville			6095	6309								
Oriskany			6309	6421								
Helderburg			6421	6681								
Bass Island			6681	6780								
Salina G			6780	6960								
Salina F	6960	7759										
Lockport	7759	8081										
Rochester	8081	8385										
Packer Shell	8385	8492										
Clinton	8492	8575										
Medina	8575	8874										
Queenston	8874	9431										
2nd Intermediate	0	3000 TVD 9143 MD										
8.5" Curve and 8.5" Lateral	6-5/8" 28.6# Q 125HP EAGLE SFH to 8,850" (CHANGEOVER) 5-1/2" 23# P 110HC CDC HTQ to TMD	Reedsville	9431	10049			10.5ppg-14.5ppg SOB M	Lead: 15.0 ppg / 35.85 Class H / 20% Excess / Yield = 1.1475 Tail: 15.6 ppg / Class H Acid Soluble / 20% Excess / Yield = 1.7668 TOC @ 6,000'	Run 1 spiral centralizer every 8 joints from the top of the curve to surface. Run 1 spiral centralizer every 3 joints from the 1st 5.5' long joint to the top of the curve.	Once on bottom/TD with casing, circulate at max allowable pump rate for at least 2x bottoms up, or until returns and pump pressures indicate the hole is clean. Circulate a minimum of one hole volume prior to pumping cement.	(6-5/8") Production casing = 0.432" wall thickness Burst = 15410 psi (5-1/2") Production casing = 0.415" wall thickness Burst = 14520 psi Note: Actual centralizer schedules may be changed due to hole conditions	
		Utica	10049	10662								
		Point Pleasant	10662	10782								
		Target	10700	10700								

LP @ 10700' TVD / 11158' MD 8.5" Hole - Cemented Long String +/-16212' ft Lateral TD @ +/-10700' TVD +/-27370' MD

JW 9/18/18