



STATE OF NEW MEXICO  
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

CASE  
2851



BRUCE KING  
GOVERNOR

ANITA LOCKWOOD  
CABINET SECRETARY

POST OFFICE BOX 2088  
STATE LAND OFFICE BUILDING  
SANTA FE, NEW MEXICO 87504  
(505) 827-5800

June 13, 1994

Pyramid Energy, Inc.  
10101 Reunion Place  
One Union Square, Suite 210  
San Antonio, Texas 78216-4156

Attention: Scott Graef

Dear Mr. Graef:

Reference is made to your request dated April 29, 1994, to increase the surface injection pressure on six wells within the East Pearl Queen Unit Waterflood Project. This request is based upon fracture data contained within your request.

The data has been analyzed by my staff and we feel an increase in injection pressure on these wells is justified at this time. You are therefore authorized to increase the surface injection pressure on the following described wells:

<u>WELL &amp; LOCATION</u>	<u>MAXIMUM SURFACE INJECTION PRESSURE</u>
East Pearl Queen Unit No. 23 Unit G, 28-19S-35E	1800 PSIG
East Pearl Queen Unit No. 25 Unit E, 27-19S-35E	1800 PSIG
East Pearl Queen Unit No. 34 Unit I, 28-19S-35E	1800 PSIG
East Pearl Queen Unit No. 35 Unit M, 27-19S-35E	1800 PSIG
East Pearl Queen Unit No. 41 Unit C, 34-19S-35E	1800 PSIG
East Pearl Queen Unit No. 43 Unit E, 34-19S-35E	1800 PSIG

The Division Director may rescind this injection pressure increase if it becomes apparent that the injected water is not being confined to the injection zone or is endangering any fresh water aquifers.

Sincerely,

William J. LeMay  
Director

xc: Case No. 2851, OCD-Hobbs,  
D. Catanach, R. Brown



PYRAMID ENERGY, INC.

10101 Reunion Place • One Union Square, Suite 210

San Antonio, Texas 78216-4156 • (210) 308-0000 • FAX: (210) 308-8111

FAX TRANSMITTAL

DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

PLEASE DELIVER ATTACHED PAGES TO:

NAME: DAVID CATANACH

FIRM: \_\_\_\_\_

FAX NUMBER: 1-505-827-5741

DEPARTMENT: \_\_\_\_\_

FROM: SCOTT CRAFTMESSAGE: ATTACHED IS THE INFORMATION WEDISCUSSED CONCERNING THE MAXIMUMADDITIONAL PRODUCTION ON THE EAST & WESTPIEDMONT AREATOTAL PAGES: 4 (INCLUDING COVER SHEET)

**PYRAMID ENERGY, INC.**

10101 Reunion Place • One Union Square, Suite 210

San Antonio, Texas 78210-4100 • (210) 300-0000 • FAX: (210) 308-8111

April 29, 1994

Energy, Minerals and Natural Resources Department  
Oil Conservation Division  
P.O. Box 2088  
Santa Fe, NM 87501

Attention: Mr. David Catanach

RE: Injection Pressure -- West Pearl Queen and East Pearl  
Queen Units, Pearl Queen Field, Lea County, New Mexico

Dear Mr. Catanach:

Over the last four years, Pyramid has conducted an infill drilling program on the captioned waterfloods. The idea has been to drill locations inside the original 40 acre spacing pattern and recover reserves from areas that have not been effectively swept by waterflooding. To maximize the recovery in the new wells, additional wellbores were permitted and converted to injection service. The permit for the new injection wells set their maximum injection pressure at approximately 1000 psi with the stipulation that higher injection pressure could be approved by running step rate test to determine the frac gradient for the reservoir. However, the older injection wells still active in both units are not subject to any injection pressure limitations. It is not reasonable that the older wells which were permitted under less stringent regulations be allowed to inject at unlimited pressures while the new wells are limited to less than 1000 psi. Pyramid is requesting that the maximum pressure for all injection wells in the West Pearl Queen Unit and the East Pearl Queen Unit be raised to 1800 psi and that all wells not currently limited on injection pressure be subject to the 1800 psi cap.

Several attempts were made at running step rate tests on wells in the field by pumping into the reservoir at various rates and accurately recording the surface pressure at each rate. Using published frictions factors for the tubing strings, a bottom hole pressure was calculated at each rate. In all cases it appeared as though we were unable to reach the fracture pressure before exceeding the working pressure of the wellhead and other surface equipment. Halliburton was requested to review the computer data generated during fracture stimulation in three of Pyramid's new wells drilled on the West Pearl Queen Unit and to calculate a fracture gradient from that data. Attached is a letter from

Mr. David Catanach  
April 29, 1994  
Page 2

Halliburton showing the results of their calculations for the wells. Using the lowest of the three gradients calculated .959 psi/ft and density of injected fluid at 9.2 ppg, it would take a surface pressure of 2283 psi to fracture the formation at 4750; (4750' is the approximate top of the injection interval). The injection wellheads and surface equipment are only rated to 2000 psi working pressure. The current injection pressure in field is around 1750 psi. Therefore, there is only a 250 psi pressure range in which a step rate test can be safely conducted. This small pressure range along with the fact that the fracture gradient cannot be reached because of pressure limitations will make the information obtained from the tests unreliable and may lead to wrong conclusions.

Pyramid feels that the gradients calculated by Halliburton are representative of the Pearl Queen reservoir and that the maximum pressure of 1800 psi requested is almost 500 psi below the actual frac pressure. Please review this matter and see if you can authorize the injection pressure increase based on the information presented. If you have any questions or need additional information, call me at (210) 308-8000.

Sincerely,

PYRAMID ENERGY, INC.

Scott Graef  
Operations Manager

SG/tlw

cc: Jerry Sexton

**HALLIBURTON****HALLIBURTON ENERGY SERVICES**

8610 N. New Braunfels / Suite 614 / San Antonio, TX 78217 / Tel: 210-824-2471 / Fax: 210-824-1172

January 26, 1994

Mr. Scott Graef  
Pyramid Energy Inc.  
10101 Reunion Place, Suite 120  
San Antonio, TX 78216

Re: WPQU Lea County, NM

In regards to your request, I have reviewed the frac data from each of the wells submitted, in order to determine the fracture gradient. The results are as follows:

Well#	Ave Depth Perf (Ft.)	ISIP (psi)	Calc. Frac Grad.
WPQU-191	4843	2660	.987
WPQU-193	4809	2509	.959
WPQU-194	4875	2821	1.016

If I can be of further assistance please advise.

Respectfully Submitted

Ronald L. Cooper



## PYRAMID ENERGY, INC.

10101 Reunion Place • One Union Square, Suite 210

San Antonio, Texas 78216-4156 • (210) 308-8000 • FAX: (210) 308-8111

FAX TRANSMITTALDATE: MAY 25, 1994 TIME: 4:45

PLEASE DELIVER ATTACHED PAGES TO:

NAME: DAVID CATANACHFIRM: OIL CONSERVATION DIVISIONFAX NUMBER: (505) 827-5741

DEPARTMENT: \_\_\_\_\_

FROM: SCOTT GRAEFMESSAGE: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_TOTAL PAGES: 2 (INCLUDING COVER SHEET)



## PYRAMID ENERGY, INC.

10101 Reunion Place • One Union Square, Suite 210

San Antonio, Texas 78216-4156 • (210) 308-8000 • FAX: (210) 308-8111

May 25, 1994

Oil Conservation Division  
P.O. Box 2088  
Santa Fe, New Mexico 87504-2088  
Attn: David Catanach

Dear Mr. Catanach:

Below is a list of wells for which Pyramid Energy, Inc. is requesting an increase in allowable injection pressure.

West Pearl Queen Unit #110-H, 29-19-35  
West Pearl Queen Unit #119-I, 29-19-35  
West Pearl Queen Unit #121-K, 28-19-35  
West Pearl Queen Unit #126-M, 28-19-35  
West Pearl Queen Unit #128-O, 29-19-35  
West Pearl Queen Unit #143-A, 33-19-35

East Pearl Queen Unit #23-G, 28-19-35  
East Pearl Queen Unit #25-E, 27-19-35  
East Pearl Queen Unit #34-I, 28-19-35  
East Pearl Queen Unit #35-M, 27-19-35  
East Pearl Queen Unit #41-C, 34-19-35  
East Pearl Queen Unit #43-E, 34-19-35

If you should have any questions, please feel free to contact me.

Sincerely,

Scott Graef  
Operations Manager

SG:dkh

State of New Mexico  
Oil Conservation Commission



STATE GEOLOGIST  
A. L. PORTER, JR.  
SECRETARY - DIRECTOR

Mr. Jason Kellahin  
Kellahin & Fox  
Attorneys at Law  
Box 1713  
Santa Fe, New Mexico

Re: Case No. 2852  
Order No. R-2539 &  
Applicant: R-2164-A  
Continental Oil Company  
Amerasia Ref. Corp.

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

A. L. Porter, Jr.

12/

**Carbon copy of order also sent to:**

Hobbs OCC           x          

Arteria OCC

**Astec OCC** \_\_\_\_\_

**OTHER** \_\_\_\_\_