SIETE OIL & GAS CORPORATION

Petroleum Building Suite 200
P.O. Box 2523 Roswell, New Mexico 88202
Telephone (505) 622-2202

Need to get to hearing

April 27, 1990

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

To Whom it May Concern:

Please find attached the form C-108 for Siete's East Shugart Waterflood. The NMOCD will hear Siete Oil and Gas Corporation's application to inject water at our proposed East Shugart Waterflood on May 2, 1990. The proposed injection wells are as follows:

Geronimo Federal #2
950' FNL & 2310' FEL
Section 24, T-18-S, R-31-E
Eddy County, New Mexico

Geronimo Federal #7
1750' FNL & 990' FEL
Section 24, T-18-S, R-31-E
Eddy County, New Mexico

Inca Federal #4
760' FNL & 420' FWL
Section 19, T-18-S, R-32-E
Lea County, New Mexico

If you have any questions, please call me at (505) 622-2202.

Sincerely,

SIETE OIL AND GAS CORPORATION

Robert S. Lee
Senior Petroleum Engineer

RSL/amp

ENERGY AND MINERALS DEPARTMENT

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501

Revised 7-1-81

APPLICATION FOR AUTHORIZATION TO INJECT

I. Purpose: [X] Secondary Recovery [ ] Pressure Maintenance [ ] Disposal [ ] Storage
Application qualifies for administrative approval? [ ] yes [X] no

II. Operator: Siete Oil and Gas Corporation

Address: P.O. Box 2523 Roswell, NM 88202

Contact party: Robert Lee Phone: 505-622-2202

III. Well data: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? [ ] yes [X] 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 source 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: Robert Lee Title Senior Reservoir Engineer

Signature: Robert Lee Date: October 6, 1989

* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be duplicated and resubmitted. Please show the date and circumstance of the earlier submittal. _____

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate Division

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, P. O. Box 2088, Santa Fe, New Mexico 87501 within 15 days.

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

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.

SIETE OIL & GAS CORPORATION
CURRENT WELLBORE SCHEMATIC

WELL: Geronimo Federal No. 2
FIELD: Shugart-SA-Grayburg
INTERVAL: Grayburg
Comp: 4/16/85
IP: 136 BO, 60 BWPD, 77 MCFGPD
GOR 566-1

LOCATION:
950' FNL & 2310' FEL
Section 24: T18S, R31E
Eddy County, N.M.
API #: 30-015-25244
Spudded 17 1/2" hole on 4/3/85

ELEVATION: 4694' KB
ZERO: 8' AGL

TOPS
1. Queen 3512'
2. Penrose 3759'
3. Grayburg 4072'
4. Grayburg 4264'

EQUIPMENT IN HOLE
1. Jensen 114 Pump
2. 131 jts. tbg.

Seat Nipple @ 4197'

SURFACE CASING ran 10 jts. 13 3/8" 48# J-55 STC @ 345'KB cem w/400 sks. Class "C", 2% CaCl2, circulate

PRESENT COMPLETION INTERVAL
Grayburg Zone

<-Perf 4264' - 4277.5' (10 shots) w/1000 gals. 15% HCL acid, Frac w/20,000 gals. YF3 Crosslink w/47,000# 12/20 sand.

Acidize & Frac existing perfs (4/3/87) w/500 gals. 15% HCL acid.Frac w/27,000 gals. 30# Crosslink w/6,400 100# mesh, 38,000# <-20/40 & 37,000# 12/20 sand

PRODUCTION CASING ran 118 jts. 4 1/2" 10.5# J-55 STC @ 4700' KB, cem w/1730 sks. Lt. Wt. III, tail in w/460 sks. 50/50 POZ Class "C", circulate

TD: 4702'
PBTD: 4691'

DRAWN BY: ARDEEN
DATE: JULY 21, 1988

Per Trico - Pump History

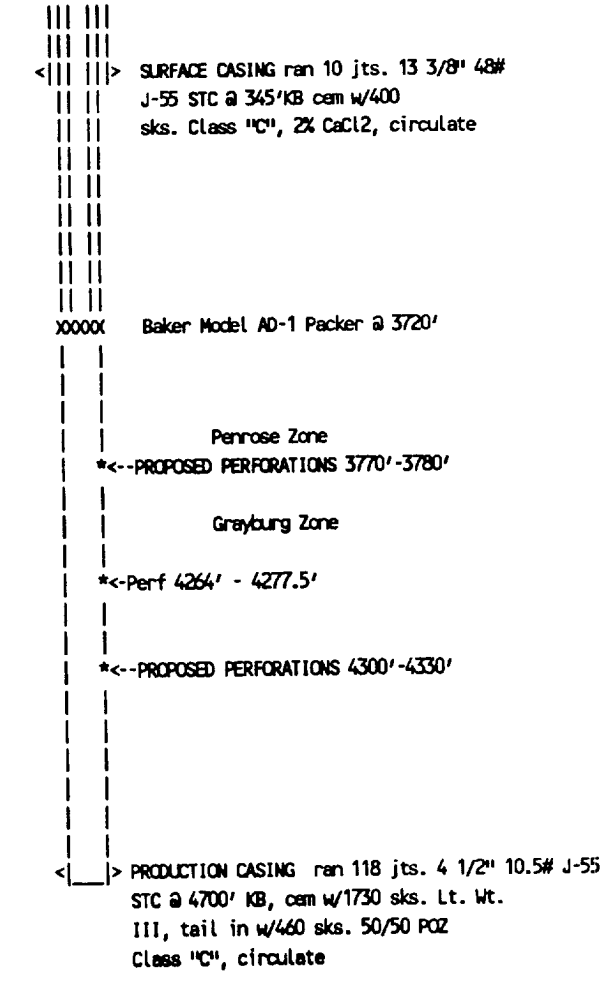
SIETE OIL & GAS CORPORATION
PROPOSED

WELL: Geronimo Federal No. 2
FIELD: Shugart-SA-Grayburg
INTERVAL: Grayburg
Comp: 4/16/85
IP: 136 BO, 60 BWPD, 77 MCFGPD
GOR 566-1

LOCATION:
950' FNL & 2310' FEL
Section 24: T18S, R31E
Eddy County, N.M.
API #: 30-015-25244
Spudded 17 1/2" hole on 4/3/85

ELEVATION: 4694' KB
ZERO: 8' AGL

TOPS
1. Queen 3512'
2. Penrose 3759'
3. Grayburg 4072'
4. Grayburg 4264'



TD: 4702'
PBTD: 4691'

DRAWN BY: ARDEEN
DATE: JULY 21, 1988

SIETE OIL & GAS CORPORATION

Geronimo Federal No. 2 - Convert to Injection

NMOCD Form C-108 Section III

III. Data on injection well(s)

A. Injection well information (see attached schematic)

Tabular data

1. Lease: Geronimo Federal lease

   Well No: 2

   Location: 950' FNL & 2310' FEL
   Section 24, T-18S, R-31E
   Eddy County, NM

2. Casing: 13-3/8" surface @ 345' w/400 sks., circ. to surface
   4 1/2" production @ 4700' w/2190 sks. circ. to surface.

3. Injection tubing: + or - 118 Jts. 2-3/8", 4.7 lb/ft, J-55 internally plastic coated tubing.

4. Packer: Baker Model AD-1 injection packer set @ 3720' feet.

B. Other well information

1. Injection formation: Yates-7 Rivers-Queen-Penrose-Grayburg

   Field: Shugart Yates 7-Rvrs Queen Grayburg

2. Cased hole perforated interval from 4264' - 4277.5'.

3. The Geronimo Federal No. 2 well was originally drilled for oil and gas production.

4. There are no other perforated or tested intervals in the Geronimo Federal No. 2 well.

5. Within the area of the Geronimo Federal No. 2, there are no higher productive formations. The Delaware is productive at about 5300'. But this wellbore does not penetrate the Delaware zone.

SIETE OIL & GAS CORPORATION
CURRENT WELLBORE SCHEMATIC

WELL: Geronimo Federal No. 7
FIELD: Shugart-SA-Grayburg
INTERVAL: Grayburg
Comp: 5/4/86
IP: 115 BOPD, 113 BWPD, 55 MCFGPD (GOR 478)
API #: 30-015-25598

LOCATION:
1750' FNL & 990' FEL
Section 24: T18S, R31E
Eddy County, N.M.
Spudded 12 1/4" hole on 4/21/86

ELEVATION: 4492' KB
ZERO: 8' AGL

TOPS
1. Yates 2396'
2. Queen 3505'
3. Grayburg 4018'
4. San Andres 4420'

EQUIPMENT IN HOLE
1. American 114 Pump
2. 133 jts. 2 3/8" tbg.
3. RBP @ 4283'
4. 150-3/4" rods
5. 2 -2' rod subs
Seat Nipple @ 4247'

RBP @ 4283'

SURFACE CASING - ran 9 jts. 8 5/8" 24# J-55 @ 362'
cem w/230 sks. Class C w/2% CaCl2 &
1/4# celloflake - circ.

PRESENT COMPLETION INTERVAL

Grayburg
*<--Perf 4250' - 4262' (9 shots) w/1000 gal. 15% acid
* frac w/33,000 gals. 30# Crosslink, w/4000#
*<--100 mesh, 36,000# 20/40 & 35,000# 12/20 (2 stages)

*<--Perf 4299' 4309.5' (8 shots) w/500 gal.
* 15% acid, 20,000 gal. crosslink
* 2,000# 100 mesh, 20,000#
*<--20/40, 20,000# 12/20.

PRODUCTION CASING - ran 113 jts. 5 1/2" J-55 @ 4499'
cem w/500 sks. HEII, 10# salt, tail in w/
200 sks. 50/50 POZ, 6# salt - circ.

TD: 4500'
PBTD: 4489'

DRAWN BY: ARDEEN
DATE: JULY 15, 1988

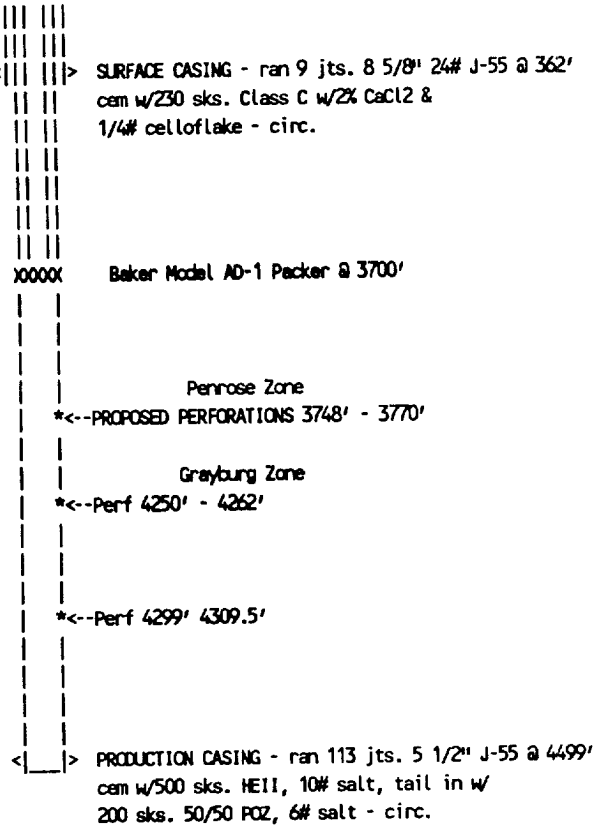
SIETE OIL & GAS CORPORATION
PROPOSED

WELL: Geronimo Federal No. 7
FIELD: Shugart-SA-Grayburg
INTERVAL: Grayburg
Comp: 5/4/86
IP: 115 BOPD, 113 BWPD, 55 MCFGPD (GOR 478)
API #: 30-015-25598

LOCATION:
1750' FNL & 990' FEL
Section 24: T18S, R31E
Eddy County, N.M.
Spudded 12 1/4" hole on 4/21/86

ELEVATION: 4492' KB
ZERO: 8' AGL

TOPS
1. Yates 2396'
2. Queen 3505'
3. Grayburg 4018'
4. San Andres 4420'



TD: 4500'
PBTD: 4489'

DRAWN BY: ARDEEN
DATE: JULY 15, 1988

SIETE OIL & GAS CORPORATION

Geronimo Federal No. 7 - Convert to Injection

NMOCD Form C-108 Section III

III. Data on injection well(s)

A. Injection well information (see attached schematic)

Tabular data

1. Lease: Geronimo Federal lease

   Well No: 7

   Location: 1750' FNL & 990' FEL
   Section 24, T-18S, R-31E
   Eddy County, NM

2. Casing: 8-5/8" surface @ 362' w/230 sks., circ. to surface
   5-1/2" production @ 4499' w/700 sks. circ. to surface.

3. Injection tubing: + or - 118 Jts. 2-3/8", 4.7 lb/ft, J-55 internally plastic coated tubing.

4. Packer: Baker Model AD-1 injection packer set @ 3700' feet.

B. Other well information

1. Injection formation: Yates-7 Rivers-Queen-Penrose-Grayburg

   Field: Shugart Yates 7-Rvrs Queen Grayburg

2. Cased hole perforated interval from 4250' - 4262'.

3. The Geronimo Federal No. 7 well was originally drilled for oil and gas production.

4. There are other perforated intervals in the Geronimo Federal No. 7 well. These are at 4299'- 4309.5'. There is a RBP @ 4283', which will be pulled. The lower zone will then be fraced and used for injection.

5. Within the area of the Geronimo Federal No. 7, the Delaware is productive at about 5300'. But this wellbore does not penetrate the Delaware zone. There are no higher productive intervals.

SIETE OIL & GAS CORPORATION
CURRENT WELLBORE SCHEMATIC

WELL: Inca Federal No. 4 — LOCATION:
FIELD: Y-SR-Q-GB-SA — 760' FNL & 420' FWL
INTERVAL: Penrose — Section 19: T18S, R32E
Comp: 2/4/88 — Lea County, N. M.
IP: 82 BOPD, 39 BWPD, 28 MCFGPD, (GOR 339)
Spudded 12 1/4" hole on 1/7/88 — API #: 30-025-30039

ELEVATION: 3719' KB
ZERO: 8' AGL

TOPS
1. B/Salt 2200'
2. T/Queen 3520'
3. T/Grayburg 3942'

EQUIPMENT IN HOLE
1. Trico P.J.
2. 110 jts. 2 3/8" tbg

Seat Nipple @ 3728'

SURFACE CASING - ran 8 jts. 8 5/8" 24# J-55 @ 358'
cem w/230 sks. HEII, w/2% CaCl2 & 1/4#
celloflake - circ.

PRESENT COMPLETION INTERVAL

Penrose
*<--Perf 3768'-3792' (17 shots) w/ 1,000 gal.
* 15%, Frac w/17,000 gals. 30# Crosslink
*<--w/2000# 100 mesh, 27,000# 20/40 sand & 12,000# 12/20

Grayburg
*<--Perf 4269'-4279' (11 shots) w/500 gal. .15%,
* 15,000 gal. 2000# 100 mesh
*<--25,000# 20/40, 12,000 12/20.

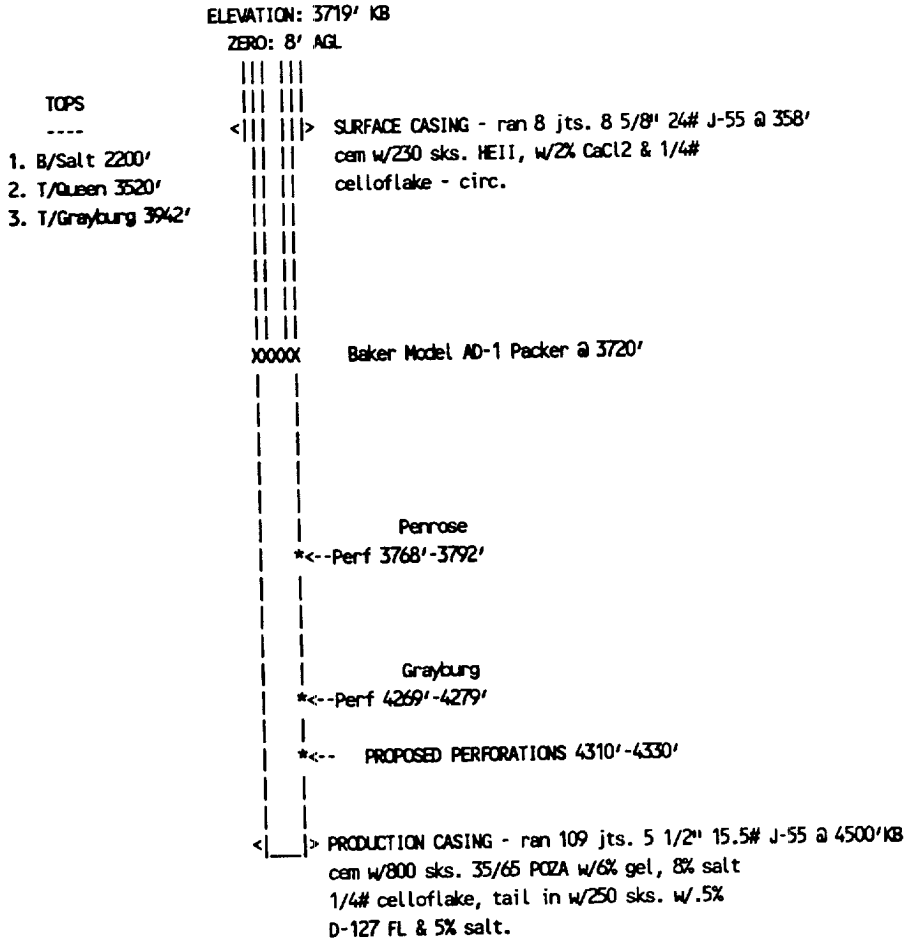
PRODUCTION CASING - ran 109 jts. 5 1/2" 15.5# J-55 @ 4500'KB
cem w/800 sks. 35/65 POZA w/6% gel, 8% salt
1/4# celloflake, tail in w/250 sks. w/.5%
D-127 FL & 5% salt.

DRAWN BY: ARDEEN — TD: 4500'
DATE: JULY 12, 1988 — PBTD: 4244'

SIETE OIL & GAS CORPORATION
PROPOSED

WELL: Inca Federal No. 4
FIELD: Y-SR-Q-GB-SA
INTERVAL: Penrose
Comp: 2/4/88
IP: 82 BOPD, 39 BWPD, 28 MCFGPD, (GOR 339)
Spudded 12 1/4" hole on 1/7/88

LOCATION:
760' FNL & 420' FWL
Section 19: T18S, R32E
Lea County, N. M.
API #: 30-025-30039



DRAWN BY: ARDEEN
DATE: JULY 12, 1988

TD: 4500'
PBTD: 4244'

SIETE OIL & GAS CORPORATION

Inca Federal No. 4 - Convert to Injection

NMOCD Form C-108 Section III

III. Data on injection well(s)

A. Injection well information (see attached schematic)

Tabular data

1. Lease: Inca Federal lease

   Well No: 4

   Location: 760' FNL & 420' FWL
   Section 19, T-18S, R-32E
   Lea County, NM

2. Casing: 8-5/8" surface @ 358' w/230 sks., circ. to surface
   5-1/2" production @ 4500' w/1050 sks. circ. to surface.

3. Injection tubing: + or - 118 Jts. 2-3/8", 4.7 lb/ft, J-55 internally plastic coated tubing.

4. Packer: Baker Model AD-1 injection packer set @ 3720' feet.

B. Other well information

1. Injection formation: Yates-7 Rivers-Queen-Penrose-Grayburg

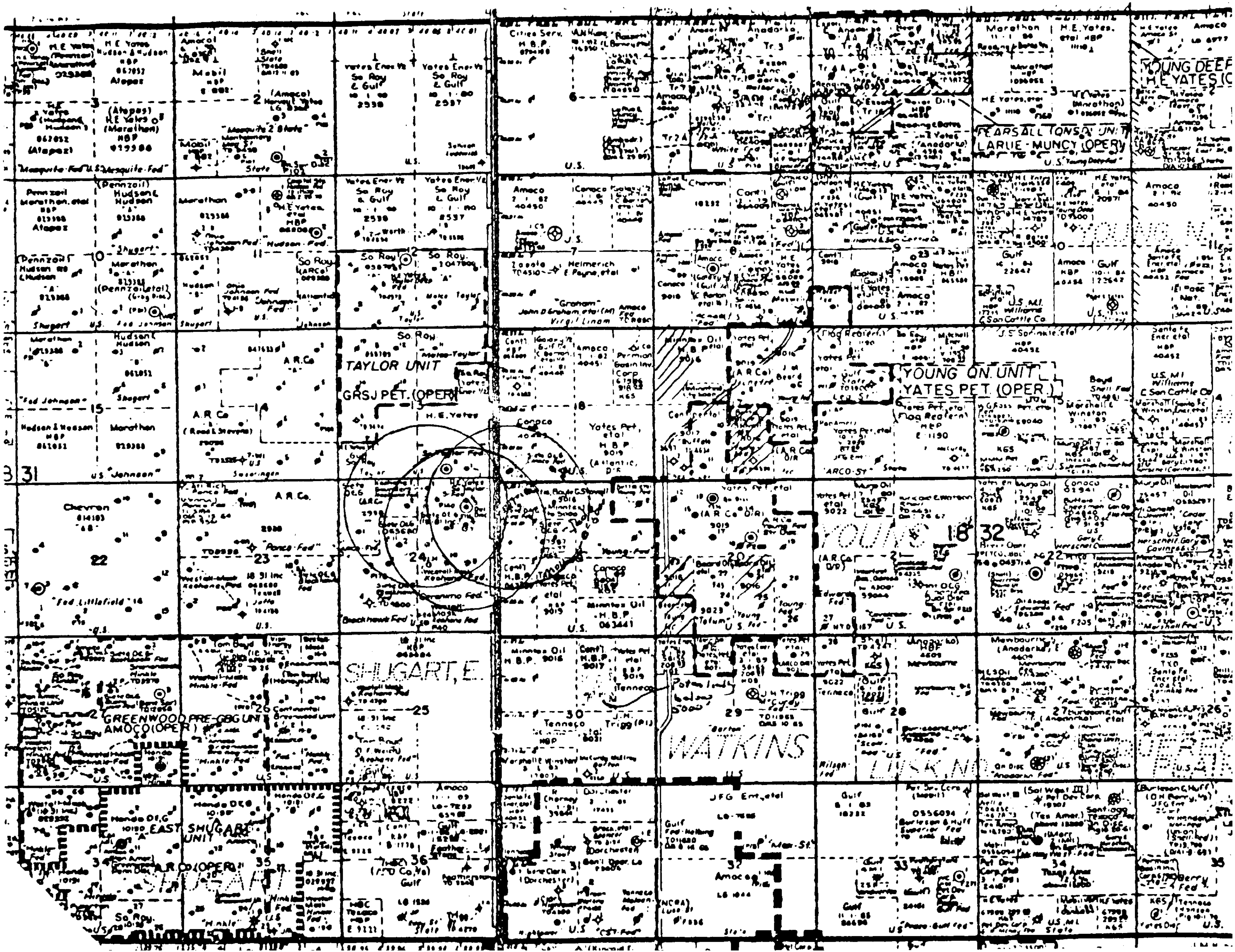
   Field: Shugart Yates 7-Rvrs Queen Grayburg

2. Cased hole perforated interval from 3768' - 3792', 4269' - 4279'.

3. The Inca Federal No. 4 well was originally drilled for oil and gas production.

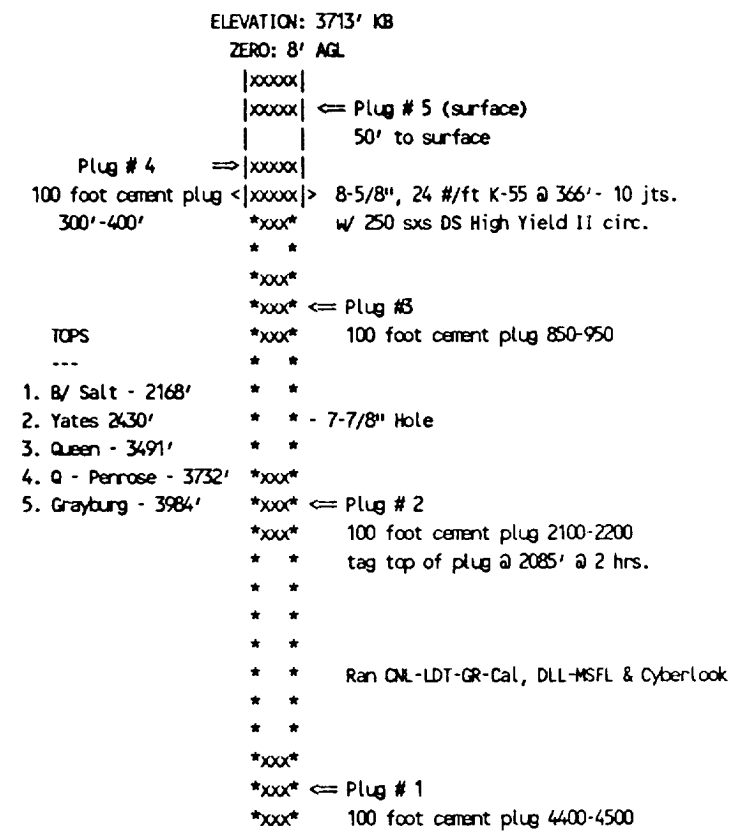
4. There are no other perforated or tested intervals in the Inca Federal No. 4 well.

5. Within the area of the Inca Federal No. 4, there are no other higher productive formations. The Delaware is productive at a depth of 5300'. But this well does not penetrate the Delaware.


TAYLOR UNIT
GRSJ PET. (OPER)
YOUNG QN. UNIT
YATES PET. (OPER.)
PEARSALL TONSA UNIT
LARUE-MUNCY (OPER)
YOUNG DEEP
H.E. YATES (O
SHUGART, E.
GREENWOOD PRE-GBG UNIT
AMOCO (OPER.)
EAST SHUGART UNIT
A.R.Co (OPER.)
WATKINS
YOUNG
Chevron
Marathon
Amoco
Mobil
Gulf
Conoco
Tenneco
U.S.

SIETE OIL & GAS CORPORATION

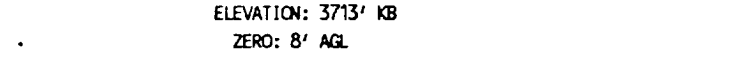
WELL: Blackhawk Federal No. 4 — LOCATION:
FIELD: Shugart — 990' FSL & 990' FWL
INTERVAL: Proposed Queen-Grayburg — Section 24, T-18S, R-31E
Spudded 6/11/86 — Eddy County, N.M.
Dry & Abandoned; plugged 6/20/86 — API #: 30-015-25629



DRAWN BY: JER
DATE: November 7, 1987

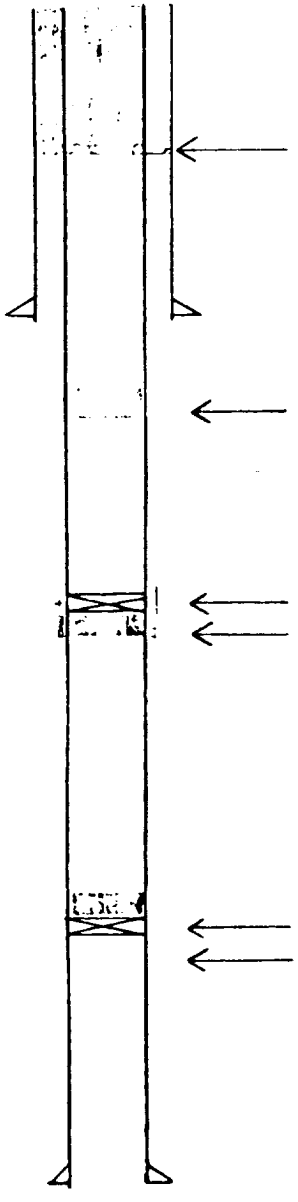
SIETE OIL & GAS CORPORATION

WELL: Blackhawk Federal No. 4 — LOCATION:
FIELD: Shugart — 990' FSL & 990' FWL
INTERVAL: Proposed Queen-Grayburg — Section 24, T-18S, R-31E
Spudded 6/11/86 — Eddy County, N.M.
Dry & Abandoned; plugged 6/20/86 — API #: 30-015-25629



Siete Oil & Gas Corporation
Keohane Federal No. 1
330' FNL & 2260' FEL
Sec. 24 : T18S, R31E
Eddy County, New Mexico

PLUGGING DIAGRAM



Perforations @ 400' w/4 holes per foot in 7" casing circulated cement Between 7" & 8 5/8" casing - Filled inside 7" casing from surface to 400' (142 sks.).

8 5/8" 24# casing set @ 897' cemented w/50 sks.

Perforations @ 1100' w/4 holes per foot - Could not circulate spot 20 sk. plug (100') top of cement @ 1000'.

20 sk. cement plug (100') TOC @ 2194'

Cement retainer @ 2294'.

Perforations @ 2350' w/4 holes per foot
Squeezed perfs w/35 sks cement
Set 100' plug on top of retainer - TOC @ 2196'

CIBP Set @ 3775'
Old perforations 3811' - 17'

7" 20# casing set @ TD 4232' & cemented w/100 sks.

SIETE OIL GAS CORPORATION

Shugart Waterflood Project - Convert to Injection

NMOCD Form C-108 Sections VII - XIII

VII. Injection Data

1. Injection Rates
   a. Proposed average daily water injection is 300 BWPD/Well.
   b. Maximum rate of daily water injection is 500 BWPD/Well.

2. The injection station for the gathering and processing injection water will be a closed system.

3. Injection Pressures
   a. Proposed average daily injection pressure is 600 PSI.
   b. Maximum daily injection pressure is 740 PSI*.
   * Note: Maximum injection pressure abides by .2 PSI/Ft maximum injection pressure imposed by the NMOCD. Future necessary increases in surface pressure will be obtained administratively from the NMOCD using field obtained "Step Rate Test" data.

4. Chemical analysis of injection and formation water (see attached Nalco water analysis).
   a. Proposed injection fluid will be produced water from offsetting Siete operated leases which currently produce from both the East Shugart Delaware and Shugart Grayburg formations. These leases are the Geronimo Federal lease (E/2 Sec. 24, T-18S, R31E), Arco Federal Lease (NE/4 NW/4 and SW/4 NW/4 Section 24, T-18S, R-31E), and Blackhawk Federal lease (NE/4 NE/4 Section 23, T-18S, R-31E) in Eddy County, New Mexico, and the Conoco Federal lease (SW/4 SW/4 Section 18, T-18S, R32E), Inca Federal lease (N/2 and SW/4 NW/4 Section 19, T-18S, R32E), Jade Federal lease (SE/4 NW/4 Section 19, T-18S, R32E) and Mohawk Federal lease (NE/4 SW/4 Section 19, T18S, R32E) in Lea County, New Mexico.
   b. A sample of formation water was obtained from a nearby Siete operated Queen-Penrose producing well, the Scottsdale Federal No. 1 in the NW/4 NE/4 Section 27, T18S, R31E in Eddy County, New Mexico. This well is approximately 2 miles west of the proposed unit.

5. Water injection will be into a zone currently productive of oil and gas.

VIII. Geologic Data:

The injection interval on the proposed Shugart Waterflood Project is the Penrose and Grayburg Queen formation. The Penrose and Grayburg, a fine to medium grained sandstone of the Guadalupian Series and Permian age. The Penrose interval exists at an average depth of 3723 feet (-16 feet subsea) and has an average gross thickness of approximately 200 feet. The average net pay thickness of the injection interval is approximately 8 feet. The Grayburg interval exists at a depth of around 4250' (-543 feet subsea), and has an average gross thickness of approximately 270 feet. The average pay thickness for this injection interval is approximately 25 feet. There are no sources of drinking water overlying or underlying the proposed injection interval.

IX. Penrose and Grayburg zones to be perforated will also be fracture stimulated similiar to the original completions.

X. Well logs for these wells have been previously submitted. The well tests are as follows:

	BOPD	BWPD	MCFGPD	EST. CUM. PROD. MBO
Geronimo #2	12	12	9	61.0
Geronimo #7	31	8	86	49.2
Inca #4	21	0	24	7.7

I, Robert Lee, a Production/Reservoir Engineer for Siete Oil and Gas Corporation and in behalf of, have compiled and examined all available geologic and engineering data and have not found any evidence of hydrologic connections between the proposed Shugart Penrose-Grayburg Waterflood Project injection zone and any sources of underground drinking water.

XII. Proof of Notice - requirements
1. See attached mailing list and registered mail certificates.

OIL FIELD SERVICES DIVISION
VISCO CHEMICALS

NALCO CHEMICAL COMPANY
6520 CARLSBAD HIGHWAY ◻ HOBBS, NEW MEXICO 88240 ◻ AREA 505-393-0436

January 18, 1988

RECEIVED
JAN 22 1988

Siete Oil & Gas
Roswell, NM

Attention: Eddie Rodriguez

Eddie,

As you requested I have conducted water analyses on produced water from the Geronimo, Arco and Scottsdale leases. In addition, compatibility was determined to ensure that these waters will not cause scaling problems when mixed. The compatability report attached is for a combination of Geronimo/Arco water and Scottsdale water. The water labeled "produced" is the Geronimo/Arco water that you plan to inject and the sample labeled "fresh" is the water that is present in the formation now.

As you can see from the report, the $CaCO_3$ and the $CaSO_4$ indices are positive at some mixture ratios and temperatures. However, the magnitude of the indices is small and indicates only a slight chance of scale precipitation in the formation. If this is determined to be a problem, a concentration of 1-2 ppm of Visco 953 Scale Inhibitor can be added to the waters before injection.

Since the water tanks at the batteries are open to the atmosphere it will be necessary to remove the oxygen from the water before injection. This can be accomplished by adding an oxygen scavenger to the water before it is transferred to the skim tank. When the water station is complete and actual oxygen levels can be determined, the type and amount of oxygen scavenger can be selected.

Eddie, it is my opinion that the Geronimo/Arco water can be used for injection without any adverse results to the formation as long as the oxygen and scale problems are addressed. I look forward to working with you on this project in the near future. If you have any questions, please contact me at 505-393-0436. Thank you.

Respectfully,

David T. Parker

David T. Parker
District Salesman

VISCO Water Compatibility Report

Prepared for SIETE OIL & GAS
LOCO HILLS

Parker, David T.
NALCO Chemical Company
21-JAN-88

	PRODUCED WATER	FRESH WATER
Sample Date	: 01/08/88	01/08/88
Water Source	: GERONIMO & ARCO	SCOTTSDALE

Temperature Degrees F	Water Mixture (Fresh/Produced)	CaCO3 Index Stiff-Davis units	CaSO4 Index Skillman units	Actual CaSO4 Mg/L
60	0 /100	* 0.29	* 11.81	992.
	20 / 80	* 0.35	* 9.40	907.
	40 / 60	* 0.39	* 6.90	822.
	50 / 50	* 0.40	* 5.61	779.
	60 / 40	* 0.40	* 4.28	737.
	80 / 20	* 0.41	* 1.49	652.
	100 / 0	* 0.41	* -1.57	567.
80	0 /100	* 0.52	* 11.84	
	20 / 80	* 0.58	* 9.43	
	40 / 60	* 0.62	* 6.94	
	50 / 50	* 0.62	* 5.65	
	60 / 40	* 0.62	* 4.32	
	80 / 20	* 0.64	* 1.53	
	100 / 0	* 0.63	* -1.52	
100	0 /100	* 0.80	* 11.76	
	20 / 80	* 0.87	* 9.35	
	40 / 60	* 0.90	* 6.85	
	50 / 50	* 0.91	* 5.56	
	60 / 40	* 0.91	* 4.22	
	80 / 20	* 0.92	* 1.42	
	100 / 0	* 0.92	* -1.64	
120	0 /100	* 1.14	* 11.36	
	20 / 80	* 1.20	* 8.92	
	40 / 60	* 1.24	* 6.38	
	50 / 50	* 1.24	* 5.07	
	60 / 40	* 1.24	* 3.71	
	80 / 20	* 1.26	* 0.86	
	100 / 0	* 1.25	* -2.27	

* Note: Nalco refered to the Scottsdales water (Similar to Blackhawk formation water) as fresh water

Temperature Degrees F	Water Mixture (Fresh/Produced)	CaCO3 Index Stiff-Davis units	CaSO4 Index Skillman units
140	0 /100	* 1.53	* 11.39
	20 / 80	* 1.59	* 8.95
	40 / 60	* 1.63	* 6.42
	50 / 50	* 1.64	* 5.10
	60 / 40	* 1.64	* 3.75
	80 / 20	* 1.65	* 0.90
	100 / 0	* 1.65	* -2.23
160	0 /100	* 1.98	* 11.46
	20 / 80	* 2.04	* 9.03
	40 / 60	* 2.08	* 6.51
	50 / 50	* 2.08	* 5.20
	60 / 40	* 2.08	* 3.85
	80 / 20	* 2.09	* 1.01
	100 / 0	* 2.09	* -2.10
180	0 /100	* 2.48	* 11.54
	20 / 80	* 2.54	* 9.12
	40 / 60	* 2.58	* 6.60
	50 / 50	* 2.58	* 5.29
	60 / 40	* 2.58	* 3.95
	80 / 20	* 2.59	* 1.12
	100 / 0	* 2.59	* -1.98

* At this temperature and total ionic strength, the value of "K" exceeds reported values. The index number given is estimated and if positive, scaling is expected.

SIETE OIL & GAS
LOCO HILLS

7-DEC-87

SCOTTSDALE FEDERAL
WELLHEAD

>>> Oil Field Water Analysis <<<

DISSOLVED SOLIDS

Cations		mg/l	meq/l		mg/l
Sodium	Na+	75,877.6	3,299.0	as NaCl	
Calcium	Ca++	7,600.0	380.0	as CaCO3	19,000.0
Magnesium	Mg++	5,346.0	440.0	as CaCO3	22,000.0
Barium	Ba++			as CaCO3	
Strontium	Sr++			as CaCO3	
Total Cations		88,823.6	4,119.0		

Anions		mg/l	meq/l		mg/l
Chloride	Cl-	145,680.0	4,108.2	as NaCl	240,000.0
Sulfate	SO4=	270.4	5.6	as Na2SO4	400.0
Carbonate	CO3=			as CaCO3	
Bicarb.	HCO3-	317.2	5.2	as CaCO3	260.0
Total Anions		146,267.6	4,119.0		

Total Solids 235,091.2

METALS

Total Iron,Fe	0.9	as Fe	0.9
Acid to Phen,CO2		as CaCO3	

OTHER PROPERTIES

pH	6.1
Specific Gravity	1.2
Turbidity	
Oxygen, as O2 ppm	
Sulfide as H2Sppm	
Temperature F	70.0

SIETE OIL & GAS
LOCO HILLS

7-DEC-87

SCOTTSDALE FEDERAL
WELLHEAD

>>> Scaling Indices <<<

Positive values indicate scaling tendencies

Temperature (Deg. F)	Calcium Carbonate	Calcium Sulfate	Barium Sulfate	Strontium Sulfate
60	-0.12	-28.74	NA	NA
80	+0.08	-28.80	NA	NA
100	+0.32	-28.72	NA	NA
120	+0.61	-28.24	NA	NA
140	+0.95	-28.22	NA	NA
160	+1.32	-23.03	NA	NA
180	+1.74	-28.27	NA	NA
200	+2.20	NA	NA	NA
220	NA	NA	NA	NA
240	NA	NA	NA	NA
260	NA	NA	NA	NA
280	NA	NA	NA	NA
300	NA	NA	NA	NA
320	NA	NA	NA	NA

SIETE OIL & GAS
LOCO HILLS

7-DEC-87

ARCO FEDERAL
WELLHEAD

>>> Oil Field Water Analysis <<<

DISSOLVED SOLIDS

Cations		mg/l	meq/l		mg/l
Sodium	Na+	70,047.0	3,045.5	as NaCl	
Calcium	Ca++	8,000.0	400.0	as CaCO3	20,000.0
Magnesium	Mg++	4,131.0	340.0	as CaCO3	17,000.0
Barium	Ba++			as CaCO3	
Strontium	Sr++			as CaCO3	
Total Cations		82,178.0	3,785.5		

Anions		mg/l	meq/l		mg/l
Chloride	Cl-	133,540.0	3,765.8	as NaCl	220,000.0
Sulfate	SO4=	811.2	16.9	as Na2SO4	1,200.0
Carbonate	CO3=			as CaCO3	
Bicarb.	HCO3-	170.8	2.8	as CaCO3	140.0
Total Anions		134,522.0	3,785.5		

Total Solids	216,700.0	

METALS

Total Iron,Fe	0.7	as Fe 0.7
Acid to Phen,CO2		as CaCO3

OTHER PROPERTIES

pH	6.1
Specific Gravity	1.2
Turbidity	
Oxygen, as O2 ppm	
Sulfide as H2Sppm	
Temperature F	70.0

SIETE OIL & GAS
LOCO HILLS

7-DEC-87

ARCO FEDERAL
WELLHEAD

>>> Scaling Indices <<<

Positive values indicate scaling tendencies

Temperature (Deg. F)	Calcium Carbonate	Calcium Sulfate	Barium Sulfate	Strontium Sulfate
60	-0.44	-13.48	NA	NA
80	-0.25	-13.59	NA	NA
100	-0.01	-13.53	NA	NA
120	+0.27	-12.98	NA	NA
140	+0.60	-12.85	NA	NA
160	+0.97	-12.76	NA	NA
180	+1.39	-12.68	NA	NA
200	+1.86	NA	NA	NA
220	NA	NA	NA	NA
240	NA	NA	NA	NA
260	NA	NA	NA	NA
280	NA	NA	NA	NA
300	NA	NA	NA	NA
320	NA	NA	NA	NA

>>> Scaling Indices <<<

Positive values indicate scaling tendencies

Temperature (Deg. F)	* Calcium Carbonate	Calcium Sulfate	Barium Sulfate	Strontium Sulfate
60	-0.10	-7.92	NA	NA
80	+0.11	-7.86	NA	NA
100	+0.40	-7.88	NA	NA
120	+0.73	-8.15	NA	NA
140	+1.12	-8.36	NA	NA
160	+1.57	-8.56	NA	NA
180	+2.07	-8.77	NA	NA
200	+2.63	NA	NA	NA
220	NA	NA	NA	NA
240	NA	NA	NA	NA
260	NA	NA	NA	NA
280	NA	NA	NA	NA
300	NA	NA	NA	NA
320	NA	NA	NA	NA

* At this temperature and total ionic strength, the value of "K" exceeds reported values. The index number given is estimated and if positive, scaling is expected.

SIETE OIL & GAS
LOCO HILLS

7-DEC-87

GERONIMO BATTERY
WATER TANK

>>> Oil Field Water Analysis <<<

DISSOLVED SOLIDS

Cations		mg/l	meq/l		mg/l
Sodium	Na+	114,115.5	4,961.5	as NaCl	
Calcium	Ca++	15,200.0	760.0	as CaCO3	38,000.0
Magnesium	Mg++	3,402.0	280.0	as CaCO3	14,000.0
Barium	Ba++			as CaCO3	
Strontium	Sr++			as CaCO3	
Total Cations		132,717.5	6,001.5		

Anions		mg/l	meq/l		mg/l
Chloride	Cl-	212,450.0	5,991.1	as NaCl	350,000.0
Sulfate	SO4=	405.6	8.4	as Na2SO4	600.0
Carbonate	CO3=			as CaCO3	
Bicarb.	HCO3-	122.0	2.0	as CaCO3	100.0
Total Anions		212,977.6	6,001.5		

Total Solids	345,695.1

METALS

Total Iron,Fe	12.0	as Fe	12.0
Acid to Phen,CO2		as CaCO3	

OTHER PROPERTIES

pH	6.0
Specific Gravity	1.3
Turbidity	
Oxygen, as O2 ppm	
Sulfide as H2Sppm	
Temperature F	70.0