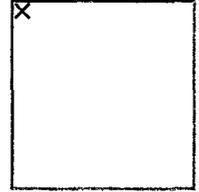




United States Department of the Interior  
Bureau of Land Management  
Carlsbad Field Office



Refer to: 3160-3

To: AFM, Lands & Minerals, CFO  
From: Geologist, CFO  
Subject: Geologic Review of Application for Permit to Drill

COPY

**Operator:** Cimarex Energy Co of Colorado  
**Well Name and Number:** Red Hills Unit-23H  
**Potash:** No  
**Location:** SHL:0160'/N.& 1330'/N. SEC005 T026S, R033E.(NENW)  
**County** Lea **Lease Number:** NM0160973 **APD Received:** 3-25-2014  
**Ground Level Elevation:** 3379 **Surface Geology:** Qoa-Older alluvial deposits  
**TVD:** 9875 **MD:** 14456 **BH Mud Weight:** 9.2  
**BHP:** 4724 **MASP:** 2552

**1. Geologic Marker Tops (from reports on surrounding wells):**

Geologic Marker	RED HILLS FEDERAL #001 3002525049 T26E R33E Sec 6 660FNL 660FEL	RED HILLS UNIT #003 3002528144 T26E R33E Sec 5 1980FSL 2180FWL	RED HILLS UNIT #005 3002535112 T25E R33E Sec 33 1695FNL 717FWL	<b>Proposed Well</b> Red Hills Unit-23H T026S, R033E.(NENWSEC005 0160'/N.& 1330'/N Unit
	Elevation	Elevation	Elevation	Elevation
Rustler	815	869	926	854
Top of Salt	1150	1200	1260	1289
Lamar	4820	4864	4894	4859
Bell Canyon	4852	4903	4932	4894
Bone Spring Lime	8986	8982	9013	8999
1st BS Sand	9975	9987	10030	9999
2nd Bone Spring	10464	10514	10580	10489
3rd Bone Spring	11618	11629	11691	11649
Wolfcamp	12067	12162	12129	12089

**2. Fresh Water Information**

**a. Fresh Water:** 944

**b. Fresh Water Remarks:**

According to well data from the New Mexico Office of the State Engineer's Water Rights Reporting System, there are 23 water wells within a six-mile radius of the proposed project. Depth to water ranges from 50 to 220 feet. Usable water can also be found within the Magenta Dolomite Member of the Rustler Formation down to a depth of approximately 944 feet.

DEC 10 2014

c. Water Basin: Carlsbad Water Basin

**3. Recommended Casing Setting Depth**

a. Surface Casing Depth: 950

b. Intermediate Casing Depth: 4850

c. 2nd Interm. Casing Depth \_\_\_\_\_

d. Casing Depth Remarks:

The operator proposes to set surface casing at 1045 feet, which could be too deep and past the competent anhydrite. Instead, set casing in the anhydrite just below the base of the Magenta Dolomite at approximately 950 feet. If salt is encountered, set casing at least 25 feet above the salt. The operator proposes to set intermediate casing at 4920 feet, which will be too deep and into the Delaware Sands. Instead, set casing in the basal anhydrite of the Castile Formation or the Lamar Limestone at approximately 4850 feet.

**4. Geologic Hazards**

a. Cave/Karst Occurance: \_\_\_\_\_

b. Potential Cave/Karst Depth: \_\_\_\_\_

c. Possible Water Flows: Castile, Salado,

d. Possible Lost Circulation: Rustler, Red Beds, Delaware,

e. Possible Abnormal Pressure: NO

f. H2S within 1 mile: YES

g. H2S Remarks:

H2S has been reported within one-mile of the proposed project. Measurements up to 2000 ppm were reported within the Red Hills Pool.

**5. Additional Remarks**

Geologist: Robert Salaz

Sign Off Date: 10-23-2014