

Jason Kellahin
W. Thomas Kellahin
Karen Aubrey

KELLAHIN and KELLAHIN
Attorneys at Law
El Patio - 117 North Guadalupe
Post Office Box 2265
Santa Fe, New Mexico 87504-2265

Telephone 982-4285
Area Code 505

November 25, 1985

Case 8787

Mr. Richard L. Stamets
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

"Hand Delivered"

Re: The Eastland Oil Company
Proposed Power Grayburg Unit
and Secondary Recovery Project
Eddy County, New Mexico

RECEIVED

NOV 26 1985

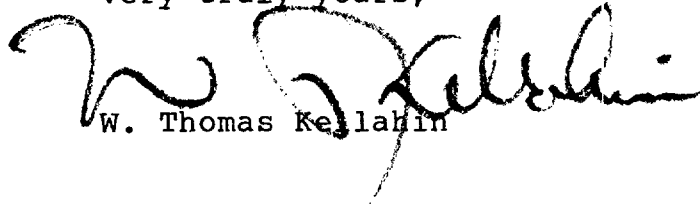
Dear Mr. Stamets:

OIL CONSERVATION DIVISION

On behalf of The Eastland Oil Company, please set the enclosed application for approval of the unit and the secondary waterflood project for hearing at the next Examiner hearing on December 18, 1985, in Santa Fe, New Mexico.

A copy of this application and the OCD Form C-108 is being sent by certified mail to all addresses listed.

Very truly yours,


W. Thomas Kellahin

WTK:ca
Enc.

cc: Bureau of Land Management
Roswell District Office
P. O. Box 1397
Roswell, New Mexico 88201

Anadarko Producing Company
P. O. Box 2497
Midland, Texas 79702

Amoco Production Company
P. O. Box 68
Hobbs, New Mexico 88240

KELLAHIN and KELLAHIN

Mr. Richard L. Stamets
November 25, 1985
Page 2

APCO Production Company
80 Sierra Cr., C.R. 240
Durango, Colorado 81301

ARCO Oil & Gas Company
P. O. Box 1610
Midland, Texas 79702

Belnorth Petroleum Corporation
One Petroleum Center, Bldg. 6
3300 N. "A" Street
Midland, Texas 79705

Cal-Mon Oil Company
P. O. Box 2066
Midland, Texas 79702

El Paso Natural Gas Company
P. O. Box 1492
El Paso, Texas 79978

Northern Natural Gas Company
One Petroleum Center, Bldg. 6
3300 N. "A" Street
Midland, Texas 79705

Pogo Producing Company
Box 10340, 300 Midland Tower
Midland, Texas 79702

Union Texas Petroleum Corporation
Division of Allied Chemical Corporation
P. O. Box 200128
Houston, Texas 77216

Harvey E. Yates Company
P. O. Box 1933
Roswell, New Mexico 88201

George D. Neal
The Eastland Oil Company
P. O. Drawer 3488
Midland, Texas 79702

Jerry Sexton
Oil Conservation Division - Hobbs
P. O. Box 1980
Hobbs, New Mexico 88240



THE EASTLAND OIL COMPANY

P.O. DRAWER 3488
MIDLAND, TEXAS 79702
TELEPHONE: (915) 683-6293

RECEIVED

JAN 16 '89

C. C. D.
ARTESIA, OFFICE

January 13, 1989

State of New Mexico
Oil Conservation Division
P. O. Drawer DD
Artesia, New Mexico 88210

Attention: Mike Williams

Re: Power Grayburg (Federal) Unit
Eddy County, New Mexico
Order No. R-8164, R-8165 and R-8165-A

Gentlemen:

By order no. R-8164, R-8165 and R-8165-A, the New Mexico Oil Conservation Division authorized The Eastland Oil Company to install a waterflood project on its Power Grayburg (Federal) Unit. The approved unit acreage and the approved injection wells are shown on the attached plat. Five wells were converted to injection and five wells were used as producers.

The injection was initiated on July 10, 1987 at the limiting pressure of 1000 psi. The attached table gives the history of injection to the present date.

Tract 1a Well No. 3 initially took water at the maximum pressure of 980 psi and declined in volume from 741 barrels per month in 1987 to 5 barrels per month in 1988.

Tract 2 Well No. 1 began injection at an average pressure of 666 psi in 1987 and a rate of 5394 barrels per month. However, this pressure gradually increased in 1988 to 952 psi and declined to a rate of 751 barrels per month.

Tract 3 Well No. 1 had an injection pressure of 968 psi in 1987 and a rate of 2942 barrels per month. In 1988, the rate decreased to 1169 barrels per month with an increase of injection pressure to 999 psi.

Tract 4 Well No. 1 initially required 902 psi to inject 6148 barrels of water per month but this pressure increased to 969 psi while the rate was declining to 4392 barrels per month in 1988.

State of New Mexico
Oil Conservation Division
January 13, 1989
Page 2

Permission was given by the Artesia office of the New Mexico Oil Conservation Division to conduct a 30-day test in September, 1988 on Tract 3 Well No. 1. The surface injection pressure was increased from 1,000 psi to 1,100 psi for 12 days and to 1,200 psi for 18 days. The injection volume increased from approximately 30 barrels per day to the lower pressure to 80 barrels per day at 1,100 psi and 155 barrels per day at 1,200 psi. The well was shut-in and the surface pressure observed. The wellhead pressure required 18 days to return to 980 psi where injection resumed at 30 barrels per day.

Step-rate injection tests have been run on Tract 12 #3 in October, 1987; Tract 3 #2 in April, 1988; and Tract 2 #1 in July, 1988. All three tests showed increasing surface and bottom-hole pressures with increasing input rates to the limit of the well equipment. Copies of these tests are attached.

A waterflood recovery of 321,400 barrels of oil was estimated for the Power Grayburg Unit project using 2,700,000 barrels of injection water. At the current rate of injection, this volume cannot be economically obtained. An increase in oil production has been observed in Tract 3 #3 from 1 BOPD to 30 BOPD. This is in the area where maximum water has been injected.

Order No. R-8165, paragraph (12) states that "the injection wells should be so equipped as to limit injection pressure to 1,000 psi, but the Division Director should have authority to increase said pressure limitation should circumstances warrant." In order to successfully flood the Power Grayburg Unit, we request that the pressure limitation be increased to 1,200 psi and that this pressure be observed for a period sufficient to determine results of the increase.

Yours truly,

THE EASTLAND OIL COMPANY



Travis Reed
Production Superintendent

Encl.

TABLE I - WATER INJECTION HISTORY
POWER GRAYBURG (FEDERAL) UNIT
EDDY COUNTY, NEW MEXICO

YEAR	MONTH	TRACT 1a #3 WATER INJ WELLHEAD BBLs PSI	TRACT 2 #1 WATER INJ WELLHEAD BBLs PSI	TRACT 3 #1 WATER INJ WELLHEAD BBLs PSI	TRACT 3 #2 WATER INJ WELLHEAD BBLs PSI	TRACT 4 #1 WATER INJ WELLHEAD BBLs PSI
1987 (6 months)						
	JULY	4053 980	7836 0	6359 980	7506 740	7792 790
	AUGUST	305 980	6510 520	2676 950	6346 780	6060 860
	SEPTEMBER	51 980	5946 750	2802 970	6075 840	5946 920
	OCTOBER	6 980	4802 870	2129 970	5379 860	5243 920
	NOVEMBER	0 980	4320 920	2038 970	5794 870	6006 970
	DECEMBER	35 980	2950 940	1649 970	6032 930	5840 950
	CUMULATIVE FOR YEAR	4450	32364	17653	37132	36887
	AVERAGE PER MONTH	741 980	5394 666	2942 968	6189 837	6148 902
1988 (11 months)						
	JANUARY	33 980	1201 970	1213 970	5375 950	4848 950
	FEBRUARY	23 980	846 970	807 970	4608 960	3887 950
	MARCH	0 980	923 980	1172 980	5545 920	5126 980
	APRIL	5 980	691 980	916 980	5915 980	4279 980
	MAY	0 980	665 980	887 980	11610 980	4524 980
	JUNE	0 980	734 980	838 980	6221 980	4220 980
	JULY	0 980	818 980	997 980	2028 920	4595 980
	AUGUST	0 980	1095 980	1058 980	10045 980	5192 980
	SEPTEMBER	0 980	0 980	3739 1200	6882 940	3715 950
	OCTOBER	0 980	1116 980	478 990	7669 980	4200 950
	NOVEMBER	0 980	174 980	751 980	6653 980	3734 980
	CUMULATIVE FOR YEAR	56	8263	12856	77551	48320
	AVERAGE PER MONTH	5 980	751 952	1169 999	7050 961	4392 969

R-30-E

Amoco

Cal - Mon, etal

R-31-E

H.E. Yates

No. Nat. Gas

State

U.S.

State

Eastland

1

Eastland

Eastland

6

Eastland

T 18 S

Sibyl - Fed

Belnorth, etal

U.S.

Belnorth, etal

POWER GRAYBURG (FEDERAL) UNIT

Eddy County, New Mexico

EASTLAND OIL COMPANY

Producer

③ Tract No.

Injection Well

Scale in Feet

2330



Kenwood - Fed

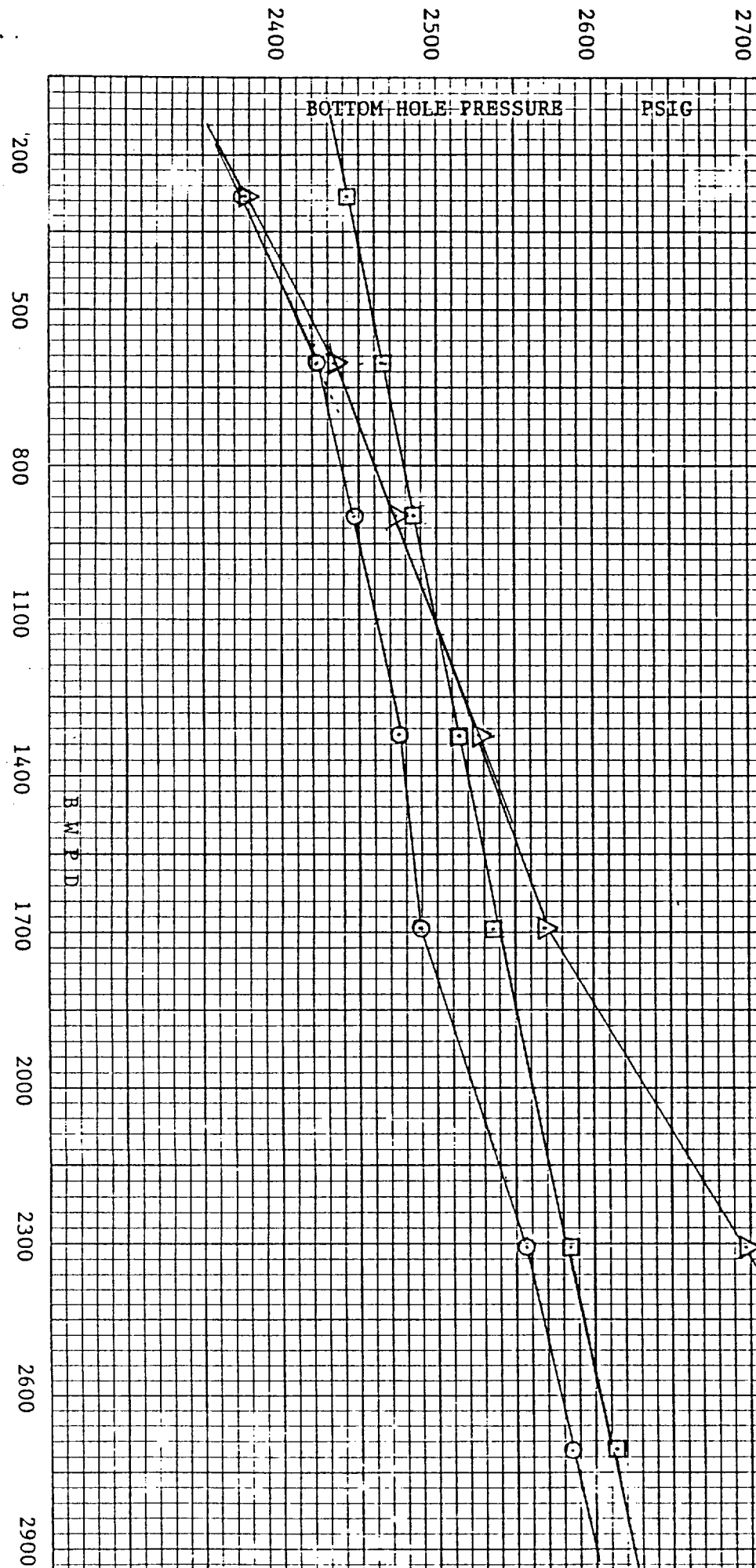
Allied - Fed

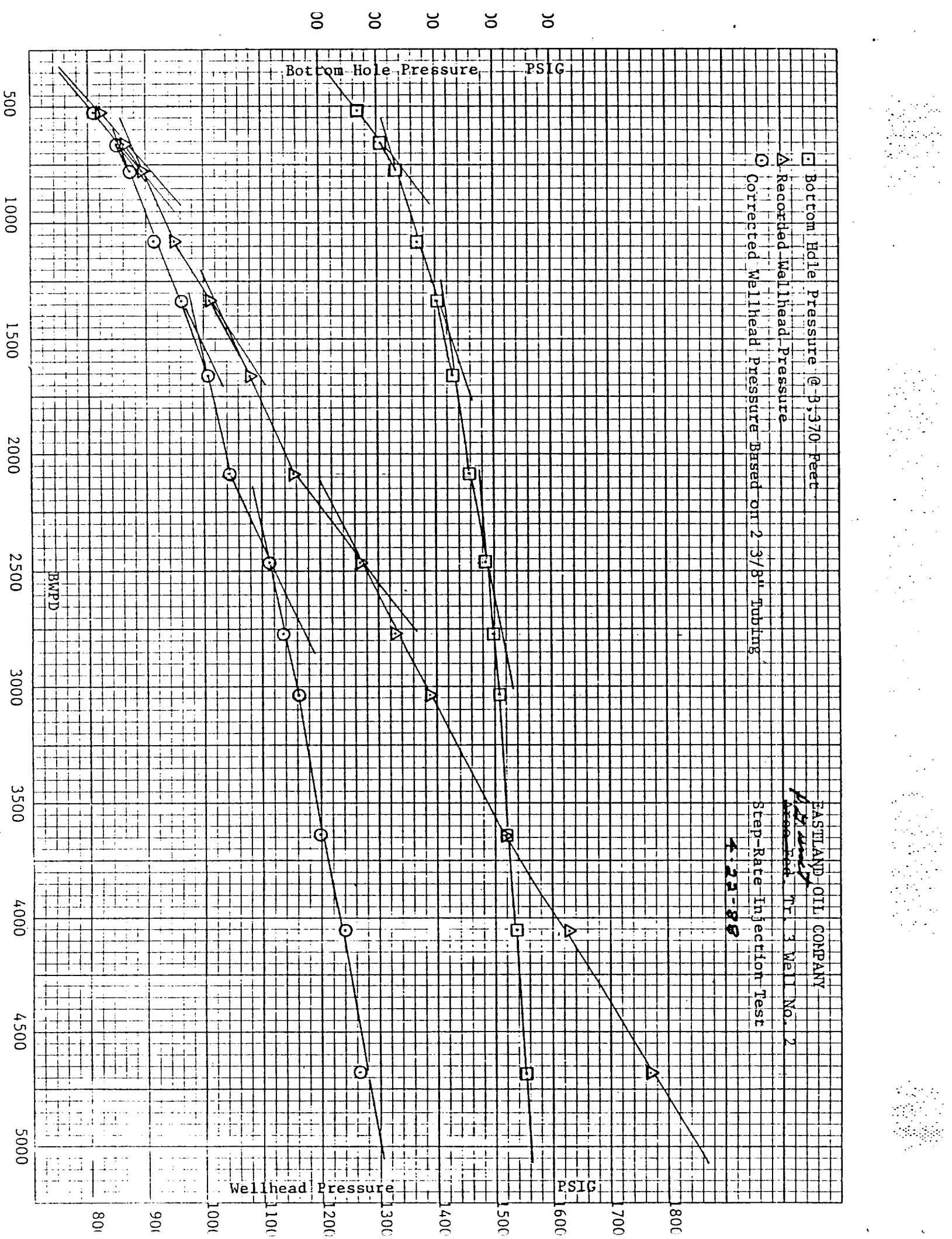
Arco - Fed

Pogo Prod.

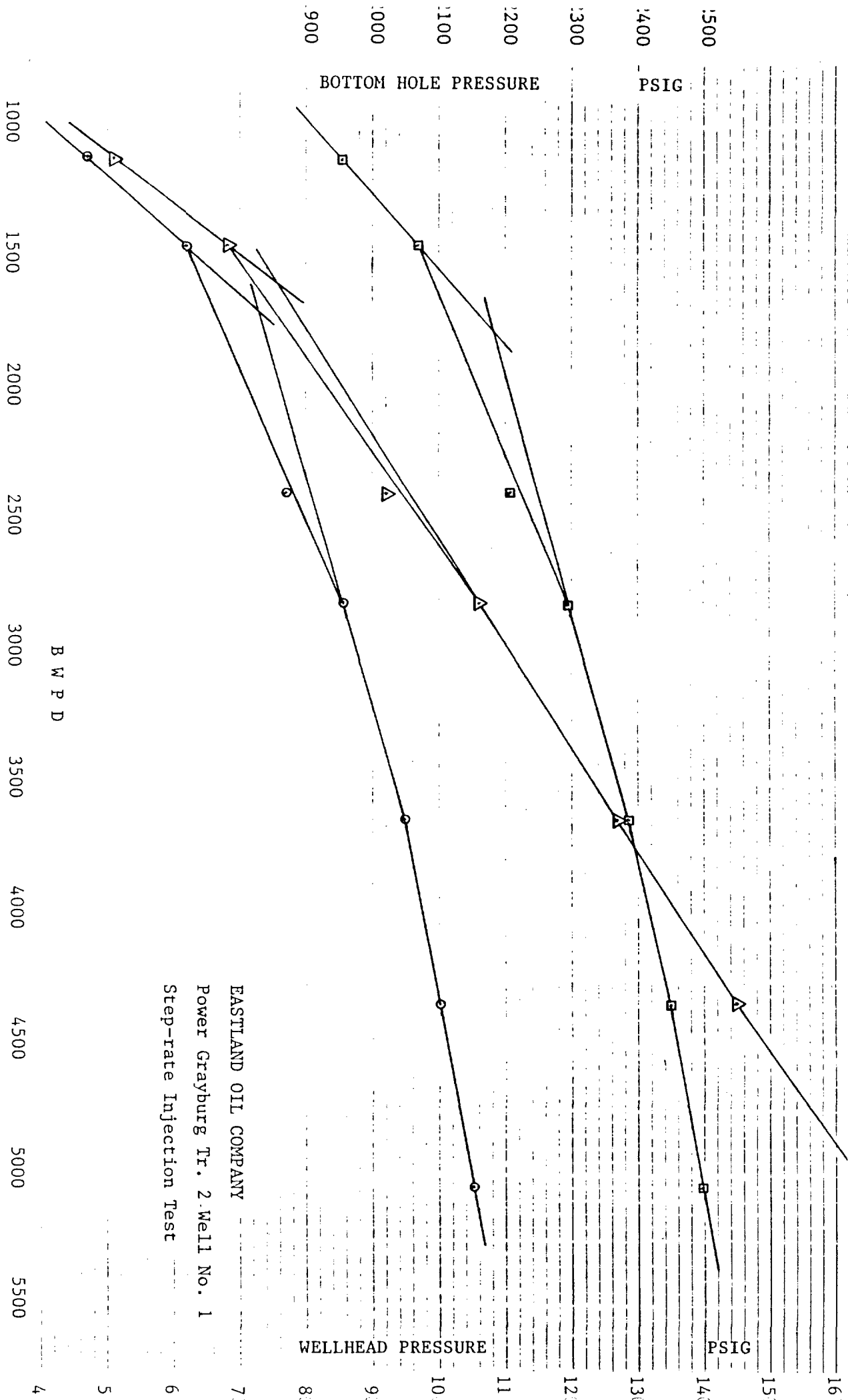
Apco HBP

Amoco





■ Bottom Hole Pressure @ 3,439 Feet
 ▲ Recorded Wellhead Pressure
 ○ Corrected Wellhead Pressure Based on 2 3/8" Tubing



EASTLAND OIL COMPANY
 Power Grayburg Tr. 2 Well No. 1
 Step-rate Injection Test



STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

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

February 9, 1989

The Eastland Oil Company
P.O. Drawer 3488
Midland, TX 79702

Attention: Travis Reed

RE: *Amended Order*
Injection Pressure Increase
Power Grayburg Federal Unit
Eddy County, New Mexico

Dear Mr. Reed:

Reference is made to your request dated January 13, 1989, to increase the surface injection pressure on four wells within the Power-Grayburg Federal Unit Waterflood Project. This request is based on step rate tests conducted on these wells during 1988. The results of the tests have been reviewed 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 wells:

<u>WELL AND LOCATION</u>	<u>MAXIMUM INJECTION SURFACE PRESSURE</u>
<i>3 Well No. 2</i> PGFU Tract 1 A Well No. 3 Unit B , Section 8 , T-18 South, R-31 East , NMPM; <i>E 6</i>	1200 PSIG
PGFU Tract 2 Well No. 1 Unit A, Section 6, T-18 South, R-31 East, NMPM;	1200 PSIG
PGFU Tract 3 Well No. 1 Unit C, Section 6, T-18 South, R-31 East, NMPM; and	1200 PSIG
PGFU Tract 4 Well No. 1 Unit A, Section 1, T-18 South, R-30 East, NMPM,	1200 PSIG

All in Eddy County, New Mexico.



STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

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

February 9, 1989

The Eastland Oil Company
P.O. Drawer 3488
Midland, TX 79702

Attention: Travis Reed

RE: Injection Pressure Increase
Power Grayburg Federal Unit
Eddy County, New Mexico

Dear Mr. Reed:

Reference is made to your request dated January 13, 1989, to increase the surface injection pressure on four wells within the Power-Grayburg Federal Unit Waterflood Project. This request is based on step rate tests conducted on these wells during 1988. The results of the tests have been reviewed 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 wells:

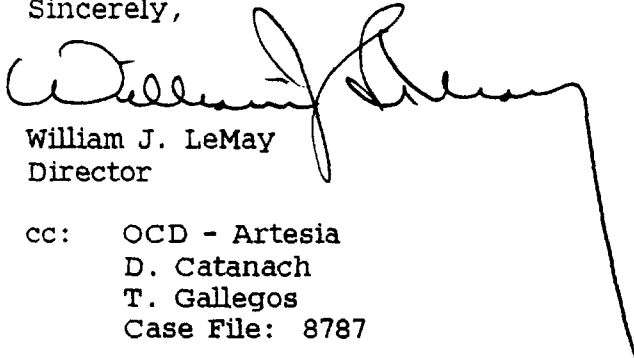
<u>WELL AND LOCATION</u>	<u>MAXIMUM INJECTION SURFACE PRESSURE</u>
PGFU Tract 1-A Well No. 3 Unit C, Section 5, T-18 South, R-31 East, NMPM;	1200 PSIG
PGFU Tract 2 Well No. 1 Unit A, Section 6, T-18 South, R-31 East, NMPM;	1200 PSIG
PGFU Tract 3 Well No. 1 Unit C, Section 6, T-18 South, R-31 East, NMPM; and	1200 PSIG
PGFU Tract 4 Well No. 1 Unit A, Section 1, T-18 South, R-30 East, NMPM,	1200 PSIG

All in Eddy County, New Mexico.

Injection Pressure Increase
The Eastland Oil Company
February 9, 1989
Page 2

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,

A handwritten signature in black ink, appearing to read 'William J. LeMay', with a long, sweeping horizontal line extending to the right.

William J. LeMay
Director

cc: OCD - Artesia
 D. Catanach
 T. Gallegos
 Case File: 8787

COMPANY: The Eastland Oil Company
ADDRESS: P.O. Drawer 3488
CITY, STATE, ZIP: Midland, Texas 79702
ATTENTION: Travis Reed

Re: Injection Pressure Increase
Power Craybury Federal Unit
Eddy County, New Mexico

Dear Sir:

Reference is made to your request dated January 13, 1989, to increase the surface injection pressure on four wells within the Power Craybury Federal Unit Waterflood Project. This request is based on ~~a~~ step rate test(s) conducted on ~~the~~ these well(s) ~~on~~ during 1988. ~~1988~~ The results of the test(s) have been reviewed by my staff and we feel an increase in injection pressure on ~~this~~ these well(s) is justified at this time.

You are therefore authorized to increase the surface injection pressure on the following well(s).

<u>Well & Location</u>	<u>Maximum Injection Surface Pressure</u>
<u>Tract 1-7</u> <u>PGFU Well No. 1 3</u> <u>Unit C, Section 5, T-18 South, R-31 East, NMPM</u>	<u>1200</u> <u>1250 PSIG</u>
<u>Tract 2</u> <u>PGFU Well No. 1 1</u> <u>Unit A, Section 6, T-18 South, R-31 East, NMPM</u>	<u>1200 PSIG</u>
<u>Tract 3</u> <u>PGFU Well No. 1 1</u> <u>Unit C, Section 6, T-18 South, R-31 East, NMPM</u>	<u>1200 PSIG</u>
<u>Tract 4</u> <u>PGFU Well No. 1 1</u> <u>Unit A, Section 1, T-18 South, R-30 East, NMPM</u>	<u>1200 PSIG</u>

All in Eddy County, New Mexico

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.

cc CCD-Alex
D. Catana
T. Collegas
File # 8787

Sincerely,
William J. LeMay

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION



GARREY CARRUTHERS
GOVERNOR

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

February 24, 1989

The Eastland Oil Company
P.O. Drawer 3488
Midland, TX 79702

Attention: Travis Reed

RE: Amended Order, Injection Pressure
Increase Power Grayburg Federal Unit,
Eddy County, New Mexico

Dear Mr. Reed:

Reference is made to your request dated January 13, 1989, to increase the surface injection pressure on four wells within the Power-Grayburg Federal Unit Waterflood Project. This request is based on step rate tests conducted on these wells during 1988. The results of the tests have been reviewed 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 wells:

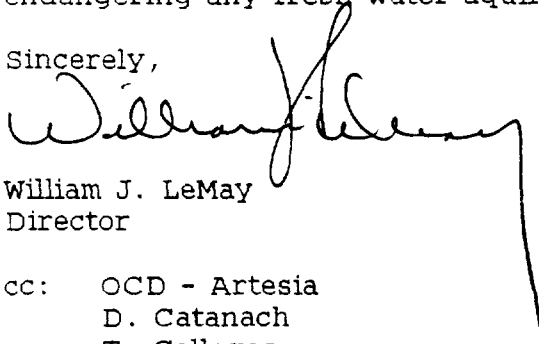
<u>WELL AND LOCATION</u>	<u>MAXIMUM INJECTION SURFACE PRESSURE</u>
PGFU Tract 3 Well No. 2 Unit E, Section 6, T-18 South, R-31 East, NMPM;	1200 PSIG
PGFU Tract 2 Well No. 1 Unit A, Section 6, T-18 South, R-31 East, NMPM;	1200 PSIG
PGFU Tract 3 Well No. 1 Unit C, Section 6, T-18 South, R-31 East, NMPM; and	1200 PSIG
PGFU Tract 4 Well No. 1 Unit A, Section 1, T-18 South, R-30 East, NMPM,	1200 PSIG

All in Eddy County, New Mexico.

Injection Pressure Increase
The Eastland Oil Company
February 24, 1989
Page 2

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,

A handwritten signature in dark ink, appearing to read "William J. LeMay". The signature is fluid and cursive, with a long, sweeping horizontal stroke at the end.

William J. LeMay
Director

cc: OCD - Artesia
D. Catanach
T. Gallegos
Case File: 8787



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONEY ANAYA
GOVERNOR

February 27, 1986

POST OFFICE BOX 2086
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

Mr. Thomas Kellahin
Kellahin & Kellahin
Attorneys at Law
Post Office Box 2265
Santa Fe, New Mexico

Re: CASE NO. 8787
ORDER NO. R-3165

Applicant:

The Eastland Oil Company

Dear Sir:

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

Sincerely,

A handwritten signature in cursive script, appearing to read "R. L. Stamets".

R. L. STAMETS
Director

RLS/fd

Copy of order also sent to:

Hobbs OCD ☒
Artesia OCD ☒
Aztec OCD ☐

Other _____



THE EASTLAND OIL COMPANY

P.O. DRAWER 3488 • MIDLAND, TEXAS 79702
TELEPHONE: (915) 683-6293 • FAX: (915) 683-6295

June 19, 1990

State of New Mexico
Oil Conservation Division
P. O. Drawer DD
Artesia, NM 88210

Attention: Mike Williams

Re: Increase in Wellhead Pressure Limitation
Power Grayburg (Federal) Unit
Eddy County, New Mexico

Gentlemen:

The Eastland Oil Company in February, 1989 was granted an increase in the surface injection pressure on our four wells in the Power Grayburg Unit Waterflood Project from the original 1,000 psi to 1,200 psi. Surface pressure has now reached 1,200 psi with 2 wells, TR2-#1 and TR3-#1 only taking an average of 353 bbls. water per month.

The attached table gives the history of injection since granted increase for past 17 months. Also enclosed are step-rate injection tests taken on TR2-#1 and TR 3-#2 wells in 1988.

Tract 2-#1 was treated w/5000 gals. 15% NEFE acid on May 9, 1990, but did not help us any on injection volumes in this well.

We have had increase in oil production from 14 bbls. per day to 90 bbls. per day with no increase in water production after treating Tract 3-#3 & Tract 4-#2 with small frac jobs for clean up. This is in area where maximum of 646,814 bbls. water has been injected in TR3-#2 and TR4-#1, compared to 103,600 bbls. injected in TR2-#1 and TR3-#1 since injection began in July, 1987 to June 1, 1990.

In order to successfully flood the Power Grayburg Unit, we request that the pressure limitation be increased to 1,400 psi and that this pressure be observed for a period sufficient to determine results of the increase.

Yours truly,

THE EASTLAND OIL COMPANY

Travis Reed
Production Superintendent

TR/bt

Enclosures

RECEIVED

JUN 21 1990

C. L. D.
ARTESIA, OFFICE

WATER INJECTION HISTORY
POWER GRAYBURG (FEDERAL) UNIT

		<u>TRACT 2-#1</u>		<u>TRACT 3-#1</u>		<u>TRACT 3-#2</u>		<u>TRACT 4-#2</u>	
YR.	MO.	Wtr.Inj. Bbls.	Wellhd. Pr.PSI	Wtr.Inj. Bbls.	Wellhd. Pr.PSI	Wtr.Inj. Bbls.	Wellhd. Pr.PSI	Wtr. Inj. Bbls.	Wellhd. Pr.PSI
89	JAN.	13	980	558	980	6845	980	3725	980
	FEB.	2676	1130	1718	1130	5473	1000	4875	1030
	MAR.	2935	1180	1762	1180	6256	980	5740	1080
	APR.	2510	1180	1392	1180	6500	980	12364	1100
	MAY	1009	1180	1442	1180	7384	980	6962	1080
	JUNE	761	1190	1454	1200	7411	1040	7734	1090
	JULY	1019	1190	1544	1200	14592	1100	14865	1160
	AUG.	646	1190	1557	1200	19160	1100	20585	1170
	SEPT.	633	1200	1175	1200	14621	1130	17443	1170
	OCT.	493	1200	1020	1200	12267	1130	16656	1170
	NOV.	329	1200	533	1200	12274	1130	19035	1170
	DEC.	289	1200	408	1200	23654	1170	17241	1170
	CUM FOR YR.	13313	-----	14563	-----	136437	-----	147225	-----
	AVE. PER MO.	1109	1168	1213	1170	11369	1060	12268	1114
90	(5 MOS.)								
	JAN.	125	1200	106	1200	18209	1180	16935	1180
	FEB.	308	1200	330	1200	15525	1180	15608	1180
	MAR.	139	1200	288	1200	16751	1180	15970	1190
	APR.	245	1200	426	1200	14550	1190	14855	1200
	MAY	938	1200	629	1200	15085	1200	12466	1200
	CUM FOR YR.	1755	-----	1779	-----	80120	-----	75834	-----
	AVE. PER MO.	351	1200	356	1200	16024	1186	15166	1190

Amoco

No. Nat. Gas

Cal - Mon, etal

H.E. Yates

State

Eastland

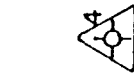
1

309,198
Bbls. imp.

④



339,616
Bbls. imp.



③

47,626
Bbls. imp.



②

55,994
Bbls. imp.

6

Eastland

U.S.



State

Eastland

①a



①b



Kenwood - Fed

Allied - Fed

Pogo Prod.

Apco

HBP

Arco - Fed

Sibyl - Fed

Belnorth, etal

U.S.

Belnorth, etal

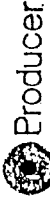
U.S.

Amoco

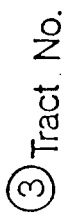
POWER GRAYBURG (FEDERAL) UNIT

Eddy County, New Mexico

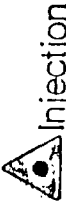
EASTLAND OIL COMPANY



Producer



Tract No.

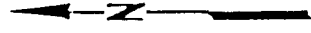


Injection Well

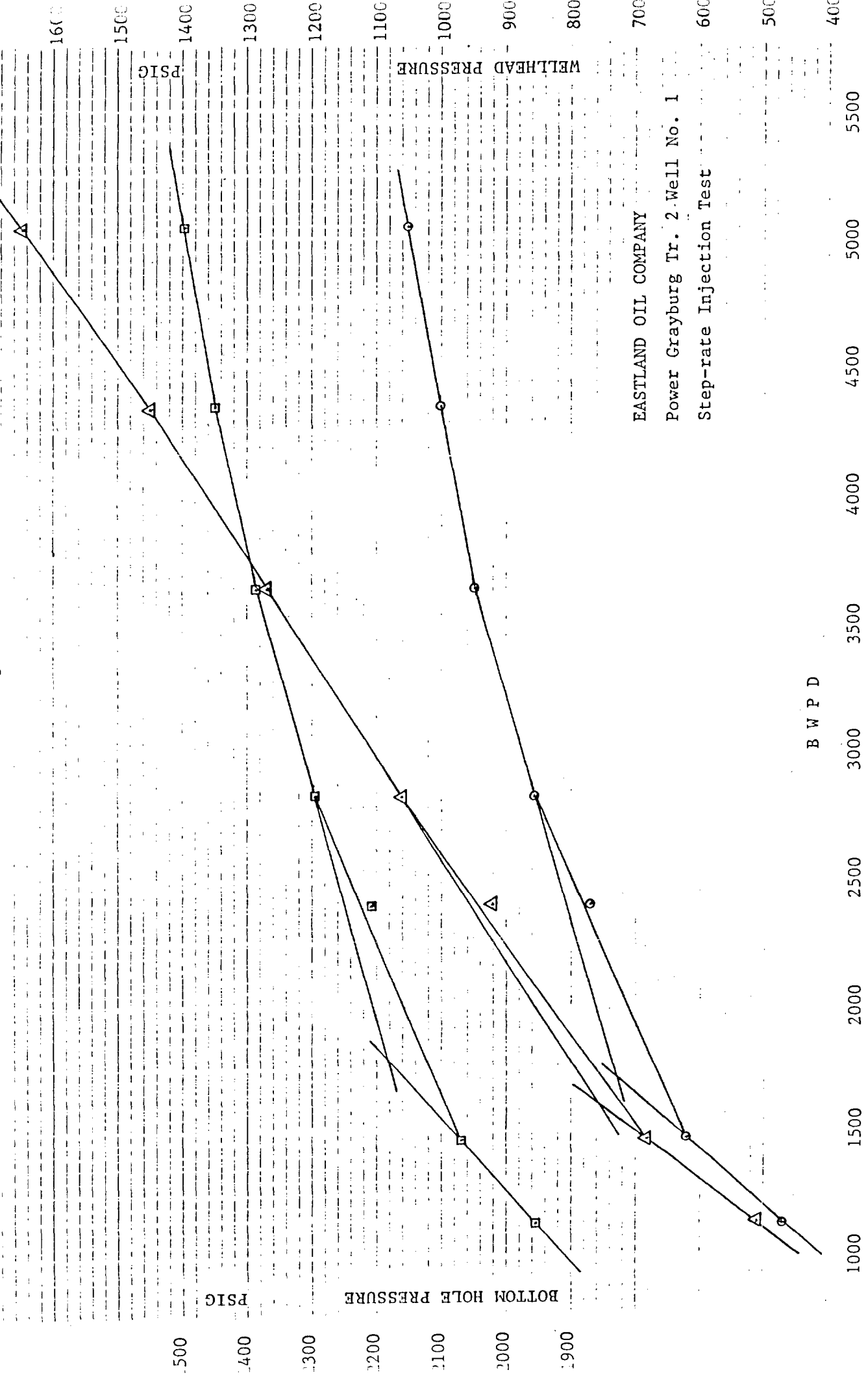


Scale In Feet

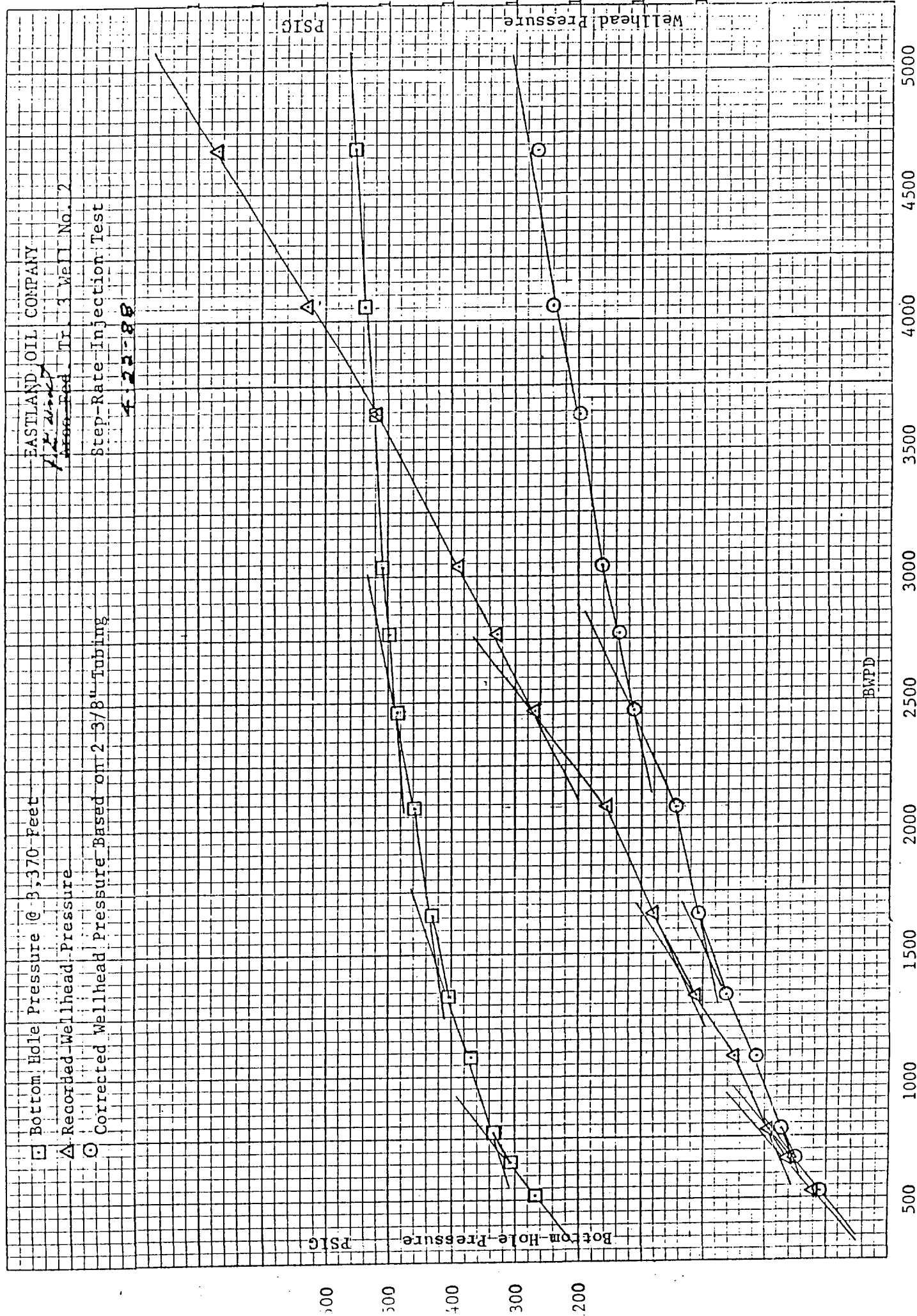
2330



■ Bottom Hole Pressure @ 3,439 Feet
 ▲ Recorded Wellhead Pressure
 ○ Corrected Wellhead Pressure Based on 2 3/8" Tubing



EASTLAND OIL COMPANY
 Power Grayburg Tr. 2 Well No. 1
 Step-rate Injection Test





STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

August 1, 1990

GARREY CARRUTHERS
GOVERNOR

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

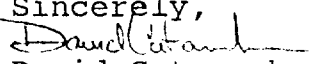
Eastland Oil Company
P.O. Drawer 3488
Midland, Texas 79702

Attention: Travis Reed

Dear Mr. Reed:

Reference is made to your request dated June 19, 1990 to increase the surface injection pressure on four wells within the Power Grayburg Unit Waterflood Project. It is Division policy to approve injection pressure increases only after a showing that such increases will not result in the fracturing of the injection formation. While I am sympathetic with your problem, I must answer to the Environmental Protection Agency regarding such action. I would be happy to consider your request if accompanied by at least two current step rate tests.

If you should have any questions, please contact myself at (505) 827-5800.

Sincerely,

David Catanach
Engineer

xc: OCD-Artesia
Case File-8787