

**APPLICATION FOR AUTHORIZATION TO INJECT  
VACA "13" FEDERAL NO.2**

**XI. CHEMICAL ANALYSIS OF WATER FROM FRESH WATER WELLS WITHIN  
ONE MILE OF INJECTION WELL**

A phone conversation with Fred McMinn of the State Engineers Offices, State of New Mexico @ 3:55 p.m. on 4/4/2000 failed to identify any fresh water wells within one mile of the proposed injection well. However, a search of EOG Resources internal records shows a fresh water well with an approved permit number of C-2373-S located in the NE1/4,NW1/4,NW1/4 of section 13, township 25S, Range 33E in Lea County, New Mexico on land owned by Diamond & One-Half filed by Enron Oil & Gas Company (currently known as EOG Resources, Inc.) for the purpose of commercial oil and gas development. This well was drilled to a total depth of 642' with fresh water zone being encountered at a depth of 295' and 6-5/8" casing set and cemented at 636'. Please see attached fresh water analysis.

XII. I have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the injection zone and any underground source of drinking water.

XIII. See attached proof.

Waylon C. Martin, M.A.

To: Larry Bray - Asst. Field Manager, Lands and Minerals

From: Les Babyak - Petroleum Engineer

Date: May 15, 2000

Re: Application for Unit Approval by EOG Resources, Inc.  
Red Hills North Unit  
Lea County, New Mexico

I have received EOG's application for approval of the Red Hills North Unit, Lea County, New Mexico, which is attached.

Currently there are thirty-nine (39) oil producers in the Red Hills North (Bone Spring) Field, located in Secs. 1,12,13, T25S, R33E and Secs. 6,7,8,17,18, T25S, R34E. The field has produced 5.0 MMBO and 7.2 BCFG and will produce an additional 7.6 MMBO and 27.8 BCFG in primary development. I estimate an additional 3-5 years of primary production is left in this field. During this time, EOG has proposed to begin an eight (8) well horizontal drilling program which will enhance primary production and which then will be used as injectors so that greater injection volumes will be possible when secondary recovery is begun. Also, during this time a pilot water injection project will be started to test the reservoir for secondary recovery potential. Studies by EOG suggest an additional 12 MMBO is potentially recoverable by water or gas flooding.

A participation formula has been proposed which will be used for both the primary and secondary recovery phases. It is: Tract Participation = 33.33% @Ac-ft + 33.33% Remaining Primary Oil + 33.33% Current Oil Production. This formula is reasonable and I recommend that it be approved. EOG holds 93.5% of the Working Interest in the unit and all ORR Interests have approved it. I recommend also that the unit be designated as a logical unit for exploratory and secondary development.

*Les Babyak*

BEFORE THE OIL CONSERVATION DIVISION  
Santa Fe, New Mexico  
Case No. 12399 & 12329 Exhibit No. 4A  
Submitted by:  
EOG Resources, Inc.  
Hearing Date: May 18, 2000

In Reply  
Refer to:  
NMPNM-100---X  
3180 (06200)

Memorandum

5/16/2000

To: Assistant Field Office Manager, Lands and Minerals, RFO

From: Staff Geologist, RFO

Subject: Designation of Proposed Red Hills North Bone Spring Unit, Lea County, New Mexico

The proposed Red Hills North Bone Spring Unit Area is described as follows:

T. 25 S., R. 33 E., NMPM, Lea County

sec. 1, W $\frac{1}{2}$ NE $\frac{1}{4}$ , SE $\frac{1}{4}$ NE $\frac{1}{4}$ , E $\frac{1}{4}$ NW $\frac{1}{4}$ , NE $\frac{1}{4}$ SW $\frac{1}{4}$ ,  
S $\frac{1}{2}$ SW $\frac{1}{4}$  and SE $\frac{1}{4}$ ;  
sec. 12, all;  
sec. 13, NE $\frac{1}{4}$ , N $\frac{1}{4}$ NW $\frac{1}{4}$ , SE $\frac{1}{4}$ NW $\frac{1}{4}$  and NE $\frac{1}{4}$ SE $\frac{1}{4}$ .

T. 25 S., R. 34 E., NMPM, Lea County

sec. 6, S $\frac{1}{2}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$  and W $\frac{1}{2}$ SE $\frac{1}{4}$ ;  
sec. 7, all;  
sec. 8, W $\frac{1}{2}$ SW $\frac{1}{4}$ ;  
sec. 17, SW $\frac{1}{4}$ NE $\frac{1}{4}$ , W $\frac{1}{2}$ NW $\frac{1}{4}$ , SE $\frac{1}{4}$ NW $\frac{1}{4}$ , N $\frac{1}{2}$ SW $\frac{1}{4}$  and  
NW $\frac{1}{4}$ SE $\frac{1}{4}$ ;  
sec. 18, N $\frac{1}{2}$  and N $\frac{1}{2}$ S $\frac{1}{2}$ .

(containing 4,193.20 acres more or less)

The proposed unit area is located in the southwestern corner of Lea County within the High Plains section of the Great Plains Province. The City of Carlsbad is located approximately 40+ miles to the northwest and the small town of Jal is 18 miles due east.

The operators purpose in proposing this unit primarily concerns the drilling of 8 horizontal wells to increase primary production in a low permeability Bone Spring reservoir. In addition, the horizontal wells will allow for greater injection volumes for secondary recovery projects. Unitization will also benefit the BLM, the operator and the working interest owners by simplifying allocation of production and administrative processes.

The proposed unit is based on an analysis of the Bone Spring Formation and the main pay is found in a fine grained turbidite sequence found in the third sandstone.

**COMMISSIONER'S OFFICE**

Phone (505) 827-5760

Fax (505) 827-5766

**ADMINISTRATION**

Phone (505) 827-5700

Fax (505) 827-5853

**GENERAL COUNSEL**

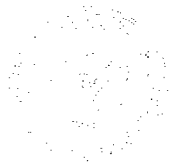
Phone (505) 827-5713

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**PUBLIC AFFAIRS**

Phone (505) 827-1245

Fax (505) 827-5766



**New Mexico State Land Office  
Commissioner of Public Lands  
Ray Powell, M.S., D.V.M.**

**COMMERCIAL RESOURCES**

Phone (505) 827-5724

Fax (505) 827-6157

**MINERAL RESOURCES**

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Fax (505) 827-4739

**ROYALTY MANAGEMENT**

Phone (505) 827-5772

Fax (505) 827-4739

**SURFACE RESOURCES**

Phone (505) 827-5793

Fax (505) 827-5711

June 1, 2000

EOG Resources  
P. O. Box 2267  
Midland, Texas 79702

Attention: Mr. Larry D. Cunningham

Re: Preliminary Approval  
Proposed Red Hills North Unit  
Lea County, New Mexico

Dear Mr. Cunningham:

This office has received the unexecuted copy of the unit agreement, which you have submitted for the proposed Red Hills North Unit area, Lea County, New Mexico.

Pursuant to Section 3. EXHIBITS, on page 3 of your proposed unit agreement, please submit a copy of the Exhibit "B" schedule showing, to the extent known to the Unit Operator, the acreage comprising each Tract, percentages and kind of ownership of oil and gas interests in all land in the Unit Area, and the Tract Participation of each Tract.

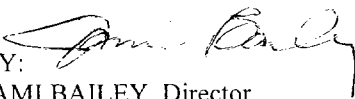
Your Exhibit "B" should also list all Federal Tracts first followed by the State Tracts.

Our preliminary approval will not be given until we receive the above requested exhibits.

If you have any questions or if we may be of further help, please contact Pete Martinez at (505) 827-5791.

Very truly yours,

RAY POWELL, M.S., D.V.M.  
COMMISSIONER OF PUBLIC LANDS

BY:   
JAMI BAILEY, Director  
Oil, Gas and Minerals Division  
(505) 827-5744

RP/JB/pm

cc: **OCD-Santa Fe, Attention: Mr. Roy Johnson**  
Mr. William Carr