



NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

March 16, 1998

CF 3059
R-2708
CF 3769
R-3420
WFX-734
PDEV0020600734

Devon Energy Corporation
20 North Broadway, Suite 1500
Oklahoma City, Oklahoma 73102-8260

Attn: Mr. E.L. Buttross, Jr.

**RE: Injection Pressure Increase,
East Shugart Unit Waterflood Project,
Eddy County, New Mexico**

Reference is made to your request dated February 12, 1998, to increase the surface injection pressure on a field-wide group of wells in the above referenced waterflood project. This request is based on fracture pressure gradient data obtained on several offsetting wells. The data has been reviewed by my staff. At this time, we feel an increase in injection pressure on the wells contained in your request is justified.

You are therefore authorized to increase the surface injection pressure on the following wells:

<i>Well Name and Number</i>	<i>ULSTR</i>	<i>Pressure Gradient</i>	<i>Top Perf</i>	<i>Authorized Pressure</i>
East Shugart Unit Well No.2	B-34-18S-27E	.39 psi/ft	3298'	1286 PSIG
East Shugart Unit Well No.9	H-35-18S-27E	.45 psi/ft	3404'	1532 PSIG
East Shugart Unit Well No.20	L-35-18S-27E	.48 psi/ft	3416'	1640 PSIG
East Shugart Unit Well No.24	N-35-18S-27E	.50 psi/ft	3355'	1678 PSIG
East Shugart Unit Well No.33	K-34-18S-27E	.44 psi/ft	3400'	1496 PSIG
East Shugart Unit Well No.41	G-34-18S-27E	.46 psi/ft	3634'	1672 PSIG
East Shugart Unit Well No.42	A-34-18S-27E	.46 psi/ft	3641'	1675 PSIG
East Shugart Unit Well No.52	B-35-18S-27E	.34 psi/ft	3701'	1258 PSIG
East Shugart Unit Well No.76	F-35-18S-27E	.41 psi/ft	3525'	1445 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,

Lori Wrotenberg,
Director

Injection Pressure Increase
Devon Energy Corporation
March 16, 1998
Page 2

LW/BES/kv

cc: Oil Conservation Division - Artesia
File: Case File Nos.3059, 3769; WFXs-734; PSI-X 3rd QTR 98 ✓



**NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT**

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

April 16, 1998

CORRECTED ISSUE

Devon Energy Corporation
20 North Broadway, Suite 1500
Oklahoma City, Oklahoma 73102-8260

Attn: Mr. E.L. Buttross, Jr.

***RE: Injection Pressure Increase,
East Shugart Unit Waterflood Project,
Eddy County, New Mexico***

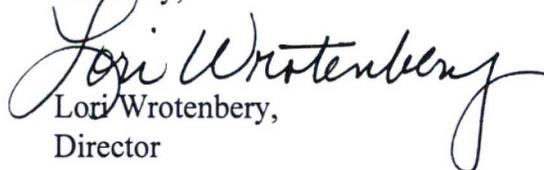
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East Shugart Unit Well No.2	B-34-18S-31E	.39 psi/ft	3298'	1286 PSIG
East Shugart Unit Well No.9	H-35-18S-31E	.45 psi/ft	3404'	1532 PSIG
East Shugart Unit Well No.20	L-35-18S-31E	.48 psi/ft	3416'	1640 PSIG
East Shugart Unit Well No.24	N-35-18S-31E	.50 psi/ft	3355'	1678 PSIG
East Shugart Unit Well No.33	K-34-18S-31E	.44 psi/ft	3400'	1496 PSIG
East Shugart Unit Well No.41	G-34-18S-31E	.46 psi/ft	3634'	1672 PSIG
East Shugart Unit Well No.42	A-34-18S-31E	.46 psi/ft	3641'	1675 PSIG
East Shugart Unit Well No.52	B-35-18S-31E	.34 psi/ft	3701'	1258 PSIG
East Shugart Unit Well No.76	F-35-18S-31E	.41 psi/ft	3525'	1445 PSIG

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Lori Wrotenberg,
Director

*Injection Pressure Increase
Devon Energy Corporation
March 16, 1998
Page 2*

LW/BES/kv

cc: Oil Conservation Division - Artesia
File: Case File Nos.3059, 3769; WFXs-734; PSI-X 3rd QTR 98 ✓
4th

ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION
- Engineering Bureau -

ADMINISTRATIVE APPLICATION COVERSHEET

THIS COVERSHEET IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS

Application Acronyms:

- [NSP-Non-Standard Proration Unit] [NSL-Non-Standard Location]
- [DD-Directional Drilling] [SD-Simultaneous Dedication]
- [DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]
- [PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]
- [WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]
- [SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]
- [EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]



[1] **TYPE OF APPLICATION - Check Those Which Apply for [A]**

- [A] Location - Spacing Unit - Directional Drilling
 NSL NSP DD SD

Check One Only for [B] or [C]

- [B] Commingling - Storage - Measurement
 DHC CTB PLC PC OLS OLM

- [C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery
 WFX PMX SWD IPI EOR PPR

[2] **NOTIFICATION REQUIRED TO: - Check Those Which Apply, or Does Not Apply**

- [A] Working, Royalty or Overriding Royalty Interest Owners
- [B] Offset Operators, Leaseholders or Surface Owner
- [C] Application is One Which Requires Published Legal Notice
- [D] Notification and/or Concurrent Approval by BLM or SLO
U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office
- [E] For all of the above, Proof of Notification or Publication is Attached, and/or,
- [F] Waivers are Attached

[3] **INFORMATION / DATA SUBMITTED IS COMPLETE - Statement of Understanding**

I hereby certify that I, or personnel under my supervision, have read and complied with all applicable Rules and Regulations of the Oil Conservation Division. Further, I assert that the attached application for administrative approval is accurate and complete to the best of my knowledge and where applicable, verify that all interest (WI, RI, ORRI) is common. I further verify that all applicable API Numbers are included. I understand that any omission of data, information or notification is cause to have the application package returned with no action taken.

Note: Statement must be completed by an individual with supervisory capacity.

E. L. Buttross
 Print or Type Name

E. L. Buttross Jr.
 Signature

District Engineer
 Title

2/11/98
 Date



ENERGY CORPORATION

20 North Broadway, Suite 1500
Oklahoma City, Oklahoma 73102-8260

Telephone 405/235-3611
FAX 405/552-4550

February 11, 1998

Certified Mail No. Z 397 639 542

STATE OF NEW MEXICO
Energy, Minerals and Natural Resources Dept.
Oil Conservation Division, District II
2040 South Pacheco
Santa Fe, NM 87505

ATTN: Ben Stone

RE: Injection Pressure Increase
East Shugart Unit # 2, 9, 20, 24, 33, 41, 42, 52, & 76
Sections 34 and 35 of T18S-R31E
Eddy County, New Mexico

Gentlemen:

Devon Energy Corporation requests that the maximum injection pressures for the above referenced wells be increased. This request is based on the data in Table 1, which shows the frac gradients obtained from stimulation treatments on wells in the area. Figure I is a map showing the location of the proposed injectors and the wells used in this study. The wells were grouped into two areas, east and west.

The frac gradient is used to calculate the maximum surface injection pressure (injection wellhead pressure gradient x depth to the uppermost perforation = maximum surface injection pressure) that can be attained without fracturing the formation. Provided the calculated wellhead pressure gradient is not exceeded, the formation cannot be fractured and injection fluids will be contained in the formation. This had been confirmed through injection surveys run on existing injection wells in the unit.

Based on the attached information, Devon respectfully requests that the **maximum wellhead pressure gradient for the subject injection wells be increased to .44 psi per foot of depth to the uppermost perforation.** This is the average for the wells in each area of interest.

The injection wells and the requested increased maximum injection pressures are as follows:

Well Name	Location UL-S-T-R	Perfs	Requested Max Injection surf Pressure
East Shugart Unit #2	UL "B" of Section 34-T18S-R27E	3298-3882'	1451
East Shugart Unit #9	UL "H" of Section 35-T18S-R27E	3404-3895'	1498
East Shugart Unit #20	UL "L" of Section 35-T18S-R27E	3416-3862'	1503
East Shugart Unit #24	UL "N" of Section 35-T18S-R27E	3355-3899'	1476
East Shugart Unit #33	UL "K" of Section 34-T18S-R27E	3400-3857'	1496
East Shugart Unit #41	UL "G" of Section 34-T18S-R27E	3634-3813'	1599
East Shugart Unit #42	UL "A" of Section 34-T18S-R27E	3641-3813'	1602
East Shugart Unit #52	UL "B" of Section 35-T18S-R27E	3701-3875'	1628
East Shugart Unit #76	UL "F" of Section 35-T18S-R27E	3525-3902'	1551

We will also periodically run injection surveys to ensure that injection is confined to the Queen formation.

If you have questions, please call me at (405) 552-4509.

Sincerely,

DEVON ENERGY CORPORATION (NEVADA)



E. L. Buttross, Jr.
District Engineer

EB/dk

Enclosures

copy: well files

WEST

TABLE I					
INJECTION WELLHEAD PRESSURE GRADIENTS					
EAST SHUGART UNIT (west)					
PROPOSED INJECTOR	OFFSET WELLS	TREATMENT ISIP	TOP PERF	FRAC GRADIENT PSI/FT	WELLHEAD PRESSURE GRADIENT PSI/FT
East Shugart Unit #41	ESU #41	1350	3634	0.81	0.34
	ESU #43	1616	2664	1.04	0.57
	ESU #42	1511	3641	0.85	0.38
	ESU #40	1360	2736	0.93	0.46
	ESU #54	1450	2670	0.98	0.51
	ESU #36	1602	2634	1.04	0.57
	ESU #2	1650	3759	0.87	0.40
	ESU #33	1418	2606	0.98	0.51
	ESU #14	1400	3341	0.85	0.38
	ESU #14	1400	3341	0.85	0.38
East Shugart Unit #33	ESU #33	1418	3400	0.85	0.38
	ESU #54	1450	2670	0.98	0.51
	ESU #36	1602	2634	1.04	0.57
	ESU #41	1400	3760	0.81	0.34
	ESU #14	1400	3341	0.85	0.38
	ESU #14	1400	3341	0.85	0.38
East Shugart Unit #2	ESU #2	NA			
	ESU #42	1511	3641	0.85	0.38
	ESU #41	1350	3634	0.81	0.34
	ESU #40	1360	2736	0.93	0.46
East Shugart Unit #42	ESU #42	1511	3641		
	ESU #40	1360	2736	0.93	0.46
	ESU #43	1616	2664	1.04	0.57
	ESU #41	1350	3634	0.81	0.34
Average				0.91	0.44

.46

.44

.39

.96

**TABLE I
INJECTION WELLHEAD PRESSURE GRADIENTS
EAST SHUGART UNIT (east)**

PROPOSED INJECTOR	OFFSET WELLS	TREATMENT ISIP	TOP PERF	FRAC GRADIENT PSI/FT	WELLHEAD PRESSURE GRADIENT PSI/FT
East Shugart Unit #52	ESU #52				
	ESU #7	1400	3701	0.81	0.34
	ESU #69	1280	3676	0.78	0.31
	ESU #50	1760	3692	0.91	0.44
	ESU #49	1180	3712	0.75	0.28
	ESU #75	1460	3740	0.82	0.35
East Shugart Unit #24	ESU #24	NA			
	ESU #74	1300	3457	0.81	0.34
	ESU #72	2124	3182	1.10	0.63
	ESU #71	1910	3152	1.04	0.57
	ESU #58	1580	3363	0.90	0.43
	ESU #57	1890	3348	1.00	0.53
East Shugart Unit #76	ESU #76	1670	3525	0.91	0.44
	ESU #69	1280	3676	0.78	0.31
	ESU #50	1760	3692	0.91	0.44
	ESU #78	1247	3460	0.79	0.32
	ESU #47	1516	2731	0.99	0.52
East Shugart Unit #9	ESU #9	NA			
	ESU #49	1180	3712	0.75	0.28
	ESU #61	2050	3563	1.01	0.54
	ESU #75	1460	3740	0.82	0.35
	ESU #56	2400	3591	1.10	0.63
	ESU #50	1760	3692	0.91	0.44
East Shugart Unit #20	ESU #20	NA			
	ESU #71	1910	3152	1.04	0.57
	ESU #72	2124	3182	1.10	0.63
	ESU #25	1600	3535	0.89	0.42
	ESU #67	1517	3406	0.88	0.41
	ESU #45	1483	2710	0.98	0.51
	ESU #78	1247	3460	0.79	0.32
	AVERAGE			0.91	0.44

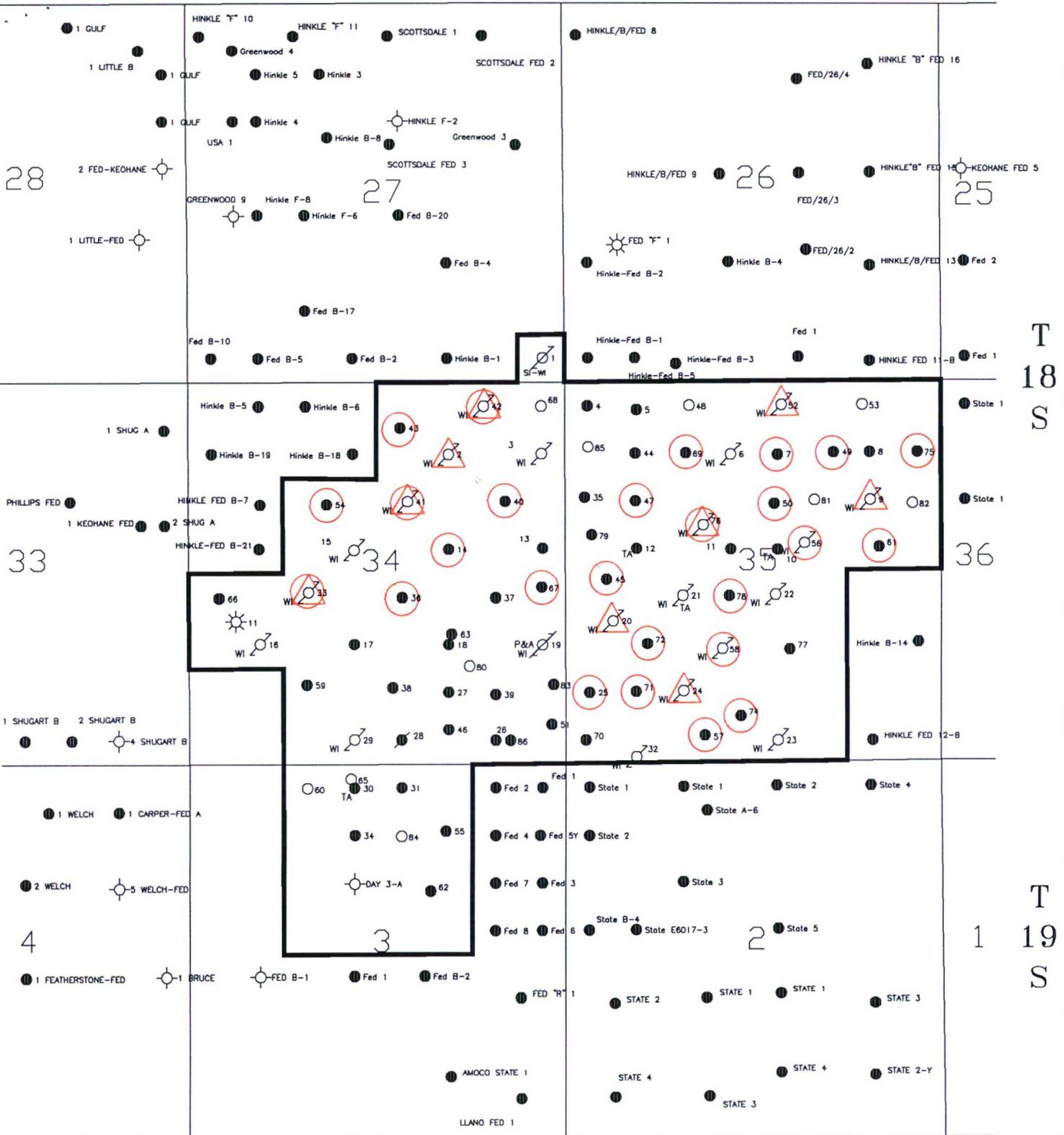
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EAST SHUGART UNIT
EDDY COUNTY, NEW MEXICO

FIGURE 1

- PROPOSED INJECTOR
- FRAC GRADIENT DATA

