



## DRILLING PROGRAM

BHR Fed J22-15-397-4RH  
NW/4, SE/4 S22 T3N R97W  
Rio Blanco Co., Colorado

Surface: Lat. 40.212032° Long: -108.259757°  
BHL: Lat. 40.234551° Long: -108.263274°  
Graded GL: 5,938'  
KB: 25'  
Date: Nov 27-2017

### 1 ESTIMATED FORMATION TOPS

FORMATION	TVD(KB)	MD(KB)
Wasatch	25'	
Mesaverde	1,659'	
Loss Zone 1 (in H1 Sidetrack)	2,520'	
Rollins	4,623'	4,660'
Loss Zone 2 (in Wiley Vertical Plot)	5,120'	5,183'
Sego-Lower	5,961'	6,065'
Castlegate	6,386'	6,516'
Mancos - Marker 6 - Condensed Section	7,664'	7,861'
Niobrara - Buck Peak *	8,997'	9,253'
Niobrara - Tow Creek *	9,440'	9,698'
Niobrara - Wolf Mountain *	9,808'	
Niobrara - Hot Wolf Mtn - Rangely Bench *	10,135'	
Top Target *	10,166'	
Target	10,191'	
Base Target	10,216'	

### 2 ESTIMATED DEPTHS AT WHICH WATER, OIL, GAS, OR OTHER MINERAL BEARING FORMATIONS ARE EXPECTED TO BE ENCOUNTERED

A.	Formations marked with an asterisk (*) in "1.0" above indicate anticipated oil or gas bearing formations.
B.	Several water zones were identified within the Mesaverde and Upper Mancos stratigraphic units between 3,300' (base of surface casing) and 6,416' MD using open hole logs/mud logs from BHR Fed J22-15-397-2RH well that was drilled on same pad as proposed BHR Fed J22-15-397-4RH well. These porous rock units have been noted, and casing design for proposed J22-15-397-4RH well has taken these into account so that surface and intermediate casing will cover all identified zones. A thixotropic mixture of cement has been proposed on intermediate lead to cover loss zone around 5,120'.
3	<b>CASING AND CEMENTING WILL BE DONE TO PROTECT POTENTIALLY PRODUCTIVE HYDROCARBONS, FRESH WATER ZONES, ABNORMAL PRESSURE ZONES, AND PROSPECTIVELY VALUABLE MINERAL DEPOSITS.</b>
A.	Casing Head: 11" 5M x 11", With Flange at Ground Level Tubing Head: 11" 5M x 7-1/6" 10M Operators minimum specifications for pressure control equipment are shown on the attached BOP schematic. After running surface and intermediate casing, and prior to drilling out, all BOPE (blind rams, pipe rams, manifold, etc.) and related equipment will be pressure tested to 100% of the BOP's rated working pressure. The Annular Preventer will be tested to 70% of its rated working pressure. Thereafter, the BOPE will be checked daily for mechanical operations. Such check will be noted in the IADC drilling reports. BOPE will be tested to a low pressure of 250 psi prior to testing to the high pressures indicated above.

### 4.0a PROPOSED CASING PROGRAM

Section	Top (MD)	Bottom (MD)	Hole	Csg OD	Wt (lb/ft)	Grade	Thread	Length
Conductor:	Surface	80'	20"	16"	75	XHY	PE	80'
Surface:	Surface	3,300'	13 1/4"	9 5/8"	36	J55	LTC	3,300'
Intermediate:	Surface	9,346'	8 1/4"	7"	29	HCE P110	BTC	9,346'
Production Liner:	9100'	19,658'	6"	4 1/4"	13.5	P110	BTC	10,558'

NOTE: All casing installed shall be NEW CONDITION

### 4.0b CASING PROPERTIES DESIGN FACTORS

Section	Interval (MD)	Casing	ID	COLLAPSE (psi)	BURST (psi)	TENSION (k-lbs)*
Conductor:	Surface - 80'	16", 75#, XHY, PE	15.1240"	n/a	n/a	n/a
Surface:	Surface - 3,300'	9 5/8", 36#, J55, LTC	8.765"	2,020	3,510	453
Intermediate:	Surface - 9,346'	7", 29.0#, HCE P110, BTC	6.059"	9,760	12,750	955
Production Liner:	9,100' - 19,658'	4 1/4", 13.5#, P110, BTC	3.795"	10,690	12,310	422

\* Less of Body or Jt Strength



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### CASING RATING / DESIGN SAFETY FACTORS

Section	Interval (MD)	Casing	COLLAPSE (psi)			BURST (psi)			TENSION (k-lbs)		
Conductor:	Surface - 80'	16", 75#, XHY, PE	n/a	/	n/a	n/a	/	n/a	n/a	/	n/a
Surface:	Surface - 3,300'	9 5/8", 36#, J55, LTC	1.0	/	1.3	1.2	/	1.9	1.6	/	1.5
Intermediate:	Surface - 9,346'	7", 29.0#, HCE P110, BTC	1.0	/	1.7	1.2	/	1.28	1.6	/	2.9
Production Liner:	9,100' - 19,658'	4 1/2", 13.5#, P110, BTC	1.0	/	1.5	1.2	/	1.23	1.6	/	2.1

## 5 CEMENTING PROGRAM

### 5.1 Surface Casing Cementing Program

Surface Casing Set At:		3,300' MD(KB)			Excess (%)	Total Vol + % Excess		Yield (ft³/sx)	Sacks
Density (lb/gal)	Fill Up (ft)	Volume (ft³)		( bbl)		(ft³)			
Lead:	12	0'-2,800'	2,800'	1,266.4 ft³	50%	338 bbl	1,899.5 ft³	2.53 ft³/sx	750
Tail:	12.5	2,800'-3,300'	500'	226.1 ft³	0%	40 bbl	226.1 ft³	2.22 ft³/sx	102
Shoe:	12.5	43'	18.7 ft³		0%	3.3 bbl	18.7 ft³	2.22 ft³/sx	9
Recipes									
Lead:	Type III + Additives								
Tail:	Type III + Additives								
Shoe Track:	Same Slurry As Tail.								

### 5.2 Intermediate Casing Cementing Program

Intermediate Casing Set At:		9,346' MD(KB)						
Density		Fill Up	Volume	Excess	Total Vol + % Excess		Yield	
(lb/gal)		(ft)	(ft³)	(%)	(bbl)	(ft³)	(ft³/sx)	Sacks
Lead:	12.5	3100'- 3300'	200'	20%	7.3 bbl	41 ft³	2.07ft³/sx	20
Lead:	12.5	3300'-7464'	4,164'	20%	134 bbl	751 ft³	2.07ft³/sx	363
Tail:	13.5	7464'-9346'	1882'	20%	60.5 bbl	340 ft³	1.9 ft³/sx	180
Shoe:	13.5	43'	9 ft³	0%	1.7 bbl	9 ft³	1.9 ft³/sx	5
Recipes								
Lead:	Type III + Additives							
Tail:	50/50 Class G / POZ + Additives							
Shoe Track:	Same Slurry As Tail.							

### 5.3 Production Casing Cementing Program

Production Casing Set:		19,658' MD(KB)							
Density	Fill Up	Volume	Excess	Total Vol + % Excess		Yield			
(lb/gal)	(ft)	(ft³)	(%)	(bbl)	(ft³)	(ft³/sx)		Sacks	
Lead:	13.5	8,900'-9,346'	446'	43.8 ft³	0%	7.8 bbl	43.8 ft³	1.85 ft³/sx	24
Tail:	13.5	9,346'-19,658'	10,312'	886 ft³	15%	181 bbl	1,018 ft³	1.85 ft³/sx	550
Shoe:	13.5	43'	3.6 ft³	0%	0.7 bbl	3.6 ft³	1.85 ft³/sx	2	
Recipes									
Lead:	50/50 Class G / POZ + Additives								
Tail:	50/50 Class G / POZ + Additives								
Shoe Track:	Same Slurry As Tail								

## 6 DRILLING MUD PROGRAM

Hole Section	From	To	Mud Type (lb/gal)	MW (sec/qt)	Vis (cP)	PV (lb/100 ft³)	YP (lb/100 ft³)	LGS (%)	pH	API WL	HPHT (ml)	O/W (o.w)	ES	WPS (mg/l)
Surface	80'	3,300'	LSND 8.5-9.0	30-45	8-20	6-12	<6%	8.5-9.5	-	12-20	-	-	-	-
Intermediate	3,300'	9,346'	LSND 8.5-9.5	30-45	8-20	6-12	<6%	8.5-9.5	-	6-8	-	-	-	-
Production	9,346'	19,658'	OBM 12.0-12.5	40-60	12-20	6-14	<5%	-	-	-	10.0-20.0	80/20-75/25	500-900	250-350



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### 7 BOTTOM HOLE PRESSURE AND TEMPERATURE

BHP	BHT	BHT
(psi)	Circ	Static
6,825	235°F	255°F

### 8 AUXILIARY EQUIPMENT

See attached schematic for BOP components  
Centrifuge to be used in Intermediate and Production Holes

### 9 BLM AND COLORADO OIL & GAS COMMISSION NOTICES

- 24 Hours prior to spud/48 Hrs COGCC
- 24 hours prior to running and cementing casing
- 24 hours prior to testing BOPs/FIT
- 24 hours prior to P&A of well/48 hrs COGCC

### 10 DEVIATION & MWD SURVEYS AND OPEN HOLE LOGGING PROGRAM

#### 10.1 Deviation Surveys & MWD

Surface Hole: 3" maximum deviation, 1"/100' Dog Leg Severity. Survey every 500'  
Surface - TD: Please see attached directional plan

#### 10.2 Open Hole Logging Program

The pilot well BHR Fed J22-15-397-2RH was drilled on the J22 Pad and logged with an open-hole resistivity log with gamma-ray from TD into the intermediate casing. This subsequent well BHR Fed J22-15-397-4RH on the pad will have a cement bond log with gamma-ray run on the intermediate casing. BHR Fed J22-15-397-4RH well will have the horizontal portion of the wellbore logged with measured-while-drilling log with gamma-ray.



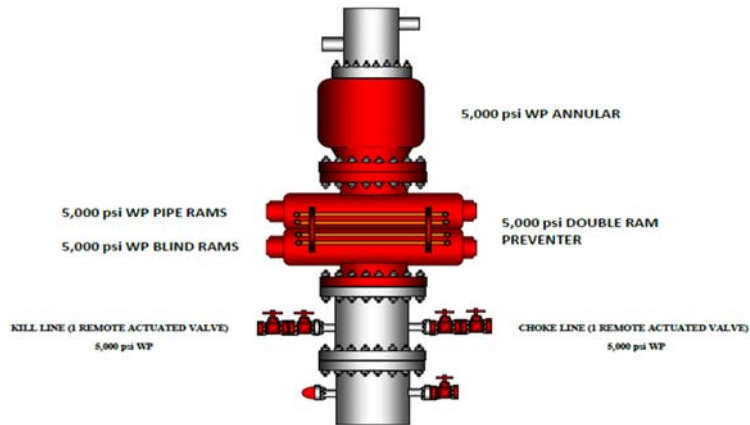
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### BOP AND PRESSURE CONTAINMENT DATA

1. BOP EQUIPMENT SHALL CONSIST OF A DOUBLE GATE, HYDRAULICALLY OPERATED ANNULAR PREVENTER WITH PIPE & BLIND RAMS OR TOW SINGLE RAM TYPE PREVENTERS. ONE EQUIPPED WITH PIPE RAMS, THE OTHER EQUIPPED WITH BLIND RAMS.
2. BOP'S ARE TO BE WELL BRACED WITH HAND CONTROLS EXTENDED CLEAR OF THE SUBSTRUCTURE.
3. ACCUMULATOR TO PROVIDE CLOSING PRESSURE IN EXCESS OF THAT REQUIRED WITH SUFFICIENT VOLUME TO OPERATE ALL COMPONENTS.
4. AUXILIARY EQUIPMENT: LOWER KELLY COCK, FULL OPENING STARBBING VALVE, 2½" CHOKE MANIFOLD.
5. ALL BOP EQUIPMENT, AUXILIARY EQUIPMENT, STAND PIPE, VALVES, AND ROTARY HOSE TO BE TESTED TO THE RATED WORKING PRESSURE OF THE BOP'S AT THE TIME OF INSTALLATION AND EVERY 30 DAYS THEREAFTER. BOT'S TO BE MECHANICALLY CHECKED DAILY.
6. MODIFICATION OF HOOK-UP OR TESTING PROCEDURE MUST BE APPROVED IN WRITING ON TOWER REPORTS BY WELLSITE SUPERVISOR.





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## ATTACHMENT B

### PRESSURE CONTAINMENT MAINFOLD EQUIPMENT

