

Phillips Petroleum Company



Hayden, Colorado

Mud Program for Woodley Spring Pilot Project Coal Bed Methane Exploratory Wells Routt County, Colorado

Lands Involved: Section 31, T. 8N., R. 87W., 6th P.M.
 Section 35, T. 8N., R. 88W., 6th P.M.
 Section 36, T. 8N., R. 88W., 6th P.M.

Mud Program for the subject wells listed below:

- | | |
|-----------------------|---------------------|
| 1. Federal 35-8-88 #1 | 6. State 36-8-88 #5 |
| 2. Federal 35-8-88 #2 | 7. State 36-8-88 #6 |
| 3. Federal 31-8-87 #1 | 8. State 36-8-88 #7 |
| 4. Federal 31-8-87 #2 | 9. State 36-8-88 #8 |
| 5. Meagher 31-8-87 #1 | |



Surface to Total Depth (TD)

<u>Hole Size</u>	<u>Casing Size</u>	<u>Wt./Ft.</u>	<u>Grade</u>	<u>Joint</u>	<u>Depth Set</u>
12-1/4"	8-5/8"	24	J-55	STC	450'
7-7/8"	5 1/2"	15.5	J-55	LTC	3500'

Surface pipe will be set (8-5/8") to 400'-500'. These wells will have 5 1/2" casing cemented from 3500' (TD) up to 1400'.

Objective of the producing wells will be to gather production data and log data on the coalbeds in the Williams Fork Formation and to de-water the coal seams for natural gas production.

Pit level monitoring from surface to TD.

<u>Interval</u>	<u>Type</u>	<u>Weight</u>	<u>Viscosity</u>	<u>Fluid Loss</u>
0 - 450'	Air / native mud	8.5-9.0	28-32	No control
450' - 3500'	Air / native & commercial muds	9.0-10.5	35-50	No control
Coal Interval(s)		9.0- 9.5	N/A	< 10 cc

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Mud Program

Sufficient mud material(s) to maintain mud properties will be available at the well site during drilling operations. In addition to bentonite gel, mud quality may be maintained using fluid loss additives, potash and soda ash. For lost circulation cedar fiber, cottonseed hulls, blended fiber products and sawdust may be used.

Drill surface hole (12 1/4") with bentonite sweeps. Use caustic for flocculation and pH control. Lost circulation materials (fiber, cottonseed hulls, paper) will be kept on hand to control losses.

Drill production hole (7 7/8"), continue as with surface hole. Use PHPA, PAC polymer and fine fiber for filtrate control. Use SAPP, polymer thinner, or chrome-free Desco if a thinner is necessary. Keep pH above 9.0 to prevent spoilage.

Materials to be used are as follows:

- On-lease produced water
- Bentonite clay
- Barite (inert weighting material)
- Biodegradable polymer soap
- Caustic soda – NaOH
- Lost circulation materials (fine fiber, cottonseed hulls, paper)
- PAC polymer – modified cellulose polymer
- PHPA – partially hydrolyzed poly acrylamide polymer
- Polymer Thinner – polyacrylate polymer
- SAPP – sodium acid pyrophosphate – mud thinner
- Chrome-free Desco – tannin-based mud thinner

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