

**NINE POINT DRILLING PLAN****Emerald 94X*****Rangely Weber Sand Unit*****Directional Well****Surface: 1243 FSL & 1055 FEL, Section 26, T2N, R103W****Bottomhole: LAT 40°6'36.657"N LON 108°55'4.742"W****Rio Blanco County, CO****a. NAMES & ESTIMATED TOPS OF GEOLOGIC GROUPS:**

<b>Name</b>	<b>Estimated Tops</b>
Mancos group	Surface

**b. NAMES, ESTIMATED TOPS & THICKNESS OF FORMATIONS:  
(based upon est. surface elev. of 5,602')**

<b>Name</b>	<b>Estimated Tops</b>	<b>Thickness</b>
Mancos	Surface	3,251'
Frontier	3,251' TVD/ 3,272' MD	359'
Dakota	3,610' TVD/ 3,641' MD	104'
Morrison	3,714' TVD/ 3,748' MD	678'
Curtis	4,392' TVD/ 4,445' MD	123'
Entrada	4,515' TVD/ 4,571' MD	135'
Carmel	4,640' TVD/ 4,700' MD	83'
Navajo	4,723' TVD/ 4,785' MD	645'
Chinle	5,368' TVD/ 5,448' MD	116'
Shinarump	5,484' TVD/ 5,568' MD	82'
Moenkopi	5,566' TVD/ 5,652' MD	720'
Weber	6,286' TVD/ 6,392' MD	395'
TD	6,681' TVD/ 6,798' MD	

**c. PRESSURE CONTROL EQUIPMENT:****For drilling surface hole to 2000':**

No BOP equipment required.

**For drilling through 9 5/8" surface casing to TD:**

Maximum anticipated surface pressure is &lt;3000 psi.

Pressure control equipment shall be in accordance with BLM minimum standards.

A casing head with an 11", 3000 psi flange will be welded onto the 9 5/8" surface casing.

BOP stack will consist of either 2 single gate or a double gate and annular preventer. The gate preventers will be equipped with pipe rams on bottom and blind rams on top. The choke and kill lines will be connected to outlets below the bottom rams, utilizing either the ram body outlet or a drilling spool with side outlets. Co-flex hose will be utilized from the BOP to the choke manifold. The BOP stack will be 11" or 13.625" bore, 3000 psi working pressure or greater. The choke and kill lines will be 3" bore, 3000 psi working pressure or greater. Please refer to attached schematic.

Test procedure and frequency shall be in accordance with BLM minimum standards for 3000 psi equipment, per BLM Oil & Gas Order #2.

d. **PROPOSED CASING PROGRAM, DRILLED HOLE SIZE:**

**Casing Information:** All casing will be new pipe and tested to 1500 psi.

Casing	Weight	Grade	Conn.	Stage	Centralizers
9 5/8"	36.0#/ft	K-55	LTC	No	*
7"	23.0#/ft	FS-80	LTC	No	As Needed

\*Centralizers will be placed on the bottom three joints and every fourth joint thereafter.

**Casing Design Information (9 5/8" casing @ 2000'):**

Collapse value for new pipe: 2020 psi    Actual Load: 915 psi    S.F.: 2.2

Burst value for new pipe: 3520 psi    Actual Load: 731 psi\*    S.F.: 4.8

Tension value for new pipe: 489,000#    Actual Load: 72,000#    S.F.: 6.8

\*Surface casing burst load based on a formation fracture gradient of 1.0 psi/ft.

**(7" casing @ top of Weber at 6286' TVD):**

Collapse value for new pipe: 6340 psi    Actual Load: 3268 psi    S.F.: 1.9

Burst value for new pipe: 6770 psi    Actual Load: 3286 psi    S.F.: 2.1

Tension value for new pipe: 487,000#    Actual Load: 157,573#    S.F.: 3.1

### **Surface Hole (0'-2000')**

The surface hole will be drilled using a conventional rotary drilling rig. A 12 1/4" hole will be drilled utilizing fresh water mud.

### **Production Hole (2000' - 6286' TVD)**

Drilling below surface casing will be with conventional rotary equipment utilizing fresh water mud. Hole size will be 8 3/4".

### **Open Hole (6286' TVD - TD)**

The Weber Payzone will be drilled and completed open hole utilizing NaCl brine. Hole size will be 6-1/8".

#### **e. AMOUNT AND TYPES OF CEMENT TO BE USED SETTING CASING STRING:**

<b>Casing</b>	<b>Cement</b>
9 5/8"	Two slurry system with oilfield type cement circulated in place. Lead: 35:65 Poz: Class "G" cement mixed at 12.7 ppg with an yield of 1.9 cf/sx. Theoretical volume of lead cement is 499 sacks including 80% excess in the open hole. Tail: Class "G" cement mixed at 15.8 ppg with an yield of 1.15 cf/sx. Theoretical volume of tail cement is 290 sacks. Volumes based on calculated plus 100% excess. Tail plug used. Allowed to set under pressure. Theoretical open hole annular volume is 598 cu ft.
7"	Two slurry system with oilfield "light weight" cement with additives ahead of oilfield premium cement with additives circulated in place. Lead: Class G cement mixed at 11.0 ppg with a yield of 3.23 cf/sx. Theoretical volume of lead cement is 323 sacks including 80% excess in the open hole. Tail: CemCRETE Blend 54/46 mixed at 12.5 ppg with a yield of 1.62 cf/sx. Theoretical volume of tail cement is 384 sacks including 80% excess in the open hole. If cement does not reach the surface in cementing the production string, a bond log will be run to determine the top of cement (TOC) to ensure isolation between the Frontier formation and the surface casing shoe.

#### **f. TYPES AND CHARACTERISTICS OF PROPOSED CIRCULATING MEDIUM:**

The well will be drilled using a closed loop system. There will be no reserve pit. Fluid levels in pits will be monitored using a Pit Volume Totalizer provided by a service company. Water based drilling fluid will be de-watered and cuttings will be put into a cuttings pit. The cuttings pit will be in compliance with COGCC's COA-38 which states:



- The moisture content of any drill cuttings in a cuttings pit, trench, or pile shall be as low as practicable to prevent accumulation of liquids greater than de minimis amounts. At the time of closure, the drill cuttings must also meet the applicable standards of table 910-1.

The following COGCC COA's will also be met:

**COA 5** - Operator must implement best management practices to contain any unintentional release of fluids.

**COA 9** - If fluids are conveyed via pipeline, operator must implement best management practices to contain any unintentional release of fluids.

**COA 23** - Operator must ensure 110 percent secondary containment for any volume of fluids contained at well site during drilling and completion operations; including, but not limited to, construction of a berm or diversion dike, diversion/collection trenches within and/or outside of berms/dikes, site grading, or other comparable measures (i.e., BMPs associated with stormwater management) sufficiently protective of the nearby surface water.

**COA 39** - No portion of any pit that will be used to hold liquids shall be constructed on fill material, unless the pit and fill slope are designed and certified by a professional engineer, subject to review and approval by the director prior to construction of the pit. The construction and lining of the pit shall be supervised by a professional engineer or their agent. The entire base of the pit must be in cut.

### **Surface Hole (0'-2000')**

A conventional rotary rig will be used to drill the surface hole. Water based drilling fluids consisting primarily of fresh water, bentonite, lignite, caustic, lime, soda ash, and polymers will be used. No chromate's will be used. It is not intended to use oil in the mud, however, in the event it is used, oil concentration will be less than 4% by volume. Maximum anticipated mud weight is  $\pm 9.0$  ppg.

A minimum quantity of weighting material will be kept on location

### **Production Hole (2000'-6286' TVD')**

Drilling below surface casing will be with water based drilling fluids consisting primarily of fresh water, bentonite, lignite, caustic, lime, soda ash, and polymers. No chromate's will be used. It is not intended to use oil in the mud, however, in the event it is used, oil concentration will be less than 4% by volume. Maximum anticipated mud weight is  $\pm 10.0$  ppg.

A minimum quantity of weighting material will be kept on location.

H<sub>2</sub>S and CO<sub>2</sub> detector will be used at all times during drilling operation.

### **Open Hole (6286' TVD'-TD)**

The Weber Payzone will be drilled and completed open hole utilizing NaCl brine.

## **g. TESTING, LOGGING AND CORING PROCEDURES:**

**Logging:**

Electric Logging: Cased Hole logs / gamma ray and porosity  
Open Hole logs (possible)

**Coring:** None planned.

**Testing:** None planned.

**h. EXPECTED BOTTOM HOLE PRESSURES, ABNORMAL PRESSURES, TEMPERATURES OR POTENTIAL HAZARDS:**

Normal pressure gradient to top of Weber. Offset pressure history indicates that the pressure gradient in the Weber should be between a minimum of 0.32 psi/ft to a maximum of 0.50 psi/ft.

Maximum expected BHP @ TD: ~ 3000 psi  
Maximum expected BHT @ TD: ~ 160° F

**Hydrogen Sulfide:**

Hydrogen sulfide (H<sub>2</sub>S) gas exists in the Weber Formation within the Rangely Field. Concentrations vary across the Field (+/- 100-700 ppm) due to a long history of production in conjunction with water and CO<sub>2</sub> injection.

Chevron's "H<sub>2</sub>S Contingency Plan" will be adhered to minimize any potential hazard.

**Possible Aquifers:** None

**Oil:** Probable in Weber @ 6286' – 6681' TVD

**Gas:** Probable minor gas in Weber @ 6286' TVD decreasing to TD.

**Protection of oil, gas, water, or other mineral bearing formations:**

Protection shall be accomplished by cementing surface casing back to the surface. Production casing will be cemented with a sufficient cement volume to attempt to bring cement back to surface. If cement does not reach the surface in cementing the production string, a bond log will be run to determine the top of cement (TOC) to ensure isolation between the Frontier formation and the surface casing shoe.

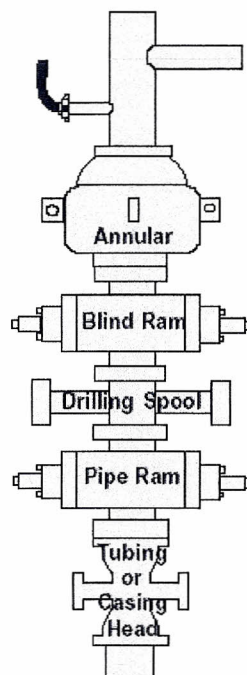
**i. OTHER INFORMATION:**

**Auxiliary Equipment**

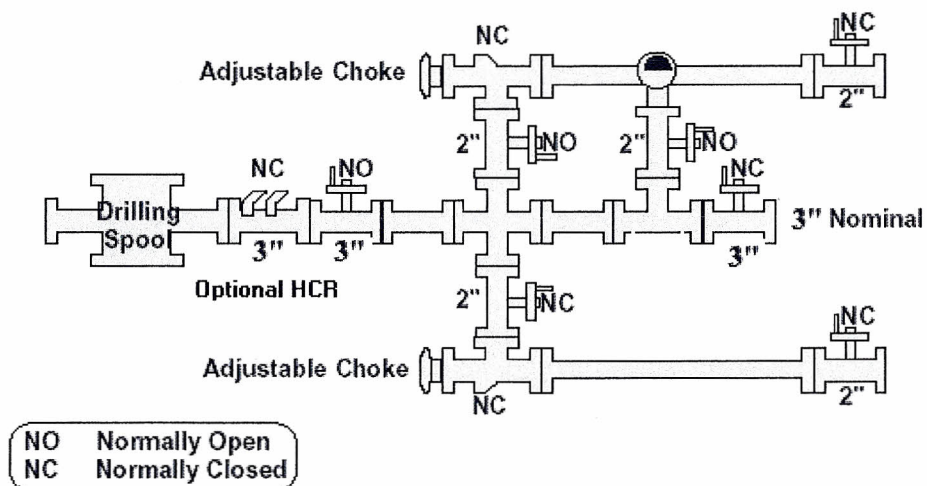
Conventional Rotary Drilling Rig  
Geolograph  
PVT-Flowmeter  
Desilter  
Desander  
Full Opening Safety Valve  
Upper Kelly Valve  
Lower Kelly Valve

# BOP Schematic

Class III BOP Stack



Class III Choke Manifold







**Scientific Drilling**  
Rocky Mountain Operations

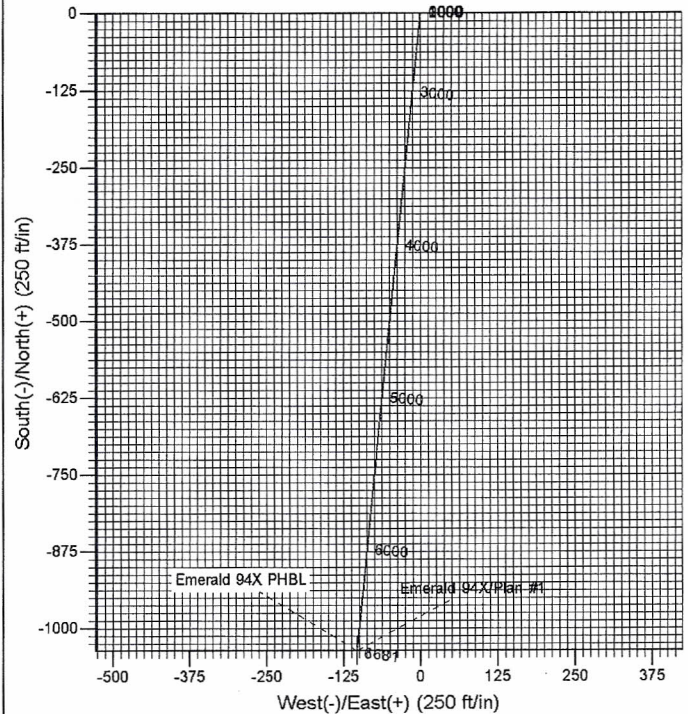
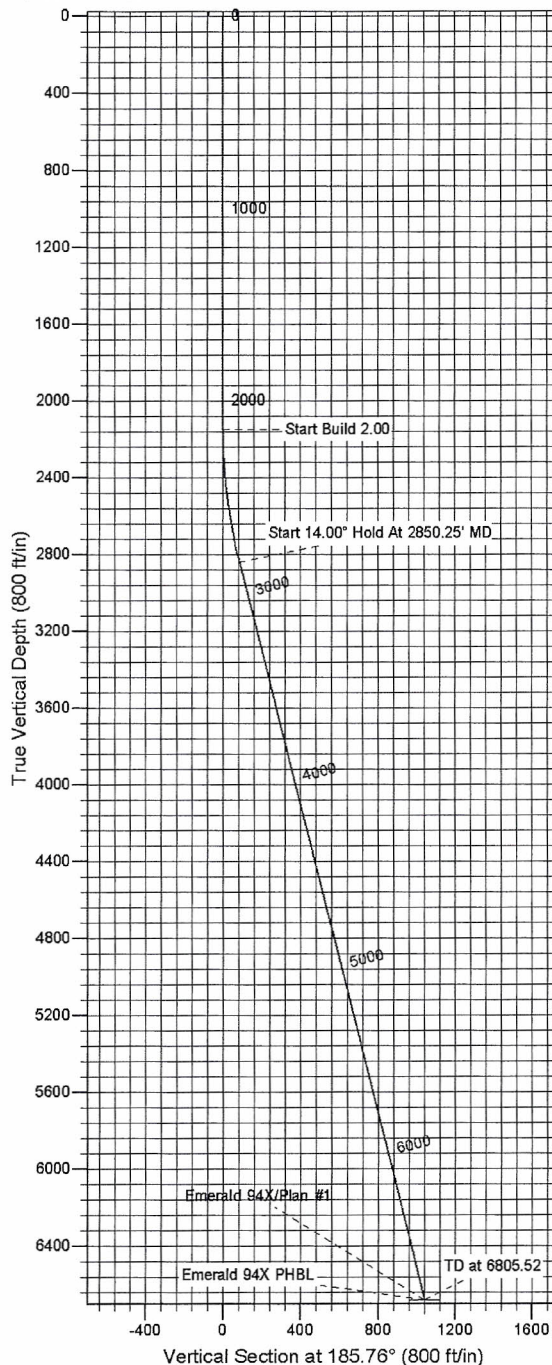
Company: Chevron  
Project: Rio Blanco County, CO (NAD 83)  
Site: Emerald



Well Details: Emerald 94X

TVD Reference: GL 5509' & RKB 22' @ 5531.00ft Ground Level: 5509.00  
+N/-S +E/-W Northing Easting Latitude Longitude Slot  
0.00 0.00 1301406.22 2044223.36 40° 6' 36.657 N 108° 55' 4.742 W

T M Azimuths to True North  
Magnetic North: 10.90°  
Magnetic Field  
Strength: 52558.4snT  
Dip Angle: 66.10°  
Date: 11/3/2010  
Model: IGRF200510



FORMATION TOP DETAILS

No formation data is available

Plan: Plan #1

10:53, November 03 2010  
Created By: Rex Hall

PROJECT DETAILS: Rio Blanco County, CO (NAD 83)

Geodetic System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: Colorado Northern Zone  
System Datum: Mean Sea Level

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	D/leg	T/Face	V/Sed	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2150.00	0.00	0.00	2150.00	0.00	0.00	0.00	0.00	0.00	
3	2850.25	14.00	185.76	2843.30	-84.73	-8.55	2.00	185.76	85.16	
4	6805.52	14.00	185.76	6681.00	-1037.09	-104.64	0.00	0.00	1042.36	Emerald 94X PHBL