

State of New Mexico
ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT
Santa Fe, New Mexico 87505



February 1, 1995



Greenhill Petroleum Corporation
11490 Westheimer Road, Suite 200
Houston, Texas 77077-6841

CF 10154
R-9431

**RE: Injection Pressure Increase
Lovington San Andres Unit
Waterflood Project
Lea County, New Mexico**

Dear Mr. Tilley:

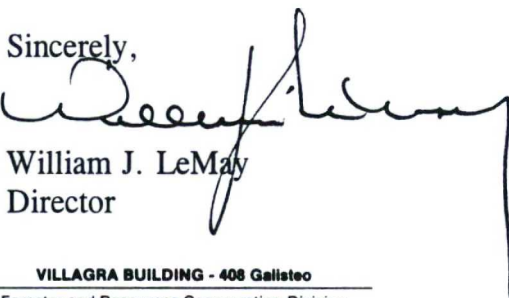
Reference is made to your request dated January 9, 1995, to increase the surface injection pressure on two wells within the Lovington San Andres Unit Waterflood Project. This request is based on step rate tests conducted on these wells on December 27, 1994. The results of the tests have been reviewed 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:

Well and Location	Maximum Injection Surface Pressure
LSAU Well No. 25 Unit O, Section 36, Township 16 South, Range 36 East	2050 PSIG
LSAU Well No. 5 Unit A, Section 36, Township 16 South, Range 36 East	2050 PSIG
Both wells located in Lea 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.

Sincerely,


William J. LeMay
Director

VILLAGRA BUILDING - 408 Galisteo

Forestry and Resources Conservation Division
P.O. Box 1948 87504-1948
827-5830

Park and Recreation Division
P.O. Box 1147 87504-1147
827-7465

2040 South Pacheco

Office of the Secretary
827-5950

Administrative Services
827-5925

Energy Conservation & Management
827-5900

Mining and Minerals
827-5970

Oil Conservation
827-7131

Injection Pressure Increase
Greenhill Petroleum Corporation
February 1, 1995
Page 2

WJL/DRC

cc: Oil Conservation Division - Hobbs
File: Case File 10154; PSI-X 1ST QTR

3rd



GREENHILL PETROLEUM CORPORATION

Incorporated in Delaware, U.S.A.

11490 WESTHEIMER ROAD, SUITE 200
HOUSTON, TEXAS 77077-6841
TELEPHONE (713) 589-8484
FAX (713) 589-9399

RECEIVED

65 JAN 14 AM 8 52

January 9, 1995

Oil Conservation Division
Energy, Minerals and Natural Resources Department
State of New Mexico
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

Attention: David Catanach

Re: Lovington San Andres Unit
Lea County, New Mexico
Request for Injection Pressure Increases

Gentlemen:

In compliance with the current Administrative Order (# WFX-632), Greenhill Petroleum Corporation has run additional step rate tests on selected water injection wells in order to show justification for injection pressure increases. Attached Table 1 shows the current maximum allowed injection pressure and the requested maximum allowable injection pressure for each well tested. Included are the step-rate test results which were conducted December 27, 1994. This data is submitted for your review to substantiate our request.

We respectfully request approval to increase the wellhead injection pressures as indicated for each well submitted. Until notification is received the wells will continued to be operated at the current maximum allowed pressures.

Thank you for your time and consideration of this request.

Sincerely,

David M. Tilley
Production Engineer

DMT:s
Enclosures

cc: Files

TABLE 1

Lovington San Andres Unit

WELL	#	Current Maximum Injection Pressure	Requested Maximum Injection Pressure
LSAU	5	1800	2050
LSAU	25	1800	2050

WEST-TEST, INC.

A SUBSIDIARY OF JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

File
Dust
1-9-95

STEP RATE INJECTION TEST

CLIENT: GREENHILL PETROLEUM CORPORATION

DATE: DECEMBER 27, 1994

WELL NAME: LOVINGTON SAN ANDRES UNIT NO. 25
LEA COUNTY, NEW MEXICO

WO#: 94-14-2271

OPEN HOLE 4515-5099

PACKER DEPTH = 4440

BHP GAUGE DEPTH = 4807

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
1	12:50	1477.8				1477.8		3724.0
	12:55	1580.1	0.9	259.2	3.411	1576.7	7.56	3816.4
	1:00	1613.2	1.7	230.4	2.744	1610.5	6.72	3847.5
	1:05	1643.8	2.6	259.2	3.411	1640.4	7.56	3871.8
				249.6				
2	1:10	1735.9	4.2	460.8	9.890	1726.0	13.44	3958.9
	1:15	1760.2	5.7	432.0	8.777	1751.4	12.60	3996.1
	1:20	1792.1	7.3	460.8	9.890	1782.2	13.44	4020.7
3				451.2				
	1:25	1924.0	9.9	748.8	24.283	1899.7	21.84	4146.5
	1:30	1979.0	12.5	748.8	24.283	1954.7	21.84	4197.8
	1:35	2003.4	15.0	720.0	22.583	1980.8	21.00	4226.0
4				739.2				
	1:40	2139.3	18.8	1094.4	49.000	2090.3	31.92	4350.0
	1:45	2179.1	22.4	1036.8	44.336	2134.8	30.24	4393.0
	1:50	2211.2	26.1	1065.6	46.641	2164.6	31.08	4431.4
5				1065.6				
	1:55	2320.2	30.9	1382.4	75.490	2244.7	40.32	4522.5
	2:00	2351.0	35.6	1353.6	72.607	2278.4	39.48	4558.3
	2:05	2375.4	40.3	1353.6	72.607	2302.8	39.48	4585.2
6				1363.2				
	2:10	2453.6	46.1	1670.4	107.136	2346.5	48.72	4646.5
	2:15	2484.4	51.7	1612.8	100.402	2384.0	47.04	4680.5
	2:20	2502.4	57.5	1670.4	107.136	2395.3	48.72	4706.9
				1651.2				

WEST-TEST, INC.

A SUBSIDIARY OF JOHN WEST ENGINEERING COMPANY

Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: GREENHILL PETROLEUM CORPORATION

DATE: DECEMBER 27, 1994

WELL NAME: LOVINGTON SAN ANDRES UNIT NO. 25
LEA COUNTY, NEW MEXICO

WO#: 94-14-2271

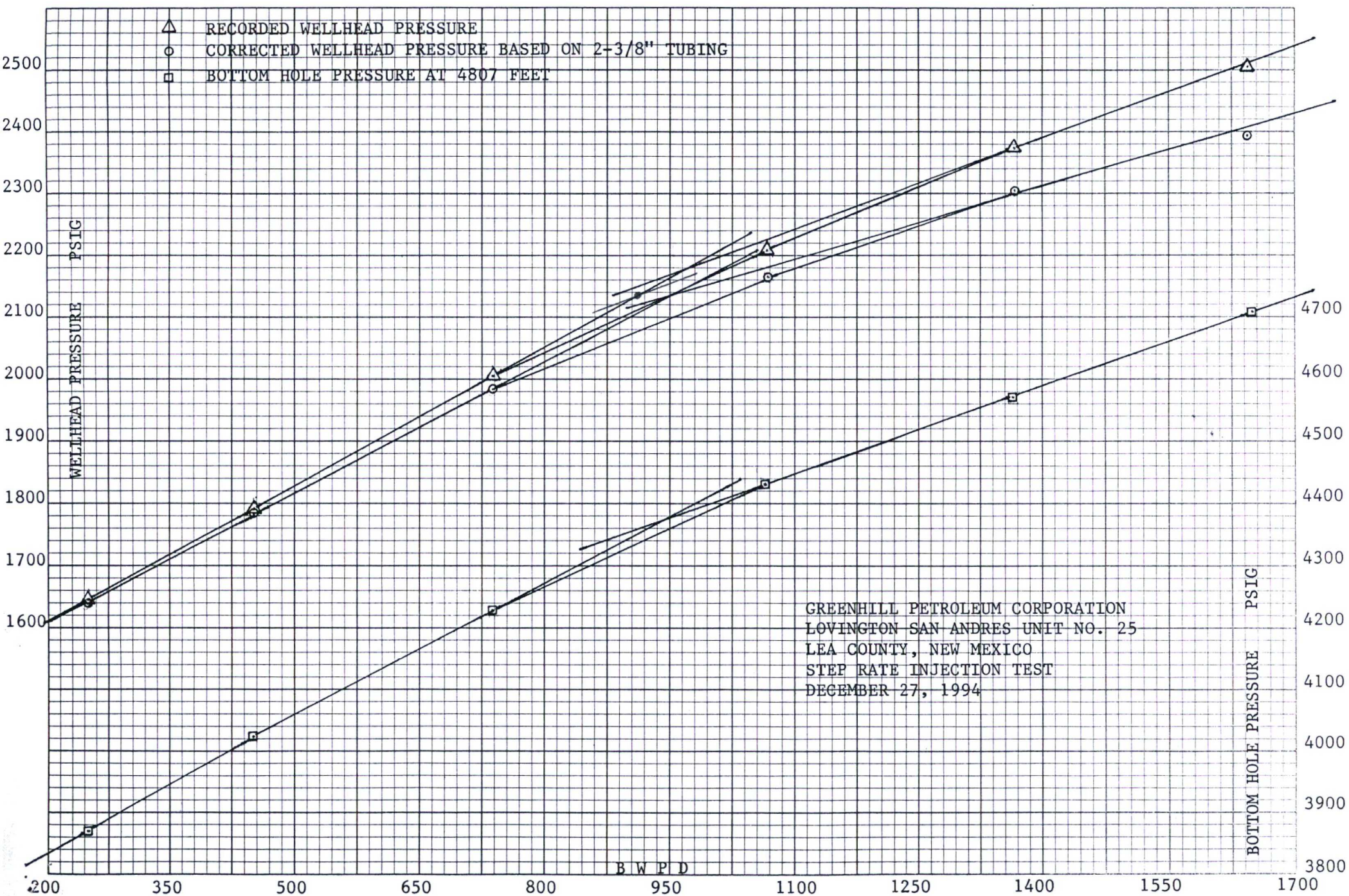
OPEN HOLE 4515-5099

PACKER DEPTH = 4440

BHP GAUGE DEPTH = 4807

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
1	12:50	1477.8				1477.8		3724.0
	12:55	1580.1	0.9	259.2	3.411	1576.7	7.56	3816.4
	1:00	1613.2	1.7	230.4	2.744	1610.5	6.72	3847.5
	1:05	1643.8	2.6	259.2	3.411	1640.4	7.56	3871.8
				249.6				
2	1:10	1735.9	4.2	460.8	9.890	1726.0	13.44	3958.9
	1:15	1760.2	5.7	432.0	8.777	1751.4	12.60	3996.1
	1:20	1792.1	7.3	460.8	9.890	1782.2	13.44	4020.7
				451.2				
	1:25	1924.0	9.9	748.8	24.283	1899.7	21.84	4146.5
3	1:30	1979.0	12.5	748.8	24.283	1954.7	21.84	4197.8
	1:35	2003.4	15.0	720.0	22.583	1980.8	21.00	4226.0
				739.2				
	1:40	2139.3	18.8	1094.4	49.000	2090.3	31.92	4350.0
	1:45	2179.1	22.4	1036.8	44.336	2134.8	30.24	4393.0
4	1:50	2211.2	26.1	1065.6	46.641	2164.6	31.08	4431.
				1065.6				
	1:55	2320.2	30.9	1382.4	75.490	2244.7	40.32	45'
	2:00	2351.0	35.6	1353.6	72.607	2278.4	39.48	4'
	2:05	2375.4	40.3	1353.6	72.607	2302.8	39.48	
5				1363.2				
	2:10	2453.6	46.1	1670.4	107.136	2346.5	48.72	
	2:15	2484.4	51.7	1612.8	100.402	2384.0	47.04	
	2:20	2502.4	57.5	1670.4	107.136	2395.3	48.7	
				1651.2				

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
STEP NO. & REMARKS	TIME	SURFACE TUBING PRESS. (psig)	CUMMULATIVE VOL. INJECTED (bbls)	INJECTION RATE (bbls/day)	FRICTION HEAD LOSS (psi)	CORRECTED TUBING PRESS. (psi) (1) - (4)	INJECTION RATE (gpm) (3)/34.2837	MEASURED BHP (psi)
FALLOFF	2:21	2328.1				2328.1		4630.4
	2:22	2275.5				2275.5		4578.7
	2:23	2230.6				2230.6		4530.9
	2:24	2185.7				2185.7		4483.2
	2:25	2143.5				2143.5		4438.1
	2:30	1966.6				1966.6		4248.0
	2:35	1843.7				1843.7		4118.5



WEST-TEST, INC.
A SUBSIDIARY OF JOHN WEST ENGINEERING COMPANY
Hobbs, New Mexico

STEP RATE INJECTION TEST

CLIENT: GREENHILL PETROLEUM CORPORATION

DATE: DECEMBER 27, 1994

WELL NAME: LOVINGTON SAN ANDRES UNIT NO. 5
LEA COUNTY, NEW MEXICO

WO#: 94-14-2270

OPEN HOLE 4575-5130

PACKER DEPTH = 4490

BHP GAUGE DEPTH = 4852

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1)-(4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
1	9:00	1481.0				1481.0		3722.4
	9:05	1578.2	0.8	230.4	2.769	1575.4	6.72	3763.8
	9:10	1611.4	1.6	230.4	2.769	1608.6	6.72	3792.0
	9:15	1635.7	2.5	259.2	3.443	1632.3	7.56	3814.4
				240.0				
2	9:20	1722.7	4.2	489.6	11.168	1711.5	14.28	3886.0
	9:25	1762.4	5.9	489.6	11.168	1751.2	14.28	3933.4
	9:30	1802.0	7.6	489.6	11.168	1790.8	14.28	3971.0
3				489.6				
	9:35	1871.1	9.9	662.4	19.536	1851.6	19.32	4027.9
	9:40	1918.5	12.1	633.6	17.994	1900.5	18.48	4069.8
	9:45	1936.4	14.4	662.4	19.536	1916.9	19.32	4105.3
				652.8				
4	9:50	2009.3	17.8	979.2	40.260	1969.0	28.56	4170.3
	9:55	2049.0	21.1	950.4	38.097	2010.9	27.72	4215.8
	10:00	2087.4	24.5	979.2	40.260	2047.1	28.56	4251.2
				969.6				
5	10:05	2148.9	28.8	1238.4	62.167	2086.7	36.12	4301.2
	10:10	2178.4	33.1	1238.4	62.167	2116.2	36.12	4340.0
	10:15	2214.2	37.5	1267.2	64.868	2149.3	36.96	4367.5
6				1248.0				
	10:20	2262.9	42.8	1526.4	91.528	2171.4	44.52	4405.6
	10:25	2288.5	48.1	1526.4	91.528	2197.0	44.52	4435.5
	10:30	2307.7	53.4	1526.4	91.528	2216.2	44.52	4462.7
				1526.4				
7	10:35	2379.5	59.8	1843.2	129.740	2249.8	53.76	4496.4
	10:40	2393.3	66.3	1872.0	133.515	2259.8	54.60	4523.3
	10:45	2416.6	72.7	1843.2	129.740	2286.9	53.76	4549.1
				1852.8				

STEP NO. & REMARKS	TIME	(1) SURFACE TUBING PRESS. (psig)	(2) CUMMULATIVE VOL. INJECTED (bbls)	(3) INJECTION RATE (bbls/day)	(4) FRICTION HEAD LOSS (psi)	(5) CORRECTED TUBING PRESS. (psi) (1) - (4)	(6) INJECTION RATE (gpm) (3)/34.2857	(7) MEASURED BHP (psi)
8 FALLOFF	10:50	2482.0	80.0	2102.4	165.497	2316.5	61.32	4577.3
	10:55	2494.7	87.6	2188.8	178.298	2316.4	63.84	4605.1
	11:00	2512.6	95.0	2131.2 2140.8	169.715	2342.9	62.16	4626.2
	11:01	2339.5				2339.5		4621.9
	11:02	2328.0				2328.0		4619.9
	11:03	2325.4				2325.4		4617.9
	11:04	2324.1				2324.1		4616.7
	11:05	2321.5				2321.5		4613.6
	11:10	2313.7				2313.7		4600.0
	11:15	2307.3				2307.3		4586.6

