Form 3160-5
(June 1990)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RECEIVED
BLM
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070 ALBUQUERQUE, N.M.

FORM APPROVED
Budget Bureau No. 1004-(
Expires: March 31, 199.

## SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.
Use "APPLICATION FOR PERMIT—" for such proposals

SUBMIT IN TRIPLICATE

5. Lease Designation and Serial No.: NM-44453

6. If Indian, Allottee or Tribe Name: N/A

7. If Unit or CA, Agreement Designation: San Isidro (Shallow)

1. Type of Well: [ ] Oil Well [ ] Gas Well [x] Other

8. Well Name and No.: San Is. (Sh'w.) 7-11

2. Name of Operator: Energy Development Corporation (713) 750-7563

9. API Well No.: 30-043-20729

3. Address and Telephone No.: 1000 Louisiana, Suite 2900, Houston, Tx. 77002

10. Field and Pool, or Exploratory Area: Rio Puerco Mancos

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)
Surface: NESW 7-20n-2w
BHL: Same

11. County or Parish, State: Sandoval, NM

12. CHECK APPROPRIATE BOX(s) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

| TYPE OF SUBMISSION | TYPE OF ACTION | |
|---|---|---|
| [x] Notice of Intent | [ ] Abandonment | [ ] Change of Plans |
| [ ] Subsequent Report | [ ] Recompletion | [ ] New Construction |
| [ ] Final Abandonment Notice | [ ] Plugging Back | [ ] Non-Routine Fracturing |
| | [ ] Casing Repair | [ ] Water Shut-Off |
| | [ ] Altering Casing | [x] Conversion to Injection |
| | [ ] Other _____ | [x] Dispose Water |

(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Will convert existing oil well to a water dispoal injection well as detailed in attached state application.

SEP 2000

cc: BLM(3 + 2 for OCD), Linton

14. I hereby certify that the foregoing is true and correct
Signed _____ Title Consultant (505) 466-8120 Date 1-24-96

(This space for Federal or State office use)
Approved by /s/ Patricia M. Hester Title Lands and Mineral Resources Date 8/28/97
Conditions of approval, if any:

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

*See Instruction on Reverse Side

STATE OF NEW MEXICO
ENERGY, MINERALS and NATURAL
RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
PO BOX 2088
SANTA FE, NM 87504-2088

FORM C-108
Revised 7-1-81

# APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: ____ Secondary Recovery ____ Pressure Maintenance XXX Disposal ____ Storage
Application qualifies for administrative approval? ___Yes XX No

II. OPERATOR: ENERGY DEVELOPMENT CORPORATION

ADDRESS: 1000 LOUISIANA, SUITE 2900, HOUSTON, TX. 77002

CONTACT PARTY: BRIAN WOOD c/o PERMITS WEST, INC. PHONE: 505 466-8120

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 XXX 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 t 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 propos ell, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing li re, studies, nearby wells, etc.).

*VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, t ness and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers co aining waters with total dissolved solids concentrations of 10,000 mg/1 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 bes my knowledge and belief.

NAME: BRIAN WOOD TITLE: CONSUL NT

SIGNATURE: Brian Wood DATE: 1-24-96

* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need be 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 District Office

Energy Development Corporation
San Isidro (Shallow) Unit 7-11
2074' FSL & 1650' FWL
Sec. 7, T. 20 N., R. 2 W.
Sandoval County, NM

DISPOSAL WELL APPLICATION

I. Purpose is disposal.

II. Operator is Energy Development Corporation.
Address is 1000 Louisiana, Suite 2900, Houston, Tx. 77002.
Contact is Brian Wood (Permits West, Inc.). Phone is (505) 466-8120.

III. A. (1) Lease is BLM oil and gas lease NM-44453, which comprises all of Sections 6-8, T. 20 N., R. & W. When APD was filed, prior to unit formation, lease was known as Johnson 7-11. Well name and number is San Isidro (Shallow) Unit 7-11. Well is at 2074' FSL and 1650' FWL Sec. 7, T. 20 N., R. 2 W.

A. (2) Surface casing (9-5/8", 36#, J-55) was set at 595' in a 13-1/2" hole and cemented to the surface (visually observed) with 135 sx (448 cu ft) 65/35 Pozmix and 150 sx (177 cu ft) Class B. Intermediate string (7", 23#, J-55) was set at 3666' KB in a 8-3/4" hole and cemented to 325' (checked by log) with 230 sx (766 cu ft) 65/35 Pozmix and 100 sx (118 cu ft) Class B. Long string (4-1/2", 10.5#, J-55) was set at 4762' KB in a 6" hole and cemented to 3339' (checked by log) with 165 sx (208 cu ft) 50/50 Pozmix.

A. (3) Tubing will be ceramic lined 2-7/8" 6.5# injection string set at 2349' (disposal interval is 2438' - 2624').

A. (4) Model R packer from Baker will be set at 2350'.

B. (1) Disposal zone will be Menefee Formation.

B. (2) Disposal interval will be 2438' - 2624'. It was perforated (0.36") with 2 shots per foot through 6 intervals (2438'-2441', 2516'-2522', 2550'-2562', 2590'-2594', 2600-2604', 2614'-2624') in 1992 during testing for a possible oil well completion (Mancos was completed in 1984, but became sub-marginal and was abandoned).

B. (3) Well was drilled in 1984 as a Mancos oil well.

B. (4) Mancos was perforated from 4169' to 4290'. During 1992 recompletion into Menefee a CIBP was set at 2667' and 4 perforations at 3160'-3162' were squeezed.

B. (5) Top of Mancos is 3112', which is 488' below the lowest Menefee perforation. While neither produce locally, Pt. Lookout top (2940') is

316' below the lowest Menefee perforation and the Cliff House top (1632') is 806' above the highest Menefee perforation.

IV. This is not an expansion of an existing injection project.

V. A map is attached showing all wells within a half mile (there are none, closest is the 7-3 which is 2765' north and its BHL is 4757' north) and within 2 miles (12 oil + 3 P&A; all 15 wells are within the unit). The same map also shows all leases within a half mile (all Federal and all within the unit) and within two miles (all Federal or state).

VI. This is the only well within a half mile. Profile is attached.

VII. 1. Average injection rate = 100 bwpd. Maximum rate = 1000 bwpd.
2. System will be open (trucked to well). Two 300 bbl steel tanks, Gasso 3211 triplex pump with Waukesha CRG 155 engine, and a 20" filter cartridge with two 75 micron filters will be installed.
3. Average injection pressure = 700 psi. Maximum = 2000 psi.
4. Water source will be unit wells producing from Mancos. Analyses of receiving (7-11) and injected waters are attached. A summary follows:

| Parameter | Drink. Water Stand. | 7-11* | 7-3 | 5-15 | 12-10 |
|---|---|---|---|---|---|
| pH | 6.5-8.5 | 7.6-8.0 | 7.5 | 7.5 | 7.3 |
| TDS | 500 | 8790 | 3243 | 27356 | 25495 |
| Bicarbonate | - | 630-2020 | 988 | 744 | 598 |
| Chloride | 250 | 1029-3800 | 1300 | 16000 | 15000 |
| Sulfate | 250 | <300 | 11 | 81 | 3 |
| Calcium | - | 58-116 | 120 | 1080 | 120 |
| Magnesium | - | 0.1-64 | 389 | 98 | 170 |
| Sodium | - | 3062 | 348 | 9271 | 9495 |
| Iron | 0.3 | 1.0 | 2.6 | 36 | 3.6 |
| Barium | 1.0 | 17.0 | 85 | 46 | 105 |
| Total Hardness | - | 200 | 1900 | 3100 | 1000 |

*range of 3 different samples

5. Analysis of disposal zone water is attached. Salient points are that the disposal zone water TDS exceeds drinking water standards by over 17 times, chlorides by 4 to 15 times, iron by 3 times, and barium 17 times. The Menefee is a mix of coal, shale, claystone, carbonaceous siltstone, and sandstone layers. Its depositional environment was a marine lagoon. An analysis (S. E. Craigg's 1980 Hydrogeology and water resources of the Chico Arroyo - Torreon Wash Area, McKinley and Sandoval Counties, New Mexico) of Menefee water 20-30 miles southwest of the 7-11 well found TDS increased from southwest to northeast to a high of 10,272. Five unit wells (5-2, 6-16, 11-14, 12-10, 13-11) which penetrated the Menefee and reported what they found, found oil in the Menefee. All five wells are within 2 miles of the 7-11.

VIII. The Menefee consists of coal, shale, claystone, carbonaceous siltstone, and sandstone. Menefee oil pools are found at the Rusty (≈30 mi. W in 22n-7w) and Seven Lakes (≈50 mi. SW in 18n-10w) Fields. It is 627' thick in the 7-11 wellbore. Top is 2312' and bottom is 2939'. Fracture gradient is 0.82 psi/ft.

Two zones (Pictured Cliffs and Cliff House) above the Menefee are water bearing. Local TDS data from these zones is lacking. Basin wide, specific conductance of Pictured Cliffs and Cliff House water ranges from 2000 μmhos near outcrops to 30,000 μmhos in deeper gas prone areas. Five unit wells (5-2, 6-16, 11-14, 12-10, 13-11) penetrated the Pictured Cliffs and reported what was found there. All five found gas in the Pictured Cliffs. Three unit wells (5-2, 11-14, 12-10) penetrated the Cliff House and reported what was found there. All three found gas in the Cliff House.

The water bearing Pt. Lookout lies immediately below the Menefee. Four unit wells penetrated the Pt. Lookout and reported what was found there. Two (11-14, 12-10) of the four reported they found gas and two (6-16, 13-11) reported they found oil and gas.

IX. Stimulation, if needed, will be acidization.

X. Induction, CDL, GR, Compensated Density, Sidewall Neutron, and CBL logs were run and are on file.

XI. Based on a field inspection (Dec. 20) and the NM State Engineer's Office record review (Oct. 26), there are no fresh water wells within a mile of the 7-11.

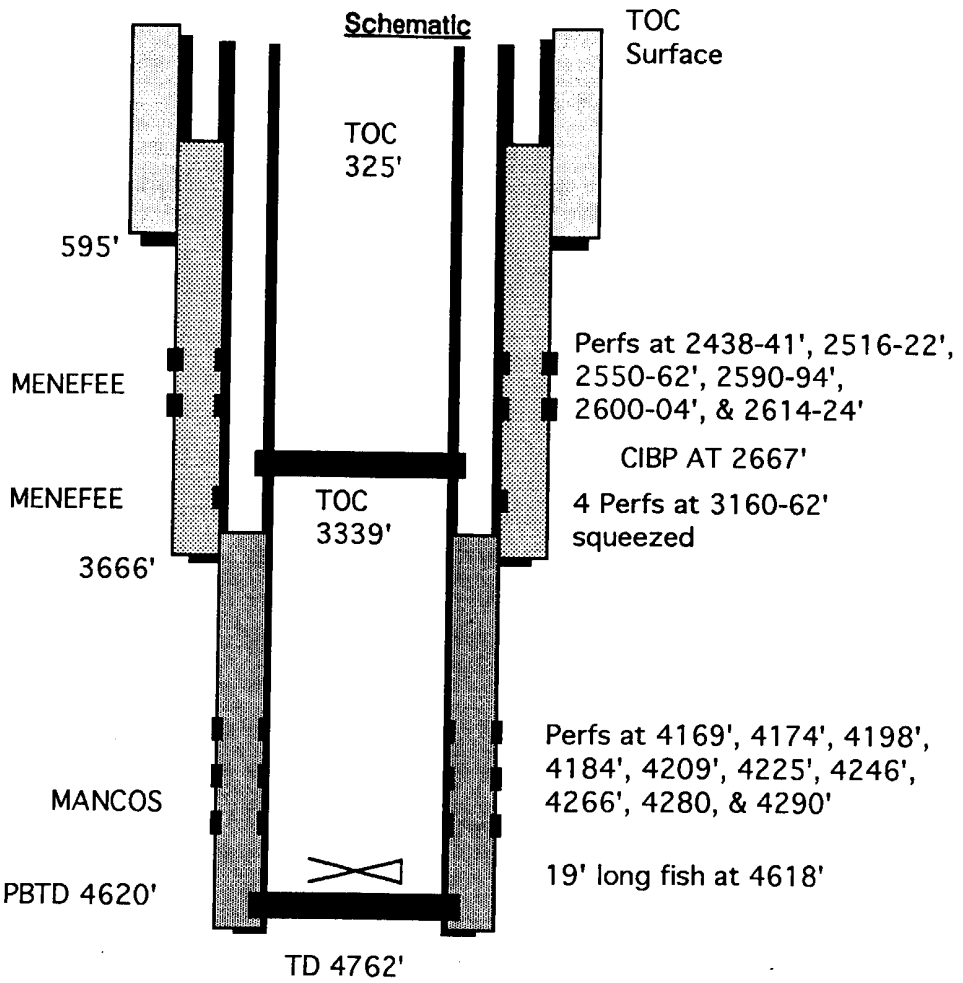
XII. Geologic and engineering data at the NM Oil Conservation Div. and NM Institute of Mining & Technology have been examined. No evidence of open faults or other hydrologic connection between the Menefee and any underground source of water has been found. An injectivity test was run on 9-28-95 and the Menefee tested at a rate of 720 bwpd and 700 psi.

XIII. Notice has been sent to the surface owner (BLM Albuquerque District). Energy Development Corporation is the operator of all leases within a half mile since all leases within a half mile are in its San Isidro (Shallow) Unit.

# INJECTION WELL DATA SHEET

OPERATOR: Energy Development Corporation — LEASE: NM-44453

WELL NO.: San Isidro (Shallow) Unit 7-11 — FOOTAGE LOCATION: 2074' FSL & 1650' FWL — SECTION: 7 — TOWNSHIP: 20n — RANGE: 2w




## Well Construction Data

### Surface Casing

Size 9-5/8" • Cemented with 285 sx.

TOC Surface feet determined by Visual

Hole Size 13-1/2" (448 cf 65/35 Poz + 177 cf Class B)

### Intermediate Casing

Size 7" • Cemented with 330 sx.

TOC 325' feet determined by Log

Hole Size 8-3/4" (766 cf 65/35 Poz + 118 cf Class B)

### Long String

Size 4-1/2" • Cemented with 165 sx.

TOC 3,339' feet determined by Log

Hole Size 6" (208 cf 50/50 Poz)

Total Depth 4,775' (PBTD 4620' with CIBP @ 2,667')

### Injection Interval

_____ feet to 2,624' feet

(perforated or open-hole; indicate which)

# INJECTION WELL DATA SHEET

Tubing Size 2-7/8" 6.5# lined with Ceramic (type of internal coating) set in a Baker packer at 2,350' feet

Other type of tubing / casing seal if applicable N/A

Other Data

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

   If no, for what purpose was the well originally drilled? Drilled & produced briefly as Mancos oil well. Later recompleted in Menefee (no production).

2. Name of the injection formation Menefee

3. Name of Field or Pool (if applicable) Rio Puerco Mancos

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. Mancos perf'ed. between 4,169' & 4,290' at 10 different levels (1 spf, 0.32" holes, 3-1/8" carrier gun). CIBP @ 2667'.

5. Give the names and depths of any over or underlying oil of gas zones (pools) in this area.

   Over: None designated, but some unproductive oil & gas zones present

   Under: Mancos

SAN ISIDRO

# WATER ANALYSIS REPORT

Company : E D C
Address : CUBA, N.M.
Lease : REO PERCO
Well : INJ. WELL
Sample Pt. : SWAB

Date : 10-26-95
Date Sampled : 10-25-95
Analysis No.

| ANALYSIS | | mg/L | * meq/L | | |
|---|---|---|---|---|---|
| 1. pH | 8.0 | | | | |
| 2. H2S | N/A | | | | |
| 3. Specific Gravity | 1 | | | | |
| 4. Total Dissolved Solids | | 8790.1 | | | |
| 5. Suspended Solids | | | | | |
| 6. Dissolved Oxygen | | | | | |
| 7. Dissolved CO2 | | | | | |
| 8. Oil in Water | | | | | |
| 9. Phenolphthalein Alkalinity (CaCO3) | | | | | |
| 10. Methyl Orange Alkalinity (CaCO3) | | | | | |
| 11. Bicarbonate | HCO3 | 1830.0 | HCO3 | 30.0 | |
| 12. Chloride | Cl | 3800.0 | Cl | 107.2 | |
| 13. Sulfate | SO4 | 0.0 | SO4 | 0.0 | |
| 14. Calcium | Ca | 80.0 | Ca | 4.0 | |
| 15. Magnesium | Mg | 0.1 | Mg | 0.0 | |
| 16. Sodium (calculated) | Na | 3062.1 | Na | 133.2 | |
| 17. Iron | Fe | 1.0 | | | |
| 18. Barium | Ba | 17.0 | | | |
| 19. Strontium | Sr | 0.0 | | | |
| 20. Total Hardness (CaCO3) | | 200.0 | | | |

## PROBABLE MINERAL COMPOSITION

| *milli equivalents per Liter | | | Compound | Equiv wt | X meq/l. | = mg/l. |
|---|---|---|---|---|---|---|
| 4 | *Ca <----- | *HCO3 30 | Ca(HCO3)2 | 81.0 | 4.0 | 324 |
| | -------> | | CaSO4 | 68.1 | | |
| 0 | *Mg -----> | *SO4 0 | CaCl2 | 55.5 | | |
| | <---------- | | Mg(HCO3)2 | 73.2 | 0.0 | 0 |
| 133 | *Na -----> | *Cl 107 | MgSO4 | 60.2 | | |
| | | | MgCl2 | 47.6 | | |

Saturation Values Dist. Water 20 C
CaCO3 13 mg/L
CaSO4 * 2H2O 2090 mg/l.
BaSO4 2.4 mg/L

| | | | |
|---|---|---|---|
| NaHCO3 | 84.0 | 26.0 | 2184 |
| Na2SO4 | 71.0 | | |
| NaCl | 58.4 | 107.2 | 6264 |

REMARKS:

Petrolite Oilfield Chemicals Group

Respectfully submitted, D. STEWART

SAN ISIDRO (SHALLOW) UNIT 7-11

# SCALE TENDENCY REPORT

| | | | |
|---|---|---|---|
| Company | : E D C | Date | : 10-26-95 |
| Address | : CUBA, N.M. | Date Sampled | : 10-25-95 |
| Lease | : REO PERCO | Analysis No. | : |
| Well | : INJ. WELL | Analyst | : D. STEWART |
| Sample Pt | : SWAB | | |

## STABILITY INDEX CALCULATIONS
(Stiff-Davis Method)
CaCO3 Scaling Tendency

S.I. = 1.3 at 80 deg. F or 27 deg. C
S.I. = 1.3 at 100 deg. F or 38 deg. C
S.I. = 1.3 at 120 deg. F or 49 deg. C
S.I. = 1.4 at 140 deg. F or 60 deg. C
S.I. = 1.4 at 160 deg. F or 71 deg. C

**********

## CALCIUM SULFATE SCALING TENDENCY CALCULATIONS
(Skillman-McDonald-Stiff Method)
Calcium Sulfate

S = 2290 at 80 deg. F or 27 deg. C
S = 2320 at 100 deg. F or 38 deg. C
S = 2315 at 120 deg. F or 49 deg. C
S = 2301 at 140 deg. F or 60 deg. C
S = 2264 at 160 deg. F or 71 deg. C

Petrolite Oilfield Chemicals Group

Respectfully submitted, D. STEWART

SAN ISIDRO (SHALLOW) UNIT 7-11

# HALLIBURTON DISTRICT LABORATORY
# WATER ANALYSIS DATA SHEET

Analysis Date: ~~8-11-92~~ Report No. ———

To Veteran Exploration

Submitted By ——— Date Received 8-11-92

Well Number Johnson 7-11 Location 2560'-2570' (2nd Swab) Formation Menefee
Data for Report

Specific Gravity ~~1.001~~ 1.001

pH ~~7.64~~ 7.64

| Aliquot or Dilution | Ion | Calculation | | |
|---|---|---|---|---|
| | Fe Log | | ~~Nil~~ | Nil |
| | K %T | | ~~Nil~~ | Nil |
| | Na %T | | | |
| | Ca | | ~~116~~ | 116 |
| | Mg | | ~~64~~ | 64 |
| | Cl | | ~~1030~~ | 1029 |
| | SO4 Log | | ~~<300~~ | <300 |
| | CO3 | | | |
| | HCO3 | | ~~630~~ | 630 |
| | TDS | | | |

Rw 2.74 at 75 ~~—~~ °F

## NOTICE

This report is based on sound engineering practices, but because of variable well conditions and other information which must be relied upon, Halliburton makes no warranty, express or implied, as to the accuracy of the data or of any calculations or opinions expressed herein. You agree that Halliburton shall not be liable for any loss or damage whether due to negligence or otherwise arising out of or in connection with such data calculations or opinions.

# HALLIBURTON DISTRICT LABORATORY
# WATER ANALYSIS DATA SHEET

Report No. ———

Analysis Date: ~~8-11-92~~

To Veteran Exploration

Submitted By ——— Date Received 8-11-92

Well Number Johnson 7-11 Location 2560'-2570' (8th Swab) Formation Menefee

Data for Report

Specific Gravity ~~1.001~~ 1.001

pH ~~7.71~~ 7.71

| Aliquot or Dilution | Ion | Calculation | | |
|---|---|---|---|---|
| | Fe Log | | ~~Nil~~ | NIL |
| | K %T | | ~~Nil~~ | NIL |
| | Na %T | | | |
| | Ca | | ~~58~~ | 58 |
| | Mg | | ~~21~~ | 21 |
| | Cl | | ~~1074~~ | 1074 |
| | SO4 Log | | ~~<300~~ | <300 |
| | CO3 | | | |
| | HCO3 | | ~~2020~~ | 2020 |
| | TDS | | | |

Rw 1.52 at ~~75~~ °F

## NOTICE

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08. 12 92 10:23 P01

SAN ISIDRO (SHALLOW) UNIT 7-11

B. Schlumberger

# WATER ANALYSIS REPORT

Company : E.D.C.
Address : CUBAN M.
Lease : REO PUERCO
Well : #5-15 Producer
Sample Pt. : WELLHEAD

Date : 1-13-95
Date Sampled : 1-10-95
Analysis No. :

| | ANALYSIS | | mg/L | | * meq/L |
|---|---|---|---|---|---|
| 1. | pH | 7.5 | | | |
| 2. | H2S | 1 | | | |
| 3. | Specific Gravity | 1.02 | | | |
| 4. | Total Dissolved Solids | | 27356.2 | | |
| 5. | Suspended Solids | | | | |
| 6. | Dissolved Oxygen | | | | |
| 7. | Dissolved CO2 | | | | |
| 8. | Oil In Water | | | | |
| 9. | Phenolphthalein Alkalinity (CaCO3) | | | | |
| 10. | Methyl Orange Alkalinity (CaCO3) | | | | |
| 11. | Bicarbonate | HCO3 | 744.0 | HCO3 | 12. |
| 12. | Chloride | Cl | 16000.0 | Cl | 451. |
| 13. | Sulfate | SO4 | 81.0 | SO4 | 1. |
| 14. | Calcium | Ca | 1080.0 | Ca | 53. |
| 15. | Magnesium | Mg | 97.9 | Mg | 8. |
| 16. | Sodium (calculated) | Na | 9271.3 | Na | 403. |
| 17. | Iron | Fe | 36.0 | | |
| 18. | Barium | Ba | 46.0 | | |
| 19. | Strontium | Sr | 0.0 | | |
| 20. | Total Hardness (CaCO3) | | 3100.0 | | |

## PROBABLE MINERAL COMPOSITION

*milli equivalents per Liter

| | | |
|---|---|---|
| 54 | *Ca <------ *HCO3 | 12 |
| | /-------> | |
| 8 | *Mg ------> *SO4 | 2 |
| | <---------/ | |
| 403 | *Na ------> *Cl | 451 |

Saturation Values Dist. Water 20 C

| | |
|---|---|
| CaCO3 | 13 mg/L |
| CaSO4 * 2H2O | 2090 mg/L |
| BaSO4 | 2.4 mg/L |

| Compound | Equiv wt | X meq/L | = mg/L |
|---|---|---|---|
| Ca(HCO3)2 | 81.0 | 12.2 | 988 |
| CaSO4 | 68.1 | 1.7 | 115 |
| CaCl2 | 55.5 | 40.0 | 2220 |
| Mg(HCO3)2 | 73.2 | | |
| MgSO4 | 60.2 | | |
| MgCl2 | 47.6 | 8.1 | 383 |
| NaHCO3 | 84.0 | | |
| Na2SO4 | 71.0 | | |
| NaCl | 58.4 | 403.3 | 568 |

REMARKS:

Petrolite Oilfield Chemicals Group

Respectfully submitted,
D. STEWART

SAN ISIDRO (SHALLOW) UNIT 5-15

# WATER ANALYSIS REPORT

| | | | |
|---|---|---|---|
| Company | : E.D.C. | Date | : 9-3-93 |
| Address | : CUBA, N.M. | Date Sampled | : 9-1-93 |
| Lease | : REO PUERCO | Analysis No. | : 1 |
| Well | : 7-3 ~~Producer~~ | | |
| Sample Pt. | : SEPARATOR | | |

| | ANALYSIS | | mg/L | | * meq |
|---|---|---|---|---|---|
| 1. | pH | 7.5 | | | |
| 2. | H2S | 1 | | | |
| 3. | Specific Gravity | 1.01 | | | |
| 4. | Total Dissolved Solids | | 3243.1 | | |
| 5. | Suspended Solids | | | | |
| 6. | Dissolved Oxygen | | | | |
| 7. | Dissolved CO2 | | 22 | | |
| 8. | Oil In Water | | | | |
| 9. | Phenolphthalein Alkalinity (CaCO3) | | | | |
| 10. | Methyl Orange Alkalinity (CaCO3) | | | | |
| 11. | Bicarbonate | HCO3 | 988.0 | HCO3 | 16.2 |
| 12. | Chloride | Cl | 1300.0 | Cl | 36.7 |
| 13. | Sulfate | SO4 | 11.0 | SO4 | 0.2 |
| 14. | Calcium | Ca | 120.0 | Ca | 6.0 |
| 15. | Magnesium | Mg | 388.7 | Mg | 32.0 |
| 16. | Sodium (calculated) | Na | 347.8 | Na | 15.1 |
| 17. | Iron | Fe | 2.6 | | |
| 18. | Barium | Ba | 85.0 | | |
| 19. | Strontium | Sr | 0.0 | | |
| 20. | Total Hardness (CaCO3) | | 1900.0 | | |

## PROBABLE MINERAL COMPOSITION

*milli equivalents per Liter

| | | |
|---|---|---|
| 6 | *Ca <----- *HCO3 | 16 |
| 32 | *Mg -----> *SO4 | 0 |
| 15 | *Na -----> *Cl | 37 |

| Compound | Equiv wt | X meq/L | mg/L |
|---|---|---|---|
| Ca(HCO3)2 | 81.0 | 6.0 | 485 |
| CaSO4 | 68.1 | | |
| CaCl2 | 55.5 | | |
| Mg(HCO3)2 | 73.2 | 10.2 | 747 |
| MgSO4 | 60.2 | 0.2 | 14 |
| MgCl2 | 47.6 | 21.5 | 1026 |
| NaHCO3 | 84.0 | | |
| Na2SO4 | 71.0 | | |
| NaCl | 58.4 | 15.1 | 884 |

Saturation Values Dist. Water 20 C

| | |
|---|---|
| CaCO3 | 13 mg/L |
| CaSO4 * 2H2O | 2090 mg/L |
| BaSO4 | 2.4 mg/L |

REMARKS:

Petrolite Oilfield Chemicals Group

Respectfully submitted,
D. STEWART

SAN ISIDRO (SHALLOW) UNIT 7-3

WATER ANALYSIS REPORT

| | | | |
|---|---|---|---|
| Company | : E.D.C. | Date | : 9-3-93 |
| Address | : CUBA, N.M. | Date Sampled | : 9-1-93 |
| Lease | : REO PUERCO | Analysis No. | : 1 |
| Well | : 12-10 Producer | | |
| Sample Pt. | : SEPARATOR | | |

| | ANALYSIS | | mg/L | | * mc |
|---|---|---|---|---|---|
| 1. | pH | 7.3 | | | |
| 2. | H2S | 2 | | | |
| 3. | Specific Gravity | 1.01 | | | |
| 4. | Total Dissolved Solids | | 25494.9 | | |
| 5. | Suspended Solids | | | | |
| 6. | Dissolved Oxygen | | | | |
| 7. | Dissolved CO2 | | 66 | | |
| 8. | Oil In Water | | | | |
| 9. | Phenolphthalein Alkalinity (CaCO3) | | | | |
| 10. | Methyl Orange Alkalinity (CaCO3) | | | | |
| 11. | Bicarbonate | HCO3 | 598.0 | HCO3 | 9. |
| 12. | Chloride | Cl | 15000.0 | Cl | 423. |
| 13. | Sulfate | SO4. | 3.0 | SO4 | 0 |
| 14. | Calcium | Ca | 120.0 | Ca | 6 |
| 15. | Magnesium | Mg | 170.1 | Mg | 14 |
| 16. | Sodium (calculated) | Na | 9495.2 | Na | 413 |
| 17. | Iron | Fe | 3.6 | | |
| 18. | Barium | Ba | 105.0 | | |
| 19. | Strontium | Sr | 0.0 | | |
| 20. | Total Hardness (CaCO3) | | 1000.0 | | |

## PROBABLE MINERAL COMPOSITION

*milli equivalents per Liter

| | | |
|---|---|---|
| 6 | *Ca <------ *HCO3 | 10 |
| | /-------> | |
| 14 | *Mg ------> *SO4 | 0 |
| | <----------/ | |
| 413 | *Na ------> *Cl | 423 |

Saturation Values Dist. Water 20 C

| | | |
|---|---|---|
| CaCO3 | 13 | mg/L |
| CaSO4 * 2H2O | 2090 | mg/L |
| BaSO4 | 2.4 | mg/L |

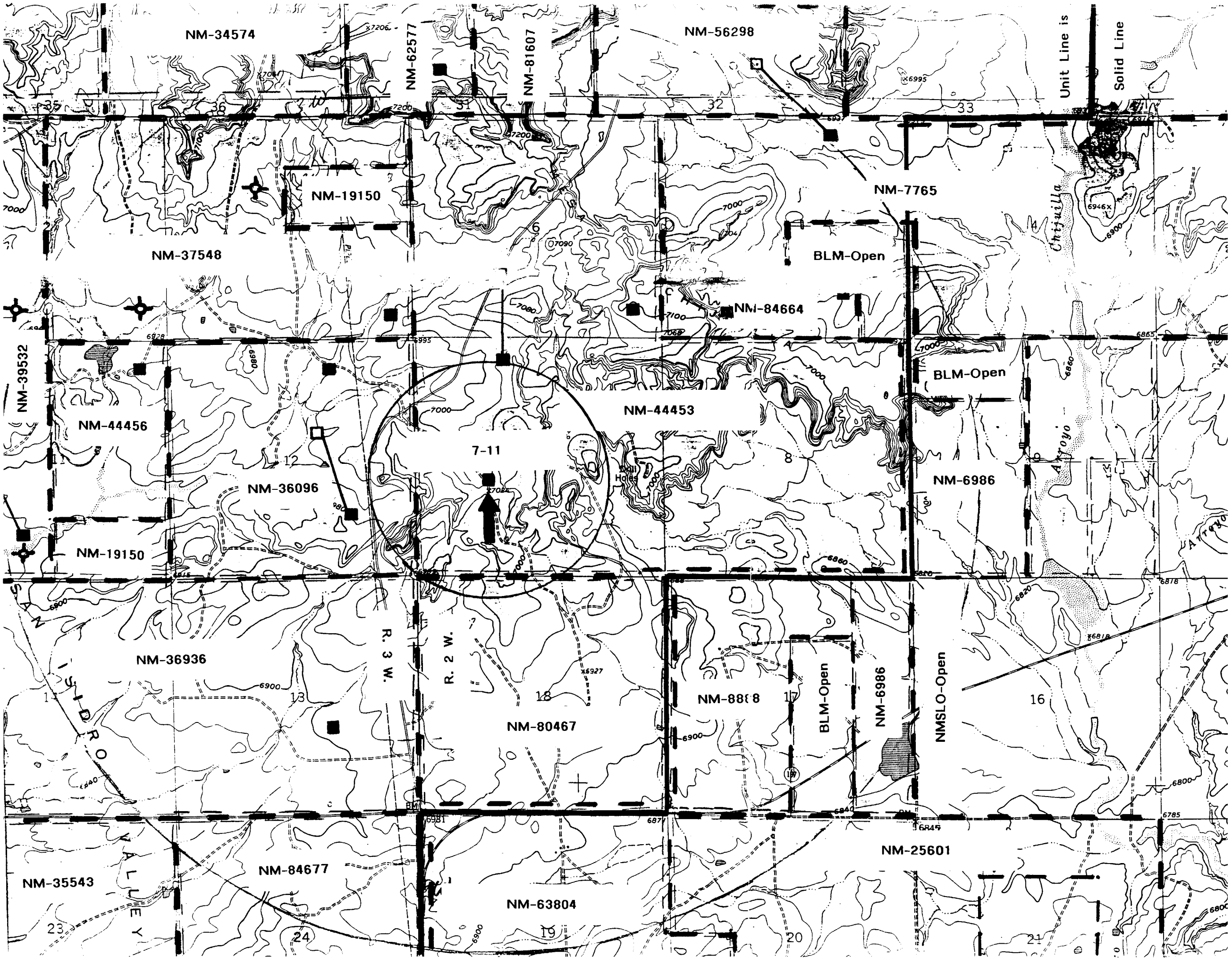
| Compound | Equiv wt | X meq/L | mg/ |
|---|---|---|---|
| Ca(HCO3)2 | 81.0 | 6.0 | 485 |
| CaSO4 | 68.1 | | |
| CaCl2 | 55.5 | | |
| Mg(HCO3)2 | 73.2 | 3.8 | 279 |
| MgSO4 | 60.2 | 0.1 | 4 |
| MgCl2 | 47.6 | 10.1 | 482 |
| NaHCO3 | 84.0 | | |
| Na2SO4 | 71.0 | | |
| NaCl | 58.4 | 413.0 | 24136 |

REMARKS:

Petrolite Oilfield Chemicals Group

Respectfully sub ted,
D. STEWART

SAN ISIDRO (SHALLOW) UNIT 12-10


NM-34574
NM-62577
NM-81607
NM-56298
Unit Line is
Solid Line
NM-19150
NM-7765
NM-37548
BLM-Open
NM-84664
NM-39532
NM-44456
NM-44453
BLM-Open
7-11
NM-36096
NM-6986
NM-19150
SAN ANDRES
R. 3 W.
R. 2 W.
NM-36936
NM-80467
NM-8888
BLM-Open
NM-6986
NMSLO-Open
NM-84677
NM-25601
NM-35543
NM-63804