11

MALLON OIL COMPANY

1099 18th Street, Suite 2750, Denver, Colorado 80202
(303) 293-2333

September 21, 1989

Mr. David Catnach
New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

Dear David:

As outlined in Mallon Oil Company's July 24, 1989 Application for Authorization to Inject, Mallon wishes to dispose of a portion of the produced water from it's Amoco-Federal lease into the Amoco Federal #1 well, NE SE Sec. 27, T 26S, R 29E, Eddy County, New Mexico.

The sands proposed for injection are in the uppermost portion of the Cherry Canyon formation at 3856-86' and 3904'-40'. As you pointed out to me the above perforation interval includes the reported cement top around the 4 1/2" production string in Meridian Oil Company's Pecos Federal #3 well located in the SW 1/4 of section 27, T 26S, R 29E. The Pecos - Federal #3 is about 1800 feet southwest of the proposed disposal site. The temperature log cement top of 3850' in that well puts the cement two feet above the top of the lower of the two sands which I understand is locally called the CC-5 sand.

Above the cement top in the Pecos Federal #3 are no zones which are producing within one mile of the well. None of the sands above the proposed disposal interval appear from logs to have the high porosity and clean gamma ray measured in that zone and thus do not appear to have the capacity to accept water that has been proven in the Upper Cherry Canyon sands. An 8 5/8" intermediate casing string is set at 2845' in the Pecos-Federal #3 with cement reportedly circulated to the surface. The setting depth correlates with the base of the anhydrite and the top at the Delaware Mountain Group. The only fresh water in the area is produced from around 250' from the Dewey Lake formation. The casing borehole annulus is presumably filled with drilling mud which should further inhibit crossflow.

As an example of the high permeability and injectivity demonstrated by the sands proposed for injection, a number of wells in the area are presently completed in those sands for disposal purposes. In particular the three wells utilized by CRW-SWD, Ralph Williamson's commercial disposal operation, are injecting at a rate of about 210,000 BWPM, primarily into the Upper Cherry Canyon sands.

A reduction in the cost of saltwater disposal will substantially lower the economic producing limit of the wells and, from the economic evaluations I have run, allows an additional 3500-5000 BO per well to be commercially producible. Excluding the proposed disposal well this would result in the production of 42,000-60,000 BO which would otherwise be left in the ground under our lease at the present well count. In addition to the presently producing wells, we have defined by step-out drilling an area on the west side of the development which should allow an additional 10-14 wells to be added to the reservoir. Since the development wells which we have drilled to define this area have lower projected reserves than earlier, easterly wells on the lease the economics to justify drilling become very tight and under the present lease operating expense, which includes off-lease commercial disposal of produced water, it is doubtful that all of the sites would be drilled. With many of our working interest partners hesitant to commit to further drilling it is even questionable as to whether any further development will take place. At approximately 45,000 BO per development well this amounts to as high as 630,000 additional barrels of oil which may not be produced from the reservoir under the present conditions.

As you can see the economics of saltwater disposal directly impact the efficiency of oil recovery from the reservoir. With a December 31, 1989 Farmout drilling deadline facing us the timing of initiating the disposal is also a factor.

If you have any questions regarding the information presented here, please feel free to call. We are anxious to move ahead with some plan so would appreciate your timely consideration of this matter.

Sincerely,

MALLON OIL COMPANY

Joe H. Cox Jr.
Production Manager

MALLON OIL COMPANY

1099 18th Street, Suite 2750, Denver, Colorado 80202
(303) 293-2333

October 3, 1989

TO: All Parties Required to be Notified

FROM: Joe H. Cox, Jr., Production Manager
Mallon OIl Company

RE: Revised Application for Authorization to Inject (NMOCD form C-108) for Proposed Conversion to Saltwater Disposal,
Amoco-Federal #1, NESE, Sec. 27 T26S, R29E
Eddy County, New Mexico

Attached is another revision of the previously submitted Application for Authorization to Inject for our Amoco-Federal #1 Well. Upon review of State Oil Conservation Division records it was found in Meridian Oil Company's, Pecos-Federal #3 Well (SW SE Sec. 27) that at the depths corresponding to the proposed disposal interval the cement would be inadequate to assure containment of any migrating fluids. The enclosed application shows a revised interval in the Cherry Canyon formation which is now being proposed for disposal.

As before, remedial cement work will be required in the Amoco-Federal #1 well prior to beginning disposal. A copy of the remedial procedure is attached.

If you have any questions regarding the revised conversion, please feel free to call.

Sincerely,

MALLON OIL COMPANY

Joe H. Cox., Jr.
Production Manager

Enclosure
JHC/da

RECOMPLETION PROCEDURE- AMOCO-FEDERAL #1
PROPOSED CHERRY CANYON SALTWATER DISPOSAL INTERVAL

1.) Set 4 1/2" cast iron bridge plug at 4800' above presently producing Williamson Sand perforations. Load hole with water and pressure test casing to 1500 psi for 15 minutes.

2.) Perforate "squeeze" holes 4300-02' 4 SPF.

3.) TIH with 4 1/2" double grip packer on 2 3/8" tubing to 4350', set packer and pressure test tbg. and packer. Release packer and pick up to 4250', set packer and reverse circulate through Braden head at maximum allowable rate until returns are relatively clean.

4.) TOH with packer and TIH w/4 1/2" cement retainer. Set retainer at 4280' and establish injection into squeeze perforations. Pump approximately 300 ft3 35/65 poz "A" followed by approximately 180 ft3 class A + 2% bentonite + 0.5% dispersant. Displace to retainer, sting out of retainer and reverse circulate tubing clean.

5.) Perforate proposed injection interval 4022-34', 4036-40' 4050-60', 4092-4102', 4106-24', 4134-54', 4165-4208' with 2 SPF. TIH with packer and tubing and spot 150 gallons acid across perforations. Set packer and break down perforations with 2350 gallons 15% HCl with 150 perf balls.

6.) TIH w/internally coated packer on 2 3/8" internally plastic coated tubing, circulate annulus with corrosion inhibiting fluid set packer at 3950' and commence injection.

MALLON OIL COMPANY

1099 18th Street, Suite 2750, Denver, Colorado 80202
(303) 293-2333

August 2, 1989

Mr. David Catnach
New Mexico Oil Conservation Division
310 Old Santa Fe Trail
P.O. Box 1148
Santa Fe, NM 87504-1148

RE: Revised Application for Authorization
to Inject, Amoco-Federal #1
NE/4 SE/4 Sec. 27, T26S, R29E
Eddy County, New Mexico

Dear David:

In preparing to send out the revised Application for Authorization to Inject I noticed that the George Mitchell #2 BO Littlefield Federal (the "problem well" that we discussed at the NMOCD) had run 7" intermediate string prior to drilling the production string borehole. A trip to the log library confirmed that the hole had been drilled with a 6 1/8" bit (see attached completion report). Since all other holes in the notification area had been drilled with 7 7/8" bits I had used the factors for that diameter hole and the appropriate casing size on all calculated cement tops and had overlooked the difference in the Mitchell well.

Using a 6 1/8" borehole and neat class "A" cement the 100% fill-up cement level calculates to 1645' KB or 1226' within the 7' intermediate string. Assuming a 75% fill-up factor the top would still be 368' within the 7" string at 2512'.

I just wanted you to be aware of where this change had come from. I apologize for not having caught it earlier and perhaps saving us all some time and trouble.

We are now submitting the revised Application for Authorization to Inject for the Cherry Canyon zone for administrative approval. The proof of newspaper advertisements and certified receipts will follow under separate cover.

Sincerely,

MALLON OIL COMPANY

Joe H. Cox, Jr.
Production Manager

JHC:sss

Enclosure

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

II. Operator: Mallon Oil Company

Address: 1099 18th Street, Suite 2750, Denver, CO 80202

Contact party: Joe H. Cox, Jr. Phone: (303) 293-2333

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: Joe H. Cox, Jr. Title Engineer

Signature: Joe H. Cox Date: 10-03-89

* 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. Submitted with completion report about 7/11/83

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.

III A.

1. Amoco-Federal #1 ; 1665' FSL, 330' FEL, Sec. 27, T26S, R29E, Eddy County, New Mexico.

2. Surface Casing: 8 5/8", set in 12 1/4" hole at 450' with 280 sx, calculated cement top at surface.

   Production Casing: 4 1/2", 11.6#/ft., set at 5820' with 450 sx in 7 7/8" hole. Bond Log cement top 4970' later squeezed with 2-100 sk squeeze jobs through perfs 4950-58 (1 SPF), 4969-5059' (1 shot/10'). Final calculated cement top 4360'.

3. Proposed injection tubing:

   2 3/8", 4.7#/ft., J-55; internally plastic coated (TK-75 or equivalent) or PVC lined.

4. Proposed injection packer:

   Baker or Elder Model "R" Double Grip Pkr. Internally coated with nickle or comparable material to tubing coating. Proposed setting depth 3950'.

III B.

1. Proposed injection formation:

   Cherry Canyon (Unnamed Sands)

   Field and Pool Name:

   Brushy Draw, Delaware.

2. Injection Interval:

   4022-34', 4036-40', 4050-60', 4092-4102', 4106-24', 4134-54', 4165-4208' (KB) perforated (2 SPF).

3. Well was originally drilled 4-13-83 as a producing well.

4. Other perforations:

   "Williamson Sd." Member, Cherry Canyon Formation original perforations 4950-58' (1SPF), 4969-5039' (1 shot/10') squeezed with two 100 sk squeeze jobs. Re-perfed 4984-90', 5000-04 (2 SPF). "Getty Sd." Member, Brushy Canyon Formation tested through perforations 5352-60'. Well presently has a cast iron bridge plug set at 5300' topped with 20' cement. Present production is from Williamson interval 4984-90, 5000-04'. A permanent bridge plug will be set at 4800'. Squeeze perforations will be shot at 4300' and cement will be circulated through a cement retainer from squeeze perforations to approximately 2700'. In the event that circulation with the Braden head cannot be established upper "circulation" holes will be shot at 2000' and cement circulated across interval, circulation holes will then be squeezed.

5. Next oil and gas producing zone uphole from proposed injection zone within field:

"Olds Sd." Mbr. Bell Canyon
Formation 2959-3031'(KB).

Next oil and gas producing zone downhole from proposed injection zone within field:

"Abbey Sd." Mbr. Cherry Canyon Formation
(approx) 4315-62' (KB).

VI. Wells Penetrating Proposed Disposal Zone Within One Half Mile of Proposed Site:

1. Well Name and Number: #1-Y Pecos Federal
Operator: Meridian Oil (El Paso Exploration)
Location: 860' FSL, 2180' FWL (SE SE) , Sec. 27, T26S, R29E, Eddy County, New Mexico.

Type well: Oil
Spud Date: 5-2-84
Completion Date: 7-11-84
Total Depth: 6,000'
PBTD: 5909'
Casing Data: Surface - 9 5/8", set at 2854' with 1025 sacks; Production - 4 1/2", set at 5970 with 760 sacks; calculated cement top = 3,287'.

Completion Data: Perforated 4945-5006', fraced 24,000 gallons water + N_2, 34,000# Sd.

2. Well Name and Number: #2 Pecos Federal
Operator: Meridian Oil (El Paso Exploration)
Location: 1980' FNL, 2030' FEL, (SW NE) Sec. 27, T26N, R29E, Eddy County, New Mexico.

Type well: Oil
Spud Date: 10-22-85
Completion Date: 11-13-85
Total Depth: 5509'
PBTD: 5470'
Casing Data: Surface-13 3/8" set at 366' with 350 sx cement. Intermediate - 8 5/8" set at 2860' with 1500 sacks. Production - 4 1/2" set at 5509' with 3500 sx; calculated cement top = 2,692'.
Completion Data: Perforate 4901-90'. Acidized with 4000 gallons 15% HCl, fraced with unreported vol. gelled water + 78,500# Sd.

3. Well Name and Number : #3 Pecos Federal
Operator: Meridian Oil (El Paso Exploration)
Location: 760' FSL, 1980' FEL (SW SE), Sec. 27, T26S, R29E, Eddy County, New Mexico.

VI (Cont.):

3. Type Well: Oil
Spud Date: 11-5-85
Completion Date: 12-11-85
Total Depth: 5505'
PBTD: 5457'
Casing Data: Surface - 13 3/8", set at 396' with 420 sx.
Intermediate - 8 5/8" set at 2845' with 775 sx.
Production - 4 1/2" set at 5500' with 375 sx; temperature log cement top = 3850' KB.
Completion Data: Perforated 4883-4979' with 46 shots, acidized with 3800 gallons 15% NEFE acid, (No frac record).

4. Well Name and Number: #2 BO, Littlefield Federal
Operator: George H. Mitchell
Location: 724' FNL, 660' FEL, Sec. 34, T26S, R29E, Eddy County, New Mexico.
Type Well: Oil
Spud Date: 5-29-84
Completion Date: 8-6-84
Total Depth: 5,900'
Casing Data: Surface - 9 5/8" set at 350' with 485 sx.
Intermediate - 7" set at 2880' with 200 sx.
Production - 4 1/2" set at 5900' with 356 sx; calculated cement top = 2512'.
Completion Data: Perforate 4950', 4953', 4957', 4961', 4964', 4967', 4973, 4976', 4979', 4983', 4989', 4992', 4995', 4998', acidized with 1500 gallons 7 1/2% MSR acid, frac with 24,000 gallons foamed, gelled water + 34,000# Sd.

5. Well Name and Number: #1 Stateline Federal
Operator: Ralph Williamson (originally New Tex Oil)
Location: 740' FNL, 330' FWL, Sec. 35, T26S, R29E, Eddy County, New Mexico.
Type Well: Oil
Spud Date: 6-4-83
Completion Date: 8-7-83
Total Depth: 6750'
PBTD: 6708'
Casing Data: Surface - 13 3/8" set at 455' with 450 sx.
Intermediate - 8 5/8" set at 2901' with 650 sx.
Production - 5 1/2" set at 6750' with 1800 sx; calculated cement top at surface.
Completion Data: Perforated 6442-6565' (22 holes) squeezed off with 150 sx. Perforated 5863-5892' (15 holes), acidized with 1500 gallons HCl, fraced with 12,000 gallons gelled water + 17,000# Sd; Perforated 5758'- 70' with 1 SPF, acidized with 1250 gallons, fraced with 12,000 gallons, 17,000 # Sd.; Perforated 5308-30' (1 SPF); acidized with 2,000 gallons frac with 15,000 gallons + 23,000# Sd.; Perforated 5103-07', 5129-35' (2SPF). Acidized with 1500 gallons frac with 12,000 gallons + 19,000# Sd.; Perf 4935-5005', acidized with 3000 gallons, fraced with 20,000 gallons + 25,000# Sd.

6. Well Name and Number: #5 EP-USA
Operator: J.C. Williamson
Location: 660' FSL, 1980' FWL, (SE SW), Sec. 26, T26S, R29E, Eddy County, New Mexico
Type Well: Oil
Spud Date: 1-31-85
Completion Date: 2-26-85
Total Depth: 6,250'
PBTD: 6,208
Casing Data: Surface - 13 3/8" set at 452' with 500 sx.
Intermediate - 8 5/8" set at 2770' with 150 sx.
Production - 4 1/2" set at 6250' with 1150 sx; calculated cement top = 2195'.
Completion Data: Perforated 4985-5057' (28 holes), acidized with 3000 gallons 7 1/2% NEFE, frac with 55,700 gallons gelled water + 100,000# Sd.

7. Well Name and Number: #6 EP-USA
Operator: J.C. Williamson
Location: 660' FSL, 660' FWL, (SW SW), Sec. 26, T26S, R29E, Eddy County, New Mexico.

Type Well: Oil
Spud Date: 3-19-85
Completion Date: 4-23-85
Total Depth: 6200'
PBTD: 6160'
Casing Data: Surface - 12 3/4" set at 425' with 450 sx.
Intermediate - 8 5/8" set at 2810' with 150 sx.
Production - 4 1/2" set at 6200' with 1150 sx.
Calculated cement top = 2145'.
Completion Data: Perforated 4958-5042'. Acidized with 3000 gallons 7 1/2% NEFE; fraced with 58,256 gallons + 99,000# Sd.

8. Well Name and Number: #9 EP-USA
Operator: J.C. Williamson
Location: 1650' FSL, 990' FWL, (NW SW), Sec. 26, T26S, R29E, Eddy County, New Mexico.

Type Well: Oil
Spud Date: 3-14-85
Completion Date: 4-16-85
Total Depth: 6,220'
PBTD: 6178'
Casing Date: Surface - 13 3/8" set at 425' with 450 sx.
Intermediate - 8 5/8" set at 2764' with 150 sx.
Production - 5 1/2" set at 6220' with 1300 sx.
Calculated Cement Top: 178'.
Completion Data: Perforated 4961-5024 (25 shots), acidized with 3000 gallons 7 1/2% HCl; fraced with 56,000 gallons + 82,450#.

9. Well Name and Number : #8 EP-USA
Operator: J.C. Williamson
Location: 1980' FSL, 1980' FWL, Sec. 26, T26S, R29E, Eddy County, New Mexico.
Type Well: Oil
Spud Date: 2-28-85
Completion Date: 3-27-85
Total Depth: 6250'
PBTD: 6208'
Casing Data: Surface - 13 3/8" set at 425' with 450 sx.
Intermediate - 8 5/8" set at 2775' with 150 sx.
Production - 5 1/2" set at 6250' with 1000 sx.
Calculated Cement Top = 1602'
Completion Data: Perforated 4983-5065', acidized with 3000 gallons, fraced with 57,496 gallons + 100,000# Sd.

10. Well Name and Number: #3 Holly "A" Federal
Operator: J.C. Williamson
Location: 1980' FNL, 660' FWL, (SW NW), Sec. 26, T26S, R29E, Eddy County, New Mexico
Type Well: Oil
Spud Date: 12-17-84
Completion Date: 1-17-85
Total Depth: 5452'
PBTD: 5412'
Casing Data: Surface 13 3/8" set at 472' with 500 sx.
Intermediate - 8 5/8" set at 5432' with 900 sx.
Calculated Cement Top = 2259'
Completion Data: Perforated 4935-5026'; acidized with 3000 gallons 7 1/2% NEFE: fraced with 55,000 gallons gelled water and 89,000# Sd.

11. Well Name and Number: Amoco-Federal #3
Operator: Mallon Oil Company
Location: 2310' FSL, 1681' FEL (NW SE), Sec. 27, T26S, R29E, Eddy County, New Mexico
Type Well: Oil
Spud Date: 8-16-83
Completion Date: 10-14-83
Total Depth: 5075'
PBTD: 5035'
Casing Data: Surface - 8 5/8", set at 445' with 280 sx;
Production - 5 1/2", set at 5070' with 400 sx;
Cement Top (CBL) - 3219'
Completion Data: Perforated 4909-4974' (1 SPF). Acidized with 1500 gallons, fraced with 30,000 gallons + 64,000# sd.

12. Well Name and Number: Amoco-Federal #4
Operator: Mallon Oil Company
Location: 2310' FNL, 330' FEL, (SE NE), Sec. 27, T26S, R29E, Eddy County, New Mexico
Type Well: Oil
Spud Date: 11-28-83
Completion Date: 2-27-84
Total Depth: 5052'

VI:

12. PBTD: 5037'
Casing Data: Surface - 8 5/8", set at 517' with 1275 sx.
Production - 5 1/2" set at 5046' with 450 sx.
Cement Top (CBL) - 3180'.
Completion Data: Perforated 4962-5017' (18 shots); Acidized with 2500 gallons HCI; Fraced with 30,000 gallons + 50,000# sd.

Part VII:

1. Proposed Average Daily Injection Rate: 800 BWPD.

   Proposed Maximum Daily Injection Rate: 1600 BWPD.

2. Closed system.

3. Proposed Average Surface Injection Pressure: 300 psi.

   Proposed Maximum Surface Injection Pressure: 804 psi.

4. All injected fluid will be water produced from the "Williamson Sd", Cherry Canyon Fm. (analysis attached). No water from the proposed injection zone is available for analysis.

5. The apparent water resistivity back calculated from the open hole logs indicates a sodium chloride equivalent concentration of 28,000 PPM (mg/L). There are no wells producing from proposed disposal zone within one mile.

VIII Proposed Injection Zone:

Unnamed Sands, Cherry Canyon Fm., Delaware Mountain Group.

Fine to medium grained sandstone bounded by areally continuous shales above and below.

Net sand thickness (porosity greater than 20%) 74' (4024-4206', Gross).

Drinking Water Zone:

"Dewey Lake" 150-200'± (KB), no other known fresh water zones in area.

IX. Proposed Stimulation:

Zone well will be perforated and broken down with acid. If injection tests prior to beginning disposal indicate a need for further stimulation, a frac job consisting of approximately 20,000 gallons gelled water and 40,000# of sand will be conducted.

X.

Logs previously submitted.

XI.

See attachments for water analyses from the two known fresh water wells in the area.

Well #1 SW SW Sec. 22, T26S, R29E, "Challenger Fresh", sampled 5-27-88.

Well #2 NW SW Sec. 26, T26S, R29E, "Williamson Fresh", sampled 5-27-88.

XII. Statement regarding hydrologic connection between fresh water aquifer and proposed disposal zone:

Detailed mapping of the Williamson Sd (Cherry Canyon Formation) which lies approximately 700' below the proposed disposal zone shows no indication of faulting or other potential conduits for fluid flow between the proposed disposal zone and the aquifer in the Dewey Lake Formation. Further, no indications have been observed during drilling of the wells to make such geologic phenomena seem likely.

HALLIBURTON DIVISION LABORATORY
HALLIBURTON SERVICES
MIDLAND DIVISION
HOBBS, NEW MEXICO 88240

RECEIVED JUN 0 3 1988

LABORATORY WATER ANALYSIS No.

Mallon Oil Date 5-25-88

bmitted by Date Rec.

ell No. Depth Formation

ounty Field Source

	Williamson Fresh	Amoco Production	Challanger Fresh	
sistivity	.854 @ 70°	.059 @ 70°	1.75 @ 70°	
ecific Gravity	1.005	1.205	1.000	
l	7.2	6.7	7.1	
lcium (Ca)	1350	32,500	450	*MPL
gnesium (Mg)	90	5100	Nil	
lorides (Cl)	4000	189,000	1600	
lfates (SO_4)	1800	100	1700	
carbonates (HCO_3)	180	24	193	
luble Iron (Fe)	Nil	25	nil	

emarks:

*Milligrams per liter

Respectfully submitted,

nalyst: HALLIBURTON COMPANY

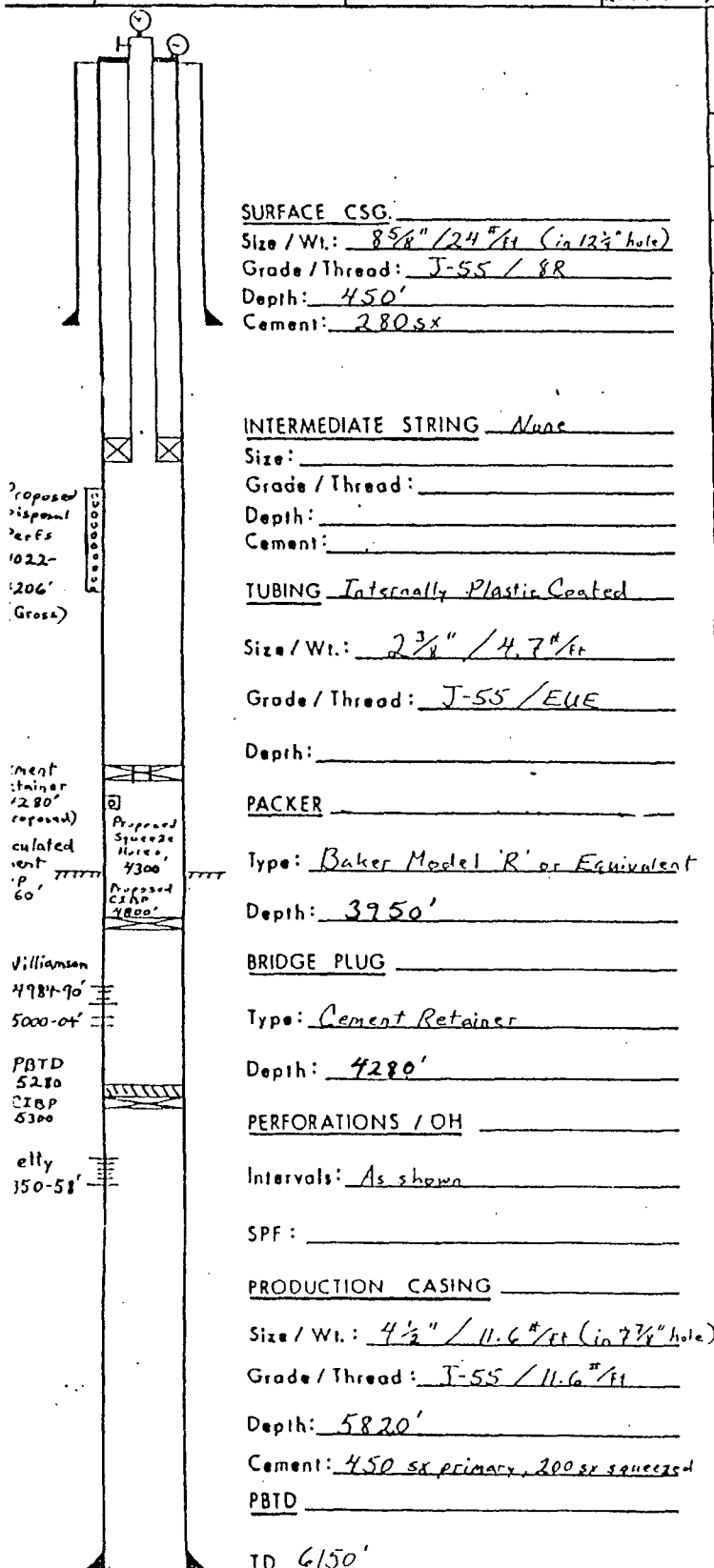
By
CHEMIST

NOTICE

MALLON OIL COMPANY

Well Mechanics & Work History

ASE-WELL	FIELD NAME	DATE	LOCATION
Amoco - Federal #1	Brushy Draw - Delaware	7-23-89	1665'FSL, 330'FEL (NE SE)
OUNTY	STATE	ELEV. DATUM - G.L.	
Eddy	New Mexico	2877'KB - 2869'GL	Sec. 27 Twp 26S R 29E



SURFACE CSG.
Size / Wt.: 8 5/8" / 24 #/ft (in 12¼" hole)
Grade / Thread: J-55 / 8R
Depth: 450'
Cement: 280 sx

INTERMEDIATE STRING None
Size:
Grade / Thread:
Depth:
Cement:

TUBING Internally Plastic Coated
Size / Wt.: 2 3/8" / 4.7 #/ft
Grade / Thread: J-55 / EUE
Depth:

PACKER
Type: Baker Model 'R' or Equivalent
Depth: 3950'

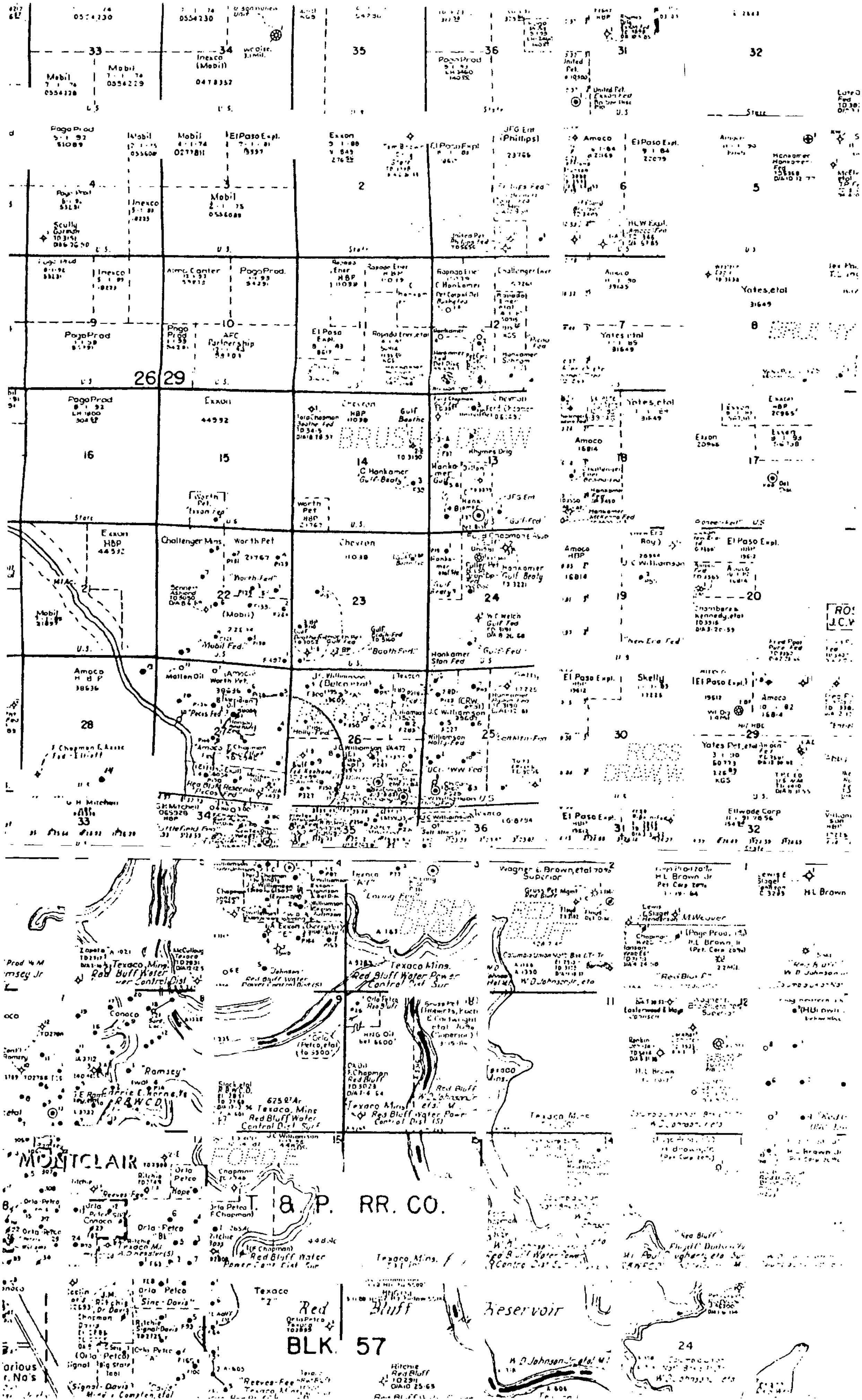
BRIDGE PLUG
Type: Cement Retainer
Depth: 4280'

PERFORATIONS / OH
Intervals: As shown
SPF:

PRODUCTION CASING
Size / Wt.: 4½" / 11.6 #/ft (in 7⅞" hole)
Grade / Thread: J-55 / 11.6 #/ft
Depth: 5820'
Cement: 450 sx primary, 200 sx squeezed
PBTD
TD 6150'

COMMENTS

Schematic diagram For application to inject saltwater. Well configuration as shown is proposed, not actual at the time of application.



33
34
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32
Mobil
Inexco (Mobil)
PogoProd
4
3
2
6
5
Scully
Inexco
Mobil
El Paso Expl.
Exxon
Amoco
Yates, etal
9
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11
12
7
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PogoProd
AFC Partnership
26
29
16
15
14
13
18
17
Chevron
Gulf
BRUSHY DRAW
C Hankamer
Rhymes Drlg
Exxon HBP
Challenger Mins.
Worth Pet.
22
23
24
19
20
Gulf Fed
"North Fed"
"Mobil Fed."
"Booth Fed."
"New Era Fed"
Amoco
28
27
26
25
30
29
Mallon Oil
J.C. Williamson
Skelly
Yates Pet., etal
ROSS DRAW
G H Mitchell
33
34
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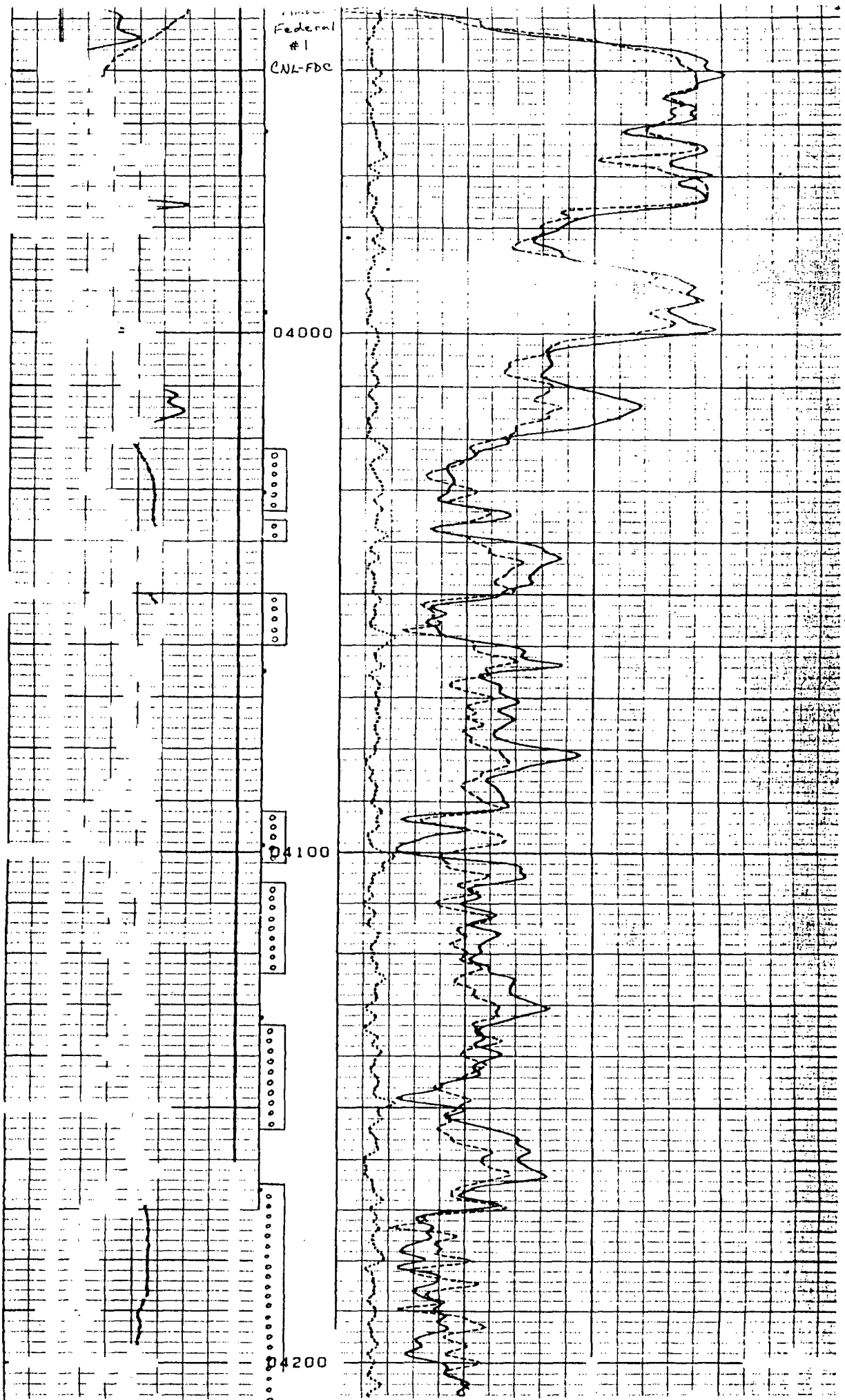
36
31
32
Red Bluff Reservoir
Ellwode Corp
Wagner & Brown, etal
H L Brown
Texaco Mins.
Red Bluff Water Power Control Dist. Sur.
RED BLUFF
"Ramsey"
Conoco
R.W.C.D.
MONTCLAIR
Orla Petco
Ritchie
T. & P. RR. CO.
Texaco Mins.
Texaco "Z"
Red Bluff
Reservoir
BLK. 57
24
W D Johnson Jr. etal
"Sine-Davis"
"Reeves Fee"
Signal-Davis


Federal
#1
CNL-FDC
04000
04100
04200