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## Sage Energy Company

Independence Plaza 400 W. Illinois, Suite 1080  
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April 16, 2004

Oil Conservation Division  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

Attention: Mr. David Catanach

Re: Maximum Injection Pressure

NVANU '9' Well No. 3  
Unit O, Section 2, T-17 South, R-34 East, NMMP,  
Lea County, New Mexico

227

30-025-29192

460FSL - 1680 FEL

O. 2-17, 34

Dear Mr. Catanach:

Sage Energy Company operates 16 water injection wells in the North Vacuum Abo North Unit and have recently converted the 9#3 to water injection service as our 17<sup>th</sup> water injection well. This unit was formed in 1991 and Sage has made and had approved a minimum of five applications for increased surface injection pressure. The sixteen wells have maximum surface injection pressures (set by the NMOCD) ranging from 3800# to 4850#.

Currently we are limited in the 9#3 to a maximum surface injection pressure of 1720#. Upon initial completion of this well as a producer in 1985, an ISIP of 2800# was recorded. This would suggest a frac gradient of .76 psi/ft. The current yardstick of .2 psi/ft to set the maximum surface injection pressure seems conservative.

Utilizing the 7C#2 as our most conservative guideline, this wells 3800# maximum injection pressure reflects a frac gradient guideline of .43 psi/ft. All other injection wells in our unit have frac gradient guidelines in excess of .47 psi/ft and range from .47 to .56 with an average of .505 psi/ft.

Structurally, the NVANU is a plunging nose located on the northern edge of the productive Abo formation. The pay is thinning and very tight (.1-.3 md). Other Abo waterflood units are located to the south and are contiguous with our unit. The North Vacuum Abo Unit and the North Vacuum Abo East Unit are operated by ExxonMobil while the North Vacuum Abo West Unit is operated by Chevron-Texaco. Maps are included for clarity.

I hope this information will be useful to you in order to re-evaluate the maximum injection pressure previously assigned to the NVANU 9#3. If you require any further information, please contact me at 432-683-5271.

Sincerely,



George M. Harris, Jr.

TP 11-532.





