

SWD

8/11/98

# LIMARK CORPORATION

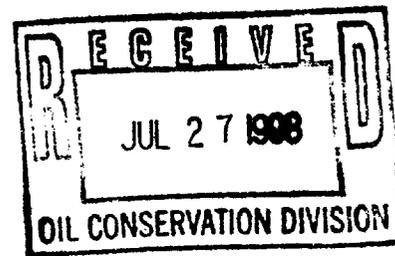
Mark A. Philpy,  
President

P.O. Box 10708  
Midland, Texas 79702-7708  
915 / 684 - 5765 (FAX) 684 - 5959

July 24, 1998

State of New Mexico  
Oil Conservation Division  
Attention: David Catnac  
2040 Pacheco St.  
Santa Fe, New Mexico 87505

*DCN*



via Federal Express

Re: Form C-108  
Application for Authorization to Inject  
Federal 27-1 well  
1395' FSL & 1575' FEL  
Section 27, T-20N, R-4-W  
Sandoval County, New Mexico

Gentlemen:

Please find enclosed your form C-108 "Application for Authorization to Inject" for disposal of produced water into the lower Entrada interval in the above subject well. Please be advised that we have requested publication of a legal notice regarding this application in the Monday, July 27, 1998 edition of the Albuquerque Journal.

Should you need further information, please advise.

Yours sincerely,

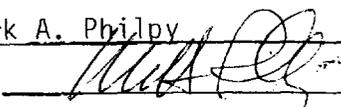
A handwritten signature in black ink, appearing to read "Mark A. Philpy".

Mark A. Philpy,  
President

cc: New Mexico Oil Conservation Division  
1000 Rio Brazos Rd.  
Aztec, New Mexico 87410

United States Department of the Interior  
Bureau of Land Management  
Rio Puerco Resource Area  
435 Montano NE  
Albuquerque, New Mexico 87107-4935

**APPLICATION FOR AUTHORIZATION TO INJECT**

- I. PURPOSE: Secondary Recovery Pressure Maintenance  Disposal Storage  
Application qualifies for administrative approval?  Yes  No
- II. OPERATOR: Limark Corporation  
ADDRESS: P.O. Box 10708, Midland, Texas 79702-7708  
CONTACT PARTY: Mark A. Philpy, President PHONE: 915/684-5765
- III. WELL DATA: Complete the data required on the reverse side of this form for each well processed for injection. Additional sheets may be attached if necessary.
- IV. Is this an expansion of an existing project:  Yes  No  
If yes, give the Division order number authorizing the project \_\_\_\_\_
- V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.
- VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.
- VII. Attach data on the proposed operation, including:
1. Proposed average and maximum daily rate and volume of fluids to be injected;
  2. Whether the system is open or closed;
  3. Proposed average and maximum injection pressure;
  4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and
  5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).
- \*VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.
- IX. Describe the proposed stimulation program, if any.
- \* X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted.)
- \* XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.
- XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.
- XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.
- XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.
- NAME: Mark A. Philpy TITLE: President  
SIGNATURE:  DATE: 07/24/98
- \* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted. Please show the date and circumstance of the earlier submittal. \_\_\_\_\_

**III. WELL DATA**

**A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:**

- (1) Lease name; Well No.; Location by Section, Township, and Range; and footage location within the section.
- (2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.
- (3) A description of the tubing to be used including its size, lining material, and setting depth.
- (4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District Offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

**B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.**

- (1) The name of the injection formation and, if applicable, the field or pool name.
- (2) The injection interval and whether it is perforated or open-hole.
- (3) State if the well was drilled for injection or, if not, the original purpose of the well.
- (4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.
- (5) Give the depth to and name of the next higher and next lower oil or gas zone in the area of the well, if any.

**XIV. PROOF OF NOTICE**

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

- (1) The name, address, phone number, and contact party for the applicant;
- (2) The intended purpose of the injection well; with the exact location of single wells or the section, township, and range location of multiple wells;
- (3) The formation name and depth with expected maximum injection rates and pressures; and
- (4) A notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, PO Box 2088, Santa Fe, NM 87504-2088 within 15 days.

**NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.**

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**NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.**

**APPLICATION FOR AUTHORIZATION TO INJECT**

FEDERAL 27-1 WELL  
1395' FSL & 1575' FEL  
SECTION 27, T-20-N, R-4-W  
SANDOVAL COUNTY, NEW MEXICO

I. PURPOSE: **DISPOSAL**

Application qualifies for administrative approval?  Yes

II. OPERATOR:

**LIMARK CORPORATION**

ADDRESS:

**P.O. BOX 10708, MIDLAND, TEXAS 79702-7708**

CONTACT PARTY:

**MARK A. PHILPY**

PHONE: **915/684-5765**

III. WELL DATA: **ATTACHED – Exhibit A**

IV. Is this an expansion of an existing project:  No

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review. **ATTACHED – Exhibit B**

VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail. **ATTACHED – Exhibit C**

VII. Attach data on the proposed operation including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.)

**ATTACHED – Exhibit D**

VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness and depth. Give the geologic name and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval. **ATTACHED – Exhibit E**

IX. Describe the proposed stimulation program, if any. **NONE PROPOSED**

X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted.) **ENCLOSED (One set to Santa Fe, one set to Aztec)**

XI. Attach chemical analysis of fresh water from two of more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and date samples were taken. **ATTACHED – Exhibit F**

XII. Applicants for disposal well must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water. **ATTACHED – Exhibit G**

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form. **ATTACHED – Exhibit H**

XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

NAME: **Mark A. Philpy**

TITLE: **President**

SIGNATURE: \_\_\_\_\_

DATE: **07/24/98**

INJECTION WELL DATA SHEET

OPERATOR Limark Corporation LEASE Federal 27

WELL NO. #1 1395' FSL & 1575' FEL SECTION 27 TOWNSHIP 20 N RANGE 4 W  
FOOTAGE LOCATION

Schematic

SEE ATTACHED

Well Construction Data

Surface Casing

Size 9 5/8" Cemented with 225 sx.

TOC surface feet determined by visual

Hole Size 12 1/4" @ 326'

Intermediate Casing

Size None Cemented with      sx.

TOC      feet determined by     

Hole Size     

Log String

Size 7" Cemented with 900\* sx.

TOC surface\* feet determined by visual\*

Hole Size 8 3/4" @ 6040'

Total Depth 6100'\*

Injection Interval

6034 feet to 6100 feet  
(perforated or open-hole; indicate which)

\* Final cement + open hole to be determined at completion

INJECTION WELL DATA SHEET

Tubing Size 2 3/8" to 2500' from 2500 to ID lined with N/A set in a  
Baker Model A-3 Lok Set packer at 6000 feet  
(type of internal coating)

Other type of tubing / casing seal if applicable \_\_\_\_\_

Other Data

1. Is this a new well drilled for injection? Yes  No

If no, for what purpose was the well originally drilled? Entrada Oil but we would like to produce from the upper interval and dispose of produced water into the basal portion of the same formation.

2. Name of the injection formation Entrada

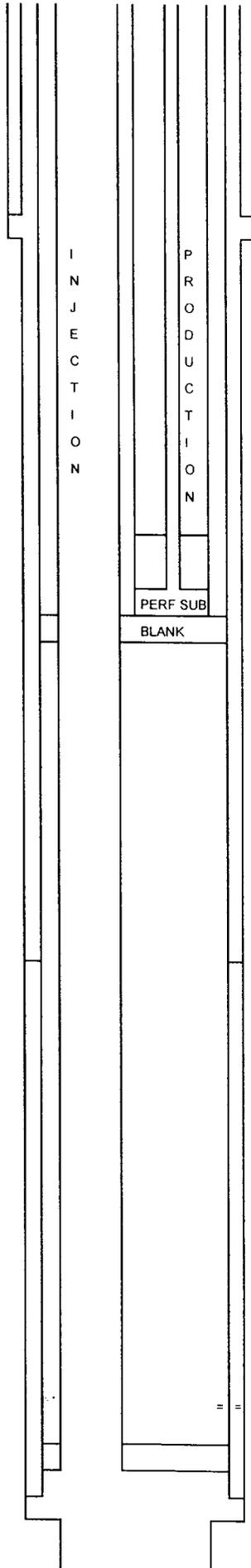
3. Name of Field or Pool (if applicable) \_\_\_\_\_

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail, i.e., sacks of cement or plug(s) used. 5864 - 66' (12 - 0.42" holes) - producing interval

5. Give the names and depths of any over or underlying oil or gas zones (pools) in this area. Mancos (San Ysidro field) - 4 miles north

**LIMARK CORPORATION**  
 FEDERAL 27-1 WELL  
 1395' FSL & 1575' FEL  
 SECTION 27, T 20 N, R 4 W  
 SANDOVAL COUNTY, NEW MEXICO

KB - 6864'  
 GL - 6847'



**SURFACE CEMENTING DETAIL**  
 225 SX CLASS 'B' - CIRCULATED TO SURFACE

**SURFACE CASING DETAIL**  
 7 JTS - 9 5/8" 36.0#/FT ST&C SET @ 324.24'

SURFACE HOLE - 12 1/4" @ 326'

**PROPOSED UPPER INJECTION STRING**  
 2,500' - 2 3/8" FLUSH JOINT (OD - 2.375")

**PROPOSED PRODUCTION TUBING**  
 2,500' - 2 7/8" TUBING (COLLAR OD - 3.6")

**PROPOSED ROD STRING**  
 2,500' - 1" RODS WITH ROD GUIDES

**PROPOSED PUMP**  
 3.5" OD PROGRESSIVE CAVITY PUMP  
 SET AT 2,500'

**PROPOSED ANCHOR**  
 BAKER - MODEL D PARALLEL STRING  
 ANCHOR WITH J LATCH SUB

**PROPOSED FINAL CEMENTING DETAIL**  
 450 SX CLASS 'H' (35/65 POZ)  
 W/ 1% CaCl + 6% GEL  
 + 50 SX POZ W/3% GEL

**PROPOSED LOWER INJECTION STRING**  
 3,500' - 2 7/8" TUBING

**LONG STRING CEMENTING DETAIL**  
 250 SX CLASS 'B' W/ 2% SODIUM METASILICATE  
 + 150 SX CLASS 'H' W/ 2% GEL  
 CEMENT TOP @ 4022'

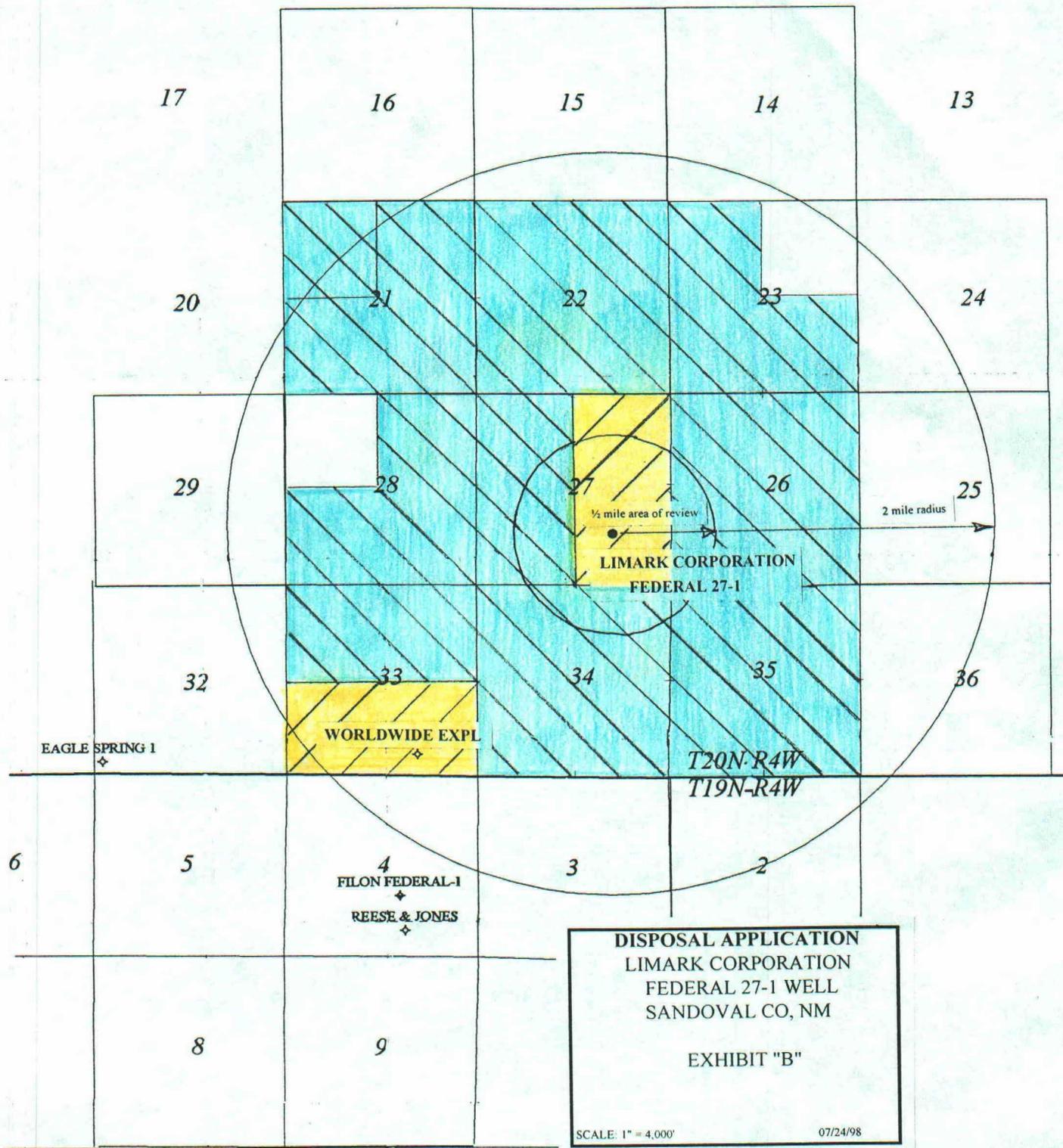
**LONG STRING CASING DETAIL**  
 1 JT - 7" 23#/FT J-55 LT&C (ID - 6.241" DRIFT)  
 70 JTS - 7" 23#/FT C-95 LT&C (ID - 6.241" DRIFT)  
 69 JTS - 7" 26#/FT C-95 LT&C (ID - 6.151" DRIFT)  
 7" FLOAT COLLAR @ 5945.65'  
 2 JTS - 7" 26#/FT LT&C  
 7" CEMENT SHOE @ 6033.37'

**PERFORATIONS**  
 5864 - 66' (12 - 0.42" HOLES)

**PROPOSED INJECTION PACKER**  
 BAKER - MODEL A-3 LOK SET RETRIEVABLE  
 CASING PACKER SET AT 6,000'

**PROPOSED OPEN HOLE**  
 6 1/8" 6034' - 6100'

8 3/4" HOLE @ 6040'



 ACREAGE LEASED BY LIMARK, ET AL

 ACREAGE LEASED BY PENWELL, ET AL

## EXHIBIT "C"

**Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.**

There are no wells located within the ½ mile area of review. The closest well to this well that has penetrated the Entrada formation is the Worldwide Exploration well drilled in the south half of Section 33 approximately 1.75 miles from the proposed injection well.

## EXHIBIT "D"

**1. Proposed average and maximum daily rate and volume of fluids to be injected;**

Proposed average daily rate is 2,000 bbls of produced water per day.  
Maximum daily rate is 4,000 bbls.

**2. Whether the system is open or closed;**

This will be a closed system.

**3. Proposed average and maximum injection pressure.**

Proposed average injection pressure should be 700 psig and proposed maximum pressure will be 1,500 psig.

**4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water;**

Water will be reinjected produced water.

**5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.)**

Not applicable. No wells within one mile of disposal well.

## EXHIBIT "E"

**Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness and depth. Give the geologic name and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentration of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.**

The injection zone in this wellbore will be in the basal portion (or regional portion) of the Jurassic Entrada sandstone which we believe to be a wind-blown deposit of thinly laminated, cross-bedded material. The sand grains are made of largely fine-grained, subrounded, and highly frosted quartz. This portion of the Entrada shows signs of high porosity and good horizontal permeability. Vertical permeability in this basal portion will probably be relatively low.

The Entrada formation varies in thickness throughout the San Juan basin. The regional thickness is in general 100 feet, but because of the sand dune deposit in this wellbore, we believe the total Entrada dune thickness to be between 200 and 220' thick. The top of the Entrada formation is at 5,865' in this wellbore. The top of the basal portion (or regional portion) is between 5,950' and 6,000'. The formation is deposited on top of the Chinle formation made up of siltstone and shale. The formation is overlain by a limestone cap of the Todilto formation.

Although the Entrada produced water has total dissolved solids below 10,000 mg/l, the nearest formation containing drinking water appears at or near the surface in the Ojo Alamo sandstone (base at approximately 100'). Exhibit 'F' contains an analysis of water produced at a nearby surface windmill and from the Max Lopez spring (approximately 1 mile south). No known sources of drinking water are below the Entrada.

EXHIBIT "F"

Page 1 of 3

Martin Water Laboratories, Inc.

P. O. BOX 1468  
 MONAHANS, TEXAS 79756  
 PH. 943-3234 OR 663-1040

709 W. INDIANA  
 MIDLAND, TEXAS 79701  
 PHONE 683-4521

RESULT OF WATER ANALYSES

TO: Mr. Mark Philpy LABORATORY NO. 398128  
P.O. Box 10708, Midland, TX 79702 SAMPLE RECEIVED 3-12-98  
 RESULTS REPORTED 3-16-98

COMPANY Limark Corp. LEASE Federal 27 #1  
 FIELD OR POOL Wildcat  
 SECTION      BLOCK      SURVEY      COUNTY Sandoval STATE NM

SOURCE OF SAMPLE AND DATE TAKEN:

- NO. 1 Recovered water - taken from Federal 27 #1. 3-10-98
- NO. 2
- NO. 3 \* Produced water to be reinjected
- NO. 4

REMARKS: Entrada

CHEMICAL AND PHYSICAL PROPERTIES				
	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.0109			
pH When Sampled				
pH When Received	7.37			
Bicarbonate as HCO <sub>3</sub>	415			
Supersaturation as CaCO <sub>3</sub>				
Undersaturation as CaCO <sub>3</sub>				
Total Hardness as CaCO <sub>3</sub>	330			
Calcium as Ca	120			
Magnesium as Mg	7			
Sodium and/or Potassium	2,792			
Sulfate as SO <sub>4</sub>	4,826			
Chloride as Cl	739			
Iron as Fe	27.5			
Barium as Ba				
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated	8,899			
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen,				
Hydrogen Sulfide	0.0			
Resistivity, ohms/m at 77° F.	0.900			
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks The above results reveal a slight decline in the calcium and sodium chloride levels of this water as compared to that recovered 2-7-98 and reported on laboratory #29853. However, the water still has basically the same characteristics as encountered previously. We do note a significantly lower iron content at this time.

By Waylan C. Martin, M.A.



Martin Water Laboratories, Inc.

P. O. BOX 1468  
 MONAHANS, TEXAS 79756  
 PH. 943-3234 OR 563-1040

709 W. INDIANA  
 MIDLAND, TEXAS 79701  
 PHONE 683-4521

RESULT OF WATER ANALYSES

TO: Mr. Mark Philpy LABORATORY NO. 398126  
P.O. Box 10708, Midland, TX 79702 SAMPLE RECEIVED 3-12-98  
 RESULTS REPORTED 3-16-98

COMPANY Limark Corp. LEASE \_\_\_\_\_

FIELD OR POOL \_\_\_\_\_

SECTION \_\_\_\_\_ BLOCK \_\_\_\_\_ SURVEY \_\_\_\_\_ COUNTY Sandoval STATE NM

SOURCE OF SAMPLE AND DATE TAKEN:

NO. 1 Spring water. 3-10-98

NO. 2 \_\_\_\_\_

NO. 3 \* Max Lopez spring

NO. 4 1 mile south from disposal well

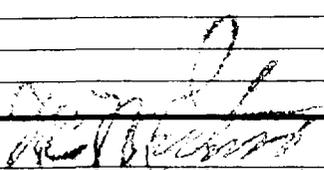
REMARKS: \_\_\_\_\_

CHEMICAL AND PHYSICAL PROPERTIES				
	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.0010			
pH When Sampled				
pH When Received	7.77			
Bicarbonate as HCO <sub>3</sub>	137			
Supersaturation as CaCO <sub>3</sub>				
Undersaturation as CaCO <sub>3</sub>				
Total Hardness as CaCO <sub>3</sub>	60			
Calcium as Ca	21			
Magnesium as Mg	2			
Sodium and/or Potassium	39			
Sulfate as SO <sub>4</sub>	26			
Chloride as Cl	4			
Iron as Fe	17.2			
Barium as Ba				
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated	229			
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen,				
Hydrogen Sulfide	0.0			
Resistivity, ohms/m at 77° F.	44.72			
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks The undersigned certifies the above to be true and correct to the best of his knowledge and belief.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

By   
 Waylan C. Martin, M.A.

## EXHIBIT "G"

**Applicants for disposal well must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.**

Limark Corporation does hereby state that we have examined all available geologic and engineering data and find no evidence of open faults of any other hydrologic connection between the disposal zone and any underground sources of drinking water.

## EXHIBIT "H"

**Applicants must complete the "Proof of Notice" section on the reverse side of this form.**

As of this 24<sup>th</sup> day of July, 1998, Limark Corporation has mailed by certified mail a copy of this application to the following:

### **SURFACE OWNER**

United States Department of the Interior  
Bureau of Land Management  
Rio Puerco Resource Area  
435 Montano NE  
Albuquerque, New Mexico 87107-4935

### **OFFSET LEASEHOLD OPERATORS**

Penwell Energy, Inc.  
600 N. Marienfeld, Suite 1100  
Midland, Texas 79701

### **PROOF OF PUBLICATION**

As of this 24<sup>th</sup> day of July, 1998, Limark Corporation has sent a notice for publication (below) to the following:

*Albuquerque Journal* (to be published in the Monday, July 27, 1998 edition)

*Cuba News* (to be published in the Friday, August 21, 1998 edition)

Limark Corporation, Attn: Mark A. Philpy, P.O. Box 10708, Midland, TX 79702-7708, (915)684-5765, is making an application with the New Mexico Oil & Gas Conservation Commission, to dispose produced water into the Entrada Formation from 6,034'-6,100' in the Federal 27-1 well located 1395' FSL and 1575' FEL of Sec. 27, T-20-N, R-4-W, Sandoval County, NM. Maximum disposal rate will be 4,000 bbls per day and maximum disposal pressure will be 1,500 psig. Interested parties must file objections or requests for hearing with the Oil Conservation Division, P.O. Box 2088, Santa Fe, NM 87204-2088 within 15 days.