



# OXY USA WTP LP 9-POINT DRILLING PLAN

## Well Information

Oxy Federal 697-15-44A  
Section 15, Township 6S, Range 97W  
Garfield County, Colorado

### 1. Geologic Markers and Formations

Names and estimated tops of all geologic groups, formations, members or zones are shown in the table below. Also indicated are probable gas-bearing horizons. The only anticipated water-bearing zones are in the Upper Wasatch. Standard drilling practice is to case off these zones to protect any useable water resources.

### Geologic Prognosis

Projected Formation Tops		GL: 8439		KB: 8469	
Tops		MD (ft) Reference KB	TVD (ft) Reference KB	TVDSS (ft)	
	Wasatch 'G' Sand	4593	4449	4020	
	Fort Union	4791	4640	3829	
	Fort Union Shale Marker	5177	5012	3457	
Mesaverde	Williams Fork	Ohio Creek ("Mesaverde" top)	6168	5985	2484
		Williams Fork ("base Ohio Creek")	6287	6104	2365
		Williams Fork Shale Marker	6812	6629	1840 ●
		Cameo Coal	8565	8381	88 ●
	Iles	Rollins	8956	8773	-304
TD based upon structural control at top of Rollins in this area (400' below)		9356	9173	-704	

## **2. Estimated Tops of Anticipated Water, Oil, Gas or Minerals and Operator's Plan for Protection**

Upper Wasatch (possible water)	2200' TVD
Williams Fork – Top of Gas (gas)	7019' TVD
Cameo Coal (gas)	8773' TVD

Casing and cementing will be designed to protect potentially productive hydrocarbons, lost circulation zones and prospectively valuable mineral deposits. All indications of usable water will be reported.

## **3. The Operators Minimum Specifications for Pressure Control**

A schematic diagram of the BOP equipment is provided in Attachment "A".

An annular 11", 5M BOP along with one pipe ram and one blind ram, will be installed on the 9-5/8" surface casing. The BOPE will be used, maintained and tested in accordance with requirements specified in Section III A-1 of Onshore Order 2.

The kill line will not be used as a fill up line.

This BOPE will be nipped up on the surface casing and tested to ~2400 psi before drilling out. The surface casing will be tested to a maximum of 80% of the rated burst pressure before drilling out.

In addition, the BOPE will be tested after any repairs made or break in the connections. The BOPE will be fully tested at least every 21 days.

## **4. Proposed Casing Setting and Cementing Program**

9-5/8" surface casing will be set ~ 2700', covering all freshwater zones and will be cemented to surface. Cement volume will be calculated to lift cement to surface plus 50% excess. The cement volume for the 4-1/2" production casing will be calculated to cover 500' above any commercial hydrocarbon zones encountered.

### Casing Program:

<u>Hole Size</u>	<u>Casing Size</u>	<u>Wt.</u>	<u>Grade</u>	<u>Connection</u>	<u>Length</u>	<u>Setting Depth</u>	<u>Condition</u>
14-3/4"	9-5/8"	36.0#	K-55	LTC	~2,700'	~2,700'	New
8-3/4"	4-1/2"	11.6#	HCP-110	BTC	~9,332'	~9,332'	New

9-5/8", 36#, K-55, LTC	Collapse	Burst	Tensile	ID	Make-up Torque
100%	2020 psi	3520 psi	462,000 lb	8.921"	Optimum – 4890
80%	1616 psi	2816 psi	369,600 lb	8.765" Drift	

4-1/2", 11.6#, HCP-110, BTC	Collapse	Burst	Tensile	ID	Make-up Torque – Optimal (ft-lbs)
100%	10,130 psi	10,690 psi	367,000 lb	4.00"	Make up to mark
80%	8,104 psi	8,552 psi	293,600 lb	3.875" Drift	

Casing Program							
Item	From (ft)	To (ft)	Length (ft)	Weight (ppf)	Grade	Joint Type	Total Weight (lbs)
9-5/8"	0	2700	2700	36.0	K-55	LTC	97,200
4-1/2"	0	9332	9332	11.6	HCP-110	BTC	105,444

Minimum Safety Factors			
Item	External Pressure Collapse	Internal Pressure Burst	Triaxial
Target	1.125	1.2	1.3
9-5/8"	1.76	1.75	2.16
4-1/2"	1.82	1.37	1.61

### Cementing Program:

<b>Casing String:</b>	9-5/8", 36#, K-55 Surface Casing, 14 – 3/4" OH	
<b>Slurry Design Basis:</b>	Lead slurry: ~2400' of 9-5/8" x 14-3/4" annulus with 50% excess, 90' of 9-5/8" x 16" annulus Tail slurry: 50' of 9-5/8", 36# shoe track, 300' of 9-5/8" x 14-3/4" annulus with 50% excess	
<b>Fluids Sequence / Volume:</b>	Spacer	10 bbls Fresh Water + 20 bbls Superflush + 10 bbls Fresh Water
	Lead Slurry	Calculated bbls of Varicem Cement, 12.3 ppg; 2.34 cf/sk <b>Goal TOC: Surface</b>
	Tail Slurry	63 bbls / 352 cf / 169 sxs Varicem Cement, 12.8 ppg; 2.08 cf/sk <b>Goal TOC: 300' Above Shoe</b>
	Displacement	Calculated bbls of fresh water

### **SURFACE LEAD CEMENT**

Fluid 4: 12.3 VERSACEM LEAD

VERSACEM (TM) SYSTEM

0.25 lbm/sk Poly-E-Flake (Additive Material)

0.1 % Tuf Fiber 594 (Additive Material)

### **SURFACE TAIL CEMENT**

Fluid 5: 12.8 VERSACEM TAIL

VERSACEM (TM) SYSTEM

0.25 lbm/sk Poly-E-Flake (Additive Material)

<b>Casing String:</b>	4-1/2", 11.6#, P110 Production Casing, 8 - 3/4" OH	
<b>Slurry Design Basis:</b>	Lead slurry: ~2800' of 4-1/2" x 8-3/4" annulus with 50% excess, 200' of 4-1/2" x 9-5/8" annulus Tail slurry: 50' of 4-1/2", 11.6# shoe track, ~3700' of 4-1/2" X 8-3/4" annulus with 50% excess	
<b>Fluids Sequence / Volume:</b>	Spacer	10 bbls Fresh Water + 20 bbls Superflush + 10 bbls Fresh Water
	Lead Slurry	Calculated bbls of Extendacem Cement, 12.4 ppg; 1.89 cf/sk <b>Goal TOC: 200' Above Surface Shoe</b>
	Tail Slurry	Calculated bbls of Varicem Cement, 13.1 ppg; 1.62 cf/sk <b>Goal TOC: 500' Above Mesaverde Top</b>
	Displacement	Calculated bbls 2% KCl Water

### **PRODUCTION LEAD CEMENT**

Fluid 4: 12.4 EXTENDACEM LEAD

EXTENDACEM (TM) SYSTEM

0.125 lbm/sk Poly-E-Flake (Additive Material)

### **PRODUCTION TAIL CEMENT**

Fluid 5: 13.1 VARICEM TAIL

VARICEM (TM) CEMENT

0.125 lbm/sk Poly-E-Flake (Additive Material)

## **5. Mud Program**

The mud specifications described in Mud Table A will be used to drill surface to 2,700'. The system will be converted to the mud specifications described in Mud Table B for drilling below 2,700'. Mud properties will generally follow the schedule below but may change as hole conditions dictate. Sufficient mud materials to

maintain mud properties, control lost circulation and to contain blowout will be available at the wellsite. All mud additives are biodegradable and Material Safety Data Sheets will be kept on location at all times. No chrome constituent additives will be used in the mud system without prior BLM approval.

**Mud Table A**

<b>Hole Section</b>		<b>14-3/4 " Surface Interval to Approx 2700' MD</b>			
<b>Type</b>	<b>Density</b>	<b>Fluids</b>	<b>PV/YP</b>	<b>Fluid Loss</b>	<b>Drill Solids</b>
Spud Mud with 2% FlexFirm, starting 200' above upper Red Bed	8.7 – 9.0	500-650 GPM	12-18 / 12-20	8 - 10 cc's	< 5%

**Mud Table B**

<b>Hole Section</b>		<b>Drill 8-3/4" Production Interval to ~ 9352' MD</b>				
<b>Type</b>	<b>Density</b>	<b>PV</b>	<b>YP</b>	<b>API FL</b>	<b>pH</b>	<b>Drill Solids</b>
FlexFirm/NewPhalt /GSX-510	8.7 - 9.0	10 - 20	18 - 22	< 6	9-11	< 5%

The mud will be checked several times daily to determine density, viscosity, chlorides, pH, fluid loss, and LCM.

In addition, the circulating system will contain a gas monitoring system to continuously monitor total hydrocarbon gas levels.

## 6. Logging Program

The logging program for the well is described in the table below. Due to the inherent instability of the wellbore, there is an increased risk of losing wireline logging tools. Consequently, wells are evaluated using cased hole logging to evaluate resource potential. Open hole logs may be run under specific circumstances (e.g. for geomechanical data).

Cased hole logging

Run	Logs	Tool name	Interval	Vendor
1	CCL/CBL; GR; Temperature; Pulsed Neutron	CCL/CBL; Temperature	TD to +500' above cement at bottom of surface casing	Schlumberger
		GR	TD to surface	
		RST (sigma down)	TD to surface casing	
		RST (spectrum up)	TD to ~700' above Fort Union	

## 7. Anticipated Pressures and Temperatures

No abnormal pressures, temperatures or hazards are expected to be encountered. No overpressured intervals are expected. Proper mud weight will be maintained to drill at a balanced or slightly over-balanced condition.

The Williams Fork Shale zone has potential for lost circulation due to the fractured nature of the shale. In addition to drilling in a balanced or slightly over-balanced condition, the drilling fluid will contain various types of LCM to plug the fractures and prevent losses.

No H<sub>2</sub>S or other hazardous gases have been encountered in offset wells.

## 8. Directional Program

*(Directional program description to be provided for each APD)*

<b>Maximum Planned Hole Inclination:</b>	15.69 deg
<b>Proximity Issues:</b>	None
<b>Survey Program:</b>	Real-Time MWD



Company: OXY USA RMAT  
Project: Garfield County, CO NAD27  
Site: Cascade Creek 697-158 Pad



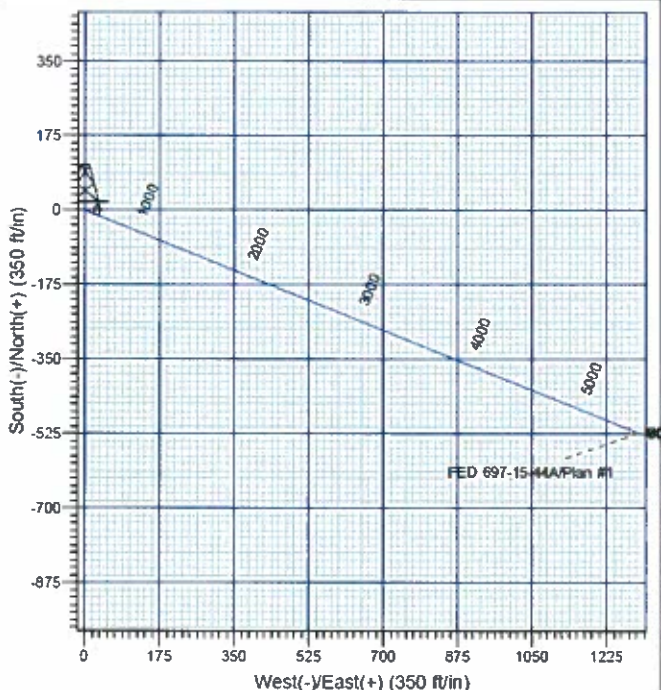
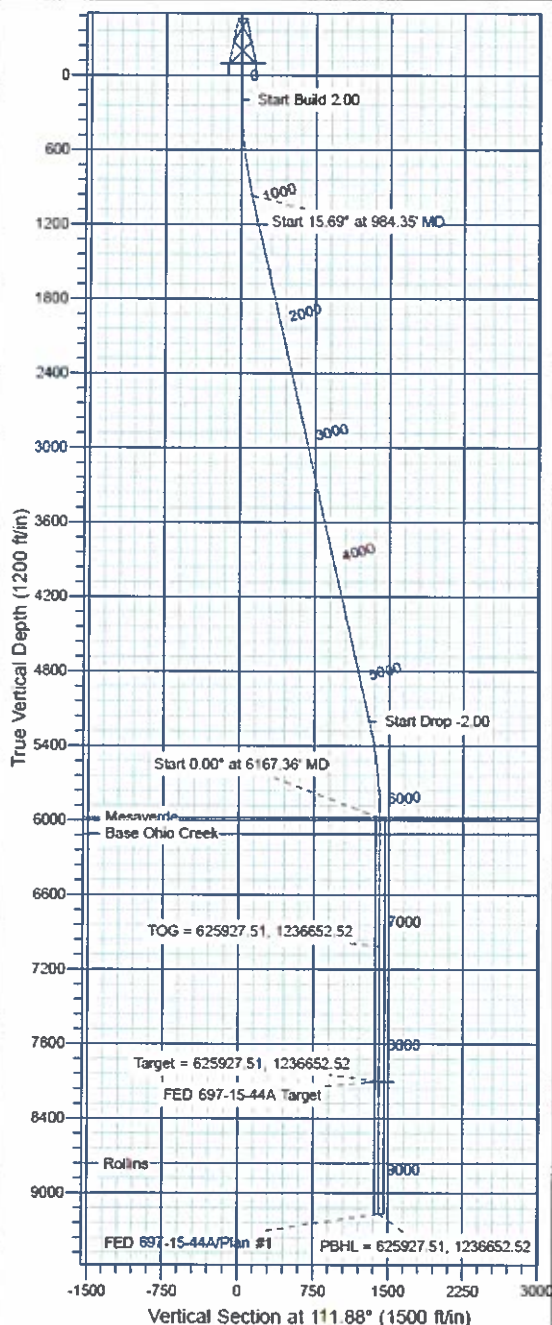
Well Details: FED 697-15-44A

TVD Reference: GL 8439' & RKB 30' @ 8469.00ft (H&P Rig) Ground Level: 8439.00  
+N/-S 0.00 +E/-W 0.00 Northing 626488.97 Easting 1235367.06 Latitude 39° 31' 19.942 N Longitude 108° 12' 39.165 W Slot G



Azimuths to True North  
Magnetic North: 10.44°

Magnetic Field  
Strength: 52208.9nT  
Dip Angle: 65.72°  
Date: 7/11/2011  
Model: IGRF2010



#### FORMATION TOP DETAILS

TVDPath: MDPath: Formation  
5984.00 6167.36 Mesaverde  
6109.00 6202.36 Base Ohio Creek  
6769.00 6952.36 Rollins

#### Plan Plan #1

11:36, July 15 2011

Created By: Janie Cooke

PROJECT DETAILS: Garfield County, CO NAD27

Geodetic System: US State Plane 1927 (Exact solution)  
Datum: NAD 1927 (NADCON CONUS)  
Ellipsoid: Clarke 1866  
Zone: Colorado Central 502

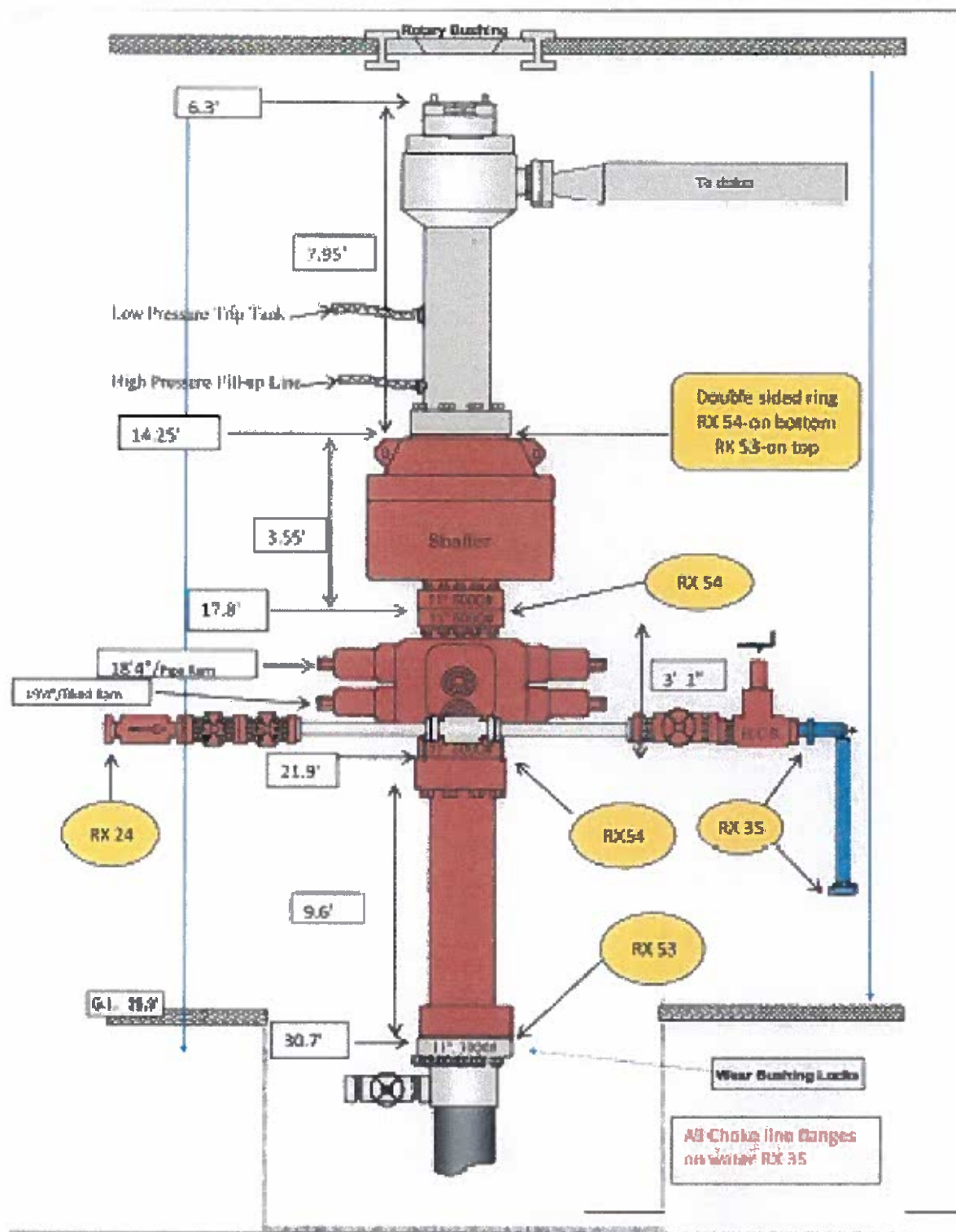
System Datum: Mean Sea Level

#### SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	
3	984.35	15.69	111.88	974.59	-39.77	99.02	2.00	111.88	100.70	
4	5383.01	15.69	111.88	5209.41	-483.08	1202.63	0.00	0.00	0.00	
5	6167.36	0.00	0.00	5984.00	-522.85	1301.64	2.00	180.00	402.73	
6	8287.36	0.00	0.00	8104.00	-522.85	1301.64	0.00	0.00	402.73	
7	9352.36	0.00	0.00	9169.00	-522.85	1301.64	0.00	0.00	402.73	FED 697-15-44A Target

## Attachments

### a) BOPE Schematic





## b) Choke Manifold Schematic

