

Entek GRB LLC  
**SD Federal 24-9DL**  
Surface: 2,257' FSL 431' FEL (NE/4 SE/4)  
BHL: ±1,027' FSL ±725' FEL (SE/4 SE/4)  
Sec. 24 T12N R89W  
Moffat County, Colorado  
Surface: Fee  
Federal Mineral Lease: COC69112

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

This Application for Permit to Drill (APD) was initially filed under the Notice of Staking (NOS) process as stated per Onshore Order No. 1 (OSO #1) and supporting Bureau of Land Management (BLM) documents. The process was changed to the "APD" process per OSO #1. This document was prepared using language and requirements consistent with those previously approved by BLM for nearby wells. This APD process will include an onsite meeting on August 4, 2010, as determined by BLM, at which time the specific concerns of Entek GRB LLC (Entek) and BLM will be discussed. Best efforts have been made to address specific concerns of the BLM representatives.

Please contact Mr. Michael Verm with Entek at 713-992-8115, if there are any questions or concerns regarding this Drilling Program.

**SURFACE ELEVATION** – 7,050.1' (Un-graded ground elevation)

**SURFACE FORMATION** – Lewis – Fresh water possible

**ESTIMATED FORMATION TOPS**

Lewis	Surface	Shale
Almond	123'	Sandstone, siltstone, shale & minor coal
Pioneer	537'	Coal seam
Darling	737'	Coal seam
BFW	964'	Sandstone, shale & coal
Trout Creek	1,054'	Sandstone
Iles	2,204'	Sandstone, shale & minor coal
DFS	2,304'	Sandstone
Hatfield	2,439'	Sandstone
Cherokee Creek	2,532'	Sandstone
Deep Creek	3,167'	Sandstone
Cow Creek / MRPS	4,108'	Sandstone
Shannon	4,609'	Sandstone & siltstone
Niobrara	5,604'	Shale, sandstone & limestone
Alpha Sill	5,852'	Shale
Frontier	8,260'	Sandstone
<b>TOTAL DEPTH</b>	<b>8,500' TVD (8,710' MD)</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:

Lewis	Surface	Some water bearing
Almond	123'	Some water, oil, & gas bearing
Pioneer	537'	Some water & gas bearing
Darling	737'	Some water & gas bearing
BWF	964'	Some water, oil, & gas bearing
Trout Creek	1,054'	Some water, oil, & gas bearing
Iles	2,204'	Some water, oil, & gas bearing
DFS	2,304'	Some water, oil, & gas bearing
Hatfield	2,439'	Some water, oil, & gas bearing
Cherokee Creek	2,532'	Some water, oil, & gas bearing
Deep Creek	3,162'	Some water, oil, & gas bearing
Cow Creek / MRPS	4,108'	Some water, oil, & gas bearing
Shannon	4,609'	Some oil & gas bearing
Niobrara	5,604'	Some oil & gas bearing
Alpha Sill	5,852'	Some oil & gas bearing
Frontier	8,260'	Some water, oil, & gas bearing

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

**CASING PROGRAM**

<b>Total Measured Depth (MD)</b>	<b>Hole Diameter</b>	<b>Casing Diameter</b>	<b>Casing Weight and Grade</b>	<b>Cement</b>
0 – 40'	16"	14"	Conductor Casing	Redi Mix to surface
0' – 1,250'	12-1/4"	9-5/8"	J-55 36# ST&C New	To surface (Lead: ±205 sxs Control Set C; Tail: ±200 sxs Thixmix)*
0' – 5,760'	8-3/4"	7"	J-55 23# ST&C New	5,760' – 1,050' (Lead: ±445 sxs ThixLite; Tail: ±155 sxs Thixmix) **
5,760' – TD	Open Hole	4-1/2"	10.5# Slotted Hanger Liner	None

\* Cement volume calculated with 100% excess.

\*\* Cement volume calculated with 30% excess.

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

Yields:	Surface:	Lead:	Control Set C yield =	2.66 ft <sup>3</sup> /sx (11.8 ppg)
				15.9 gps
		Tail:	Thixmix yield =	1.35 ft <sup>3</sup> /sx (14.5 ppg)
				6.5 gps
	Production:	Lead:	ThixLite yield =	1.63 ft <sup>3</sup> /sx (12.6 ppg)
				9.04 gps
		Tail:	Thixmix yield =	1.35 ft <sup>3</sup> /sx (14.5 ppg)
				6.5 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 Sanjel proprietary products. If another cement contractor is used, these blends and products may vary slightly).

Cement additives:

Surface:	Lead:	<b>Control Set C</b>
		1.0 % CaCl <sub>2</sub>
		1.0% SMS
		1%OGC-60
		2 lb/sk PSflake
	Tail:	<b>Thixmix</b>
		1.0 % CaCl <sub>2</sub>
		2 lb/sk PSflake
Production:	Lead:	<b>ThixLite</b>
		1.0 % SMS
		0.2% LTR
		1/4 lb/sk Polyflake
	Tail:	<b>Thixmix</b>
		0.2% LTR
		1/4 lb/sk Polyflake

#### 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 (MD)

0'	-	40'	Water
40'	-	1,250'	Natural Gel
			M.W.: 9 ppg
			Visc.: 40 – 50
			PV: 10 – 20
			YP: 10 – 15
			pH: 8.5 – 9.0
			WL: 9 - 10
1,250'	-	5,760'	Air Potassium Silicate
			M.W.: 7 ppg
			Visc.: 38 – 45
			PV: 6 – 16
			YP: 6 – 12
			pH: 10.8 – 11.0
			WL: 9
5,760'	-	TD	Air Potassium Hydroxide
			M.W.: 7.0 ppg

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

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 Lithodensity/Compressed Neutron, Dipole Sonic and Fracture Orientation.
- 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: 3,825 psi

ANTICIPATED START DATE

August 30, 2010

COMPLETION

The location pad will be sufficient size to accommodate all completion equipment activities and equipment. A string of 2-3/8", 4.7#, N-80, EUE 8rnd will be run as production tubing. A Sundry Notice (SN) will be submitted with a revised completion program if warranted.

# SD Federal 24-9DL

NE SE 24-T12N-R89W  
MOFFAT COUNTY, COLORADO

## SURFACE and PRODUCTION CASING DESIGN

Proposed Intermediate Casing Depth	5,500	TVD	8,500
Proposed Depth of Surface Casing	1,250	Feet	(Producing Depth)
Estimated Pressure Gradient	0.450	Psi/ft	
BHP at Producing Depth	2,475	Producing TD x Gradient	
Hydrostatic Head of Gas/Oil/Mud:	1,870	Producing TD x 0.22 psi/ft	
Mud Weight - Production	9.00	#/gal	
Mud Weight - Surface	7.00	#/gal	

### SURFACE CASING

#### MAXIMUM DESIGN SURFACE PRESSURE

Bottom Hole Pressure	minus	Hydrostatic Head	
0.450 PSI/FT x 5,500	minus	0.220 PSI/FT x 8500	
2475 psi	minus	1870 psi	<b>605 psi</b>

#### CASING STRENGTH

Weight / Type	Collapse (psi)	Burst (psi)	Tension (lbs)
9 5/8" 36# J55 36.00	2020	3520	394,000
9 5/8" 40# J55 40.00	2570	3950	452,000

#### DESIGN FACTORS

#### SAFETY FACTORS

Tension (dry)						
9 5/8" 36# J55	45,000	lbs	#/ft x TVD			
9 5/8" 40# J55	50,000	lbs	#/ft x TVD			
9 5/8" 36# J55	Safety Factor	design/actual	<b>8.76</b>	<b>Tension OK</b>	1.800	
9 5/8" 40# J55	Safety Factor	design/actual	<b>9.04</b>	<b>Tension OK</b>	1.800	
Burst						
9 5/8" 36# J55	Safety Factor	design/actual	<b>5.82</b>	<b>Burst OK</b>	1.000	
9 5/8" 40# J55	Safety Factor	design/actual	<b>6.53</b>	<b>Burst OK</b>	1.000	
Collapse						
Hydrostatic =	0.052 x MW Surf x depth	455				
9 5/8" 36# J55	Safety Factor =	design/actual	<b>4.44</b>	<b>Collapse OK</b>	1.125	
9 5/8" 40# J55	Safety Factor =	design/actual	<b>5.65</b>	<b>Collapse OK</b>	1.125	

### PRODUCTION CASING

#### MAXIMUM DESIGN PRODUCING PRESSURE

Bottom Hole Pressure	minus	Hydrostatic Head	
0.450 PSI/FT x 5,500	minus	0.220 PSI/FT x 8500	
2475 psi	minus	1870 psi	<b>605 psi</b>

#### CASING STRENGTH

Weight / Type	Collapse (psi)	Burst (psi)	Tension (lbs)
7" 23# K55 STC 23.00	3270	4360	284,000
7" 26# J55 STC 26.00	4320	4980	334,000
4 1/2" 10.5# J55 STC 10.50	4010	4790	146,000

UN-CEMENTED SLOTTED LINER

#### DESIGN FACTORS

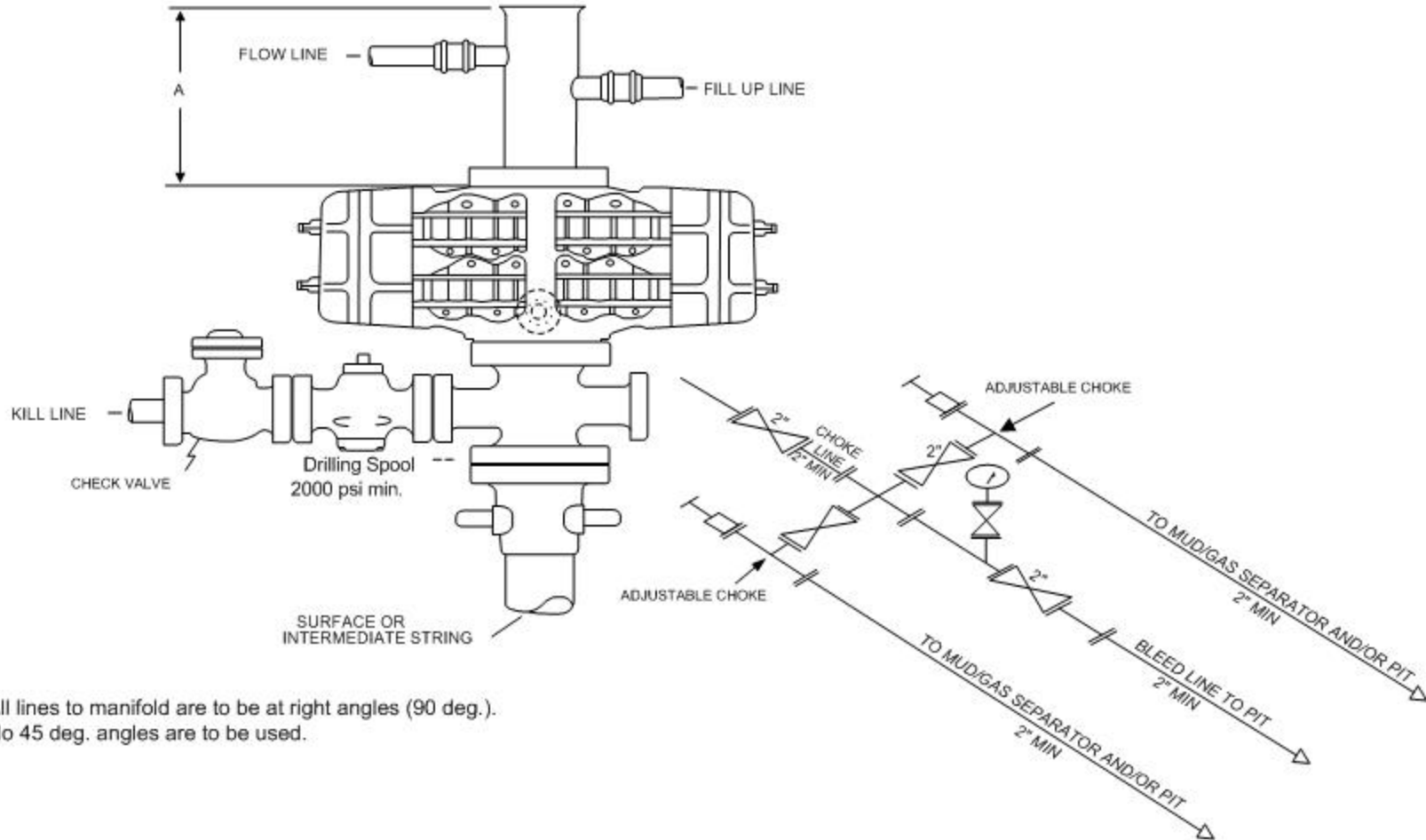
#### SAFETY FACTORS

Tension (dry)						
#/ft x TVD	126,500	lbs	23.00	5,500	ft	
#/ft x TVD	143,000	lbs	26.00	5,500	ft	
#/ft x TVD	32,025	lbs	10.50	3,050	ft	
7" 23# K55 STC	Safety Factor	design/actual	<b>2.245</b>	<b>Tension OK</b>	1.800	
7" 26# J55 STC	Safety Factor	design/actual	<b>2.336</b>	<b>Tension OK</b>	1.800	
4 1/2" 10.5# J55	Safety Factor	design/actual	<b>4.559</b>	<b>Tension OK</b>	1.800	
Burst						
7" 23# K55 STC	Safety Factor	design/actual	<b>7.207</b>	<b>Burst OK</b>	1.000	
7" 26# J55 STC	Safety Factor	design/actual	<b>8.231</b>	<b>Burst OK</b>	1.000	
4 1/2" 10.5# J55 STC	Safety Factor	design/actual	<b>7.917</b>	<b>Burst OK</b>	1.000	
Collapse						
Hydrostatic =	0.052 x mud wt x depth	2574				
7" 23# K55 STC	Safety Factor =	design/actual	<b>1.270</b>	<b>Collapse OK</b>	1.125	
7" 26# J55 STC	Safety Factor =	design/actual	<b>1.678</b>	<b>Collapse OK</b>	1.125	
4 1/2" 10.5# J55 STC	Safety Factor =	design/actual	<b>1.558</b>	<b>Collapse OK</b>	1.125	

WILL HANG 1900 FT 4 1/2  
LINER IN BOTTOM OF 7"

NA - LINER WILL BE SLOTTED

NA - LINER WILL BE SLOTTED



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



## **Entek GRB, Inc**

**Moffat County, CO  
Sec. 24-T12N-89W  
SD Federal 24-9  
Wellbore #1**

**Plan: Plan #1**

## **Standard Planning Report**

**24 June, 2010**



Entek GRB, Inc  
SD Federal 24-9DL  
Moffat County, CO

Geodetic System: US State Plane 1983  
Zone: Colorado Northern Zone  
WELL @ 7062.0ft (Original Well Elev)  
Ground Level: 7050.0  
Latitude: 40° 58' 45.642 N  
Longitude: 107° 19' 9.214 W  
Magnetic North is 10.36° East of True North (Magnetic Declination)



FORMATION TOP DETAILS

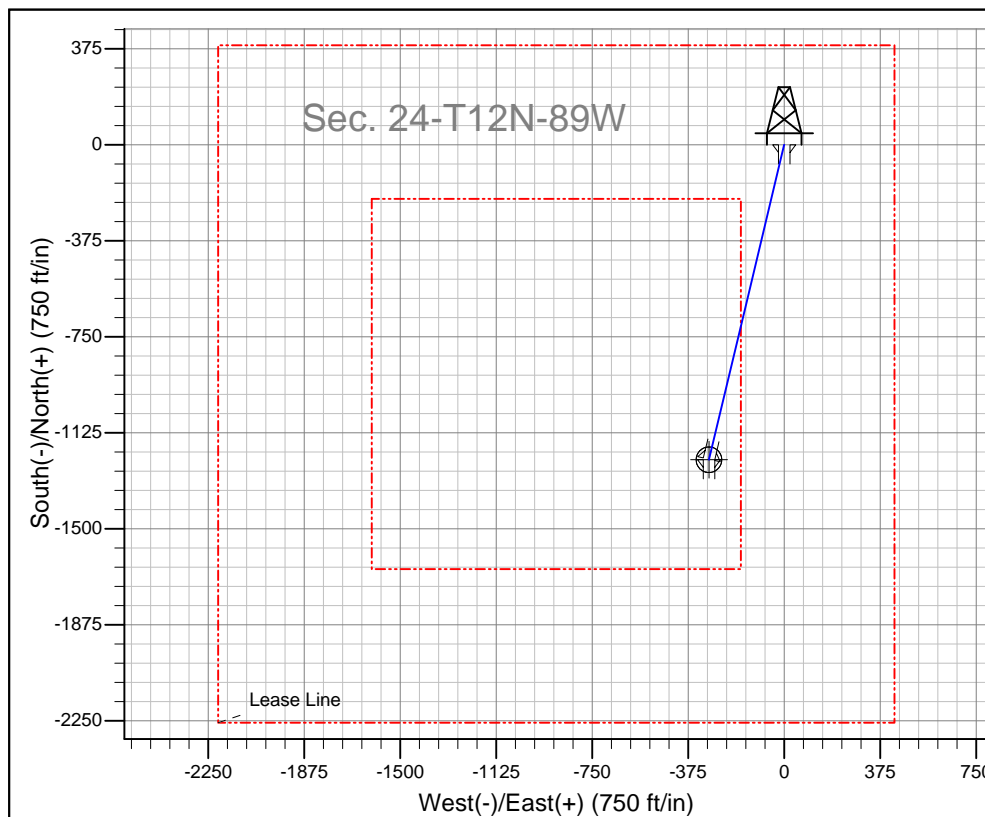
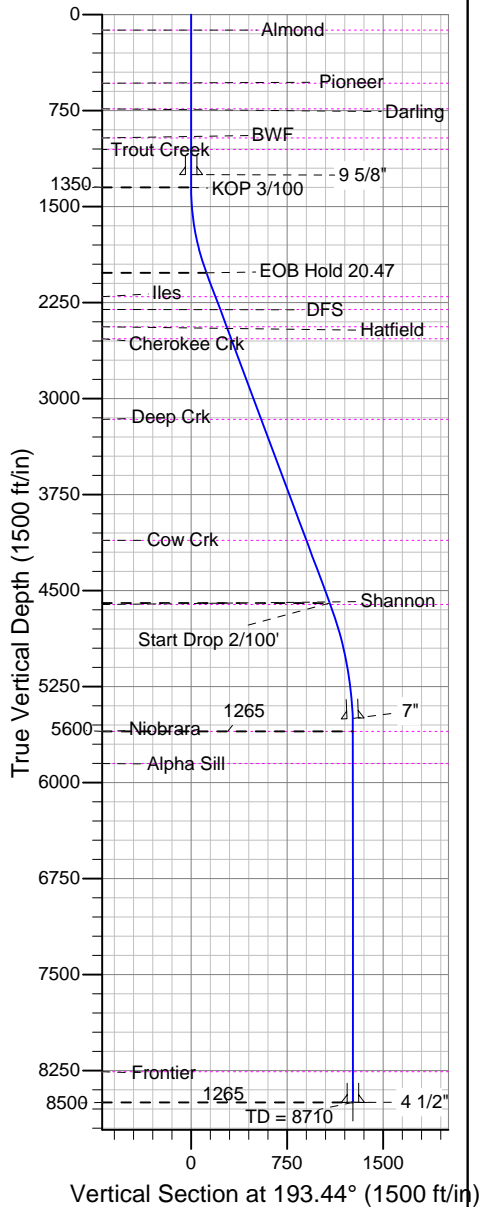
TVDPath	MDPath	Formation
123.0	123.0	Almond
537.0	537.0	Pioneer
737.0	737.0	Darling
964.0	964.0	BWF
1054.0	1054.0	Trout Creek
2204.0	2231.0	Iles
2304.0	2337.7	DFS
2439.0	2481.8	Hatfield
2532.0	2581.1	Cherokee Crk
3162.0	3253.5	Deep Crk
4108.0	4263.3	Cow Crk
4609.0	4798.1	Shannon
5600.0	5810.0	Niobrara
5852.0	6062.0	Alpha Sill
8260.0	8470.0	Frontier

SECTION DETAILS

MD	Inc	Azi	TVD	+N-S	+E-W	DLeg	TFace	VSec	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
1350.0	0.00	0.00	1350.0	0.0	0.0	0.00	0.00	0.0	
2032.4	20.47	193.44	2018.0	-117.3	-28.0	3.00	193.44	120.6	
4786.4	20.47	193.44	4598.1	-1054.1	-251.9	0.00	0.00	1083.8	
5810.0	0.00	0.00	5600.0	-1230.1	-294.0	2.00	180.00	1264.7	
8710.0	0.00	0.00	8500.0	-1230.1	-294.0	0.00	0.00	1264.7	

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N-S	+E-W	Latitude	Longitude	Shape
SD Federal 24-9DL	8500.0	-1230.1	-294.0	40° 58' 33.488 N	107° 19' 13.046 W	Circle (Radius: 50.0)



CASING DETAILS

TVD	MD	Name	Size
1250.0	1250.0	9 5/8"	9-5/8
5500.0	5710.0	7"	7
8500.0	8710.0	4 1/2"	4-1/2



Azimuths to True North  
Magnetic North: 10.36°

Magnetic Field  
Strength: 53221.1nT  
Dip Angle: 67.10°  
Date: 06/24/2010  
Model: IGRF2010



# Crescent Directional Drilling, LP

## Planning Report

<b>Database:</b>	EDM 2003.16 Single User Db	<b>Local Co-ordinate Reference:</b>	Well SD Federal 24-9
<b>Company:</b>	Entek GRB, Inc	<b>TVD Reference:</b>	WELL @ 7062.0ft (Original Well Elev)
<b>Project:</b>	Moffat County, CO	<b>MD Reference:</b>	WELL @ 7062.0ft (Original Well Elev)
<b>Site:</b>	Sec. 24-T12N-89W	<b>North Reference:</b>	True
<b>Well:</b>	SD Federal 24-9	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #1		

<b>Project</b>	Moffat County, CO		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

Site		Sec. 24-T12N-89W				
Site Position:		Northing:	1,604,783.74 ft	Latitude:	40° 58' 45.642 N	
From:	Lat/Long	Easting:	2,497,692.22 ft	Longitude:	107° 19' 9.214 W	
Position Uncertainty:		0.0 ft	Slot Radius:	"	Grid Convergence:	-1.18 °

Well	SD Federal 24-9					
Well Position	+N/-S	0.0 ft	Northing:	1,604,783.74 ft	Latitude:	40° 58' 45.642 N
	+E/-W	0.0 ft	Easting:	2,497,692.22 ft	Longitude:	107° 19' 9.214 W
Position Uncertainty		0.0 ft	Wellhead Elevation:	7,062.0 ft	Ground Level:	7,050.0 ft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	06/24/10	10.36	67.10	53,221

<b>Design</b>	Plan #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PROTOTYPE	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	193.44

<b>Plan Sections</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	<b>TFO (°)</b>	<b>Target</b>
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,350.0	0.00	0.00	1,350.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,032.4	20.47	193.44	2,018.0	-117.3	-28.0	3.00	3.00	0.00	193.44	
4,786.4	20.47	193.44	4,598.1	-1,054.1	-251.9	0.00	0.00	0.00	0.00	
5,810.0	0.00	0.00	5,600.0	-1,230.1	-294.0	2.00	-2.00	0.00	180.00	
8,710.0	0.00	0.00	8,500.0	-1,230.1	-294.0	0.00	0.00	0.00	0.00	

<b>Database:</b>	EDM 2003.16 Single User Db	<b>Local Co-ordinate Reference:</b>	Well SD Federal 24-9
<b>Company:</b>	Entek GRB, Inc	<b>TVD Reference:</b>	WELL @ 7062.0ft (Original Well Elev)
<b>Project:</b>	Moffat County, CO	<b>MD Reference:</b>	WELL @ 7062.0ft (Original Well Elev)
<b>Site:</b>	Sec. 24-T12N-89W	<b>North Reference:</b>	True
<b>Well:</b>	SD Federal 24-9	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
123.0	0.00	0.00	123.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>Almond</b>									
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
537.0	0.00	0.00	537.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>Pioneer</b>									
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
737.0	0.00	0.00	737.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>Darling</b>									
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
964.0	0.00	0.00	964.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>BWF</b>									
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,054.0	0.00	0.00	1,054.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>Trout Creek</b>									
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,250.0	0.00	0.00	1,250.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>9 5/8"</b>									
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,350.0	0.00	0.00	1,350.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>KOP 3/100'</b>									
1,400.0	1.50	193.44	1,400.0	-0.6	-0.2	0.7	3.00	3.00	0.00
1,500.0	4.50	193.44	1,499.8	-5.7	-1.4	5.9	3.00	3.00	0.00
1,600.0	7.50	193.44	1,599.3	-15.9	-3.8	16.3	3.00	3.00	0.00
1,700.0	10.50	193.44	1,698.0	-31.1	-7.4	32.0	3.00	3.00	0.00
1,800.0	13.50	193.44	1,795.8	-51.3	-12.3	52.8	3.00	3.00	0.00
1,900.0	16.50	193.44	1,892.4	-76.5	-18.3	78.6	3.00	3.00	0.00
2,000.0	19.50	193.44	1,987.5	-106.5	-25.5	109.5	3.00	3.00	0.00
2,032.4	20.47	193.44	2,018.0	-117.3	-28.0	120.6	3.00	3.00	0.00
<b>EOB Hold D20.47eg</b>									
2,100.0	20.47	193.44	2,081.3	-140.3	-33.5	144.3	0.00	0.00	0.00
2,200.0	20.47	193.44	2,175.0	-174.3	-41.7	179.2	0.00	0.00	0.00
2,231.0	20.47	193.44	2,204.0	-184.9	-44.2	190.1	0.00	0.00	0.00
<b>Iles</b>									
2,300.0	20.47	193.44	2,268.7	-208.3	-49.8	214.2	0.00	0.00	0.00
2,337.7	20.47	193.44	2,304.0	-221.2	-52.9	227.4	0.00	0.00	0.00
<b>DFS</b>									
2,400.0	20.47	193.44	2,362.4	-242.4	-57.9	249.2	0.00	0.00	0.00
2,481.8	20.47	193.44	2,439.0	-270.2	-64.6	277.8	0.00	0.00	0.00
<b>Hatfield</b>									
2,500.0	20.47	193.44	2,456.0	-276.4	-66.1	284.2	0.00	0.00	0.00
2,581.1	20.47	193.44	2,532.0	-304.0	-72.6	312.5	0.00	0.00	0.00
<b>Cherokee Crk</b>									
2,600.0	20.47	193.44	2,549.7	-310.4	-74.2	319.1	0.00	0.00	0.00
2,700.0	20.47	193.44	2,643.4	-344.4	-82.3	354.1	0.00	0.00	0.00

<b>Database:</b>	EDM 2003.16 Single User Db	<b>Local Co-ordinate Reference:</b>	Well SD Federal 24-9
<b>Company:</b>	Entek GRB, Inc	<b>TVD Reference:</b>	WELL @ 7062.0ft (Original Well Elev)
<b>Project:</b>	Moffat County, CO	<b>MD Reference:</b>	WELL @ 7062.0ft (Original Well Elev)
<b>Site:</b>	Sec. 24-T12N-89W	<b>North Reference:</b>	True
<b>Well:</b>	SD Federal 24-9	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
2,800.0	20.47	193.44	2,737.1	-378.4	-90.4	389.1	0.00	0.00	0.00
2,900.0	20.47	193.44	2,830.8	-412.4	-98.6	424.1	0.00	0.00	0.00
3,000.0	20.47	193.44	2,924.5	-446.5	-106.7	459.0	0.00	0.00	0.00
3,100.0	20.47	193.44	3,018.2	-480.5	-114.8	494.0	0.00	0.00	0.00
3,200.0	20.47	193.44	3,111.8	-514.5	-123.0	529.0	0.00	0.00	0.00
3,253.5	20.47	193.44	3,162.0	-532.7	-127.3	547.7	0.00	0.00	0.00
<b>Deep Crk</b>									
3,300.0	20.47	193.44	3,205.5	-548.5	-131.1	563.9	0.00	0.00	0.00
3,400.0	20.47	193.44	3,299.2	-582.5	-139.2	598.9	0.00	0.00	0.00
3,500.0	20.47	193.44	3,392.9	-616.5	-147.4	633.9	0.00	0.00	0.00
3,600.0	20.47	193.44	3,486.6	-650.5	-155.5	668.9	0.00	0.00	0.00
3,700.0	20.47	193.44	3,580.3	-684.6	-163.6	703.8	0.00	0.00	0.00
3,800.0	20.47	193.44	3,673.9	-718.6	-171.7	738.8	0.00	0.00	0.00
3,900.0	20.47	193.44	3,767.6	-752.6	-179.9	773.8	0.00	0.00	0.00
4,000.0	20.47	193.44	3,861.3	-786.6	-188.0	808.8	0.00	0.00	0.00
4,100.0	20.47	193.44	3,955.0	-820.6	-196.1	843.7	0.00	0.00	0.00
4,200.0	20.47	193.44	4,048.7	-854.6	-204.3	878.7	0.00	0.00	0.00
4,263.3	20.47	193.44	4,108.0	-876.2	-209.4	900.9	0.00	0.00	0.00
<b>Cow Crk</b>									
4,300.0	20.47	193.44	4,142.4	-888.7	-212.4	913.7	0.00	0.00	0.00
4,400.0	20.47	193.44	4,236.1	-922.7	-220.5	948.7	0.00	0.00	0.00
4,500.0	20.47	193.44	4,329.7	-956.7	-228.7	983.6	0.00	0.00	0.00
4,600.0	20.47	193.44	4,423.4	-990.7	-236.8	1,018.6	0.00	0.00	0.00
4,700.0	20.47	193.44	4,517.1	-1,024.7	-244.9	1,053.6	0.00	0.00	0.00
4,786.4	20.47	193.44	4,598.0	-1,054.1	-251.9	1,083.8	0.00	0.00	0.00
<b>Start Drop 2/100'</b>									
4,798.1	20.24	193.44	4,609.0	-1,058.1	-252.9	1,087.9	2.00	-2.00	0.00
<b>Shannon</b>									
4,800.0	20.20	193.44	4,610.8	-1,058.7	-253.0	1,088.5	2.00	-2.00	0.00
4,900.0	18.20	193.44	4,705.2	-1,090.7	-260.7	1,121.4	2.00	-2.00	0.00
5,000.0	16.20	193.44	4,800.8	-1,119.5	-267.6	1,151.0	2.00	-2.00	0.00
5,100.0	14.20	193.44	4,897.3	-1,145.0	-273.7	1,177.2	2.00	-2.00	0.00
5,200.0	12.20	193.44	4,994.6	-1,167.2	-279.0	1,200.0	2.00	-2.00	0.00
5,300.0	10.20	193.44	5,092.7	-1,186.0	-283.5	1,219.5	2.00	-2.00	0.00
5,400.0	8.20	193.44	5,191.4	-1,201.6	-287.2	1,235.4	2.00	-2.00	0.00
5,500.0	6.20	193.44	5,290.6	-1,213.8	-290.1	1,248.0	2.00	-2.00	0.00
5,600.0	4.20	193.44	5,390.2	-1,222.6	-292.2	1,257.0	2.00	-2.00	0.00
5,700.0	2.20	193.44	5,490.0	-1,228.0	-293.5	1,262.6	2.00	-2.00	0.00
5,760.0	1.00	193.44	5,550.0	-1,229.7	-293.9	1,264.3	2.00	-2.00	0.00
<b>7"</b>									
5,800.0	0.20	193.44	5,590.0	-1,230.1	-294.0	1,264.7	2.00	-2.00	0.00
5,810.0	0.00	0.00	5,600.0	-1,230.1	-294.0	1,264.7	2.00	-2.00	0.00
<b>EOD - Niobrara</b>									
5,900.0	0.00	0.00	5,690.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
6,000.0	0.00	0.00	5,790.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
6,062.0	0.00	0.00	5,852.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
<b>Alpha Sill</b>									
6,100.0	0.00	0.00	5,890.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
6,200.0	0.00	0.00	5,990.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
6,300.0	0.00	0.00	6,090.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
6,400.0	0.00	0.00	6,190.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
6,500.0	0.00	0.00	6,290.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
6,600.0	0.00	0.00	6,390.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00

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<b>Project:</b>	Moffat County, CO	<b>MD Reference:</b>	WELL @ 7062.0ft (Original Well Elev)
<b>Site:</b>	Sec. 24-T12N-89W	<b>North Reference:</b>	True
<b>Well:</b>	SD Federal 24-9	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
6,700.0	0.00	0.00	6,490.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
6,800.0	0.00	0.00	6,590.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
6,900.0	0.00	0.00	6,690.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
7,000.0	0.00	0.00	6,790.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
7,100.0	0.00	0.00	6,890.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
7,200.0	0.00	0.00	6,990.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
7,300.0	0.00	0.00	7,090.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
7,400.0	0.00	0.00	7,190.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
7,500.0	0.00	0.00	7,290.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
7,600.0	0.00	0.00	7,390.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
7,700.0	0.00	0.00	7,490.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
7,800.0	0.00	0.00	7,590.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
7,900.0	0.00	0.00	7,690.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
8,000.0	0.00	0.00	7,790.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
8,100.0	0.00	0.00	7,890.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
8,200.0	0.00	0.00	7,990.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
8,300.0	0.00	0.00	8,090.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
8,400.0	0.00	0.00	8,190.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
8,470.0	0.00	0.00	8,260.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
Frontier									
8,500.0	0.00	0.00	8,290.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
8,600.0	0.00	0.00	8,390.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
8,700.0	0.00	0.00	8,490.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
8,710.0	0.00	0.00	8,500.0	-1,230.1	-294.0	1,264.7	0.00	0.00	0.00
TD = 8710' MD - 4 1/2" - SD Federal 24-9DL									

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
SD Federal 24-9DL	0.00	0.00	8,500.0	-1,230.1	-294.0	1,603,559.95	2,497,373.05	40° 58' 33.488 N	107° 19' 13.046 W
- plan hits target									
- Circle (radius 50.0)									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
1,270.8	1,250.0	9 5/8"	9-5/8	12-1/4	
5,715.5	5,550.0	7"	7	9-3/4	
8,665.5	8,500.0	4 1/2"	4-1/2	6-1/4	



# Crescent Directional Drilling, LP

## Planning Report

<b>Database:</b>	EDM 2003.16 Single User Db	<b>Local Co-ordinate Reference:</b>	Well SD Federal 24-9
<b>Company:</b>	Entek GRB, Inc	<b>TVD Reference:</b>	WELL @ 7062.0ft (Original Well Elev)
<b>Project:</b>	Moffat County, CO	<b>MD Reference:</b>	WELL @ 7062.0ft (Original Well Elev)
<b>Site:</b>	Sec. 24-T12N-89W	<b>North Reference:</b>	True
<b>Well:</b>	SD Federal 24-9	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #1		

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
2,604.4	2,532.0	Cherokee Crk		0.00		
6,017.5	5,852.0	Alpha Sill		0.00		
2,263.2	2,204.0	Iles		0.00		
4,243.9	4,108.0	Cow Crk		0.00		
2,507.7	2,439.0	Hatfield		0.00		
1,066.9	1,054.0	Trout Creek		0.00		
4,764.7	4,609.0	Shannon		0.00		
8,425.5	8,260.0	Frontier		0.00		
123.0	123.0	Almond		0.00		
3,259.8	3,162.0	Deep Crk		0.00		
5,765.5	5,600.0	Niobrara		0.00		
740.2	737.0	Darling		0.00		
2,367.2	2,304.0	DFS		0.00		
537.8	537.0	Pioneer		0.00		
973.3	964.0	BWF		0.00		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,350.0	1,350.0	0.0	0.0	KOP 3/100'
2,032.4	2,018.0	-117.3	-28.0	EOB Hold D20.47eg
4,786.4	4,598.0	-1,054.1	-251.9	Start Drop 2/100'
5,810.0	5,600.0	-1,230.1	-294.0	EOD
8,710.0	8,500.0	-1,230.1	-294.0	TD = 8710' MD