



**ARCO Permian**  
PO Box 1089  
Eunice NM 88231  
Telephone 505 394 1600

Southeast New Mexico Asset Area

December 16, 1998

Oil Conservation Division  
2040 South Pacheco St.  
Santa Fe, New Mexico 87505

Subject:       Annual Survey  
                  State AA-2 #1 SWD661  
                  Eddy County, New Mexico

Gentlemen:

Enclosed is a copy of the annual survey that SWD order #SWD661 requires. Results of the survey are noted in the comments section of the log.

Please contact me at (505) 394-1602 if I can be of any assistance.

Sincerely,

Robert L. Manthei  
Operations Supervisor

RLM/vo

cc:     OCD – Artesia  
          DOE – Carlsbad  
          Central Files

Enclosure



NEW MEXICO ENERGY, MINERALS  
& NATURAL RESOURCES DEPARTMENT

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

September 28, 1998

ARCO Permian  
P.O. Box 1610  
Midland, Texas 79702-1610

Attn: Mr. Dennis Braaten

**RE: Injection Pressure Increase,  
State AA-2 SWD Well No.1,  
Eddy County, New Mexico**

Dear Mr. Braaten:

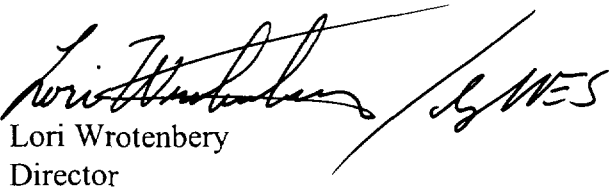
Reference is made to your request dated September 21, 1998 to increase the surface injection pressure on the above referenced well. This request is based on data obtained from a step rate test conducted on September 14, 1998. The results of the test have been reviewed by my staff and we feel an increase in injection pressure on this well is justified at this time.

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

| <b>Well and Location</b>                                                             | <b>Maximum Injection Pressure</b> |
|--------------------------------------------------------------------------------------|-----------------------------------|
| State AA-2 SWD Well No.1                                                             | 1200 PSIG                         |
| Located in Section 35, Township 22 South, Range 31 East,<br>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.

Sincerely,

  
Lori Wrotenbery  
Director

LW/BES/kv

cc: Oil Conservation Division - Hobbs  
Files: SWD-661; PSI-X 2ndQTR98

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

**STEP RATE INJECTION TEST**

CLIENT: ARCO PERMIAN

DATE: SEPTEMBER 14, 1998

WELL NAME: STATE AA-2 NO.1 SWD  
 EDDY COUNTY, NEW MEXICO

WO#: 98-14-1243

PERFS - 4489-5870

PACKER DEPTH = 4389

BHP GAUGE DEPTH = 5090

| STEP NO.<br>&<br>REMARKS | TIME  | (1)<br>SURFACE<br>TUBING PRESS<br>(psig) | (2)<br>CUMULATIVE<br>VOL. INJECTED<br>(bbls) | (3)<br>INJECTION<br>RATE<br>(bbls/day) | (4)<br>FRICTION<br>HEAD LOSS<br>(psi) | (5)<br>CORRECTED<br>TUBING PRESS<br>(psig) (1)-(4) | (6)<br>INJECTION<br>RATE (gpm)<br>(3)/34.2857 | (7)<br>MEASURED<br>BHP<br>(psig) |
|--------------------------|-------|------------------------------------------|----------------------------------------------|----------------------------------------|---------------------------------------|----------------------------------------------------|-----------------------------------------------|----------------------------------|
|                          | 9:45  | 408.4                                    |                                              |                                        |                                       | 408.4                                              |                                               | 3011.4                           |
|                          | 9:50  | 445.8                                    | 6.2                                          | 1785.6                                 | 128.088                               | 317.8                                              | 52.08                                         | 3017.5                           |
|                          | 9:55  | 454.7                                    | 12.4                                         | 1785.6                                 | 128.088                               | 326.6                                              | 52.08                                         | 3034.7                           |
| 1                        | 10:00 | 463.5                                    | 18.6                                         | 1785.6                                 | 128.088                               | 335.4                                              | 52.08                                         | 3039.7                           |
|                          |       |                                          |                                              | 1785.6                                 |                                       |                                                    |                                               |                                  |
|                          | 10:05 | 507.1                                    | 28.9                                         | 2966.4                                 | 327.592                               | 179.5                                              | 86.52                                         | 3053.6                           |
|                          | 10:10 | 509.6                                    | 39.4                                         | 3024.0                                 | 339.457                               | 170.1                                              | 88.20                                         | 3060.9                           |
| 2                        | 10:15 | 508.5                                    | 49.9                                         | 3024.0                                 | 339.457                               | 169.0                                              | 88.20                                         | 3066.1                           |
|                          |       |                                          |                                              | 3004.8                                 |                                       |                                                    |                                               |                                  |
|                          | 10:20 | 611.8                                    | 66.2                                         | 4694.4                                 | 765.829                               | -154.0                                             | 136.92                                        | 3085.8                           |
|                          | 10:25 | 591.9                                    | 82.0                                         | 4550.4                                 | 722.937                               | -131.0                                             | 132.72                                        | 3091.7                           |
| 3                        | 10:30 | 595.7                                    | 97.7                                         | 4521.6                                 | 714.495                               | -118.8                                             | 131.88                                        | 3097.7                           |
|                          |       |                                          |                                              | 4588.8                                 |                                       |                                                    |                                               |                                  |
|                          | 10:35 | 720.2                                    | 118.7                                        | 6048.0                                 | 1223.743                              | -503.5                                             | 176.40                                        | 3116.4                           |
|                          | 10:40 | 710.2                                    | 140.7                                        | 6336.0                                 | 1333.726                              | -623.5                                             | 184.80                                        | 3123.2                           |
| 4                        | 10:45 | 730.2                                    | 160.6                                        | 5731.2                                 | 1107.804                              | -377.6                                             | 167.16                                        | 3130.3                           |
|                          |       |                                          |                                              | 6038.4                                 |                                       |                                                    |                                               |                                  |
|                          | 10:50 | 845.9                                    | 186.4                                        | 7430.4                                 | 1790.940                              | -945.0                                             | 216.72                                        | 3149.6                           |
|                          | 10:55 | 848.4                                    | 212.3                                        | 7459.2                                 | 1803.804                              | -955.4                                             | 217.56                                        | 3159.4                           |
| 5                        | 11:00 | 859.7                                    | 238.3                                        | 7488.0                                 | 1816.709                              | -957.0                                             | 218.40                                        | 3166.4                           |
|                          |       |                                          |                                              | 7459.2                                 |                                       |                                                    |                                               |                                  |
|                          | 11:05 | 994.0                                    | 270.3                                        | 9216.0                                 | 2667.547                              | -1673.5                                            | 268.80                                        | 3185.2                           |
|                          | 11:10 | 1018.9                                   | 301.0                                        | 8841.6                                 | 2470.533                              | -1451.6                                            | 257.88                                        | 3194.9                           |
| 6                        | 11:15 | 1027.6                                   | 332.5                                        | 9072.0                                 | 2590.951                              | -1563.4                                            | 264.60                                        | 3201.7                           |
|                          |       |                                          |                                              | 9043.2                                 |                                       |                                                    |                                               |                                  |
|                          | 11:20 | 1159.9                                   | 368.9                                        | 10483.2                                | 3385.495                              | -2225.6                                            | 305.76                                        | 3219.1                           |
|                          | 11:25 | 1172.4                                   | 405.4                                        | 10512.0                                | 3402.722                              | -2230.3                                            | 306.60                                        | 3226.3                           |
| 7                        | 11:30 | 1166.2                                   | 441.8                                        | 10483.2                                | 3385.495                              | -2219.3                                            | 305.76                                        | 3234.2                           |
|                          |       |                                          |                                              | 10492.8                                |                                       |                                                    |                                               |                                  |

| STEP NO.<br>A            |       | (1)<br>SURFACE<br>TUBING PRESS.<br>(psig) | (2)<br>CUMULATIVE<br>VOL. INJECTED<br>(bbls) | (3)<br>INJECTION<br>RATE<br>(bbls/day) | (4)<br>FRICTION<br>HEAD LOSS<br>(psf) | (5)<br>CORRECTED<br>TUBING PRESS.<br>(psf) (1)-(4) | (6)<br>INJECTION<br>RATE (gpm)<br>(3)/34.2857 | (7)<br>MEASURED<br>BHP<br>(psf) |
|--------------------------|-------|-------------------------------------------|----------------------------------------------|----------------------------------------|---------------------------------------|----------------------------------------------------|-----------------------------------------------|---------------------------------|
| 8                        | 11:35 | 1319.6                                    | 483.4                                        | 11980.8                                | 4334.184                              | -3014.6                                            | 349.44                                        | 3248.3                          |
|                          | 11:40 | 1332.1                                    | 524.4                                        | 11808.0                                | 4219.246                              | -2887.1                                            | 344.40                                        | 3254.6                          |
|                          | 11:45 | 1334.6                                    | 565.7                                        | 11894.4                                | 4276.537                              | -2941.9                                            | 346.92                                        | 3259.1                          |
|                          |       |                                           |                                              | 11894.4                                |                                       |                                                    |                                               |                                 |
| 9                        | 11:50 | 1513.0                                    | 612.2                                        | 13392.0                                | 5325.850                              | -3812.7                                            | 390.60                                        | 3271.8                          |
|                          | 11:55 | 1514.2                                    | 658.0                                        | 13190.4                                | 5178.283                              | -3664.1                                            | 384.72                                        | 3277.0                          |
|                          | 12:00 | 1511.7                                    | 703.3                                        | 13046.4                                | 5074.186                              | -3562.5                                            | 380.52                                        | 3281.4                          |
|                          |       |                                           |                                              | 13209.6                                |                                       |                                                    |                                               |                                 |
| 10                       | 12:05 | 1757.5                                    | 754.9                                        | 14880.8                                | 6456.343                              | -4698.8                                            | 433.44                                        | 3294.9                          |
|                          | 12:10 | 1773.7                                    | 805.9                                        |                                        |                                       | 1773.7                                             |                                               | 3299.6                          |
| SHUT DOWN - OUT OF WATER |       |                                           |                                              |                                        |                                       |                                                    |                                               |                                 |
| FALLOFF                  | 12:11 | 685.8                                     |                                              |                                        |                                       | 685.8                                              |                                               | 3269.4                          |
|                          | 12:12 | 662.2                                     |                                              |                                        |                                       | 662.2                                              |                                               | 3258.1                          |
|                          | 12:13 | 656.0                                     |                                              |                                        |                                       | 656.0                                              |                                               | 3251.4                          |
|                          | 12:14 | 649.8                                     |                                              |                                        |                                       | 649.8                                              |                                               | 3245.9                          |
|                          | 12:15 | 644.8                                     |                                              |                                        |                                       | 644.8                                              |                                               | 3241.0                          |
|                          | 12:20 | 626.2                                     |                                              |                                        |                                       | 626.2                                              |                                               | 3223.2                          |
|                          | 12:25 | 611.2                                     |                                              |                                        |                                       | 611.2                                              |                                               | 3209.7                          |



## INJECTION PROFILE

|         |                  |
|---------|------------------|
| Company | ARCO PERMIAN     |
| Well    | STATE AA-2 NO. 1 |
| Field   | LIVINGSTON RIDGE |
| County  | EDDY             |
| State   | NEW MEXICO       |

| File Number | Location            |
|-------------|---------------------|
| 14 805      | 660' FNL & 660' FEL |

UNIT LETTER A  
SEC. 2 TWP. 23-S RGE. 31-E

| Company / Area | Well Field | County State | Permanent Datum        | G.L.       | Elevation         | Elevation    |
|----------------|------------|--------------|------------------------|------------|-------------------|--------------|
|                |            |              | Log Measured From      | K.B. 10.4' | Above Perm. Datum | K.B. 3453'   |
|                |            |              | Drilling Measured From | K.B.       |                   | D.F. 3452'   |
|                |            |              |                        | K.B.       |                   | G.L. 3442.6' |

|                        |           |
|------------------------|-----------|
| Date                   | 11-11-88  |
| Depth Driller          | 5800'     |
| ing Back               | 5750'     |
| Depth Logger           | 5738'     |
| Bottom Logged Interval | 5738'     |
| Top Log Interval       | 4200'     |
| Recorded By            | K BULLARD |
| Witnessed By           | B MANTHEI |
| Case Location          | ODESSA TX |
| Unit No                | 3725      |
| Equipment Operator     | R TROUTZ  |
| Type Of Well           | INJECTION |
| Status                 | INJECTING |
| Type Of Fluid          | WATER     |
| Fluid Level            | SURFACE   |
| Rate                   | 5500 BPD  |
| Pressure               | 900 PSI   |

| Run Number | Borehole Record |      | Tubing Record |               |
|------------|-----------------|------|---------------|---------------|
|            | Bit             | From | To            | Weight<br>IPC |
| 1          |                 |      |               |               |
| 2          |                 |      |               |               |
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