

Entek GRB LLC  
**FRU Federal 1-1**  
653' FNL 659' FEL Lot 5  
Sec. 1 T11N R88W  
Routt County, Colorado  
Surface: Federal  
Federal Mineral Lease: COC59201  
Focus Ranch Unit: COC63212X

**DRILLING PROGRAM**

**(All Drilling Procedures will be followed as Per Onshore Orders No. 1 and No. 2)**

**Entek GRB LLC respectfully requests that all information regarding this well be kept confidential.**

This Application for Permit to Drill (APD) is filed under the Notice of Staking (NOS) process as stated in Onshore Order No. 1 (OSO #1) and supporting Bureau of Land Management (BLM) documents. This NOS process included an onsite meeting on May 31, 2012, prior to the submittal of this application, at which time the specific concerns of Entek GRB LLC (Entek) and the BLM were discussed. All specific concerns of the BLM representatives are addressed herein, as are specific stipulations from the BLM.

Please contact Ms. Kristen Stocks, with Entek at (307) 200-1930, if there are any questions or concerns regarding this Drilling Program.

SURFACE ELEVATION – 7,583' (Un-graded ground elevation)

SURFACE FORMATION – Trout Creek – Freshwater possible

ESTIMATED FORMATION TOPS

	True Vertical Depth	Geology
Trout Creek	1,760'	Sandstone
Iles Coal	2,942'	Sandstone, shale & minor coal
DFS	3,042'	Sandstone
Hatfield	3,177'	Sandstone
Cherokee Creek	3,488'	Sandstone
Deep Creek	3,900'	Sandstone
Marapos	4,505'	Sandstone
Mancos Lower	6,184'	Sandstone
Niobrara	6,800'	Shale, sandstone & limestone
Carlile	7,684'	Shale
Frontier	7,944'	Sandstone
Bent	8,088'	Shale & Sandstone
<b>TOTAL DEPTH</b>	<b>8,200'</b>	

ESTIMATED DEPTHS OF ANTICIPATED WATER, OIL, GAS, OR MINERAL BEARING FORMATIONS

Estimated depths at which water, oil, gas or other mineral-bearing formations are expected to be encountered:

	True Vertical Depth	Lithology
Trout Creek	1,760'	Some water, oil, & gas bearing
Iles Coal	2,942'	Some water, oil, & gas bearing
DFS	3,042'	Some water, oil, & gas bearing
Hatfield	3,177'	Some water, oil, & gas bearing
Cherokee Creek	3,488'	Some water, oil, & gas bearing
Deep Creek	3,900'	Some water, oil, & gas bearing
Marapos	4,505'	Some water, oil, & gas bearing
Mancos Lower	6,184'	Some water, oil, & gas bearing
Niobrara	6,800'	Some oil & gas bearing
Carlile	7,684'	Some oil & gas bearing
Frontier	7,944'	Some water, oil & gas bearing
Bent	8,088'	Some water, oil & gas bearing
<b>TOTAL DEPTH</b>	<b>8,200'</b>	

CASING PROGRAM

Total Depth (TD)	Hole Diameter	Casing Diameter	Casing Weight and Grade	Cement
0' – 60'	20"	16"	Conductor Casing	Redi Mix to surface
0' – 2,000'	12-1/4"	9-5/8"	36# J-55 ST&C New	To surface (Lead: ±237 sxs Varicem; Tail: ± 150 sxs Varicem)*
0' – 8,200'	8-3/4"	7"	23# P-110 LT&C New	Stage 1: 6,600' – 1,800': (Lead±395 sxs Halliburton Light Standard*; Tail: 75 sxs Econocem**)  A DV tool will be run at ±6,600'  Stage 2: 6,600' – 8,200' (±252 sxs Econocem;)

\* Cement volume calculated with 50% excess.

\*\* Lead cement volume calculated with 25% excess. Tail cement volume calculated with 15% excess.

*All fresh water and prospective valuable minerals encountered during drilling will be recorded by depth and protected.*

Yields:	Surface:	Lead:	Varicem (TM) Cement=	2.97 ft <sup>3</sup> /sx (11.5ppg) 17.82gps
		Tail:	Varicem (TM) Cement=	1.82 ft <sup>3</sup> /sx(13.5 ppg) 9.17 gps
	Production:	Stage 1:	Econocem (TM) System=	1.28 ft <sup>3</sup> /sx (14.2 ppg) 5.45 gps
		Stage 2:	Lead: Halliburton Light Standard=	2.03 ft <sup>3</sup> /sx (12.5 ppg) 10.98 gps
			Tail: Econocem (TM) System=	1.26 ft <sup>3</sup> /sx (14.2 ppg) 5.56 gps

Surface casing top 100' will use 1" tubing, with Class "G" cement with 2% CaCl<sub>2</sub> if necessary.

Cement additives – (Note: Some additives are Halliburton proprietary products. If another cement contractor is used, these blends and products may vary slightly).

Cement additives:

	Surface:	Lead:	<b>Varicem (TM) Cement</b> 3 lb/sx Pheno Seal Medium
		Tail:	<b>Varicem (TM) Cement</b> 3 lb/sx Pheno Seal Medium
	Production:	Stage 1:	<b>Econocem (TM) System</b> 0.25% HR-5 0.15% Econolite 3 lb/sx Silicate
		Stage 2:	Lead: <b>Halliburton Lite Standard</b> 0.2% Halad(R )-567 6lb/sx Silicalite 0.5% D-AIR 5000 0.35% HR-7
			Tail: <b>Econocem (TM) System</b> 0.15% HR-5 0.15% Econolite 3 lb/sx Silicate

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PRESSURE CONTROL

- See attached blowout preventer diagram.

BOPs and choke manifold will be installed and pressure tested before drilling out of surface casing (subsequent pressure test will be performed whenever pressure seals are broken), and then will be checked daily as to mechanical operating condition. BOPs will be pressure tested at least once every 30 days. Ram type preventers and related pressure control equipment will be pressure tested to related working pressure of the stack assembly if a test plug is used. If a plug is not used, the stack assembly will be tested to the rated working pressure of the stack assembly or 70% of the minimum internal yield of the casing, whichever is less. Annular type preventers will be pressure tested to 50% of their working pressure. All casing strings will be pressure tested to 0.22 psi/ft or 1,500 psi, whichever is greater, not to exceed 70% of the internal yield. If a 5M system or greater is used, the casing shoe will be tested by drilling 5-20' out from under the shoe and pressure tested to a maximum expected mud weight equivalent as shown in the mud program listed below.

A manual locking device (i.e. hand wheels) or automatic locking devices shall be installed on the BOP stack. Remote controls capable of both opening and closing all preventers shall be readily accessible to the driller.

The choke manifold and accumulator will meet or exceed Onshore Order No. 2 (OSO #2) standards. The BOP equipment will be tested after any repairs to the equipment. Pipe rams, blind rams and annular preventer will be activated on each trip and weekly BOP drills will be conducted with each crew. All tests, maintenance, and BOP drills will be documented on rig "tower sheets".

Statement of Accumulator System and Location of Hydraulic Controls

*The drilling rig has not been selected for this well. Selection will take place after approval of this application is granted. Manual and/or hydraulic controls will be in compliance with OSO #2 for 2,000 psi system.*

*A remote accumulator will be used. Pressures, capacities, location of remote hydraulic and manual controls will be identified at the time of the BLM supervised BOP test.*

MUD PROGRAM

0'	-	60'	Water
60'	-	2,500'	Natural Gel
			M.W.: 9 ppg
			Visc.: 40 – 50
			PV: 10 – 20
			YP: 10 – 15
			pH: 8.5 – 9.0
			WL: 9 - 10
2,500'	-	TD'	Mineral Oil Based Invert
			M.W.: <8.0 ppg
			Visc.: 35 - 50
			PV: 10 – 20 cp@120°F
			YP: 6 – 8@120°F

*Sufficient mud materials to maintain mud properties, control lost circulation and to contain a “kick” will be available on location.*

Entek will utilize a closed loop drilling system and the cuttings will be disposed at an approved off-site disposal facility.

#### AUXILIARY EQUIPMENT

- A. Upper Kelly cock; lower Kelly cock will be installed while drilling and tested at the time of the BOP test.
- B. Inside BOP or stabbing valve with handle (available on rig floor).
- C. Safety valve(s) and subs to fit all string connections in use.
- D. Mud monitoring will be with a flow sensor, pit level indicator, and visually observation.

#### LOGGING, CORING TESTING PROGRAM

- A. Logging: Platform Express, Array Induction Lithio density/ Compensated Nuetron.
- B. Coring: None planned – Whole core or rotary sidewall cores as warranted.
- C. Testing: None planned – Drill Stem tests may be run on shows of interest.

#### ABNORMAL CONDITIONS

- A. Pressures: No abnormal conditions are anticipated.  
Anticipated BHP gradient: 0.45 psi/ft
- B. Temperatures: No abnormal conditions are anticipated.
- C. H<sub>2</sub>S: None Anticipated.
- D. Estimated bottom hole pressure: 3,690 psi

#### ANTICIPATED START DATE

October 31, 2012

#### COMPLETION

The location pad will be sufficient size to accommodate all completion equipment activities and equipment. A string of 2-7/8” 6.5#, N-80 8rd EUE will be run as production tubing. A Sundry Notice (SN) will be submitted with a revised completion program if warranted.

All flaring procedures will be determined by the appropriate agencies and will be complied with.

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## Surface, Intermediate, and Production Casing Design

Proposed Total Depth	TVD	MD			
Proposed Depth of Surface Casing	8,200	8,200	FT		
Proposed Depth of Intermediate Csg	2,000	2,000	FT	Proposed Casing Size	9-5/8"
Proposed Depth of Production Casing	8,200	8,200	FT	Proposed Casing Size	7"
Formation Gradient	0	0	FT	Proposed Casing Size	4.5"
BHP at Producing Depth	0.450	Psi/ft			
Hydrostatic Head of Gas/Oil/Mud:	3,690	Producing TVD x Gradient			
Max Planned Mud Weight - Surface	1,804	Producing TVD x 0.22 psi/ft			
Max Planned Mud Weight - Intermediate	9.00	#/gal			
Max Planned Mud Weight - Production	9.00	#/gal			

\*\* All Designs done assuming worst case scenario - void pipe

### SURFACE CASING

MAXIMUM DESIGN PRESSURE

<b>Bottom Hole Pressure</b>		<b>Hydrostatic Head</b>	
Gradient	Max Csg Depth w/200' SF		depth
0.450	2,200	0.220	0
PSI/FT x	psi	PSI/FT x	psi
990		0	990
			psi

CASING TYPE AND DIMENSIONS	Weight / Type	Collapse (psi)	Burst (psi)	Tension (lbs)	
9 5/8" 36# J55	36.00	2020	3520	394,000	***Recommendation Based on washing down Surface Csg if needed
9 5/8" 36# H40	36.00	1740	2560	294,000	

DESIGN FACTORS

SAFETY FACTORS

<b>Tension (dry)</b>					
9 5/8" 36# J55	9 5/8" 36# H40	79,200	72,000	lbs	#/ft x TVD
9 5/8" 36# J55	Safety Factor	design/actual	<b>4.97</b>		<b>Tension OK</b> 1.800
9 5/8" 36# H40	Safety Factor	design/actual	<b>4.08</b>		<b>Tension OK</b> 1.800

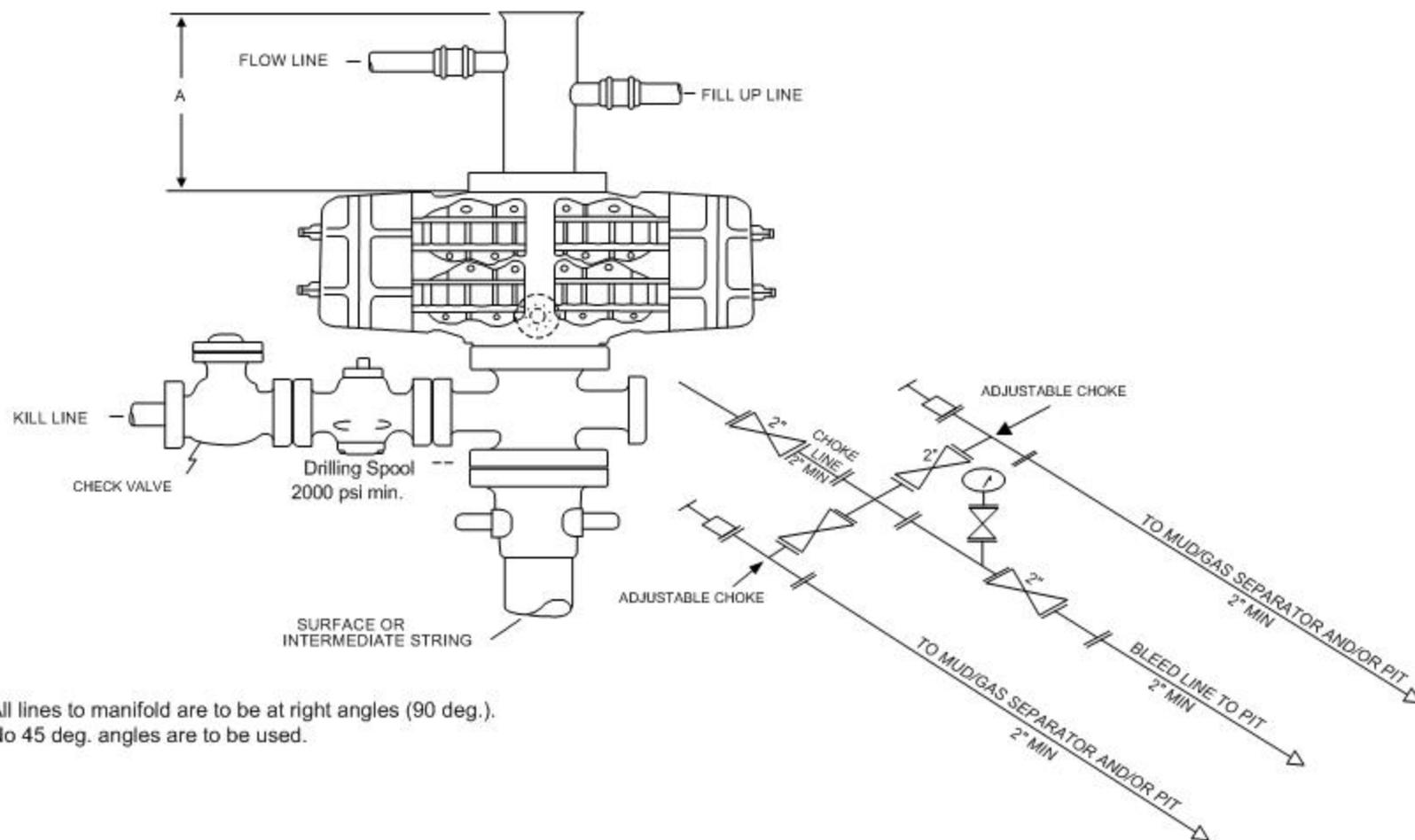
  

<b>Burst</b>					
9 5/8" 36# J55	9 5/8" 36# H40	design/actual	<b>3.56</b>		<b>Burst OK</b> 1.000
9 5/8" 36# H40	Safety Factor	design/actual	<b>2.59</b>		<b>Burst OK</b> 1.000

<b>Collapse</b>					
9 5/8" 36# J55	9 5/8" 36# H40	Hydrostatic =	0.052 x MW x depth =	936	
9 5/8" 36# J55	Safety Factor =	design/actual	<b>2.16</b>		<b>Collapse OK</b> 1.125
9 5/8" 36# H40	Safety Factor =	design/actual	<b>1.86</b>		<b>Collapse OK</b> 1.125

## ANNULAR PREVENTER MAY BE SUBSTITUTED FOR DOUBLE GATE PREVENTERS



All lines to manifold are to be at right angles (90 deg.).  
No 45 deg. angles are to be used.

2M CHOKE MANIFOLD EQUIPMENT – CONFIGURATION MAY VARY

## BLOWOUT PREVENTER

2,000 psi minimum