STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
HOBBS DISTRICT OFFICE

BRUCE KING
GOVERNOR

2-27-95

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88241-1980
(505) 393-6161

OIL CONSERVATION DIVISION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

SWD-589

RE: Proposed:
MC _____
DHC _____
NSL _____
NSP _____
SWD X
WFX _____
PMX _____

Gentlemen:

I have examined the application for the:

Mack Energy Corp Federal 18 #4-H 18-19S-33E
Operator Lease & Well No. Unit S-T-R

and my recommendations are as follows:

OK J

Yours very truly,

Jerry Sexton
Supervisor, District 1

/ed

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: Mack Energy Corporation

Address: P.O. Box 960, Artesia, New Mexico 88211-0960

Contact party: Jim Brown Phone: (505) 748-1288

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: Robert G. Chase Title Field Supervisor

Signature: Robert G. Chase Date: 2-1-95

* 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.

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. Well Data: Injection Well Data Sheet Attached

Mack Energy Corporation	Federal 18			
OPERATOR	LEASE			
4	1980' FNL, 660' FEL	18	T19S	R33E
WELL NO.	FOOTAGE LOCATION	SECTION	TOWNSHIP	RANGE

Schematic

Tabular Data

Surface Casing

Size 8 5/8" 24# " Cemented with 150 sx.

TOC 19 feet determined by calculation

Hole size 12 1/4

Intermediate Casing

Size _____" Cemented with _____sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 5 1/2 " Cemented with 40 sx.

TOC 3130 feet determined by calculation

Hole size 7 7/8

Total depth 3350'

Injection interval

3350 feet to 3450' open hole feet
(perforated or open-hole, indicate which)

Tubing size 2 7/8 lined with plastic (material) set in a

Baker AD-1 (brand and model) _____ packer at 3250 feet

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation Seven Rivers

2. Name of Field or Pool (if applicable) Tonto Yates Seven Rivers West

3. Is this a new well drilled for injection? [ ] Yes [X] No

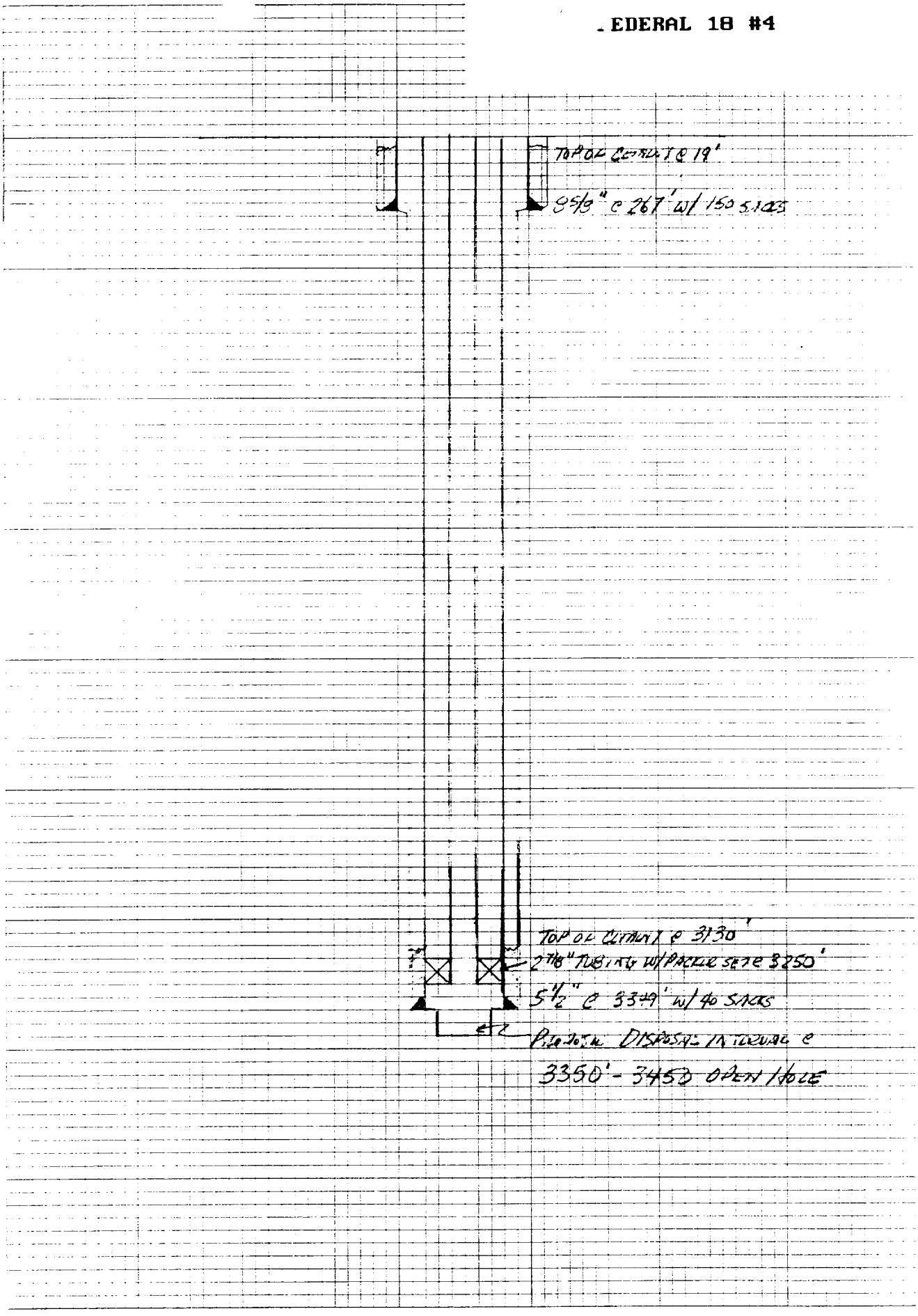
   If no, for what purpose was the well originally drilled? oil producing well

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) Perfs 3282'-3310'

   Perfs will be squeezed with 100 sacks of Class C cement. Drill out cement and drill to 3450' and put on for disposal.

5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. 3010' - Tonto Yates Seven Rivers West

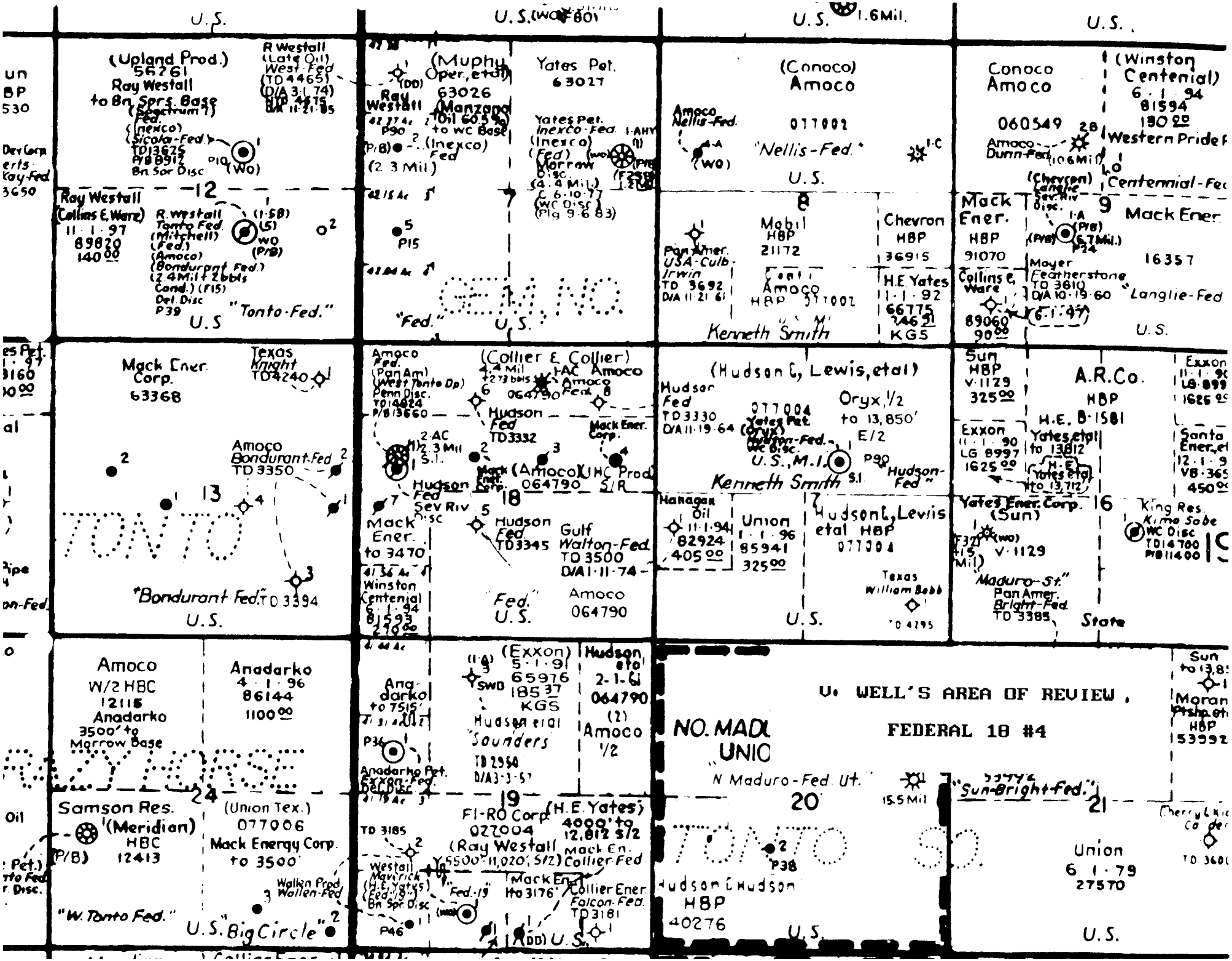
EDERAL 18 #4



46 0700

10 X 10 TO THE INCH
KEUFFEL & ESSER CO.

V. Map Attached


U.S.
U.S.
U.S.
U.S.
(Upland Prod.)
56761
Ray Westall
to Bn. Spgs. Base
(Spectrum 7)
Fed
(Inexco)
(Sicola-Fed.)
TD13625
P/B 8912
Bn Spr Disc
P10
(WO)
R Westall
(Late Oil)
West Fed
(TD 4465)
(D/A 3-1-74)
WD 4575
D/A 11-21-85
Ray Westall
(Collins E. Ware)
11-1-97
89820
140 00
R. Westall
Tonto Fed
(Mitchell)
(Fed.)
(Amoco)
(Bondurant Fed.)
(2.4 Mil+2bbls
Cond.) (F15)
Del. Disc
P39
(1-SB)
(5)
WO
(P/B)
"Tonto-Fed."
U.S
12
(DD)
Ray
Westall
42.27 Ac
P90
(P/B)
(2.3 Mil)
(Muphy
Oper, etal)
63026
(Manzano
Oil 60.5%
to WC Base
(Inexco)
Fed
42.15 Ac
P15
42.84 Ac
"Fed."
U.S.
Yates Pet.
63027
Yates Pet.
Inexco-Fed.
(Inexco)
(Fed)
Morrow
Disc
(4.4 Mil.)
C 6-10-77
(WC Disc)
(Plg 9-6-83)
1-AHY
(1)
(WC)
(P/B)
(F25B)
7
(Conoco)
Amoco
Amoco
Nellis-Fed.
4-A
(WO)
077002
"Nellis-Fed."
1-C
U.S.
8
Mobil
HBP
21172
Pan Amer.
USA-Culb-
Irwin
TD 3692
D/A 11-21-61
Amoco
HBP
077002
Chevron
HBP
36915
H.E. Yates
1-1-92
66775
2462
KGS
Kenneth Smith
Conoco
Amoco
060549
Amoco
Dunn-Fed
(10.6 Mil)
2-B
(Winston
Centenial)
6-1-94
81594
180 00
Western Pride
Centennial-Fed
(Chevron)
(Langlie
Sev Riv
Disc.)
1-A
(P/B)
(6.7 Mil.)
P24
9
Mack Ener.
16357
Mack
Ener.
HBP
91070
Collins E.
Ware
89060
90 00
Mayer
Featherstone
TD 3810
D/A 10-19-60
(6-1-97)
Langlie-Fed
U.S.
Mack Ener.
Corp.
63368
Texas
Knight
TD4240
Amoco
Bondurant-Fed
TD 3350
2
1
13
4
3
"Bondurant-Fed." TD 3394
U.S.
Amoco
Fed.
(Pan Am)
(West Tonto Dp)
Penn Disc.
TD 14024
P/B 13660
6
(Collier E. Collier)
4.4 Mil
273 bbls
Cond.
1-AC
Amoco
064790
Amoco Fed.
8
Hudson
Fed
TD3332
Mack Ener.
Corp.
2-AC
(1/2)
2.3 Mil
S.L.
2
3
4
Mack
(Amoco)(UHC Prod)
064790 S/R
Hudson
Fed
Sev Riv
Disc
7
5
18
Mack
Ener.
to 3470
41.36 Ac
Winston
Centenial
6-1-94
81593
270 00
Hudson
Fed
TD3345
Gulf
Walton-Fed.
TD 3500
D/A 1-11-74
Amoco
064790
Fed.
U.S.
(Hudson C, Lewis, etal)
Hudson
Fed
TD 3330
D/A 11-19-64
077004
Yates Pet.
(Oryx)
Walton-Fed.
WC Disc.
Oryx, 1/2
to 13,850'
E/2
U.S., M.I.
P90
Hudson-
Fed"
Kenneth Smith
S.I.
Hanagan
Oil
11-1-94
82924
405 00
Union
1-1-96
85941
325 00
Hudson C, Lewis
etal HBP
077004
Texas
William Bobb
TD 4295
U.S.
Sun
HBP
V-1129
325 00
Exxon
11-1-90
LG 8997
1625 00
A.R.Co.
HBP
H.E. B-1581
Yates, etal
to 13812
H.E.
Yates etal
to 13,712
Yates Ener. Corp.
(Sun)
F37
(1.5
Mil)
(wo)
V-1129
"Maduro-St."
Pan Amer.
Bright-Fed
TD 3385
16
State
Exxon
11-1-90
LG 8999
1625 00
Santa
Ener, et
12-1-9
VB-365
450 00
King Res.
Kimo Sabe
WC Disc
TD 14700
PB 11400
Amoco
W/2 HBC
12115
Anadarko
3500' to
Morrow Base
Anadarko
4-1-96
86144
1100 00
Samson Res.
(Meridian)
HBC
12413
(P/B)
(Union Tex.)
077006
Mack Energy Corp.
to 3500
Walkin Prod.
Wallen-Fed
"W. Tonto Fed."
U.S. "Big Circle"
24
3
2
Anadarko
to 7515'
P36
Anadarko Pet.
Exxon-Fed.
Del. Disc
(Exxon)
5-1-91
65976
1853
KGS
Hudson etal
Sounders
TD 2950
D/A 3-3-57
Hudson
etal
2-1-61
064790
(2)
Amoco
1/2
19
Fl-RO Corp
027004
(Ray Westall
Y 5500' - 11,020', S/2)
(H.E. Yates)
4000' to
12,812 S/2
Mack En.
Collier-Fed
TD 3185
Westall
Maverick
(H.E. Yates)
(Fed.-19)
Bn Spr Disc
P46
Mack Ener.
to 3176'
Collier Ener.
Falcon-Fed.
TD 3181
(DD)
U.S.
U. WELL'S AREA OF REVIEW.
FEDERAL 18 #4
NO. MADI
UNIO
N Maduro-Fed Ut.
20
15.5 Mil
"Sun-Bright-Fed."
21
P38
Hudson C Hudson
HBP
40276
U.S.
U.S.
Sun
to 13,8
Moran
Prish et
HBP
53992
Union
6-1-79
27570
U.S.

VI. Tabulation of Well Data

DATE PREPARED BY WORK PAPER NO

REVIEWED BY

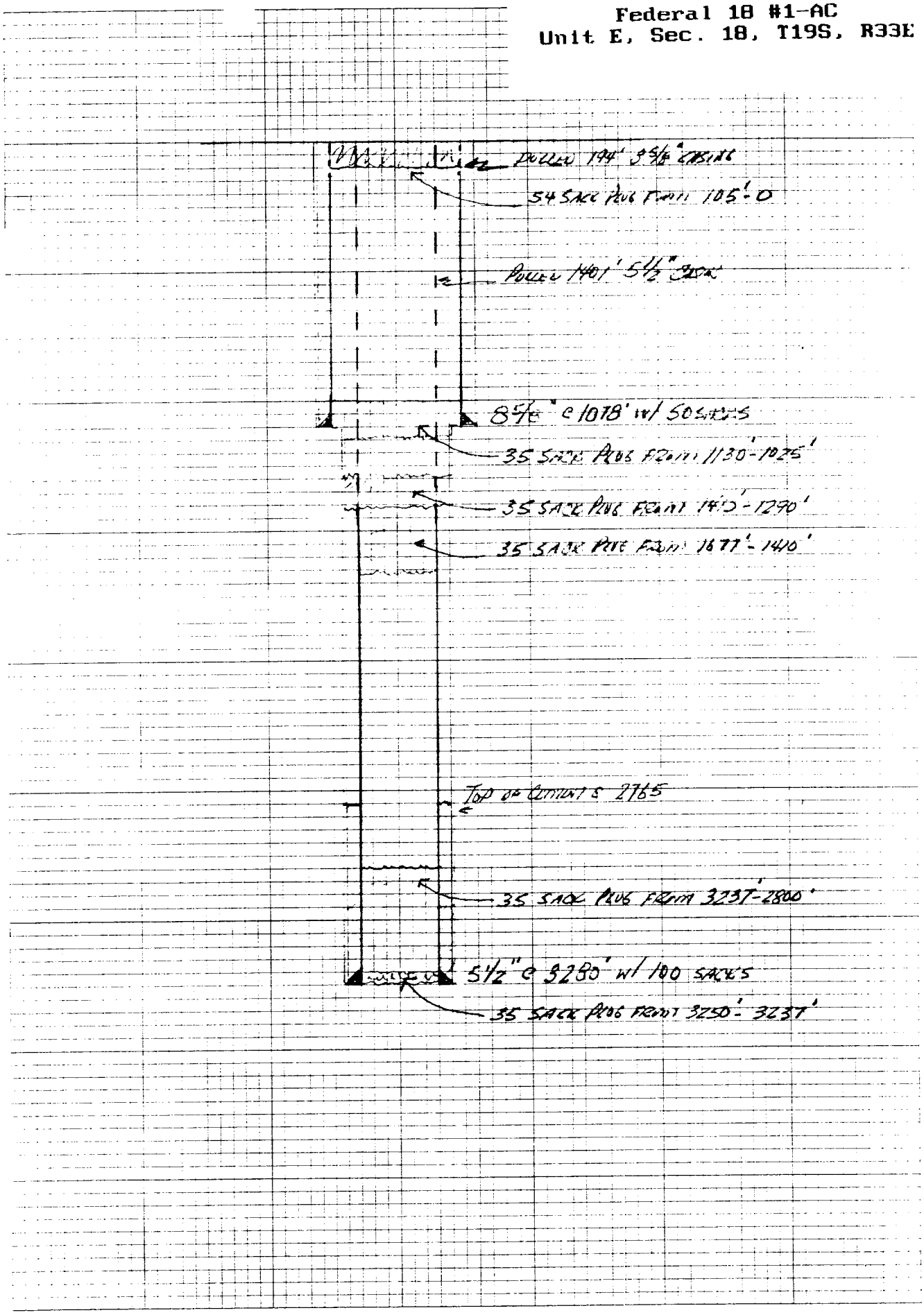
Federal 18 Lease

Tonto Yates Seven Rivers, West

Lea County, New Mexico

1 Federal 18 Wells	2 Location	3	4 Status	5 Date Spudded	6 Total Depth	8 Completion Interval & Date	9
#1 AC	Unit E, Sec. 18, T19S, R33E 2180' FNL, 690' FWL		P&A 10/25/75	4/13/60	3281'	3259'-63'	5/23/60
#2	Unit F, Sec. 18, T19S, R33E 1980' FNL, 2039' FWL		Producing	5/28/60	3306'	3247'-56'	6/6/60
#3	Unit G, Sec. 18, T19S, R33E 1980' FNL, 1980' FEL		P&A 11/4/74	6/15/60	3283'	3250'-70'	6/23/60
#4	Unit H, Sec. 18, T19S, R33E 1980' FNL, 660' FEL		Shut-In	6/23/60	3346'	3282'-85' 3287'-90' 3293'-3300' 3305'-10'	6/30/60
#5	Unit K, Sec. 18, T19S, R33E 1980' FSL, 2039' FWL		P&A 7/12/60	7/4/60	3345'	D&A	7/12/60
#6	Unit C, Sec. 18, T19S, R33E 990' FNL, 2045' FWL		P&A 7/22/60	7/14/60	3332'	D&A	7/22/60

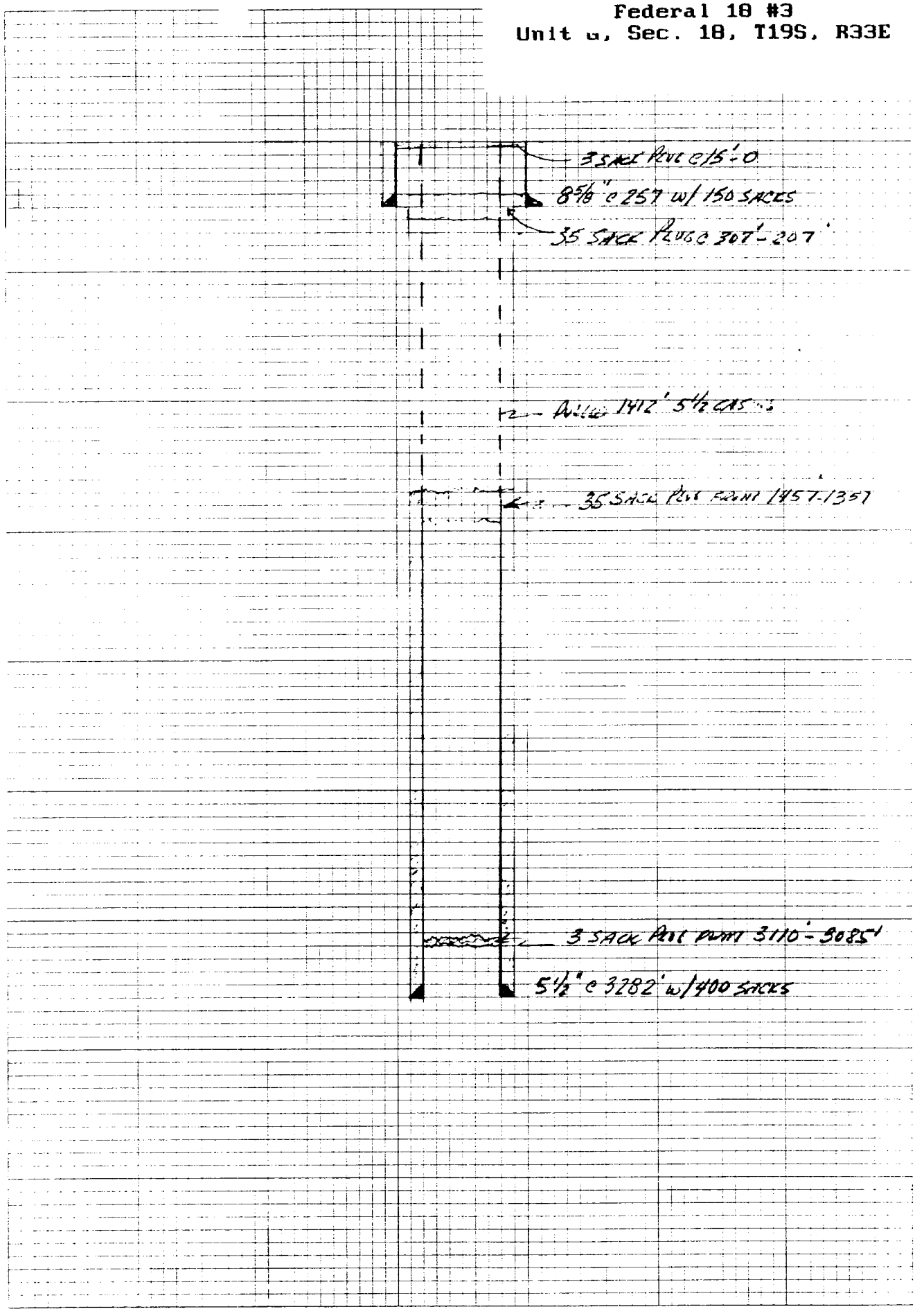
Federal 18 #1-AC
Unit E, Sec. 18, T19S, R33E



46 0700

10 X 10 TO THE INCH
KEUFFEL & ESSER CO MADE IN U.S.A.

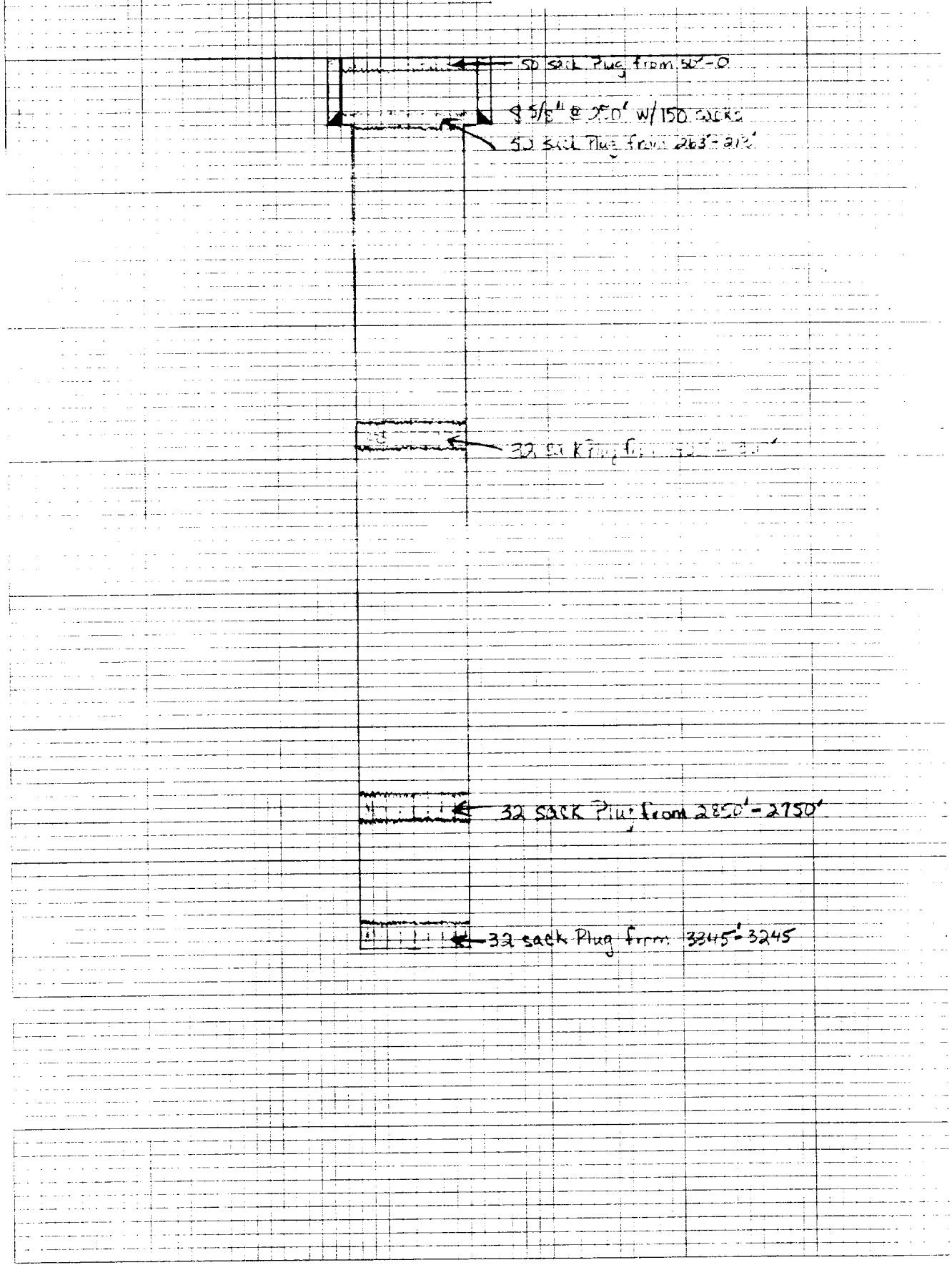
Federal 18 #3
Unit G, Sec. 18, T19S, R33E



46 0700

10 X 10 TO THE INCH
KEUFFEL & ESSER CO. MADE IN U.S.A.

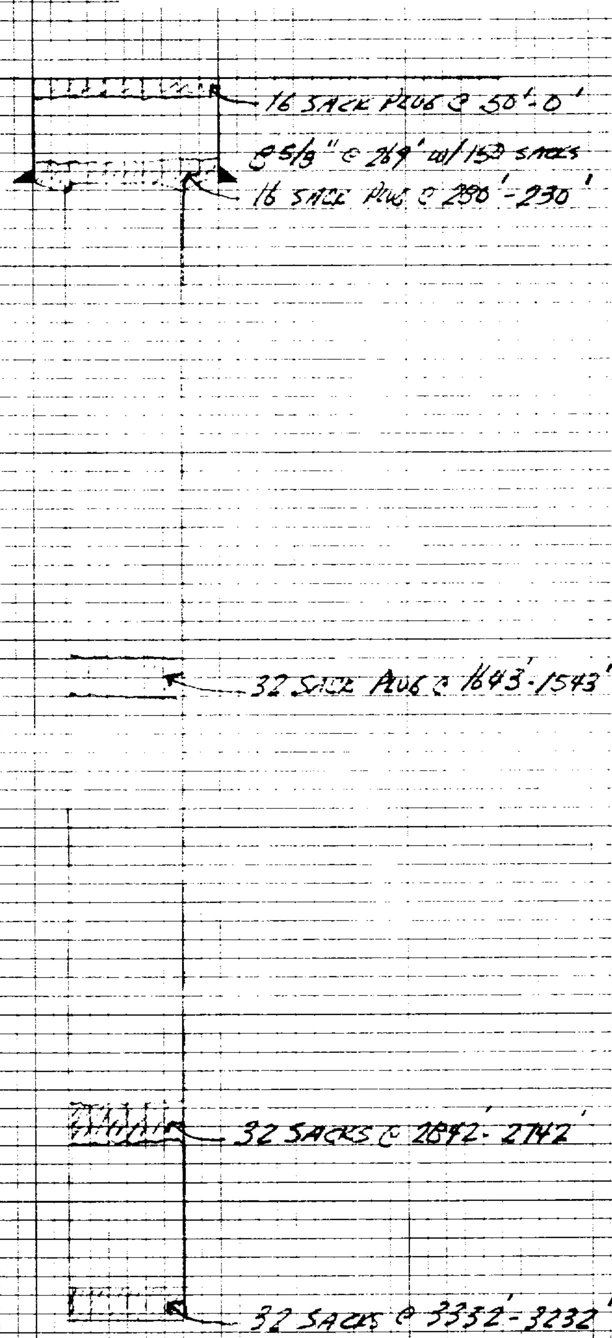
Federal 18 #5
Unit .., Sec. 18, T19S, R33E



46 0700

10 X 10 TO THE INCH • 5 X 5 TO THE INCH
KEUFFEL & ESSER CO. MADE IN U.S.A.

Federal 18 #6
Unit C, Sec. 18, T19S, R33E



VII DATA SHEET: PROPOSED OPERATIONS

1. Proposed average and maximum daily rate and volume of fluids to be injected; **Respectively, 1800 BWPD and 2000 BWPD.**

2. The system is **closed.**

3. Proposed average and maximum injection pressure; **Vacuum - 100#**

4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; **See attached Analysis dated 10/24/94.**

PETROLITE

Petrolite Corporation
510 West Texas
Artesia, NM 88210-2041

TRETOLITE DIVISION

(505) 746-3588
Fax (505) 746-3580

Reply to:
P.O. Box FF
Artesia, NM
88211-7531

WATER ANALYSIS REPORT

Company	: MACK ENERGY	Date	: 10/24/94
Address	: ARTESIA, NEW MEXICO	Date Sampled	: 10/24/94
Lease	: FEDERAL	Analysis No.	: 1238
Well	: #18		
Sample Pt.	: WELLHEAD		

	ANALYSIS		mg/L		* meq/L
1.	pH	7.0			
2.	H2S	130 PPM			
3.	Specific Gravity	1.010			
4.	Total Dissolved Solids		17346.8		
5.	Suspended Solids		NR		
6.	Dissolved Oxygen		NR		
7.	Dissolved CO2		125 PPM		
8.	Oil In Water		NR		
9.	Phenolphthalein Alkalinity (CaCO3)				
10.	Methyl Orange Alkalinity (CaCO3)		600.0		
11.	Bicarbonate	HCO3	732.0	HCO3	12.0
12.	Chloride	Cl	8171.6	Cl	230.5
13.	Sulfate	SO4	2300.0	SO4	47.9
14.	Calcium	Ca	1090.2	Ca	54.4
15.	Magnesium	Mg	418.1	Mg	34.4
16.	Sodium (calculated)	Na	4634.9	Na	201.6
17.	Iron	Fe	NR		
18.	Barium	Ba	NR		
19.	Strontium	Sr	NR		
20.	Total Hardness (CaCO3)		4444.0		

PROBABLE MINERAL COMPOSITION

*milli equivalents per Liter

54	*Ca <----- *HCO3	12
	/------->	
34	*Mg -----> *SO4	48
	<---------/	
202	*Na -----> *Cl	231

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	12.0	972
CaSO4	68.1	42.4	2886
CaCl2	55.5		
Mg(HCO3)2	73.2		
MgSO4	60.2	5.5	331
MgCl2	47.6	28.9	1376
NaHCO3	84.0		
Na2SO4	71.0		
NaCl	58.4	201.6	11782

REMARKS:
-------- C. CULP

Petrolite Oilfield Chemicals Group

Respectfully submitted,
ROZANNE JOHNSON

PETROLITE

SCALE TENDENCY REPORT

Company	: MACK ENERGY	Date	: 10/24/94
Address	: ARTESIA, NEW MEXICO	Date Sampled	: 10/24/94
Lease	: FEDERAL	Analysis No.	: 1238
Well	: #18	Analyst	: ROZANNE JOHNSON
Sample Pt.	: WELLHEAD		

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

S.I. = 0.8 at 60 deg. F or 16 deg. C
S.I. = 0.8 at 80 deg. F or 27 deg. C
S.I. = 0.8 at 100 deg. F or 38 deg. C
S.I. = 0.9 at 120 deg. F or 49 deg. C
S.I. = 0.9 at 140 deg. F or 60 deg. C

****

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

S = 3395 at 60 deg. F or 16 deg C
S = 3541 at 80 deg. F or 27 deg C
S = 3610 at 100 deg. F or 38 deg C
S = 3622 at 120 deg. F or 49 deg C
S = 3620 at 140 deg. F or 60 deg C

Petrolite Oilfield Chemicals Group

Respectfully submitted,
ROZANNE JOHNSON

VIII. See "Other Data" on Injection Well Data Sheet

IX PROPOSED STIMULATION PROGRAM

To be treated with 1000 gallons 15% Acid.

X. Well Logs

LANE WELLS COMPANY

A DIVISION OF DRESSER INDUSTRIES, INC.

COPY

Gamma Ray Neutron

FILE NO.

COMPANY William A. and Edward R. Hudson

WELL Federal '18" No. 4

FIELD Undesignated

COUNTY Lea STATE N. Mexico

LOCATION:

SEC TWP RGE

Other Services

Elevations: KB* DF* GL*

Permanent Datum Ground Level Elev.

Log Measured from K.B. 10 Ft. Above Permanent Datum

Drilling Measured from K.B.

Date	7-1-60	7-1-60
Run No.	1-NN	1-NW
Type Log	Gamma Ray	N/Neutron
Depth-Driller	3350	3350
Depth-Logger	3346	3346
Btm. Logged Interval	3333	3345
Top Logged Interval	Surface	Surface
Type Fluid in Hole	Mud	Mud
Salinity Ppm Cl.		
Density Lb./Gal.		
Level		
Max. Rec. Temp. Deg. F		
Oper. Rig Time	2 hrs.	2 hrs.
Recorded By	Grant	Grant
Witnessed By	Miller	Miller

Run No.	Bit	Bore Hole Record From	To	Size	Wgt.	Casing Record From	To
1	12 1/4	Surface	270	8 5/8		Surface	270
1	7 7/8	270	3350	OH		270	3350

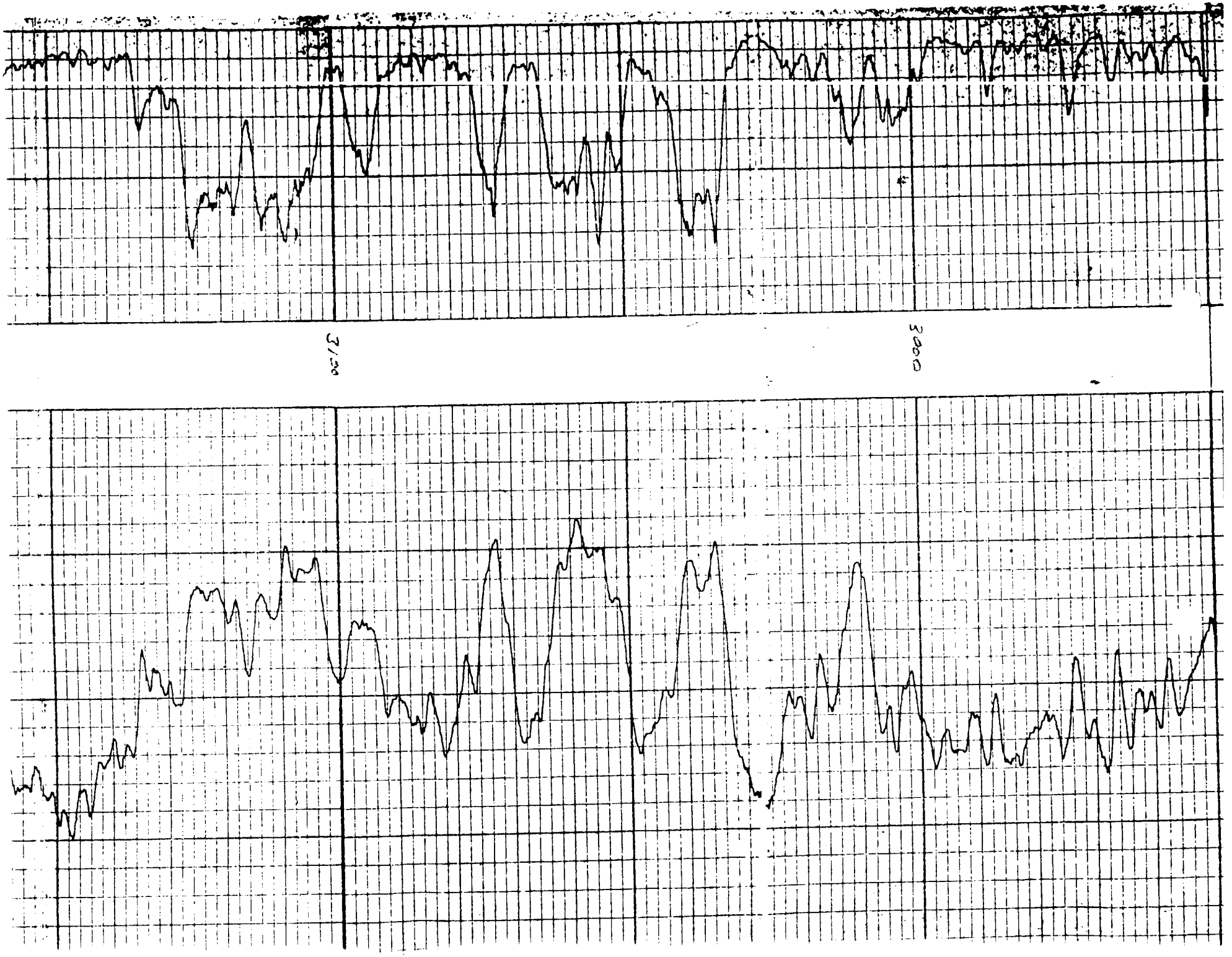
Equipment Data	Gamma Ray	Neutron
Run No.	1-NN	1-NW
Log Type		N/Neutron
Tool Model No.	402	402
Diam.	3 5/8	3 5/8
Detect. Model No.	D461	D6N1
Type	Scint	Scint
Length	4"	4"
Source Model No.		S1DA3
Serial No.		3275
Spacing	13"	13.5
Type		Ra Be
Strength		300 MC
General		
Truck No.	P-501	
Truck No.	P-501	
Serial No.		

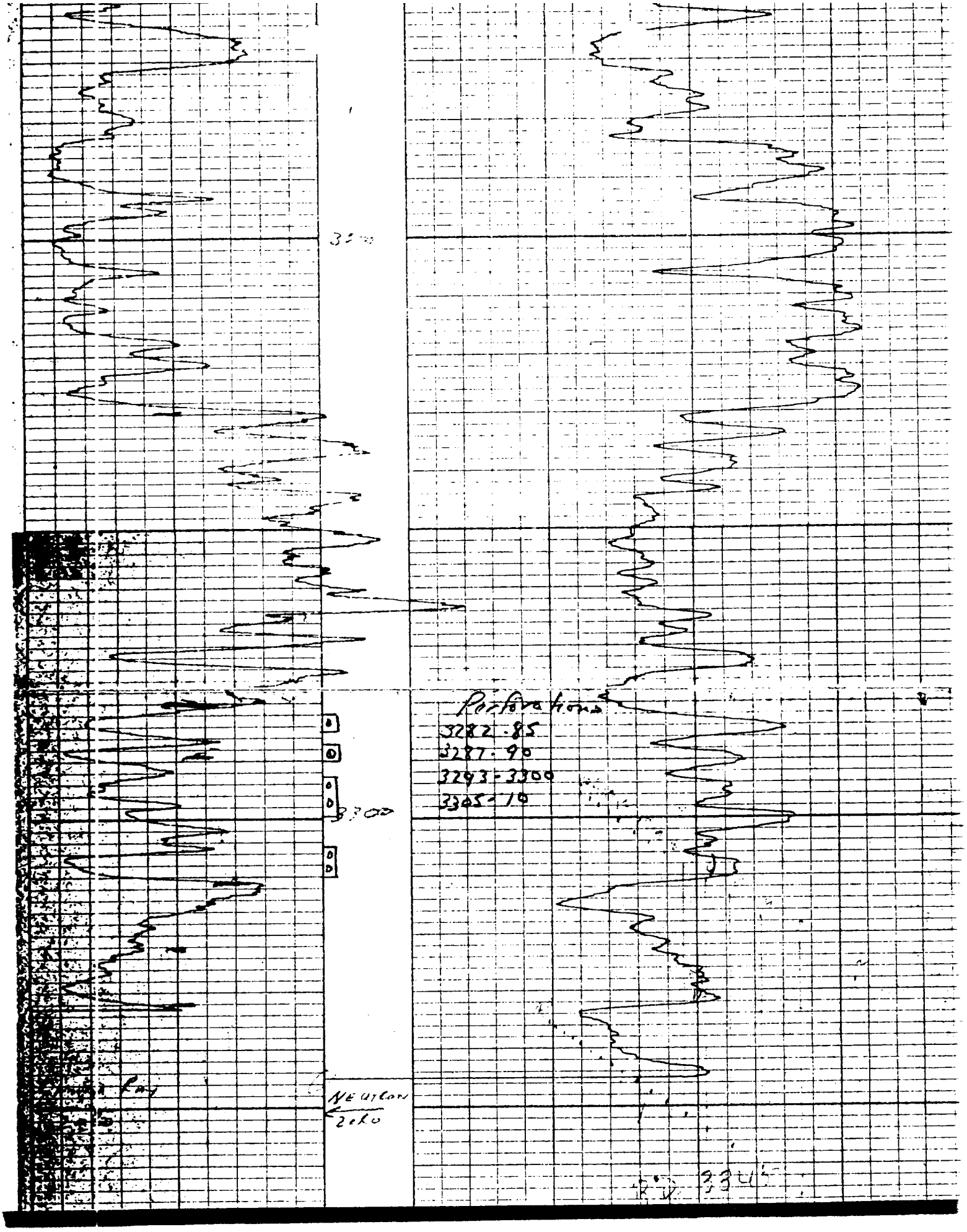
Logging Data

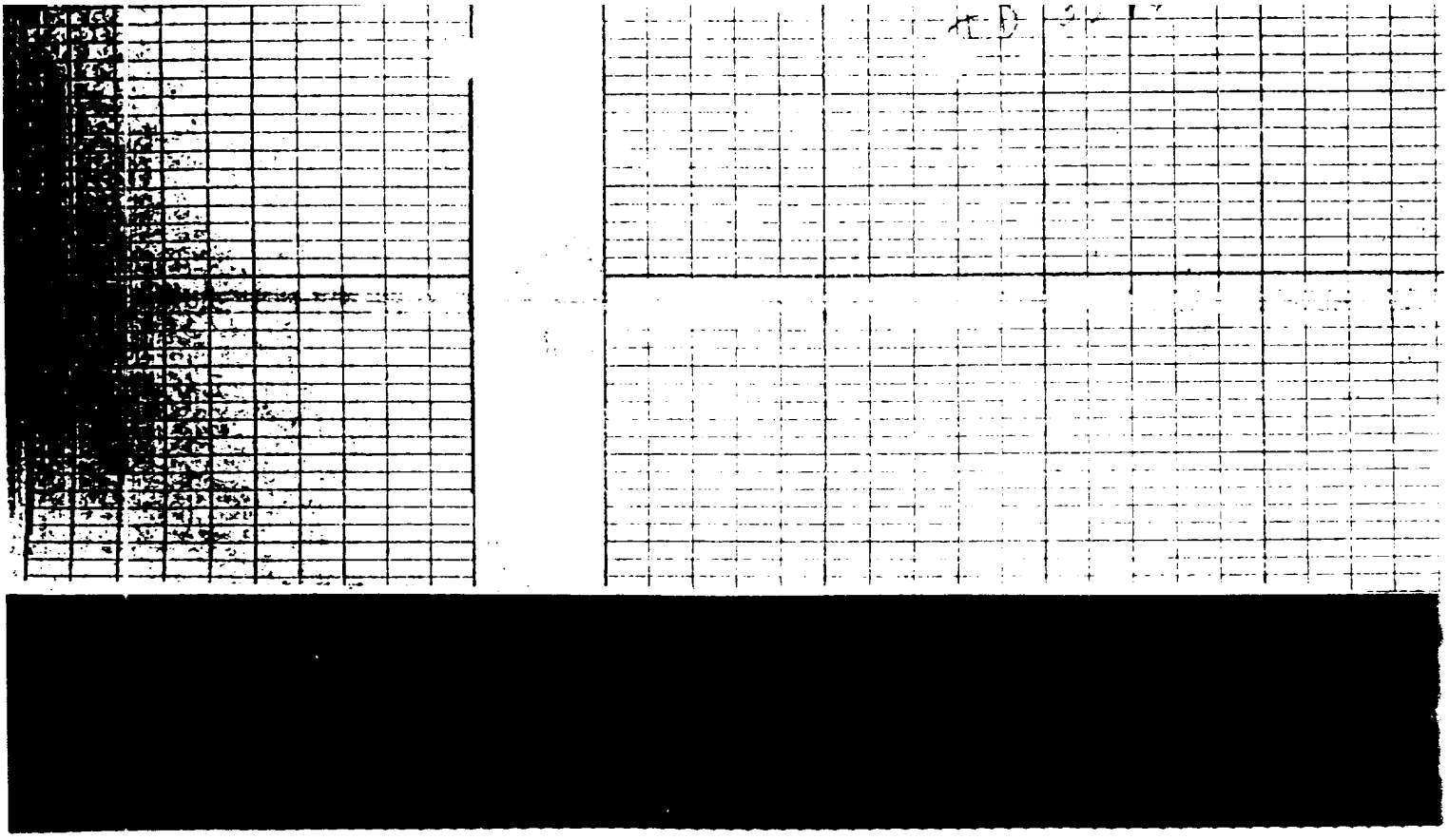
General Depths From	To	Speed Ft./Min.	Gamma Ray T.C. Sec.	Sens. Settings	Zero Div. L or R	API G.R. Units Per Log Div.	Neutron T.C. Sec.	Sens. Settings	Zero Div. L or R	API N. Units Per Log Div.
3345	Surface	60	0.9	610	0	4 R.U.	0.9	115	3 L	12.5 E.U.
3345	2950	30	2.0	610	0	4 R.U.	2.0	115	3 L	12.5 E.U.

Remarks: # Location # Elevations unavailable in Ld.

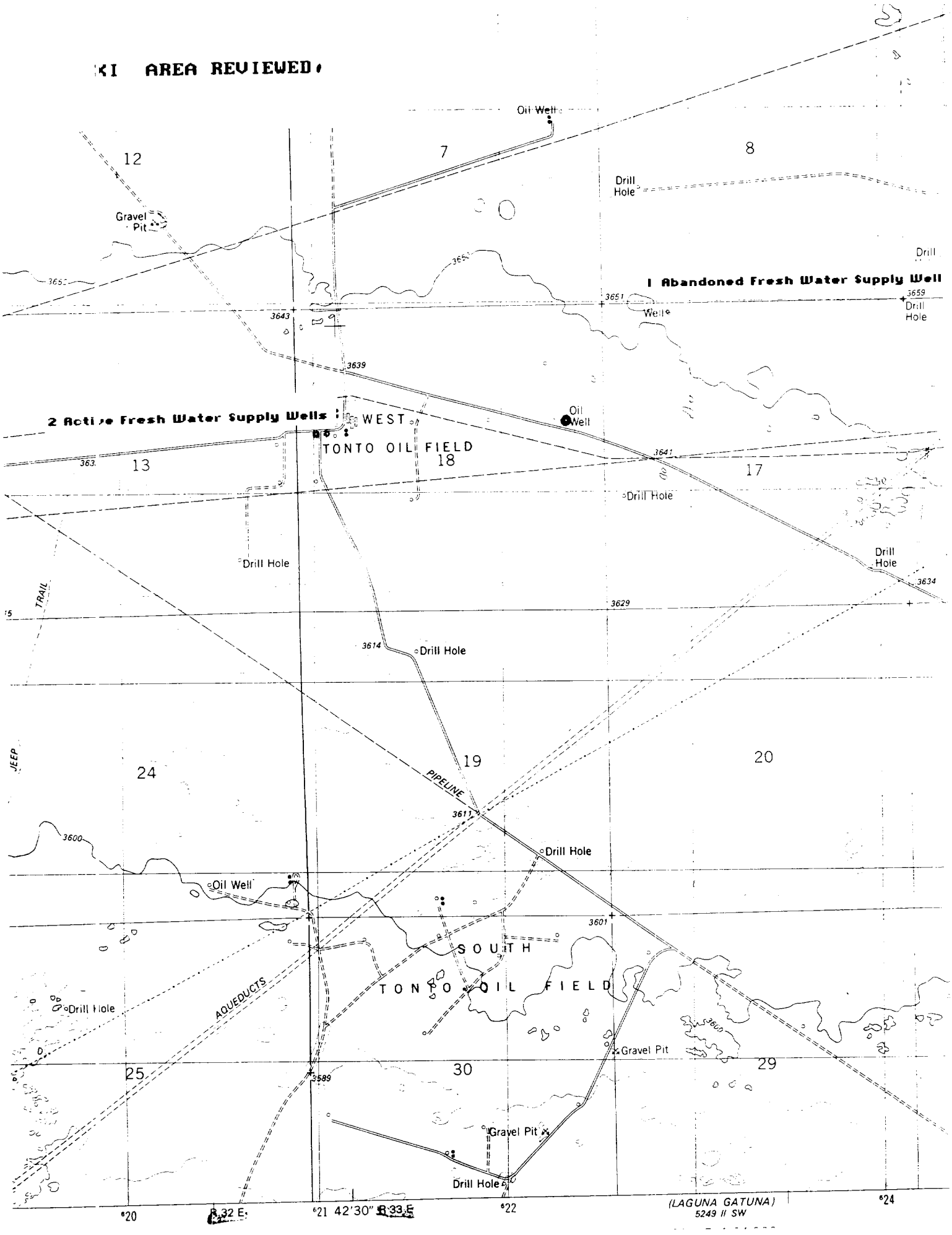
Reference Literature:


3/30
3300


3200
Perforations
3282-85
3287-90
3293-3300
3305-10
Neutron
Zero



XI. Chemical Analysis of Fresh Water Wells - water is coming from both of the two adjacent wells shown


KI AREA REVIEWED
Oil Well
12
7
8
Drill Hole
Gravel Pit
1 Abandoned Fresh Water Supply Well
3659
Drill Hole
3643
3639
2 Active Fresh Water Supply Wells
WEST
TONTO OIL FIELD
Oil Well
3641
13
18
17
Drill Hole
Drill Hole
Drill Hole
3634
TRAIL
3629
3614
Drill Hole
19
20
24
PIPELINE
3611
3600
Drill Hole
Oil Well
3601
SOUTH
TONTO OIL FIELD
AQUEDUCTS
Drill Hole
Gravel Pit
3600
25
30
29
3589
Gravel Pit
Drill Hole
(LAGUNA GATUNA)
5249 II SW
20
R.32 E.
21 42'30" R.33 E.
22
24

PETROLITE

Petrolite Corporation
200 North Loraine, Suite 1100
Midland, TX 79701-4736

TRETOLITE DIVISION

(915) 682-4301
Fax (915) 684-7873

Reply to:
P.O. Box 60180
Midland, TX 79711-0180

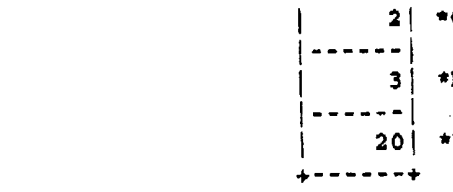
WATER ANALYSIS REPORT

Company	: MACK ENERGY	Date	: 2-3-95
Address	: ARTESIA, NEW MEXICO	Date Sampled	: 1-26-95
Lease	: FRESH WATER	Analysis No.	: 1089
Well	:		
Sample Pt.	: COW TROUGH		

	ANALYSIS		mg/L		* meq/L
1.	pH	8.3			
2.	H2S	0 PPM			
3.	Specific Gravity	1.001			
4.	Total Dissolved Solids		1646.8		
5.	Suspended Solids				
6.	Dissolved Oxygen				
7.	Dissolved CO2		0 PPM		
8.	Oil In Water				
9.	Phenolphthalein Alkalinity (CaCO3)				
10.	Methyl Orange Alkalinity (CaCO3)				
11.	Bicarbonate	HCO3	406.3	HCO3	6.7
12.	Chloride	Cl	300.0	Cl	8.5
13.	Sulfate	SO4	422.0	SO4	8.8
14.	Calcium	Ca	34.0	Ca	1.7
15.	Magnesium	Mg	31.0	Mg	2.6
16.	Sodium (calculated)	Na	452.0	Na	19.7
17.	Iron	Fe	0.5		
18.	Barium	Ba	0.0		
19.	Strontium	Sr	1.0		
20.	Total Hardness (CaCO3)		213.0		

PROBABLE MINERAL COMPOSITION

*milli equivalents per Liter



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	1.7	138
CaSO4	68.1		
CaCl2	55.5		
Mg(HCO3)2	73.2	2.6	187
MgSO4	60.2		
MgCl2	47.6		
NaHCO3	84.0	2.4	203
Na2SO4	71.0	8.8	624
NaCl	58.4	8.5	495

REMARKS: CULP - ARTESIA OFFICE - FILE

Petrolite Oilfield Chemicals Group

Respectfully submitted,
SHEILA DEARMAN

PETROLITE

TRETOLITE DIVISION

Petrolite Corporation
200 North Loraine, Suite 1100
Midland, TX 79701-4736

(915) 682-4301
Fax (915) 684-7873

Reply to:
P.O. Box 60180
Midland, TX 79711-0180

SCALE TENDENCY REPORT

Company	: MACK ENERGY	Date	: 2-3-95
Address	: ARTESIA, NEW MEXICO	Date Sampled	: 1-26-95
Lease	: FRESH WATER	Analysis No.	: 1089
Well	:	Analyst	: SHEILA DEARMAN
Sample Pt.	: COW TROUGH		

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

S.I. = 0.8 at 80 deg. F or 27 deg. C
S.I. = 0.9 at 120 deg. F or 49 deg. C

****

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

S = 1111 at 80 deg. F or 27 deg C
S = 1094 at 120 deg. F or 49 deg C

Petrolite Oilfield Chemicals Group

Respectfully submitted,
SHEILA DEARMAN