STATE OF NEW MEXICO

ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
AZTEC DISTRICT OFFICE

1000 RIO BRAZOS ROAD
AZTEC, NEW MEXICO 87410
(505) 334-6178

Date: 9-11-92

Attn: David Catanach
Ben Stone

Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87504-2088

RE: Proposed MC_____ Proposed DHC_____
Proposed NSL_____ Proposed SWD X
Proposed WFX_____ Proposed PMX_____
Proposed NSP_____ Proposed DD_____

Gentlemen:

I have examined the application received on 9-11-92

for the Phillips Petroleum Corp. Sec. T. 3-8 Unit SWD #303
OPERATOR LEASE & WELL NO.

E-14-31N-8W and my recommendations are as follows:
UL-S-T-R

Approve - Step Rate Required

Yours truly,

Jerry Sexton

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

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

FORM C-108
Revised 7-1-81

APPLICATION FOR AUTHORIZATION TO INJECT

I. Purpose: ☐ Secondary Recovery ☐ Pressure Maintenance ☒ Disposal ☐ Storage
Application qualifies for administrative approval? ☒ yes ☐ no

II. Operator: Phillips Petroleum Company

Address: 5525 Hwy 64 NBU 3004, Farmington, New Mexico 87401

Contact party: Louis Robinson Phone: (505) 599-3412

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 ☒ 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: L.E. Robinson Title Sr. Drlg. & Prod. Engr.

Signature: L.E. Robinson Date: September 9, 1992

* 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 district office

ATTACHMENT
SALTWATER DISPOSAL APPLICATION
SAN JUAN 32-8
WELL NO. 303

III. Well Data

A. (1) San Juan 32-8 Unit SWD No. 303, Section 14, T-31N, R-8-W, 1762′ FNL & 708′ FWL, San Juan Co., New Mexico.

(2) See Saltwater Disposal Well Casing Design - Attachment No. 1.

(3) 2-7/8", 6.50 #/ft, 8rd, N-80, Baker Plastic Coat 571, internal coated tubing, set at 8350′.

(4) Baker Model D permanent packer with seal assembly and anchor latch set at 8350′.

B. (1) Injection Formations:

| | | | | | |
|---|---|---|---|---|---|
| (a) | Morrison | Top | - 8341′ | Bottom | - 8826′ |
| (b) | Bluff | Top | - 8826′ | Bottom | - 8964′ |
| (c) | Entrada | Top | - 9070′ | Bottom | - 9314′ |

Field: Undesignated

(2) The perforated interval:

8510′ - 8782′
8860′ - 8930′
9074′ - 9210′

(3) Drilled for saltwater disposal purposes only.

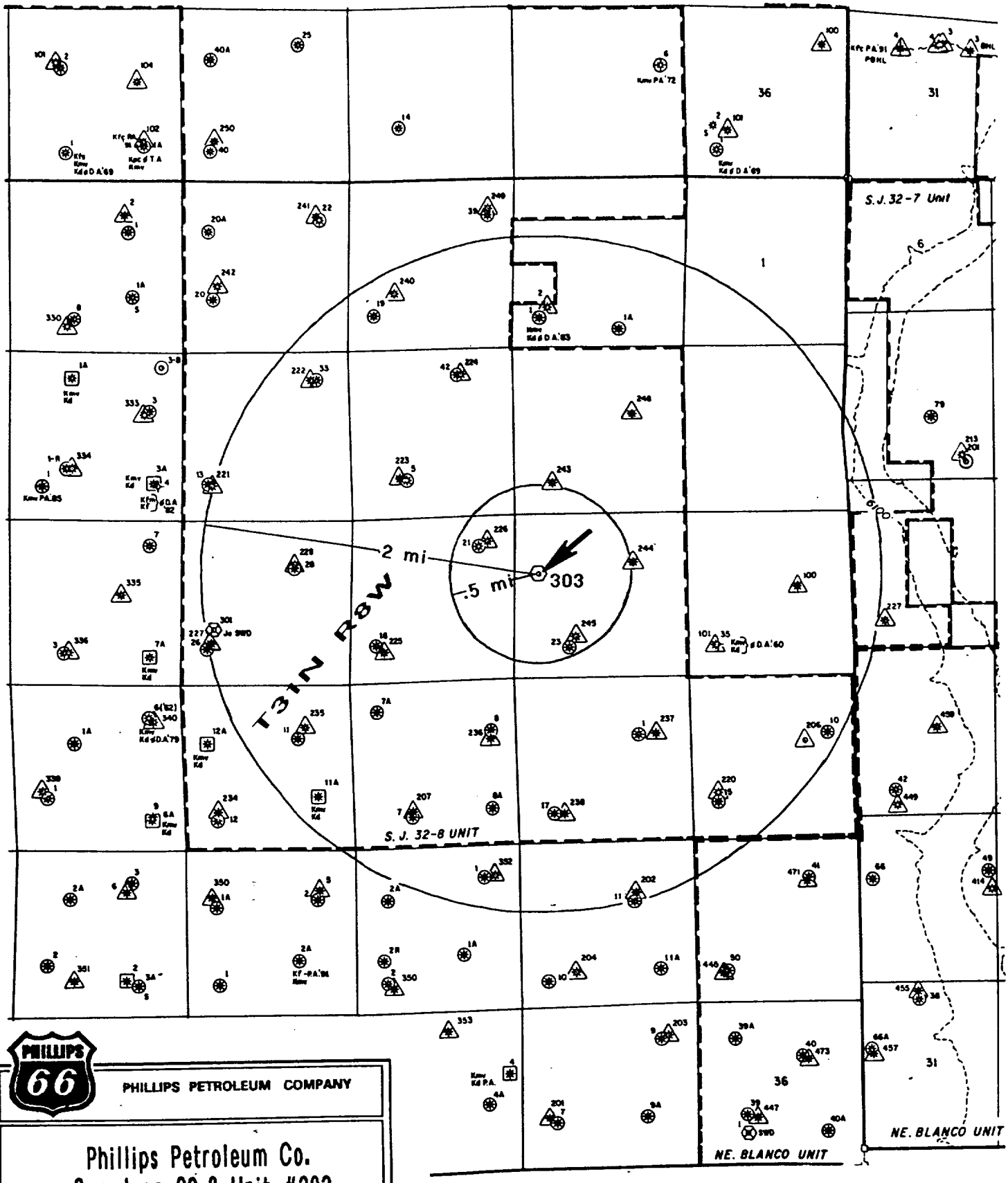
(4) None

(5) Next higher zone, Dakota Sandstone (8043′ - 8268)
Next lower zone - None

V. Map attached.

VI. There are no wells within the 0.5 mile area of review that penetrate the proposed injection zones. The only two wells in this portion of San Juan Basin that penetrate the proposed injection zones are the Blackwood & Nichols Northeast Blanco Unit #1 Pump Mesa SWD (SW 36-31N-8W) and the Phillips Petroleum San Juan 32-8 Unit #301 SWD (SW 16-31N-8W).

VII (1) Average daily rate 3,000 barrels of water per day.
Maximum daily rate 6,000 barrels of water per day.




PHILLIPS 66

PHILLIPS PETROLEUM COMPANY

# Phillips Petroleum Co.
# San Juan 32-8 Unit #303
# Proposed Injection Well

| INTERPRETATION: | DATE: | DRAFTING: | FILE NO.: |
|---|---|---|---|
| T R Moore | 8/92 | trm | |

(2) Closed system.

(3) Average injection pressure 1800 psi.
Maximum injection pressure 2700 psi.

(4) Reinjection of Fruitland Coalseam produced water. Produced water from the San Juan 32-8 Unit. Produced water may also come from the Blanco lease wells (#201, #202, #203, and #204) adjoining the San Juan 32-8 Unit southern border.

(5) The Morrison, Bluff and Entrada Sandstones are not productive of hydrocarbons within the prescribed one-mile radius. Produced water samples of these formation waters are not available in the immediate vicinity. All available information from data on the deep, central portion of the San Juan Basin suggests that the natural waters of these formations are certainly in excess of 10,000 ppm total dissolved solids, and are likely to be in excess of 20,000 ppm total dissolved solids. Data presented by Stone, et al (1983) would also support that the waters in the proposed receiving formations are saline. Wireline log data from the subject well confirms that the interstitial waters of the proposed injection zones are saline.

VIII. Please refer to enclosed wireline logs and tabulation of the formation tops from the proposed injection well.

The proposed saltwater receiving formations in the San Juan 32-8 Unit #303 well are the sandstones and sandy siltstones suitable for injection in the Morrison Formation, the Bluff Sandstone, and the Entrada Sandstone. All three of these units are of Late Jurassic age.

The Morrison Formation was encountered in the 32-8 #303 borehole from 8268-8826 ft. The sandstones and sandy siltstones suitable for saltwater injection occur below 8500 ft. The sandstones may be generally described as being light brown to reddish brown to white, medium to very fine grained, moderately well to poorly sorted, silty and/or calcareous in part, and firm to hard but occasionally somewhat friable. The associated siltstones are reddish brown to tan, slightly sandy, normally slightly calcareous, firm to hard, and commonly produced platy drill-cuttings. As indicated by wireline logs, the porosity of the proposed receiving zones in the Morrison ranges from 2 to 10%. Formation permeability and transmissivity are enhanced by natural fracturing.

The Bluff Sandstone is comprised of white to pale red, medium to very fine grained, moderately well sorted, calcareous, sporadically cherty, locally silty sandstones with some interbedded siltstones and silty shales. It was encountered in the #303 borehole from 8826-8964 ft. The porosity of the

proposed receiving horizons in the Bluff range from 2-8%. Naturally occurring fractures augment the permeability and transmissivity of the Bluff.

The third proposed water-receiving zone, the Entrada Sandstone, was cut in the subject well form 9070-9374 ft. It is comprised, predominantly, of white to pink, fine to very fine grained sandstones which are moderately well to poorly sorted, silty, slightly calcareous, quartzose, and hard. Intercalated with the sandstones are reddish brown, sandy, argillaceous, slightly calcareous siltstones. Wireline log porosity of the Entrada is less than 6%, but the permeability and transmissivity of the formation is enhanced by natural fracturing.

Potential usable-water aquifers overlying the proposed injection zones at this location are at depths less than 2446 ft. These include porous and permeable sandstones in the San Jose, Nacimiento, and Ojo Alamo Formations. The waters of these formations in this portion of the San Juan Basin, as indicated by data cited by Stone, et al, (1983), may be characterized as follows:

**San Jose Formation** (0 - ca. 1800 ft.) - total dissolved solids (TDS) content estimated to be 500 to 2800 ppm, with dramatic variations in water quality locally;

**Nacimiento Formation** (ca. 1800 - 2344 ft.) - TDS content estimated to be 1225 to 9100 ppm, limited quantities and highly variable water quality, and;

**Ojo Alamo Sandstone** (2344 - 2466 ft.) - TDS content estimated to be 1325 to 6550 ppm, variable quality but slightly saline overall.

The total dissolved solids content figures cited above have been converted from specific conductance values cited by Stone, et al, (1983), using the general formula

TDS (ppm) = 0.7 X specific conductance (micromhos).

No water samples are available from within one mile of the proposed injection well.

IX. Proposed Stimulation Program

Entrada- 152,000 gals. crosslinked gel with 300,000 lbs 20/40 Ottawa sand.

Bluff - 108,000 gals. crosslinked gel with 210,000 lbs 20/40 Ottawa sand.

Morrison- 164,000 gals. crosslinked gel with 342,000 lbs 20/40 Ottawa sand.

X. Logging and Test Data

Well logs will be filed with Division.

XI. There are no known freshwater wells available for sampling within one mile of the subject proposed injection well.

XII. Phillips Petroleum Company geologists and engineers have examined available geologic and engineering data and can find no evidence of nor reason to believe of any hydrologic connection between the proposed saltwater injection zones and any underground source of potable water.

## Reference

Stone, W. J., F. P. Lyford, P. F. Frenzel, N. H. Mizell and E. T. Padgett (1983) Hydrogeology and Water Resources of San Juan Basin, New Mexico: New Mexico Bur. Mines and Min. Resources, Hydrologic Report No. 6, 70 pp.

Attachment No. 1



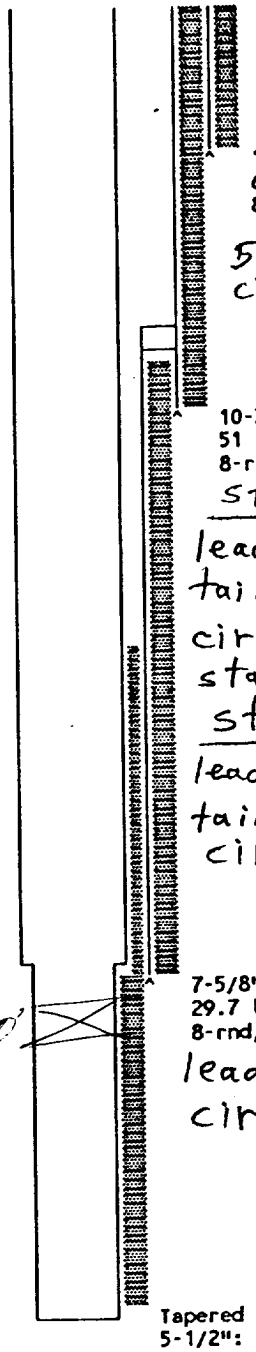
PROPOSED WELLBORE SCHEMATIC
PHILLIPS PETROLEUM COMPANY-FARMINGTON AREA REGION

RKB @ _____ ;
CHF @ _____ ;
GL @ 6637 ;

Date July 11, 1992
Lease Type: Federal
Lease & Well No. San Juan 32-8 Unit No. 303 SWD Well
Legal Description 1762' FNL & 708' FWL, Sec 14, T31N-R8W
San Juan County State: New Mexico
Field Entrada, Morrison & Bluff
Tbg.
Other

Date Drilled:
Hole/Casing Condition:
Last Stimulation:
Workover Proposal:

Wellhead Description: (Include connection that BOP will bolt to)



16" @ 450'
65 lb/ft, H-40
8-rnd, ST&C

525 sx class G
circulate to surface

10-3/4" @ 3950'
51 lb/ft, J-55
8-rnd, ST&C

stage 1
lead - 450sx 65/35 poz/class G
tail - 500 sx class G
circulated to top of
stage tool @ 2500'

stage 2
lead - 650 sx 65/35 poz/class G
tail - 150 sx class G
circulate to surface

| CAPACITIES: | BBL/FT |
|---|---|
| 2-7/8" . lb/ft | 0.00 |
| 2-3/8" 4.7 lb/ft X 4-1/2" 11.6 lb/ft | 0.01010 |
| 4-1/2" 11.6 lb/ft | 0.01550 |
| 4-1/2" 11.6 lb/ft X 7" 23 lb/ft | 0.01970 |

7-5/8" Liner: 3750'-8000'
29.7 lb/ft, N-80
8-rnd, LT&C
lead - 540sx 65/35 poz/class G ; tail - 200sx class G
circulate cement to top of liner @ 3750'.

Tapered Production Casing
5-1/2": Surface to 8000'
17 lb/ft, N-80
8-rnd, LT&C
4-1/2": 8000' to 9450' (TD)
11.6 lb/ft, N-80
8-rnd, LT&C

600sx class G
circulate to 7000'.

Proposed TD @ 9450'

PERFORATING SCHEDULE

San Juan 32-8 Unit #303
Disposal Well Stimulation

| D/N Meas (8/18/92) | Feet | Shot Density | # Of Holes |
|---|---|---|---|
| ENTRADA Stage 1 | | | |
| 9074-9090 | 16 | 2 SPF | 33 |
| 9140-9210 | 70 | " | 141 |
| | 86 | | 174 |
| | | | |
| BLUFF Stage 2 | | | |
| 8860-8930 | 70 | 2 SPF | 141 |
| | | | |
| MORRISON Stage 3 | | | |
| 8510-50 | 40 | 2 SPF | 81 |
| 8614-40 | 26 | " | 53 |
| 8658-74 | 16 | " | 33 |
| 8694-8718 | 24 | " | 49 |
| 8746-82 | 36 | " | 73 |
| | 142 | | 289 |

T. M. Larimer 8/19/92

PHILLIPS

INTER-OFFICE CORRESPONDENCE SUBJECT: San Juan 32-8 Unit #303
Completion Recommendation
San Juan County, New Mexico

TO: L. E. Robinson
FROM: T. M. Larimer (r) K. L. Czirr KLC
DATE: 8/19/92 TML

Please furnish a detailed procedure to perforate and stimulate the Entrada, Bluff, and Morrison formations in the subject well based on the following rough procedure. Stimulation designs will be forwarded upon selection of service company.

1. With 2-7/8" workstring, clean out well to PBTD and displace wellbore fluid with 2% KCl. KCl water should be filtered to 25 micron nominal.

2. Spot 10% acetic acid across Stage 1 interval and COOH.

3. Run GR/CCL/CBL/VDL from TD to top of cement.

4. Perforate the Entrada formation with casing gun 86', 2 shot per foot, 0.35" hole size, 120° phasing, as shown in attached perforating schedule Stage 1.

5. GIH with 2-7/8" work string & selective acidizing packer and breakdown the perfs with 1 bbl 10% acetic acid per 5 foot interval. Record BD pressures and ISIP's on daily completion report. After breaking down all perfs, reverse acid/KCL from annulus until returns show no acid. COOH.

6. Frac well as per stimulation procedure. Maximum surface treating pressure is 6000 psi. Flow well back immediately for forced closure as per the onsite Reservoir Engineer. Flow back well to clean up bottoms up plus 1 hour. Be sure to have an ample supply of 1/8" and 1/4" chokes on location for the flow back. Record flowing pressures and choke sizes on daily completion report.

7. GIH with wireline CIBP and set at +/- 9000'. COOH with wireline.

8. Perforate the Bluff formation with casing gun 70', 2 shot per foot, 0.35" hole size, 120° phasing, as shown in attached perforating schedule Stage 2.

9. GIH with 2-7/8" work string & selective acidizing packer and spot 7.5% HCl across perforated interval and allow to soak. Breakdown the perfs with 1 bbl 7.5% HCl per 5 foot interval. Record BD pressures and ISIP's on daily completion report.

After breaking down all perfs, reverse acid/KCL from annulus until returns show no acid. COOH.

10. Frac well as per stimulation procedure. Maximum surface treating pressure is 6000 psi. Flow well back immediately for forced closure as per the onsite Reservoir Engineer. Flow back well to clean up bottoms up plus 1 hour. Be sure to have an ample supply of 1/8" and 1/4" chokes on location for the flow back. Record flowing pressures and choke sizes on daily completion report.

11. GIH with wireline CIBP and set at +/- 8821'. COOH with wireline.

12. Perforate the Morrison formation with casing gun 142', 2 shot per foot, 0.35" hole size, 120° phasing, as shown in attached perforating schedule Stage 3.

13. GIH with 2-7/8" work string & selective acidizing packer and spot 7.5% HCl across perforated interval and allow to soak. Breakdown the perfs with 1 bbl 7.5% HCl per 5 foot interval. Record BD pressures and ISIP's on daily completion report. After breaking down all perfs, reverse acid/KCL from annulus until returns show no acid. COOH.

14. Frac well as per stimulation procedure. Maximum surface treating pressure is 6000 psi. Flow well back immediately for forced closure as per the onsite Reservoir Engineer. Flow back well to clean up bottoms up plus 1 hour. Be sure to have an ample supply of 1/8" and 1/4" chokes on location for the flow back. Record flowing pressures and choke sizes on daily completion report.

15. GIH with 2-7/8" workstring and bit. Drill out CIBP's at 9000' and 8821'. Clean-out to PBTD. COOH with 2-7/8" workstring and bit.

16. GIH with retrievable packer on wireline and set at 8350'. COOH with wireline.

17. GIH with 2-7/8" injection string and sting into packer.

18. RD and release completion rig.

19. GIH with production logging tools on wireline to monitor flow rate and pressures. RU pump truck and begin step-rate test with filtered Fruitland Coal produced water as per onsite Reservoir Engineer. COOH with wireline.

cc: R. A. Allred
J. G. Bearden
R. R. Davis
A. J. Kieke
O. J. Mitchell
R. L. Hawks
T. R. Moore
L. E. Hasely
J. L. Loudermilk

San Juan 32-8 #303 SWD
1762' FNL & 708' FWL
San Juan Co., New Mexico

FORMATION LOG TOPS

The TD was 9370 feet drilled from a surveyed ground elevation of 6637 feet and a KB of 6656 feet on Four Corners Rig #15. The formation tops above the Dakota Ss. are picked off the Neutron log run through casing to the surface. Those formation tops from the Dakota Ss. to TD are from the open hole Dual Induction Log.

| FORMATION | DEPTH | ELEVATION(sea level) |
|---|---|---|
| San Jose Fm. | Surface | +6637 |
| Ojo Alamo Ss. | 2344 | +4312 |
| Kirtland Sh. | 2446 | +4210 |
| Fruitland Fm. | 3240 | +3416 |
| Fruitland Coal Top | 3362 | +3294 |
| Fruitland Coal Base | 3522 | +3134 |
| Pictured Cliffs Ss. | 3524 | +3132 |
| Lewis Sh. | | |
| Cliff House Ss. | 5486 | +1170 |
| Menefee Fm. | 5532 | +1124 |
| Pt. Lookout Ss. | 5834 | +822 |
| Mancos Sh. | 6330 | +326 |
| Gallup Ss. Member | 6694 | -38 |
| Greenhorn Ls. Memb. | 7887 | -1231 |
| Graneros Sh. Member | 7941 | -1285 |
| Dakota Ss. | 8043 | -1387 |
| Morrison Fm. | 8268 | -1612 |
| Bluff Ss. | 8826 | -2170 |
| Summerville Fm. | 8964 | -2308 |
| Todilto Ls. | 9061 | -2405 |
| Entrada Ss. | 9070 | -2414 |
| Chinle Fm. | 9314 | -2658 |
| Total Depth | 9370 | -2714 |

The S.J. 32-8 #303 was logged by Halliburton and Schlumberger on August 17 & 18, 1992. Due to computer problems only the open hole Dual Induction log was run by Halliburton. The cased hole Cement Bond Log was run by HLS but engineer error resulted in the failure of the Pulsed Echo Tool (a cement evaluation devise). Halliburton was relieved of further logging responsibilities and Schlumberger completed the open hole logging operations. Richard Allred, drilling supervisor, decided against running the cased hole cement evaluation tool by Schlumberger.

Ralph L. Hawks Jr.
August 24, 1992